GEOGRAPHICAL INDICATIONS ECONOMICS AND SPATIAL MARKETING RESEARCH: SPATIAL STATISTIC AND LOCATIONAL ANALYSIS

PESQUISA DAS INDICAÇÔES GEOGRÀFICAS NA ECONOMIA E GEOMARKETING: STATISTICA ESPACIAL E ANÁLISE DE LOCALIZAÇÃO

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ABSTRACT
The paper underlines the usefulness of Geographic Indications economic fundamentals and the geographical statistics location/concentration indexes. Form the central places theory to cluster analysis such assessment is always important to define and qualify producers, production or in other word the market offer. Concentration and location index of a GIs is a subset of the main theory analysis because GI identify a special product, a different one with social and historical features, that cannot locate production in different regions and to be concentrated near the customers. The paper doesn't enter in such analysis but shows the meaning of some indicators like location index that can be used to assess potentials in the region. The paper has a didactical purpose because a location analysis could be used both in economics and marketing (spatial marketing) quantitative GI researches. That also imply that every assessment of potential GI must be developed with such analysis although the legal process protocol doesn't mention it as in Brazil.

KEYWORDS: Geographic indications. Locational index. GI Economics. GI spatial marketing.

RESUMO
O artigo discute a economia de GI e a importância das estatísticas geográficas, tais como índices de localização e concentração. Da teoria dos lugares centrais para a análise de cluster tal avaliação sempre foi importante para definir e qualificar os produtores, a produção ou, em outras palavras, a oferta do mercado. O índice de concentração e localização de um IG é um subconjunto da análise da teoria principal porque o IG identifica um produto especial, um diferencial por meios históricos e sociais, que não pode mover sua produção de uma região e se concentrar para se posicionar perto dos clientes. O artigo não entra nessa análise, mas mostra o

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significado de alguns indicadores como o índice de localização que pode ser usado para avaliar os potenciais da região. O artigo tem um objetivo didático, pois uma análise locational pode ser usada tanto em economia quanto em marketing (marketing espacial) em pesquisas quantitativas de IG. Isto implica que toda avaliação de potencial de IG deve ser desenvolvida com tal análise embora o protocolo do processo legal no Brasil não o refira.

PALAVRAS-CHAVE: *Indicação Geográfica. APL. Região Metropolitana de Brasília. Quociente locational.*

INTRODUCTION

The certification process in Brazil has the goal to collect all information and documents needed in the INPI´s (the Brazilian intellectual property agency) *Resolução 95/2018* and, when the collect is completed after the INPI evaluation the certification is confirmed. The process of Geographic Indication (GI) certification, in Brazil depends on a list of documents and rules defined by the that states between others the *renome* or the reputation of the GI.

One way to resume and certify this reputation is the historical records of the goods sold related to its geographical origin, but also the trend of sales and a client survey or demand analysis. Related to demand also a quantification of the production and offer must be assess or researched and identify how many producers are located in the region. Besides the number and the qualification of producers is another mandatory information in the certification process. The quantitative analysis is developed in Europe but not in Brazil because all certifications, that were researched in Brazilian database, did not imply such analysis its are not developed or annexed to Brazilian GI certification.

Thus assessing GI potential depends on different indicators: social, economic, legal and governance arise the question of which indicators could and must be used to support certification process demand and qualify GI in Brazil? Among them what are linked to the location and could assess quantitative analysis worth to support the claim of the certification? The paper uses a bibliographic procedure with didactical aim to show what indicators could be used to assess quantitative location analysis. This could be used to complete area description and production explanations information.

We like to focus on geographical indicators to demonstrate the mandatory importance of a quantitative analysis for every GI before and after certification. The paper will be divided in a section of literature reference a discussion and a conclusion remark that ends the paper. The work is justified because we can find very little literature about spatial analysis and GI.

LITERATURE REFERENCE

It was in the nineteenth century, with the development of a system of international treaties between major powers, that became more frequent to regulate international trade and intellectual property matters. The Paris Union Convention for the Protection of Intellectual Property, signed by 164 countries in 1883, including Brazil, included indications of origin and appellations (or designations) of origin as separate objects of industrial protection, but did not clearly define how to prove them, just as he did not use in his terminology the term Geographical Indication which was coined most often.

The Lisbon agreement in 1958 that the first after the second war world , that fixed rules to geographical indication. It was called, at this time, geographical denomination or

appellation of origin. In 1967 the World Intellectual Propriety Organization WIPO was created to administrate treaty and agreement on industrial and intellectual property. .

WIPO administrate 24 international treaties for its activities. Treaties are divided into three general groups: Intellectual Property Protection; Global Protection System and; Classification. In accordance with Article 3 of the Convention for the Establishment of the World Intellectual Property Organization, at the time of its establishment in 1967, the main purpose of the organization is to promote the protection of intellectual property internationally. There were currently 184 Associated States, or 90% of the world's countries. This the international main GI legal and source of regulations framework is the following resuming table.

Table 1 – Chronological GI regulation agreements

YEAR	
1883	**Paris Convention** on the Protection of Industrial Property;
1891	**Madrid Agreement** for the Repression of False or Deceptive Indications of Source;
1958	**Lisbon Agreement**
1967	World intellectual propriety Organization - **WIPO**
1994	World Trade Organization **WTO** Agreement on Trade-Related Aspects of Intellectual Property Rights (**TRIPS**).
2008	**WIPO** *Intellectual Property* **Handbook***: Policy, Law and Use*
2015	**WIPO Geneva conference**

Source: author alessandro@unb.br. 2021

However, the most important international regulatory framework for the current definition of Geographical Indications came in 1994 when was signed the Agreement on Aspects of Trade Related Intellectual Property Law (TRIPS), which was also known as the TRIPs Agreement. It is an international treaty, part of the set of agreements signed in 1994 that ended the Uruguay Round and created the World Trade Organization - WTO. An important aspect is that TRIPs has changed and simplified the concept of GIs that were brought in by previous Lisbon international agreements. Within the rights provided for in the TRIPs Agreement are the Geographical Indications defined in article 22, paragraph 1, as

> Geographical indications are, for the purposes of this Agreement, indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin. (AGREEMENT ON TRADE-RELATED ASPECTS OF INTELLECTUAL PROPERTY RIGHTS Art. 22).

So the Appellation of Origin (Lisbon) that defined a geographical denomination has collected different definitions over time from: (a) Geographical Denomination protecting an Appellation of Origin that is relationship exclusively or essentially between geographical origin and characteristic qualities of the product (Lisbon) to (b) A certification (geographical indication) of the relationship between product and geographical region (TRIPS) up to (c) A Sign that include an Indication of origin (which includes services) of products or a Designation of origin that implies the relationship exclusively or essentially between geographical origin and characteristic qualities of the product. (WIPO).

What essentially give the importance to GI and its certification is the possibility to sell the products at a premium price. So there are three major conditions for the recognition of a sign as a geographical indication, or a special protection that overpass a mark protection:

> • it must relate to a good;
> • these goods must originate from a defined geographical area;
> • the goods must have qualities, reputations or other characteristics which are clearly linked to the geographical origin of goods.

At the end GIs identify a product as originating in the territory of a member of the World Trade Organization (WTO), or region or locality of that territory, when a particular quality, reputation or other feature of the product is essentially attributed to its geographical origin. But in other world and for the social impact point of view a GI is important because has a collective impact and interest. It is not a public good but a collective good. For that must be protected more than a single mark and there is a public interest (social e and local) that is carried out with a governmental protection and control that implies for the GI more client confidence.

The interpretation of GI, according to WIPO, means Indication of origin and Denomination of Origin. The first is any expression or sign used to indicate that a product or service originated in a specific country, region, or place. Designation of Origin is a geographical name of a specific country, region or place where it is used to designate the origin of the product of that place by characteristic qualities that are due solely or essentially to the geographical environment, including natural and / or human factors or both (WIPO 2008, p. 120).

Brazil is a member of the World Intellectual Property Organization since 20 March 1975 and a signatory to the Paris Convention for the Protection of Industrial Property since 7 July 1884. Brazil is a WTO Member since1 January 1995. Brazil is a member of MERCOSUR since December 1991.Brazil signed Madrid protocol convention in 2016.

The type of Protection in Brazil is the *sui generis* protection. Protection is provided only at the request of a party demonstrating legal interest. The legal mark for Brazil is the Industrial Property Law No. 9.279, May 1996 and the INPI (Brazilian Intellectual Property Registration Organization) Act No. 95 of 2018 related to the process of registration; also apply Mercosur/GMC/Res. N° 26/03: Technical Rule for the Labelling of Packaged Foods.

The scope of application of the Law concerns all goods and services, so it´s more extensive than, for example, the European Union GI system. The protection granted to the GIs extends to the graphical or figurative representation of a geographical indication, as well as to the geographic representation of the country, city, region or location in which the name is a geographical indication. The protection does not extend to the translation of geographical names.

Relating the results form 1997, the year that was developed a legal framework till today, we found 76 GI in Brazil, March 2021, an average of only 3 GI for year considering 25 years. A very poor performance compared on European Countries that has more than 3,3 thousand GI and other developing countries like India that has developed more than 300 legal GI or four times more GI in the same time.

Some scholars blame the governance system for that (NIEDERLE 2013,2011, MATOS and LA ROVERE 2017, LOCATELLI 2017). This is very complicated matter because many agents simultaneous are doing many activities not all focused to GI. There are governmental and not governmental agencies working together and in the

same time a single process of Brazilian GIs. It´s implies a lot of questions and complains between so many stakeholders and the producers.

Another weakness of the Brazil system is the lack of a collective GI marks. A general GI mark will promote a public marketing communication like in Europe Union. This weakness difficult marketing campaign and communication, reduces market impact and revenues for producers. However, marketing is not the strength activities for Brazilian GI, many are not known in the internal and external markets.

Regarding the issue to assess the potential of a GI and to understand the GI economics impacts for producers, clients and rural economy one can use the regional economy approach and in particular a cluster analysis. APL or *arranjos produtivos locais*, in Brazil, is similar to cluster analysis and is used in economic policies supported by Union funds and regional programes. The aim is regional economic development.

The concept of APL or cluster was defined by the economist Alfred Marshall in the book Principles of Economics, whose first edition was published in 1890; and the eighth and final, in 1920. The same phenomenon is sometimes called a local productive arrangement, a local productive system or even a "cluster" in Brazil. Marshall describes the way in which specialized agglomerations emerge in the market. According to the author, a sectorial agglomeration of companies originates from the existence of certain natural resources in a region, from better logistics conditions or from a historical process that establishes a certain productive activity in the territory (MARSHALL 1982, p. 232-233). These concepts were used also in spatial geographic and economy today studies (FUJITA, M., KRUGMAN, P., e VENABLES, A 1999) that combine also a central place theory as we see further on in this paper.

In the Brazilian conception, an APL is formed by a set of economic, political and social actors, located in the same region, developing productive activities specialized in a certain sector and which have expressive links of production, interaction, cooperation and learning (MANUAL of APL FIESP 2014). In 2004, the APL Working Group defined Local Productive Arrangements in Brazil as: (...).... agglomerations of companies, located in the same territory, which have productive specialization and maintain links of articulation, interaction, cooperation and learning among themselves and with other local actors, such as: government, business associations, credit institutions, teaching and research (MIDIC - FIESP 2014 p.9)

According to the Permanent Working Group on Local Productive Arrangements (GTP APL), which represents the federal government's view on arrangements and which has been developing work with some Pilot APLs in the Federation Units, an APL must have the following characteristics:

• have a significant number of companies in the territory and individuals who work around a predominant productive activity;
• share perceived forms of cooperation and some governance mechanism.

The relationship between APL and GI is simple, since APL identifies the productive potential and market concentration related to products and services. Some APLs are based on agricultural activity, which leads to the conclusion that there are producers and production associations interested in collective actions for trademark and IG orders. The GI certification can support marketing of the producers included in the APL, increasing the national and international visibility of the products, increasing, in the end, the added value of the offer. This creates a virtuous circle that can increase the interest in producing and in the market as much as the demand for quality production.

The GI is still related to the APLs, because the associations interested in the GIs are agglomerations like the APLs that seek a premium price (or higher value added

to the product) that is justified with places and the production chains. This price is strictly linked to the quality certification of a product that is recognized and related to the search, experience and credibility. While the quality of an industrial product is always questioned, as it is not certified and linked to a regional and local production known in time, in the case of geographical indication the opposite happens.

According to Cassiolato and Szafiro (2000) the main peculiarities of an APL are as follows:

• the territorial dimension (the actors of the APL are located in a certain area where interaction occurs);
• the diversity of activities and actors (entrepreneurs, unions, government, educational institutions, research and development institutions, NGOs, financial and support institutions);
• tacit knowledge (knowledge acquired and passed on through interaction, uncoded knowledge);
• innovations and interactive learning (innovations and learning that arise based on the interaction of the actors); and
• governance (leadership of the APL, usually exercised by entrepreneurs or by their representative group - unions, associations).

Research on GI economics cannot be separated from the analysis of APLs in each state, because if there is no APL recognized by government institutions, the arrangement will not have the role of local priority. Nor does it present products or services of a sufficiently interesting volume to have political support for local development. As a result, it is possible for any association to obtain the IG certificate, but certainly the products have, in the view of the public development of the territory, a lower priority in relation to that of the APLs. In other words, APLs must have a private and public interest.

DISCUSSION

We retake the three basic objectives pursued through GI: consumer protection, producer protection and rural economy protection in a defined geographic area. So, following WIPO (2008), the legal recognition of geographical indications provides an institutional tool that provide communities with the opportunity to valorize their local production and extract rents based on local *savoir faire*.

According to BRAMLEY CERKIA, EBIÉNAB ESTELLE and KIRSTEN JOHANN (2009) paper the economics of geographical indications in developing countries is rather more complicated than is usually appreciated. The reasons for this are:
(1) the geographical indication concept is new to many developing countries;
(2) the institutional and legal systems are not able to ensure sufficient domestic and international protection;
(3) the are few economic benefits of a GI system and the number of GI are less than in developed countries;
(4) the majority of the population is rather poor so domestic willingness-to-pay studies will not necessarily be appropriate.

So then this situation stress the developing countries to be more interested to protection generated among many groups of producers or geographical origin based on products. Many studies on geographical indications in Brazil investigate the feasibility and case of GI protection for a number of specific products but with a priori assessment of the current and future potential of the product in terms of its volumes,

distinctive quality, homogeneity, pricing and cost of managing the supply chain, the existence of a market demand for the unique attributes of the product and the existence (or potential) of unfair competition will be required. (BRAMLEY CERKIA, EBIÉNAB ESTELLE and KIRSTEN JOHANN 2009)

Brazilian scholars must adopt an interdisciplinary approach to investigate the feasibility of GI but we argue that also are needed economic studies to compare the costs and benefits of alternatives to sui generis protection of geographical indications, for example, via trademarks, certification marks, collective marks or unfair competition law. An interdisciplinary approach to investigate the feasibility of GI protection for any specific product would need also a rigorous quantitative approach in terms of testing consumers' willingness to pay or in general to assess the demand and seek the offer optimal function.

In order to analyze GI cluster potential The question that would need to be asked first to start the GI process would be: is there a need or potential for GI protection for a specific product? In other word the research mast show, as Art.22 Trips states, the unique characteristics of the product that are linked to the geographical area or the people of the region or the product specificity, the quality and reputation of the product, the potential for a price premium or the potential loss in price and income as a result of Usurpation.

But the lack of quantitative and cluster studies in GI is not a Brazilian characteristic. According to Török, Jantyik, Maró and Moir (2020) study using a systematic literature review approach, were investigated three different aspects: market size, price premium and impacts on rural development finding there is a lack of economic data to support policies related to GIs, even in the European Union (EU), where the most important GI system exists. The authors claimed that some particular GI products of some regions could gain significant price premiums, but due to the associated higher production costs and unequal distribution in the value chain, it might not result in higher producer incomes. The most conflicting empirical results were found in how GIs can contribute to regional prosperity, as evidences of the harmful effects of GIs on rural development. So another reason to develop quantitative comparative studies and deep economics.

The last situation, i.e. analysis of economic impact of rural economy was investigated recently (FAO 2018) .The potential GI impact could be achieved by the analysis of the production area, the production process, the product exposure (cultural, social, perception) and the concentration of production of one region. Empirical results show that, in the short term (immediately following registration), GIs can, however, provoke an initial decrease as a result of specifications that directly affect production (specific requirements and delimitation of the production area (FAO 2018).

In the FAO (2018) study that was detected in the case for Vale dos Vinhedos wine, with a reduction of 78 percent in production between 2012 and 2014, following PDO registration. Another explication of the reduction is because of the number of producers using the GI as a consequence of the reservation of the name to the "true" GI product. That was the case of Futog cabbage, where the amount produced under the GI fell by 76 percent between 2010 and 2014. Finally the short-term reduction in supply can also be explained by imperfect compliance with the specifications. Its imply the mechanis of specification control with some farmers not being involved in the GI process, although they are located in the demarcated areas, or are not willing to engage in the GI strategy. In some cases the GI can result in an immediate increase in production, as in the case of Penja pepper (+ 328 percent between 2010 and 2015).

In other words there is a period of adjustment to adoption and full compliance with the specifications of the certification.

The research above stressed the importance of a located production analysis. So again to better define the potential of a GI in one region must be developed quantitative indicators about production and producer can be used an economic geography methodology called location analysis. To use spatial statistics, we must remember the geographical statistics economics and the central place theory developed the last century.

The theory of the central place, developed among others by Von Thünen (1966), Cristhaller, Lösch (1954) and Weber (1969) aimed to explain the location of activities where the pattern of supply follows a pattern of demand that is dispersed by nature. and the spatial structure of supply (is) dependent on the interaction of economies of scale and transport costs So a highest concentration are dependent on some characteristic, such as the presence of a mineral deposit or some specialization of the localized workforce.

Lösch (1954) developed this argument with several assumptions, such as the ubiquity of raw materials and inputs; the uniform distribution of the population in a flat space; and a profit-maximizing production function, among others and said that prices vary with distance, as higher transport fees are added as locations that are more distant from the point where the good or service is produced are reached; for consumers increasingly distant from this point, the quantity demanded is progressively smaller, due to the delivery price being progressively higher. So, then the analysis by Lösch (1954) define demand areas as a result of the interaction between transport costs and the maximization of firms' profits, causing the existence of boundary areas that are neighbors to other areas of demand.

The Christallerian system model requires more common sense than properly economic analyzes for your understanding. It is based on two assumptions: 1) the need that if a function with a given market area is supplied by a particular center, that center will also supply all functions that have equal or smaller market areas; 2) and the existence of a constant growth factor k in the size of the market area. With these assumptions Christaller builds his system of central hierarchical places. The model could be interpreted as a "shopping model". Services or manufacture of goods are market oriented, or in other words they are offered both to consumers and to providers of other functions which refers to the figure of a shopping center and its shop windows offering different types of goods. This market orientation brings a clear correspondence between the spatial distribution of supply and demand, as well as the variation in the strength of that correspondence, which will ultimately depend for Christaller (as in Lösch) on transport costs and economies of scale.

However, and many today the social and economic network operate at different levels (political, technological, commercial, etc.), establish multiple connections (one node can connect to several other nodes) with different frequencies (routine or casual) and intensities (amount of exchanges, flows, etc.). This variety of levels, connections, frequencies and intensity creates, in general, a complex pattern of relationships where the structures of local connections tend to affect the structure of the network as a whole and vice versa. In this case, a movement in a specific node or point in the network can have more intense impacts in its most immediate areas of influence and produce secondary and less intense impacts on the network as a whole. This the case of GI.

Social and historical relations that exist in the GI differentiates the analysis of a common good from a GI. Given the variety of connections and the structure of the nodes, these secondary impacts can produce non-negligible, non-linear and non-

regular changes in neighborhoods distant from the network. These changes in networks are measured in several ways: connectivity (number of nodes that can be accessed by a specific node), centralities (structure of the node and its surroundings), flows (volume of relationships between nodes vis-à-vis the total relationships of a node and the importance of these relationships in the network), stability (frequency and restrictions on connections), intensity (volume of flows) etc.

In general the problem is explore the location of facilities to optimize some objective. Distance or some measure more or less functionally related to distance (e. g., travel time or cost, demand satisfaction) is fundamental to such problems. Consequently, we have classified them according to their consideration of distance and the distance the customer is willing to cover to by the good.

As many scholars found (FUJITA, M., KRUGMAN, P., e VENABLES, A.J. 1999; MARTIN, R. 1999; PARR, J.B. 2002, PARR, J.B., BUDD 2000) is more difficult to develop location models because every market has to evaluate set covering, maximal covering, p -center, p -dispersion, p -median, ¯xed charge, hub, and maxisum in different way and in the same region. This overlay analysis became more difficult differentiating goods. In all of these models, the underlying network is given, as are the locations of the demands to be served by the facilities and the locations of existing facilities.

Multi-objective modeling will become increasingly important. Since location decisions for GI are not inherently strategic, they often must define transportation costs and traveling time for customers held by multiple constituents. Long-term location decisions impact and constrain the shorter term tactical and operational decisions made after facilities are in place, so logistics and supply chain will be the main function in these cases. Thus, the development of models that integrate facility location decisions with approximations of tactical and operational decisions will be another important area. But also public and private sector facilities interact with other parts of the infrastructure (e.g., highways, airports, rail lines, ports, production facilities and equipment) . Embedding facility location modeling approaches in more general network design algorithms will also be an important and challenging area for future work.

To verify the potential of goods production to use in such models must be calculate a concentration deduction measure. A cluster analysis that measures economic and social features developed in Italy is the one which assess industrial districts. The index calculation is based on a technique that uses statistics (*coefficiente di concentrazione territoriale* or location coefficient) to determine the influence of a productive sector in the local or regional economy with respect to the national economy.

The local systems index was created for Fabio Sforzi, which depends on several elaboration steps. This process is institutionalized for a law to 317 that sets the maximum size of the small and medium company 200 employees and 10 billion € of capital. From an operational point of view The local work system is a system of municipalities glued to each other where there is at least 75% demand or labor supply.

The demand side function is:

$F_a = DR(A) / DT(A)$

into where:
DR (A) workers residing in the area;

DT (A) total workers in the area;
The supply side function:

$$F_o = DR (A) / VT (A)$$

into where:
VT (A) workers active in the area.

To identify the industrialization of the area, the index of endowment and industrialization potential is used.

The first (endowrment) is defined for the function:

$$[D_i (A) / D_i (I) /] \ / \ [D (A) / D (I)]$$

where:

D_i (A) represents workers in the manufactured industry (i) in the local system (A);
D_i (I) represents workers in the manufactured industry (i) in Brazil;
D (A) represents the total workers in the area;
D (I) represents workers in Brazil in the manufactured industry.

The second (industrialization potencial) is defined for the function:

$$[V_i (A) / V_i (I) /] / [V (A) / V (I)]$$

V_i (A) represents workers active in the manufactured industry (i) in the local system (A);
V_i (I) represents workers active in the manufactured industry (i) in Brazil;
V (A) represents the total number of workers active in the area;
V (I) represents the total number of active workers in Brazil.

Productive specialization is another parameter and it is defined as:

$$[Di (j) (A) / Di (j) (I) /] \ / \ [Di (A) / Di (I) /]$$

where the local system is greater than or equal to the national average:

D_i (j) (A) represents workers in the industry class j in the local work system (A);
D_i (j) (I) the total number of workers in the industry class already in Brazil.

The use of the local system is useful to capture the social aspects of the workers' movement and the infrastructure available in the area. However, it is not enough that a sector is specialized to form a class of interest, it must also have a high specialization dominant in the area.

To define this, we can use the media or media method (AVENI 2020).We must also ensure that the sector has high specialization. I.e. in Brazil one can assume the IBGE classification by class of economic activity and that the dominance criterion indicates that there are at least 20% of workers in the area.

Another way to calculate a concentration of producer and identify production location it is useful to use directly spatial statistical measures. Several authors have used this (BRITTO AND ALBUQUERQUE 2002, SUZIGAN ET AL. 2001 AND 2003, CROCCO ET AL. 2003, CROCCO 2018). According to Crocco et ali (2003) for the elaboration of criteria for the identification of local productive arrangements, it is interesting to develop an indicator that is capable of capturing four characteristics of an APL: (1) the specificity of a sector within a region; (2) its weight in relation to the region's industrial structure; (3) the importance of the sector nationally; and (4) the absolute scale of the local industrial structure.

A kind of index to ensure that is the Industry Locational Quotient (QL).

$$QL = \frac{E^i_j / E_j}{E^i_{BR} / E_{BR}}$$

Where
E^i_j = Employment of sector i in region j;
E_j = Total employment in region j;
$E i_{BR}$ = Employment of sector i in Brazil;
E_{BR} = Total Industrial Employment in Brazil

Another main geographical statistic index is the concentration of sales and market share. The Herfindahl index (also known as Herfindahl–Hirschman Index) is a measure of the size of firms in relation to the industry it is in and an indicator of the amount of competition among them. HHI is calculated by squaring the market share of each competing firm in the industry and then summing the resulting numbers where the market shares are expressed as fractions or points. The result is proportional to the average market share, weighted by market share.

The HHI can range from 0 to 1.0, moving from a huge number of very small firms to a single monopolistic producer. Increases in the Herfindahl index generally indicate a decrease in competition and an increase of market power, whereas decreases indicate the opposite. Alternatively, if whole percentages are used, the index ranges from 0 to 10,000 "points". For example, an index of .25 is the same as 2,500 points.

ENDING REMARKS

The paper aimed to explain the importance of a GI location analysis for the certification process and assessing economic impacts. Although very few analyses, and none in Brazil, uses this method to explore GI potential, also very few explore location analysis after GI certification.

Our paper suggests that a location analysis, using geographical economics theories and indicators exposed above, could be useful both for explore and to assess. Quantitative analysis needs a data set that must be provided by public agencies, as in Brazil the IBGE, or by specialized observatory.

The most simples index is the location index that can explain the weight of the producer's organization of a GI into the market in terms of firms, quantitative production and workforce. This imply an economic (number of firms, quantity produced) and social (workers, number of firms in the region) impact that is useful to asses a potential of a GI in a region.

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