



Australian Government  
Productivity Commission

# Rules of Origin under the Australia–New Zealand Closer Economic Relations Trade Agreement

Supplement to  
Productivity  
Commission  
Research Report

Restrictiveness Index for  
Preferential Rules of Origin

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# Abbreviations

AFTA	ASEAN Free Trade Area
ANDEAN	Andean Subregional Integration Agreement
CER	Australia–New Zealand Closer Economic Relations Trade Agreement
cif	cost, insurance and freight
CTC	change in tariff classification
DMRM	determined manufactured raw materials
EFTA	European Free Trade Area
EU	European Union
fis	free into store
fob	free on board
HS	Harmonized System
MERCOSUR	Acuerdo Comercial–Mercado Común del Sur (Southern Common Market Agreement)
MFN	most favoured nation
MLI	member liberalisation index
NAFTA	North American Free Trade Agreement
NZ	New Zealand
OECD	Organisation for Economic Co-operation and Development
PANEURO	Pan-European
PC	Productivity Commission
PMV	passenger motor vehicles
PTA	preferential trade agreement
RoO	rules of origin
RVC	regional value content
SAFTA	Singapore–Australia Free Trade Agreement

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SPARTECA	South Pacific Regional Trade and Economic Cooperation Agreement
TCF	textiles, clothing and footwear
US	United States
WCO	World Customs Organization
WTO	World Trade Organization

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# Key points

- Rules of origin (RoO) are the criteria used to determine where a good has been made for the purpose of ensuring that only the products of countries which are party to a preferential trade agreement (PTA) obtain concessional entry under the agreement.
- Because RoO can act as non-tariff or regulatory barriers to trade, their impact is not easily measured.
- The index results show that the restrictiveness of RoO varies significantly across PTAs.
- They suggest that the restrictiveness of RoO in the Closer Economic Relations Trade Agreement between Australia and New Zealand (CER) is low to moderate, relative to the level of restrictiveness identified in 17 other PTAs.
- They also suggest that NAFTA and related agreements, and agreements entered into by the European Union, have the most restrictive origin rules. These agreements tend to be associated with multiple criteria for determining origin and more restrictive variants of individual criteria.
- In addition, the more restrictive RoO tend to be associated with PTAs where member countries have higher average tariff and non-tariff barriers and where the differences in tariffs within each member country is also relatively high.

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# 1 Introduction

The terms of reference for the study into rules of origin (RoO) under the Australia–New Zealand Closer Economic Relations Trade Agreement (CER) asked the Commission, amongst other things, to identify economic problems with the operation and design of the RoO, to assess the costs and benefits of any proposed changes and to consider relevant international developments.

RoO in a preferential trade agreement (PTA) such as CER are designed to confine access to trade concessions to goods from member countries of the PTA. They discriminate against non-members of trade agreements in favour of members. However, because the rules can act as non-tariff or regulatory barriers to trade, their impact is not easily measured or evaluated.

This paper attempts to assist in addressing the issues raised in the terms of reference and to fill the information gap concerning the impact of origin rules by providing a comparison of the trade restrictiveness of origin rules between PTAs. The basis of the comparison is an index measure of the restrictiveness of RoO in the CER agreement and in 17 other PTAs. The RoO regimes considered were operative in the early 2000s.

Because the information base for compiling restrictiveness indexes is limited, the results should be seen as indicative of orders of magnitude, rather than as a precise measure of restrictiveness.

## 1.1 Background

An index approach is one way to assess the degree of restrictiveness of government interventions where price and quantity measures of the impact of those interventions, such as RoO, are not readily available. An index quantifies prevailing restrictions into a summary measure to facilitate comparisons on a common basis across PTAs.

Different RoO restrict trade differently. The index focuses on the extent to which identified RoO-related regulatory barriers may restrict trade between members and non-members. In doing so, it also recognises that RoO have effects that reduce or modify the value of tariff concessions in trade agreements — for example, by

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affecting the degree of certainty of tariff concessions or through compliance or administration costs. In calculating the index, allowance has been made for factors influencing certainty of market access, compliance costs and other considerations.

Index methodologies have previously been applied to analyse origin rules in NAFTA and European Union-related agreements (Estevadeoral 2000, Brenton and Manchin 2002, Augier, Gasiorek and Lai-Tong 2003, Estevadeoral and Suominen 2003). Indexes developed in those studies have focused on particular provisions of RoO — for example, whether a change in tariff classification (CTC) is at the tariff item (HS 8-digit), sub-heading (6-digit), heading (4-digit) or the chapter (2-digit) level. They have also taken into account other factors affecting the restrictiveness of origin rules, including: tariff phase-out schedules; cumulation; duty drawback; tolerance; and outward processing provisions in a PTA.

This study expands on the range of RoO factors examined in earlier studies and includes, for example, details of regional value content requirements and factors influencing market access in the index. It also decomposes the RoO-related component of the PTA Member Liberalisation Index (MLI) described in Adams et al. (2003).<sup>1</sup>

The agreements included in the study were selected because Australia is a member — CER, SPARTECA and the Singapore–Australia Free Trade Agreement (SAFTA) — or on the basis that the agreement is likely to affect the trade flows of Australia’s major trading partners or that the provisions of the agreements may be relevant to future PTAs involving Australia. The other agreements included are: NAFTA; PANEURO;<sup>2</sup> EFTA; ASEAN–FTA (AFTA); ANDEAN; European Union–Egypt; Israel–United States; MERCOSUR; European Union–Poland; European Union–Mexico; Chile–United States; Chile–MERCOSUR; United States–Singapore; United States–Jordan; and Singapore–New Zealand.

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<sup>1</sup> In that ‘liberalisation index’, a higher index value indicated a more liberal agreement. This study follows the convention adopted in analyses of restrictions in services trade (for example, McGuire et al. 2000, Nguyen-Hong 2000 and Kalirajan 2000), whereby a higher index value indicates more restrictive (less liberal) provisions. These studies also discussed the potential pros and cons of various methods of measurement of regulatory barriers.

<sup>2</sup> The Pan-European (PANEURO) system of RoO applies to preferential relations between the European Union, the European Free Trade Area and the central and eastern European economies within a network of PTAs.

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## **1.2 Structure of the paper**

The paper first provides some background on the use of the indexes in trade analysis. Chapter 2 outlines a framework for measuring the restrictiveness of RoO. Chapter 3 describes how that framework has been applied in the construction of trade restrictiveness indexes for the CER and 17 other PTAs. The final chapter presents detailed results from the study.



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## 2 Index methodology

The index methodology involves specifying a *regimen* of provisions or criteria used to determine origin in a PTA, a *weight* for each criterion reflecting its relative importance in the index and a *score* reflecting the restrictiveness of the variant implemented in the RoO regime. Because economic theory and existing studies do not provide a readily available ‘standard’ against which any particular method or provision for determining origin can be judged, the weights and scores are assigned subjectively by reference to other studies and the nature of the provision. The methodology allows RoO to be analysed in terms of their characteristics, with the index value of a particular regime reflecting ex ante the restrictiveness of the origin rules faced by firms. However, the index alone does not provide a measure of the ex post effects of an implementation of RoO.

For a particular RoO regime, the index value reflects the number of restrictions applied, the relative importance of each of those restrictions (the weight) and the restrictiveness of each variant (the score). Overall, a higher index value indicates a more restrictive trading environment on account of RoO. Nevertheless, in interpreting index values, it should be borne in mind that, while an index provides a measure to quantify all relevant restrictions related to preferential RoO that can be identified by available information sources, a higher score may simply reflect a greater availability of information rather than a more restrictive regime. This study attempts to overcome this limitation by using the best known, reviewed and compiled sources of information on preferential RoO (see section 2.2). In addition, it should be noted that the provisions in the PTAs are assessed in the index according to the actual provision in agreements, rather than the extent to which the provision may have been implemented. Where the degree to which PTA members implement RoO provisions differs, the index values reported may also differ from their ‘true’ or underlying values.

The index is a measure of the restrictiveness of a RoO regime, at the margin. That is, it assumes that the provisions are relevant to firms’ decision-making and activities. For example, RoO provisions would typically not be relevant for items with MFN tariffs of zero (ie where the margin of preference afforded to a PTA member is zero), since compliance with an origin rule would not confer a financial benefit to the PTA exporter. It would also not be relevant when RoO have no effect on firms’ production and trade decisions.

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The determination of weights for restriction categories is designed to reflect the economic significance of restrictions on firms' efficiency in a PTA. However, their expected impact on merchandise trade flows of member and non-member countries also depends on the external tariff environment of a PTA. To account for this effect within the index framework adopted, the estimated index for each PTA examined was re-weighted by the *mean* and *relative standard deviation* of MFN tariff rates in each country in a PTA. Both the original and re-weighted indexes are presented in chapter 4.

## 2.1 Index structure and restrictiveness ranking

In constructing the index, a bottom-up approach has been used, whereby the detailed information on each agreement was collected and assessed for regulations governing preferential RoO, before being aggregated into a single restrictiveness index value for each agreement. The detailed information was grouped into three broad groups:

- *primary criteria* reflecting the main methods of origin determination;
- *supplementary criteria* for other provisions related to preferential RoO; and
- *other effects of RoO*.

The basic structure of the index is reported in table 2.1. The categorisation adopted reflects the methods, or tests, of origin determination canvassed by the World Customs Organization (WCO), and regulations that have evolved to support the application of those tests.

The possible restrictiveness of each of the eleven criteria listed in table 2.1 was first measured by identifying the variants by which each criterion is applied and then subjectively assigning restrictiveness scores to each item according to the likely restrictiveness of the variant. The scores assigned range from zero for the least restrictive variant to one for the most restrictive variant identified. According to this structure, the greater the likely restrictiveness of a provision, the higher the score it has received. The score of zero is also applied when a provision is not identified as part of a RoO regime.

To complete the index, the score assigned to each item was aggregated according to the weights shown in table 2.1. In principle, it would be most desirable to determine the index weights empirically using regression techniques after controlling for all factors that may determine trade and industrial organisation, at the margin. In practice, this has not been possible and rules of thumb have been employed.

**Table 2.1 Restriction categories for preferential RoO**

<i>Number</i>	<i>Restriction category</i>	<i>Weight</i>
<b>Primary criteria</b>		<b>0.60</b>
1	Change in tariff classification	0.20
2	Regional value content or percentage criterion	0.20
3	Specified manufacturing process test and/or sector-specific rules	0.20
<b>Supplementary criteria</b>		<b>0.25</b>
4	Type of cumulation	0.05
5	Provisions that go beyond cumulation	0.05
6	Duty drawback	0.05
7	Territoriality or outward processing	0.05
8	Geographic location of manufacturing process	0.05
<b>Other effects of RoO</b>		<b>0.15</b>
9	Degree of certainty	0.05
10	Compliance and administration costs	0.05
11	Rigidity	0.05
<b>Total weight</b>		<b>1.00</b>

The primary criteria consist of three sub-categories. The weight assigned to the primary criteria, as a group, is 0.6 out of a total weight of one. This relatively high weight was assigned to this group because of the likely predominance of the tests in origin determination. Group weights are further disaggregated into subgroups on the basis of frequency of use and their likely importance in RoO regimes. Details of the disaggregation are provided in chapter 3.

Two main origin tests — the CTC (change in tariff classification) and regional value content (RVC) methods — are each given a relatively high weight of 0.2, reflecting their predominance as primary tests in RoO regimes.

Sector-specific rules are generally defined through the specified manufacturing process test.<sup>1</sup> These tests are applied in conjunction with other tests (commonly, the CTC method). However, they are still essentially primary criteria and can be relatively restrictive. They are therefore given a separate weight of 0.2.

Sector-specific RoO are also commonly more stringent than rules of general application, especially for so-called ‘sensitive’ sectors, as they are generally designed to shield those sectors from import competition. Because of the potentially large relative impact that sector-specific rules can have on the restrictiveness of the

<sup>1</sup> Nearly 90 per cent of PTAs analysed by WTO (2002).

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RoO regimes, the weight of 0.2 is considered appropriate in the presence of such provisions.

There are several other features of RoO which can influence whether or not origin is conferred on a product and hence determine the impact of the RoO regime on trade flows. These are cumulation rules, tolerance or de minimis thresholds, duty exception and drawback provisions, the extent of permissible outward processing and the last stage of manufacturing process requirement. These features are included as supplementary criteria and allocated one-fourth of the total index weight, with uniform weights being allocated between five sub-categories.

Where different variants of the same criterion are applied, the origin rule was scored according to the variant assessed as the one most commonly applied — that is, the most common threshold level when multiple threshold levels are used and the most common digit level of CTC when multiple levels are used. For example, the CTC can be applied at the chapter (2-digit), heading (4-digit) or item levels (6 or 8-digit). An agreement using the CTC method was scored according to the level most commonly applied. This relatively conservative approach may understate the true restrictiveness of a regime at the margin, which quite possibly could be determined by the most restrictive variant applied (eg the chapter 2-digit level in the CTC test).

In this framework, the highest restrictiveness scores were assigned to more complex origin rules using the more restrictive variants of each criteria and/or incorporating sector-specific provisions. Lower scores were assigned to rules that are relatively ‘clean’ — that is, free of deliberately restrictive provisions (such as sector-specific rules).

## 2.2 Information sources

Information on rules of origin regulations has been gathered from a number of sources, including the following:

- *Vermulst (1994)* summarised regulations set in preferential and non-preferential rules of origin in Australia, Canada, the European Community, Japan, and the United States.
- *LaNasa (1995)* detailed various methods of origin determination and discussed the advantages and disadvantages of each.
- *Driessen and Graafsma (1999)* provided an overview of the Pan-European Harmonised Origin Protocols.
- *WTO (2002)* surveyed coverage of regulations associated with preferential rules and the technical nature of the issues involved.

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- *Moïsé (2002)* reviewed RoO provisions embedded in various preferential trading arrangements.
  - *Brenton (2003)* reviewed the key features of preferential RoO and their economic impact on trade and investment.
  - *Estevadeordal and Suominen (2003)* surveyed the RoO regimes that exist and compiled all the relevant information on the RoO provisions for a number of PTAs by 6-digit HS tariff line item.

These sources of information were not always sufficiently comprehensive in the coverage of regulatory regimes in particular PTAs. To fill this information gap, additional information on relevant rules has also been collected directly from the individual agreements (such as that provided by documentation accessible in electronic form using the internet).



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## 3 Calculating the index

This chapter elaborates the structure of the restrictiveness index outlined in chapter 2. It summarises each criterion in the index and allocates a restrictiveness score to each. It also outlines the rationale for scoring within each criterion and the score assigned to the CER and selected other agreements. The information presented in this chapter is summarised in appendix A which shows, in tabular form, the index, the weight assigned to each criterion and the restrictiveness score assigned to each restriction category.

### 3.1 Primary criteria

#### Change in tariff classification

Origin is conferred under the CTC method if there is a change in tariff classification between material inputs and the goods produced from those inputs, using as a reference the Harmonized Commodity Description and Coding System (Harmonized System — HS). The CTC method can be applied at different levels in the HS. The restrictiveness categories and associated restrictiveness scores adopted in this study follow the tariff heading structure of the HS. A change in tariff classification at the broad (2-digit) chapter level provides the highest hurdle for conferring origin and is therefore given the highest restrictiveness score of one (table 3.1). Progressively lower scores are assigned to the heading (4-digit), sub-heading (6-digit) and tariff item (8-digit) levels.

Table 3.1 **Restriction categories for change in tariff classification criterion**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.20</b>		<b>Change in tariff classification</b>
	0.00	Tariff item (HS 8-digit)
	0.20	Sub-heading (HS 6-digit)
	0.50	Heading (HS 4-digit)
	1.00	Chapter (HS 2-digit)

As indicated in chapter 2, scores are assigned according to the classification level mainly used in a trade agreement. For example, when the CTC method is mainly applied at the heading (HS 4-digit) level, a score of 0.5 is assigned. MERCOSUR, PANEURO and European Union-based agreements apply the CTC method mainly at the heading level and accordingly have received that score. When the CTC rules are based mainly on the 2-digit classification (as in NAFTA), a score of one is assigned.

CER RoO are not based on the CTC method for determining origin and accordingly are given a score of zero.

### Regional value content or percentage criterion

Origin is conferred under the RVC method when a threshold percentage of locally or regionally produced inputs is reached in the exporting country. The RVC method can be applied in a number of formulations. To reflect the main features of these formulations, six sub-criteria are identified as being relevant for the determination of origin (table 3.2). The pivotal sub-criterion for the application of RVC method is the threshold percentage adopted — expressed as either a minimum percentage of value that must have been added in the PTA region or a maximum percentage of value of imports from non-member economies allowed. This sub-category takes the highest weight of 0.1. In this study, a neutral approach is adopted for the weighting of the remaining five sub-criteria and each is given an equal weight (0.02).

Table 3.2 **Restriction categories for regional value content or percentage criterion**

<i>Number</i>	<i>Restriction sub-category</i>	<i>Weight</i>
	<b>Regional value content or percentage criterion</b>	<b>0.20</b>
2.1	Percentage of originating material	0.10
2.2	Formulation of regional value content	0.02
2.3	Elements of production costs for domestic content	0.02
2.4	Treatment of determined manufactured raw materials	0.02
2.5	Methods of qualifying production costs	0.02
2.6	Valuation of non-originating material	0.02

Some agreements invoke all criteria while others invoke a subset. Restrictiveness scores assigned to each sub-category in this study are set out below.

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### *Percentage of originating material*

The rule used in assessing restrictiveness in this category is unambiguous. The higher the percentage of originating material required, the higher the restrictiveness score (table 3.3).

**Table 3.3 Restrictiveness scores for alternative regional value content percentage thresholds<sup>a</sup>**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.10</b>		<b>Percentage of originating material</b>
	0.00	Less than 25%
	0.20	26-35%
	0.40	36-45%
	0.60	46-55%
	0.80	56-65%
	1.00	More than 65%

<sup>a</sup> Agreements applying regional content thresholds to confer origin can use different valuation methods. To improve comparability of thresholds in alternate agreements, the thresholds have been normalised to a factory cost basis — that is, the basis adopted in CER (see text).

Grading the restrictiveness of different agreements is complicated by the fact that different agreements adopt different valuation methods. Four benchmark methods are commonly referred to.

- The *factory cost build-up method* is defined as qualifying materials, labour and overheads, expressed as a percentage of all materials, plus qualifying labour and overheads.
- The *net cost build-down method* is defined as the net cost of the final product less the value of imported materials, expressed as a percentage of the net cost of the final product. Net cost is defined in NAFTA, for example, as all the costs incurred by the manufacturer minus expenses relating to sales promotion, royalties, shipping and packaging costs, and non-allowable interest costs.
- The *transaction value build-up method* is defined as the value of locally-sourced materials expressed as a percentage of the value of the final product.
- The *transaction value build-down method* is defined as the value of the final product less the value of imported materials, expressed as a percentage of the value of the final product.

Since the elements in the calculation of the respective thresholds differ, an equivalent level of protection would require different threshold percentages, depending on the method. Thus the percentage thresholds are not strictly comparable between agreements where different methods are adopted. To facilitate

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the compilation of the restrictiveness index on a common basis across agreements, the RVC thresholds of each agreement have been standardised to a factory cost equivalent — to correspond to the valuation method applied in the CER. Ideally, the standardisation process would involve a detailed input-output analysis of industry cost structures within each trading agreement. As it has not been possible to undertake such a comprehensive analysis for this study, proxy conversion factors have been derived from input-output data on inputs of locally produced and imported materials for Australia. This information implies the following conversion factors:

- 1.00 for the factory cost build-up method (the benchmark);
- 1.04 for the net cost build-down method. A conversion ratio of more than one is adopted because the value of net costs is defined by the exclusion of certain expenditures (eg sales promotion) and the cost base is characteristically larger than for the factory cost build-up method — a method under which costs are defined by inclusion. For a given level of qualifying expenditure, a larger cost base is considered to imply a higher threshold for a given level of restrictiveness; and
- 1.20 for the transaction value build-down method. A conversion factor of more than one is adopted because the cost base comprises the full value of the good inclusive of factory costs, overheads and profits and is characteristically larger than for the factory cost build-up method. Agreements offering the transaction value build-down method for determining origin also tend to offer the ‘build-up’ variant. The threshold pertaining to the transaction value build-down provision of such agreements has been used as the focus of this study.

The standard thresholds are then classified to one of the ranges listed in table 3.3. The broad approximations provided should give meaningful, albeit qualified, indicators of the relative restrictiveness of thresholds across the preferential trade agreements considered.

Available information indicates that domestic content thresholds invoked typically lie between 25 and 60 percent (inclusive, factory cost basis). A value of more than 65 per cent is the exception and is given the highest score. The CER agreement adopts a uniform 50 per cent domestic content requirement and is given a score of 0.6. Where multiple thresholds are invoked, the agreement is scored according to the most commonly used threshold level, as indicated by available information. The most common RVC thresholds in NAFTA, defined by the net cost method, are 40 and 50 per cent; this translates to 42 and 52 per cent factory cost thresholds, according to the above approach. The agreement is given a score of 0.6.

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### *Formulation of regional value content*

The percentage of originating and non-originating materials can be formulated in three different ways — value of parts, domestic content and imported content (table 3.4). Wherever the value of parts test is used, it is assessed as the most restrictive of the alternatives because it focuses on a very small set of either local or non-local material inputs. For example, it has been used in Pan-European RoO regimes in the regulations relating to radio and television receivers to enforce relatively restrictive origin rules (LaNasa 1995).

Table 3.4 **Restrictiveness scores for alternative formulations of regional value content**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.02</b>		<b>Formulation of regional value content</b>
	0.00	Any method
	0.30	Import content
	0.60	Domestic content
	1.00	Value of parts

Formulation of the percentage criterion based on domestic content is considered to be more restrictive than a specification based on the imported content because it is considered to facilitate manipulation and to add to compliance and administration costs. Formulation of the percentage criterion in the CER is based on the domestic content method and as a result it is given a score of 0.6.

### *Elements of production costs for domestic content*

Typically, the narrower the range of qualifying expenditures relative to total costs, the harder it would be for a firm to reach the origin threshold and the more restrictive would be an origin rule. Accordingly, RoO which include fewer expenditure items as qualifying expenditures are considered to be more restrictive and are given a higher score.

In this study, a score of zero is given where no costs are excluded from regimens of qualifying expenditures (table 3.5). A progressively higher score is given where an increasing number of costs are excluded. The more cost items that are excluded, the more restrictive is this criterion.

The final score is based on the treatment of the item in the origin rules of an agreement for which exclusion is regarded as most restrictive.

**Table 3.5 Restrictiveness scores for the coverage of qualifying expenditures**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.02</b>		<b>Elements of production costs for domestic content</b>
	0.00	All costs included
	0.10	Taxes and duties paid on materials excluded
	0.20	Indirect labour also excluded
	0.30	Other capital costs also excluded
	0.40	Inner containers also excluded
	0.50	Other packaging expenses also excluded
	0.70	Selling, general and administrative expenses also excluded
	1.00	Profits also excluded

The CER, which excludes firms' profits along with the other expenditures at the last stage of manufacturing in the determination of eligible expenditures, is given a score of one.

#### *Treatment of determined manufactured raw materials*

Determined manufactured raw materials (DMRM) provisions allow for certain materials of third country origin that are not manufactured in either partner economy to be defined as 'manufactured raw materials' and treated as qualifying expenditures for the determination of origin. The inclusion of DMRM provisions in a trade agreement tends to have a liberalising effect. Accordingly, in this study, origin rules without such provisions are treated as more restrictive than rules that allow the inclusion of certain materials from third countries — that is, rules with DMRM provisions (table 3.6).

**Table 3.6 Restrictiveness scores for alternative treatments of determined qualifying materials**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.02</b>		<b>Treatment of determined manufactured raw materials</b>
	0.00	Imports from all zero tariff line items to member economies are treated as eligible expenditures
	0.50	Imports from selected zero tariff line items to member economies are treated as eligible expenditures
	1.00	No provision for allowing DMRM in calculating domestic content

In the CER, DMRM include certain imported raw materials when they are used in finished goods that are otherwise *wholly manufactured goods*. On the other hand, all imports used in the production of *partly manufactured goods* are treated as non-

originating. Because of the selective nature of this provision, CER is assigned a score of 0.5.

*Methods of qualifying production costs<sup>1</sup>*

Of the RVC methods applied, the factory cost build-up method is typically considered to have the narrowest cost base (since it focuses on the manufacturing aspect of the production and distribution chain), affording the least flexibility to businesses in making their input choices. It is also administratively more complicated (because eligible expenditures are aggregated — built up — from component expenditures). This method is treated as most restrictive (table 3.7).

On the other hand, the transaction value method is typically considered to have the widest cost base (since it focuses on transaction values, typically including transport and distribution costs) that affords the most flexibility to firms in making their input choices. The transaction value build-down method is also considered to be administratively relatively simple (because respondents need only identify ineligible expenditures). Because of their broad cost bases and the flexibility that this affords business, regimes invoking transaction value methods are considered to be less restrictive than other regimes. Regimes that allow traders to choose the cost base they apply are considered least restrictive.

**Table 3.7 Restrictiveness scores for alternative methods of qualifying production costs**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.02</b>		<b>Methods of qualifying production costs</b>
	0.00	Any method
	0.25	Transaction value method
	0.50	Net cost method
	1.00	Factory cost method

Because the CER applies the factory cost build-up method, it is given the highest score.

<sup>1</sup> Methods of qualifying production costs are given their own weighting because they are related to the cost base rather than the threshold discussed under the scores for alternative thresholds in table 3.3.

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### Valuation of non-originating material

The potential restrictiveness of RoO depends on the valuation of non-originating materials (ie non-eligible expenditures), with origin rules incorporating narrower valuation bases being considered more restrictive than rules with a broader valuation basis. For example, an ‘ex-factory’ cost basis is considered to be the narrowest valuation basis and origin rules incorporating this provision are treated as the most restrictive on this account (table 3.8). Less restrictive valuation bases, in order of restrictiveness, include free on board at port of embarkation (fob), cost insurance and freight at port of unloading (cif) and free into store (fis).

Table 3.8 **Restrictiveness scores for alternative valuation bases for non-originating materials**

Weight	Score	Restriction category
<b>0.02</b>		<b>Valuation of non-originating materials</b>
	0.00	Not relevant or unspecified
	0.25	Free into store (fis)
	0.50	Cost, insurance and freight (cif)
	0.75	Free on board (fob)
	1.00	Ex-factory cost

CER values its non-originating materials at fob values (ie at the port of embarkation) and is assigned a score of 0.75.

### Specified manufacturing process test and/or sector-specific rules

The inclusion of specific process tests adds to the restrictiveness of origin rules. Such tests typically are specified in terms of particular industrial processes and ways of working, limiting the prospect for technological or organisational change and productivity improvement. Variants of the method prescribe at the outset certain production or sourcing requirements that must be met — termed the *positive test* — or must not be evident — the *negative test* — to confer origin.

The negative test is treated as being the more restrictive, as it may indiscriminately and unintentionally exclude products on the basis of a particular product characteristic rather than the characteristics of the full production process (table 3.9). The application of a negative specific process test is of particular

concern when the test is applied to narrowly defined production processes.<sup>2</sup> The positive test runs the risk of unintentionally excluding originating items because they are produced by unscheduled processes.

As the CER does not include any process-specific tests, it is given a score of zero.

**Table 3.9 Restrictiveness scores for the inclusion of a specified manufacturing process test and/or sector-specific rules**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.10</b>		<b>Type of specified manufacturing process test applied</b>
	0.00	No test
	0.50	Positive test for specific process
	1.00	Negative test for specific process
<b>0.10</b>		<b>Sector-specific rules</b>
	0.00	All sectors treated uniformly
	0.50	Single manufacturing sector (eg TCF) only
	1.00	Multiple manufacturing sectors (eg TCF & PMV)

RoO that use a combination of three main methods — CTC, RVC and specific process test — typically specify them differently for different product categories. In certain cases, two or more of the methods must be satisfied — for example, a CTC *and* a RVC requirement. Origin rules adopting sector-specific rules and rules requiring the satisfaction of multiple requirements are regarded as being more restrictive and are given the highest restrictiveness score in this study. Certain RoO embody sector-specific provisions that allow the application of alternative methods for determining origin (eg CTC *or* the specified RVC).

While the sector-specific nature of such rules is considered to add to the overall restrictiveness of the regime and to administrative complexity, they may also selectively relax some of the constraints inherent in single sector-specific rules.<sup>3</sup> Because of the selectivity of the provisions, they are likely to afford an artificial advantage to one sector over other sectors. Such arrangements are given a higher restrictiveness score in this study.

The presence of sector-specific rules for more than one sector is treated as the most restrictive variant (table 3.9). For example, textiles, clothing and footwear, and automobiles are commonly assigned particularly stringent origin requirements (eg the ‘yarn forward’ rule in NAFTA). RoO including sector-specific rules for only

<sup>2</sup> For example, in the European Union, regulation governing photocopiers states that the incorporation of an optical system into a photocopying apparatus will not confer origin, but it does not explain which operations will confer origin (LaNasa 1995).

<sup>3</sup> See Brenton (2003).

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one manufacturing sector (the less common case) are treated as moderately restrictive.

The CER, which is free of sector-specific provisions is given a score of zero.

## 3.2 Supplementary criteria

### Type of cumulation

Cumulation allows producers to count materials purchased from outside of the PTA area as originating in the area for the purpose of determining origin. Cumulation is relevant for the application of RVC methods involving cost calculations. Cumulation can take the form of:

- *bilateral cumulation* — (the most common form) whereby materials supplied by any member country of a PTA can be counted as domestic content by the exporting country in its exports to other member countries;
- *full cumulation* — whereby any processing in any member country can be counted as qualifying content, regardless of whether the processing is sufficient to confer originating status to the materials involved. Put another way, the whole preferential area created by a PTA will be considered a single territory and *any* working or processing within the area will count towards the determination of origin; and
- *diagonal cumulation* — whereby materials from specific non-member countries can be counted as domestic content by the exporting country.

In this study, origin rules that involve no cumulation in the valuation of regional content are treated as being the most restrictive, and rules allowing bilateral cumulation as being more restrictive than methods involving full or diagonal cumulation (table 3.10). Diagonal cumulation is treated as least restrictive on the grounds that it allows specified materials from non-member countries to be counted as qualifying materials.

CER permits diagonal cumulation on materials originating in Forum Island countries and thus is given a score of 0.2.

**Table 3.10 Restrictiveness scores to reflect inclusion of cumulation provisions**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Type of cumulation</b>
	0.00	All
	0.20	Diagonal
	0.40	Full
	0.60	Bilateral
	1.00	No cumulation

### Provisions that go beyond cumulation

Some provisions in PTAs go beyond cumulation in allowing origin of non-members' materials. For any cumulation method, detailed testing of the source of inputs can influence the restrictiveness of the origin rules. These provisions include:

- *tracing* — where, in full cumulation, all processing done in economies participating in a cumulation system counts as 'originating' input to the final product;
- *tolerance or de minimis rules* — which allow the maximum percentage of non-originating materials that would otherwise be not accepted; and
- the *absorption principle* — when a non-originating intermediate material acquires originating status by satisfying an initial test relating to input requirements and/or lack of availability of domestically produced supplies, this material is considered to be 100 per cent originating once incorporated into a final product.

Of the alternatives, tracing tests are treated as the least liberalising because they restrict valuations to include only originating materials (table 3.11). By contrast, under tolerance rules or the absorption principle, the full value of the material input is given originating status if an initial test is satisfied. Tolerance tests are treated as the most liberal of the options because they are regarded as providing the greatest scope for raising the level of 'originating' content.

CER applies tolerance rules on one-off basis available in particular short-term circumstances and is given a score of 0.1.

**Table 3.11 Restrictiveness scores to reflect provisions that go beyond cumulation**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Provisions that go beyond cumulation</b>
	0.00	Cumulation allowed
	0.10	Tolerance or de minimis allowed
	0.25	Absorption principle
	0.50	Tracing test
	1.00	Absorption principle, tracing and tolerance tests not used

## Duty drawback

Duty drawback (and similar) schemes allow tariffs due on imported materials used in the production of export items to be waived or refunded. Such schemes selectively lower the cost of inputs used to produce goods for export. In origin rules, access to drawback provisions generally available to exporters can be restricted, or denied entirely, raising the cost of exporting to member economies and encouraging firms to purchase inputs from potentially higher-cost local sources. Origin rules that disallow or derogate drawback arrangements for exporters are treated as more restrictive than rules that do not (table 3.12).

**Table 3.12 Restrictiveness scores to reflect the allowance of duty drawback**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Duty drawback</b>
	0.00	Drawback allowed
	1.00	Drawback not allowed

CER allows duty drawback on imported materials used to produce goods exported to the partner country and it is given a restrictiveness score of zero.

## Territoriality or outward processing

Territoriality provisions also go beyond the cumulation provisions in PTAs in allowing the use of materials from non-member countries. However, this is treated as a separate item in the index because of its importance in modern industrial manufacturing and organisation (eg through contracting-out and commission work).

Origin rules that limit or disallow origin being conferred on goods produced using outsourcing and outward processing arrangements are treated as more restrictive

than rules that do not (table 3.13). Limitations usually involve the imposition of limits on the value of regional content that can be acquired outside the cumulation area — generally 10 per cent.

**Table 3.13 Restrictiveness scores to reflect the inclusion of territoriality or outward processing**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Territoriality or outward processing</b>
	0.00	Territoriality or outward processing included
	1.00	Territoriality or outward processing excluded

CER does not contain explicit territoriality or outward process provisions and is given a score of one. (The ‘last place of manufacture’ criterion, a related restriction, is considered in the next item.)

### **Geographic location of manufacturing process**

Some RoO that invoke a RVC test also specify a geographic location requirement for the last stage of manufacturing. Such a requirement may overlook genuine regional content and add to the restrictiveness of the origin rule. Accordingly, RoO specifying the location of the last place of manufacture receive a higher restrictiveness score than RoO that do not (table 3.14). Rules allowing the last stage of manufacture to occur in any partner country (eg when the last process is contracted out) receive a lower restrictiveness score than rules requiring that the last place of manufacture be in the ‘exporting’ partner country only.

**Table 3.14 Restrictiveness scores for a geographic location of manufacturing process requirement**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Geographic location of manufacturing process</b>
	0.00	Anywhere or not specified
	0.50	Any partner country
	1.00	Exporting partner country only

CER origin rules include a geographic location test that requires the last stage of manufacture to be performed in either partner country and is given a restrictiveness score of 0.5.

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### 3.3 Other effects of RoO

The restrictiveness of RoO can also be influenced by factors such as certainty in proving origin, level of compliance and administrative costs, and degrees of flexibility in accommodating technical change.

#### Degree of certainty

Regulatory risk associated with uncertainty of origin determination (eg arising out of exchange rate fluctuations) would be expected to influence the way businesses act, thereby adding to the restrictiveness of an origin regime. It is therefore possible for origin regimes to be highly restrictive due to the criteria above — for example, origin determinations based on the CTC method applied at the 2-digit heading level — but to be relatively certain.

On the other hand, other methods that may be less restrictive, including those based on an RVC requirement with a relatively low and uniform threshold, could be less certain because of exogenous factors (eg exchange rate fluctuations). In this study, RoO based purely on RVC methods are considered less certain and hence more restrictive according to this criterion (table 3.15). Origin rules based on the application of CTC alone (that is, without additional tests being imposed) are relatively more certain. RoO based on a combination of RVC and CTC methods are relatively less certain and given the highest restrictiveness score. That is, the certainty characteristic of an origin regime is considered to be determined by the least certain element.

Table 3.15 **Restrictiveness scores to reflect the degree of certainty**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Degree of certainty</b>
	0.00	Higher certainty (eg CTC alone or technical test alone)
	1.00	Lower certainty (eg RVC or combination of CTC and RVC or technical test)

Because origin determination in the CER is based on an RVC method, it is given the maximum restrictiveness score of one. Of the 17 other PTAs analysed, none is based on a CTC test or technical test alone, so that no agreement receives a zero score for this criterion. NAFTA, MERCOSUR and other agreements, although CTC-based, apply the CTC method in combination with the RVC and technical tests of origin determination. Hence, these agreements are also given a score of one.

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## Compliance and administration costs

Compliance costs of meeting RoO requirements raise the cost of trade within a PTA and act as a non-tariff barrier. Administration costs are the costs incurred by government agencies in overseeing and enforcing the RoO. Factors influencing these costs within an origin regime are taken into account by the restrictiveness scores of the regime-specific characteristics discussed above. In addition, it may be that the compliance and administrative costs of membership of multiple agreements amount to more than the sum of the costs of individual agreements. This would be so to the extent that membership of multiple agreements involves additional coordination effort (the ‘spaghetti bowl’ effect). In such cases, the existence of multiple agreements would add to the trade restrictiveness of individual agreements.

In this study, the restrictiveness of an agreement is considered to be at its highest, according to this criterion, when most member countries are also members of more than one agreement and those agreements invoke more than one method for determining origin (table 3.16). Membership of multiple agreements which use dissimilar rules is considered to be more restrictive, while membership of only a single agreement is considered the least restrictive according to this criterion.

Table 3.16 **Restrictiveness scores to reflect compliance and administration costs**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Compliance and administration costs</b>
	0.00	Most PTA members are only a member of one PTA
	0.50	Most PTA members are involved in more than one PTA with similar RoO
	1.00	Most PTA members are involved in more than one PTA with multiple RoO

At this stage, Australia and New Zealand are members of three PTAs — both are members of CER and SPARTECA and each has a separate agreement with Singapore. These agreements apply almost similar RVC methods for their origin determination. Hence, in this study, the CER is given a score of 0.5. Moreover, other agreements considered are also given scores of 0.5 because the method for determining origin is broadly similar between countries in overlapping agreements.

## Rigidity

Rules of origin can act as non-tariff barriers that, depending on the individual methods of origin determination, restrict technical and organisation change in the production of goods in member countries. For example, rules based on a RVC

threshold can restrict technological and organisational change where firms are close to the content threshold. Rules based on a CTC method to some extent accommodate relevant technologies. However, under a CTC method, there is a potential for thresholds and reference classifications to inhibit change and productivity improvement. This is likely to increase with time, as more firms come up against boundaries imposed by origin rules — which may have been relatively liberal at the inception of an agreement.

In this study, RoO that do not allow waivers for origin determination based on product-specific requirements are treated as more restrictive than origin rules that allow waivers (table 3.17).

**Table 3.17 Restrictiveness scores to reflect rigidity**

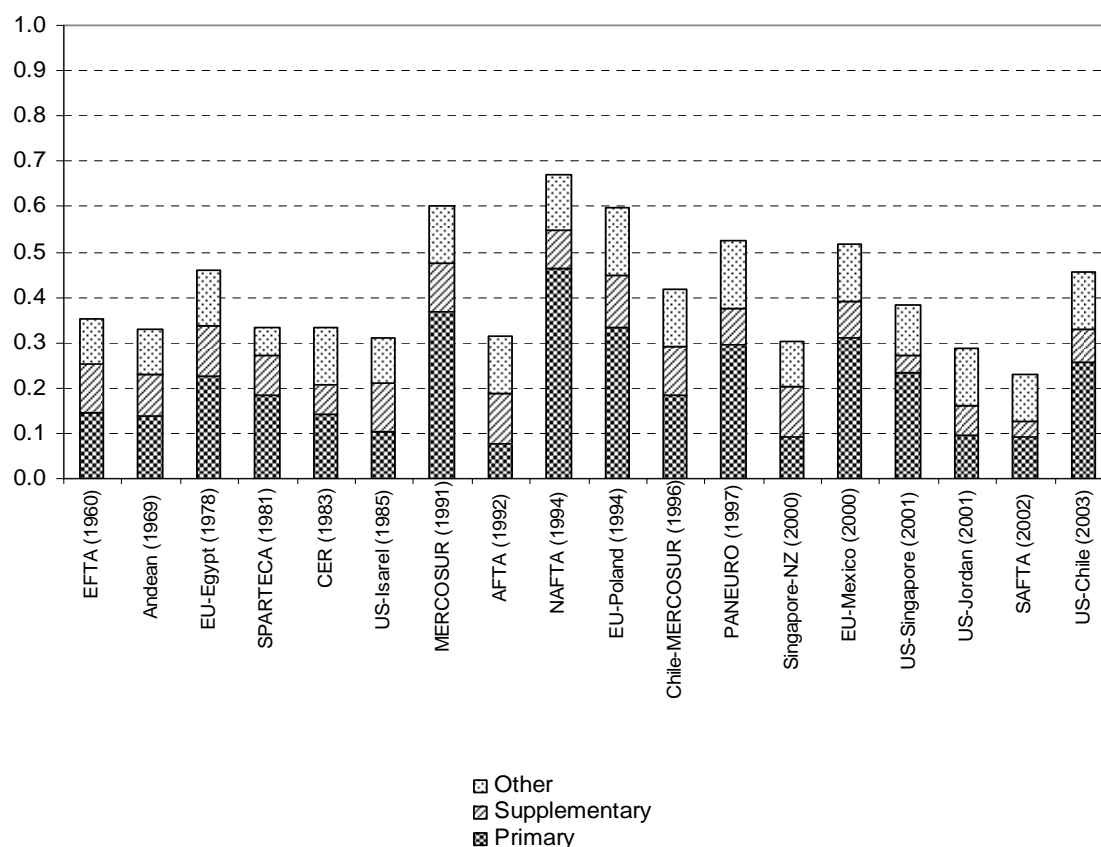
<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Rigidity</b>
	0.00	No rigidity: waiver provision applied to all tariff items
	0.25	Partial rigidity: waivers allowed for a minority of tariff items
	0.50	More than partial rigidity: waivers allowed for a majority of tariff items
	1.00	Global rigidity: no waiver, RoO applies to all tariff items

The CER agreement does not allow the waiver of its RVC threshold and is therefore given a restrictiveness score of one for this criteria. On the other hand, the United States–Singapore agreement, which has provisions that are generally more restrictive than those in CER, has a waiver of CTC and RVC requirements for electronics and information technology goods and is given a score of 0.25.

## 4 Results

The index analysis shows significant variation in the restrictiveness of RoO across PTAs (figure 4.1). This variation and dissimilarities in the mix of provisions associated with RoO regimes are likely to affect the extent and pattern of merchandise trade between member and non-member economies.

Figure 4.1 **Restrictiveness index for preferential RoO<sup>a</sup>**  
Index score ranges between zero and one



<sup>a</sup> MERCOSUR was intended to become a customs union after a transition period of five years. However, this has been postponed because of the macroeconomic problems faced by its member countries. According to Moisé (2002), the transitional rules of origin in MERCOSUR have been extended until at least 2006.

Source: Commission estimates.

Compared with the level of restrictiveness identified for other PTAs, the index suggests that the CER RoO is low to moderately restrictive. RoO with the highest

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index values, including NAFTA, MERCOSUR and European Union–Poland, tend to be associated with regimes that adopt multiple criteria and more restrictive variants of individual criteria.

The nature of, and differences in, rules associated with PTAs in the Americas, European and Asia–Pacific regions are outlined below.

## **4.1 PTAs associated with the Americas**

Of the 18 PTAs analysed, eight — NAFTA, United States–Chile, United States–Singapore, United States–Jordan, Israel–United States, Andean, MERCOSUR, MERCOSUR–Chile — are associated with the Americas. Although some PTAs have members located outside the Americas, they include at least one member located in the region (eg United States–Singapore) and generally have rules aligned with those of key agreements such as NAFTA.

### **Primary criteria**

There is a lot of variation across RoO regimes in the Americas. At the one extreme, NAFTA incorporates CTC, RVC and technical test rules which vary between product groups, while, at the other extreme, available public information suggests that the Andean agreement is based only on an RVC test, free of sector-specific criteria. The MERCOSUR and MERCOSUR–Chile agreements fall between the Andean and the NAFTA extremes. While origin rules in these agreements are also based on CTC rules and different combinations of RVC and technical requirements, they tend not to be as stringent as those included in NAFTA. This is reflected in a lower restrictiveness score for these agreements relative to NAFTA.

NAFTA was used as a framework for the United States–Singapore and United States–Chile agreements. As in NAFTA, the RoO regimes in these agreements variously require a change in chapter, heading, sub-heading or item levels, depending on the product in question. In addition, RoO for many products combine the CTC with RVC and technical requirements. Nonetheless, while the RoO of the United States–Chile and United States–Singapore agreements are relatively complex, they depart from the benchmark NAFTA in a number of important ways (see below for details).

The United States bilateral agreements with Israel and Jordan diverge markedly from the NAFTA model, operating on only RVC rules. The RoO require that the domestic content cannot be less than 35 percent of the value of the product in these agreements. The application of a single test across all activities and relatively low

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regional content requirement are reflected in a low restrictiveness index score for these agreements.

### **Supplementary criteria**

To some extent, NAFTA and other PTAs in the Americas apply *de minimis* or tolerance rules, which reduce the restrictiveness of the provisions. Available information suggests that there is no *de minimis* rule in MERCOSUR and PTAs linked to it. The NAFTA *de minimis* provision allows goods to qualify for preferences as long as the non-originating inputs are not more than 7 per cent (in most cases) of the transaction value or the total cost of the good. The NAFTA *de minimis* provision, however, does not extend to the production of dairy produce, citrus fruit juice, coffee and cocoa products and some machinery and mechanical appliances such as air conditioners and refrigerators, thereby eroding the benefits of the liberalising provision. In textiles, the *de minimis* provision refers to the weight, rather than the value.

The absorption rule is widely used in many PTAs analysed in this study and has the effect of lowering the restrictiveness index score relative to agreements that do not include such a provision. For example, in NAFTA, a good may acquire originating status if it is produced in a NAFTA economy from materials deemed as originating in the area — whether such materials are wholly obtained or have satisfied a CTC or RVC criterion — even if no change in CTC takes place between the intermediate material and the final product.

PTAs involving countries in the American region tend to preclude duty drawback for member economies, thereby raising the restrictiveness of the index relative to other agreements. Nonetheless, some have allowed for phase-out periods during which drawback is permitted. For example, NAFTA allowed Mexico to use drawback during the first seven years. NAFTA also provides for leniency in the application of the no-drawback rule by putting in place a refund system, whereby the producer will be refunded the lesser of the amount of any duties levied on imported materials and the amount of duties levied (if any) on the exports of the good to the member economies. MERCOSUR, United States–Israel and United States–Jordan agreements permit duty drawback. However, in MERCOSUR, no duty drawback provisions apply for Argentinian and Brazilian imports of intermediate automotive products when the final product is exported to a MERCOSUR partner.

An outward processing and integrated sourcing initiative is included in the United States–Singapore agreement and lowers the measured restrictiveness score of the agreement. The integrated sourcing initiative applies mainly to globalised

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sectors such as information and communication technologies. Under the scheme, certain IT components and medical devices are not subject to RoO when traded between the two countries. The scheme is designed to reflect the economic realities of globally distributed production linkages and to further encourage United States multinationals to take advantage of Asian economies' comparative advantage in this sector.

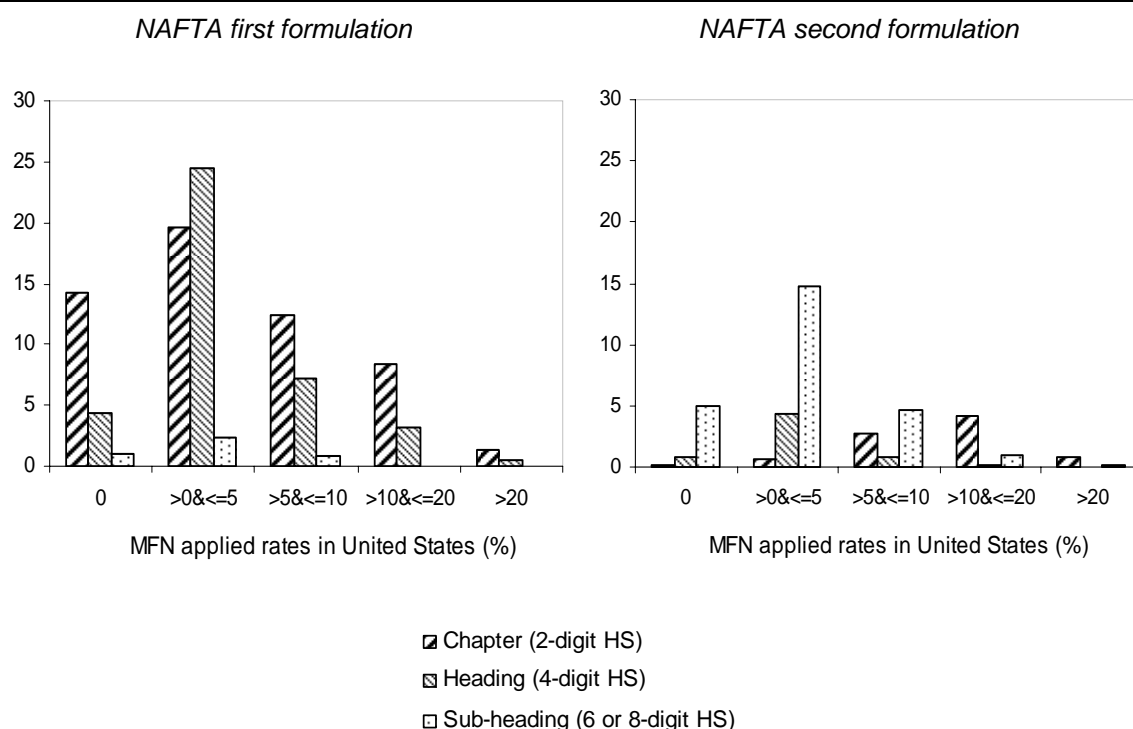
## **Further analysis of RoO in NAFTA**

The substantial transformation provisions included in NAFTA are complex. This is because of the wide application of multiple criteria that vary in detail between products. For example, nearly 40 per cent of the 6-digit items in the United States tariff provide two formulations of the origin rule and allow firms to opt for the formulation that most suits their operations. A further 2 per cent of items provide three formulations of the origin rule. The first formulation offered is typically a CTC test. The additional formulations offered involve a CTC test plus another criterion (commonly the RVC requirement).

In constructing the RoO restrictiveness index for NAFTA (and other agreements), the restrictiveness scores were derived by adding the scores on the additional element introduced in each formulation. This additive approach penalises agreements that have multiple formulations relative to agreements with single formulations for each trade item. While it is possible that the additive approach 'double counts' protection provided by some origin rules, it also suggests that the additional complexity and rigidities inherent in agreements with multiple formulations have a restrictive effect in their own right. This is additional to the restrictive effect of the presence of sector-specific rules measured separately in the index. On the other hand, as pointed out above, to the extent that provisions are more stringent for sectors that are typically protected from third country imports by relatively high tariff and non-tariff barriers, NAFTA (and other agreements) origin rules are more restrictive at the margin than these comparisons suggest.

To provide some information about the relationship between the stringency of origin criteria and the level of industry protection, figure 4.2 presents a cross-classification of restrictiveness indicators (or restrictiveness categories) in NAFTA with MFN tariff rates in the United States. Because NAFTA invokes a number of formulations of origin rules for each tariff item, figure 4.2 has been divided into two panels, one for the first formulation (the left panel) and the other for the second formulation (the right panel). As three or more formulations are offered for only a small proportion of tariff items, a similar cross-classification of these items is not presented.

**Figure 4.2 The application of the CTC method in NAFTA**  
 Percentage of United States 6-digit tariff items



Sources: Based on Estevadeordal (2000), Estevadeordal and Suominen (2003) and OECD (2003).

The left hand panel of figure 4.2 indicates that, in the first origin formulation, a change in tariff classification at the 2-digit (chapter) level is frequently required to confer origin. This is the most restrictive form of this test, implying a higher restrictiveness score than if the CTC test was predominantly applied at a finer level (eg 4, 6 or 8-digit levels). The figure also shows that the less restrictive 4-digit test is the most common primary test when tariff protection is relatively low (ie between zero and 5 per cent). As tariff rates increase, so does the share of items in any one group subject to more restrictive 2-digit test.

The right hand panel shows that when a second formulation is included (ie for 40 per cent of 6-digit items), the CTC element of the origin rule is more often applied at the sub-heading (6-digit) level. The relaxation of the CTC requirement is balanced by the introduction of additional criteria (eg an RVC rule). Nevertheless, there is a significant minority of cases for which the CTC test is applied at the 2-digit level, even in the second formulation. These items typically have higher MFN tariff rates.

Overall, figure 4.2 suggests that the more restrictive provisions in NAFTA are applied to items protected by higher MFN rates in the United States.

In the NAFTA, the first and subsequent formulations may involve a simple CTC test or a composite test (involving ‘exceptions’ to the simple CTC test or additional tests using RVC or technical criteria). The left hand column of table 4.1 examines the structure of the origin rules in the first formulation (applied to all tariff items) while the right hand column examines the structure of the second formulation (applied to 40 per cent of items). Figure 4.3 cross-classifies the structural characteristics of each formulation with United States tariff rate groups. In contrast to figure 4.2, figure 4.3 does not cross-classify items by whether the CTC aspect of the origin determination is applied at the 2, 4 or 6 & 8-digit levels of the tariff.

**Table 4.1 RoO in NAFTA by criteria<sup>a, b</sup>**  
Per cent of matched 6-digit items in the United States tariff

<i>Category</i>	<i>NAFTA first formulation</i>	<i>NAFTA second formulation</i>
CTC only	50.3	0.2
CTC & ECTC	38.6	4.2
CTC & RVC	3.1	1.6
CTC, ECTC & RVC	1.3	27.2
CTC, ECTC & TECH	6.7	5.9
CTC, RVC & TECH	0.1	0.2
Total	100.0	39.3
RVC in combination with the other methods	4.5	29.0

<sup>a</sup> CTC — change in tariff classification requirement; ECTC — exception to a particular CTC requirement; RVC — regional value content requirement; and TECH — technical requirement. <sup>b</sup> The number of tariff line items for the year 2000 and included in this analysis is 4762 which is the number of matching items in OECD (2003) — which provided tariff rate data for 5114 items — and Estevadeordal and Suominen (2003) — which provided RoO provisions data for 5065 items.

Source: Estevadeordal and Suominen (2003); OECD (2003).

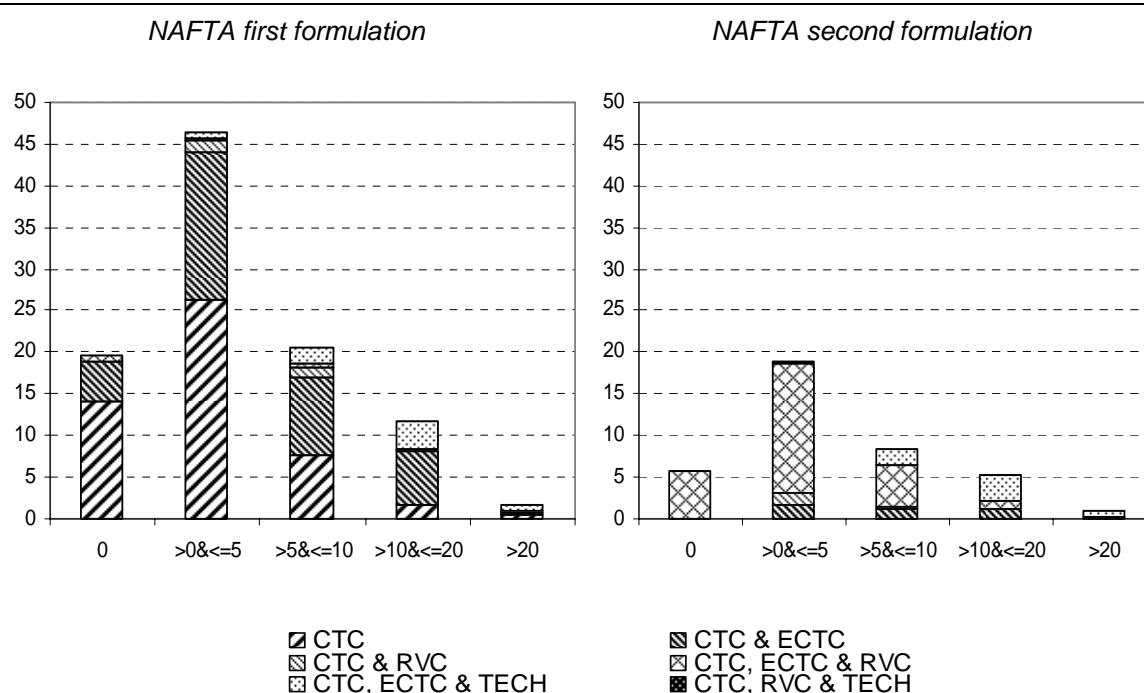
In about 50 per cent of 6-digit tariff items, the CTC test (typically at the 2-digit level) is the only criterion applied (left hand column in table 4.1). For a further 39 per cent of items (typically when the CTC method is applied at the 4 to 8-digit tariff level), the CTC method is applied with exceptions (ie the CTC and ECTC category) to avoid conferring origin on products made with certain inputs.<sup>1</sup> For nearly 7 per cent of items, the CTC method with exceptions is applied in conjunction with a technical test.<sup>2</sup>

<sup>1</sup> For example, a change to subheading 9000.10 from any other chapter *except* from heading 70.02.

<sup>2</sup> For example, a change to heading 63.04 through 63.10 from any other chapter *except* inputs from certain headings and chapters (from heading 51.06 through 51.13, 52.04 through 52.12, 53.07 through 53.08 or 53.10 through 53.11, chapter 54 through 55 or heading 58.01 through 58.02 or 60.01 through 60.06) provided that the good is both *cut* or *knot* or *shape* and *sewn* or otherwise assembled in the territory of one or more of the parties.

While NAFTA is typically identified with a CTC approach to determining origin, the RVC method would appear to play a major role in origin determinations which may not be readily apparent. In the first formulation, a RVC requirement in combination with a CTC or other requirement is specified for about 5 per cent of tariff line items (table 4.1). However, because the first formulation of the origin rules is specified at the chapter (2-digit) level, it is relatively hard to satisfy and hence restrictive. In this case, the second formulation of the origin rules is likely to be important for many items. For that formulation, nearly 30 per cent of all tariff line items (at the 6-digit level) specify an RVC requirement in combination with a CTC or other requirement (table 4.1). However, origin rules are typically not relevant for items with zero tariff — a significant proportion of total tariff line items. Removing the effect of zero items from the calculation shows that around 70 per cent of tariff items in the United States with non-zero tariffs are subject to an RVC rule.

Figure 4.3 RoO in NAFTA by criteria<sup>a</sup>



<sup>a</sup> CTC change in tariff classification; ECTC exception attached to a particular CTC; RVC regional value content and TECH technical requirement specified in the origin determination.

Sources: Based on Estevadeordal (2000), Estevadeordal and Suominen (2003) and OECD (2003).

The RVC rule would also appear to be most prevalent for tariff items with lower tariffs. In the first formulation of origin rules, the use of the RVC method is almost exclusive to items with tariff rates of less than 10 per cent (figure 4.3). For the second formulation, the incidence of an RVC requirement diminishes as United States tariff rates increase. For higher tariff items, origin rules based on physical

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criteria such as the CTC method or technical tests predominate in both the first and second formulations.

Overall, the complexity of NAFTA provisions, and the relative severity of the provisions when they are applied, are the main contributing factors behind the relatively high restrictiveness score estimated for the origin rules.

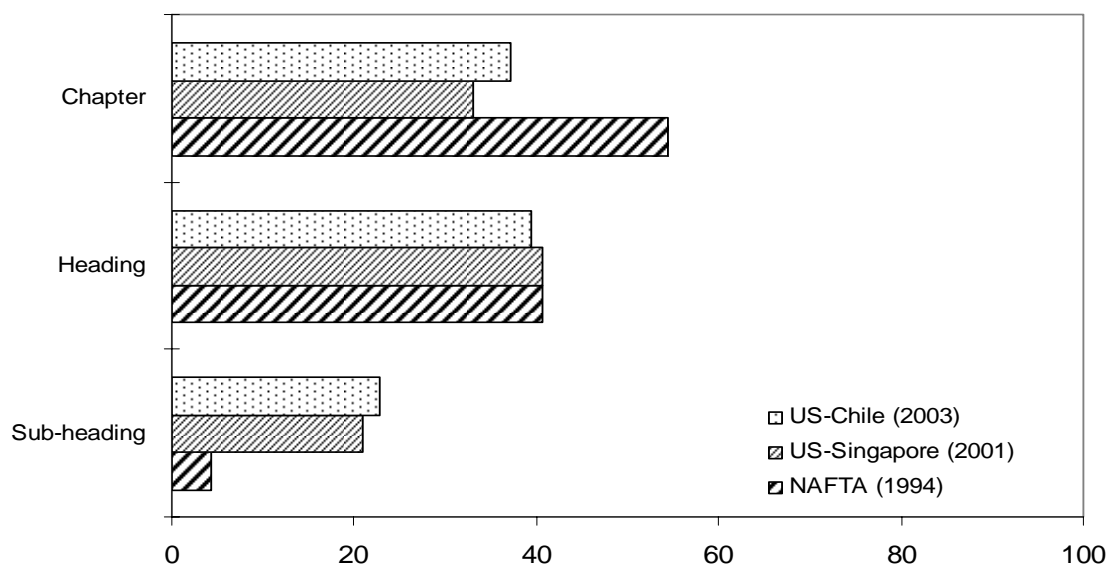
### **Comparison of RoO in NAFTA, United States–Singapore and United States–Chile agreements**

The origin rules in the United States–Singapore (2001) and United States–Chile (2003) agreements are similar in broad design to the provisions in NAFTA (1994) — including the widespread use of multiple formulations for determining origin. Nevertheless, figure 4.4 indicates that the proportion of items subject to the most restrictive — that is, 2-digit — variant of the CTC test in the first formulation of the respective origin tests is significantly lower in the United States–Singapore and the United States–Chile agreements (33 per cent and 37 per cent, respectively) than in NAFTA (54 per cent). Similarly, the proportion of items subject to the most liberal variant of the CTC test is much higher in the later agreements (21 per cent and 23 per cent, respectively) than in NAFTA (5 per cent). The adoption of less restrictive provisions was not more widespread with successive agreements, however. For example, a higher proportion of tariff items in the later United States–Chile agreement are subject to the more restrictive 2-digit CTC test than in the earlier United States–Singapore agreement.

The adoption of more liberal CTC provisions in the first formulation is reflected in lower restrictiveness scores for the later agreements compared to NAFTA. In these agreements, the 4-digit tariff heading is most commonly applied to test origin compared with the 2-digit test in NAFTA.

Figure 4.4 **Comparison of RoO in NAFTA, United States–Singapore and United States–Chile agreements**

Based on first RoO formulation only, percentage of tariff line items



Source: Based on Estevadeordal and Suominen (2003).

## 4.2 European-based PTAs

Of the 18 PTAs analysed, five — EFTA, European Union–Egypt, European Union–Poland, PANEURO and European Union–Mexico — are considered as European-based.

### Primary criteria

The CTC test at the 4-digit level is the main primary criterion applied in PTAs associated with the European Union. In addition to this test, RVC tests and sector-specific technical requirements tests are also applied. The specification of origin requirements varies markedly across economic sectors. After all the provisions of the European Union-based origin rules are taken into account, a relatively high and uniform restrictiveness score is assigned. The relatively uniform scores reflect the European Union’s drive to harmonise its existing and future preferential RoO regimes in order to reduce the compliance and other costs of exporting within the preferential trading framework.

One notable development is that newer PTAs involving the European Union allow for alternative ways of determining origin for about a quarter of the 8-digit tariff

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items, whereas rules in the earlier agreements tended to be based on one set of rules for each item. The introduction of choice in the determination of origin adds to complexity and, in this study, would increase the restrictiveness score for an agreement relative to other agreements, other things being equal.

### **Supplementary criteria**

European Union origin regimes apply more liberal de minimis rules than those applied under NAFTA. However, detailed provisions vary between sectors. For example, the de minimis rules applied to textiles and apparel are less liberal than those applied to other sectors. The application of exceptions limits possible reductions in the restrictiveness score in this study.

The European Union's Pan-European system of diagonal cumulation, applied since 1997, incorporates 16 partners (European Union plus 15 other central and eastern European countries). This system allows producers to use components originating in any of the participating economies without losing the preferential status of the final product. This liberalising provision lowers the restrictiveness score of these agreements relative to other agreements.

The European Economic Area agreement between the EFTA and European Union permits full cumulation, thereby lowering the restrictiveness score relative to other agreements.

European Union-based PTAs explicitly preclude duty drawback provisions. However, a phase-out period of up to two years was allowed for Mexico in the European Union–Mexico agreement. The exclusion of duty drawback raises the restrictiveness score relative to agreements not precluding drawback.

## **4.3 PTAs in the Asia–Pacific region**

Of the 18 PTAs analysed, five — SPARTECA, CER, AFTA, Singapore–New Zealand and SAFTA — are based in the Asia–Pacific region.

### **Primary criteria**

The relative complexity of RoO in the American and European regions stands in contrast to the simplicity of RoO in many Asia–Pacific PTAs. The main criterion used in these agreements is the RVC rule based on the factory cost method — for example, with thresholds of 25 or 40 per cent in the Singapore–New Zealand agreement and 50 per cent in the CER. Apart from SAFTA, they also impose a

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geographical requirement for the last stage of manufacturing to be performed in the exporting partner country.

### **Supplementary criteria**

All PTAs in this region allow for bilateral cumulation and to some extent diagonal cumulation. However, products from the South Pacific Islands which cumulate with Australia's inputs in the production of goods for export to New Zealand have to have a minimum of 25 per cent of South Pacific Island content. The allowance of cumulation lowers the restrictiveness score relative to the case of no cumulation in other agreements.

CER and SPARTECA allow a one-off 2 per cent tolerance in the RVC for particular certain short-term circumstances in exporting. All five agreements permit duty drawback, lowering the restrictiveness score relative to agreements not allowing drawback.

Outward processing is recognised in all of Singapore's PTAs, including those with Australia and New Zealand. The outward processing provisions enable Singapore to outsource part of the manufacturing process, usually the lower value added or labour-intensive activities, to neighbouring economies and still count the value of Singaporean production done prior to the outsourcing activity as local Singaporean content. The allowance for outward processing is a form of cumulation and lowers the restrictiveness score for the relevant agreements.

## **4.4 Weighted index**

Examination of the provisions of various RoO indicates the potential restrictiveness of those regimes and the variability between regimes. However, the effects on trade and resource use are also influenced by the MFN tariff environment and the associated 'margin of preference' conferred by trade agreements.<sup>3</sup> Generally speaking, the higher the margins of preference conferred by trade agreements, the greater the potential for RoO regulations to distort production decisions and trade flows relative to the case where there are no origin rules.<sup>4</sup> Significant differences in

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<sup>3</sup> The margin of preference is a measure of the difference between MFN and preferential rates in a PTA member country. The higher the margin of preference, the more important determination of origin would be for sourcing decisions.

<sup>4</sup> Higher tariffs can add to the incentive to create trade between the partner countries and also to divert supplies to the PTA partner to take advantage of the available margins of preference. RoO, by raising input costs of final goods producers, offset these incentives. RoO also result in 'intermediate goods diversion' as the incentive for producers to purchase more expensive or lower quality inputs from within the region is increased.

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tariff rates, and hence margins of preference, between member countries can add to the selectivity of these processes.<sup>5</sup>

To examine the potential interaction of MFN tariff levels between PTA partners' origin rules, WTO (2003) data on tariff levels in individual countries are used to calculate mean and standard deviations of MFN tariff levels in each PTA. These additional measures are then used to re-weight the restrictiveness index scores presented in figure 4.1. The re-weighted restrictiveness indices are shown in figures 4.5 and 4.6, respectively. Because the standardised tariff means and standard deviations are typically less than one, the re-weighted index values generally lower than the basic indexes.<sup>6</sup>

The analysis indicates that the more restrictive origin rules tend to be associated with PTAs where member countries have higher average tariffs and where the differences in tariffs (ie standard deviations) between tariff rates within member countries is also relatively high. For example, the correlation coefficients between the unweighted restrictiveness index (shown in figure 4.1) and the mean applied tariff rates, and the unweighted restrictiveness index and the standard deviation of tariff rates of PTAs are 0.51 and 0.42, respectively.

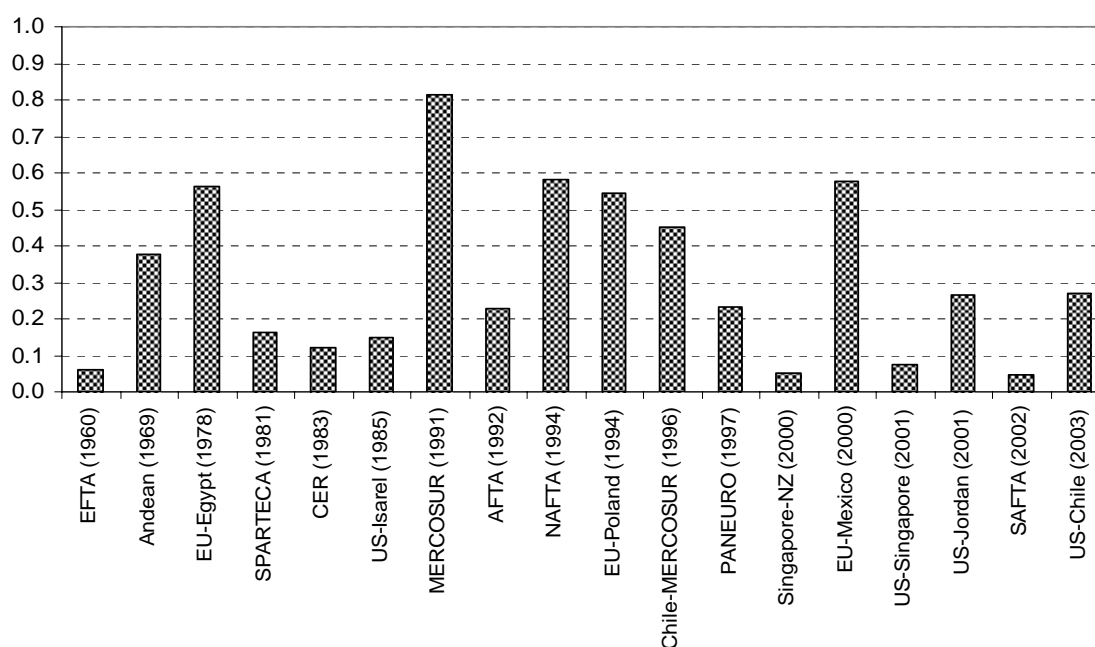
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<sup>5</sup> Tariff differences between partner countries can also add to the incentive for goods to enter a PTA region through the low tariff country for transshipment to the higher tariff country, subject to transport and handling costs.

<sup>6</sup> Tariff means and standard deviations were divided by ten to give equal scale with the calculated index.

Figure 4.5 **Restrictiveness index for preferential RoO weighted by the simple mean of members' tariff rates<sup>a</sup>**

Index score ranges between zero and one



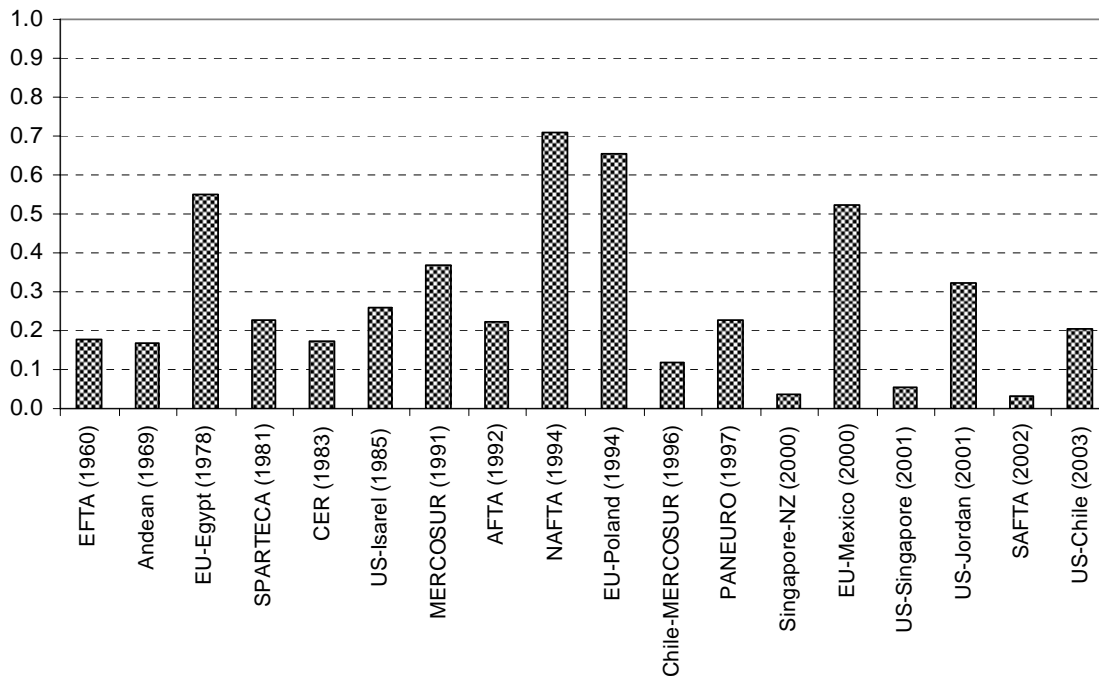
<sup>a</sup> Restrictiveness index in figure 4.1 multiplied by the mean of applied MFN rates of countries in a PTA. Applied MFN rates are for the years 2000 and 2001 and they are scaled to ten — that is, the mean tariff is divided by ten.

Sources: Figure 4.1 and WTO (2003).

The two variants of the restrictiveness index are similarly positively correlated with the unweighted index, with correlation of around 0.76 for both series. The re-weighted data confirm that MERCOSUR and the NAFTA RoO are amongst the more distorting. The relatively low tariff levels and variability for Australia and New Zealand is reflected in relatively low re-weighted index values for CER. However, the indexes are not perfectly correlated, indicating some significant variability in the relationship between the estimated restrictiveness of RoO and tariffs structures. For example, RoO associated with the United States–Singapore agreement are moderately restrictive according to the basic index calculations (figure 4.1). However, average tariffs in Singapore and the United States are relatively low, suggesting that the distorting effects of the origin rules are also low by comparison with other agreements. Nevertheless, the least restrictive agreements according to the analysis of this study are the Singapore–New Zealand agreement and SAFTA. These agreements are characterised by less restrictive origin requirements that have been implemented in an environment of relatively low tariffs.

**Figure 4.6 Restrictiveness index for preferential RoO weighted by the standard deviation of members' tariff rates<sup>a</sup>**

Index score ranges between zero and one



<sup>a</sup> Restrictiveness index in figure 4.1 multiplied by the standard deviation of applied MFN rates of countries in a PTA. Applied MFN rates are for the years 2000 and 2001 and they are scaled to ten — that is, the standard deviation of tariff rates is divided by ten.

Sources: Figure 4.1 and WTO (2003).

## 4.5 Summing up

In summary, the results show significant variation in the restrictiveness of RoO across PTAs. This variation and the uneven incidence of individual provisions across PTAs are likely to affect the extent and the pattern of merchandise trade between the member and non-member economies and the allocation of resources. Variation in external tariffs and the tariff concessions based on them are also likely to contribute to those effects.

Compared with the level of restrictiveness identified for other PTAs, restrictiveness of CER RoO would appear to be relatively low to moderate. Re-weighting of the index by a measure of the variability of MFN tariff, a measure of the potential of RoO to distort trade and resource allocation, confirms a low to moderate restrictiveness rating for CER RoO.

# A Index details

Table A.1 **Restrictiveness index for preferential RoO — index in detail**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>PRIMARY CRITERIA</b>		
<b>0.20</b>		<b>Change in tariff classification</b>
	0.00	Tariff item (HS 8-digit)
	0.20	Sub-heading (HS 6-digit)
	0.50	Heading (HS 4-digit)
	1.00	Chapter (HS 2-digit)
		<b>Regional value content or percentage criterion</b>
<b>0.10</b>		<i>Percentage of originating material</i>
	0.00	Less than 25%
	0.20	26-35%
	0.40	36-45%
	0.60	46-55%
	0.80	56-65%
	1.00	More than 65%
<b>0.02</b>		<i>Formulation of regional value content</i>
	0.00	Any method
	0.30	Import content
	0.60	Domestic content
	1.00	Value of parts
<b>0.02</b>		<i>Elements of production costs for domestic content</i>
	0.00	All costs included
	0.10	Taxes and duties paid on materials excluded
	0.20	Indirect labour also excluded
	0.30	Other capital costs also excluded
	0.40	Inner containers also excluded
	0.50	Other packaging expenses also excluded
	0.70	Selling, general and administrative expenses also excluded
	1.00	Profits also excluded

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**Table A.1 (continued)**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.02</b>		<i>Treatment of determined manufactured raw materials</i>
	0.00	Imports from all zero tariff line items to member economies are treated as eligible expenditures
	0.50	Imports from selected zero tariff line items to member economies are treated as eligible expenditures
	1.00	No provision for allowing DMRM in calculating domestic content
<b>0.02</b>		<i>Methods of qualifying production costs</i>
	0.00	Any method
	0.25	Transaction value method
	0.50	Net cost method
	1.00	Factory cost method
<b>0.02</b>		<i>Valuation of non-originating materials</i>
	0.00	Not relevant or unspecified
	0.25	Free into store (fis)
	0.50	Cost, insurance and freight (cif)
	0.75	Free on board (fob)
	1.00	Ex-factory cost
<b>0.10</b>		<b>Type of specified manufacturing process test applied</b>
	0.00	No test
	0.50	Positive test for specific process
	1.00	Negative test for specific process
<b>0.10</b>		<b>Sector-specific rules</b>
	0.00	All sectors treated uniformly
	0.50	Single manufacturing sector (eg TCF) only
	1.00	Multiple sectors (eg TCF & PMV)
<b>SUPPLEMENTARY CRITERIA</b>		
<b>0.05</b>		<b>Type of cumulation</b>
	0.00	All
	0.20	Diagonal
	0.40	Full
	0.60	Bilateral
	1.00	No cumulation
<b>0.05</b>		<b>Provisions that go beyond cumulation</b>
	0.00	Cumulation allowed
	0.10	Tolerance or de minimis allowed
	0.25	Absorption principle
	0.50	Tracing test
	1.00	Absorption principle, tracing and tolerance tests not used

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**Table A.1 (continued)**

<i>Weight</i>	<i>Score</i>	<i>Restriction category</i>
<b>0.05</b>		<b>Duty drawback</b>
	0.00	Drawback allowed
	1.00	Drawback not allowed
<b>0.05</b>		<b>Territoriality or outward processing</b>
	0.00	Territoriality or outward processing included
	1.00	Territoriality or outward processing excluded
<b>0.05</b>		<b>Geographic location of manufacturing process</b>
	0.00	Anywhere or not specified
	0.50	Any partner country
	1.00	Exporting partner country only
<b>OTHER EFFECTS OF RoO</b>		
<b>0.05</b>		<b>Degree of certainty</b>
	0.00	Higher certainty (eg CTC alone or technical test)
	1.00	Lower certainty (eg RVC or combination of CTC and RVC or technical test)
<b>0.05</b>		<b>Compliance and administration costs</b>
	0.00	Most PTA members are only a member of one PTA
	0.50	Most PTA members are involved in more than one PTA with similar RoO
	1.00	Most PTA members are involved in more than one PTA with multiple RoO
<b>0.05</b>		<b>Rigidity</b>
	0.00	No rigidity: waiver provision applied to all tariff items
	0.25	Partial rigidity: waivers allowed for a minority of tariff items
	0.50	More than partial rigidity: waivers allowed for a majority of tariff items
	1.00	Global rigidity: no waiver, RoO applies to all tariff items
<b>1.00</b>		<b>GRAND TOTAL</b>

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Table A.2 Restrictiveness index for preferential RoO — detailed results by PTA

<i>Restriction category</i>	<i>EFTA (1960)</i>	<i>Andean (1969)</i>	<i>EU- Egypt (1978)</i>	<i>SPARTECA (1981)</i>	<i>CER (1983)</i>	<i>US-Israel (1985)</i>	<i>MERCOSUR (1991)</i>	<i>AFTA (1992)</i>	<i>NAFTA (1994)</i>
<b>PRIMARY CRITERIA</b>									
Change in tariff classification	0.000	0.000	0.060	0.000	0.000	0.000	0.100	0.000	0.200
Regional value content or percentage criterion									
<i>Percentage of originating material</i>	0.060	0.060	0.040	0.060	0.060	0.040	0.060	0.040	0.060
<i>Formulation of regional value content</i>	0.012	0.006	0.006	0.012	0.012	0.012	0.006	0.006	0.012
<i>Elements of production costs for domestic content</i>	0.000	0.002	0.000	0.000	0.020	0.010	0.010	0.001	0.010
<i>Treatment of determined manufactured raw materials</i>	0.010	0.010	0.010	0.020	0.010	0.020	0.020	0.010	0.010
<i>Methods of qualifying production costs</i>	0.005	0.005	0.005	0.020	0.020	0.005	0.005	0.005	0.005
<i>Valuation of non-originating material</i>	0.010	0.005	0.005	0.020	0.020	0.015	0.015	0.015	0.015
Specified manufacturing process test	0.050	0.050	0.100	0.000	0.000	0.000	0.100	0.000	0.050
Sector-specific rules	0.000	0.000	0.000	0.050	0.000	0.000	0.050	0.000	0.100
<b>Subtotal</b>	<b>0.147</b>	<b>0.138</b>	<b>0.226</b>	<b>0.182</b>	<b>0.142</b>	<b>0.102</b>	<b>0.366</b>	<b>0.077</b>	<b>0.462</b>
<b>SUPPLEMENTARY CRITERIA</b>									
<i>Type of cumulation</i>	0.010	0.030	0.030	0.010	0.010	0.030	0.030	0.030	0.030
<i>Provisions that go beyond cumulation</i>	0.005	0.013	0.005	0.005	0.005	0.005	0.005	0.005	0.005
<i>Duty drawback</i>	0.025	0.000	0.000	0.000	0.000	0.025	0.050	0.000	0.000
<i>Territoriality or outward processing</i>	0.050	0.025	0.050	0.025	0.050	0.025	0.000	0.050	0.025
<i>Geographic location of manufacturing process</i>	0.025	0.025	0.025	0.050	0.000	0.025	0.025	0.025	0.025
<b>Subtotal</b>	<b>0.105</b>	<b>0.093</b>	<b>0.110</b>	<b>0.090</b>	<b>0.065</b>	<b>0.110</b>	<b>0.110</b>	<b>0.110</b>	<b>0.085</b>
<b>OTHER EFFECTS OF RoO</b>									
<i>Degree of certainty</i>	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
<i>Compliance and administration costs</i>	0.025	0.000	0.025	0.000	0.025	0.000	0.025	0.025	0.025
<i>Rigidity</i>	0.025	0.050	0.050	0.013	0.050	0.050	0.050	0.050	0.050
<b>Subtotal</b>	<b>0.100</b>	<b>0.100</b>	<b>0.125</b>	<b>0.063</b>	<b>0.125</b>	<b>0.100</b>	<b>0.125</b>	<b>0.125</b>	<b>0.125</b>
<b>GRAND TOTAL</b>	<b>0.352</b>	<b>0.330</b>	<b>0.461</b>	<b>0.335</b>	<b>0.332</b>	<b>0.312</b>	<b>0.601</b>	<b>0.312</b>	<b>0.672</b>

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Table A.2 (continued)

<i>Restriction category</i>	<i>EU- Poland (1994)</i>	<i>Chile- MERCOSUR (1996)</i>	<i>PANEURO (1997)</i>	<i>Singapore- NZ (2000)</i>	<i>EU- Mexico (2000)</i>	<i>US- Singapore (2001)</i>	<i>US- Jordan (2001)</i>	<i>SAFTA (2002)</i>	<i>US- Chile (2003)</i>
<b>PRIMARY CRITERIA</b>									
Change in tariff classification	0.100	0.000	0.100	0.000	0.100	0.050	0.000	0.000	0.100
Regional value content or percentage criterion									
<i>Percentage of originating material</i>	0.100	0.080	0.080	0.040	0.060	0.040	0.040	0.040	0.060
<i>Formulation of percentage criteria</i>	0.006	0.006	0.006	0.012	0.006	0.012	0.012	0.012	0.006
<i>Elements of production costs for domestic content</i>	0.006	0.002	0.000	0.006	0.006	0.000	0.020	0.006	0.010
<i>Treatment of determined manufactured raw materials</i>	0.010	0.020	0.000	0.000	0.020	0.010	0.010	0.000	0.010
<i>Methods of qualifying production costs</i>	0.005	0.010	0.005	0.020	0.005	0.005	0.010	0.020	0.005
<i>Valuation of non-originating material</i>	0.005	0.015	0.005	0.015	0.015	0.015	0.005	0.015	0.015
Specified manufacturing process test	0.050	0.000	0.050	0.000	0.050	0.050	0.000	0.000	0.000
Sector-specific rules	0.050	0.050	0.050	0.000	0.050	0.050	0.000	0.000	0.050
<b>Subtotal</b>	<b>0.332</b>	<b>0.183</b>	<b>0.296</b>	<b>0.093</b>	<b>0.312</b>	<b>0.232</b>	<b>0.097</b>	<b>0.093</b>	<b>0.256</b>
<b>SUPPLEMENTARY CRITERIA</b>									
<i>Type of cumulation</i>	0.010	0.030	0.010	0.030	0.030	0.010	0.010	0.030	0.020
<i>Provisions that go beyond cumulation</i>	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
<i>Duty drawback</i>	0.025	0.025	0.050	0.000	0.000	0.000	0.025	0.000	0.025
<i>Territoriality or outward processing</i>	0.050	0.025	0.000	0.050	0.050	0.000	0.025	0.000	0.000
<i>Geographic location of manufacturing process</i>	0.025	0.025	0.025	0.025	0.025	0.025	0.000	0.000	0.025
<b>Subtotal</b>	<b>0.115</b>	<b>0.110</b>	<b>0.080</b>	<b>0.110</b>	<b>0.080</b>	<b>0.040</b>	<b>0.065</b>	<b>0.035</b>	<b>0.075</b>
<b>OTHER EFFECTS OF RoO</b>									
<i>Degree of certainty</i>	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
<i>Compliance and administration costs</i>	0.050	0.025	0.050	0.025	0.025	0.050	0.025	0.025	0.050
<i>Rigidity</i>	0.050	0.050	0.050	0.025	0.050	0.013	0.050	0.025	0.025
<b>Subtotal</b>	<b>0.150</b>	<b>0.125</b>	<b>0.150</b>	<b>0.100</b>	<b>0.125</b>	<b>0.113</b>	<b>0.125</b>	<b>0.100</b>	<b>0.125</b>
<b>GRAND TOTAL</b>	<b>0.597</b>	<b>0.418</b>	<b>0.526</b>	<b>0.303</b>	<b>0.517</b>	<b>0.385</b>	<b>0.287</b>	<b>0.228</b>	<b>0.456</b>



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