

# THE COMPETITION BETWEEN CHINA AND SOUTH KOREA FOR EXPORT MARKETS IN LATIN AMERICA: AN ANALYSIS BY TECHNOLOGICAL CATEGORIES<sup>1</sup>

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## ABSTRACT

The trade competition between China and South Korea for Latin America's market over the period 2001-2019 is researched in this paper. We build an export quality index based on the classification of exports by technological intensity to show China's and Korea's export profiles have become more similar over time. Additionally, we calculate an index of competition between the said countries in Latin American markets. We then compute an exports function of South Korean exports to Latin America using a dynamic panel data analysis where the competition index, the Chinese exchange rate, and Latin America's GDP are explanatory variables. The estimation results show the Chinese exchange rate and the competition between China and South Korea impart a negative impact on South Korean exports to the region, while Latin America's GDP does a positive one.

**Keywords:** Exports, exchange rate, China, South Korea, panel data.

**JEL Classification:** F10, F14, O33.

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LA COMPETENCIA ENTRE CHINA Y COREA DEL SUR POR MERCADOS DE EXPORTACIÓN EN AMÉRICA LATINA: UN ANÁLISIS POR CATEGORÍAS TECNOLÓGICAS

**RESUMEN**

En este artículo investigamos la competencia entre China y Corea del Sur por los mercados de exportación en América Latina entre 2001 y 2019. Construimos un índice de calidad de las exportaciones basado en la clasificación de las exportaciones por intensidad tecnológica, y lo utilizamos para mostrar que los perfiles de exportación de China y Corea del Sur se han vuelto más similares con el tiempo. Además, calculamos un índice de competencia entre Corea del Sur y China en los mercados latinoamericanos para las últimas dos décadas. Luego, estimamos una función de exportaciones para las exportaciones sudcoreanas a América Latina utilizando un análisis de datos de panel dinámico, tomando el índice de competencia, el tipo de cambio chino y el PIB latinoamericano como variables explicativas. Los resultados de la estimación muestran un impacto negativo del tipo de cambio chino y de la competencia entre China y Corea del Sur en las exportaciones sudcoreanas a la región y un impacto positivo en el PIB de los países latinoamericanos.

**Palabras clave:** exportaciones, tipo de cambio, China, Corea del Sur, datos de panel.

**Clasificación JEL:** F10, F14, O33.

## 1. INTRODUCTION

Trade between South Korea and Latin American countries grew at an average annual rate of 13% between 2000 and 2013. In 2013, the region absorbed 6% of South Korean exports and was the origin of 3.5% of South Korean imports (ECLAC, 2015). In 2022, South Korea exported approximately U\$ 26 billion to Latin America. South Korea has also presented a growing trade surplus with the region over the last two decades.

There is large potential for increasing cooperation and trade between South Korea and Latin America, given the complementarity between their economies. Thus, there are many opportunities for the diversification of bilateral trade in the future. As an initial effort in that direction,

free trade agreements have been signed between the Republic of South Korea and three countries in the region: Chile, Peru and Colombia (ECLAC, 2015).

On the other hand, China has increased its role in international trade over the last two decades, and has also changed its exports profile towards more technologically sophisticated goods (Naughton, 2018). As a consequence of these developments, China has increased its competition with South Korea's exports in third markets. According to the South Korea Institute for Industrial Economics & Trade (KIET), 37% of South Korea's and China's export items are currently overlapping with each other, as China's export industry structure is shifting toward capital—and technology—intensive sectors. In particular, China has increased its share of exports and imports in Latin America, and is now the main trade partner for several countries in the region.

Considering the increasing competition between South Korea and China in third markets, we investigate the competition between the two countries for export markets in Latin America. In particular, we examine the evolution of exports from South Korea and China to twelve major Latin American countries between 2001 and 2019, in order to estimate the impact of China's competition on South Korea's exports to the region. The twelve countries in our sample are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela, which represented 93% of the total Gross Domestic Product (GDP) of Latin America in 2019 (according to the ECLAC database).

The main questions we address are: Do South Korea and China have a similar sectoral composition of exports to Latin America? How has this similarity evolved over time? What has been the impact on South Korean exports to Latin America of the increasing competition from China in the last two decades? What is the impact of changes in the Chinese exchange rate on the value of South Korean exports to Latin America?

One of the most important aspects of this study relates to the fact that the impacts on South Korean exports of the increasing competition from China may not be evenly distributed across the globe, due to differences in trade profiles between countries or regions. Therefore, analyses that are able to address such regional specificities may be very relevant for trade and industrial policies designed to improve South Korea's export performance in Latin America.

Based on the growing technological convergence between China and South Korea, and the increasing role of China in global trade, we hypothesize that the rising competition from China in Latin American markets and fluctuations in the Chinese exchange rate have negatively affected South Korean exports to the region. This hypothesis will be tested through the estimation of an exports function using dynamic panel data methods.

The main contribution of this paper is to provide an empirical assessment of the competitive dynamics between China and South Korea in Latin America, using a sectoral classification by technological intensity and constructing specific indices of export competition. This study adds to the literature by focusing on Latin America, a region that is often overlooked in studies of China-South Korea trade rivalry, despite its strategic importance and increasing trade flows with both countries.

The remainder of the paper is organized as follows. Section two presents the theoretical background on the relationship between competitiveness, productive specialization, and international trade, drawing on both classical and contemporary approaches. Section three provides a brief literature review on the growing importance of China in international trade and, in particular on the competition between South Korea and China for export markets in Latin America. Section four describes the data and presents the classification of exports by technological intensity, the index of competition between South Korea and China, and the methodology used for estimating the exports function. Section five reports the results, including the export quality index for South Korea and China between 2001 and 2019, the index of export competition, and the estimated effects of China-South Korea competition and the Chinese exchange rate on South Korean exports to Latin America. Finally, conclusions, policy implications, and research limitations are presented in section six.

## **2. THEORETICAL BACKGROUND: COMPETITIVENESS, SPECIALIZATION, AND INTERNATIONAL TRADE**

The relationship between competitiveness, productive specialization, and international trade has been a central issue in economic theory. Classical and neoclassical trade theories, such as Ricardian comparative advantage and the Heckscher-Ohlin model, explain trade flows based

on differences in factor endowments and productivity. However, these models have limitations in explaining the dynamics of technological change, market structure, and non-price competitiveness.

Krugman (1980; 1982; 1988) introduced the New Trade Theory, emphasizing increasing returns to scale, product differentiation, and the role of monopolistic competition in shaping trade patterns. This framework helps to explain why countries with similar endowments still engage in bilateral trade and how intra-industry trade can emerge. It also provides insights into how economies with technological capabilities can improve their competitiveness by innovating and diversifying exports.

In a broader context, Patibandla (1994) and Berkun and Meijl (1998) review the evolution of trade theories and highlight the shift from factor-based models to those incorporating strategic behavior, learning, and innovation. These new approaches underscore that competitiveness is not only price-driven, but also influenced by the technological content and quality of exports.

The role of exchange rates in competitiveness has also been analyzed. Dornbusch (1975) and Aoki (1983) explore the transmission mechanisms between exchange rate changes and trade balances, notably through the Marshall-Lerner condition. Their work emphasizes the time dynamics of trade adjustment and the importance of elasticities in determining the effects of currency depreciation on export performance.

More recent approaches incorporate global value chains (GVCs) and task-based trade. Grossman and Rossi-Hansberg (2008) propose a framework in which trade in tasks—rather than goods—can affect wage structures and specialization. Similarly, Inomata (2017) and Szymczak (2024) provide overviews of how GVCs have transformed the nature of competitiveness and productive specialization, making them increasingly dependent on firms' positions in international production networks.

From an empirical and policy-oriented perspective, Erokhin, Tianming, and Andrei (2023) present a comprehensive review of international trade and competitiveness theories, combining traditional and contemporary views. They highlight that, in the context of developing countries, upgrading export quality and integrating into GVCs are key to improve competitiveness in global markets.

This theoretical framework informs the empirical analysis in this paper by connecting trade performance to the structure and technological

content of exports, and by considering the role of exchange rates and external competition. In particular, the increasing similarity between China's and South Korea's export profiles suggests that non-price competitiveness and specialization in high-tech sectors may become central for maintaining export performance in regions like Latin America.

### **3. CHINA AND SOUTH KOREA IN INTERNATIONAL TRADE**

In this section, we provide a brief review of the empirical literature that addresses the impact of China's expansion on international trade, especially in Latin America, and the competition between South Korea and China for export markets. Particularly, we focus on the composition of exports by technological intensity and the influence of the exchange rate on competition between China and South Korea.

Lall (2000) examines the evolution of manufactured exports from developing countries, using a detailed classification by technological level. The classification proposed by Lall (2000) divides exports into five groups of products, namely: (i) Primary products (PP): Little or no processing; (ii) Resource-based manufactures (RB): Generally simple, labour-intensive products, but including segments that use capital- and skill-intensive technologies; (iii) Low-technology manufactures (LT): Products that use stable and well-diffused technology, usually embodied in capital equipment; (iv) Medium-technology manufactures (MT): This represents a crucial segment of the industrial activity in developed economies, and comprises the majority of skill- and scale-intensive technologies in intermediate and capital goods; and (v) High-technology manufactures (HT): Advanced technology products in rapid evolution, characterized by high Research and Development (R&D) investment and an emphasis on product design.

Blázquez-Lidoy, Rodríguez, and Santiso (2006) analyse China's trade impact on Latin American countries. They use two indices of trade competition to compare the impact of China on 15 Latin American countries during the period 1998-2004. In general terms, the results show that there is no relevant trade competition between China and Latin America during the period, given the complementarity of their economies.

Barbosa (2020) examines the trade patterns between China and some central and peripheral regions in the period 2000-2016. The main pur-

pose of this study is to stress the unfolding of different trade patterns in the countries of Latin America. Barbosa (2020) considers that the rise of China and the models of international integration of Latin American countries have led to a process of disintegration and fragmentation in the region in economic terms, thus bringing about new dilemmas for the development of countries in the region.

Like Barbosa (2020), Bekerman, Dulcich and Moncaut (2013) examine the expansion of economic relations between China and Latin American countries and argue that this may offer opportunities in the short term, as seen in exports of primary products and improved terms of trade. However, it also means challenges for the long term which, if not properly confronted, can worsen structural external vulnerability. In this research, they analyse the direct and indirect effects on those Latin American countries that trade with China, particularly Argentina and Brazil. In general, they consider that the importance of these countries as suppliers of food, oil and other primary goods, essential for sustaining the growth of the Chinese economy, have generated dynamic effects for these countries, such as the expansion of exports and a sharp improvement in the international prices of some primary products.

Libanio (2012) examines the impacts on Brazilian states of China's expansion in international trade. First, the author analyses the pattern of the export specialization of Brazilian states in comparison to the pattern of China, by calculating coefficients of specialization (Blázquez-Lidoy, Rodríguez, and Santiso, 2006). Then, the correlation between these coefficients and economic growth rates for the period 1996-2009 is investigated. The results show that economic growth in Brazilian states has been strongly influenced by the degree of complementarity in relation to Chinese exports, and by China's growing demand for agricultural and mineral commodities. Thus, Brazilian states that produce and export raw materials tended to grow more than the national average between 2000 and 2009.

Medeiros and Cintra (2015) analyse the increasing presence of China and its influence on Latin American economies during the previous decade. The paper stresses a 'demand effect' —associated with increasing exports and investments— and a 'structure effect' —related to deindustrialization and an increasing share of primary goods in the exports from Latin America. The main conclusion of the paper is that the change

in terms of trade and the demand for exports derived from Chinese expansion have tended to foster economic growth in Latin America.

Prazeres, Bohl and Zhang (2021) aim to answer the following questions: What will trade between China and Latin America and the Caribbean (LAC) look like in 2035? How important will China be for LAC's exports and imports? How will the sectoral composition of China–LAC trade evolve over the coming fifteen years? To answer these questions, the report explores four alternative scenarios for China–LAC trade until 2035, highlighting the most interesting outcomes and implications. A key finding of the research is that China is still gaining ground in LAC trade and is likely to continue to do so until 2035. The scenarios estimate that, by 2035, China's participation in the overall LAC trade will lie in the range of 15 to 24 per cent. In many cases, increased trade dependence on China could translate into reduced dependence on the United States. For all four of the scenarios presented in the paper, the relevance of the United States as a destination for LAC exports declines.

Greenaway, Mahabir and Milner (2010) explore whether and how the growth of China's exports displaced those of other Asian countries to third markets over the period 1990–2003. Over this period, China's surge in exports appeared to displace its neighbours' exports to third markets, with a 1% increase leading to a 0.07% drop in Asian countries' exports. The results provide evidence of a displacement of Asian countries' exports to third markets, although with a relatively small order of magnitude overall. The effect is increasing over time and is greater in more industrialized country markets.

ECLAC (2015) describes South Korea's development process and provides a detailed account of the trade relations between South Korea and Latin American countries from 2000 to 2013. The report finds that South Korea was able to expand its exports to Latin America during the period, and also that Latin American exports to South Korea are highly concentrated in few countries, products and companies, and are chiefly made up of primary goods.

Nonnenberg (2013) aims to compare the performance of Latin American and South and Southeast Asian countries over the previous three decades with respect to the technological intensity of their exports. The main contribution of this paper is the construction of an indicator of technological intensity that allows adequate measurements of the degree

of knowledge content of exports from both regions. This indicator is calculated for all sample countries for the period 1983-2008, based on data from Comtrade/World Integrated Trade Solutions (WITS). It clearly shows that exports from Asian countries present a much higher technological intensity when compared to exports from Latin American countries.

Baak (2014) examines the competition between Chinese and South Korean machinery exports in the Japanese market, by employing a structural model and panel data for 16 machinery products from 2000 to 2012. His findings suggest that China and South Korea competition is based on higher technology export goods.

La and Shin (2019) investigate the competition effects between South Korea and China exports in their common-export markets, considering market sophistication. Using empirical analysis to identify the demand for product quality across countries, the authors estimate the effects of market sophistication on the competition between South Korean exports and Chinese products, considering 61 common markets for South Korea and China during the period 2003-2010. Their main findings can be summarized as follows: The negative effects of the competition between South Korea and China on South Korea's exports to third markets are stronger when consumers are less sophisticated. On the other hand, the negative effects diminish when the third market possesses a high demand for quality, novelty, design, brand or eco-friendliness.

Kim (2020) examines the need for South Korea to diversify the destinations of its exports and reduce its dependence on sales to the USA and China. As a way of studying possible alternative export markets for South Korean products, Brazil is analysed by the author, considering factors such as the relevance of Latin America as an emerging market, the high growth of South Korean exports to Brazil, and the low trade interdependence and asymmetry between South Korea and Brazil. The paper also emphasizes that the bilateral relationship is mostly economic and commercial and is less complex in political and diplomatic terms than the relationships with the USA and China. The results of the empirical sectoral analysis on the Brazilian market indicate that there are some attractive markets in which South Korea has the potential to intensify its exports to Brazil.

Lastly, we present some literature on the role of exchange rates in trade competition. Mattoo, Mishra and Subramanian (2017) investigate

how China's exchange rate affects the exports of developing countries to third markets. They include product —and destination— specific indices of competition between China and its developing country competitors over the period 2000-2014, and report that a country's exports of products that compete with Chinese exports increase when the Renminbi appreciates.

Thorbecke (2017) examines whether South Korea and China compete in exporting lower-technology goods, and the impact of exchange rate shocks. His results indicate that a depreciation of the Renminbi leads to a large decrease in South Korean lower-technology exports. Eum (2019) examines the impact of changes in the Chinese exchange rate on South Korean exports, considering the characteristics of the exported products. The empirical evidence provided in the paper is based on import data for the Organisation for Economic Co-operation and Development (OECD) countries from 2002 to 2014. Eum uses three different indices to measure the substitutability and complementarity between products from South Korea and China. The results show that South Korea's exports to OECD countries of products that have a greater degree of competition fall more intensively as the Renminbi depreciates. However, once quality differences between South Korean and Chinese products are considered in the estimation, the negative impact of the depreciation of the Chinese Renminbi turns out to be negligible.

In broad terms, the overview of the literature contains some elements that are relevant for the analysis proposed here. First, it is clear that China has increased its role as an exporter of goods to Latin America in the past two decades – not only in terms of the total value of exports, but also in terms of the composition of the exports, moving towards more sophisticated sectors. Second, the literature suggests that competition between South Korea and China has increased as a consequence of the Chinese expansion. Third, exchange rates have a role to play in terms of competitiveness. And last, but not least, the role of exchange rates is less important when there is larger product differentiation —which is expected considering the importance of non-price competitiveness. The following sections of this paper will address some of these issues by examining the competition between China and South Korea for export markets in Latin America between 2001 and 2019.

#### 4. DATA, MODEL AND ESTIMATION METHODOLOGY

The first goal of this research is to provide a detailed description of South Korea's and China's exports to Latin American countries between 2001 and 2019. Data on exports were collected from the United Nations (UN)-Comtrade database, and classified into five groups, according to the categories proposed by Lall (2000): Primary products, resource-based manufactures, and low-tech, medium-tech and high-tech manufactures. The classification adopted in this paper follows the three-digit Standard International Trade Classification (SITC), Revision 2.<sup>2</sup>

Following this classification, exports were divided into two large groups, X1 and X2. The first group comprises products classified as primary products, resource-based manufactures and low-technology manufactures (PP, RB and LT, respectively). This means that X1 represents exports with lower technological content. The second group, named X2, includes medium- and high-technology manufactures (MT and HT), which correspond to products with higher technological intensity (Libanio, 2012). The export quality index  $EQI_{it}$  was then defined as<sup>3</sup>:

$$EQI_{i,t} = (X2_{i,t} - X1_{i,t}) / TotalExports_{i,t} \quad [1]$$

This index ranges from  $-1$  to  $+1$ . Lower values are associated with a lower technological content of the exports. The extreme cases are: A country exports only PP, RB and LT ( $EQI = -1$ ); or a country exports only MT and HT ( $EQI = +1$ ). Therefore, according to the terminology adopted here, the higher the  $EQI$ , the better the quality (in terms of technological content) of exports from country  $i$  in period  $t$ .

Next, two indexes of competition between South Korea and China in Latin American markets are calculated for the period 2001-2019. The indexes are the so-called coefficient of specialization (CS) and coefficient of conformity (CC). The calculation of these indexes follows two

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<sup>2</sup> The use of SITC Revision 2 is primarily due to its wide historical availability and consistency across the entire period under analysis (2001-2019). Additionally, SITC Revision 2 is commonly used in empirical studies on trade and technological intensity, particularly those based on the typology proposed by Lall (2000).

<sup>3</sup> Where the superscripts  $i$  and  $t$  stand for country and period, respectively.

different methodologies proposed by Blázquez-Lidoy, Rodríguez, and Santiso (2006):

$$CS = 1 - \frac{1}{2} \sum_n |a_{it}^n - a_{jt}^n| \tag{2}$$

$$CC = \frac{\sum_n a_{it}^n a_{jt}^n}{\sqrt{(\sum_n (a_{it}^n)^2)} \sqrt{(\sum_n (a_{jt}^n)^2)}} \tag{3}$$

where  $a_{it}$  represents the share of good  $n$  in the exports of country  $i$  to Latin America in period  $t$ . In our case, country  $i$  is South Korea, whereas country  $j$  is China. Based on equations [2] and [3] above, these indexes measure the similarity between exports of two countries in respect to a third country (or region). If two countries have identical export profiles, the CS and the CC index are both equal to 1. At the other extreme, if there are no similarities between exports from the two countries, the coefficients would approach zero. In the first case, the competition for Latin American markets would be stiff between the two countries, while in the latter case there would be no competition.

Finally, our research aims to estimate the impact of the increasing competition with China and the impact of real exchange rate shocks on South Korea’s exports to Latin America. To do this, an exports function is estimated that includes the competition indices as explanatory variables:

$$X_{it} = \alpha_0 X_{it-1} + \alpha_1 RER_t + \alpha_2 CI_{it} + \alpha_3 Y_{it}^* + u_i + \varepsilon_{it} \tag{4}$$

where  $X_{it}$  represents the South Korean exports to Latin American countries,  $RER_t$  refers to the real exchange rate of the Chinese Renminbi,  $CI_{it}$  represents the index of export competition between China and South Korea in Latin American markets (the arithmetic mean of the terms CS and CC defined above), and  $Y_{it}^*$  represents real GDP of the importing country. The term  $u_i$  is the unobserved heterogeneity or time invariant variables, and  $\varepsilon_{it}$  is the vector of independent and identically distributed (iid) errors. GDP is measured in constant US dollars and the source of the GDP data is the Economic Commission for Latin America and the

Caribbean (ECLAC) (<https://www.cepal.org/pt-br/datos-y-estadisticas>). The data on the real effective exchange rate is extracted from the World Development Indicators database (<https://databank.worldbank.org/source/world-development-indicators>).

The estimation requires an initial transformation in first differences to eliminate the individual effects  $u_i$  and a subsequent estimation by GMM (Generalized Method of Moments) with appropriate instruments to mitigate the correlation between  $X_{it-1}$  and  $\varepsilon_{it}$ . The use of GMM methods in the analysis of dynamic panels was refined by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). There are at least two major variants of these estimators for dynamic panels, the GMM in first differences (Arellano and Bond 1991; Arellano and Bover, 1995) and the GMM system estimation (Blundell and Bond, 1998). The first consists of an estimation in first differences, using as instruments the lags of the lagged term and the lags of the exogenous and pre-determined explanatory variables in level.

In this paper, we initially perform Ordinary Least Squares (OLS) levels and within-groups (fixed effects) estimations of the coefficients. Both estimators for  $\rho$  are biased: The OLS upward and the within-groups downward. Thus, the coefficient value obtained from the OLS estimation is usually seen as an approximate upper bound whereas the coefficient obtained from the within-group estimation is regarded as a lower bound (Hoeffler, 2002; Roodman, 2006).

We also perform the GMM first-difference estimation and the system GMM estimation. Because the coefficient value from the system GMM estimation shows that there is unit root, we choose the GMM first-difference (FD-GMM) of Arellano and Bond (1991) as the best estimation method.

The use of dynamic panel data models and GMM estimation offers important advantages, such as controlling for unobserved heterogeneity, addressing potential endogeneity, and allowing for the dynamic structure of export behaviour. However, GMM estimation also has limitations, including sensitivity to instrument selection and the need for a large number of time periods and cross-sectional units to ensure robust results. Moreover, the validity of the results depends heavily on diagnostic tests and the strength of the instruments used in the estimation.

## 5. RESULTS AND INTERPRETATION

Figures 1 and 2 show the evolution of exports from South Korea and China, respectively, to Latin America between 2001 and 2019. For the case of South Korea, the data indicates that the total value of South Korean exports increased during the 2000s, reached a peak between 2011 and 2014, and declined in recent years. Also, the figure shows that medium- and high-technology goods have been the main components of exports to Latin America during the entire period of analysis.

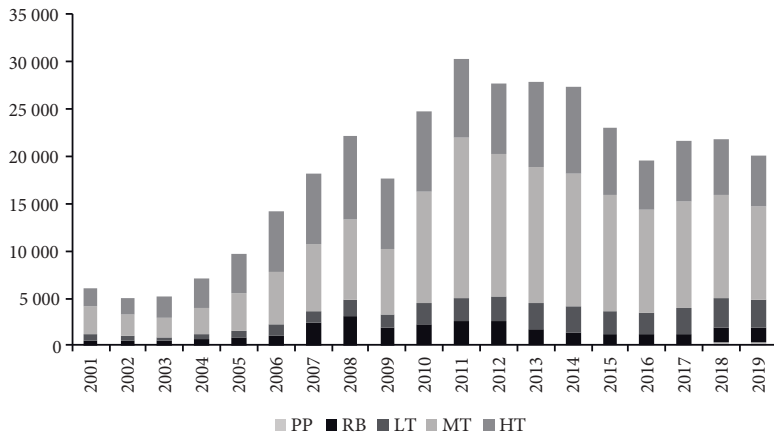
In the case of China, there are two important elements to be mentioned. First, it should be noted that the total Chinese exports to Latin America increased substantially over the period —the value of exports in 2019 was 22 times larger than in 2001. Secondly, there was a relevant change in the composition of Chinese exports over time, with an increase in the share of medium- and high-technology manufactures, and a decline in the other categories —low-tech manufactures, in particular. This move of Chinese exports towards a more sophisticated export profile is the most important aspect for explaining the increase in the competition with South Korea in the Latin American markets.

Lastly, it should be noted that the values of South Korea's and China's exports to Latin America were similar in 2001 (around US\$ 5 billion), and that in 2019 Chinese exports were 6.5 times larger than South Korean exports to the region. Another interesting piece of information is that global exports from China are four times larger than South Korea's global exports. Comparing the relative export performance of the two countries in Latin America to their exports to the rest of the world, one can conclude that China has a better penetration in Latin America than South Korea does, in relative terms.

The export quality index (EQI) provides a measure of the changes in the composition of exports, in terms of technological content. Figure 3 shows China's and South Korea's EQI of twelve Latin American countries between 2001 and 2019. In the early 2000s, China had a negative export quality index, which means a lower technological content of Chinese exports and a predominance of PP, RB and LT goods. Over time, a shift from simpler to more complex products from China explains the increase in the export quality index. Besides that, the evolution of the EQI illustrates the

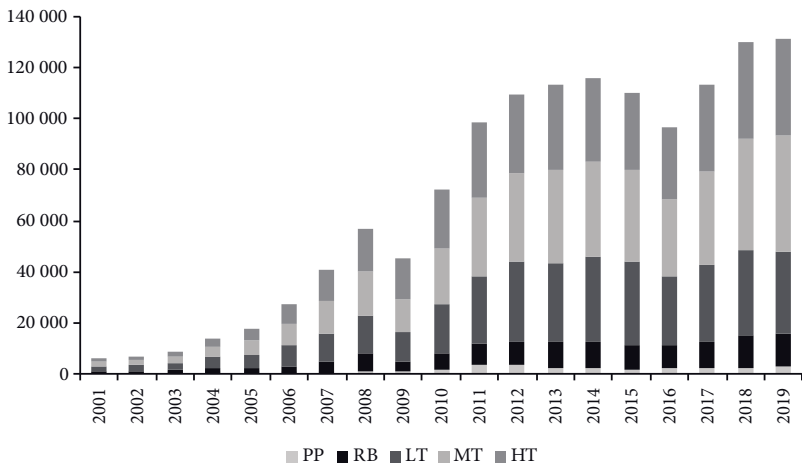
fast change in ‘Made in China’ products, which were initially associated with a lower technological content.

**Figure 1. South Korea: Exports to selected Latin American countries by technological classification, 2001-2019 (US\$ million)**



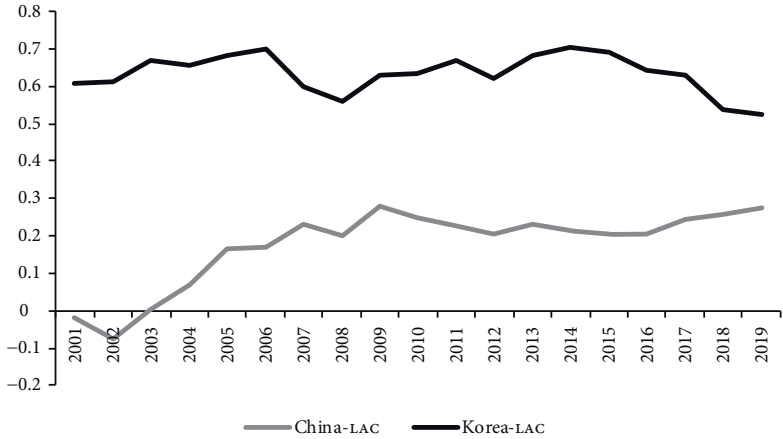
Source: Authors' calculations using UN-Comtrade data.

**Figure 2. China: Exports to selected Latin American countries by technological classification, 2001-2019 (US\$ million)**



Source: Authors' calculations using UN-Comtrade data.

**Figure 3. Export quality index for selected Latin American countries, 2001-2019**



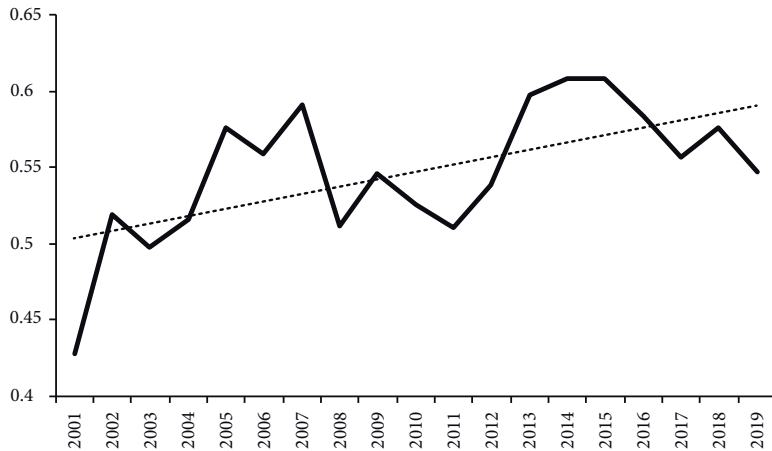
Source: Authors' calculations.

South Korean exports to Latin America, in turn, show a high EQI for the entire period of analysis, ranging from +0.52 to +0.7. However, it is clear that the composition of exports from South Korea and China to Latin America has become increasingly similar —as measured by the EQI— over time. This result is mainly due to the increase in the export quality index for China, and it provides evidence of the increasing importance of China as a competitor of South Korea in international trade to Latin America.

Figure 4 shows the index of export competition (Blázquez-Lidoy, Rodríguez, and Santiso, 2006) between South Korea and China for selected Latin American countries between 2001 and 2019. In general, the competition between the two countries was increasing during the period of analysis. This means that the similarities between the structures of exports from South Korea and China are increasing over time. Interestingly, the index of competition falls after reaching a peak in 2014-2015, suggesting a decline in the similarity of export composition between South Korea and China.

One possible explanation for this result is the decline of South Korean exports in some selected sectors or groups of products, accompanied by an increase in Chinese exports to the region in these same sectors.

**Figure 4. Index of exports competition between South Korea and China in Latin America, 2001-2019**



Source: Authors' calculations.

In particular, South Korean exports have declined whereas Chinese exports have increased in products such as passenger motor vehicles (SITC 781), heating and cooling equipment and parts (741), ships, boats and floating structures (793), optical instruments and apparatus (871), and optical goods (884).

In order to investigate the role of the Chinese exchange rate, as well as the competition between China and South Korea in exports to Latin America, we proceed to the estimation of the exports functions taking these elements as explanatory variables. Table 1 contains the results of the GMM difference estimation, which was selected as the most appropriate method as explained in the previous section of this paper<sup>4</sup>.

The results show that both values of the lagged terms of exports are highly significant. This is the reason for considering two lags of South Korean exports. For the real exchange rate, the negative sign suggests a negative impact of the Chinese exchange rate on South Korean exports.

<sup>4</sup> Variables were first-differenced following the Arellano and Bond (1991) method. No further transformations were applied. Coefficients represent short-run effects of changes in the explanatory variables.

**Table 1. Estimation of exports function, South Korea to Latin America, 2001-2019**

Dependent variable: South Korean exports to Latin America		
N = 192; T = 19		
GMM diff		
Independent variables	Coef.	Prob. > z
<i>South Korean exports</i> <sub>t-1</sub>	0.8562258	0.000
<i>South Korean exports</i> <sub>t-2</sub>	-0.133288	0.000
<i>Real exchange rate</i>	-1.15e+07	0.000
<i>Index of competition</i>	-2.21e+08	0.224
<i>GDP</i>	3,303.486	0.000
Instruments		140

Source: Authors' calculation.

This result means that a depreciation of the Renminbi lowers the export prices for products from China, improving their price competitiveness, and eventually brings about a decline in the share of other exporters (including South Korea) in the Latin American market. Our results can be associated with those presented by Eum (2019), who finds that a depreciation of the Chinese Renminbi reduces South Korean exports to OECD member countries and, in addition, that the negative spillover effects from a depreciation of the Renminbi are larger when we consider how well the Chinese export product quality meets the needs of importers. In our case, as the Chinese exchange rate is associated with a negative impact on South Korean exports, this means that differences in the quality of products between the two countries are not large enough to cancel out the effects of the currency depreciation.

Regarding the index of competition, it was negative but not statistically significant in the estimation. The negative sign confirms what is expected by the theory, because it suggests that a higher degree of competition with China brought about negative effects on South Korean exports during this period. As mentioned before, China's export profile has changed toward more technologically advanced goods over time and has become more similar to South Korea's export profile. Therefore, China

has become an important competitor and has been able to increase its market share in Latin America, to the expense South Korea's export demand in the region. However, although the inclusion of the competition index in the model is theoretically grounded and empirically relevant, the variable was not statistically significant. One possible explanation is that the index, as constructed, may not accurately capture the nuances of export competition across the different sectors or countries analyzed. Another potential explanation is that international competition does not exert a direct or linear effect on the dependent variable in the specified model, being mediated by other factors not included in the estimation, such as trade policies, firm-level productivity, or market differentiation strategies. Even though it is statistically insignificant, the presence of the index remains analytically valuable, as it highlights the complexity of trade dynamics in the context under investigation. In any case, this result may be taken with caution and requires further research in the future.

As for the GDP of the selected Latin American countries, the estimated coefficient is positive and highly significant. This result suggests that South Korean exports have benefited from higher growth rates in the region, which is expected by the theory.

In sum, our estimation results are, for the most part, in line with the literature. First, they confirm the relevance of the Chinese exchange rate for exports from other countries, as found by Mattoo, Mishra, and Subramanian (2017), with specific reference to the case of South Korea. In addition, the literature points out that exchange rate shocks tend to have smaller impacts when there is quality differentiation. In our case, the significant exchange rate effects may be associated with the increasing similarity in the composition of exports between China and South Korea—that is, a small quality differentiation—as presented by our export quality index and by the index of export competition between the two countries.

## 6. CONCLUDING REMARKS

We examined the competition between China and South Korea for export markets in Latin America from 2001 to 2019. We built an index of export quality for China and South Korea, based on a classification by technological intensity (Lall, 2000): Primary products, resource-based

manufactures, and low-tech, medium-tech and high-tech manufactures. In addition, we calculated an index of competition between South Korea and China in Latin American markets for the period. An exports function for South Korean exports to Latin America was then estimated using panel data analysis, in order to investigate the roles of competition between China and South Korea and the Chinese exchange rate.

The main results of this paper confirm the growing importance of China as a competitor for South Korea in Latin America, given China's move towards a more sophisticated export basket. This finding was captured by the increasing export quality index from China over time. In addition, the estimation results show that a depreciation of the Chinese exchange rate reduces South Korean exports to Latin America, whereas growth in Latin American countries' GDP increases such exports. On the other hand, an increase in the index of trade competition between China and South Korea reduces South Korean exports to Latin American countries. This result is expected by the theory, since trade competition is more intense when the export profile of two countries becomes more similar. In particular, China has become an important competitor and has been able to increase its market share in Latin America, to the expense South Korea's export demand in the region. However, it should be noted that the competition index is not statistically significant in our estimations, which points to the limitations of the index to accurately capture the nuances of export competition across the different countries analysed. In any case, the presence of the index remains analytically valuable, as it highlights an important feature of export dynamics in the context under investigation, although we recognize that the result presented in this paper may be taken with caution and requires further research in the future.

Finally, our research leads to some important economic policy implications for improving South Korean exports to Latin America. First, product differentiation, based on innovation and product quality, must be pursued in order to lower the effects of a devaluation in the Chinese exchange rate. In the current scenario, price-competitiveness is still relevant for the region. Second, bilateral trade agreements between South Korea and Latin American countries may give South Korea additional competitive advantages, considering the growing similarity between China's and South Korea's export profiles.

This research has some limitations. First, the analysis focuses on a sample of twelve Latin American countries, which, although representative, does not cover the entire region. Second, the technological classification used, while widely accepted, is based on fixed criteria that may not fully capture recent structural changes in production. Third, the availability of consistent and detailed data on export quality and competition indices limits the possibility of including additional explanatory variables. Future research could explore more granular sectoral dynamics and incorporate additional variables related to innovation, investment, and trade policies. ◀

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