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The Role of Rules of Origin on Supply Chains: Lessons from the European Context

Pamela Bombarda, a professor at CY Cergy-Paris Université, is visiting the Paris School of Economics from September to December 2024. This policy brief presents findings from her collaborative research with Elisa Gamberoni and Irene Iodice on the effects of relaxing local content requirements on global supply chains in the European context.

Free trade agreements (FTAs) are a tool to bolster regional integration. However, several studies have shown the potential for price distortions and reduced efficiency in resource allocation associated with FTAs. One crucial factor contributing to allocative inefficiency within FTAs is the local content requirements, which are determined by **rules of origin and cumulation system**. Rules of origin (RoO) define which intermediate goods allow a product to qualify for preferential access, while the cumulation system allows materials in another country to be considered as originating domestically to fulfil the rule of origin.

Several studies analyzing rules of origin (RoO) have highlighted their role in shaping value chains among member and non-member countries, as well as their impact on welfare. In this study, we develop a comprehensive and detailed database on European RoO by systematically codifying various texts from multiple free trade agreements (FTAs). This allows us to propose a metric for measuring RoO restrictions at the intermediate goods level, which will be used to quantify the effects of RoO liberalization on sourcing decisions. Specifically, we focus on a subset of Central and Eastern European Countries (CEECs) and analyze two key events that **reduced the restrictiveness of RoO**: the implementation of the Pan-European Cumulation System in 1997, which introduced diagonal cumulation, and the elimination of RoO for CEECs that joined the EU Customs Union following the 2004 European enlargement.[1] Using a difference-in-differences approach, our results offer new evidence on the effects of relaxing rules of origin (RoO) on imports of intermediate goods and its potential impact on reshaping value chains.

[1]CEECs includes BAFTA and CEFTA countries. BAFTA includes Estonia, Latvia, and Lithuania. CEFTA includes Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovak Republic and Slovenia.

The Case of Europe: Institution Background

Various Free Trade Agreements (FTAs) were signed in Europe following the Soviet Union's collapse. This created a complex environment for countries involved in, or seeking to participate in, regional value chains. To address this intricate network of FTAs, the European Union (EU) introduced the Pan-European Cumulation System (PECS) in 1997. PECS standardized rules of origin among participating countries and introduced diagonal cumulation, which allowed the use of intermediate goods from other PECS signatories without affecting the origin status or preferential treatment of final products.

Subsequently, in 2004, some of the PECS signatories joined the EU Customs Union, which eliminated the use of RoO among members. The elimination of RoO is an important development for the newly joined countries as it is expected to expand their sourcing possibilities when seeking for intermediates.

RoO inherently restrict the use of intermediate inputs sourced from outside the FTA region. Figure 1 illustrates how RoO operated under both diagonal cumulation (PECS) and elimination of RoO (EU 2004 enlargement), using the example of intermediate goods from Poland (POL) processed into final goods in Lithuania (LTU) for export to the EU15[1].[1]

The evolution occurred in three stages:

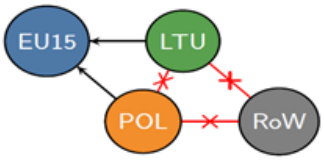
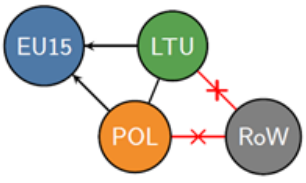
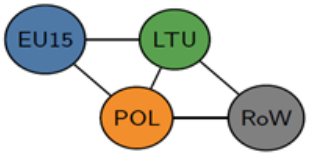
(1) Pre-PECS: Although both Lithuania and Poland had separate FTAs with preferential access to the EU, Lithuanian producers could not use Polish intermediate inputs while maintaining preferential treatment status for their exports to the EU.

(2) PECS Implementation (1997): With diagonal cumulation, Lithuanian producers could now use Polish intermediates as originating inputs while maintaining preferential treatment for exports to the EU15.

(3) EU Accession (2004): When Lithuania and Poland joined the EU, RoO requirements between member states were eliminated entirely. This allowed unrestricted use of intermediates from non-EU countries (Rest of World - RoW).

[2]EU15 refers to the member states that had joined the European Union as of 1995, the starting point of this analysis.

Figure 1.
Originating status of intermediate inputs used in Lithuania's export to the EU

Panel (1): Before 1997 PECS (Bilateral cumulation)	Panel (2): After 1997 PECS (Diagonal cumulation)	Panel (3): After 2004 EU enlargement
 Originating input from POL is NOT considered to be originating input in LTU.	 Originating input from POL is considered to be originating input in LTU.	 RoOs are eliminated, free movements of goods within the EU.

Proposing a Metric for Rules of Origin (RoO) Restrictiveness

The construction of a metric for RoO intensity is based on three legal texts: the Trade Agreements of the European Communities with member countries of BAFTA and CEFTA signed in 1994, and the PECS agreement signed in 1997. The RoO are textual guidelines that define the processing or work required on non-originating materials for a product to achieve originating status. They apply to final goods at the six-digit level of the Harmonized System, while also imposing restrictions on the use of intermediate goods.

The construction of our EU-RoO measure follows a three-step methodology:

First, we identify five categories of RoO restrictions – Regional Value Content, Change in Tariff Classification, Technical Requirement, Wholly Obtained, and No Rule – and assign each restriction a percentage-based restriction following the information in the treaties' annexes.

Second, for each final good subject to RoO, we identify the set of intermediate goods facing the restriction (as outlined in the treaty texts) and assign them the aforementioned percent-age restrictions.

Finally, we develop an aggregate index summarizing the RoO restrictions faced by each in-termediate good. The index is calculated as a weighted average of percentage restrictions, with weights reflecting the importance of each intermediate in various final goods' produc-tion processes. Detailed methodology and calculations are presented in the full paper.

Main findings

Figure 2 graphically summarises our main results, showing the evolution of regional and global supply chains before and after the implementation of the Pan-European Cumulation System in 1997 (in red) and the enlargement of the EU in 2004 (in blue). The horizontal axis represents the average evolution of CEEC imports from the RoW at sectoral level, while the vertical axis represents the average evolution of CEEC imports from other CEECs.

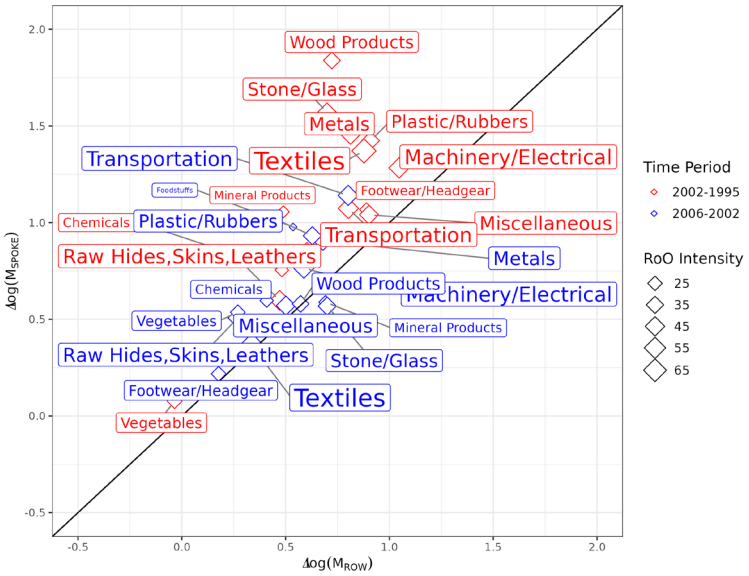
Between 1995 and 2002, CEECs' imports from other CEECs grew faster than imports from the rest of the world. This is illustrated by the red dots being above the 45-degree line, with two significantly further up). This trend is evident across various sectors and aligns with the liberalization of rules of origin within the cumulation zone induced by the Preferential Trade Agreement PECS. This suggests a regionalization of value chains. Furthermore, sectors with higher RoO restrictiveness (indicated by larger diamond sizes) appear higher on the graph in this period. This suggests that more restricted sectors experienced greater benefits from the liberalization of cumulation, reflected in increased imports from CEECs to CEECs.

In contrast, between 2002 and 2006, most sectors (represented by blue dots) are positioned closer to the 45-degree line, indicating more balanced growth in imports from both CEECs and the rest of the world (RoW). Notably, larger diamonds, which represent sectors with higher rules of origin (RoO) intensity, are located further down in this period. This suggests that these more restrictive sectors have opened up more to global supply chains. In some instances, CEECs' imports from the RoW grew faster

than those from other CEECs, as indicated by blue dots below the 45-degree line. This aligns with the globalization of value chains that followed the complete elimination of RoO barriers upon joining the EU in 2004.

In summary, the results indicate that more favorable cumulation rules are linked to an increase in intermediate imports from countries where restrictions have been lifted, thus reshaping value chains. The transition from bilateral to diagonal (PECS) cumulation facilitated a regional reassessment of sourcing decisions for CEECs, encouraging imports from PECS members in comparison to both the RoW and the EU15. Conversely, the integration into the customs union, EU enlargement enabled regional supply chains to become more global. By eliminating the need for RoO, EU enlargement in 2004 allowed CEECs to overcome restrictions on intermediates sourced from outside the cumulation zone. Consequently, intermediates that had faced significant restrictions due to RoO before 2004 experienced a substantial increase in imports from the RoW relative to both other CEECs and the EU15.

Figure 2.
Change in CEECs' imports from other CEECs vs. RoW by HS2 sectors



Estimation

We use a difference-in-differences identification strategy, grounded in structural gravity equations where we model RoO as trade barriers on intermediate goods. Our estimates indicate that a 1% increase in the intensity of RoO, measured by value requirements, leads to a 0.3% to 0.7% rise in intermediate imports from countries where these restrictions have been relaxed. We further explore how these elasticities vary based on the preferential margin, which represents the incentive for exporters to gain duty-free access to the free trade agreement (FTA) area. Our findings show that larger margins, granted to final goods that heavily rely on these intermediates, generally result in a stronger import response. This is because producers in CEECs are more willing to comply with stricter RoOs when larger margins are at stake, making the impact on imports more pronounced when RoO requirements are later liberalized.

Final Remarks

Our research provides novel evidence that the type of cumulation rules affects supply chains by influencing input choices. The standardization of rules of origin prompted by the Pan-European Cumulation System has strengthened regional production structures, while EU enlargement has facilitated a smoother transition toward a global network of supply chains. This dynamic restructuring highlights the significant impact that policy changes can have on global trade configurations. Our results are particularly relevant in the context of ongoing discussions around FTAs and RoO. They suggest that greater flexibility in RoO may catalyze supply chain transformation and potentially enhance allocative efficiency.

Disclaimer: The view expressed in this brief are those of the authors and they do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.

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