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AN ECONOMETRIC ANALYSIS IN THE REGIONAL COMPREHENSIVE ECONOMIC PARTNERSHIP

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ABSTRACT

Rules of origin differ among overlapping free trade agreements, raising firm compliance costs, discouraging utilization of trade preferences, and hindering regional value chains. Using a unique dataset comparing the restrictiveness of product-specific rules of origin (PSRO) between the Regional Comprehensive Economic Partnership (RCEP) and other free trade agreements in Asia based on manufacturing requirements, this study aims to identify the factors explaining the stringency of RCEP PSROs. The econometric analysis based on maximum-likelihood models shows that economic sectors and political economy determinants and negotiating capacities significantly influence PSRO stringency under the RCEP. In particular, restrictiveness scores we develop show that (i) products for which developing RCEP members exhibit a strong revealed comparative advantage face stricter PSROs, and (ii) the degree of sophistication of the production process is positively related to PSRO leniency. This casts doubt on the potential for RCEP to provide a viable solution to the existing "noodle bowl" of rules of origin in Asia and reduce firms' costs of compliance in developing economies. It also demonstrates the need to strengthen aid for trade in policy and negotiations in developing Asia.

Keywords: international trade agreements, product-specific rules of origin, market access, RCEP, regional integration, political economy

JEL codes: F13, F15

I. Introduction

In a globalized world dominated by international value chains, preferential rules of origin have become one of most impactful trade policy tools to foster regional integration. [1] Defined by the World Trade Organization (WTO) as "the criteria needed to determine the national source of a product",[2] in free trade agreements (FTAs), they formally differentiate products originating in a member country from those originating in nonmember economies, thus determining the eligibility of a product for preferential tariff treatment.

While not a recent phenomenon, global value chains have rapidly emerged in recent decades because of technological innovations in transportation and communication, reducing costs and enabling countries to specialize in the production of components. [3] The fragmentation of production processes across countries has therefore substantially grown and inputs are sourced from suppliers around the world. In 2022, intermediate goods accounted for approximately half of total trade.[4]

With widespread internationalization of production, determining the origin of a good is increasingly challenging. The vast majority of non-primary products traded in international markets rarely originate from a single country and the involvement of multinational firms further complicates determination of origin (Gourevitch, Bohn, and McKendrick 2000 in Harilal and Beena 2005). In this context, rules of origin determination is critical, especially when combined with the flourishing of free trade areas. Rules of origin are an essential instrument to limit the cost of potential trade deflection while ensuring a sufficient degree of trade creation and ensure a positive welfare impact.[5] They ensure that goods traded between member countries and benefitting from the preferential treatment are not simply assembled in a member country by using components exclusively originating from third countries. In the absence of rules of origin, products from third countries could be imported by the country exhibiting the lowest tariff to enter the FTA and benefit from preferential treatment when reexported within the trade bloc (Felbermayr, Teti, and Yalcin). At the same time, it is essential to take into account the costs such rules impose on firms ensuring that these do not act as a deterrent to their utilization of FTA. Understanding the industrial context, needs of companies, availability of inputs, and available technologies is essential in designing rules of origin.

The tradeoff between the benefits of lenient rules of origin allowing firms—particularly medium and small enterprises—to reap the benefits of an FTA and the potential cost of trade deflection

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[1] Preferential rules of origin are used in reciprocal or non-reciprocal agreements. Non-preferential rules of origin determine the origin of the good independently of any preferential treatment at the border and are mostly used to apply WTO agreements (ex. anti-dumping or countervailing duties).
[2] WTO. Technical Information on Rules of Origin. https://www.wto.org/english/tratop_e/roi_e/roi_info_e.htm.
[3] WTO. 2014. World Trade Report 2014. Chapter C. The Rise of Global Value Chains. https://www.wto.org/english/res_e/booksp_e/wtr14-2c_e.pdf.
[4] WTO. 2023. Exports of Intermediate Goods Post Sustained Growth in Second Quarter of 2022. https://www.wto.org/english/news_e/news23_e/stat_01feb23_e.htm#:~:text=The%20share%20of%20IGs%20in,activity%20in%20global%20supply%20chains.
[5] Trade deflection refers to cases where products from nonmember exporters enter the free trade bloc via the member with the lowest tariff, and subsequently move duty-free to higher-tariff members.

has long been discussed in the trade policy sphere. While such economic objectives could be assumed to be at the heart of trade negotiations, this paper shows that political considerations with disproportionate influence from large economies may be the major factor at play. Understanding these dynamics is essential to assess whether an FTA will deliver its expected benefits and to orient future (re-)negotiations towards more effective trade deals, such as in the case the Regional Comprehensive Economic Partnership (RCEP).

The creation of a common rules of origin platform among 15 economies in Asia and the Pacific is often perceived as one of the most significant trade-liberalizing benefits offered by the RCEP. The wide geographical coverage of the agreement and its cumulation provision is expected to foster regional value chains through stronger incentives to source inputs within the region, and lower costs of compliance and heterogeneity for exporting companies. [6] However, RCEP rules of origin only provide an alternative to the existing "noodle bowl" of overlapping rules of origin in the region, but do not supersede rules applicable in pre-existing agreements. RCEP rules of origin thus may well turn into an additional layer of complexity depending on how they have been designed and negotiated.

While the RCEP does provide an opportunity to simplify the complex mosaic of overlapping rules of origin, the market access benefits and resulting wider economic gains of the agreement can only be assessed in the industrial context of the region based on the stringency of the product-specific rules of origin (PSRO) and tariff concessions. Recent research (Crivelli, Inama, and Pearson 2022, 2023) has shown that the PSROs contained in the RCEP are neither more liberal than those of the ASEAN Trade in Goods Agreement (ATIGA), nor than those of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and selected ASEAN+1 FTAs. This already suggests the possible use of rules of origin as a protectionist instrument by some RCEP members with significant bargaining power, compensating or offsetting the benefits of tariff reduction. Negotiations to determine RCEP PSROs for the 5,205 tariff lines were notably slow and difficult, according to Rillo, Robeniol, and Buban (2022). Prior to the 6th RCEP Intersessional Trade Negotiating Committee Meeting and Related Meetings of 24 August 2019, 86.72% of total tariff lines (or 4,514 subheadings) were agreed on by the TF-PSR (PSRO Task Force)[7], the last body under the committee to complete its task (Rillo, Robeniol, and Buban 2022). These difficult negotiations, mirroring those of tariff concessions that tediously lasted for 8 years,[8] can be seen as the result of diverging interests among member countries.

Studies on PSRO stringency such as Portugal-Perez (2011) in the case of North American Free Trade Agreement (NAFTA) show that developed countries have significant bargaining power during negotiations and can craft rules of origin according to their interests and at the expense of developing partners. Did similar dynamics apply to RCEP?

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[6] RCEP Article 3.4 provides for diagonal cumulation of originating materials with the possibility to design a full cumulation scheme in the future.
[7] RCEP TNC Chair's Guidance to Working Groups and Sub-Working Groups, 24 August 2019, the ASEAN Secretariat, Jakarta.
[8] Rillo, Robeniol, and Buban (2022) note: "One key challenge was the lack of readiness of [countries] to exercise flexibility. Many, if not all [countries], took hard-line positions, making it difficult to reach consensus."

Using a unique dataset codifying the PSRO stringency based on their industrial process requirements at the 6-digit level of the Harmonized Commodity Description and Coding System (HS 6), this study aims to identify the factors explaining the relative restrictiveness of RCEP PSROs when compared with ATIGA, CPTPP, and ASEAN+1 trade agreements, focusing on political economy determinants.

The innovative codification of the PSRO restrictiveness and methodology developed in this paper represents a major contribution to the literature. For the first time, PSRO restrictiveness has been tailored to the subtance of the PSRO in a given sector rather than being based on an abstract predetermined coding related essentially to the form of the rules.[9] To identify potential differences in bargaining power between RCEP countries depending on their level of economic advancement,[10] we separate RCEP members into developing countries (Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar,[11] the Philippines, Thailand, and Viet Nam) and developed countries (Australia, Brunei Darussalam, Japan, the Republic of Korea, New Zealand, and Singapore). Due to its economic size, the People's Republic of China is analyzed separately.

First, we compare RCEP PSROs with those of six other agreements one by one using a probit model. In a second stage, we build restrictiveness scores at the product level to investigate the factors influencing the relative PSRO stringency employing ordered logit models. The empirical specifications take into account sectors and variables reflecting potential trade deflection as well as revealed comparative advantages. We find that political determinants and negotiating capacities significantly influence the stringency of PSROs under RCEP. The restrictiveness scores we develop show that products for which developing countries have a strong revealed advantage face stricter PSROs. Comparing the RCEP with other agreements individually shows that the People's Republic of China's (PRC) revealed comparative advantages favorably influence PSRO stringency. Both analyses reveal that the degree of knowledge sophistication needed to produce a product is negatively associated with PSRO stringency. Such a finding is favorable to the few RCEP developed members where these highly sophisticated goods are produced. Overall, the higher the value of exports from developing to developed RCEP partners for a particular product, the stricter its associated PSRO. In contrast, PSROs tend to be lenient for highly traded products from developed to developing members.[12]

Section II provides a brief overview of the major contribution to the literature on the the cost of compliance of rules of origin and their determinants. Section III reviews the indexes commonly

[9] The substance of a PSRO refers to the requirement of working or processing for a product to achieve substantial transformation, and therefore acquire originating status and eligibility for preferential treatment at the time of exportation. The form of the PSRO refers to its drafting technique, independently of its content or stringency.
[10] Based on World Bank income groups. Developed countries correspond to high-income countries while developing countries are all other countries. See https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups for more information.
[11] Effective 1 February 2021, ADB placed a temporary hold on sovereign project disbursements and new contracts in Myanmar.
[12] RCEP developed members are Australia, Japan, the Republic of Korea, Brunei Darussalam, New Zealand, and Singapore. Developing members are Cambodia, Indonesia, the Philippines, Malaysia, Myanmar, Thailand, and Viet Nam.

used in the literature to quantify PSRO restrictiveness and highlights their shortcomings. Section IV introduces our new method to build measures based on relative stringency.

Section V presents the variables and econometric frameworks employed to examine the determinants of RCEP PSRO restrictiveness using our new measurements. Estimation results obtained when comparing RCEP with the six other agreements using a probit and fractional logit models are presented in section V. Section VI concludes.

II. Literature

Rules of origin have been characterized in the economic literature as carrying a series of disadvantages. In addition to compliance with the PSROs in industrial process, rules of origin also imply substantial costs in red tape (Cadot et al. 2006 and Carrère and de Melo 2006), such as documentation and certification procedures. For example, in the case of NAFTA, Anson et al. (2005) find that administrative costs account for almost half of the preference margin. Unsurprisingly rules of origin are used as protectionist tools. Several authors in the 1990s and 2000s, such as Harilal and Beena (2005), note a growing tendency to use them as nontariff barriers to trade, especially for producers of intermediates (Hoekman 1993; James 1997, in Harilal and Beena 2005), as traditional protectionist policies are increasingly constrained (Destler 2006). More stringent rules of origin on local content to protect regional producers of intermediate goods affect companies producing final goods by preventing them from choosing the most efficient supplier around the world (Conconi et al. 2018). As a consequence, regional producers have to rely on less efficient internal input sources, raising production costs. This induces these producers to also request protection, leading to “cascading protection along the production chain” (Harilal and Beena 2005, Hoekman 1993).

The stringency of PSROs is influenced by trading interests, and lobbies defending the interests of specific product groups in each member country may try to influence negotiation positions. In addition, the stringency of rules of origin can result from differing bargaining power between member countries (Portugal-Perez 2011). When trade agreements involve member countries with varying levels of development, more economically developed countries may have considerably more influence on the stringency of rules of origin. Authors such as Anson et al. (2005) argue that “southern partners are left on their participation constraint” when they are involved in vertical trade agreements, as they are eventually provided with little market access.

Moreover, rules of origin can be used as an instrument to create captive markets, according to the trade suppression mechanism described by Rodriguez (2001). Strict rules of origin are imposed by intermediate goods producers to force downstream companies located in other parties to buy their products instead of inputs produced by more efficient and cheaper competitors located in third countries. Since developed member countries are more likely to produce capital-intensive intermediate goods and firms located in developing member countries are more likely to only assemble final goods, northern countries tend to benefit from vertical trade agreements.

Rules of origin can consequently limit trade "beyond what is needed to prevent trade deflection", as they can be used as protectionist instruments or contribute to the creation of captive markets. Empirical evidence corroborates the role played by political economy determinants in explaining the stringency of rules of origin. In the case of the North American Free Trade Agreement (NAFTA), Portugal-Perez (2011, 276–305) captures the stringency of rules of origin by using an ordinal index (R-index).[13] Performing regression analysis with an ordered probit approach over 4,074 observations at the HS6 level, [14] Portugal-Perez finds that the stringency of rules of origin is considerably influenced by United States political economy determinants. Stricter PSROs were obtained by import-competing industries, which benefited from the highest degree of protection before NAFTA. By contrast, more lenient PSROs were granted to export-oriented sectors characterized by a high degree of competitiveness before NAFTA. These results illustrate that differences in bargaining power between countries depend on their level of economic development. Using a similar R-index and analyzing NAFTA as well as the Single List of the European Union's PANEURO system covering the EU's preferential trade agreements, Cadot et al. (2006) find that higher values taken by the index are positively associated with most favored nation tariff peaks. This, according to the authors, suggests that the political economy determinants, i.e., special interest pressures, causing tariff peaks, also influence the stringency of rules of origin.

The distortive effects of rules of origin detrimental to developing countries are corroborated by empirical evidence examining trade flows. Analyzing NAFTA, tracing intermediate goods affected by sourcing restrictions and tracing final goods imposing sourcing restrictions for every intermediate good, Conconi et al. (2018) find that growth in Mexican imports of intermediate goods from nonmember countries was reduced because of rules of origin on final goods. In particular, the magnitude of the reduction depends on "whether change in tariff classification rules were combined with alternative value added rules" or not, among other factors. Because tariffs on inputs are lower than tariffs on final goods, sourcing restrictions therefore considerably raise their effective rate of protection, leading to trade diversion.

Some of the above contributions (e.g., Cadot et al. 2006, Portugal-Perez 2011) use an index of restrictiveness first elaborated by Estevadeordal (2000) and further developed by other authors in subsequent contributions to capture the stringency of PSROs. Inama (2022), examining the limits of such an index of restrictiveness and the consequent literature, shows that restrictiveness is not correctly measured because the score allocated to a particular PSRO in the index does not vary across the HS system, leading to biases in regression results. Hoekman and Inama (2018) point out that economic research on rules of origin is limited because the methodologies often rely on the estimation of *ad valorem* tariff equivalents of the rules or the creation of stringency indexes assess their distortions on trade.

Such efforts are admittedly critical to understand how rules of origin can be used as nontariff barriers. However, they may not be useful to inform governments cooperating on the draft of PSROs as part of trade agreement negotiations. Detailed analysis of PSROs is required for understanding how they have changed and where they have been adopted by governments. This study suggests a new reading and coding of the product specific rules of origin contained in FTAs,

[13] The different PSROs are classified on a 1–7 scale, where lower values indicate more lenient requirements.
[14] Each observation corresponds to a specific PSRO.

based on a model elaborated by Inama (2022) and, developed and applied in recent research on Asian FTAs (Crivelli, Inama, and Pearson 2022, 2023).

III. Measuring Rules of Origin Restrictiveness

A review of rules of origin stringency indexes

Studies examining the impacts or the effects of PSRO restrictiveness usually use an R-index. The first index to measure the stringency of rules of origin was developed by Estevadeordal (2000) and further elaborated by (Cadot et al. 2006, Portugal-Perez 2011, Hayakawa 2014, Kohpaiboon and Jongwanich 2022).

Each different type of PSRO is given a particular score, depending on their stringency based on the "form" of the PSRO—the way the PSRO is drafted—to establish a ranking. The index is based on the following general logic in terms of change of tariff classification (CTC) rules. A change of tariff subheading (CTSH) is less stringent than a change of tariff heading (CTH), and the latter is more lenient than a change of chapter (CC). In a modified version developed by Cadot et al. (2006) and subsequently used by Portugal-Perez (2011), allowances and exceptions are considered in the design of the index. For example, while CTH alone corresponds to a stringency value of 4, the latter decreases to 3 if an allowance requirement is added to the CTH rule. The value becomes 5 if a technical requirement and exception or wholly obtained criteria accompany the rule.

To our knowledge, Kohpaiboon and Jongwanich (2022) is the only contribution using an R-index in the RCEP assigning a score ranging from 1 (lowest stringency) to 7 (highest stringency) to the agreement's PSROs. The wholly obtained/produced criterion (WO) is considered the most stringent form of PSRO and therefore gets a score of 7, except for products classified in the first 24 chapters of the HS classification, where it receives the value of 1.[15] With a score of 5, CC is also classified by the authors as one of the most restrictive forms of PSRO. Regional value content (RVC)40 and CTH are both granted the score of 3. CTSH is considered as the least restrictive PSRO and is assigned a score of 1.

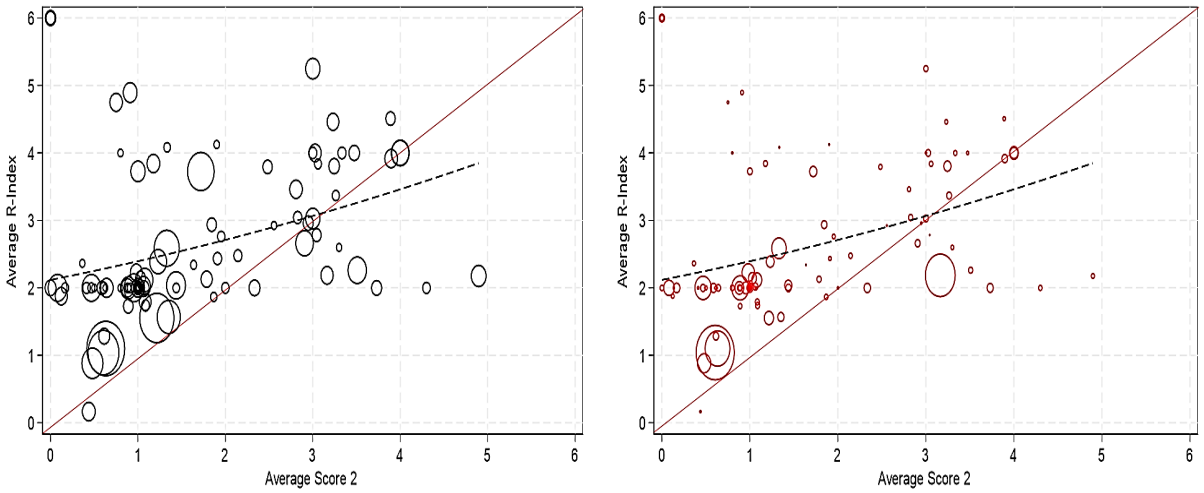
A major disadvantage of the vast majority of these indexes[16] and their elaboration is that they do not relate the "form", i.e., the way in which the PSRO is drafted, to the specific sectors where the PSRO is applicable. A particular form of PSRO may not yield the same degree of stringency across all sectors. For example, in the case of raw agricultural products, the WO criterion may not be particularly stringent since the goods do not usually include components or ingredients from other countries. By contrast, WO would be extremely restrictive for electronic equipment. The R-Index measurements used in the literature fail to reflect these critical distinctions.

[15] While this correction is aimed at addressing the concern that a WO criterion is less stringent in agricultural products than in more complex industrial goods, it is not providing an adequate solution to properly reflect the stringency of the different rules. For example, a CTH or CTSH in food preparation is still less restrictive than a WO rule.

[16] With the exception of Kohpaiboon and Jongwanish (2022) adjustments of the WO criterion in agricultural chapters. As described in the previous footnote, this method still presents limitations.

In a similar vein, the industry or agriculture sector influences the restrictiveness of a change of HS chapter requirement (CC). In the case of chapter 87, CC would be very stringent because cars and parts of cars are categorized in the same chapter. The required CC would not be met because a complex process is required to assemble cars from different parts. By contrast, a simple process such as producing flour (chapter 11) from grinding cereals (chapter 10) would meet the CC requirement. As a consequence, the reality of manufacturing is not reflected if the same score is allocated to this PSRO across different sectors. For instance, in the case of live animals, the wholly obtained rule might be lenient while the same rule might be strict in the case of industrial goods. Manufacturing processes should therefore be carefully examined when codifying the stringency of rules of origin.

Figure 1: Average R-Index and Restrictiveness Score by Chapter



Note: Score 2 counts the number of agreements having more lenient PSROs than RCEP at the HS6 digit level. Its values range from 0 to 6 at the HS6 level. The R index is built following the methodology developed by Kohpaiboon and Jongwanish (2022), excluding their correction for agricultural products. Therefore, the score reflecting the highest degree of restrictiveness for WO is assigned across all sectors. The R-index is rescaled to take values from 0 to 6 instead of values from 1 to 7. The red line pertains to x = y.
The size of the circles in the left panel represents the number of tariff lines for a particular chapter. In the right panel, the size of circles represents the total RCEP trade between developed and developing countries.
Sources: Authors' calculations.

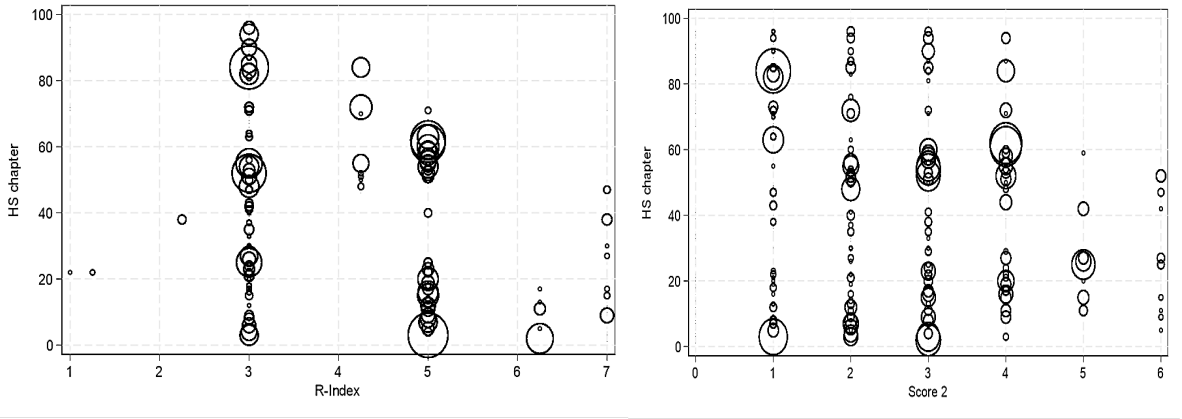
By plotting a typical R-index against our stringency measure, Figure 1 illustrates to which extent a careful analysis of each PSRO in terms of manufacturing requirement is needed to assess the stringency of PSROs instead of using an index based exclusively on the form. On the vertical axis, the plots show an average R-index built following the methodology developed by Kohpaiboon and Jongwanish (2022)[17] allocating a score for each form of PSRO to reflect stringency. This R-index is rescaled and plotted against the average of the second stringency score developed in this paper, based on the number of agreements more lenient than RCEP (see next section). In both cases,

[17] To illustrate the "mainstream" results of an R-Index, we exclude their correction for agricultural products, and instead assign the score reflecting the highest degree of restrictiveness for WO across all sectors.

lower values reflect more leniency. The averages of both measures are calculated by chapter. The Figure shows a positive correlation between the two measurements, but it is much flatter than what is expected from two perfectly correlated variables capturing the same measures. Several outliers can be spotted. In the upper left corner, the data points correspond to agricultural products automatically allocated the most stringent when their PSRO is WO. The other noticeable outlier is chapter 25. While this chapter exhibits the highest average stringency when RCEP is compared with other agreements as revealed by the restrictiveness measure we developed, the R-index would only find an average stringency value. In addition, a considerable number of chapters lie below the fitted line in the bottom left corner. Their presence in this area implies that the average stringency of their PSROs is more lenient than other agreements under the RCEP, while their PSROs are classified as average restrictive by the R-index. Taken together, these chapters account for considerable trade value, as shown by the size of circles in right panel of Figure 1. The misclassification of the stringency of PSROs based exclusively on their form following an R-index can therefore generate strong bias in economic analysis and conclusions.

Figure 2 compares the two types of measurements (the R-index and the relative stringency score we developed by chapter). We show that the first chapters of the HS have lower values under the score we developed compared with the R-index. There is also a much greater proportion of tariff lines located in the lower values of our score (value 1) while values for the R-index are mostly concentrated around 3 and 4. A significant portion of tariff lines for the agricultural chapters and machinery and electrical equipment tend to appear as more lenient following our methodology. Conversely, several chapters are classified as highly restrictive under our score, while the R-index does not properly capture the challenges for the private sector to comply with the rules. For example, a significant number of tariff lines are allocated a score of 5 for Chapter 25 [18] and 42 [19] with our relative stringency score, while PSROs for these lines are categorized as moderately stringent under the R-Index.

Figures 2: Distribution of Stringency Score by HS Chapter



[18] Salt; sulfur; earths and stone; plastering materials, lime, and cement.
[19] Articles of leather; saddlery and harness; travel goods, handbags, and similar containers; articles of animal gut (other than silkworm gut).

Notes: Score 2 counts the number of agreements having more lenient PSROs than RCEP at the HS6 digit level. Its values range from 0 to 6 at the HS6 level. The R index is built following the methodology developed by Kohpaiboon and Jongwanish (2022), excluding their correction for agricultural products. Therefore, the score reflecting the highest degree of restrictiveness for WO is assigned across all sectors. The R-index is rescaled to take values from 0 to 6 instead of values from 1 to 7. Circles' size represents total number of tariff lines.
Source: Authors.

IV. A New Manufacturing Requirement Methodology to Measure the Restrictiveness of PSROs

To determine whether diverging interests shaped the stringency of PSROs under the RCEP and identify potential political economy determinants, we adopt a new approach developed by Crivelli, Inama, and Pearson (2022), and used in their subsequent study in 2023 to compare the PSRO across trade agreements in Asia and the Pacific. More specifically, the RCEP is compared with the CPTPP, ATIGA, and four ASEAN+1 agreements. The CPTPP among Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Viet Nam, is a modern mega-regional agreement that entered into force 3 years before the RCEP. Twelve years older than RCEP, ATIGA entered into effect in 2010, and was followed by the subsequent signing of several ASEAN+1 agreements between ASEAN countries and individual (or group of) dialogue partners. These include the four agreements covered in the present study: that are the ASEAN-Japan Comprehensive Economic Partnership (AJCEP), the ASEAN-Australia-New Zealand FTA (AANZFTA), the ASEAN-People's Republic of China FTA (ACFTA), and the ASEAN-Republic of Korea FTA (AKFTA).

Origin criteria in RCEP, ATIGA, CPTPP, and ASEAN+1 FTAs

To benefit from the preferential tariff negotiated under an FTA, goods need to originate in the FTA territory, i.e., they need to meet origin criteria requiring a product to be either wholly obtained or sufficiently transformed. The WO criterion requires that the good should be entirely produced within the territory of an FTA without addition of any non-originating materials. Products subject to this criterion are generally natural resources and agricultural goods. It is commonly viewed as the strictest criterion. Alternatively, the use of non-originating materials in the production of a good exported under an FTA can be allowed provided that its manufacturing process complies with the criteria defining substantial transformation. The latter criteria are divided into three categories: (i) RVC, (ii) CTC, and (iii) specific working or processing. The CTC and RVC are the two main criteria applied in the RCEP to ensure goods have undergone "substantial transformation".

For the CTC rule to be met, it is required that all non-originating inputs used to produce the finished good have undergone a CTC within an RCEP member country. CTC can occur at three different levels of the HS. A CC, CTH, and a CTSH, respectively, refer to a change in the first two, four, and six digits of the HS code of non-originating inputs used in the production of the exported product. The following examples illustrate CTC rules. Producing apricot jam (chapter 20) by using imported apricots (chapter 8) qualifies as a CC. Producing gold jewelry (HS 7113) by using imported pure gold (HS 7108) is an example of a CTH. Making salts and esters of tartaric acid

(HS 291813) by using imported tartaric acid (HS 291812) is a CTSH (Australian Government 2021). For some products, RCEP PSROs also provide for exceptions to the above CTC. When exceptions are specified in the PSRO, the CTC rule does not apply to all subheadings, headings, or chapters.

Under the RVC criterion, "substantial transformation" is ensured by imposing that processes and originating materials from RCEP countries account for a particular percentage of the good's final value. In the RCEP, the RVC is 40%. In some PSROs, the CTC and RVC are combined, providing more flexibility to the exporting firm in choosing either of the two.

Codification methodology

Focusing on the manufacturing requirements that are origin-conferring rather than on the way the PSROs are drafted, a recent study[20] assessed the impact of the reform of EU generalized scheme of preferences rules of origin of 2011 and was developed in Crivelli, Inama, and Pearson (2022, 2023), as illustrated in Table 1. The example shows how restrictiveness is measured by using the manufacturing requirement methodology through an example from HS chapter 2 about meat and cuts of meat products.

Under ATIGA, obtaining meat (chapter 2) by slaughtering live animals of chapter 1 meets the CC requirement. By contrast, this would not be possible under the RCEP, due to the exclusion of chapter 1 in the PSRO. Therefore, the RCEP PSRO is stricter than ATIGA. Moreover, the ATIGA PSRO allows use of the RVC40 requirement as an alternative. Reducing size by deboning or cutting animal carcasses can help meet this requirement.

Table 1: Meat Products

HS and products description	RCEP	ATIGA	CPTPP	Change in Stringency
HS 0201 to HS 0210, Meat	CC except from Chapter 01	RVC40 or CC	A change to a good of heading 02.01 through 02.10 from any other chapter.	RCEP PSRO is more stringent than CPTPP and ATIGA. ATIGA appears the more lenient

ATIGA = ASEAN Trade in Goods Agreement, CC = Change of Chapter, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, HS = harmonized system, PSRO = product-specific rules of origin, RCEP = Regional Comprehensive Economic Partnership, RVC = regional value content.
Source: Crivelli, Inama, and Pearson 2022.

Crivelli Inama, and Pearson (2022) used the above manufacturing requirement methodology to establish a comprehensive comparative dataset containing all PSROs of ATIGA, RCEP, and CPTPP and codifying their stringency at the HS six-digit level (2012 version). To do so, line-by-line comparison of about 15,000 observations has been carried out based on the manufacturing requirement embedded in the form of the PSROs. In a second study, Crivelli, Inama, and Pearson (2023), the same authors produced a new comparative dataset containing the PSROs of RCEP,

[20] See Crivelli and Inama (2021).

AANZA, AFCTA, AJCEP, and AKFTA using the HS 2012 codes at the six-digit level following a line-by-line comparison of around 25,000 observations.

Based on this data, we compute four relative measures: two stringency scores (score 1 and score 2) based on the RCEP and the 6 comparative agreements (ATIGA, CPTPP, ASEAN+1) combining the two datasets described above, and two leniency ranking measures (rank 1 and rank 2) using the two individual datasets separately (ATIGA, CPTPP; ASEAN+1):

Pooled analysis – Stringency scores

- **Average stringency (score 1):** This score is calculated as follows. For each HS6 line and each RCEP comparative agreement, we first assign the value of 0 if the PSRO of the comparative agreement is stricter than RCEP, 0.5 if they have equal stringency, and 1 if the RCEP's PSROs are more stringent. For each HS6 line, we therefore have six values—one for each agreement the RCEP is compared with. The average stringency score corresponds to the simple average of the stringency value across the six agreements. The score ranges between zero and one. A higher value indicates more stringency.

- **Count stringency (score 2):** This score between 0 and 6 counts the number of agreements having more lenient PSROs than RCEP at the HS6 digit level. For example, if for a particular tariff line, a value of 4 indicates that 4 agreements have more lenient PSROs than RCEP, and two are equally or more stringent. Higher values indicate more stringency.

Individual analysis—Leniency ranks

- **Rank leniency (rank 1 and rank 2):** The two scores apply the same ranking system as in Crivelli, Inama, and Pearson 2023, and 2022, respectively, based on RCEP PSRO leniency. If the RCEP has the most lenient PSRO for a particular tariff line among all agreements used in the study, the rank takes the value 1. If the RCEP has the second most lenient PSRO, the rank takes the value 2 and so on. The first stringency rank (rank 1) compares the RCEP with the ASEAN+1 agreements. The second (rank 2) compares the RCEP with the CPTPP and ATIGA agreements. Higher values indicate more stringency. Values for rank 1 and 2 range between 1 and 5 and between 1 and 3, respectively.

V. Data and Econometric Model

To identify the determinants of RCEP PSRO stringency, the following specification is adopted:

$$Y_i = \beta_0 + \sum_{j=1}^{16} \beta_j \, Dummy_j + \delta_0 Consumption_i + \delta_1 Intermediate_i + \delta_2 PCI_i + \delta_3 Meanbaserate_i^{ad} + \delta_4 TD_i^{ad\_dev} + \delta_5 TD_i^{dev\_ad} + \delta_6 RCA_i^{ad} + \delta_7 RCA_i^{dev} + \delta_8 X\_RCEP_i^{dev} + \delta_9 X\_RCEP_i^{ad} + \delta_{10} X\_ROW_i^{ad} + \delta_{11} X\_ROW_i^{dev} + \delta_{12} Tariff\_reduction_i + \delta_{13} PRC\_baserate_i + \delta_{14} X\_PRC\_RCEP_i + \delta_{15} M\_PRC\_RCEP_i + \delta_{16} RCA\_PRC_i + \varepsilon_i$$

Where Y_i reflects the relative stringency of the RCEP rules of origin for product *i*, defined at the HS-6 digit level, captured by 10 different measures divided into two categories:

i. six pairwise indicators comparing RCEP with each agreement *k* separately (individual regressions for each agreement), and;
ii. four stringency measures (two scores, two ranks) as defined in section III.

Under (i) Y_i takes the value 1 if the PSRO for product *i* is more (less) stringent under RCEP than under agreement *k* (ATIGA, CPTPP or any of the ASEAN+1 agreements), and 0 if the PSRO is equally or less (more) stringent under RCEP than under the other agreement. This specification is estimated using a probit model.

Under (ii), the model is estimated using an ordered logit approach and the dependent variable (Y_i) takes the values of the different stringency scores/ranks detailed in section III. In the case of score 1, we use a fractional response approach as the variable is continuous and ranges between 0 to 1.

Our independent variables include a wide range of potential PSRO determinants focusing on both, standard rules of origin economic objectives of maximizing trade creation while minimizing trade deflection, and on political economy factors. The latter aim to capture bargaining power differences between RCEP developed and developing members[21] and the potential use of PSROs as a protectionist tool. In line with the literature,[22] the PSRO determinants related to political economy considerations and potential trade deflection are based on the following variables.

[21] To repeat, the RCEP developed members are Australia, Japan, the Republic of Korea, Brunei Darussalam, New Zealand, and Singapore. Developing members are Cambodia, Indonesia, the Philippines, Malaysia, Myanmar, Thailand, and Viet Nam. The People's Republic of China is singled out from the developing group due to the size of its economy and incorporated separately in the regressions. The results are robust to the exclusion of Singapore and Brunei Darussalam, the two developed ASEAN economies.

[22] For example, see the empirical framework in Portugal-Perez (2011).

The mean base rate[23] under RCEP for economically advanced countries is denoted by $Meanbaserate_i^{ad}$. We expect the coefficient of this variable (δ_3) to be positive and statistically significant if developed countries are using PSROs as an instrument to protect industries that received higher protection through high tariff rates before RCEP came into force. This would corroborate the results obtained by Cadot et al. (2006) in the case of NAFTA and the EU's PANEURO system.

The propensity of trade deflection through developing (or developed) RCEP parties is proxied by two variables, $TD_i^{ad\_dev}$ (or $TD_i^{ad\_dev}$), capturing the difference in base rates between the two country groups. More specifically, the trade deflection variables are computed as follows:

$$TD_i^{ad\_dev} = Max\{0; Base\ rate_i^{advanced} - Base\ rate_i^{developing}\}$$
$$TD_i^{dev\_ad} = Max\{0; Base\ rate_i^{developing} - Base\ rate_i^{advanced}\}$$

$TD_i^{ad\_dev}$ takes the value of the base rate of developed (or advanced) economies minus the value of the base rate of developing countries whenever the difference between the two is positive, and 0 otherwise. $TD_i^{dev\_ad}$ takes the value of the base rate of developing countries minus the value of the base rate of developed countries if positive, and 0 otherwise. As described in the introduction, the main objective of rules of origin is to prevent trade deflection. If negotiations followed an economic rationale, we expect the coefficients (δ_4 and δ_5) to be positive and significant. A positive coefficient on $TD_i^{ad\_dev}$($TD_i^{dev\_ad}$) indicates that stricter PSROs are implemented in response to greater incentives of trade deflection through RCEP developing (advanced) members.

($Tariff\_reduction_i$) denotes the difference between the baserate and the new tariff in the first year RCEP came into force. Larger tariffs reduction in year 1 could potentially induce stricter PSROs as member countries may try to deter any trade deflection dynamic that could be induced by RCEP lower tariffs. In this case, we would expect δ_{12} to be statistically significant and positive. In a way similar to Portugal-Perez (2011), we introduce two variables to proxy the presence of a revealed comparative advantage[24] (RCA). RCA_i^{dev} and RCA_i^{ad} are the revealed comparative indexes for RCEP developing and developed countries, respectively, calculated over 2016–2019. RCA variables are computed as the ratio between the share of exports of a specific good in the total exports of an RCEP developing (developed) economy, and the world's exports share of this good in global exports.[25] If RCEP developing (developed) countries have a revealed comparative advantage, the RCA index is greater than 1. A negative coefficient on the RCA index variable indicates that PSROs are more lenient for sectors in which a comparative advantage is observed. A significant difference in RCA coefficients between RCEP developed and developing economies

[23] All tariff rates used in this paper (base rate and tariff phasing down) are extracted from the schedule of tariff commitments submitted by RCEP members.
[24] Revealed comparative advantages are computed as the ratio between the share of exports of a specific good in the total exports of an economy, and the world's exports share of this good in global exports. The average RCA for 2016–2019 is used in the estimations.
[25] All the export and import data used in this paper, directly as independent variable or serving to compute other indicators such as the RCA, are yearly data obtained from UN Comtrade, averaged over 2016–2019, the period over which the vast majority of RCEP PSROs were negotiated.

suggests an asymmetric bargaining power between parties. For example, a negative coefficient on the RCA variable of developed countries associated with a positive or insignificant coefficient in developing members indicate that the PSROs favor the interests of exporters located in RCEP developed members over those of their counterparts located in developing RCEP economies. Similarly, an insignificant coefficient on the RCA variable of developed countries associated with a positive RCA coefficient in developing members indicates that the latter are facing more stringent PSRO in sectors where they exhibit comparative advantage, while the impact is insignificant in developed economies.

PCI$_i$ denotes the product complexity index (PCI). We calculate the average value of the index over 2016–2019 to build this variable. The product complexity index is developed by Harvard Kennedy School's Growth Lab to identify asymmetries between RCEP developed and developing members. A higher PCI value indicates a higher degree of sophistication and diversity of the productive know-how needed to manufacture the specific product. Typically, the most sophisticated products can only be manufactured in a few countries. Higher values taken by the index reflecting a higher degree of sophistication associated with more lenient PSROs, may suggest that PSROs were negotiated in favor of developed RCEP members. In this case, we expect δ_2 to be statistically significant and have a negative sign.

$X\_RCEP_i^{dev}$ and $X\_RCEP_i^{ad}$ respectively denote the value of exports from developing RCEP members to economically advanced members and the value of exports from developed to developing RCEP members. Industries in economically advanced RCEP countries may try to impose stricter PSROs on products where exports from RCEP developing economies may considerably rise with RCEP implementation. To capture the trade dynamics, we include the total value of exports from developing to advanced RCEP countries and the total value of imports from advanced to RCEP developing countries.

Industries in developed RCEP countries may try to impose stricter PSROs on products where exports from RCEP developing economies are expected to considerably rise with RCEP implementation. To assess this potential use of rules of origin as a protectionist tool, we introduce the variables $X_ROW_i^{dev}$and $X\_ROW_i^{ad}$ to proxy the potential trade rerouting from the rest of the world once the agreement is in place. $X_ROW_i^{dev}$and $X\_ROW_i^{ad}$ respectively denote the value of exports from developing RCEP members to the rest of the world, and the value of exports from developed RCEP members to the rest of the world. A higher value corresponds to a higher threat of rerouting, as argued by Portugal-Perez (2011). We expect δ_{10} (or δ_{11}) to be positive if import-competing industries in developed countries (or developing countries) influence the adoption of stricter PSROs for goods highly exported to the rest of the world and that could be easily rerouted within the region as a result of the agreement's implementation.

Four different variables are included specifically for the PRC, namely the PRC base rate ($PRC\_baserate_i$), the PRC's exports to RCEP members ($X\_PRC\_RCEP_i$), the PRC's imports from RCEP countries ($M\_PRC\_RCEP_i$), and the PRC's revealed comparative advantage variable (RCA_PRC_i). The variables are built by using the same sources and methods as the corresponding

variables for the developing and developed country groups and can be interpreted in the same way.

As additional control variables, two dummy variables (*Consumption*$_i$ and *Intermediate*$_i$) are introduced to reflect the position of the good in the value chain. The classification by Broad Economic Categories is used for this purpose.[26] *Consumption*$_i$ takes the value 1 if the good is a consumption product and 0 otherwise; *Intermediate*$_i$ is equal to 1 if the product can be classified as an intermediate product and 0 otherwise. We expect a positive sign on consumption goods that are more likely to incorporate foreign inputs could suggest. The model also includes dummies sector fixed effects ($Dummy_j$) for each product group as defined by the World Integrated Trade Solution to control for sectoral dynamics and manufacturing process specificities that could explain PSRO stringency.

Table 2 provides descriptive statistics of the variables used in this study.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Dummy=1 if RCEP more stringent than AJCEP, 0 otherwise	5205	.052	.222	0	1
Dummy=1 if RCEP more stringent than AANZFTA, 0 otherwise	5205	.342	.475	0	1
Dummy=1 if RCEP more stringent than ACFTA, 0 otherwise	5205	.173	.378	0	1
Dummy=1 if RCEP more stringent than AKFTA, 0 otherwise	5205	.241	.428	0	1
Dummy=1 if RCEP more stringent than ATIGA, 0 otherwise	5205	.409	.492	0	1
Dummy=1 if RCEP more stringent than CPTPP, 0 otherwise	5205	.318	.466	0	1
Dummy=1 if RCEP less stringent than AJCEP, 0 otherwise	5205	.398	.49	0	1
Dummy=1 if RCEP less stringent than AANZFTA, 0 otherwise	5205	.074	.262	0	1
Dummy=1 if RCEP less stringent than ACFTA, 0 otherwise	5205	.292	.455	0	1
Dummy=1 if RCEP less stringent than AKFTA, 0 otherwise	5205	.181	.385	0	1
Dummy=1 if RCEP less stringent than ATIGA, 0 otherwise	5205	.119	.324	0	1
Dummy=1 if RCEP less stringent than CPTPP, 0 otherwise	5205	.314	.464	0	1
Score 1	5205	.261	.245	0	1
Score 2	5118	1.549	1.471	0	6
Rank 1	5124	1.544	.706	1	5
Rank 2	5199	1.685	.518	1	3
Animal	5205	.065	.246	0	1
Chemicals	5205	.151	.358	0	1
Clothing	5205	.052	.221	0	1
Food products	5205	.041	.197	0	1
Footwear	5205	.009	.095	0	1
Fuels	5205	.008	.091	0	1
Hides and skins	5205	.013	.114	0	1
Machinery and electrics	5205	.148	.355	0	1
Metals	5205	.108	.311	0	1
Minerals	5205	.02	.141	0	1
Miscellaneous	5205	.068	.252	0	1
Plastic and rubber	5205	.041	.197	0	1
Stone and glass	5205	.037	.19	0	1
Textiles	5205	.101	.302	0	1
Transportation	5205	.025	.156	0	1

Continued on the next page

[26] United Nations Statistics Division. Classification by Broad Economic Categories (BEC) Revision 4. https://unstats.un.org/unsd/classifications/Family/Detail/10.

Variable	Obs	Mean	Std. Dev.	Min	Max
Vegetable	5205	.068	.251	0	1
Wood	5205	.045	.208	0	1
Consumption	5205	.227	.419	0	1
Intermediate	5205	.582	.493	0	1
Product complexity index	5205	.006	1.016	-3.004	2.471
Baserate, developed countries	5205	3.577	8.058	0	160.06
Propensity to trade deflection to developed RCEP countries (TD^{ad_dev})	5205	.674	7.222	0	153.435
Propensity to trade deflection to developing RCEP countries (TD^{dev_ad})	5205	5.133	4.446	0	31.667
Revealed comparative advantage developed countries	5177	.907	2.518	0	85.558
Revealed comparative advantage developing countries	5142	1.383	3.725	0	104.3
Exports RCEP from developing to developed	5205	.04	.275	0	9.996
Imports RCEP to developing from developed	5205	.048	.398	0	14.781
Exports to ROW from developed	5205	.348	2.508	0	81.837
Exports to ROW from developing	5205	.626	3.525	0	160.217
Tariff reduction in year 1	5205	2.811	3.395	0	59.281
Base rate PRC for RCEP	5205	9.936	7.366	0	65
Exports from PRC to RCEP	5205	.114	.615	0	23.915
PRC imports from RCEP	5205	.132	1.419	0	56.428
PRC revealed comparative advantage	5205	1.207	1.368	0	6.786

PRC = People's Republic of China, ROW = rest of world.
Trade agreements: AJCEP = ASEAN-Japan Comprehensive Economic Partnership, AANZFTA = ASEAN-Australia-New Zealand FTA, ACFTA = ASEAN-People's Republic of China FTA, AKFTA = ASEAN-Republic of Korea FTA, ATIGA = ASEAN Trade in Goods Agreement, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, RCEP = Regional Comprehensive Economic Partnership.
Source: Authors.

VI. Results

Pairwise comparisons

Tables 3 and 4 report estimation results for pairwise comparisons between RCEP and the six other agreements.

Table 3: Estimation Results for Pairwise Comparisons – Restricted Model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	AJCEP		AANZFTA		ACFTA		AKFTA		ATIGA		CPTPP	
VARIABLES	RCEP - Stricter	RCEP- More lenient	RCEP - Stricter	RCEP - More lenient	RCEP - Stricter	RCEP - More lenient	RCEP- Stricter	RCEP - More lenient	RCEP - Stricter	RCEP - More lenient	RCEP - Stricter	RCEP - More lenient
Consumption	-0.175	-0.267***	0.156*	-0.132	0.354***	-0.860***	0.012	-0.754***	0.067	-0.523***	0.264***	-0.159*
	(0.137)	(0.087)	(0.093)	(0.156)	(0.125)	(0.087)	(0.127)	(0.088)	(0.092)	(0.143)	(0.087)	(0.088)
Intermediate	-0.219**	-0.394***	0.130*	0.004	-0.270**	-0.223***	0.189**	-0.666***	-0.159**	-0.029	0.502***	-0.277***
	(0.095)	(0.066)	(0.077)	(0.083)	(0.106)	(0.064)	(0.093)	(0.065)	(0.074)	(0.076)	(0.068)	(0.068)
Base rate, developed countries	0.005*	0.004**	-0.001	0.003	0.000	-0.002	0.005**	-0.003	-0.002	0.020	0.003	0.004*
	(0.003)	(0.002)	(0.002)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.017)	(0.003)	(0.002)
Exports RCEP from developing to developed	0.154*	0.052	0.471***	0.128	0.261**	-0.971***	0.220*	0.055	0.198*	0.110	0.078	-0.179
	(0.092)	(0.082)	(0.161)	(0.147)	(0.106)	(0.312)	(0.121)	(0.105)	(0.102)	(0.143)	(0.090)	(0.171)
Imports RCEP to developing from developed	-0.248***	0.020	-0.448**	-0.141	-0.160**	-0.191	0.004	-0.206	-0.246***	-0.058	-0.083	0.005
	(0.074)	(0.051)	(0.213)	(0.124)	(0.079)	(0.186)	(0.079)	(0.130)	(0.089)	(0.092)	(0.080)	(0.081)
Constant	-1.603***	-0.433***	-1.363***	-2.564***	-1.013***	-0.283**	-1.397***	-0.240*	-0.514***	-0.706***	-0.056	-0.411***
	(0.176)	(0.114)	(0.134)	(0.350)	(0.142)	(0.122)	(0.138)	(0.125)	(0.113)	(0.120)	(0.112)	(0.113)
R^2	0.334	0.223	0.303	0.174	0.473	0.132	0.550	0.158	0.439	0.117	0.206	0.178
Observations	4,371	4,889	5,158	4,057	5,028	4,596	5,158	4,623	5,205	4,021	4,936	4,893
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

AJCEP = ASEAN-Japan Comprehensive Economic Partnership, AANZFTA = ASEAN-Australia-New Zealand FTA, ACFTA = ASEAN-People's Republic of China FTA, AKFTA = ASEAN-Republic of Korea FTA, ATIGA = ASEAN Trade in Goods Agreement, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, RCEP = Regional Comprehensive Economic Partnership.
Notes: Estimates are obtained by using a probit model. Robust standard errors are reported in parentheses. * means significant at the 10% level, ** means significant at the 5% level, *** means significant at the 1% level.
Source: Authors.

Estimation results for restricted models containing only the dummy variables for product groups, the base rate of developed countries and trade variables are presented in Table 3. The results show that the larger the value of exports from developing to developed RCEP members, the stricter the PSRO, while the reverse is true for exports from developed to developing countries. In other words, RCEP PSRO tends to penalize developing members, making it more difficult for companies to comply and use the agreement. There is no consistent finding for the mean base rate of developed RCEP countries, with a large number of coefficients found to be statistically insignificant.

Table 4: Estimation Results for Pairwise Comparisons – Full Model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	AJCEP		AANZFTA		ACFTA		AKFTA		ATIGA		CPTPP	
VARIABLES	RCEP - Stricter	RCEP- More lenient	RCEP - Stricter	RCEP - More lenient	RCEP - Stricter	RCEP - More lenient	RCEP- Stricter	RCEP - More lenient	RCEP - Stricter	RCEP - More lenient	RCEP - Stricter	RCEP - More lenient
Consumption	-0.218	-0.404***	0.042	-0.271	0.274**	-0.702***	0.034	-0.733***	0.043	-0.722***	0.230**	-0.158*
	(0.141)	(0.093)	(0.097)	(0.173)	(0.130)	(0.092)	(0.132)	(0.097)	(0.097)	(0.163)	(0.092)	(0.095)
Intermediate	-0.241**	-0.399***	0.167**	0.021	-0.230**	-0.268***	0.129	-0.648***	-0.148*	-0.032	0.544***	-0.296***
	(0.096)	(0.067)	(0.079)	(0.088)	(0.116)	(0.067)	(0.098)	(0.067)	(0.076)	(0.079)	(0.069)	(0.069)
Product complexity index	-0.085	-0.002	-0.126***	0.047	-0.215***	0.125***	-0.004	0.149***	-0.092***	0.009	0.028	0.020
	(0.056)	(0.030)	(0.032)	(0.051)	(0.042)	(0.032)	(0.044)	(0.036)	(0.035)	(0.041)	(0.030)	(0.033)
Base rate, developed countries	-0.017	0.145***	0.023	0.124***	0.051***	-0.023*	0.005	0.027*	-0.002	0.159***	-0.025*	0.065***
	(0.019)	(0.015)	(0.014)	(0.033)	(0.017)	(0.014)	(0.016)	(0.016)	(0.014)	(0.030)	(0.014)	(0.014)
Propensity to trade deflection towards developed	0.027	-0.124***	-0.018	-0.174*	-0.050***	0.038***	0.006	-0.002	-0.000	-0.272**	0.014	-0.051***
	(0.018)	(0.018)	(0.014)	(0.099)	(0.018)	(0.014)	(0.016)	(0.018)	(0.014)	(0.118)	(0.015)	(0.014)
Propensity to trade deflection towards developing	0.005	0.002	0.016**	0.075***	0.007	-0.030***	-0.014*	0.012*	-0.004	0.073***	0.004	-0.026***
	(0.010)	(0.006)	(0.007)	(0.010)	(0.008)	(0.006)	(0.008)	(0.007)	(0.007)	(0.010)	(0.007)	(0.006)
Revealed comparative advantage developed	-0.013	-0.018	0.012	-0.026	-0.004	-0.008	-0.002	-0.055***	-0.005	-0.007	0.001	-0.007
	(0.011)	(0.012)	(0.009)	(0.030)	(0.011)	(0.010)	(0.009)	(0.017)	(0.008)	(0.014)	(0.009)	(0.012)
Revealed comparative advantage developing	-0.002	0.002	0.007	0.004	0.015***	-0.008	0.015***	-0.013**	0.000	0.014**	0.002	0.006
	(0.007)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.005)	(0.007)	(0.005)	(0.006)	(0.005)	(0.005)
Exports RCEP from developing to developed	0.098	-0.229	0.226	-0.376	0.012	-0.772**	-0.062	0.149	0.090	-0.381*	0.160	0.020
	(0.105)	(0.149)	(0.182)	(0.242)	(0.108)	(0.372)	(0.114)	(0.120)	(0.116)	(0.211)	(0.126)	(0.220)
Imports RCEP to developing from developed	-0.180*	-0.017	-0.262	-0.091	0.002	-0.316	0.117	-0.301**	-0.172*	0.020	0.114	-0.077
	(0.097)	(0.089)	(0.172)	(0.150)	(0.094)	(0.202)	(0.088)	(0.136)	(0.091)	(0.101)	(0.077)	(0.091)
Exports to ROW from developed	-0.013	-0.003	0.019	-0.025	-0.027	-0.016	-0.050**	0.050**	0.011	-0.015	-0.056**	0.018
	(0.022)	(0.012)	(0.017)	(0.020)	(0.018)	(0.027)	(0.022)	(0.020)	(0.015)	(0.016)	(0.024)	(0.017)
Exports to ROW from developing	0.008	0.039*	0.073***	0.025	0.036	0.024	0.022	0.007	0.049**	0.048*	0.011	-0.021
	(0.022)	(0.021)	(0.026)	(0.024)	(0.026)	(0.030)	(0.017)	(0.022)	(0.022)	(0.027)	(0.021)	(0.020)
Tariff reduction	-0.006	-0.118***	-0.014	-0.261***	-0.009	-0.047**	-0.017	-0.093***	0.007	-0.319***	0.041**	-0.054***
	(0.017)	(0.022)	(0.018)	(0.041)	(0.015)	(0.020)	(0.017)	(0.025)	(0.015)	(0.038)	(0.019)	(0.017)
PRC base rate	0.012***	-0.006	0.002	-0.010	-0.012***	0.006*	0.011***	0.000	-0.004	-0.006	0.012***	0.003
	(0.005)	(0.004)	(0.003)	(0.007)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.007)	(0.003)	(0.004)
Exports from PRC to RCEP	-0.047	-0.241**	-0.432**	-0.067	-0.114	-0.295	-0.100	-0.221	-0.325**	-0.216	-0.004	0.015
	(0.147)	(0.121)	(0.169)	(0.139)	(0.164)	(0.191)	(0.110)	(0.150)	(0.137)	(0.164)	(0.121)	(0.124)
Chinese Imports from RCEP	0.025	0.101**	-0.044	0.051	0.020	0.111**	0.142***	-0.025	-0.014	0.034	-0.046	-0.008
	(0.021)	(0.046)	(0.027)	(0.035)	(0.021)	(0.048)	(0.035)	(0.036)	(0.020)	(0.025)	(0.056)	(0.031)
PRC revealed comparative advantage	-0.003	0.044***	0.035**	0.093***	-0.015	-0.003	-0.046*	0.033*	0.005	0.056**	-0.024	0.060***
	(0.028)	(0.017)	(0.017)	(0.027)	(0.022)	(0.018)	(0.024)	(0.019)	(0.019)	(0.023)	(0.017)	(0.018)
Constant	-1.661***	-0.377***	-1.655***	-2.855***	-1.218***	0.016	-1.273***	0.009	-0.492***	-0.730***	-0.227*	-0.222*
	(0.195)	(0.117)	(0.143)	(0.378)	(0.168)	(0.136)	(0.153)	(0.143)	(0.125)	(0.131)	(0.118)	(0.116)
R^2	0.337	0.245	0.309	0.220	0.478	0.144	0.555	0.173	0.440	0.158	0.214	0.189
Observations	4,330	4,812	5,080	4,004	4,950	4,521	5,080	4,550	5,127	3,973	4,858	4,815
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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AJCEP = ASEAN-Japan Comprehensive Economic Partnership, AANZFTA = ASEAN-Australia-New Zealand FTA, ACFTA = ASEAN-People's Republic of China FTA, AKFTA = ASEAN-Republic of Korea FTA, ATIGA = ASEAN Trade in Goods Agreement, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, RCEP = Regional Comprehensive Economic Partnership.
Notes: Estimates are obtained by using a probit model. Robust standard errors are reported in parentheses. * significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.
Source: Authors.

The addition of new covariates does not considerably change the conclusions drawn from Table 3, except that much fewer coefficients are statistically significant for the two trade variables discussed above and that the higher the average base rate of developed countries, the more likely the product to face a more lenient PSRO. However, the converse holds for products experiencing larger tariff reduction in year 1 under RCEP.

Trade deflection variables, which are added to models contained in Table 4, are not associated with clear trends, with the exception of the propensity to trade deflection toward developed countries. In this latter case, the higher the propensity, the less likely for the product to face a more lenient PSRO in four of the six comparisons. No clear trends are identifiable for the revealed comparative advantage variables, as most of their coefficients are statistically insignificant.

While consumption products are found to face stricter PSROs, the regression results for the product complexity index show that more complex goods tend to be less likely to be subject to more stringent PSROs, while being characterized by a higher probability of facing more lenient PSROs in four of the comparisons.

Lastly, estimation results indicate that products for which PRC has a more marked revealed comparative advantage are more likely to face more lenient PSROs in five of the six comparisons.

Relative stringency scores

Tables 5 and 6 report results for models using the relative stringency measures as dependent variables.

Table 5: Estimation Results for Relative Stringency Measures – Restricted Model

VARIABLES	(1) Score 1	(2) Score 2	(3) Rank 1	(4) Rank 2
Consumption	0.221***	0.483***	0.521***	0.239
	(0.076)	(0.130)	(0.170)	(0.147)
Intermediate	0.149**	0.384***	0.457***	0.419***
	(0.058)	(0.084)	(0.132)	(0.100)
Base rate, developed countries	0.001	0.001	0.000	-0.000
	(0.003)	(0.008)	(0.005)	(0.006)
Exports RCEP from developing to developed	0.252***	0.424***	0.366***	0.003
	(0.072)	(0.150)	(0.137)	(0.111)
Imports RCEP to developing from developed	-0.182**	-0.283	-0.016	-0.187*
	(0.072)	(0.205)	(0.119)	(0.100)
Constant	-1.388***			
	(0.089)			

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VARIABLES	(1) Score 1	(2) Score 2	(3) Rank 1	(4) Rank 2
R^2	0.120	0.186	0.391	0.143
Observations	5,205	5,118	5,124	5,199
Sector dummies	Yes	Yes	Yes	Yes

RCEP = Regional Comprehensive Economic Partnership.
Notes: Estimates are obtained by using a fractional response approach for score 1, and ordered logit models for score 2, rank 1 and rank 2. Robust standard errors are reported in parentheses. * means significant at the 10% level, ** means significant at the 5% level, *** means significant at the 1% level.
Source: Authors.

Estimation results for a restricted model containing only the dummy variables for product groups, the base rate of developed countries and trade variables in Table 5 show that the higher the value of exports from developing to developed RCEP members, the stricter PSROs are. This finding is consistent across three of the four models (score 1, score 2 and rank1), the only exception being rank 2 comparing RCEP with ATIGA and CPTPP. However, in this case, exports from developed to developing RCEP countries are shown to face more lenient PSROs the higher their value. This result is also found in the first regression for the first regression where score is the dependent variable. In terms of product groups, RCEP is more restrictive for consumption and intermediate products.

Table 6: Estimation Results for Relative Stringency Measures – Full Model

VARIABLES	(1) Score 1	(2) Score 2	(3) Rank 1	(4) Rank 2	(5) Score 1	(6) Score 2	(7) Rank 1	(8) Rank 2
Consumption	0.162**	0.344***	0.387**	0.139	0.161**	0.344***	0.390**	0.141
	(0.078)	(0.131)	(0.177)	(0.152)	(0.078)	(0.131)	(0.177)	(0.153)
Intermediate	0.183***	0.448***	0.485***	0.504***	0.182***	0.453***	0.481***	0.508***
	(0.060)	(0.088)	(0.137)	(0.102)	(0.060)	(0.087)	(0.136)	(0.102)
Product complexity index	-0.071***	-0.142***	-0.198***	0.068	-0.072***	-0.145***	-0.203***	0.065
	(0.022)	(0.037)	(0.046)	(0.050)	(0.022)	(0.037)	(0.047)	(0.050)
Base rate, developed countries	0.013	0.024	0.057**	-0.017	0.012	0.022	0.057**	-0.022
	(0.011)	(0.022)	(0.025)	(0.025)	(0.011)	(0.023)	(0.026)	(0.026)
Propensity to trade deflection towards developed	-0.012	-0.033	-0.041	-0.009	-0.011	-0.027	-0.037	-0.001
	(0.011)	(0.025)	(0.025)	(0.027)	(0.011)	(0.026)	(0.026)	(0.028)
Propensity to trade deflection towards developing	0.007	0.009	0.007	0.015	0.006	0.005	0.005	0.010
	(0.005)	(0.008)	(0.012)	(0.010)	(0.005)	(0.009)	(0.013)	(0.011)
Revealed comparative advantage developed	0.004	0.006	0.007	0.018	0.004	0.005	0.004	0.016
	(0.007)	(0.014)	(0.012)	(0.024)	(0.007)	(0.013)	(0.011)	(0.024)
Revealed comparative advantage developing	0.014***	0.015*	0.026***	-0.004	0.014***	0.013*	0.024***	-0.005
	(0.003)	(0.008)	(0.008)	(0.008)	(0.003)	(0.008)	(0.008)	(0.009)
Exports RCEP from developing to developed	0.156*	0.358*	0.111	0.112	0.106	0.243	0.017	0.101
	(0.084)	(0.209)	(0.098)	(0.128)	(0.092)	(0.215)	(0.113)	(0.148)
Imports RCEP to developing from developed	-0.124*	-0.198	-0.030	-0.056	-0.079	-0.123	0.028	-0.039
	(0.072)	(0.260)	(0.130)	(0.095)	(0.078)	(0.177)	(0.118)	(0.104)
Exports to ROW from developed	-0.011	-0.021	0.009	-0.042**	-0.020	-0.051*	-0.009	-0.033
	(0.009)	(0.017)	(0.014)	(0.020)	(0.014)	(0.030)	(0.027)	(0.022)
Exports to ROW from developing	0.010	0.010	0.027	-0.000	0.024	0.036	0.050	0.015
	(0.009)	(0.028)	(0.022)	(0.010)	(0.017)	(0.041)	(0.033)	(0.028)
Tariff reduction	0.006	0.032	-0.046	0.084***	0.003	0.022	-0.053	0.075***
	(0.013)	(0.027)	(0.046)	(0.028)	(0.014)	(0.030)	(0.050)	(0.028)
PRC base rate					0.004	0.010*	0.007	0.011
					(0.003)	(0.006)	(0.007)	(0.007)
Exports from PRC to RCEP					-0.088	-0.172	-0.132	-0.086
					(0.088)	(0.166)	(0.143)	(0.159)
PRC imports from RCEP					0.021	0.067	0.043	-0.019
					(0.018)	(0.042)	(0.041)	(0.046)
PRC revealed comparative advantage					-0.003	0.007	-0.032	-0.006
					(0.011)	(0.020)	(0.025)	(0.025)
Constant	-1.529***				-1.526***			
	(0.102)				(0.102)			
R^2	0.123	0.189	0.324	0.149	0.123	0.189	0.325	0.149
Observations	5,127	5,041	5,047	5,121	5,127	5,041	5,047	5,121
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

PRC = People's Republic of China, RCEP = Regional Comprehensive Economic Partnership, ROW = rest of world.
Notes: Estimates are obtained by using a fractional response approach for score 1, and ordered logit models for score 2, rank 1 and rank 2. Robust standard errors are reported in parentheses. * means significant at the 10% level, ** means significant at the 5% level, *** means significant at the 1% level.
Source: Authors.

Most of these findings are robust to the inclusion of additional covariates. Table 6 adds variables reflecting political economy determinants as well as the product complexity index. The first four and the four last columns respectively report results for the models without and with covariates reflecting the PRC's potential interests. Estimation results show that very few coefficients associated with the variables capturing potential trade deflection are statistically significant. None of the propensity to trade deflection covariates is significant, while the exports to the rest of the world from developed countries is significant in two columns only (2 and 4). PRC-related variables show almost no statistically significant results either. The average base rate variable for developed countries is only significant for the comparison between RCEP and ASEAN+1 agreements and associated with a positive coefficient (columns 3 and 7), while the tariff reduction variable is only found to be statistically significant in columns 4 and 8.

Conversely, products for which RCEP developing countries exhibit a larger comparative advantage face stricter PSROs for almost all indicators. In addition, the estimation results for the product complexity index show that higher values for more products characterized by a higher degree of sophistication and containing a higher knowledge intensity tend to be associated with more lenient PSROs. The findings obtained earlier (Table 6) for exports from developing to developed RCEP members are only valid for score 1 and score 2, but these two models are the most general and do not include the insignificant PRC-related covariates. Overall, these findings suggest that political economy determinants were at play when PSROs were negotiated, as they seem to favor RCEP developed countries. While it is harder for products for which developing members have a revealed comparative advantage to qualify for preferential treatment under the RCEP, goods requiring relatively more know-how to be produced face more lenient PSROs. Most interestingly, the primary objective of rules of origin, that is, preventing trade deflection, seem to have no impact on the negotiations.

VII. Conclusion

This study shows that various factors, among them political economy determinants, explain PSRO stringency under the RCEP by using a relative stringency index and by carrying out pairwise comparisons between the RCEP and six other agreements. While Nicita (2021) finds RCEP tariff concessions to be reciprocal and to take into account both the interests of exporters' lobbies and those of importing governments, our findings tend to indicate that some political economy determinants, disadvantageous to developing RCEP members, were at play when negotiating PSROs.

Our analysis based on the restrictiveness scores indicates that PSRO stringency under RCEP is significantly influenced by political economy determinants or differences in negotiating capacities while standard trade deflection motives are insignificant. More stringent PSROs are found to be more likely to be attributed to products for which developing RCEP members have a comparative advantage. In addition, the higher the value of exports from developing RCEP countries to developed members, the stricter the PSROs. More complex products, i.e., requiring a higher degree of sophisticated know-how in their production and that can only be produced in a few countries, are found to face less stringent PSROs. This could reflect the bargaining power and limited negotiation and technical skills of developed RCEP members since complex products are

typically produced in economically advanced countries. This result holds for both the relative score and pairwise comparison analyses.

The PRC's influence on the negotiations is corroborated by results obtained for the pairwise analysis only. Products for which the PRC revealed comparative advantage are more likely to be subject to less stringent PSROs compared to other products.

This study shows that the complexity of rules of origin requires technical assistance and capacity building to avoid developing economies being penalized during negotiations of FTA and unilateral trade preferences schemes. In particular, aid for trade is critically needed to support developing economies (individually or as a group) during RCEP implementation. For example, advanced technical skills will be required to understand and apply tariff differentials. In addition, negotiating capacities will be instrumental in unfolding RCEP built-in agenda, such as the adoption of full cumulation and self-certification.

Future research could investigate the empirical impacts of RCEP PSROs on trade between developed and developing members and third countries. For example, companies' choices to utilize ASEAN+1 agreements or RCEP could be examined to check whether differences in terms of PSROs played a role in their decisions.

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The Determinants of Product-Specific Rules of Origin

An Econometric Analysis in the Regional Comprehensive Economic Partnership

Rules of origin differ among overlapping free trade agreements, raising firm compliance costs, discouraging utilization of trade preferences, and hindering regional value chains. This study exploits a unique dataset comparing the restrictiveness of product-specific rules of origin (PSRO) between the Regional Comprehensive Economic Partnership (RCEP) and other free trade agreements in Asia based on manufacturing requirements. Using maximum-likelihood models, the econometric analysis shows that economic sectors, political economy determinants, and negotiating capacities significantly influence PSRO stringency under the RCEP.

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