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ラテンアメリカにおける機械生産ネットワーク：質・量からの分析

シルバ　シャンギ　マテウス

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Institute for Economic Studies, Keio University
2-15-45 Mita, Minato-ku, Tokyo 108-8345, Japan
ies-office@adst.keio.ac.jp
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【要旨】
ラテンアメリカ諸国への機械部品サプライヤーの構成国は大きく変化し、東アジアが主なサプライヤーとなった。本論文はサプライヤーの構成がラテンアメリカ域内の機械貿易に及ぼした影響を質・量の両面から分析した。1996 年から 2011 年までのラテンアメリカ 17 ヵ国に関して、細分化された貿易データを UN Comtrade から入手して分析を行った。分析の結果、ラテンアメリカ内からの部品・中間財の輸入はプラスの量的効果を及ぼした一方で、東アジア、特に中国と香港からの輸入は、量的効果にとどまらず地域内機械生産ネットワークの拡大や品質の向上にプラスの影響を与えていたことが明らかとなった。他方、アメリカやカナダからの輸入は品質に対し負の影響を及ぼした。

シルバ　シャンギ　マテウス
慶應義塾大学 経済学研究科
〒108-8345
東京都港区三田2-15-45
mateus.chang@keio.jp

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Machinery production networks in Latin America: a quantity and quality analysis*

Mateus Silva Chang†

Graduate School of Economics

Keio University, Japan

Abstract

This paper investigates the effects that the increase in import of machinery parts and components and changes in the suppliers` composition had in the trade of final products and parts and components inside Latin America. In our analysis we consider these effects according to two dimensions: a quantity one that captures if there was an intensification of trade, and a quality one that captures changes in the sophistication of the traded goods. The research employs disaggregated trade data obtained from the UN Comtrade for 17 Latin American countries between 1996 and 2011. We find evidences that an increase in import of parts and components from Latin America had positive impacts on the quantity dimension, while increases in imports from the East Asian region, in special China and Hong Kong, had positive effects on the quantity dimension, nurturing the expansion of machinery production networks inside Latin America, and positive effects on the quality dimension, increasing the sophistication of the products traded inside Latin America. On the opposite side, imports from United States and Canada had negative quantity effects.

JEL code: F14, F15, and F23.

Key words: machinery trade, fragmentation, international production networks, Latin America.

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† Corresponding author. E-mail: mateus.chang@keio.jp

1. Introduction

In the last decades there was an exponential increase in the international trade, with production fragmentation been one of the main elements responsible for this trade enhancement. The fragmentation process, referred as “trade in tasks” by Grossman and Rossi-Hansberg (2006), lead to an increase in global integration generating a web of economic interactions commonly denoted as international production networks. In the beginning, this change involved mostly trade among rich nations, but the real “revolution started when supply chain trade gained importance among high-tech and low-wage nations between 1985 and 1995” (Baldwin and Lopez-Gonzalez, 2015, p. 1682). In other words, production fragmentation caused a revolution, because it opened new possibilities to the developing countries, allowing their participation in the production process of manufactured goods that they could not produce, generating new opportunities of economic growth.

The expansion of production networks changed the rules of the economic development game, facilitating developing countries` access to networks, global markets, capital, knowledge, and technology (OECD, 2013). Previously, a country had to climb every single step in the industrial development ladder, but the advent of production networks offered the possibility of skipping steps in the catch-up process through the acquisition of knowledge and technology from third countries and the specialization in one or few steps of the production process. Understanding these changes and its implications is very important to developing countries in order to draw efficient policies and benefit from these new opportunities to promote sustainable economic growth and development.

The empirical literature in this area is very rich, with many studies that focus on the regions where production fragmentation is more developed: East Asian region, European Union, and North America[1]. However, in the case of Latin America the literature is still incipient, although there is a growing demand for analysis of the current situation and the effects that this new trend can have on the region.

There are a few papers that provide some information about production fragmentation status in Latin America based on descriptive analysis. Aminian *et al.* (2009) compared the economic integration process in East Asia and in Latin America, analyzing the characteristics and intensity of intra-bloc and inter-bloc trade. They used a revealed comparative advantage (RCA) index to identify the share of traded parts and components with comparative advantage in the intra-bloc trade. Curran and Zignago (2013) studied the regionalization of the trade in South America from 1994 to 2007, differentiating the trade flows by the end use of the products and the level of embodied technology. They concluded that the trade agreements have not impacted extensively on the regional trade level and trade of intermediate products was still very low, indicating that regional production networks were still under-developed. Calfat *et al.* (2011) investigated the participation of Argentina, Brazil, Guatemala, and Nicaragua, in fragmented world production. They concluded that Brazil was the only country with a consolidated participation in fragmented production. Fung *et al.* (2015a) used SITC data to compare production sharing in Latin America, North America, and East Asia for the period 1985-2006. They identified the existence of a relative thick production network involving the trade of parts of motor vehicles, telecommunication equipment’s, and electronic components. However, it was concentrated on Mexico`s trade with US and

[1] For papers on production networks in the mentioned regions please refer to Ando and Kimura (2005), Ando and Kimura (2013a), Ando and Kimura (2013b), Athukorala and Yamashita (2006).

Canada, while Brazil also played a smaller role. Fung *et al.* (2015b) used the same methodology to compare Brazil, China, and Mexico`s participation in production networks. They analyzed the international trade patterns for the period 1990-2010, identifying that China`s global presence in trade of parts and components increased. Although Mexico concentrated its trade of parts and components with US, the data showed that China has become a major source of parts and components to Mexico and Brazil. The authors highlight the increasing importance of a Pan-Pacific link and a possible creation of a China-Brazil-Mexico production network.

Florensa *et al*. (2015) produced the first paper that used a quantitative framework to analyze economic integration and production fragmentation in Latin America. Using aggregated BEC data the authors analyzed the impact that changes in import of intermediate goods from different regions of the world had in the development of Latin America`s local trade. They found evidences of an increasing engagement of Latin America in production networks.

Given the importance of this topic to the development literature and the fact that production networks in Latin American region are still understudied, this work contributes to the literature shedding light on the evolution of machinery production networks in Latin America.

The contribution of this article is threefold. First, to the best of my knowledge, this is the first article that analyze quality effects that changes on structural composition of suppliers of parts and components have on the development of regional machinery production networks in Latin America. Second, differently from the previous literature on Latin American production networks, we focus our analysis on a specific object of study: the machinery industry. By focusing the analysis on a given industry it is possible to reduce biased conclusions that more aggregated data can generate, since parts and components from a specific industry are usually used in the production of final products from the same industry. Third, in this paper we complement the methodology used by Florensa *et al.* (2015) performing a robustness check exercise considering the zero trade values, a procedure that reduces the bias that a loss of this important information can generate.

The study will be organized as follows. Section 2 includes a descriptive analysis of Latin America`s participation in the machinery trade. In section 3 we present the data and in section 4 the empirical methodology employed. Section 5 shows the results, while in section 6 we perform a robustness check exercise. The final considerations of the paper are available in section 7.

2. Machinery International Trade and Latin America

In this section we used trade data, classified according to the Harmonized System disaggregated to the six-digits level, to analyze the machinery international market and Latin America`s participation on it in 1996 and 2011[2]. We also considered the changes in trade patterns from a trade margins perspective in order to identify modifications in Latin American countries` trade basket composition.

2.1 Descriptive analysis: traded values

It is well documented that the production networks, in special the machinery ones, are constituted mainly by geographical agglomerations that form regional blocs of production. It is also recognized the existence of three main regional blocs of machinery

[2] The analyzed period was chosen according to data availability.

production: the East Asian region, the European Union, and the NAFTA. In general, studies of machinery trade focus on these main areas, ignoring the situation in Latin America and the rest of the world. One of the main reasons for this fact can be understood by observing Figure 1 that shows the data for world imports and exports of machinery. The aforementioned main areas are responsible for the bulk of the traded values, while Latin America and the rest of the world are responsible for a very small share[3]. Another important difference is the fact that in the three main regions the traded value of parts and components is bigger than the final products` one, while in Latin America the traded value of final products is higher. This fact suggests a lower engagement of Latin America in machinery production networks.

== Figure 1 ==

The idiosyncrasies of Latin America, a heterogeneous region composed by countries of different sizes and governments with different political and economic orientation, localized in a vast territory full of geographical barriers, like the Andes Mountains and the Amazon Forest, are possible reasons behind its low level of engagement in production networks. Another reason pointed by Moreira *et al.* (2013) is the quality of the local infrastructure that penalizes the trade, increasing the freight costs or simply making it impracticable at competitive prices.

Nevertheless, Figure 2 reveals that for the period 1996-2011 there was an increase in the traded value of parts and components relative to the final products one. Latin American export data show an increase in traded parts and components from 46.6

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[3] The figures and table in this subsection present a conservative estimation of the situation in Latin America, given that Mexico trade data are accounted in NAFTA region. From the next subsection on Mexico`s data will be accounted as part of Latin America.

percentage points to 54.4 percentage points. Although import data reveal an increase in traded parts and components share of just 0.5 percentage points, in terms of values this change represents a substantial increase. This can be recognized by the fact that just the values of imported machinery parts and components are higher than the total value of exported machinery. Even though traded values are still smaller than the ones of the three main blocs, the increase in import of parts and components indicate that slowly Latin America is adhering to production networks in the machinery industry. Table 1 displays the compound annual growth rate of machinery trade for the period studied, revealing that Latin America had the highest growth rate for total machinery export and the second highest for machinery import. In fact, considering just the trade of parts and components, the region had the highest growth rates, corroborating the idea that participation in machinery production networks is growing in this region.

== Figure 2 ==

== Table 1 ==

As already mentioned, the core of the production networks is geographically concentrated in regional agglomerations, given the reduced costs incurred in shorter distance transport freights, reduced lead time, and the possibility of faster coordination of the whole network. Nonetheless, the development of the internet and other communication and coordination technologies, as well as the decrease in the freight cost, allowed for a growth in interactions between the regional blocs, increasing the role of East Asian region as a supplier of machinery parts and components for other region`s production networks. Bearing this fact in mind, in Figure 3 we observe the compositions of parts and components suppliers for all the five regions in order to verify changes and patterns. As expected, except for NAFTA in 2011, the intra-bloc import of machinery parts and components is dominant in the three main regions. We also verify an increase of East Asia region shares in all regions. Data for Latin America reveal a few things: in first place the Latin American share as a supplier is irrelevant in all regions, but Latin America; its intra-bloc share is just the fourth, been smaller than the shares of the three main regions; there was a considerable decrease in NAFTA and European Union shares, been substituted mainly by imports from the East Asian region. In fact, Latin America was the region where East Asian parts and components share increased the most, a growth of more than 20 percentage points.

== Figure 3 ==

From the point of view of the production fragmentation logic, a country decides to purchase more parts and components from a given region if these products have some comparative advantage. Consequently, one can expect that the increase in import of parts and components from East Asia should be beneficial to the machinery production in Latin American countries. These benefits could be related to an efficiency gain in the production process by the acquisition of cheaper and/or higher quality inputs. It can also be related to the possibility of having access to inputs that previously could not be produced domestically or obtained from a third country. In both cases a change in Latin American countries production pattern is expected. In the next section we analyze the trade margins in order to identify possible trade pattern modifications.

2.2 Descriptive analysis: the trade margins approach

The changes in trade flow can be decomposed in extensive and intensive margins, helping distinguish if changes are mainly promoted by the intensification of trade in existing relations or if it is promoted by the beginning or ending of trade relations. A country trade relation is understood as a product-destination pair in the case of exports and as a product-supplier pair in the case of imports. Given an initial and a final period, if a pair is active in both periods it is classified as a continuing pair. If country A imported (exported) a given product from (to) country B in the first period and then in the second period it does not, but it still imports (exports) the product in question from (to) a third country, we have an exit of supplier (destination). If there is a similar situation, but in the second period the product in question is not imported (exported) from (to) any other country, then it is classified as an exit of product. If in the second period country A imports (exports) a product that was not imported (exported) from (to) no other country in the first period, then this new relation is classified as an enter of product. If in the second period country A start to import (export) from (to) country B a product that was already imported (exported) in the first period from (to) a third country, then this new relation is classified as an enter of supplier (destination).

Considering just the number of relations, Figure 4 illustrates the margins of each Latin American country import of machinery parts and components. Mexico and Brazil had the highest number of product-supplier active pairs in 2011, while El Salvador, Honduras, Nicaragua and Paraguay had the lowest number of active pairs. The data reflect the diversification of the industrial park in each country. We also verify that entry of supplier margin had a very important contribution in all cases, signalizing an increasing integration of Latin America in the international economy.

== Figure 4 ==

Following Obashi and Kimura (2016), we identify the contribution that each margin had in the trade growth. In order to calculate these contributions we use the following methodology:

$$\frac{\sum_i x^c_{i,t_1} - \sum_i x^c_{i,t_0}}{\sum_i x^c_{i,t_0}} = \frac{\sum_{i \in I^c}(x^c_{i,t_1} - x^c_{i,t_0})}{\sum_i x^c_{i,t_0}} + \frac{\sum_{i \in ENP^c} x^c_{i,t_1}}{\sum_i x^c_{i,t_0}} + \frac{\sum_{i \in ENC^c} x^c_{i,t_1}}{\sum_i x^c_{i,t_0}} - \frac{\sum_{i \in EXP^c} x^c_{i,t_0}}{\sum_i x^c_{i,t_0}} - \frac{\sum_{i \in EXC^c} x^c_{i,t_0}}{\sum_i x^c_{i,t_0}} \quad (1)$$

where the value of a country *c*`s trade flow *x* for product-country pair *i* in period *t* is denoted as $x^c_{i,t}$; I^c are the continuing pairs; ENP^c are the entering products; ENC^c are the entering countries; EXP^c are the exiting products; and EXC^c are the exiting countries.

Figure 5 reveals that the contribution of the intensive margin is the most important one. Even though the contribution of supplier entry is not as big as in the previous figure, it still accounted for an important part of the parts and components import growth, indicating that the Latin American countries increased their diversity of parts and components suppliers.

== Figure 5 ==

We also observe the contribution of the extensive and intensive margins in Latin American countries exports in order to verify changes in the variety of exported products and destinations. Figure 6 shows the export margins considering just the changes in the numbers of product-destination pairs. Once again the entry of new destinations and the continuation of existing pairs are important margins. However, this time the entry of new products is also important, indicating a change in the variety of produced goods. Argentina, Brazil, and Mexico already had a more developed industrial park in 1996, consequently the entry of products is very small. Another interesting feature is that in some cases the exit of products and destinations is big, also indicating a change in the export basket composition.

== Figure 6 ==

We also decompose the export growth according to its respective margins. Figure 7 reveals different patterns. The growth in countries with a more developed industrial park like Argentina, Brazil, and Mexico was more focused on the intensive margin (Honduras is an exception, having a similar pattern to these countries). The entry of new products was important in countries like Ecuador, Nicaragua, Paraguay, and Uruguay, while in the other cases the entry of new product-destination pairs were more important. In some countries like Bolivia, El Salvador, Peru, and Venezuela the exit of product and destination had also an important role, indicating a tendency of specialization and change in their export basket.

== Figure 7 ==

The previous figures offer evidences that the import and export pattern of Latin American countries changed during the studied period. We perform one more exercise to identify changes in the number of machinery products traded by country pair[4]. The upper part of Figure 8 shows that there was an increase in the variety of parts and components and final products imported. The main changes are attributed to an increase in products traded with China and Hong Kong. The lower part of Figure 8 reveals a predominant increase in the variety of exports to Latin American countries, followed by an increase in the variety of parts and components exported to other regions.

[4] Given the economic growth of China after the WTO accession in 2001, we consider the importance of disentangling the impacts of this country from the rest of the East Asian region. We separate East Asian region in two groups: a first group composed only by China and Hong Kong, and a second group composed by the other countries in the region that we address as East Asia (EA). As mentioned before, from this subsection we consider Mexico as a member of Latin America.

== Figure 8 ==

Considering the facts presented, the change in Latin America`s trade pattern and the increase in trade flows, in the next sections we study the effects that the changes in the structural composition of machinery parts and components suppliers had in the expansion of Latin American production networks, that we refer as a quantity impact, and analyze the changes in the sophistication of the Latin American intra-bloc machinery trade basket, that we refer as a quality impact.

3. Data

In the economics literature there are many researches about the fragmentation of the production and different ways of defining the object of study. Some scholars employ a more comprehensive definition of production networks, including in their analysis all inputs used, from the raw materials until the final product. In order to capture all the steps of the production process they use international input-output tables.[5] On the other hand, there are scholars that do not consider the raw materials in their analysis, understanding that just the trade of parts and components used in a given industry should be analyzed. This second group of researchers adopt a more refined classification in order to isolate parts and components from final products.[6]

We embrace the second view that allows the use of more disaggregated data. Considering that machinery industry presents a high level of complexity and use of a large

[5] For example, Timmer *et al.* (2015) used the World Input-Output Database (WIOD), while Baldwin and Lopez-Gonzalez (2015) employed WIOD and OECD-WTO TiVA data in their analysis of production networks.

[6] For example, Athukorala (2005) separates manufacturing parts and components from final products using the Standard International Trade Classification (SITC) data, while Ando and Kimura (2005) do the same for the machinery industry using Harmonized System (HS) data.

number of parts and components, we adopted this industry as our object of study.

The analysis of machinery production networks was based on the classification of the machinery trade in parts and components and final products[7]. The data used was collected from the United Nations Commodity Trade Statistics Database (UN Comtrade), classified according to the Harmonized System disaggregated to the six-digit level. The machinery industry is comprised by all the goods categorized as general machinery sector (HS84), electric machinery sector (HS85), transport equipment sector (HS86-89), and precision machinery sector (HS90-92).

We consider the import of parts and components from countries that were responsible for at least 0.01% of the international machinery trade in 2011. The selected 89 countries are grouped in five regions.[8] We define Latin America as the group of 17 countries composed by: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela.

The PRODY measure was employed as the qualitative measure for the export and import basket of Latin American countries.[9] We also used tariff data to account for the level of integration of the Latin American economies. The tariff data was collected from the World Integrated Trade Solution (WITS)[10]. Given the availability of tariff and trade data, this study is restricted to the period from 1996 to 2011.

[7] This process was performed in accordance with the classification presented in Ando and Kimura (2005).
[8] The list containing the 89 countries divided by regions is available in the Appendix.
[9] We use the PRODY measures calculated by Hausmann *et al.* (2007). According to the authors they "constructed the PRODY measure for a consistent sample of countries that reported trade data in each of the years 1999–2001.These indexes are the result of an average of three years" (Hausmann *et al.*, 2007, p. 10). As the chosen years are previous to the Chinese accession to the World Trade Organization, the possibility of a downward bias in the ranking of the machinery goods (specially the final goods given the increase in multinationals assembling their final products China) is minimized.
[10] The tariff data was collected in the harmonized system six-digit level and when necessary was converted to the HS1992 version following the classification in Kimura and Obashi (2010).

4. Methodology

As the core of production networks are regionally concentrated, in this work we focus on the impacts that changes in the structural composition of parts and components suppliers have on Latin America`s intra-bloc trade. We assume that in a first period Latin American countries can import parts and components from any region of the world. These parts and components are employed to produce other parts and components that in a second period will be used domestically or traded to another Latin American country. Alternatively, they can be used to manufacture a final product that will be consumed domestically or traded to another Latin American country. We assume that a Latin American production network is created when a Latin American country employs the parts and components imported from any region of the world to produce a final product or other parts and components that will be exported to another Latin American.

In order to quantify the impact that changes in the structural composition of parts and components suppliers had on the development of the intra-bloc machinery trade we follow the methodology proposed by Florensa *et al.* (2015). The Latin American intra-bloc trade of final products and parts and components in a given year is explained by the tariffs imposed by the importer country in the same year and the exporter country imports of parts and components in the previous year. Fixed effect dummies are used to capture all sources of unobserved heterogeneity that are constant for each period of time, individual, and sector. Exporter-time and importer-time dummies control for the multilateral resistance, while exporter-importer-sector dummies control for unobserved heterogeneities of each type of machinery and trade pair. The proposed models were defined as follows:

$$ln(XF_{ijkt}) = \alpha_0 + \sum_{r=1}^{7} \alpha_r lnM\_pc_{rikt-1} + \alpha_8 ln(1 + tariff_{jikt}) + \gamma_{it} + \varphi_{jt} + s_{ijk} + \varepsilon_{ijkt} \quad (1)$$

$$ln(XPC_{ijkt}) = \beta_0 + \sum_{r=1}^{7} \beta_r lnM\_pc_{rikt-1} + \beta_8 ln(1 + tariff_{jikt}) + n_{it} + \tau_{jt} + z_{ijk} + \delta_{ijkt} \quad (2)$$

where the XF_{ijkt} and XPC_{ijkt} denote the traded value of final products and parts and components from country *i* to country *j* (these countries are limited only to Latin American countries) of sector *k* in year *t*, respectively. The traded values are explained by country *i*`s imports of parts and components of sector *k* from a given region *r* in year *t-1* ($\mathrm{M\_pc_{rikt-1}}$); the tariff imposed by the importing country *j* over the product of sector *k* provided by country *i* in time *t* ($1 + tariff_{jikt}$); exporter-time and importer-time dummies (time is defined as a 5-years period); and the importer-exporter-sector dummies.

The first difference between this and Florensa *et al.* (2015) work is related to the definition of the object of study. As already mentioned, we selected a more specific object of study, focusing just on the machinery industry. This allows us to use more disaggregated and detailed data, increasing the refinement of the parts and components and final products correspondence.

Considering the logic of the production fragmentation, a country will decide to purchase parts and components from another country when this product offers a comparative advantage. Given this fact, we expect that the increase in imports of parts and components from East Asian region, especially China and Hong Kong, should guarantee a production gain for Latin American countries, increasing intra-bloc trade of machinery.

Another important contribution of this papers is that the analysis is not just limited to the quantity impact of the import of parts and components on the intra-bloc trade, but we also propose a way of verifying quality changes. Since we know that there was a change in the shares of machinery parts and components providers, we attempt to evaluate if this variation also produced a modification in Latin American intra-bloc trade pattern. We expect that if East Asian region, especially China and Hong Kong, produces more efficient parts and components, with higher quality and/or cheaper prices, Latin American countries can have access to new products, been able to diversify and improve the quality of their intra-bloc trade basket.

In order to check this hypothesis, first we propose a substitution of the traded values by a trade basket sophistication index that is calculated based on the PRODY index[11] developed in Hausmann *et al*. (2007). According to Hausmann *et al*. (2007, p. 3), the PRODY "index is a weighted average of the per capita GDPs of countries exporting a given product, and thus represents the income level associated with that product". In other words, this index attributes to each one of the products, classified according to the Harmonized System disaggregated to the six-digit level, a value that varies according to the share and per capita GDP of the countries that export it. This means that products with higher PRODY value were exported more by developed countries, while products with a lower PRODY value were exported more by developing countries. The PRODY index can be used as a proxy for the sophistication of the product and according to Hausmann *et al*. (2007), countries that have an export basket more similar to the ones of the developed countries tend to register economic growth in the subsequent periods. Based on this concept and the importance of the economic growth for the development of the

[11] More specifically, the PRODY index of a product k is defined as $PRODY_k = \sum_j \frac{(x_{jk}/X_j)}{\sum_j (x_{jk}/X_j)} Y_j$, where x_{jk}/X_j is the value-share of the commodity k in the country j`s overall export basket; $\sum_j (x_{jk}/X_j)$ is the aggregated value-shares across all countries exporting good k.

Latin American countries, we use the PRODY index to calculate the composition of the import basket of parts and components (IMPY index) and the intra-bloc export basket (EXPY index). The objective is to verify if changes in import pattern of parts and components led to changes in the pattern of the Latin American intra-bloc trade. We estimate if the imports of parts and components from specific regions contributed or not to bring the Latin American intra-bloc export basket closer to developed countries` ones.

The proposed models are defined as follows:

$$ln\left(EXPYF_{ijkt}\right) = \alpha_0 + \sum_{r=1}^{7} \alpha_r lnIMPY\_pc_{rikt-1} + \alpha_8 ln\left(1 + tariff_{jikt}\right) + \gamma_{it} + \varphi_{jt} + s_{ijk} + \varepsilon_{ijkt} \quad (3)$$

$$ln\left(EXPYPC_{ijkt}\right) = \beta_0 + \sum_{r=1}^{7} \beta_r lnIMPY\_pc_{rikt-1} + \beta_8 ln\left(1 + tariff_{jikt}\right) + n_{it} + \tau_{jt} + z_{ijk} + \delta_{ijkt} \quad (4)$$

where $EXPYF_{ijkt}$ and $EXPYPC_{ijkt}$ denote the EXPY index attributed to the basket of the final products and parts and components exported from country *i* to country *j* (these countries are limited only to Latin American countries) of sector *k* in year *t*, respectively. The EXPY index is calculated as the weighted average of the PRODY index of each component of the basket of a given sector. The EXPY index attributed to the baskets of final products and parts and components traded inside Latin America is explained by the IMPY index attributed to the basket of parts and components of sector *k* that country *i* imported from a given region *r* in year *t-1* ($\mathrm{IMPYM\_pc_{rikt-1}}$);; the tariff imposed by the importing country *j* over the product of sector *k* provided by country *i* in time *t* ($1 + tariff_{jikt}$); the exporter-time and importer-time dummies (time is defined as a 5-years period); and the importer-exporter-sector dummies.

5. Results

We first estimate equations (1) and (2) for the values of intra-bloc exports of machinery final products and machinery parts and components. This exercise is performed for the pooled machinery data and for the two most important types of machinery: electric machinery and transport equipment. The first half of Table 2 contains the results for the intra-bloc exports of machinery final products. The first column presents the results for the pooled data regression. We observe that the tariff coefficient is not statistically significant, indicating that reductions in tariffs of machinery final products are not associated with changes in the exports of machinery final products. Consequently, the advance of the regional integration in Latin America, reflected by the decrease in the tariffs imposed over the intra-bloc machinery trade, have no impact in the development of Latin American production networks when pooled data of machinery final products is considered. The variables related to the origin of the import of parts and components reveal that an increase in imports from East Asia (EA), China and Hong Kong (HK), and also from Latin American (LA) countries, increases the intra-bloc trade of final products in the subsequent period. On the other hand, the coefficient of imports from the United States and Canada is negative, indicating a negative impact in the intra-bloc trade. This result can be partially explained by the fact that Mexico and Costa Rica have strong ties with US, participating in a production fragmentation that is mostly a back-and-forth intra-firm trade. Consequently, the parts and components imported from US are mainly used to manufacture goods that are re-exported to US, not stimulating the intra-bloc trade. It is also possible that a share of these parts and components imported from US and Canada are used to manufacture products that are absorbed in the domestic market, not stimulating the regional trade.

== Table 2 ==

The second column reveals the results for final electric machineries. The statistically significant negative coefficient for tariffs suggests that an increase in Latin American regional integration have a positive impact. In other words, a decrease in the tariffs imposed on the import of final electric machineries, everything *ceteris paribus*, stimulates an increase in the intra-bloc trade of final electric machineries. The coefficients of the suppliers indicate that and increase in import of electric machinery parts and components from China and HK have a positive effect in the intra-bloc trade of final electric machineries. On the opposite side, the import of electric machinery parts and components from US and Canada have a negative effect.

The third column contains the coefficients for the transport equipment. An increase in the economic integration would have no impact in the trade of final transport equipment, since the tariff coefficient is not statistically significant. On the opposite side, the coefficient for the suppliers of parts and components of transport equipment reveals that imports from EA have a positive impact, increasing the intra-bloc trade of final transport equipment. The results possibly reflect the fact that transport equipment is historically a very strong sector in some Latin American countries and that in the last two decades it was supplied with parts and components from Korean and Japanese multinationals, in special the automobile ones that installed plants in the region.

The second half of Table 2 shows the estimation results for the trade in parts and components. The negative coefficient for tariffs in the fourth column indicates that an increase in regional integration, through the decrease of the tariffs, would have a positive effect in the fragmentation and relocation of the production inside Latin America. The import of parts and components from the rest of the world (ROW), LA, EA, and China and HK, stimulate the trade of parts and components inside the Latin American bloc. On the opposite side, import of parts and components from the European Union (EU27) has the opposite effect, indicating a substitution effect. That means that imports from EU27 does not stimulate the trade inside Latin America. Probably because the parts and components imported from this region are assembled and consumed domestically or exported to a third region.

The coefficients in the fifth column indicate that regional integration has no effect in the development of electric machinery regional production networks, while only the imports from LA countries enhance the regional production networks. Considering the transport equipment, the sixth column reveals that a decrease in the tariffs can lead to an increase in the regional production networks. Only the coefficient for ROW is positive and statistically significant.

In general, we found evidences that the increase in import of parts and components especially from China and HK, EA, and LA foments the development of a Latin American production network. The negative effects are mainly related to US and Canada, given the situation previously explained.

Bearing in mind that there is a wide range of machinery products and that some are more sophisticated than the others, our next step is to examine which regions provide parts and components that allow for the development of a Latin American regional production network focused on products that are more similar to the ones produced by developed countries. Been involved in the manufacturing process of products with higher sophistication level, instead of just buying the final product from other regions, the Latin

American countries can have access to technology, benefit from possible positive spillover effects, and economic growth.

The first half of Table 3 presents the results for the intra-bloc trade of final products, while the second half presents the results for the intra-bloc trade of machinery parts and components. The tariff coefficient in the first column is positive, indicating that a decrease in the final products tariffs lead to a decrease in the sophistication of the basket composition of final machinery products traded inside Latin America in the next period. In other words, the export basket becomes more similar to the ones of the developing countries. One possible interpretation for this fact is that with higher tariffs, products with lower sophistication, lower values and comparatively easier to be produced by developing countries, were manufactured in most of the countries been consumed in the domestic market, while just machinery products with higher level of sophistication that were produced just by a few countries in the region, were traded inside the bloc. However, the reduction in the tariffs allowed for an increase in the intra-bloc trade and specialization leading to a faster growth in the trade of less sophisticated products than the sophisticated ones. Considering the parts and components suppliers, we verify that the imports from EA allowed for an increase in the sophistication of the final products traded inside the Latin America, while imports from United States and Canada had a negative impact.

== Table 3 ==

In the case of sectoral trade, the second and third columns reveal that regional integration had a similar effect for the electric machinery, while for transport equipment the coefficient is not statistically significant. The import of electric machinery parts and components from EU27, China and HK promotes an intra-bloc trade of more sophisticated final products. In the case of transport equipment the imports from the EA and the ROW have a similar effect.

The second half of Table 3 presents the results for the regional trade in parts and components. All the coefficients for the machinery pooled data are not statistically significant or zero. The results for electric machinery reveal that imports of parts and components from US and Canada leads to a decrease in the sophistication of the electric machinery parts and components traded regionally. The transport equipment coefficients reveal that imports from LA countries decrease the sophistication of intra-bloc exports of parts and components, while the rest of the coefficients are not statistically significant or zero.

In general the origin of the import of parts and components affected more the sophistication of the regional trade of final machinery products than the parts and components one. Imports from US and Canada have a negative impact in the quality of the regional trade probably because they export to Latin America parts and components that are used in the production of less sophisticated machineries. The import of parts and components from China and HK and EA increases the sophistication of the regional production networks, possibly because these countries are increasing their role as suppliers of cheap and sophisticated parts and components to other regions of the globe, allowing the development of production networks for more sophisticated machineries.

6. Robustness Check

The database used contains missing values and zero trade values for machinery trade inside Latin America. As the natural logarithm of zero does not exist, the estimated regressions does not consider the zero trade values that are an important information about the trade pattern. The dropped data are information that are not used in the estimation, possibly leading to a bias in the regression results. To avoid this problem, we proceed with a robustness check exercise that estimate the same equations using the pseudo Poisson maximum likelihood (PPML) method (SILVA and TENREYRO, 2006). The use of PPML technique is a very common practice that allow us to account for the observations with zero trade values. Nevertheless, one must be aware that in our database we also have a few missing tariff and trade data for a given group of countries and products that affect the independent variables. Unfortunately the PPML model cannot address this problem. Consequently, we adopt a conservative position in the interpretation of the results, giving more emphasis to the results that have a similar sign to the ones found in the previous section (the ones in dark grey).

The first half of Table 4 displays the results relative to intra-bloc trade of final machinery products. In the first column the coefficients for EA, and US and Canada are the only ones that are statistically significant and have the same signs as the results from Table 2. The tariff coefficient for the machinery pooled data is negative and statistically significant indicating that an increase in regional integration would increase the value of intra-bloc trade. The coefficients for China and HK, and LA become statistically non-significant, while imports from ROW becomes statistically significant and positive. The second column reveals that for electric machineries the negative coefficients for tariffs and imports from US and Canada are still statistically significant, while the coefficient for imports from China and HK is also significant and positive. The only result different from Table 2 is the statistically significant and negative coefficient for imports from ROW. The third column reveals that although the imports from EA still have a positive sign, it becomes statistically non-significant, while the imports from ROW are positive and statistically significant.

== Table 4 ==

From this first part of the table we could confirm that especially for electric machinery final products a decrease in tariffs have a positive effect in the increase of intra bloc trade, while increases in imports from EA, and China and HK stimulate the intra-bloc trade of machinery and electric machinery, respectively. On the other side, imports from US and Canada have a negative impact.

The second half of the table reveals that the coefficients for imports from China and HK, EA, and ROW are statistically significant and positive, similar to Table 2, while imports from EU27 have statistically significant and negative coefficient when machinery pooled data is considered. The coefficient for US and Canada that was negative and statistically non-significant becomes significant, while the LA one becomes insignificant. Considering the electric machinery case the coefficient for EU27 becomes statistically significant and negative, while the EA one becomes statistically significant and positive. On the other hand, the coefficient for LA becomes statistically non-significant. The last column reveals that for the transport equipment sector the coefficients for tariff and ROW become statistically non-significant. The coefficient for US and Canada becomes statistically significant and negative, while China and HK`s one becomes statistically significant and positive. From the second half of the table the only results that are similar to the ones from Table 2 are for imports from ROW, EA and China and HK for the pooled data that stimulate the intra-bloc trade of parts and components, while imports from the EU27 have a negative impact.

The same exercise is performed considering the sophistication of the products traded in the regional production networks. In the first half of Table 5 the coefficients in the first column confirm that imports of machinery parts and components from EA increase the level of sophistication of the machinery final products traded inside Latin America, while a decrease of tariff leads to a decrease in the sophistication of the final products traded. The results in the second column confirm that imports of parts and components from EU27, and China and HK increase the sophistication of the final products traded inside Latin America. The tariff coefficient is also positive. The only difference from Table 3 is the coefficient of ROW that becomes positive. Results in the third column are all different from the ones in Table 3. The coefficient for tariffs and imports from China and HK become positive and statistically significant, while the coefficients of imports from ROW and EA become statistically non-significant.

== Table 5 ==

Considering the second half of the table, the coefficients of tariffs become statistically significant and positive in all cases. The coefficient for imports from the ROW becomes statistically significant and positive in the fourth column. On the other side, the coefficient of EU27 and EA become statistically significant and negative in the fifth column. Finally, the coefficients of US and Canada become all negative. The only result statistically significant that is similar to the one in Table 3 is the negative coefficient for imports from US and Canada.

The results from Table 5 confirm that imports of parts and components from EA stimulate the intra-bloc exports of machinery final products of higher sophistication, while imports of electric machinery parts and components from EU27, and China and HK stimulate the increase in the sophistication level of electric machinery final products traded inside Latin America. Only the electric machinery imports of parts and components from US and Canada have a negative impact on the sophistication of the intra-bloc exports of parts and components.

7. Final Considerations

In this paper we investigated how the changes in the structural composition of Latin America`s suppliers of machinery parts and components affect the development of Latin American regional production networks. In our analysis we considered a quantity and a quality dimension of the impacts of these imports.

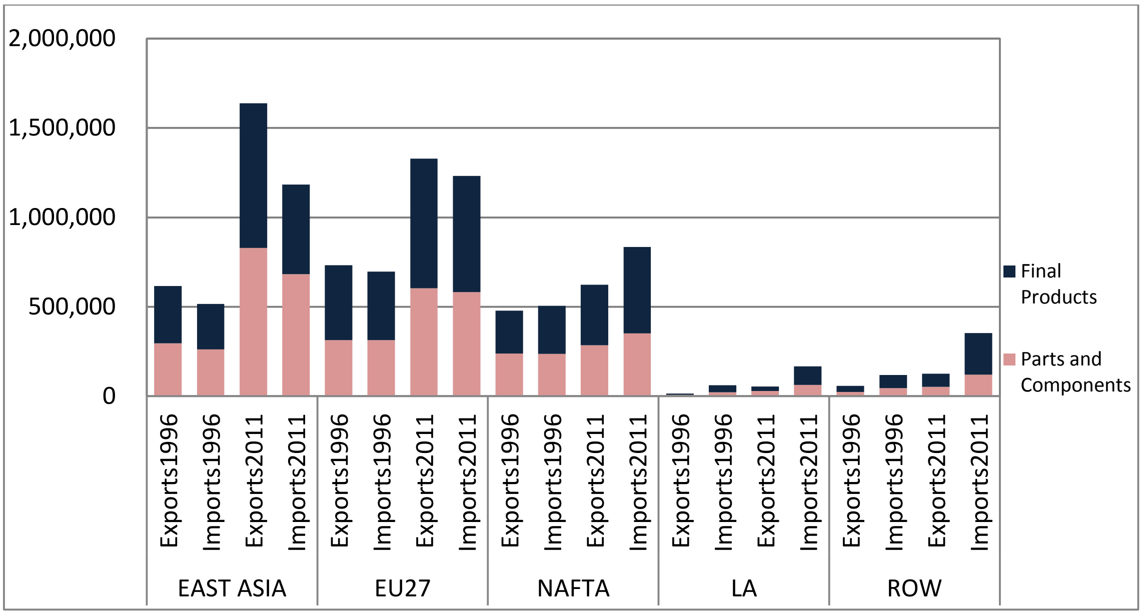
In the first part of the paper the descriptive analysis indicated a growth in the import of parts and components from all regions of the world. However, we observed that the growth in imports from the East Asian region was higher, resulting in a change in the structural composition of the suppliers. In the second part of the paper we proceeded with an econometric analysis to identify from which regions the import of parts and components contributed more to develop production networks inside Latin America and increase the level of sophistication of the traded products. The quantity analysis showed evidences that regional Latin American production networks are increasing in the last decades and that these production networks have been fomented by the import of parts and components from LA, EA, China and HK, and ROW. Imports from LA and ROW stimulate the increase in intra-bloc exports of machinery parts and components, while imports from EA stimulate the intra-bloc exports of machinery parts and components and final products. The imports from China and HK promote the intra-bloc trade of machinery parts and components in general and final products of electric machinery in especial.

On the opposite side, the import of parts and components from US and Canada did not stimulate the intra-bloc trade of final products. These countries are mainly involved in back-and-forth transactions with Mexico and Costa Rica, consequently a considerable part of their exports of parts and components are used to assemble final products that will be sent back to their markets. Another possibility is that a great part of these parts and components imported from US and Canada are used to generate products that are absorbed in the domestic market, not stimulating regional production networks.

Considering the second dimension studied, the sophistication of the products traded in Latin America`s regional production networks, the results show evidences that imports of parts and components from EA stimulate the intra-bloc exports of machinery final products with higher sophistication. The same applies for imports of electric machinery parts and components from ROW and China and HK. On the opposite side, import of electric machinery parts and components from US and Canada tend to decrease the sophistication of parts and components traded inside Latin America.

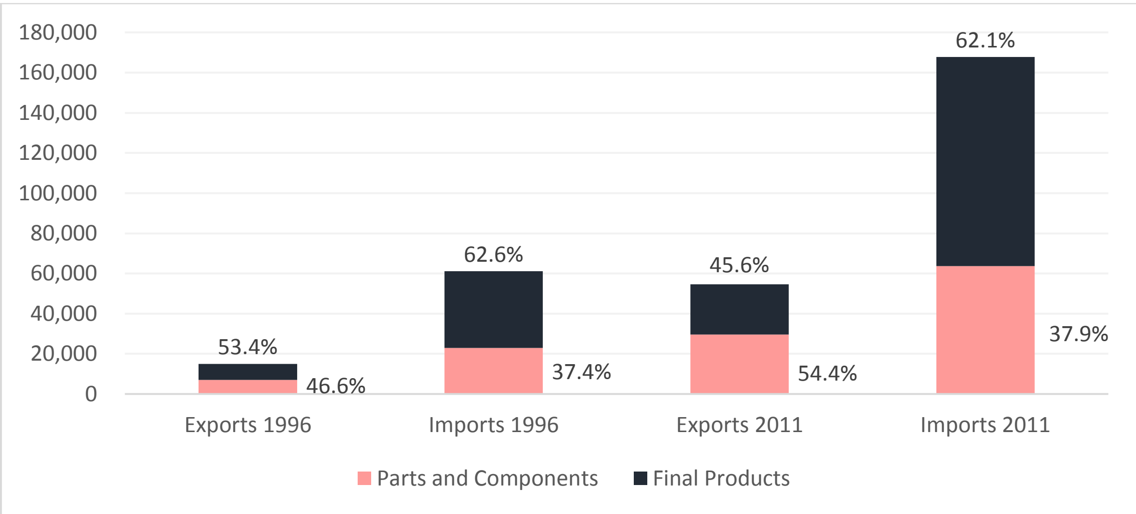
The findings of this paper indicate that Latin American governments should consider the possibility of been more proactive in the development of regional policies to facilitate the import and use of machinery parts and components, especially from the East Asian region, in order to foment the expansion of regional production networks and the increase in the sophistication level of the machinery products traded inside Latin America. Moreover, the Latin American countries could take advantage from the internalization of some steps of the machinery production to decrease the imports of machinery final products from third regions. These initial policies can lead to economic growth and other positive spillover effects. In the medium and long term this could help Latin American countries overcome the lack of competitiveness in given machinery products and allow an increase in the region`s participation in machinery international trade.

Figure 1 – Total values of exports and imports per region in 1996 and 2011 (in million US$)



Source: Chang and Kimura (2015).

Figure 2 – Latin America`s total value of machinery products trade in 1996 and 2011 (in million US$)



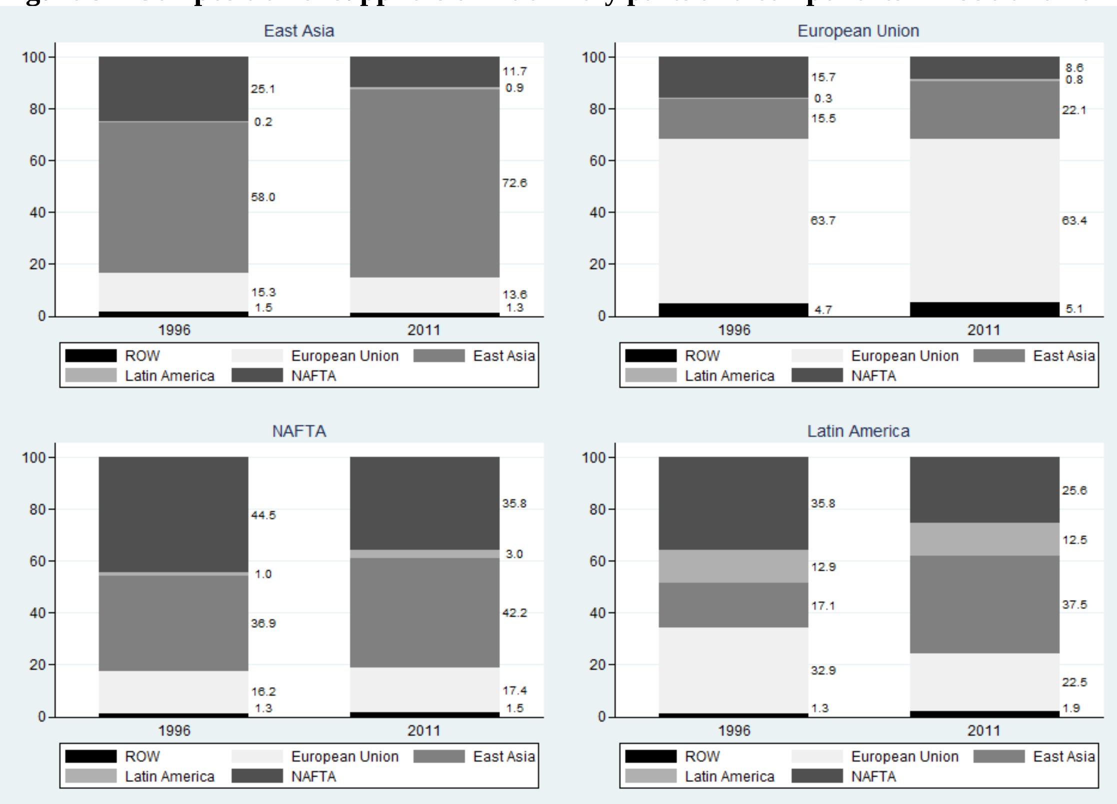
Source: Author's calculation, using data available from the UN Comtrade.

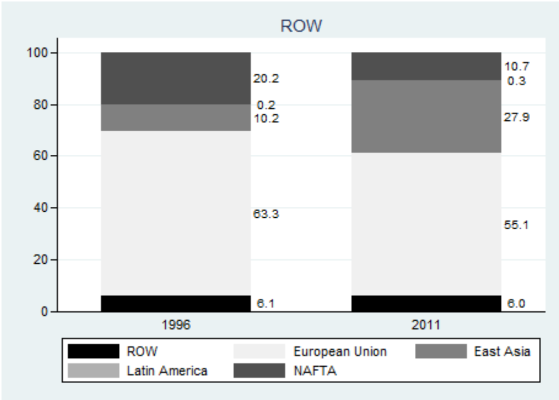
Table 1 – Compound annual growth rate of machinery trade from 1996 to 2011

		Parts and Components	Final Products	Total
East Asia	Exports	7.1%	6.4%	6.7%
	Imports	6.6%	4.6%	5.7%
EU27	Exports	4.5%	3.7%	4.1%
	Imports	4.2%	3.6%	3.9%
NAFTA	Exports	1.2%	2.3%	1.8%
	Imports	2.6%	4.0%	3.4%
LA	Exports	10.1%	7.9%	9.0%
	Imports	7.1%	6.9%	7.0%
ROW	Exports	5.1%	5.7%	5.4%
	Imports	6.9%	7.9%	7.6%

Source: Author's calculation, using data available from the UN Comtrade.

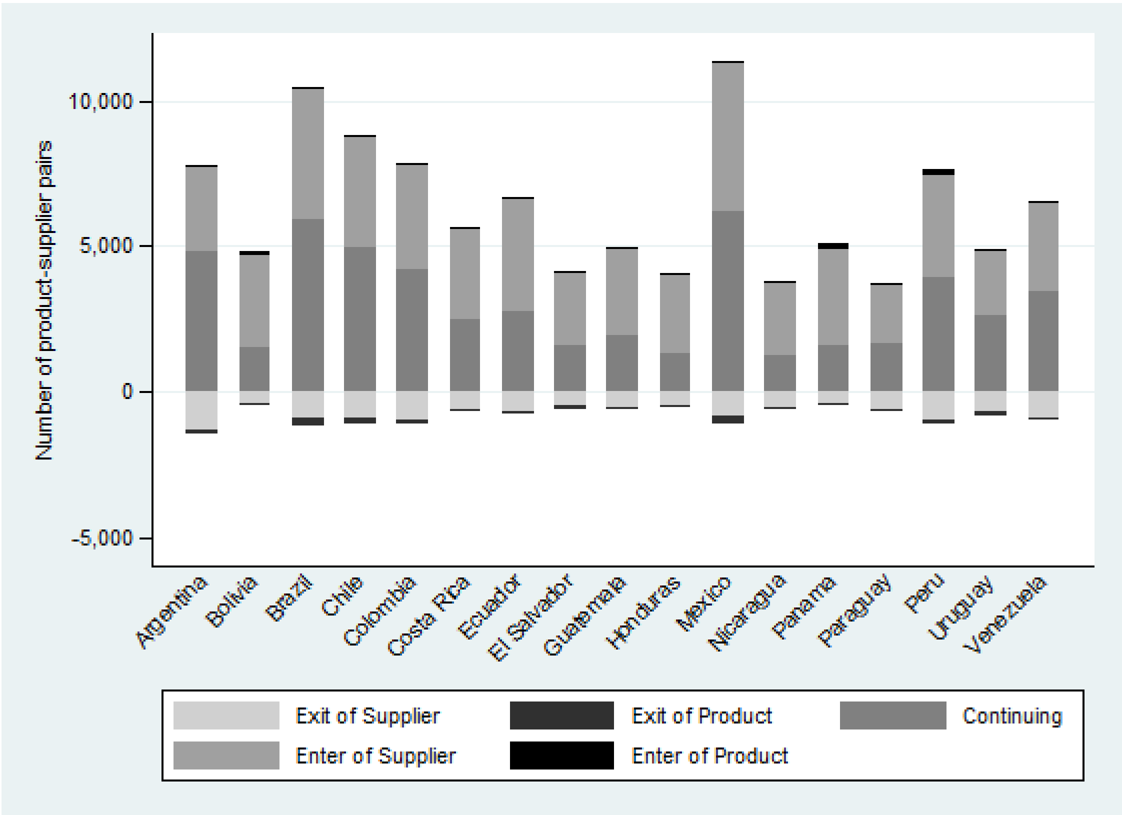
Figure 3 – Composition of suppliers of machinery parts and components in 1996 and 2011





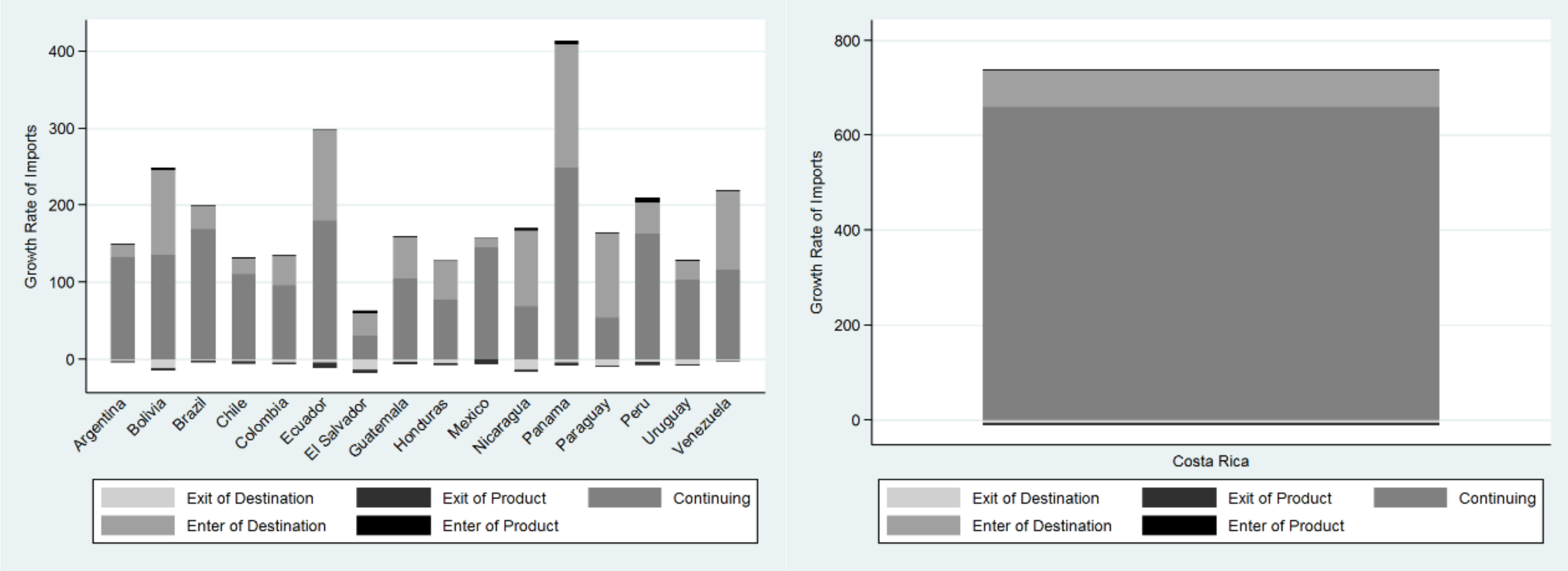
Source: Author’s calculation, using data available from the UN Comtrade.

Figure 4 – Number of product-supplier pairs in machinery parts and components imports according to the trade margins from 1996 to 2011



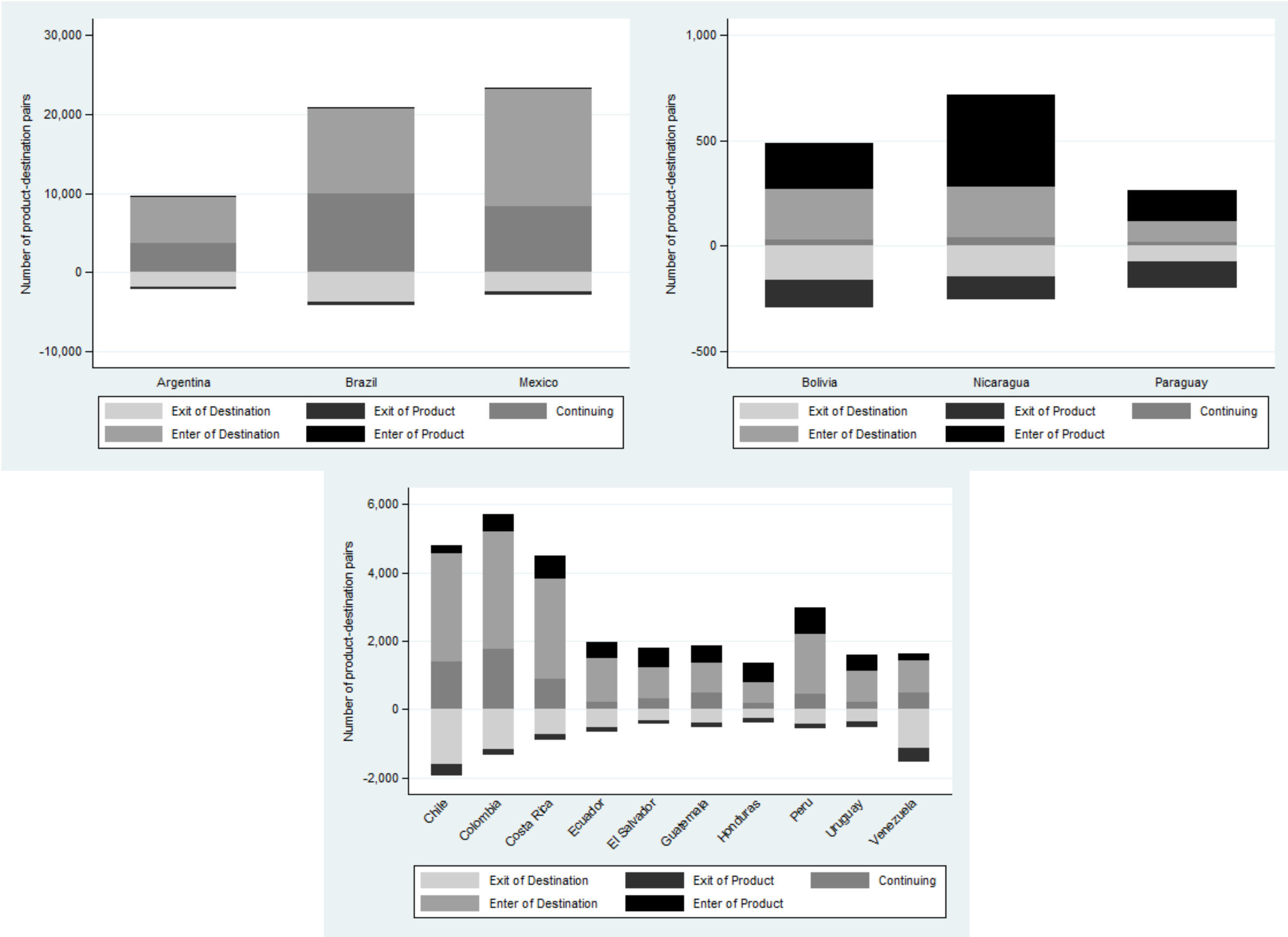
Source: Author’s calculation, using data available from the UN Comtrade.

Figure 5 – Decomposition of growth in machinery parts and components imports according to the trade margins from 1996 to 2011



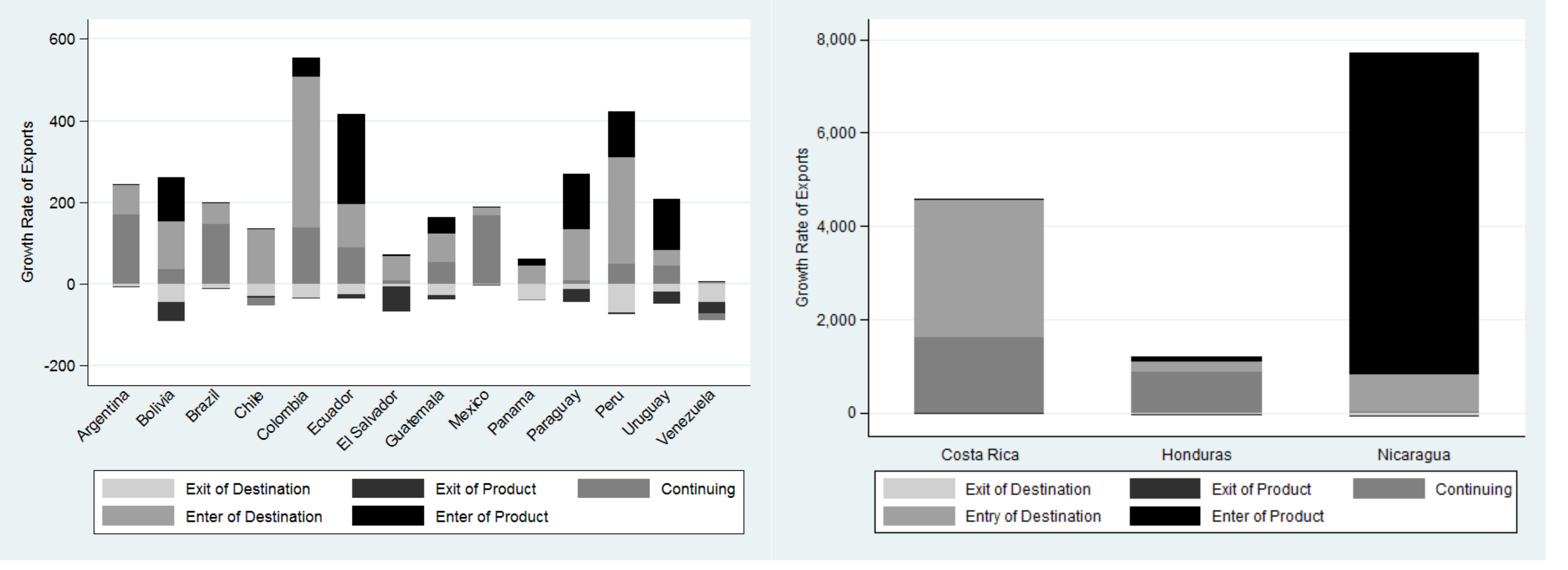
Source: Author's calculation, using data available from the UN Comtrade.

Figure 6 – Number of product-destination pairs in machinery exports according to the trade margins from 1996 to 2011



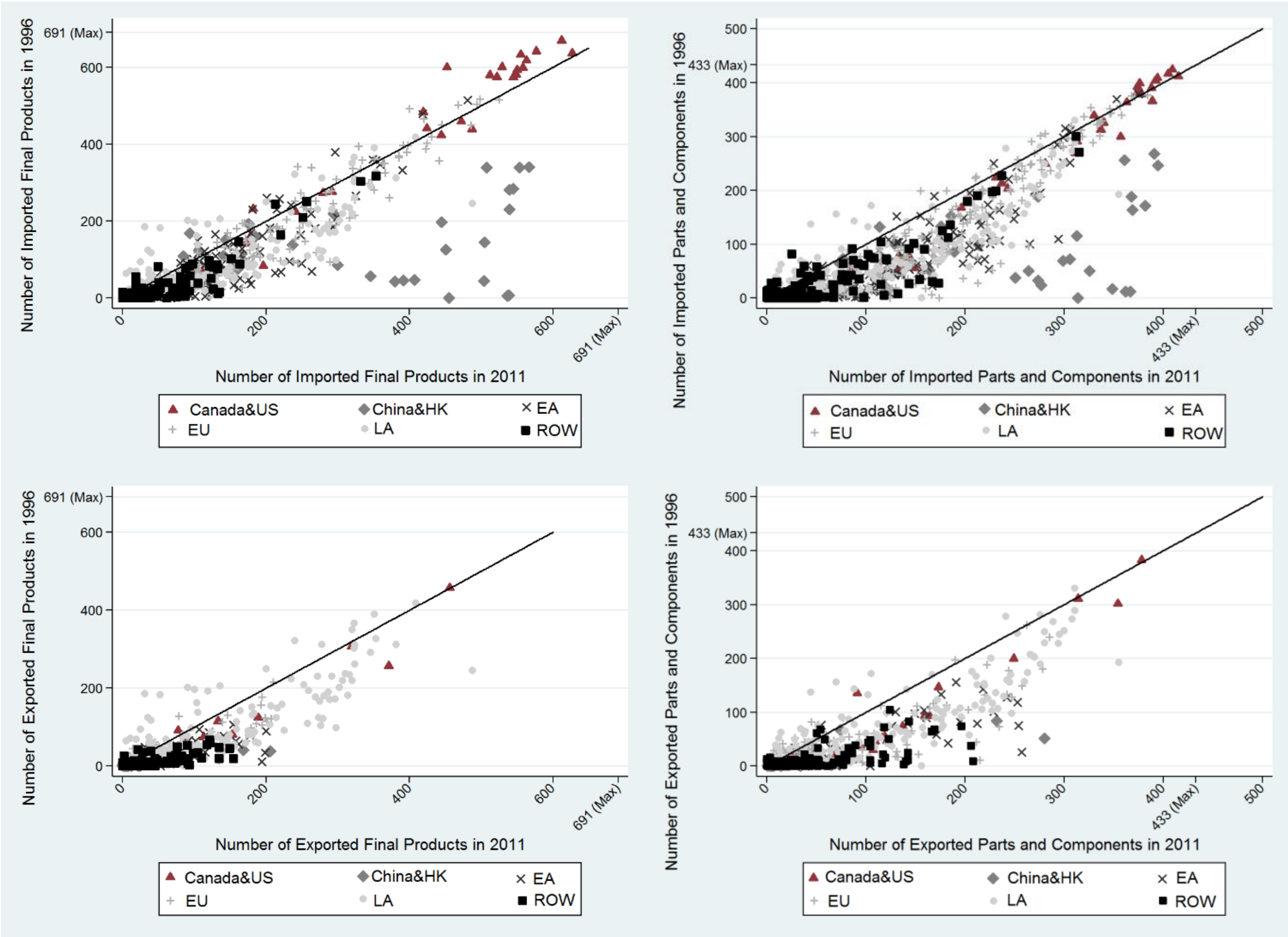
Source: Author's calculation, using data available from the UN Comtrade.

Figure 7 – Decomposition of growth in machinery parts and components exports according to the trade margins from 1996 to 2011



Source: Author's calculation, using data available from the UN Comtrade.

Figure 8 – Number of machinery products traded by country according to their region[1]



Source: Author's calculation, using data available from the UN Comtrade.

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[1] There are a total of 433 machinery parts and components and 691 machinery final products.

Table 2 – The effect of imports of machinery parts and components on the intra-bloc machinery exports

	Final Products			Parts and Components		
	Pooled Machinery	Electric Machinery	Transport Equipment	Pooled Machinery	Electric Machinery	Transport Equipment
Tariff	0.03	-0.07*	0.03	-0.04*	0.00	-0.11**
	(0.02)	(0.04)	(0.06)	(0.02)	(0.04)	(0.05)
Lagged imports of parts and components from ROW	0.03	0.03	0.00	0.04**	-0.07	0.11***
	(0.02)	(0.04)	(0.04)	(0.02)	(0.04)	(0.03)
Lagged imports of parts and components from EU27	0.05	-0.01	-0.15	-0.11***	-0.00	-0.14
	(0.04)	(0.07)	(0.13)	(0.04)	(0.08)	(0.09)
Lagged imports of parts and components from EA	0.06**	-0.11	0.28*	0.08***	-0.01	0.11
	(0.03)	(0.08)	(0.16)	(0.03)	(0.07)	(0.12)
Lagged imports of parts and components from LA	0.13***	0.10	0.11	0.18***	0.22**	0.12
	(0.03)	(0.10)	(0.13)	(0.03)	(0.09)	(0.10)
Lagged imports of parts and components from US & Canada	-0.17***	-0.18**	-0.01	-0.04	0.03	-0.18
	(0.05)	(0.09)	(0.19)	(0.05)	(0.09)	(0.14)
Lagged imports of parts and components from China & HK	0.05**	0.27***	-0.07	0.06***	0.09	0.06
	(0.02)	(0.07)	(0.06)	(0.02)	(0.07)	(0.05)
Constant	10.81***	13.52***	9.36***	11.30***	7.60***	14.06***
	(1.21)	(1.74)	(2.82)	(0.87)	(1.68)	(2.02)
Observations	13313	3570	2855	12183	3472	2695
R2	0.843	0.864	0.833	0.871	0.862	0.890

Given a restriction of space, the coefficients of secondary variables are omitted. Robust standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3 – The effect of import composition of machinery parts and components on the intra-bloc machinery exports sophistication

	Final Products			Parts and Components		
	Pooled Machinery	Electric Machinery	Transport Equipment	Pooled Machinery	Electric Machinery	Transport Equipment
Tariff	0.01**	0.01*	0.01	-0.00	-0.00	-0.00
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
Lagged imports of parts and components from ROW	0.00	0.01	0.01*	0.00	-0.00	0.00*
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Lagged imports of parts and components from EU27	0.00	0.03**	0.03	0.00	-0.01	0.00
	(0.01)	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)
Lagged imports of parts and components from EA	0.02***	0.00	0.05**	-0.00	-0.01	-0.01
	(0.00)	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)
Lagged imports of parts and components from LA	0.00	-0.02	-0.01	0.00	0.00	-0.01*
	(0.00)	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)
Lagged imports of parts and components from US & Canada	-0.03***	-0.01	0.00	-0.00	-0.03*	0.01
	(0.01)	(0.03)	(0.03)	(0.01)	(0.02)	(0.01)
Lagged imports of parts and components from China & HK	-0.01	0.03***	-0.01	0.00*	-0.00	0.00
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
Constant	9.85***	9.19***	8.82***	9.75***	10.22***	9.70***
	(0.13)	(0.38)	(0.48)	(0.07)	(0.28)	(0.13)
Observations	13313	3570	2855	12183	3472	2695
R^2	0.415	0.409	0.361	0.506	0.412	0.386

Given a restriction of space, the coefficients of secondary variables are omitted. Robust standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4 – The effect of imports of machinery parts and components on the intra-bloc machinery exports (PPML)

	Final Products			Parts and Components		
	Pooled Machinery	Electric Machinery	Transport Equipment	Pooled Machinery	Electric Machinery	Transport Equipment
Tariff	-0.09**	-0.12*	-0.05	-0.03	-0.03	-0.05
	(0.04)	(0.06)	(0.08)	(0.02)	(0.04)	(0.04)
Lagged imports of parts and components from ROW	0.12**	-0.22**	0.18**	0.10***	0.08	0.04
	(0.05)	(0.09)	(0.07)	(0.03)	(0.07)	(0.06)
Lagged imports of parts and components from EU27	0.00	0.15	-0.03	-0.32***	-0.42***	-0.08
	(0.12)	(0.23)	(0.21)	(0.11)	(0.12)	(0.12)
Lagged imports of parts and components from EA	0.19***	0.00	0.16	0.24***	0.38***	0.31
	(0.07)	(0.15)	(0.19)	(0.06)	(0.10)	(0.20)
Lagged imports of parts and components from LA	-0.05	0.08	-0.11	0.10**	0.16	0.39***
	(0.07)	(0.09)	(0.18)	(0.05)	(0.11)	(0.14)
Lagged imports of parts and components from US & Canada	-0.38***	-0.53***	-0.33	-0.17***	-0.17*	-0.49***
	(0.09)	(0.15)	(0.23)	(0.06)	(0.09)	(0.18)
Lagged imports of parts and components from China & HK	0.07	0.21**	0.06	0.15***	0.02	0.02
	(0.05)	(0.09)	(0.10)	(0.04)	(0.10)	(0.07)
Constant	16.05***	20.89***	18.10***	14.34***	8.32***	12.45***
	(2.17)	(2.48)	(3.98)	(1.33)	(2.13)	(2.40)
Observations	16676	4320	4032	15983	4256	3794
R2	0.914	0.900	0.938	0.953	0.942	0.947

Given a restriction of space, the coefficients of secondary variables are omitted. Robust standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5 – The effect of import composition of machinery parts and components on the intra-bloc machinery exports sophistication (PPML)

	Final Products			Parts and Components		
	Pooled Machinery	Electric Machinery	Transport Equipment	Pooled Machinery	Electric Machinery	Transport Equipment
Tariff	0.05***	0.07***	0.05***	0.06***	0.08***	0.06***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Lagged imports of parts and components from ROW	-0.00	0.02*	0.00	0.01*	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lagged imports of parts and components from EU27	-0.00	0.05*	0.04	-0.01	-0.05**	-0.04
	(0.01)	(0.03)	(0.05)	(0.01)	(0.02)	(0.05)
Lagged imports of parts and components from EA	0.02**	0.03	-0.01	0.01	-0.05**	-0.01
	(0.01)	(0.03)	(0.04)	(0.01)	(0.02)	(0.04)
Lagged imports of parts and components from LA	-0.01	0.01	-0.03	-0.01	0.00	-0.02
	(0.01)	(0.02)	(0.06)	(0.01)	(0.02)	(0.05)
Lagged imports of parts and components from US & Canada	-0.02	0.07	0.04	-0.04**	-0.10*	-0.09*
	(0.02)	(0.05)	(0.05)	(0.02)	(0.06)	(0.05)
Lagged imports of parts and components from China & HK	0.01	0.05**	0.03**	0.01	0.03	-0.02
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
Constant	9.65***	7.71***	8.43***	9.90***	10.72***	13.54***
	(0.27)	(0.74)	(0.87)	(0.22)	(0.76)	(1.17)
Observations	16676	4320	4032	15983	4256	3794
R2	0.499	0.465	0.496	0.539	0.506	0.555

Given a restriction of space, the coefficients of secondary variables are omitted. Robust standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix

Table A.1 – Country List by Regions

Region	Name	Region	Name	Region	Name
Canada_US	Canada	EU	Netherlands	ROW	Cote d'Ivoire
Canada_US	USA	EU	Poland	ROW	Croatia
China_HK	China	EU	Portugal	ROW	Egypt
China_HK	China, Hong Kong	EU	Romania	ROW	Georgia
EA	Australia	EU	Slovakia	ROW	Ghana
EA	India	EU	Slovenia	ROW	Iceland
EA	Indonesia	EU	Spain	ROW	Israel
EA	Japan	EU	Sweden	ROW	Jamaica
EA	Malaysia	EU	United Kingdom	ROW	Kyrgyzstan
EA	New Zealand	LA	Argentina	ROW	Mali
EA	Philippines	LA	Bolivia	ROW	Mauritius
EA	Rep. of Korea	LA	Brazil	ROW	Morocco
EA	Singapore	LA	Chile	ROW	Niger
EA	Thailand	LA	Colombia	ROW	Nigeria
EU	Austria	LA	Costa Rica	ROW	Norway
EU	Bulgaria	LA	Ecuador	ROW	Oman
EU	Czech Rep.	LA	El Salvador	ROW	Rep. of Moldova
EU	Cyprus	LA	Guatemala	ROW	Russian
EU	Denmark	LA	Honduras	ROW	Saudi Arabia
EU	Estonia	LA	Mexico	ROW	Senegal
EU	Finland	LA	Nicaragua	ROW	Sudan
EU	France	LA	Panama	ROW	Switzerland
EU	Germany	LA	Paraguay	ROW	Rep. of Macedonia
EU	Greece	LA	Peru	ROW	Tunisia
EU	Hungary	LA	Uruguay	ROW	Turkey
EU	Ireland	LA	Venezuela	ROW	Uganda
EU	Italy	ROW	Albania	ROW	Ukraine
EU	Latvia	ROW	Algeria	ROW	Tanzania
EU	Lithuania	ROW	Azerbaijan	ROW	Zambia
EU	Malta	ROW	Cameroon		

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