Level of competitiveness of products exported by Minas Gerais

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ARTICLE DETAILS

ABSTRACT

This work seeks to understand the level of competitiveness of products exported by Minas Gerais, identifying the sectors in the state as well as those that need public policies to promote exports. A descriptive and exploratory approach is used, which provides an overview of some of the main ideas that concern international trade, showing its importance for the economic development of a state. Documentary research was also done to explore data and information provided by the platform DataViva. Exported goods were grouped by the combination of the variables in the revealed comparative advantage (RCA) index. This work aims to reinforce the importance of international trade and Ricardian theory for the economic development of Minas Gerais. The results show that the products exported, when compared to the products considered "competitive" and "with competitive potential" in Brazil's exports, do not present, by and large, the same levels of competitiveness; therefore, many of these products should have their export stimulated. In addition, products with competitive potential exported by Minas Gerais are important targets for policies to promote exports.

1. INTRODUCTION

The reality of the twenty-first century means increasing pressure on public organizations to be more and more efficient. Such pressures generate technological advances and social demands, meaning that public organizations have to increasingly offer goods and services with fewer resources (Mcinerney & Barrows, 2002). Moreover, the identification and promotion of technologically sophisticated products constitute important possibilities.

Minas Gerais has an economy based on extractive, steel, and agricultural sectors and its exports are preponderantly mineral and agricultural commodities – such as iron ore and coffee – which reflects the low degree of diversification of its economy. Thus, Minas Gerais needs to seek policies and mechanisms that allow for increasing economic diversification and goods with high technological content. In this sense, public policies aimed at the economic diversification of the state can be considered as one of the challenges being faced by the public managers of Minas Gerais.

Mineral and agricultural commodities, besides having a significant influence on the generation of state wealth, comprise a large share of its exports, while other product segments have a smaller share in international trade. Thus, without ignoring Minas Gerais's potential in the export of mining, steel, and agricultural products, the idea of diversifying exports is important to enhancing its competitiveness in international trade.

In this context, some of the main questions that guide this work are: How can Minas Gerais's exports be characterized, considering the different levels of competitiveness of exported goods? How are goods considered "competitive" and "with competitive potential" distributed across the 17 development territories of Minas Gerais?

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The general objective of this study is to characterize the level of competitiveness of Minas Gerais's exports in order to better understand their competitive potential, as well as how they are distributed across its different regions and territories. Therefore, among the Brazilian goods considered competitive and with competitive potential, those exported by Minas Gerais and their level of competitiveness are identified. How these goods are distributed across the 17 development territories is also examined.

This work characterizes Minas Gerais's exports through a model created by Munduruca and Santana (2012), which involves the revealed comparative advantage (RCA) index – created by Balassa (1965) through Ricardo's (1817) theory of comparative advantages – as well as the value of exports, provided by the platform DataViva. By using this model, this work identifies goods from different sectors and with varied technological contents. In this way, this work seeks to reinforce the importance of international trade and, especially, the Ricardian theory of economic development, by characterizing the level of competitiveness of Minas Gerais's exports through the identification of the value and the comparative advantages of goods.

It is believed that the identification of products with competitive potential and the analysis and characterization of the level of competitiveness of Minas Gerais's exports can guide public managers in conducting policies that stimulate the state's economic activity. In addition, they can contribute to the formulation of policies aimed at the diversification of exports and the achievement of satisfactory standards of local and regional economic development. Thus, this study is an important guide for public administration, since it suggests relevant public policies that could increase the economic development of Minas Gerais.

Besides being descriptive and exploratory, this work uses technical procedures related to bibliographic research, which provides an overview of the main ideas related to international trade; and documentary research, which explores data and information provided by the platform DataViva.

This work is divided into five sections. This introduction is followed by the second section, which presents a literature review focusing on international trade theories, the DataViva platform, as well as international trade indicators. The third section presents the methodology. The fourth section is devoted to the presentation and analysis of results concerning the competitiveness of exported goods in Brazil and Minas Gerais; the analysis of the state's exports, focusing on the characteristics of competitive goods and with competitive potential goods, as well as how they are distributed across the 17 development territories. The last section presents final considerations.

2. LITERATURE REVIEW

By discussing international trade theories, this section seeks to make the importance of exports to regional and local economic development explicit. This study mainly uses Ricardo's (1817) theory of comparative advantages to characterize Minas Gerais's exports. Therefore, this section discusses this theory and presents other theoretical topics that approach comparative advantage and competitiveness gains in international trade.

According to Jones and Neary (1984), the Ricardian comparative advantage model is based on three main assumptions. The first is that labor is the only productive factor and can move freely to sectors with higher wages, which leads to the equalization of wages between sectors; there is, however, a difference of value between nations. The second is perfect competition between industries, ensuring zero economic profit. And the third is the equalization of relative prices of goods through international trade, which implies the non-existence of the goods' transaction costs.

In international trade, for various reasons (climate, technology, culture, etc.), countries have relative differences in productivity. According to Ricardo (1817), countries should specialize in sectors and products in which comparative costs are lower. That is, countries should produce and export goods when they have a higher level of specialization and, then, the market itself will induce them to specialize in goods that have greater comparative advantage and, consequently, a lower cost of production. Meanwhile, they should import goods when they have lower comparative advantage.

Prices can be defined as the product of the labor necessary to produce a good multiplied by the wage of the economy. In the case of two goods (1 and 2) and two countries (local and foreign), the local country will have a lower relative price for good 1 and, therefore, a comparative advantage to produce it. However, the ratio between the labor necessary to

produce good 1 and the labor necessary to produce good 2 has to be lower than the ratio of labor to produce such goods abroad.

The participation of a region in the exports of a product in relation to its share in the world trade can be measured by the revealed comparative advantage (RCA) index, first used by Balassa (1965). The RCA measures whether the share of a product in a region's exports is greater or less than its global share.

The RCA index is given in the following equation:

$$RCA_{ji} = \frac{\frac{X_{ji}}{X_j}}{\frac{X_{wi}}{X_w}} \qquad (1)$$

In this equation, X_{ji} represents the exported value of product i by country j, X_j represents country j's total value of exports, X_{wi} represents product i's total world exports, and X_w represents everything that was exported around the world (Gabinete de Planejamento, Estratégia, Avaliação e Relações Internacionais, 2010).

Thus, if the RCA is 1, the region exports exactly the average share – if the product's total exports were divided by the number of regions. If the RCA is greater than 1, the region exports is more than the average share, which means that it has comparative advantage when exporting the product in relation to other regions. Thus, the greater the RCA, the more advantages the region has in exporting a product to the rest of the world. If the RCA is less than 1, the region exports less than the average share, which means that the region has no comparative advantage when exporting the product. Therefore, the smaller and closer to 0 the RCA is, the lower advantage the region has in exporting the product.

Munduruca and Santana (2012) considered the RCA proposed by Balassa (1965) necessary to characterize the export potential of a region. By combining it with exports' weight of value, the authors characterized goods as: *without potential*, which would be the last option in any export promotion action; *stagnant*, those needed to be promoted in order to increase their competitiveness or the market itself would tend to eliminate them; *dynamic*, those that have already been getting good export results; and *with potential*, which are products that have not been properly exploited and should be the focus of promotion for foreign trade, since they

allow a sustainable expansion of exports and have a positive impact on economic growth. The empirical part of this work focuses on the model proposed by these authors.

The Heckscher-Ohlin theorem explains that each country exports goods that intensively use their abundant factors. Labor-abundant countries produce more labor-intensive goods than they actually consume, while capital-abundant countries also have to produce more capital-intensive goods than they consume, aiming to export more production volume. Therefore, the model approaches the Ricardian theory by suggesting that countries should produce and export goods that have the greatest comparative advantage or that exploit abundancy (Cassano, 2002).

Comparative advantage, according to the theory of technological advantages, results from the dynamics of technological advances and is considered a country's monopoly until the second country reaches it (known as imitation log). For Posner (1961), innovation allows nations to become exporters regardless of their advantages in productive factors. His proposal, then, is based on a model in which technology and innovation are responsible for competitively entering countries in international trade, which relates to the concept of comparative advantage proposed by Ricardo (1817).

Raymond Vernon's (1966) product life cycle theory emphasizes innovation, technology, labor qualification, and economies of scale as important in defining trade patterns. The author argues, for example, that the advantage of US firms is related to their innovation in products and processes. The model presents the hypothesis that developed countries have equal access to scientific knowledge. Thus, more mature products are produced in other sophisticated countries and standardized ones in peripheral countries, generating disparities of competitiveness between the center and periphery.

The ideas and notions related to economic complexity (*product space*) elaborated by Hausmann et al. (2007) assume that economic prosperity is related to the capability of economic societies in expanding their productive structure and knowledge base by creating a complex network of organizations and markets capable of increasing the interaction between consumers and producers. Product space defines complexity from the variety of products a country can produce, that is, the more diversified, the more complex they are. Nevertheless, this complexity

is defined not only by its diversity (number of products with comparative advantage) but also by ubiquity (number of countries that can produce the same product), since products that demand a lot of knowledge are available only in a few countries that have an extensive knowledge base.

3. METHODOLOGY

In order to achieve the objective of characterizing the level of competitiveness of Minas Gerais's exports, and based on the characterization proposed by Gil (2008), this work adopts a descriptive and exploratory approach. It uses technical procedures, bibliographic research – in order to provide an overview of the main international trade theories and ideas – and documentary research, which explores data and information provided by DataViva (dataviva.info). DataViva is an open research platform developed by the Government of the State of Minas Gerais and the Minas Gerais State Agency for Research and Development (FAPEMIG) in partnership with the Massachusetts Institute of Technology (MIT). It provides Brazil and its regional divisions' main economy data to generate information that contributes to the planning and elaboration of public policies as well as to public and private investments.

The source used for the elaboration of this work is a database of the Secretariat of Foreign Trade (SECEX)/Ministry of Development, Industry, and Foreign Trade (MDIC), which allows for the identification of the behavior of Brazilian commercial exchange. The goods are coded according to the Mercosur Common Nomenclature (NCM), which is governed by the definitions of a harmonized system created by the World Customs Organization (WCO), known as the Harmonized System Code (HS Code). The products available are categorized by section and position (digit 4 of the HS Code). Therefore, the group of products chosen for this work was in position HS-4 as it provides the highest level of detail in DataViva, enabling a more in-depth study on the region's exports.

Until the date when this work was completed, DataViva provided annual information on Brazilian exports from 2000 to 2014 and released data for the following regional divisions of the country: federation unit, mesoregion, and municipalities. The level of competitiveness of each product was defined through the model proposed by Munduruca and Santana (2012), in which the components

"comparative advantage" and "product weight" were considered. The intention was to make it possible to use the theory of comparative advantages to find the level of competitiveness of Minas Gerais's exports and to contribute to the formulation of policies aimed at its diversification.

3.1 Revealed comparative advantage

The revealed comparative advantage (RCA), an index developed by Balassa (1965), illustrates the Ricardian principle of comparative advantage. In DataViva, the RCA is calculated by considering both world trade (international RCA) and Brazilian exports (domestic RCA) for all exporting states and municipalities for the period between 2000 and 2014. However, the international RCA of the products exported by Brazil as a whole was only calculated until 2012, as the Observatory of Economic Complexity's (Massachusetts Institute of Technology, 2012) product space database provided data only until that year. The RCA was used to determine the existence of comparative advantage, admitting two possibilities for the value obtained: (a) greater than 1 (high RCA) – there is a comparative advantage to export the product; (b) less than 1 (low RCA) – no comparative advantage.

3.2 Product weight

In order to determine product weight, Munduruca and Santana (2012) propose a unit divided by the total number of exporting products in a given period as a reference value. Thus, if the state/region exports 100 products, the reference value is 0.01 or 1%. For values greater than 1%, the product is considered to have a high weight in exports. Less than 1% indicate that the product has a low weight. Brazilian exports have an average weight of 0.084% (1/1185), while Minas Gerais had 0.121% (1/826) in 2012 and 0.117% (1/854) in 2014.

3.3 Model to determine the level of competitiveness

From the relation between the values obtained by the RCA and product weight, exports can be placed at four levels of competitiveness: "stagnant," "without competitive potential," "with competitive potential," and "competitive or dynamic." As shown in Table 1, there is those with low weight and low RCA in the quadrant for the group of products "without competitive potential." According to Munduruca and

Santana (2012), these are not a good option for policies that promote exports. The quadrant of "stagnant" products corresponds to those that have high weight and low RCA, which means that they need policies to increase competitiveness, because, otherwise, the market itself tends to eliminate them.

Tab. 1
Model to determine the level of competitiveness of products

		WEIGHT	
		High	Low
RCA	High	Dynamic (competitive)	With competitive potential
	Low	Stagnant	Without competitive potential

Source: Munduruca and Santana (2012, p. 619).

The quadrant of competitive or dynamic products shows that they have high weight, high RCA, and hold a comfortable relative position. On the other hand, the products with competitive potential have low weight and high RCA. Even though they have comparative advantages, these products are not exported to their full potential. Thus, products with competitive potential should be the focus of policies to stimulate exports, since they have potential and can contribute to the sustainable growth of exports in a region (Munduruca, & Santana, 2012).

In Section 4.1, the values of products exported by Brazil and Minas Gerais in 2012 were from the extractive industry, and five main products exported by each of them were highlighted in order to observe how they influence exports. In addition, the shares of competitive, stagnant, with potential, and without competitive potential products in the country and in the state of Minas Gerais were compared. Subsequently, the levels of competitiveness within Minas Gerais's exports were identified for competitive and with competitive potential products of Brazilian exports in order to find similarities and differences in competitiveness and possible opportunities for diversification.

Section 4.2 presents an analysis of Minas Gerais's exports, focusing on the characterization of competitive and with competitive potential products. Finally, Section 4.3 discerns the distribution of these products across the 17 development territories – a division proposed by the government of the state in 2015 – and indicates which territories have the highest level of competitiveness. It also identifies the main exporting municipality, the main exported product, and the level of competitiveness of this product in the state's exports.

4. PRESENTATION AND ANALYSIS OF RESULTS

4.1 Competitiveness: Brazil and Minas Gerais

This subsection presents the products exported by Minas Gerais that make up the set of Brazilian products classified as "competitive" and "with competitive potential" as well as their levels of competitiveness. Initially, some general characteristics related to exports in Brazil and Minas Gerais are presented. Then, the products exported by Minas Gerais are compared with the competitive and with competitive potential products exported by Brazil in order to investigate if they have the same level of competitiveness.

General characteristics

In 2012 Brazil exported 1,185 products, which corresponded to $242.58 billion. Although at first sight the number of products seems significant, the five main products exported by Brazil were commodities and accounted for 36.6% of the total value of exports (Table 2).

Tab. 2
Brazil: Five Products with the Highest Value Exported (2012)

HS-4 (a)	Product	Value exported (b)	Share (%)
2601	Iron ores	30,989	12.8
2709	petroleum oils	20,306	8.4
1201	Soya beans	17,455	7.2
1701	Sugar cane in solid form	12,845	5.3
0207	Poultry, meat	6,948	2.9
	Subtotal	88,543	36.6
	Total exported by Brazil	**242,580**	**100.0**

Note: (a) Harmonized code, disaggregated into position (digit 4); (b) values expressed in millions of US dollars.

Source: Elaborated by the authors.

Minas Gerais, in turn, exported 825 products, which totaled $33.43 million in 2012, representing 13.8% of Brazilian exports. The values of the five main products exported by the state correspond to 69.3% of the value of Minas Gerais's exports, indicating a higher concentration compared to Brazil (Table 3).

Tab. 3
Minas Gerais: Five Exported Products w/ the Highest Value (2012)

HS-4 (a)	Product	Value exported (b)	Share (%)
2601	Iron ores	14,424	43.1
0901	Coffee	3,775	11.3
7202	Ferro-alloys	1,958	5.9
7108	Gold	1,723	5.2
1701	Sugar cane in solid form	1,270	3.8
	Subtotal	23,150	69.3
	Total exported by Minas Gerais	33,429	100.0

Note. (a) Harmonized code, disaggregated into position (digit 4); (b) Values expressed in millions of United States dollars.
Source: Elaborated by the authors.

Considering the classification proposed by Munduruca and Santana (2012), it is possible to generally affirm that competitive products represented a larger share in the state's exports (90.2%) than in Brazilian exports (74.1%). This shows that, mainly in the case of Minas Gerais, most of the value exported is composed of products that have already been exported, have comparative advantage, and present good results. A higher relative value of stagnant products exported by Brazil (14.8% against 5.2% in Minas Gerais's exports) is also observed, which indicates that this group of products needs promoting actions in order to increase its competitiveness in international trade (Figure 1).
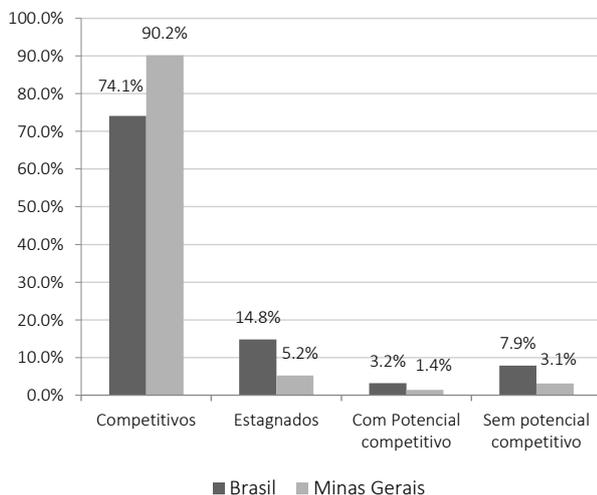
Fig. 1
Brazil and Minas Gerais: Characterization of Exports According to Product Groups.
Source: Elaborated by the authors

The products with competitive potential had a larger share in the Brazilian exports (3.2% against 1.4% in Minas Gerais's exports), which shows that Brazil presents possibilities to increase the level of competitiveness of its exports. The results confirm
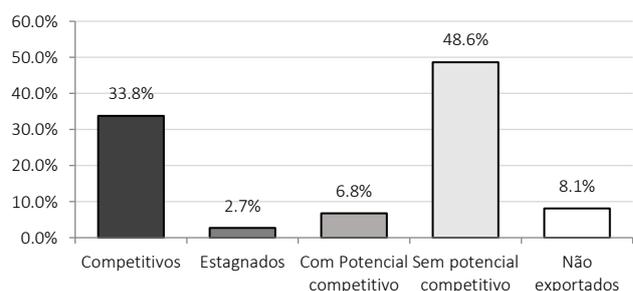
that Minas Gerais's exports, as well as Brazilian exports, are concentrated in commodities and low-sophisticated products.

In addition, a worrying aspect revealed by this study is that Minas Gerais has less product diversity of products with competitive potential in relation to the country. It is important to emphasize that, considering Brazil's more variety in terms of climate, vegetation, culture, and industrialization, this result is not surprising.

"Competitive" and "with competitive potential" products exported by Brazil and their competitiveness within Minas Gerais's exports

In this section, "competitive" and "with competitive potential" products are analyzed, focusing on Brazil's and Minas Gerais's exports. The idea is to find possible similarities and differences between these groups of products in relation to their level of competitiveness. Therefore, the products exported by Minas Gerais are compared with the products classified as competitive and with competitive potential that are exported by Brazil in order to verify if they have the same level of competitiveness.

The 74 competitive products exported by Brazil totaled $179.64 billion, which corresponds to 74.1% of the country's total exports in 2012. Within Minas Gerais's exports, these same products accounted for 80.6% ($26.93 billion), which is a higher percentage compared to Brazilian exports.
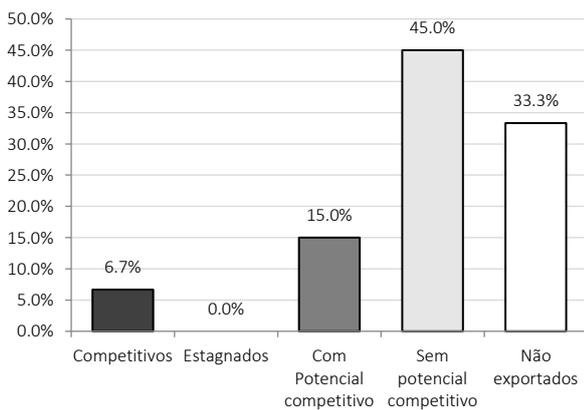

Fig. 2
Competitive Potential of Brazilian Competitive Products Within Minas Gerais's Exports (2012).
Source: Elaborated by the authors

However, not all the products considered competitive in the case of Brazilian exports are competitive in Minas Gerais's exports. Among the competitive products in Brazil's exports, only 33.8% (25 products) are also competitive in Minas Gerais's exports when compared in the same period. The others are classified as stagnant, with competitive

potential, without competitive potential, or were not even exported by the state in 2012 (Figure 2). Thus, even though many products exported by Brazil are considered competitive, most of them do not have the same level of competitiveness in Minas Gerais's exports (for example, almost half of the products were considered as not having competitive potential) or are not exported by the state.

The 120 products classified as having competitive potential in Brazil's exports accounted for only 3.2% ($7.84 billion) of the total exports in 2012. In the same period, these same products had a relative participation of 2.9% ($956.90 million) in Minas Gerais's exports. Only 15.0% of them were also considered as having competitive potential in the state's exports, and 6.7% were already considered competitive. However, the vast majority are represented by products without competitive potential or that were not exported by the state (Figure 3).

Fig. 3
Competitive Potential of the Brazilian Products with Competitive Potential within Minas Gerais's Exports (2012)
Source: Elaborated by the authors from the platform DataViva.

Among the products with competitive potential exported by Brazil, some are already competitive in Minas Gerais's exports. In other words, besides having a comparative advantage, they already have a significant weight in the state's exports. However, the vast majority of products (78.3%) were classified as not having competitive potential or were not exported.

Thus, the model proposed by Munduruca and Santana (2012) shows that Minas Gerais may be losing opportunities to diversify its exports, since many of the competitive and with competitive potential products (i.e., which have revealed comparative advantage) exported by Brazil do not

have the same level of competitiveness when taking into account only Minas Gerais's exports. It is important to understand if there is any limitation or barrier (physical, cultural, political, or economic) that prevents Minas Gerais from exporting these products with the same level of competitiveness.

As previously mentioned, international trade is a mechanism capable of boosting local economic development. Therefore, if there are favorable conditions, Minas Gerais should take advantage of products that are already considered competitive and stimulate their export. Tractors, for example, are products classified as competitive within the Brazilian exports and without potential in Minas Gerais's exports. Meanwhile, carboxylic acids and hydraulic turbines are products with competitive potential within Brazil's exports, but when considering Minas Gerais, the first is classified as without competitive potential and the second is not even exported by the state. Next, this work carries out an analysis of Minas Gerais's exports, highlighting the sectors and share of competitive and with competitive potential products.

4.2 Analysis of Minas Gerais's exports

In 2014 Minas Gerais exported 854 products, according to the digit 4 of the HS, which represented a total value of $29.32 billion. A great concentration of products from the extractive, steel and agricultural sectors (iron ores, coffee, ferro-alloys, gold, and sugar cane in solid form) was noted, representing 69.2% of total exports. When comparing Minas Gerais's exports from 2012 and 2014, the five main products are in the same position in the ranking of products with greater exporting weight. In general, the state's exports continued with the same predominant products (Table 4).

Tab. 4
Minas Gerais: Five Export Products with the Highest Value (2014)

HS-4 (a)	Product	Value exported (b)	Share (%)
2601	Iron ores	12,232	41.7
0901	Coffee	4,115	14.0
7202	Ferro-alloys	1,735	5.9
7108	Gold	1,294	4.4
1701	Sugar cane in solid form	904	3.1
	Subtotal	20,280	69.2
	Total exported by Minas Gerais	29,321	100.0

Note: (a) Harmonized code, disaggregated into position (digit 4); (b) values expressed in millions of United States dollars.
Source: Elaborated by the authors.

Tab. 5
Minas Gerais: Five Competitive Products with the Highest Value (2014)

HS-4 (a)	Product	Value exported (b)	Share (%)	Competitiveness in Brazil's exports
2601	Iron ores	12,232	41.7	Competitive
0901	Coffee	4,115	14	Competitive
7202	Ferro-alloys	1,735	5.9	Competitive
7108	Gold	1,294	4.4	Stagnant
1701	Sugar cane in solid form	904	3.1	Competitive
	Subtotal	20,280	69.2	
	Total	26,341	89.8	

Note. (a) Harmonized code, disaggregated into position (digit 4); (b) Values expressed in millions of United States dollars.
Source: Elaborated by the authors.

Once again, the extractive, steel, and agricultural sectors were predominant, since the main competitive products exported were iron ores, coffee, ferro-alloys, gold, and sugar cane in solid form. However, the share of some products with higher technological content, such as trucks (1.0%), engine parts (0.5%), and hydrogen (0.8%) is notable. As previously shown, differences in levels of competitiveness are observed when comparing Brazil's and Minas Gerais's exports (Table 5).

The 43 products with competitive potential accounted for $537.71 million, 1.8% of the total exported by the state in 2014 (Table 6).

There is greater diversification among products with competitive potential than among competitive products, since mineral and agricultural products are predominant as well as products from other sectors that, in many cases, have greater technological content. Among them, chemicals (carbides and enzymes, for example.), stone, and other materials (monumental or building stones and mirrors) can be highlighted.

Therefore, products with competitive potential exported by Minas Gerais present an excellent opportunity to promote local-spatial development through greater export diversification. As stated by Munduruca and Santana (2012), Minas Gerais can and should foster exports. Besides having revealed comparative advantage and low participation in exports, these products are from a larger variety of sectors and, in many cases, have greater technological content than the competitive products exported by the state. Next, this work analyzes how the groups of products considered competitive and with competitive potential are distributed across the 17 development territories – a regional classification recently established by the Secretariat of Planning and Management of the State of Minas Gerais.

4.3 Distribution of competitive and with competitive potential products across the 17 development territories.

Aiming to elaborate and monitor the state's regional public policies, the Government of the State of Minas Gerais divided the 853 municipalities into 17 development territories in order to decentralize public policies (MINAS GERAIS, 2015). The relative importance of each territory in the total exports of the state can be seen in Table 7. Analysis of these data indicates that the Metropolitano territory accounted for $14.28 billion, which is 50.1% of the total value exported by Minas Gerais.

Minas Gerais's exports are very concentrated in certain territories. Among the 854 products exported by the state in 2014, 737 products were exported by the Metropolitano territory, followed by Sul (333),

Tab. 6
Minas Gerais: Five Products with the Highest Value and Competitive Potential (2014)

HS 4 (a)	Product	Value exported (b)	Share (%)	Competitiveness in Brazil's exports
0102	Live bovine animals	34	0.1	Competitive
2849	Carbides	33	0.1	With competitive potential
0206	Edible offal	32	0.1	Competitive
2504	Graphite	31	0.1	With competitive potential
6802	Monumental or building stone	29	0.1	Competitive
	Subtotal	159	0.5	
	Total	538	1.8	

Note. (a) Harmonized code, disaggregated into position (digit 4); (b) Values expressed in millions of United States dollars.
Source: Elaborated by the authors.

Tab. 7
Minas Gerais: Share of the Development Territories in Total Exports and Competitive and with Competitive Potential Products (2014)

Development territory	Total exported (%)	Competitive (%)	With competitive potential (%)
1- Noroeste	3.1	3.4	3.5
2- Norte	2.8	1.2	5.6
3- Médio/Baixo Jequitinhonha	0.1	0.1	2.2
4- Mucuri	0.3	0.3	0.3
5- Alto Jequitinhonha	0.0	0.0	0.2
6- Central	0.2	0.1	0.3
7- Vale do Rio Doce	0.1	0.1	0.0
8- Vale do Aço	3.4	3.1	1.0
9- Metropolitano	50.1	50.2	41.3
10- Oeste	1.5	1.1	8.7
11- Caparaó	1.3	1.4	0.0
12- Mata	1.0	0.8	3.4
13- Vertentes	7.4	8.0	6.8
14- Sul	9.3	9.0	6.6
15- Sudoeste	3.7	4.1	0.2
16- Triângulo Norte	4.5	4.5	11.4
17- Triângulo Sul	11.4	12.4	8.6

Source: Elaborated by the authors.

Triângulo Sul (222), and Oeste (156). On the other hand, Caparaó (10 products), Médio e Baixo Jequitinhonha (6), and Alto Jequitinhonha (4) had the lowest number of export products.

In 2014 the 17 territories totaled $25.17 billion for competitive products, which corresponded to 88.3% of the total value. Thus, the share of the territories in the total value of Minas Gerais's exports and in the value of competitive products exported are similar.

When analyzing the products with competitive potential, it was also observed that they are concentrated in a few territories and mainly in the Metropolitano territory. Regions lacking competitive products, such as Vale do Rio Doce, Alto Jequitinhonha, and Caparaó, also had few products with competitive potential. In addition, some territories that had a relatively higher position in the other analyses, such as Sudoeste and Vale do Aço, had few products with competitive potential – two and three, respectively.

This group was less concentrated for the Metropolitano territory (41.3%) than the total value exported by the state. In relation to products with competitive potential, the value has greater distribution in the other territories. There is, thus, greater decentralization, which allows the development of international trade in territories that still have a low share in Minas Gerais's exports. In addition, there are territories that reached a position in the ranking of greater share, which was not

observed in other studies; Triângulo Norte was the second main territory (11.4% of exports) and the Norte, Mata, and Médio e Baixo Jequitinhonha, had significantly better positions in the export of products with competitive potential.

Therefore, the use of the Ricardian theory of revealed comparative advantages and the weight of exports make it possible to draw attention to at least two relevant aspects about the exporting profile of the development territories of Minas Gerais. First, the Metropolitano territory is the most important in terms of value and the number of products exported. Secondly, by disaggregating the competitive products in Minas Gerais's exports in 2014, the results reveal, on the one hand, that the prominence of the Metropolitan territory – which exported 37 of the 39 competitive products – and, on the other hand, that the territories with a small share in the total value exported by the state are also those that have only a few competitive products. The territories of Médio e Baixo Jequitinhonha and Vale do Rio Doce, for example, exported two competitive products, while Jequitinhonha and Caparaó exported only one.

In contrast, regarding the value of exported products with competitive potential, it was observed that some territories have larger shares than those observed in the total exported by Minas Gerais. Thus, besides stimulating economic growth and diversification, they can also reduce regional disparities in the state by promoting international trade in territories that still have low value when

Tab. 8

Minas Gerais: Main Exporter Municipalities and Products Exported by the 17 Development Territories (2014)

Development territory	Main exporting municipality	Main product exported	Competitiveness in Minas Gerais's exports
1- Noroeste	Paracatu	Gold	Competitive
2- Norte	Montes Claros	Packed medicaments	Stagnant
3- Médio e Baixo Jequitinhonha	Medina	Granite	Competitive
4- Mucuri	Nanuque	Meat of bovine animals	Competitive
5- Alto Jequitinhonha	Diamantina	Diamonds	Without competitive potential
6- Central	Três Marias	Zinc	Competitive
7- Vale do Rio Doce	Governador Valadares	Precious stones	Competitive
8- Vale do Aço	Belo Oriente	Chemical wood pulp, soda or sulfate	Competitive
9- Metropolitano	Nova Lima	Iron ores	Competitive
10- Oeste	Itaúna	Iron ores	Competitive
11- Caparaó	Matipó	Coffee	Competitive
12- Mata	Santos Dumont	Hydrogen	Competitive
13- Vertentes	Congonhas	Iron ores	Competitive
14- Sul	Varginha	Coffee	Competitive
15- Sudoeste	Guaxupé	Coffee	Competitive
16- Triângulo Norte	Araguari	Coffee	Competitive
17- Triângulo Sul	Araxá	Ferro-alloys	Competitive

Source: Elaborated by the authors.

exported. Table 8 shows the variety of sectors and products by territory and the predominance of products with greater weight in the state's exports, such as iron ore and coffee.

It is possible to observe that each development territory has different levels of competitiveness for the products exported and that some sectors have a larger share than others in the exports of each region. For example, while coffee is the main competitive product exported by Território Sul, Vale do Rio Doce exports mainly granite and precious stones – and Mucuri, bovine meat and precious stones. When considering the importance of exports and comparative advantages for economic development, regional public policies that intend to boost the economy of these territories should, then, take into account the peculiarities of international trade of each region in order to understand which sectors are already consolidated and which need to be stimulated.

5. FINAL CONSIDERATIONS

This work used the revealed comparative advantage (RCA) index and examined the weight of exports in order to characterize the level of competitiveness of Minas Gerais's exports. These were also compared to Brazil's exports, and an analysis of their distribution across the 17 development territories of the state was carried out. The study contributed to theoretical discussion on international trade by pointing out the relationship between exports and economic

development. In addition, by dividing exports into four levels of competitiveness, this work allowed for identification of possible sectors and products that could have their exports stimulated. It emphasized the importance of the Ricardian theory and identified possible public policies to boost Minas Gerais's economy. Finally, as this work deals with international trade, eventual economic potential linked to the tertiary sector or the domestic market were not considered.

It was noted that competitive products (with high RCA and high weight in exports) exported by Brazil do not necessarily have the same level of competitiveness when taking Minas Gerais's exports into account. This same disparity was observed in the products with competitive potential (with high RCA and low weight in exports). Thus, this work shows the need to understand, in the future, why these differences in levels of competitiveness exist.

Products classified as competitive and with competitive potential exported by Brazil should be the target of public policies in Minas Gerais to promote exports – if there are no physical, economic, or political barriers or limitations – allowing the expansion and diversification of the state's international trade. Moreover, when considering the products with competitive potential exported by the state, a greater variety of products from sectors was observed that, generally, have more technological content than the products considered competitive. The sectors of chemical, stone products and other materials, diverse products, and transport had a

more significant presence. This shows the importance of products with competitive potential for diversification, since their promotion indicates a sustainable expansion of exports, as pointed out by Munduruca and Santana (2012). It could also stimulate the share of different and more complex sectors in Minas Gerais's exports, which would even make it possible to reduce the concentration of the extractive, steel, and agricultural sectors.

The model proposed by Munduruca and Santana (2012) made it possible to note a large disparity in both number and value exported between the territories, showing a great concentration in the Metropolitano territory – which exported practically all products of Minas Gerais's exports and was responsible for about half of the exports in the period studied. Meanwhile, territories in the northeast of the state, such as Médio e Baixo Jequitinhonha, Vale do Rio Doce, Mucuri, and Alto Jequitinhonha, had extremely low values in total exports. Exports of competitive products were equally concentrated. This concentration was more tenuous only in the case of products with competitive potential exported by these territories.

The planning of regional development policies must focus on the territories that do not yet have an exporting tradition. As this work explained, these are the most underprivileged regions in Minas Gerais in terms of competitiveness and, therefore, they need these policies to leverage exports. However, a public policy of equitable economic development for the whole state does not necessarily require all regions to have the same diversification in exports. The comparative advantages in each region and the relations of these regions, regarding their participation in productive chains, need to be studied. A state development policy should promote the productive potential of each region.

The products with competitive potential had smaller territorial concentration when compared to the exports of competitive products and the total value exported by Minas Gerais. Thus, the increase in the share of those products in exports is a good option for public policies, since they enable more decentralized growth. When observing the distribution of the value of exported products with competitive potential, opportunities for diversification in regions that do not yet have a large share in the total exported by the state were noted.

The Ricardian theory of comparative advantages makes it possible to elaborate policies capable of stimulating the exports of different sectors and of the development territories that have a low share of exports in Minas Gerais through the commercialization of products with competitive potential. It is therefore possible to have a state with a rich, diverse, and more homogeneous trade internationally and between regions.

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Nível de competitividade dos produtos exportados por Minas Gerais

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RESUMO

O presente trabalho busca compreender o nível de competitividade dos produtos exportados por Minas Gerais, identificando os setores já consolidados no comércio internacional do estado e aqueles que necessitam de políticas públicas de fomento às exportações. Para tal, utiliza-se do método exploratório-descritivo de pesquisa, que proporciona uma visão geral de algumas das principais ideias que dizem respeito ao comércio internacional, mostrando sua importância para o desenvolvimento econômico de uma localidade, e da pesquisa documental, que explora os dados e informações disponibilizadas pela plataforma DataViva. Os produtos exportados foram agrupados pela combinação das variáveis Índice de Vantagem Comparativa Revelada (RCA) e peso no conjunto das exportações. O trabalho busca reforçar a importância do comércio internacional e da teoria ricardiana ao desenvolvimento econômico de uma localidade. Os resultados mostraram que os produtos da pauta mineira, quando comparados com os produtos Competitivos e Com Potencial Competitivo da pauta do Brasil, não apresentam, em sua maioria, o mesmo nível de competitividade, demonstrando que muitos desses produtos ainda podem ter suas exportações estimuladas dentro do território mineiro. Além disso, os produtos Com Potencial Competitivo exportados por Minas Gerais mostram-se como um importante alvo para as políticas de fomento às exportações.

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