

THE ECONOMIC IMPACT OF BELOTUR DISBURSEMENTS WITH THE BELO HORIZONTE CARNIVAL IN 2018: AN APPLICATION OF THE INPUT-OUTPUT MATRIX

O IMPACTO ECONOMICO DOS DESEMBOLSOS DA BELOTUR COM O CARNAVAL DE BELO HORIZONTE EM 2018: UMA APLICAÇÃO DA MATRIZ INSUMO-PRODUTO

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ABSTRACT

This study deals with the estimation of the economic impacts provided by the Belo Horizonte Municipal Tourism Company (Belotur) disbursements with the Carnival of 2018. The method used was the Input-Output Matrix, and the construction of the demand shock used the published extracts related to Belotur expenses with the Carnival. The results showed that Belotur's disbursements have a positive impact in the economy, significantly increasing the values of Minas Gerais' production, value added, work earnings of the population and also provided the creation of employment.

Keywords: Carnival, Input-Output Matrix, Economic Impact, Minas Gerais.

RESUMO

Este estudo trata da estimativa dos impactos econômicos proporcionados pelos desembolsos da Companhia Municipal de Turismo de Belo Horizonte (Belotur) com o Carnaval de 2018. O método utilizado foi a Matriz Insumo-Produto, e a construção do choque de demanda utilizou os extratos publicados relacionados às despesas de Belotur com o Carnaval. Os resultados mostraram que os desembolsos da Belotur têm um impacto positivo na economia, aumentando significativamente os valores da produção de Minas Gerais, valor adicionado, remuneração do trabalho da população e também proporcionaram a criação de emprego.

Palavras-chave: Carnaval, Matriz Insumo-Produto, Impacto Econômico, Minas Gerais.

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INTRODUCTION

It is notorious the relevance of the tourism sector in the economy that can manifest in different forms, as cultural or tourist event. A compelling case about the economy of tourism of Minas Gerais is the Carnival of Belo Horizonte that in 2009 started to get relevance in the state and national scenario (DIAS, 2015). Due to this, the capital of Minas Gerais became one of the more prominent Brazilian carnivals, with 3.8 million of revellers in 2018 (BELO HORIZONTE, 2018).

As mentioned, the year of 2009 marks the beginning of the return of the street blocks to the Carnival of Belo Horizonte, and in recent years these blocks have taken over the streets, avenues, squares, alleys, walkways, viaducts and villages in the city of Belo Horizonte (DIAS, 2015). As a result, the capital of Minas Gerais has won more than a simple festivity; currently, it has a set with an extensive schedule of preparations for the revelry, including street block rehearsals, parties and other events. These events move the entire production chain. There are months of activities, which brings people from other cities, other countries, generating, besides tourism promotion, employment and income (BELO HORIZONTE, 2018).

Besides, in the state of Minas Gerais, according to data collected by Belotur, it was driven by direct tourism revenue of R\$ 319.4 million during the carnival period in Belo Horizonte in 2018 (BELOTUR, 2018a). Since 2009, the Belo Horizonte Carnival has been increasing in the number of revellers. However, for municipal public agencies, the evolution of Carnival represents a challenge, given the need to interpret the social changes of the party and the adoption of public infrastructure policies and urban logistics to host the event (BELOTUR, 2017).

Therefore, the carnivals of Belo Horizonte in recent years showed vitality and a participatory dimension that placed the party among the largest in Brazil, due to the high number of revellers and their degree of participation of all social classes. However, there is nothing in the literature about the discussion of the economic effects of this boom seen in the Carnival of Belo Horizonte.

As a result, questions arise as: would the Carnival of Belo Horizonte be a generator of employment and income of high relevance to the state?; Do the disbursements made by Belotur to promote Carnival generate a return that can be considered positive for the economy?

Thus, the present paper aimed to make an estimative of the economy of the Carnival of Belo Horizonte (MG), considering the disbursements made by the Empresa Municipal de Turismo de Belo Horizonte (BELOTUR) in 2018.

Contrary to popular belief, there is not much information in the literature about the real impact of Belo Horizonte's Carnival on its economy, since academic studies on the subject are still scarce. Thus, the realization of a study on the real impact of Carnival on the economy is essential for the municipal public administration, since the quality of return on their investments and the academic environment, as it serves as a basis for further studies.

Additionally, the present study focuses on the disbursements made by Belotur, which does not represent the entire increase in demand originated by the event. There are private disbursements not covered in this analysis. Moreover, the study does not focus on tourist spending in the event municipality, which also represents a relevant demand vector to study the impact of the Carnival but given the lack of information disaggregated by economic sectors will not be possible to cover the analysis of tourists spending. The estimation of impacts used the fundamentals of the Input-Output Matrix model. This method allows the knowledge of the flows of goods and services produced in

each sector of the economy, destined to serve as inputs to other sectors to attempt the final demand. However, the matrix used corresponds to the last available (2008) during the development of the work, and it is for the State of Minas Gerais. Because the matrix is composed of structural data, which do not change easily, the hypothesis is that its use is cohesive even pass ten years.

Concerning the database, the study uses data from establishments involved in the subject of tourism in Belo Horizonte as the event organizer, Belotur, Fecomércio- MG, Municipal Secretary of Tourism and Secretary of Tourism of the State of Minas Gerais.

In addition to this introduction, this article is organized as follows: section 2 presents the history of Carnival in Belo Horizonte; section 3 portrays the considerations about tourism, economy and events; section 4 addresses the methodological aspects and its procedures; section 5 presents the results and analyzes of the economic impacts of the event for the economy of the State of Minas Gerais; section 6 concludes with the concluding remarks.

CARNIVAL OF BELO HORIZONTE

Brazilian Carnival is a national festivity with the most extended holiday on the country's official calendar. However, carnival celebrations have passed through changes due to the locality and historical period, especially in the capital of Minas Gerais.

The Belo Horizonte Carnival began in February 1897 with the extinct Corso, in which men dressed as women paraded behind wagons from Liberty Square to Afonso Pena Avenue and costumed revellers followed cars while their occupants threw confetti and streamers. Shortly after that, in the year 1899, the carnival bands emerged that still parade in the city's neighbourhoods (CÂMARA MUNICIPAL BH, 2011).

Sometime later, in the 1940s, the confetti battles and popular dances began, which proceeded to the caricature blocks and then to the samba schools. However, even after several years of celebration, the Carnival of the capital of Minas Gerais was only officialized in 1980, the year the first parade took place on Afonso Pena Avenue. Since then the parades have taken place in numerous locations in the city, Contorno Avenue; via 240, in Novo Aarão Reis and Andradas Avenue (BELOTUR, 2018b).

The Carnival of the capital of Minas Gerais was crowded at the beginning of the twentieth century. In its early years were already accounted for by the police five thousand revellers in the central region of the city and 1908 there were already eight thousand people only in the old Ouvidor Street, today Bahia Street. However, in the mid-1930s, the number of carnival revellers, blocks and clubs on the streets began to decline due to financial crises, intermittent rain in the carnival period and the criminalization of "entrudo" (FILHO, 2006).

Thus, the Carnival in the '70s and '80s had a great expressiveness, because their parades, according to the Minas Gerais anthropologist Rafael Barros, were among the largest in the country in terms of movement and opulence (BELO HORIZONTE, 2014).

Also, a few years later appeared in the capital of Minas Gerais, from 1980 and encouraged by the City Hall of Belo Horizonte, the Caricatos Blocks that gave a survival to the Carnival of the city. Since their inception, they have relied on elements from samba schools to attend the existing official competitions, evaluated on drums performance, the creativity of costumes and props, plot, musical theme and allegories (BELO HORIZONTE, 2014).

However, instead of following a growing path, Belo Horizonte's Carnival slowed down, and the city became increasingly empty during the country's most famous holiday during the 1990s. This situation remained the same until 2009 when Belo Horizonte festivities began to be reborn in a harsh way and with problems of dialogue with the municipal government.

In 2010, there were movements of occupation of public space as a way of demonstrating popular dissatisfaction with actions of municipal public management. Among them was the Municipal Decree No. 13,798 of 2009, signed by the then Mayor Márcio Lacerda, which prohibited the holding of events of any kind in the Praça da Estação.

One of the ways the people found to react to this decree was the creation of the Praia da Estação event, in which hundreds of people gathered at Praça da Estação for a picnic, where some people with bathing suits bathed in the waters of the square's fountains. The event was successful and began to repeat itself, so much so that the decree repealed in May of the same year.

From this movement, began to appear more often carnival blocks, which in 2011 already reached a total of 20 blocks that held parades and caught the attention of residents. From 2012 onwards, the number of blocks only grew (HOJE EM DIA, 2017).

In 2015, the Carnival of the capital of Minas Gerais began to take increasing measures. There were almost 200 carnival blocks that took over the city, and 1,458 thousand people attended the holidays of Belo Horizonte (BELOTUR, 2017). Besides, following the rising line of the Carnival of the capital of Minas Gerais, the year 2016 represented a new milestone. According to the Military Police, about two million revellers went to the streets to contemplate the 217 blocks. In 2017, according to Belotur data, there was a growth of 50% over the previous year, reaching the number of three million people on the streets. Also, the number of blocks registered reached 350. Finally, in 2018 the number of revellers exceeded all expectations and reached 3.8 million, an increase of 26% over the previous year and the number of blocks was almost 500 blocks.

TOURISM, ECONOMY AND EVENTS

As stated by Moesch (2002), the theme of tourism can go back to a vast timeframe, as there have been reports of human travel and displacement for centuries. Thus, it is difficult to measure the beginning of its activities.

According to the World Tourism Organization (WTO), tourism is the practice of an activity in which an individual move in search of fun, quietness, leisure and other reasons, changing their routine for a minimum of 24 hours.

Therefore, tourism is present in activities that require tourism equipment or enterprises, be it short, medium or long term, travelling for leisure, business, events, health. Additionally, uses any means of transportation and accommodation, for example, cars, aeroplanes, ships, trains, and hotels, hostels, camping.

The Tourism Economy is an area of study of economics that focuses on the allocation of resources for those travelling for tourism purposes by analyzing aspects of the supply and demand side of tourism. Their activities are called Tourism Characteristic Activities (TCA), and they would be: accommodation, food, tourist agencies and operators, land, waterway and air passenger transportation, entertainment activities and rental of movable property.

Due to this vast extension of its conception, tourism has been studied by an increasing number of researchers over the years. Its influence has expanded to countless aspects. One of these approaches deals with the importance of tourism for the development of the economy. Economic development, according to Bresser- Pereira (2006), is characterized by sustainable productivity growth in a nation or per capita income, together with capital accumulation and technical progress, is a historical phenomenon of frequent occurrence in countries that have already gone through the capitalist revolution.

Also, the cycle of economic development tends to sustain itself as the capitalist system moves to increase the stock of capital and technical knowledge. However, development rates are not unanimous in all nations, as countless variables are capable of promoting development.

Tourism, according to Barreto (1995), is an example of a sector that has increased its expressiveness, since in Brazil only in 2017 the sector injected into the economy 173 billion dollars according to the World Travel and Tourism Council (MINISTÉRIO DO TURISMO, 2018). Thus, tourism is already treated as a worldwide economic activity of high importance due to its potential to generate foreign exchange, investment, employment and income for the receiving population.

In this way, many places have benefited from the direct and indirect effects of tourism on the economy. First, the direct multiplier measures the impact of variations in the final demand of this sector, considering only the activities that provide direct inputs to it. The indirect multiplier measures the impact of changes in the final demand of the integrated circuit sector, considering only the activities that provide inputs to the sectors that are themselves inputs. Finally, the induced effect - or the income effect multiplier - measures the impact of changes in final demand in the integrated circuit industry considering the additional demand variation caused by the increase in the overall level of economic activity - the indirect effects of indirect effects - when the integrated circuit industry is stimulated, moreover, this effect is characterized by the expenses incurred by those who received money from tourism service providers (BARRETO, 1995; CARVALHO, 2006).

Besides, the public sector also benefits from tourism activities, since indirectly, the government receives through taxes that it collects from the private company, and directly, through the fees it charges tourists, for visits to some attractions.

Due to all the factors presented, tourism has a multiplier effect, which is favorable for local or regional development, since the benefits from this action are not restricted to a single recipient, generating income for almost all economic sectors. The effects are felt in several areas, for example, construction, the production of furniture and household items, the services of professionals and banking movements. Also, public service is affected since it is required to carry out works.

Thus, in addition to the economic benefits, tourism still generates positive impacts for the general population, according to Oliveira (2000), such as the justification and payment of maintenance and preservation of ecological parks, natural areas, outdoor recreation areas, historical and archaeological parks. Besides, investments in local infrastructure are also driven by tourism practices, as demands for better roads, water and sewage systems, telecommunications and energy increase.

As a result, a tourism segment that deserves prominence in this scenario of growth and development is the event tourism. However, to enter the concept of Tourism Event, it is necessary to define the term "event":

[...] the gathering or grouping of two or more persons, with common interests, with the specific purpose of purchasing products or services; update or disclose information; achieve improvement, encouragement or motivation to achieve or exceed goals; the

technical qualification of the participant and/or the purchase of goods and equipment complementary to the development of his professional activity (MARTIN, 2003, p.35).

In this way, event tourism is part of tourism that considers aspects related to the purpose of tourism activity and is therefore motivated by a specific event. It happens when there is a cultural or even professional interest in any event, be it a congress, convention, fair or otherwise.

According to Ignarra (1999), some trips have more than one member, and individuals differ in their motivations for the trip. There are also cases where the tourist can take a business trip to get to know and get rich culturally with a place they would like to know, but this is not necessarily the case, this can be a business trip without business and the business tourism itself.

Besides the motivation, it is relevant to understand the role of an event in a local economy, and especially if the government invested in the organization. The measurement of the impacts serves to show in numbers the economic evaluation of a cultural or tourist policy.

METHODOLOGY

Since the objective of this study is to estimate the impact of the Carnival in Belo Horizonte event on the Minas Gerais economy, there is a need for quantitative research, since this type this involves data analysis.

In order to develop this present study, the first step is a primary documentary analysis of financial disbursement contract extracts made by the Belotur, and other supporting documentation such as all bidding processes, public notice and proposals. Thus, once all data were available for analysis, it is of paramount importance to break them down into all disbursements by category made by Belotur. These disbursements classified by economic activities will be inputs from the main methodological framework of the process, the Input-Output Matrix.

The Input-Output Matrix, conceived by the Russian economist Wassily Leontief, allows the identification of the interdependence of productive activities regarding the inputs and outputs used and resulting from the production process.

However, before deepening the application of the Input-Output Matrix, it is necessary to demonstrate the motivation of choosing it as the principal methodology of the study in question. Figure 1 shows, according to Faria (2017), research methodologies and their strengths and weaknesses concerning the objective of the study. Thus, the most recommended methods for each object type have more asterisks, three for the most indicated and one or zero for the least indicated. Besides, there are also cost, effect, and deployment analyzes. Therefore, it is noticeable in the table the existence of essential methodologies for the study of the economic impacts of tourism on the macroeconomics, among them the Input-Output Analysis, the Regression Analysis and the General Equilibrium Model.

Figure 1: Overview of literature research perspectives.

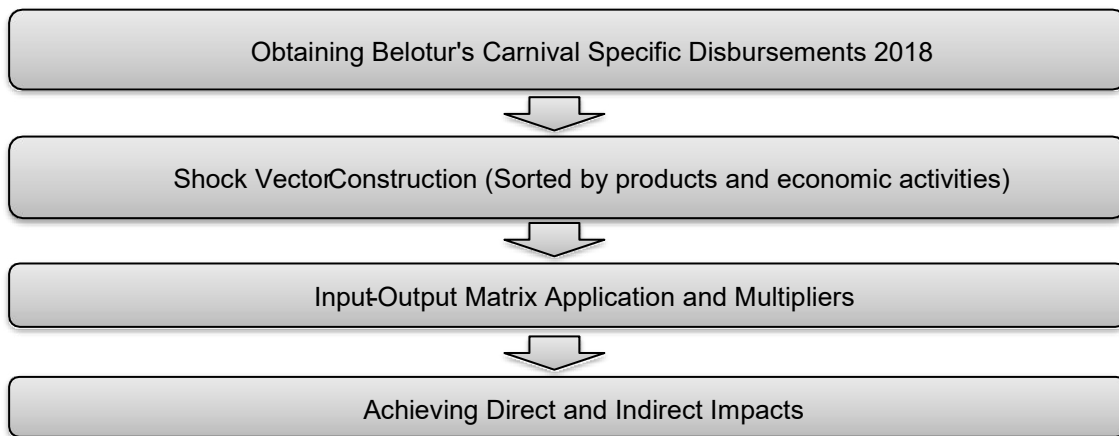
Research method	Input-Output Analysis	Tourism Satellite Account	Regression Analysis	General Equilibrium Model	Cities Plan
Impact of Tourism on Macroeconomics	***	**	***	***	*

Source: Adapted from Faria (2017, p. 235). The asterisk number in each cell means the strength of the method.

However, although all have a higher weight in the category in question, the model that works with Regression Analysis is most effectively used when the geography scale is national or international, has some dynamic effects and is not a reference when it comes to analyzing the size of tourism in the economy. Also, when it comes to an analysis by the General Equilibrium Model, its median relevance in the study of tourism size in the economy and its relatively higher cost compared to other methodologies is noticeable. Thus, the relevance of Input-Output Matrix highlighted when it comes to studies of impacts of tourism on the macroeconomics. It is possible to highlight the fact that for the State of Minas Gerais the Matrix is calculated by the Fundação João Pinheiro (2015), which facilitates access to data to build a more cohesive and coherent work with reality.

The Input-Product Matrix starts from a system with the production matrices and the input absorption or consumption matrix, which leads to the obtaining of the technological matrix. Thus, as exposed by Miller and Blair (2009), this model matrix demonstrates the monetary flow corresponding to the flow of goods and services between the various sectors of an economy, determined in time and space. The inputoutput system consists briefly in the consideration that the supply of certain goods can be used as input for other sectors. Thus, within the study in question, the matrix fits within a necessary flow for the development of the methodology. Figure 2 represents this flow and was adapted from Domingues and Carvalho (2012):

Figure 2: Methodological procedure for calculating the multiplier effects of Belotur disbursements at the Belo Horizonte Carnival in Minas Gerais.



Source: Adapted from Domingues and Carvalho (2012, p. 18).

The mathematical representation of the system consists in adapting the following model from the authors Porsse, Palermo and Portugal (2009):

$$X_i = a_{i1}X_1 + \dots + a_{ij}X_j + \dots + a_{in}X_n + F_i \quad j = 1, 2, \dots, n \#(1)$$

X_i = good offer i ;

a_{ij} = proportion of good i used with input in sector j ($i, j = 1, \dots, n$);

F_i = amount of good i used as final consumption.

Considering all sectors and using matrix language, the relations of the economic system can be represented as follows:

$$X = AX + F \quad \#(2)$$

X = goods and services offer vector (1 X n);

A = input-output coefficient matrix (n X n);

F = final consumption vector (1 X n).

Applying a mathematical operation, we have:

$$X = (I-A)^{-1} F = Z.F \quad \#(3)$$

Z = intersectoral impact matrix.

The Z matrix, called the Leontief matrix, synthesizes all direct and indirect relations of sectoral interdependence. Thus, the projection of impacts on the productive activity performed by knowing Z and the final demand vector for goods and services. The composition of this vector, aiming at feeding the impact projection model, has already been discussed in the previous sections. Additionally, to obtain the matrix Z of the Minas Gerais economy, the matrix elaborated by the Fundação João Pinheiro (2015) is used.

The Input-Output Matrix allows, from its data, to build impact multipliers, which allow us to identify which economic sectors have the most significant influence. Among these multipliers, the main ones estimate, by increasing final demand, the direct and indirect impacts of economic sectors on remuneration, employment, taxes and value added.

According to Feijó e Ramos (2013), the multipliers display the impact on the sector of the final demand on an economic variable of interest. This effect can be decomposed into total multiplier (direct and indirect), direct multiplier, indirect and induced.

Regarding the multipliers, the effects on employment are initially treated, and their initial effect is given by the total number of employed persons per product unit for each sector of the economy, expressed by the formula:

$$e = \frac{E_j}{X_j} \quad \#(4)$$

E_j = total number of employed persons in the sector j ;

X_j = value of sector output j .

The direct multiplier, according to Feijó e Ramos (2013), is given by:

$$e^D = eA \quad \#(5)$$

A = matrix of direct technical coefficients;

e = initial effects vector.

The total multiplier (direct and indirect) can be obtained by multiplying the initial effect vector by the intersectoral impact matrix of the open Leontief model. So, the total multiplier is:

$$e^{DI} = e(I - A)^{-1} \quad \#(6)$$

where: e^{DI} = vector of the direct and indirect multiplier of employment;

$(I - A)^{-1}$ = matrix of the technical coefficients of Leontief's open model.

The indirect multiplier is the difference between the total multiplier by the direct multiplier and the initial effect. According to the equation:

$$e^I = e^{DI} - e^D - e \quad \#(7)$$

e^I = vector of indirect employment multiplier;

e^{DI} = vector of the direct and indirect multiplier of employment;

e^D = vector of the direct employment multiplier.

Moreover, it is possible to consider the closed model for families, in which this group of economic agents understood as an economic sector. In practice, the column vector of the household consumption demand component incorporated into the intermediate consumption matrix and the value-added line vector has that the direct, indirect and induced multiplier obtained by multiplying the direct multiplier by the matrix of the closed model of Leontief.

$$e^{DIR} = e' (I - A)^{(-1)} \quad \#(8)$$

e^{DIR} = vector of direct, indirect and induced employment multiplier;

e' = initial effects vector of the closed model;

$(I - A)^{(-1)}$ = technical coefficient matrix of the closed Leontief model.

The induced multiplier is given by:

$$e^R = e^{DIR} - e^{DI} \quad \#(9)$$

e^R = induced multiplier vector.

The same functions can be used to calculate multipliers for any other variable that makes up the added value. This study will calculate the multipliers for income, value added and taxes, as well as employment. However, the induced effects have not been studied and analyzed due to the high cost of time required to perform this analysis.

Following the logic of the input-output model, the projections are made assuming a fixed proportionality relation of the basic variables of interest (production, value added, employment, taxes and remuneration) with the sectoral production level. The direct and indirect impact projection mechanism for each basic variable of interest can be summarized as follows:

$$V = v.X = v.Z.F \quad \#(10)$$

V = projection of impact on the basic variable of interest;

v = vector of the fixed coefficients of the basic variable by production level (V / X);

X = projection of impact on Minas Gerais sectoral production;

F = vector of disbursements associated with the event.

Also, in possession of the matrix of direct technical coefficients, sector analysis can be performed in two different ways: the open model or the closed model. The open model consists of the analysis of the Leontief matrix obtained directly from the matrix of direct coefficients, considering the productive sectors as endogenous and the elements of final demand as exogenous.

Thus, the open model considers the direct and indirect effects arising only from sectoral production. The closed model considering families, therefore, makes its final consumption endogenous by adding to the matrix of direct coefficients a row and a column related to household consumption as an economic activity (BÉRNÍ and LAUTERT, 2011).

Thus, according to Guilhoto and Sesso Filho (2010), the elaboration of the input-output matrix provides some macroeconomic aggregates to measure the level of economic activity. Through these aggregates, the model makes it possible to project the potential impacts of disbursements on the economy of Minas Gerais through structural coefficients depicted in its most recent Input-Output Matrix. Among the main mechanisms provided by the matrix, which will be vital inputs for the study of the impact of the Belo Horizonte Carnival Event on the Minas Gerais economy, we highlight the effects or impacts of how every economy responds with variations in production in other sectors, in income and employment, considering the interrelationship between the demand of the various activities and factors of production, as well as effects on state Gross Domestic Product, taxes and income.

Database

It is necessary to build a database to estimate the economic effects. Among the data required as inputs for the Input-Output Matrix are the disbursements made by the Belo Horizonte Municipal Secretariat for Economic Development, represented by Belotur. The data for the 2008 Input-Output Matrix of Minas Gerais, which already calculated the direct coefficient matrices and the Leontief matrix, carried out by the Fundação João Pinheiro (2015), and the data compiled by Belotur about the 2018 Carnival in Belo Horizonte.

Therefore, for the conference of data related to Belotur disbursements, information was collected on the website of the Official Gazette of the Municipality of Belo Horizonte. This search consisted of an analysis of the published statements regarding Belotur's expenses with the Belo Horizonte Carnival of 2018, and the period from February 1, 2018, to June 30, 2018, was used as a basis.

Besides, for the effective use of the Minas Gerais Input-Output Matrix, it was necessary to classify Belotur's disbursements with carnival festivities by categories according to the National Classification of Economic Activities - CNAE 2.0 of the Brazilian Institute of Geography and Statistics - IBGE.

Finally, in order to analyze the data from the input and output matrix, it was necessary, for the calculation of the shock vector, the deflation of the disbursement value. Thus, for this process, the price index (IGP-DI - General Price Index internal availability) was used, which is calculated by Fundação Getúlio Vargas, from July 2018 to January 2008. Thus, the shock values could be included in the calculation of the matrix, and subsequently, its effects were converted back to current values in 2018 for the analysis of the results.

ANALYSIS OF RESULTS

In order to understand the impact of the Belo Horizonte 2018 Carnival on the Minas Gerais economy, from the Input-Output Matrix, it was necessary to develop tables with the areas that were selected for the impact study and to synthesize the main sectors impacted in each one of them.

Shock vector analysis

Considering the shock caused by the disbursements made by Belotur with the festivity, it noted that these expenses concentrated in five activities according to the classification of the Fundação João Pinheiro (2015). Table 1 shows the shock vector and its distribution by activity with values of 2018 and those converted to 2008 prices in order to apply the shock in the same year of the matrix.

Table 1: Shock vector values by-products 2008 e 2018 (R\$)

Product code	Product description	Sum of value (2008 current prices)	Sum of value (2018 current prices)
110301	Business services	564.423,33	909.030,22
110601	Family and associations services	1.056.938,50	1.702.248,99
90101	Financial services	813,84	1.310,72
33401	Wood products and diverse industries	9.928,30	15.990,00
30401	Apparel & accessories	7.450,89	12.000,00
-	Prompt payment expenses	9.040,05	14.559,42
	Total	1.648.594,91	2.655.139,35
	Total discounted prompt payment expenses	1.639.554,86	2.640.579,93

Source: Own elaboration.

The activities of the shock summarized in articles of clothing and accessories (tailor-made garments); wood products and diverse industry (security equipment); business services (travel agency, advisory and consultancy of cultural projects, collection and analysis of data resulting from market research, public opinion, stage, roofing and other structures for temporary use, leasing of chemical toilets; rental of event lighting equipment; rental of research and data collection for market and opinion surveys), services provided to families and associations (independent actor; music band/musician/musical group/trio activity; activity, carnival blocks; activity, children's entertainment; provision of services and samba school (associations)); and financial services (life insurance plans). Among these economic activities, about the values, we highlight those of services provided, since the most substantial amount concentrated in this activity.

Moreover, it is possible to explain how much the final demand increased concerning the shock realized as shown in table 2, in which with the shock provided by Belotur disbursements, there was an increase in the final demand. Also, the services provided to business, families and associates were the ones that had increased the most and financial intermediation, insurance and supplementary pension services and related services, had the lowest change among the five.

Table 2: Percentage of increased demand due to shock vector by-products (%).

Product code	Product description	Variation (%)
030401	Apparel & accessories	0,00012
033401	Wood products and diverse industries	0,00013
110301	Business services	0,02780
110601	Family and associations services	0,01462
090101	Financial services	0,00001
Total	Final Demand	0,00038

Source: Own elaboration.

Analysis of effects on production

Since the shock vector of Belotur disbursements that act on the final sectoral demand of the state of Minas Gerais was estimated, the next step is to demonstrate its effects on the production of Minas Gerais in 2018 by applying from equation (3) with the final demand added to the shock. The

differences between shock and non-shock production summarized in Table 3 for the 20 (of the total of 40) highest sectors classified as those with the highest impact and the total multipliers expressed in terms of one million reais in 2018 prices.

Table 3: Absolute difference in production in 2008 e 2018 by-sectors (R\$).

Sectors	Absolute difference - current prices in 2008	Absolute difference - current prices in 2018	Ranking	Total Multiplier - current prices in 2018
Family and association services	1.058.502,31	1.704.767,57	1	645.603,47
Business services	688.001,63	1.108.058,86	2	419.627,09
Food and drinks manufacture	76.130,63	122.611,95	3	46.433,72
Real estate services	72.845,69	117.321,40	4	44.430,16
Commerce	69.314,74	111.634,64	5	42.276,56
Electricity and gas, water, sewage and urban cleaning	50.735,33	81.711,62	6	30.944,57
Information services	48.606,70	78.283,37	7	29.646,28
Public administration	39.734,79	63.994,74	8	24.235,11
Agriculture	26.404,01	42.524,89	9	16.104,38
Coke and oil refining	21.454,15	34.552,91	10	13.085,35
Transport, storage and mail	21.361,09	34.403,04	11	13.028,59
Livestock and fishing	20.117,95	32.400,90	12	12.270,37
Wood products, diverse industry	14.445,76	23.265,58	13	8.810,78
Textiles	14.155,31	22.797,80	14	8.633,63
Articles of clothing, accessories, leather, goods and footwear	13.617,45	21.931,54	15	8.305,58
Electro-electronic, scientific and hospital appliances and equipment	11.922,85	19.202,32	16	7.272,01
Chemicals manufacture	11.572,37	18.637,85	17	7.058,24
Rubber and plastic articles	10.498,19	16.907,82	18	6.403,07
Financial services	10.475,20	16.870,81	19	6.389,05
Maintenance and repair services	10.112,11	16.286,03	20	6.167,60
Total	2.340.260,89	3.769.099,82	-	1.427.375,77

Source: Own elaboration.

The sectors that benefited most from the output shock vector were the business services, family and association services, food and drinks manufacture, real estate, commerce, electricity and gas, water, sewage and urban sanitation, information services and public administration. Among these, the first sectors of services, had an increase in production with values over one million reais, demonstrating a strong impact of the shock to the production of activities related to travel agency, advisory and consulting in cultural projects, collection and analysis of data resulting from market research, public opinion, stage, coverage and other temporary use structures, as well as independent actors; musical band activity, carnival block activity; children's entertainment activity; provision of services and samba school (associations).

However, in addition to these outstanding sectors, about the tourism economy, two other sectors should be listed, transportation, storage and mail and accommodation and food services, both with an increase of over thirty and ten thousand reais respectively.

Finally, analyzing the impact on production in general with the multipliers, for each one million in the shock vector (direct effect on demand in MG), Belotur ended up generating in the economy of Minas Gerais an additional production of approximately R\$ 1,4 million. In the sector of family and associations services, the multiplier was R\$ 645.603,47 and in the business, services were R\$ 419.627,09.

Analysis of the effects on value added

As in production, the shock caused by Belotur disbursements has effects on the so-called Value Added (VA). Value added is the difference between gross production value and intermediate consumption. Furthermore, the national product can be obtained as the sum of the values added in all stages of the production processes of an economy over a specific time (SIMONSEN, 2009).

Thus, based on table 4, the impacts of this shock are more concentrated, concerning the direct effect, on services rendered to families and associates, services rendered to companies and on food and drinks manufacture, which is the industry that produces these consumer goods. Moreover, it is also noticeable the presence of the indirect impact caused by the shock, in this case, the most influential sectors were families and association services, business services, commerce and real estate services, the latter being represented by the rent of movable goods, such as cars for tourists to travel.

Besides, when analyzing the total impact, that is, resulting from direct and indirect, the sectors most impacted are the ones with the highest indirect impact. However, it is worth noting that the services provided to families and associative and business services represent, respectively, 44,38% and 29,29% of the total impact. Thus, the increase of almost four million reais in the Minas Gerais VA was directed mostly to these two sectors.

Table 4: Impact on value added by-sectors (R\$ - 2018 current prices).

Sectors	Initial Impact (R\$)	Direct Impact (R\$)	Indirect Impact (R\$)	Total Impact (R\$)	Part. (%)	Total Multiplier (R\$)
Family and association services	487.805,58	304.718,21	901.738,36	1.694.262,15	44,38	641.625,02
Business services	351.679,57	151.949,45	614.590,87	1.118.219,89	29,29	423.475,12
Commerce	97.695,97	16.186,33	161.381,80	275.264,10	7,21	104.243,81
Real estate services	67.419,29	3.029,42	109.621,26	180.069,97	4,72	68.193,34
Public administration	28.031,09	6.599,93	47.885,27	82.516,28	2,16	31.249,30
Electricity and gas, water, sewage and urban cleaning	23.368,85	8.773,92	40.826,77	72.969,54	1,91	27.633,91
Food and drinks manufacture	8.026,48	34.571,10	29.518,53	72.116,11	1,89	27.310,71
Information services	18.973,62	14.456,06	36.791,05	70.220,73	1,84	26.592,92
Agriculture	12.667,57	2.877,52	22.008,89	37.553,98	0,98	14.221,87
Transport, storage and mail	9.859,78	3.804,97	17.195,09	30.859,84	0,81	11.686,77
Livestock and fishing	8.505,42	3.686,01	15.906,67	28.098,10	0,74	10.640,88
Maintenance and repair services	7.308,01	1.084,67	12.110,17	20.502,85	0,54	7.764,53
Financial services	4.906,73	2.269,30	8.846,52	16.022,55	0,42	6.067,81
Textiles	2.504,23	3.854,34	5.288,51	11.647,08	0,31	4.410,80
Wood products and diverse industry	2.444,22	3.440,76	5.421,96	11.306,94	0,3	4.281,99

continua

conclusão

Sectors	Initial Impact (R\$)	Direct Impact (R\$)	Indirect Impact (R\$)	Total Impact (R\$)	Part. (%)	Total Multiplier (R\$)
Articles of clothing, accessories, leather goods and footwear	2.264,61	3.435,69	5.152,25	10.852,55	0,28	4.109,91
Accommodation and food services	2.613,41	1.959,60	5.280,72	9.853,73	0,26	3.731,65
Chemicals manufacture	1.705,33	3.095,66	4.512,07	9.313,06	0,24	3.526,90
Construction	2.877,54	1.114,40	5.227,50	9.219,44	0,24	3.491,45
Newspapers and magazines	2.412,86	2.134,73	4.578,89	9.126,48	0,24	3.456,24
Total	1.153.006,56	587.739,38	2.076.676,60	3.817.422,53	100	1.445.675,81

Source: Own elaboration.

Finally, for each R\$ 1 million in the shock vector (effect on demand in MG), Belotur ended up generating in the economy of Minas Gerais an increase in value added of in R\$ 1,45 million. The total multipliers in the family and association services were R\$ 642 thousand for each million in the demand and business services R\$ 423 thousand.

Food and drinks manufacture are one of the highlights that direct impact is higher than the indirect effects. The indirect multiplier for this sector was R\$11 thousand against R\$13 thousand for each million spend in the demand.

Analysis of the effects on the compensation of employees

The input-output model provides, in addition to the effects already mentioned, the projection of the impacts from Belotur's disbursements with the Carnival of the capital of Minas Gerais in 2018 on the compensation of employees (the sum of all wages and salaries paid to workers during the year). Table 5 presents the total impact on income in the Minas Gerais economy resulting from Belotur disbursements and the total multiplier.

Table 5: Impact on the compensation of employees by-sectors (R\$ - 2018 current prices).

Sectors	Initial Impact (R\$)	Direct Impact (R\$)	Indirect Impact (R\$)	Total Impact (R\$)	Part. (%)	Total Multiplier (R\$)
Family and association services	582.092,15	117.060,30	244.364,86	943.517,31	44,2	357.314,43
Business services	461.103,30	69.405,33	216.896,99	747.405,63	35	283.046,02
Commerce	87.209,03	6.463,48	47.685,23	141.357,74	6,62	53.532,84
Public administration	46.884,46	2.718,89	26.392,01	75.995,36	3,56	28.779,80
Food and drinks manufacture	30.381,30	15.675,50	3.188,47	49.245,27	2,31	18.649,41
Information services	17.022,14	5.506,61	5.062,56	27.591,30	1,29	10.448,95
Electricity and gas, water, sewage and urban cleaning	11.796,87	2.868,14	4.456,62	19.121,64	0,9	7.241,45
Livestock and fishing	10.384,41	1.498,07	4.949,69	16.832,16	0,79	6.374,42
Transport, storage and mail	8.320,69	1.701,57	3.464,81	13.487,07	0,63	5.107,62
Agriculture	7.576,27	1.089,04	3.615,12	12.280,43	0,57	4.650,66
Real estate	5.283,47	1.323,48	1.957,06	8.564,01	0,4	3.243,23

continua

conclusão

Sectors	Initial Impact (R\$)	Direct Impact (R\$)	Indirect Impact (R\$)	Total Impact (R\$)	Part. (%)	Total Multiplier (R\$)
Textiles	4.691,57	1.725,91	1.187,12	7.604,60	0,36	2.879,90
Financial services	4.612,46	999,08	1.864,83	7.476,37	0,35	2.831,34
Articles of clothing, accessories, leather goods and footwear	4.126,50	1.662,03	900,15	6.688,68	0,31	2.533,03
Wood products and diverse industry products	3.924,63	1.463,10	973,73	6.361,46	0,3	2.409,11
Maintenance and repair services	3.549,16	317,86	1.885,84	5.752,86	0,27	2.178,64
Newspapers and magazines	3.210,88	941,54	1.052,12	5.204,53	0,24	1.970,98
Rubber and plastic articles	3.152,28	878,79	1.078,49	5.109,55	0,24	1.935,01
Accommodation and food services	3.024,21	898,42	979,34	4.901,97	0,23	1.856,40
Electro-electronic, scientific and hospital appliances and equipment	2.843,89	1.221,86	543,93	4.609,68	0,22	1.745,71
Total	1.317.662,80	241.222,21	576.923,99	2.1345.809,01	100	808.840,89

Source: Own elaboration.

Due to the disbursement with the 2018 Carnival of Belo Horizonte, there was a direct and indirect increase in compensation of employees of R\$ 2,135,809.01, which impacted the income of Minas Gerais families. The four main sectors, services rendered to families and associates, services rendered to companies, commerce and public administration, had the most significant increase in the working earnings. The first two sectors presented amounts in more than hundred thousand and the next two activities with values higher than a twenty-eight thousand reais. For each million in demand, R\$ 809 thousand in compensation of employees is generated.

Moreover, considering the effects on employment expansion, Belotur's disbursements enabled the creation of 149 employment in the economy of the state. The sectors that demanded the most substantial increase in employment in absolute terms were services rendered to families and associations (around 90), business services (around 32) and commerce (around 10), as can be seen in Table 6. It is noteworthy that only services rendered to families and services rendered to companies accounted for more than 80% of the total.

Table 6: Impact on employment in employment by-sectors - 2018.

Sectors	Work factor (occupations)	Direct Impact	Indirect Impact	Total	Part. (%)	Ranking
Family and associations services	40	7	43	90	60,19	1
Business Services	14	3	15	32	21,70	2
Commerce	5	0	5	10	6,68	3
Food and drinks manufacture	0	1	1	3	1,70	4
Agriculture	1	0	1	2	1,36	5
Public administration	1	0	1	2	1,26	6
Livestock and fishing	1	0	1	2	1,23	7

continua

conclusão

Sectors	Work factor (occupations)	Direct Impact	Indirect Impact	Total	Part. (%)	Ranking
Maintenance and repair services	1	0	1	1	0,88	8
Articles of clothing, accessories, leather goods and footwear	0	0	0	1	0,63	9
Information services	0	0	0	1	0,61	10
Textiles	0	0	0	1	0,56	11
Transport, storage and mail	0	0	0	1	0,49	12
Accommodation and food services	0	0	0	1	0,44	13
Wood products and diverse industry	0	0	0	1	0,40	14
Real estate services	0	0	0	0	0,29	15
Construction	0	0	0	0	0,28	16
Electricity and gas, water, sewage and urban cleaning	0	0	0	0	0,23	17
Newspapers and magazines	0	0	0	0	0,21	18
Other non-metallic mineral products	0	0	0	0	0,14	19
Rubber and plastic articles	0	0	0	0	0,13	20
Total	65	13	71	149	100	-

Source: Own elaboration.

Analysis of tax effects

The shock from Belotur disbursements causes tax effects; in other words, due to the shock in the final demand, there is an increase in tax collection in each sector of the economy. As shown in table 7, it is noticeable that the direct impact is felt most strongly in activities related to services rendered to businesses, families and associations, representing approximately 74% of the total. On the other hand, when analyzing the indirect impacts from the shock, the highlight is the activity of commerce, which now allied with the activity of services rendered to companies, corresponds to the majority of the total indirect impact caused. Thus, concerning the total increase in tax collection with the shock, it had an increase of R\$ 44,819.37.

Table 7: Impact on tax collection by-sectors (R\$ - 2018 current prices).

Sectors	Initial Impact (R\$)	Direct Impact (R\$)	Indirect Impact (R\$)	Total Impact (R\$)	Part.(%)	Ranking
Business services	10.138,16	2.157,75	4.137,11	16.433,02	36,66	1
Family and association services	6.314,91	4.539,63	-618,66	10.235,88	22,84	2
Commerce	3.566,31	227,34	1.987,01	5.780,66	12,90	3
Information services	1.649,70	319,37	704,94	2.674,01	5,97	4
Food and drinks manufacture	1544,90	582,95	376,29	2.504,13	5,59	5
Electricity and gas, water, sewage and urban cleaning	727,31	143,23	308,36	1,178,90	2,63	6
Transport, storage and mail	359,21	82,42	140,62	582,24	1,30	7
Agriculture	305,90	69,07	120,87	495,83	1,11	8
Livestock and fishing	283,93	76,00	100,29	460,23	1,03	9
Chemicals manufacture	242,95	71,28	79,58	393,81	0,88	10
Coke and oil refining	237,23	38,92	108,37	384,52	0,86	11

continua

conclusão

Sectors	Initial Impact (R\$)	Direct Impact (R\$)	Indirect Impact (R\$)	Total Impact (R\$)	Part.(%)	Ranking
Articles of clothing, accessories, leather goods and footwear	199,41	66,64	57,17	323,23	0,72	12
Real estate services	187,80	34,62	81,99	304,41	0,68	13
Rubber and plastic articles	185,37	45,35	69,75	300,47	0,67	14
Wood products and diverse industry products	173,45	64,78	42,92	281,15	0,63	15
Textiles	173,41	71,79	35,88	281,08	0,63	16
Public administration	172,12	113,20	-6,33	278,99	0,62	17
Financial services	153,52	40,18	55,14	248,84	0,56	18
Other non-metallic mineral products	141,33	42,56	45,19	229,08	0,51	19
Electro-electronic, scientific and hospital appliances and equipment	137,03	55,31	29,78	222,11	0,50	20
TOTAL	27.650,79	9.071,81	8.096,76	44.819,37	100,00	

Source: Own elaboration.

Synthesis of the effects of the shock vector

Finally, after analyzing the shock vector in the variables of production, value added, compensation of employees, tax and employment, a similar pattern can be found since the families and association services, business services and commerce stood out in all areas studied. The first two sectors were already expected as the shock is concentrated in these sectors, and commerce proved to be most impacted by disbursements made in this sector. Besides, the food and drinks manufacture sector was the top in four of the five impact variables studied. Based on this, Table 8 summarizes these main sectors and their respective economic impacts.

Table 8: Total impact of the shock vector in the sectors on production, value added, compensation of employees, tax and employment – 2018.

Major Sectors	Shock vector (R\$)	Total impact on production (R\$)	Total impact on valued added (R\$)	Total impact on compensation of employees (R\$)	Total tax impact (R\$)	Employment
Family and association services	1.702.248,99	1.704.767,57	1.694.262,15	943.517,31	10.235,88	90
Business services	909.030,22	1.108.058,86	1.118.219,89	747.405,63	16.433,02	32
Commerce	-	111.634,64	275.264,10	141.357,74	5.780,66	10
Food and drinks manufacture	-	122.611,95	72.116,11	49.245,27	2.504,13	3
Other sectors	29.300,72	722.026,80	657.560,29	254.283,06	9.865,67	17
Total	2.640.579,93	3.769.099,82	3.817.422,53	2.135.809,01	44.819,37	149

Source: Own elaboration.

Thus, it can be inferred from table 8 and with the demand shock of R\$ 2.640.579,93, that the participation of the main sectors previously mentioned is of high relevance in the economy's warming since the sector of families and association services obtained a multiplier of R\$ 645.603,47 in production, R\$ 641.625,02 in value added, R\$ 357.314,43 in income and R\$ 3.876,38 in taxes collected for each one million of reais (2018 current prices) spend in demand. Business services had an economic impact on the production multipliers R\$ 419.627,09, and value-added R\$ 423.475,12, income R\$ 283.046,02 and taxes collected R\$ 6.223,26. These two sectors mentioned were very representative. However, sectors

such as commerce and food and drinks manufacture also stood out in the multipliers of production, value added and remuneration.

FINAL CONSIDERATIONS

The objective of this work was to construct an estimate of the economic impacts of the Belo Horizonte Carnival based on a given shock vector, which consists of the disbursements made by the Belo Horizonte Municipal Tourism Company (BELOTUR) in 2018. Thus, in order to mark the achievement of this target, some steps were needed.

This examination began with the measurement of Belotur's disbursements for the Belo Horizonte Carnival in 2018, which were categorized according to the standards established by IBGE so that they could then be included in the Input-Output Matrix as a shock that would bring about the economic effects of it happening.

Thus, as can be seen from the tables present in the analysis of the results of the work, it is possible to state that the economic return of the disbursements made by Belotur with Belo Horizonte carnival is positive, since, with the disbursement of R\$ 2.640.579,93, the economic impact on the analyzed multipliers was R\$ 3.769.099.82 for production, R\$ 3.817.422,53 in value added, R\$ 2.135.809,01 for income and R\$ 44.819,37 for taxes collected, that is, the return exceeds the amount spent (the total multipliers exceeds one). Also, due to the event, the economy was further boosted by the opening of 149 employments within the state of Minas Gerais.

Based on the results, the leading sectors for the analysis of the shock were the families and association services, business services, commerce and food and drinks manufacture. Besides, it is worth noting that the commerce sector has had most of the economic impact compared to sectors that have not received a shock. Moreover, the four sectors mentioned identified as relevant due to their significant positive influence suffered by the application of the shock vector.

Also, it is worth mentioning the presence of sectors that also had a relatively significant contribution to certain areas, about production, there was a contribution of real estate services and rent. Concerning value added, stands out, in addition to the leading mentioned earlier, the real estate and rental and public administration sector. Besides, as regards compensation of employees, as well as value added, the relative prominence of the public administration and regarding taxes, it is prudent to mention the relevance of the information services sector.

Additionally, it is worth mentioning that the thesis in question worked with some limitations during its elaboration. Firstly, since the Input-Output Matrix considers the economy of the state of Minas Gerais as a whole, the relative effects of the increase in demand due to shock and other multiplier effects had a small percentage increase due to the high value of the Minas Gerais economy and the event being concentrated in the city of Belo Horizonte; however, this did not prevent the effects from proving to be high and relevant.

Secondly, used in this article was built for the year 2008. Despite using the hypothesis that the economic structure does not change in a short period; it is recognized that a ten-year period can make differences in the results. As soon as new matrix versions are available for Minas Gerais, the present work can be updated and even compared with the results found here.

Finally, it is worth noting that the disbursements analyzed in this work were only those made by Belotur, that is, the real investment in Carnival is higher when considering the private disbursements,

and consequently its impact on the economy and its many sectors and also the impacts caused by tourists on their spending during the carnival period, which requires a large amount of information on spending by economic sectors.

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