The Importance of BRICS for the trade flow of the segment Brazilian wood pulp with Russia

A importância dos BRICS para o comércio Brasileiro de celulose com a Rússia

La importancia de los BRICS para el comercio celulosa brasileña con Rusia

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Abstract
The term BRICS, referring to the emerging countries Brazil, Russia, India, China and South Africa, aroused interest of many investors. However, there are still few studies that evaluate the evolution of trade flows between Brazil and BRICS, especially with Russia. This study analyzed the importance of BRICS (Brazil, Russia, India, China and South Africa) for the Brazilian wood pulp segment's trade flow with Russia from 1997 to 2016, comparing the period before and after of the formation of BRICS. The Indexes of Trade Intensity, Regional Orientation, Grubel and Lloyd and Menon and Dixon were used as methodological tools. The obtained results indicated that the formation of the BRICS was very important for the Brazilian wood pulp trade with Russia; trade between these nations has intensified; and the trade pattern proved to be inter-industrial. Thus, it is believed that trade between Brazil and Russia is promising and should be encouraged, as well as the BRICS.
Keywords: Wood pulp Sector; Trade Intensity; Regional Orientation; International Economy.

Resumo
O termo BRICS, faz referência aos países emergentes Brasil, Rússia, Índia, China e África do Sul, e despertou interesse de muitos investidores. Entretanto, ainda encontram-se escassos os estudos que avaliam a evolução do fluxo comercial entre Brasil e BRICS, em especial para a Rússia. Este estudo analisou a importância do BRICS para o fluxo de comércio do segmento brasileiro de celulose com a Rússia, de 1997 a 2016, comparando o período anterior e posterior à formação do BRICS. Utilizaram-se os Índices de Intensidade de Comércio, Orientação Regional, Grubel e Lloyd e Menon e Dixon, como ferramenta metodológica. Os resultados obtidos indicaram que a formação dos BRICS foi muito importante para o comércio da celulose brasileira com a Rússia; intensificou-se o comércio entre essas nações; e o padrão de comércio mostrou-se interindustrial.
Palavras-chave: Setor de celulose e papel; Intensidade do comércio; Orientação regional; Economia internacional.

Resumen
El término BRICS se refiere a los países emergentes Brasil, Rusia, India, China y Sudáfrica, y despertó el interés de muchos inversores. Sin embargo, aún existen pocos estudios que evalúen la evolución del flujo comercial entre Brasil y los BRICS, especialmente para Rusia. Este estudio analizó la importancia de los BRICS para el flujo comercial del segmento brasileño de celulosa con Rusia, de 1997 a 2016, comparando el período anterior y posterior a la formación de los BRICS. Se utilizaron como herramienta metodológica los índices de intensidad del comercio, orientación regional, Grubel y Lloyd y Menon y Dixon. Los resultados obtenidos indicaron que la formación de los BRICS fue

muy importante para el comercio brasileño de celulosa con Rusia; se intensificó el comercio entre estas naciones; y el patrón del comercio resultó ser interindustrial.

Palabras clave: Sector de la celulosa y el papel; Intensidad del comercio; Orientación regional; Economia internacional.

1. Introduction

Over the years, Brazil has enhanced a diversified wood wood pulp and paper industry with a great capacity for future growth, both for supplying the domestic market and the foreign market. "The country ranks fourth in the ranking of wood pulp producing countries of all types and as the world's first producer of eucalyptus wood wood pulp" (Indústria Brasileira de Árvores - Ibá, 2018).

In 2016, national wood pulpproduction reached almost 19 million tons and the exported volume of wood pulp reached almost 12 million tons, with the destinations of Brazilian wood pulpbeing Asian countries, Europe and the United States (Fao, 2017).

Some factors favored the growth of Brazilian wood pulp production and exports as favorable edaphoclimatic conditions to eucalyptus cultivation, short cycle and rapid production, advanced silvivulutral technology, quality of Brazilian wood pulprecognized abroad, government policies and, also the formation of economic blocks (Soares, 2010). In this case, the formation of BRICS, a political alliance composed by Brazil, Russia, India, China and South Africa, since 2009, may also have favored the growth of Brazilian wood pulp exports (Viana, 2019).

To stay in the market and strengthen economically, some countries have been coming together and creating economic blocks in order to achieve greater trade liberalization. Generally, countries adopt measures that facilitate and solve trade problems such as tax reduction or even tax exemption (Silva, 2005). These are also some measures adopted in the case of BRICS.

On the other hand, in the case of Brazil, trade liberalization implies that the Brazilian market is more open to foreign competition. Consequently, companies are more vulnerable to international economic crises and the entry of potential competitors, which could threaten the competitiveness of Brazilian wood pulp in the international market.

The BRICS at the same time represents an opportunity and a threat to Brazil, as the countries are major wood pulpproducers and exporters and go through economic cycles, which may or may not favor Brazilian exports of the commodity.

Among the BRICS countries, the Brazilian wood pulp trade is more intense with China and Russia, and the national exports of this commodity more than doubled from that period (FAO, 2017).

Thus, the main objective of this work is to analyze the importance of BRICS for the commercial flow of Brazilian wood pulpto Russia. Specifically, the evolution of the Trade Intensity Indexes, Regional Orientation, Grubel and Lloyd and Menon and Dixon of Brazilian wood pulpexports to Russia were estimated and analyzed, comparing the period before and after the formation of BRICS, that is, the period from 1997 to 2015.

Having said that, this research can contribute to the implementation of policies aimed at the specific commercialization of the sector, as well as stimulating exports and reducing Brazilian imports, contributing to the development of the regions in which it operates and also strengthening its importance for Russia, assisting linked agents to the sector in decision-making on production and marketing.

2. Theoretical Framework

Theories of International Trade

The study of the world economy has been growing with the changes generated by globalization. Thus, when addressing the theme of international economics, some important researchers can be highlighted, among them John Stuart Mill, Jean Batista Say, David Ricardo and Adam Smith. These last two names created, respectively, the famous theories of comparative and absolute advantages (Silva, 2016).

The theory of absolute advantage assumes the idea that each country must converge in the production of goods and products that are more advantageous, taking into account costs, climate conditions, labor qualification, location and the benefit of existing natural resources. Therefore, each country should produce and export what has an absolute cost advantage and import from the countries what also offered absolute cost advantage, enabling a reciprocal advantage. Thus, there would be a certain global division of labor, where each country would specialize only in the production of goods with better economic conjunctures to be realized, obtaining gains with international trade (Reis, 2008).

Later, an English economist named David Ricardo questioned the trade relationship based on an absolute cost and created the theory of Comparative Advantage which, like Adam Smith, defends production with quality and lower cost, however, adds the need to maintain a trade surplus or a positive trade balance (Ricardo, 1817).

Basically, the Comparative Advantage theory interprets that the condition for trade between two countries would be only if the opportunity cost of producing a good were very different between them. Thus, each country would specialize in the production of the product in which it has a certain advantage, either in reducing costs to produce, in the availability of natural resources, in infrastructure, in cheap labor or even advantages acquired to export. On the other hand, it would import what its manufacturing cost was high. Consequently, it would entail greater opportunities to trade with higher quality goods. In other hand, what matters is not the absolute cost of production, but the reason and effectiveness of producing (Silva, 2016).

Eli Heckscher and Bertil Ohlin, in 1919, improved the theory of comparative advantages and presented a model in which the presence of trade between nations is explained by the difference in existing productive factors, that is, depending on the factors available, related prices to the goods produced could vary (Figueiredo & Santos, 2005).

According to Istake (2003), a country with a large supply of skilled labor, it would export its products with a higher added value, since those with unqualified labor, consequently, would export less elaborate and cheaper products.

In order to explain the international competitiveness and how market patterns are revealed, a new international trade theory known as Strategic Trade Theory was developed based on the interactions of imperfectly competitive markets that enhance the importance of product differentiation, technological progress and scale economies. Unlike the classic models of international trade that no longer serve the environment of the modern economy, precisely because it does not take into account factors such as the strategies of companies and the process of improvement and differentiation of products in the face of fierce competition from globalization (Moreira, 2012).

Within this competition and comparative advantage scenario, Krugman Obstfeld (2005) thought international trade divided in two parts: inter-industry and intra-industry trade. The first, reflects fundamentally the comparative advantage, characterized by the exchange of one product for another, as manufactures for foods cited by the author himself. In the second case, there is trade based on scale economies, where both countries sell the same products, generating a reduction in the number of products produced, increasing the variety, on a larger scale and with lower costs.

Basically, while in inter-industry trade the comparative advantage plays an important and essential role in trade, intra-industry trade presents how economies of scale can stimulate trade by itself.

Intra-industry trade can also be positively explained by the participation of countries in a common trade model, such as an economic block, for example. This is explained because the fewer trade barriers exist between bilateral relations the more actively states will participate in this trade. Thus, as Hidalgo (1993) reinforces, the development of economic integration and greater commercial liberalization among its members stimulate intra-industrial growth.

Regional Integration

The concept of integration is commonly used in numerous contexts, which raises several problems and questions about its conception. Initially, it is used in the field of sociology designating the process by which the individual puts himself in society in order to socialize, that is, basically it is the integration of the individual in the collectivity (Rhein, 2002). Scholars in International Relations expressed the idea that "integration is a process based less on the formation of a community than on the establishment of an organization (regional) or association or common political institutions" (Deutsch, et al., 1957 apud Richard, 2014) or even that was essentially the creation of a Federal State. In this same context, Stanley Hoffmann (1990) and Andrew Moravcik (1993) emphasized the concept as the creation of international institutions that have the power to organize and promote negotiations between states (Hoffmann, 1990; Moravcik, 1993).

A multiplicity of approaches have been developed associating the notions of regional integration and regionalism, which differentiate in the types, generations and discussions around the benefits and harms of regional agreements for international trade.

For most, regional economic integration lies in the fact that several countries constitute a single economic space or work for this result taking different paths: the planning, the market and business action, signing international regional agreements. [...] Integration is thus defined as the result of a regional strategy that replaces contiguous national spaces with a single or unified space (Richard, 2014).

Some studies incite for integration as being regional groups defined by the grouping of nations following the course of their borders. However, only the sets signed in treaties are taken into account by the dominant majority of realistic surveys. Thus, some issues are raised by confusing a regional agreement, which could simply be defined geographically, very similar to the division of continents, with the integration of nations, which suggests different levels of cooperation. William Thompson (1973) furthering the concept of region created a list of attributions to define a region, and concluded that the territorial relationship is not a necessary condition. The States that choose to form a regional group, choose their partners based on their interests and the level of participation they want.

In view of that, the term regional integration is manifested in the formation of an integrated set of two or more countries, and they may or not be geographically linked, however, linked by a regional agreement, in order to achieve common objectives, such as eliminating trade barriers and facilitating the insertion of their economies in the chain of globalization. This process is usually characterized by several economic stages such as a) free trade area, b) customs unions, c) common markets, d) economic and monetary unions and others that, when extending to the political and social spheres, become integrations (Ferreira, 2009).

The Free Trade Zones are characterized by the elimination of old customs tariffs and other restrictive regulations and, the creation of new preferential tariffs for export and import to better serve the products originating in the Member States of the area and that also respects the tariffs in relation to non-member countries (Balassa, 1961).

The Custom Union, achieved the Free Trade Zone, is the second step in the integration process and establishes a common foreign tariff for imports of products from third countries, in other words, goods and services from extra-blocks countries guarantee the same customs duties regardless of the country where they enter, enabling the free movement of these products within the block (Ipea , 2007).

The third step consists in the consolidation of the Common Market, also known as the Single Market or Internal Market, composed of five essential freedoms: a) **the free movement of goods** which entails a common commercial policy and the establishment of the Common External Tariff for non-group nations; b) **the free movement of workers** ensuring freedom of entry, travel, residence and even work under the same conditions as national workers; (c) **free movement of persons** by enhancing the ease of immigration, asylum and visa policies; (d) **the freedom to provide services** and **the freedom of establishment** that protect individual entrepreneurs, societies and self-employed workers; and finally, e) **free movement of capital** defined by the deprivation of all restrictions and discrimination to capital movements due to nationality (Ferreira, 2009).

The last stage of the integrationist process is composed of Economic and Monetary Union. A striking feature of this stage is the creation of a Community Central Bank that, in accordance with the National Banks, serves the economies of member countries in order to have greater control over the capital circulated, while over the years it has been moving towards obtaining a single currency. Although monetary union brings even greater benefits of political integration, this reality is distant for many economic groups, such as MERCOSUR and BRICS itself, just because it requires a transition of sovereignty (Ferreira, 2009).

Thus, the process of total regional integration goes on an intense path due to the complexity of a nation ceasing to act alone to act in communion with other countries for the same purpose and under the leadership of a higher authority represented by all members.

3. Material and Methods

Trade Intensity Index (IIC)

The Trade Intensity Index (IIC) observes the progress of trade interests, as well as demonstrating the tendency of countries to exchange or market between them based on global export and import data (Anderson & Norheim, 1993).

To analyze only wood wood pulp, focus sector of this study, an adapted version is used, where the IIC from *country i* to the *country j* already considers *sector k* in the following expression:

$$IIC_{ij}^k = \frac{\left(\frac{X_{ij}^k}{X_i^k}\right)}{\frac{M_j^k}{M_w^k}} \qquad (Eq.1)$$

In which X_{ij}^k represents the Brazilian exports of the wood pulp and paper sector to Russia; X_i, Brazil's total exports from this same sector; M_J, total imports from Russia's wood pulp sector; e M_w, the total global imports of it.

Thus, an indicator greater than 1 (one) shows that bilateral trade flows are higher than expected, given the weight of the trading partner in world trade, hence it is an important market for Brazil. However, whether the IIC is less than or equal to 1 (one) indicates that the weight of Brazilian exports to Russia is equal to the weight of Russia in total world imports, that is, exporting or not becomes indifferent to that country.

Regional Trade Guidance Index (IOR)

To estimate the weight of a product or section in total exports in comparison to the weight of its total exports to the rest of the world, that is, the effectiveness of Russia in exporting to other countries, the Regional Guidance Index (IOR) proposed by Yeats (1997) is used. This index is obtained by the following expression:

$$IOR_J = \frac{\left(\frac{X_{rj}}{X_{tj}}\right)}{\left(\frac{X_{oj}}{X}\right)} \qquad (Eq. 2)$$

Where, X_{rj} represents the value of Brazil's exports of wood pulpin trade with Russia; X_{tj}, the value of total Brazilian exports also in trade with Russia; X_{oj}, the value of Brazil's exports of wood pulpin trade with the rest of the world; and X to the value of total Brazilian exports in trade with other countries.

In which, values greater than 1 (one) indicate an advantageous orientation to the regional trade, while values lower than 1 (one) indicate a convenient orientation to Brazil's relations with third markets. In other words, high values show a higher intensity of trade between Brazil and Russia and, as a result, there will be a reorientation of Brazilian exports towards other trading partners.

Grubel and Lloyd Index (GL) and Menon and Dixon Index (CT)

According to Grubel and Lloyd (1975), the intra-industry trade (CII) is deliberate as the value of exports compensated exactly by imports from the same industry. Thus, the level of each industry can be conceived by the following way:

$$GL_i = \frac{(X_i + M_i) - |X_i - M_i|}{(X_i + M_i)} \qquad \text{(Eq. 3)}$$

Where, X_i and M_i indicate, respectively, the value of exports and imports of industry i; $(X_i + M_i)$ represents the total trade of industry i; $|X_i - M_i|$, intra-industry trade and $(X_i + M_i) - |X_i - M_i|$, intra-industry trade as a whole.

The index is zero when trade is explained by inter-industry trade (CEI), however, when trade is intra-industry, the index is equal to 1 (one) (when the value of exports is equal to the value of imports). It is worth noting that the closer to the 1, the higher will be the level of sectoral aggregation.

The Grubel and Lloyd Index (GL) would be a static measure, which hold only the intra-industry index in a certain period of time, according to Hamilton and Kniest (1991). However, the main thing would not be how much intra-industry trade has been growing, but rather how much this growth would contribute to trade in total. Menon and Dixon (1995), thinking about measuring the CII and collaborating for a change in total trade, simplify this same total trade of industry k between countries i and j, in the sum of intra-industry trade with inter-industry. Thus, the total trade growth value (CT) is defined by:

$$CT_{ijk} = Ccei_{ijk} + Ccii_{ijk} \qquad \text{(Eq. 4)}$$

Em que:

$$Ccei = (1 - GL) \times cei_{ijk} \qquad \text{(Eq. 5)}$$

$$Ccii_{ijk} = GL \times cii_{ijk} \qquad \text{(Eq. 6)}$$

As a cei_{ijk} and cii_{ijk} indicate, respectively, inter-industry trade and intra-industry trade. Equations (5) and (6) measure, respectively, the growth contributions of inter-industry and intra-industry trade to total trade growth.

Data Sources

For the calculation of the indexes, were used data from the Food and *Agriculture Organization of the United States* (Fao) and the total values of exports from Brazil to Russia from the Ministry of Development, Industry and Commerce - Comex Sat (Comex Sat, 2016; Fao, 2017).

It is emphasized that the definition of the analysis interval, from 1997 to 2016, was put due to the opening of the economy from the 1990s on, as well as the stabilization of the economy with the real plan, the availability of data and the formation of the BRICS. Thus, it was possible to study and compare the Brazilian commercial scenario of the wood pulpsector with the previous period to the BRICS emergence, and the previous period to the formation of the BRICS was 1997 to 2008 and the post-BRICS period was 2009 to 2016.

4. Results and Discussions

The results on the evolution of the estimated indices are shown in Table 1.

Table 1 - Evolution of the Trade Intensity Index (IIC), Regional Guidance Index (IOR), Interindustry (CCEI) and intra-industry (CCII) and Grubel and Lloyd (GL) of cellulose, between Brazil and Russia, from 1997 to 2016

Year	IIC	IOR	GL	CCEI	CCII
1997	0,00	0,00	0,00	0,00	0,00
1998	0,00	0,00	0,00	0,00	0,00
1999	0,00	0,00	0,00	0,00	0,00
2000	0,03	0,01	0,00	0,00	0,00
2001	0,00	0,00	0,00	-100,00	0,00
2002	0,00	0,00	0,00	0,00	0,00
2003	0,00	0,00	0,03	13,53	0,54
2004	0,02	0,00	0,06	528,22	35,56
2005	0,09	0,00	0,94	-5,41	-78,28
2006	0,13	0,01	0,53	-946,28	8,79
2007	0,22	0,00	0,33	192,40	25,22
2008	1,32	0,00	0,11	492,96	6,62
2009	1,11	0.07	0,28	-33,76	18,80
2010	1,27	0,09	0,25	81,54	22,10
2011	0,79	0,10	0,37	-12,60	15,08
2012	0,84	0,18	0,33	28,27	5,45
2013	0,45	0,11	0,54	-22,11	12,61
2014	0,52	0,09	0,66	-1,31	39,03
2015	0,96	0,21	0,47	76,35	5,63
2016	0,42	0,10	0,62	-24,04	-21,21

Source: Search results.

During the period proposed for analysis, it was observed that during almost the entire period, with the exception of the years 2008, 2009 and 2010, the IIC between Brazil and Russia was less than or equal to 1, which would result in an indifferent market for Brazil, since the weight of exports to Russia follows the same as world imports (Table 1).

However, there is a gradual increase in the intensity of trade between Brazil and Russia, after the formation of the BRICS, that is, the average IIC between the years 1997 to 2008, the period preceding the formation of the economic group, was 0.15 while from 2009 to 2016 the average IIC was of the order of 0.80, indicating an increase of 427% (Table 1).

Regarding the regional orientation index (IOR) between Brazil and Russia for wood pulpexports, this index was lower than 1 in the entire period analyzed, indicating a disadvantageous orientation to regional trade. In other words, it indicates a convenient orientation to Brazil's relations with third markets (Table 1).

However, the average IOR for wood pulptrade between Brazil and Russia in the period prior to the formation of BRICS (1997 to 2008) was 0.00. But, after the formation of BRICS (2009 to 2016) the average IOR increased to 0.13. Thus, there was an increase of 1,300% (Table 1).

The results of the IIC and IOR can be explained by Russia's difficulty in installing companies for integrated processing and conversion of wood in the regions immediately close to its location, causing the country to demand more wood pulp from countries like Brazil (Viana, 2019).

On the GL index, it was lower than the unit in the entire period analyzed, indicating an interindustrial wood pulptrade between Brazil and Russia (Table 1).

The mean CCEI for the period analyzed was equal to 13.4. For the periods before and after the formation of the BRICS, the mean CCEI was 14.6 and 11.5, respectively (Table 1). The mean CCII for the period analyzed was 4.8. For the periods before and after the formation of the BRICS, the mean CCII was -0.13 and 12.1, respectively (Table 1).

Thus, according to the results obtained, it was also possible to verify that the growth rates of the trade flow of the wood pulpsector, over the period analyzed, are mainly explained by the CCEI, which shows the predominance of inter-industry trade in relation to the contribution of intra-industry trade considering the wood pulptrade between Brazil and Russia (Table 1).

The fact that the cellulose trade would be inter-industrial was foreseen, since cellulose is a commodity, that is, a product in its raw state, produced on a large scale worldwide and with homogeneous physical characteristics. The intra-industry trade occurs when products are differentiated (Krugman & Obstfeld, 2005).

Thus, according to the obtained results, it was also possible to verify that the growth rates of the trade flow of the wood pulpsector, over the period analyzed, are mainly explained by the CCEI, which shows the predominance of inter-industry trade in relation to the contribution of intra-industry trade considering the wood pulptrade between Brazil and Russia (Table 1).

In addition, it was found that the formation of BRICS intensified the wood pulptrade between Brazil and Russia and, that Russia can be considered a advantageous, potential and important market for Brazilian wood wood pulp.

In recent years, trade between the two nations has been narrowed not only in the wood pulpsegment, but also in the meat, composts and fertilizer sector and even with regard to space cooperation, and this number tends to increase since in 2017 investment in this economic relationship was 329% higher than 2016. After a recession caused by the drop in oil prices and Western sanctions caused by the crisis in 2009, Russia begins to rise again in 2015, returning to real GDP growth of 1.5% per year, which may explain the growth of the economy and the bilateral intensification of trade with Brazil (Agence France Presse – Afp, 2017).

In this context, it is believed that Brazil's wood pulptrade with Russia represents a great opportunity for the country's economy.

5. Conclusion

Based on the results obtained, it was possible to verify the importance of BRICS formation for Brazil's wood pulptrade with Russia.

After the formation of BRICS there was an increase in the intensity of trade between Brazil and Russia.

In addition, the wood pulptrade between these countries proved very advantageous with the formation of BRICS.

The flow of Brazilian wood pulptrade with Russia was inter industrial throughout the analyzed period.

It is suggested that future works be carried out in order to update this one. It is also suggested to work with other international trade indicators to analyze the wood pulp trade between Brazil and Russia, such as the constant-market-share.

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