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Extended abstract

EXTENDED ABSTRACT

Title: Analysing the growth of international trade: looking for spatial effects

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Abstract: *(minimum 1500 words)*

The shift-share approach has been traditionally used to analyse the growth rates of economic variables. The original technique decomposes growth in three effects: geographic reference effect (for example, national or global effect), industry mix or structural effect, and regional or competitive effect (Dunn, 1960). The widespread use of shift-share analysis (SSA) has been associated with its simplicity: a minimum amount of data is required to provide reasonable and useful results. Thus, SSA has been employed in the study of different issues within economics and social sciences, such as productivity, inequality, and tourism, among others (Dinc and Haynes, 2005; Dogru and Sirakaya-Turk, 2017; Espa *et al.*, 2016; Grossi and Mussini, 2018, Krabokoukis and Polyzos, 2021).

In recent decades there has been an exponential growth in the number of studies related to the theory and applications of SSA. With regard to international trade, different papers have followed the guidelines provided by authors like, among others, Markusen *et al.* (1991) and Dinc and Haynes (1998), who focused on the use of international trade as a link between regional economies and the global economy. Although there have been several contributions in this line of research, the literature on SSA that includes theory and methodology to study international trade has not been

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sufficiently developed. However, SSA could give an overview of the factors that drive the growth of exports or imports in a certain country by making sectorial and regional comparisons. Hence, this technique could assess the impact of industry structures on international trade growth (through industry mix or structural effect) and indicate how competitive a country is in regional or international markets (through the regional or competitive effect). Therefore, the analysis of international trade could benefit not only from the information that the decomposition provides, but from the ease of its application, without the need to draw upon more complex techniques.

The potential usefulness of shift-share for the analysis of international trade variables, has been proved by a few studies that used Dunn's model to analyse export performances, obtaining useful results (see Peh and Wong, 2009; Wilson and Mei, 1999).

In spite of the interesting results provided by the application of shift-share to international trade variables, most previous studies have preferred other methodologies. The most common framework to the international trade variables has been the Constant Market Share -CMS- (among others, , Chami Batista and Liu, 2017; Cheptea *et al.*, 2005; Cheptea *et al.*, 2014; Fagebberg, 1998; Lakkakula *et al.*, 2015). The CMS decomposes growth rates into different effects in a similar way to the SSA. But the CMS analysis incorporates export destinations within the decomposition instead of considering exports of the country studied. In consequence, the focus of the CMS method differs substantially from that of the traditional shift-share.

Additionally, although the importance of spatial components in the shift-share analysis was acknowledged, it was not until Nazara and Hewings (2004) that a new *spatial* modification of this method emerged. These authors introduced spatial components to the traditional shift-share decomposition to represent interactions between the regions under evaluation. The spatial framework takes into account the potential neighbourhood influences by comparing the growth rates of economic variables for a specific region with those of its neighbors. Inspired by this pioneering study, several authors have contributed to the spatial shift-share literature both in a methodological and empirical way (see among others, Espa et al, 2013, Montanía et al, 2021; Ramajo and Márquez, 2008). Despite of the constant development of the spatial SSA literature, this method has not been applied to analyse the changes in international trade.

However, using the traditional SSA along with spatial version could provide a broader view of the drivers of changes in trade variables. While the traditional SSA puts the focus on a particular geographical reference such a nation or a region, the spatial SSA also pays attention to changes in the surrounding nations or regions (Montanía et al., 2021). Thus, considering these two perspectives of SSA is a key aspect for obtaining an accurate and complete picture of determinants of changes in international trade variables.

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This paper contributes to the literature in the following ways. First, it encourages the use of the non-spatial and spatial SSA in the field of international trade. Starting from the traditional shift-share decomposition and following the “pure spatial shift-share” proposed by Ramajo and Márquez (2008), this paper aims to illustrate the use of the SSA (non-spatial and spatial SSA) to decompose the growth rates of trade variables, offering an expanded capacity of analysis about the performance of exporting countries. On one hand, the traditional SSA assesses the growth of exports in three ways. First, through the evaluation of the global exports of sector “ m ”. This allows for understanding how sectoral growth could favor the exports of a certain product. Second, by focusing on the structure of the world industry. Accordingly, the countries that export the products with highest growth could benefit from a favorable industry mix effect, and viceversa. Third, by comparing the performance of country j and the world in terms of the exports of product i . Through this effect, the traditional SSA sheds light on the advantages that countries could have in the exports of a country. On the other hand, the spatial effects expands the SSA’s capacity to offer insights about the performance of exporting countries. First, they inform about the evolution of the sector m in the neighboring countries, giving information about the trends followed by the sector within a specific region. Secondly, it analyses the industry structure of the neighboring countries, allowing to determine whether the country j has the same structure in comparison with the region it belongs to. Finally, in the same way that the traditional SSA, the spatial version also evaluates the competitiveness of a country in comparison with the neighboring countries.

Second, this paper contributes to extend the Boudeville’s (1966) method to propose both non-spatial and spatial classifications of countries, regions or provinces based on their performance in international trade. In its original form, Boudeville suggested that eight types of regions can be detected through the evaluation of the industry mix and the competitive effect of the traditional shift-share. Thus, a region may grow slowly in relation to other regions as a result of the industry mix or locational disadvantages. As a consequence, the performance of the countries or regions can be improved by different policy guidelines that address the weakness detected by the SSA (Andrikopoulos, 1980, Edwards, 1976, Stilwell, 1969). According to Stilwell (1969), the disadvantages attributed to the competitiveness of a region (measured by the competitive effect – CE) can be corrected by making general improvements in infrastructure. On the other hand, the regions that present an unfavorable industry mix may need injections of growth industries in other regions.

As with the traditional shift-share, Boudeville’s classification has been usually applied to the study of employment. In this paper we adapt Boudeville’s classification to the field of international trade. Our classification reveals the types of environments where the exports of product i is made. As a consequence, this typology constitutes a useful approach to identify the type of trade policy guidelines needed in the different areas. In addition to the use of Boudeville’s technique for the analysis of trade, and in line with Montanía et al. (2021) a new classification in terms of the spatial

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(neighbourhood) effects is offered. Then, the main contribution of this paper is to provide both spatial and a-spatial classifications about the performance of the exports of a group or system of exporter units (countries, regions, provinces, etc.). Thus, the classification of the exporter based on Boudeville's method, provides an integral way to assess the performance of the countries and hence to better develop policy guidelines for each case studied.

In order to illustrate the application of SSA (non-spatial and spatial SSA) to international trade, the case of the soybean seed exports worldwide is studied. Soybean is one of the most traded agricultural commodities in the world and its exports grew from US\$ 9.56 billion in 1996 to more than US\$ 59 billion in 2015 (UN Comtrade 2017). Soybean seed exports have been historically very concentrated in a reduced group of countries. Argentina, Brazil, and the United States have been the absolute leaders of soybean exports. To a lesser extent, Canada, Paraguay, and Ukraine have also placed their soybean production in the international market. All these countries together controlled more than 94% of global soybean exports in 2015. Thus, this study focuses on factors affecting the change in soybean export growth of the top six main exporters in the world over the 1996-2015 period.

The application to the case of study reveals several findings. First, it confirms the usefulness of shift-share analysis for the study of international trade. Shift-share allows for comparisons between geographical units (with a regional scope) while contributing sectoral information on the growth of exporters. Second, the growth of soybean exports not only depends on the national economic context: the economic structure of the neighbouring countries also contributes to the growth of exporters. Third, the Boudeville's Classification offers a framework that facilitates the elaboration of hypothesis about the sources of growth in international trade. The classification of the countries according to their performance provides information about the context where each country is performing: in global and neighbouring terms.

Therefore, future international trade research would benefit from the use of the shift-share, as well as from the addition of the proposed Boudeville's classification.

Keywords: Non-spatial and spatial shift-share; International trade; Boudeville's Classification; Soybeans

JEL codes: F10, R11