

Volume 46, Issue 1

Economic impacts of the 2023 June festivities in Sergipe, Brazil: Evidence from an inter-regional input–output model

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Abstract

This research note evaluates the economic impacts of the June 2023 Festival in Sergipe, Brazil. Using primary data from 1,750 surveyed attendees and an interregional input–output model built from electronic invoice records, we estimate the effects of public investment and tourist spending. For every R\$1 invested, R\$ 1.75 in state output is generated. Total economic output reaches R\$118 million nationwide, with R\$66 million retained in Sergipe. The event supports 2,028 jobs in Brazil, including 1,361 in Sergipe. Results highlight the role of cultural events in regional development and provide the first IO-based assessment of Sergipe's June Festival.

Authors gratefully acknowledge the financial support from the National Council for Scientific and Technological Development (CNPq), Brazil.
Editor's Note: This paper was originally submitted under a different manuscript number on 10/09/2025 and accepted for publication on 03/14/2026. A system error required us to replace the original submission with a new manuscript with a later manuscript number.

Citation: Luiz Carlos de Santana Ribeiro and Fábio Rodrigues de Moura and Milene Takasago, (2026) "Economic impacts of the 2023 June festivities in Sergipe, Brazil: Evidence from an inter-regional input–output model", *Economics Bulletin*, Volume 46, Issue 1, pages 360-370

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Submitted: February 11, 2026. **Published:** March 30, 2026.

1. Introduction

Event tourism has emerged as a significant subfield within tourism studies, driven by the growing recognition of its economic, social, and cultural impacts. Over the past few decades, scholars have highlighted how cultural, sporting, and business events can attract large numbers of visitors, stimulate local economies, and contribute to destination branding (Getz and Page, 2016). Studies on cultural events, such as music festivals (Bracalente et al., 2011; Tohmo, 2005), show that both expenditures related to event organization and visitor spending generate significant impacts on regional production. Global events such as the Olympic Games, World Cup, and major festivals have increasingly become key drivers of tourism, tourism infrastructure development, and urban regeneration (Müller *et al.* 2023).

Studies evaluating mega-events are more prevalent in Brazil, particularly those focused on the 2014 World Cup and the 2016 Rio de Janeiro Olympics (Haddad and Haddad, 2010). However, cultural events at a regional level remain less explored in literature.

Brazil is internationally known for its Carnival. However, in the month of June, the June Festivals take place in the Northeast region. These Catholic-origin festivals honor the Saints Anthony, John, and Peter. Throughout this month, various celebrations occur featuring traditional foods, bonfires, fireworks, and the traditional music style known as “forró” (Sardroni *et al.* 2016). The influx of tourists increases across all states in the Northeast region during this period. Tohmo (2005) and Getz and Page (2016) have shown that different kinds of event tourism generate important benefits for host locations and has become increasingly popular as a travel motivation.

Sergipe, Brazil’s smallest state in terms of both population and land area, and one of the nine states that make up the country’s Northeast region, has recently intensified public investment in its traditional June Festivals as part of a broader strategy to promote tourism-driven economic growth (Impressa 24h, 2023). These cultural events have been repositioned by the state government not only as celebrations of regional identity but also as instruments for generating employment, stimulating local demand, and attracting domestic visitors. Sergipe’s economic profile marked by informality, service-dependence, and low international tourist flows closely resembles that of many emerging or subnational destinations worldwide. As such, the insights from this case offer valuable lessons for policymakers seeking to evaluate or scale similar event-based tourism strategies in comparable contexts, particularly through tools like regionally disaggregated input–output models that reveal both local and spillover effects.

This research note aims to assess the economic impact of the June Festivals in Sergipe in 2023. To do so, primary and original data from a survey conducted by the Government of Sergipe are used to feed an inter-regional input-output (IO) model constructed from administrative records of electronic invoices. Therefore, our study offers an economic multiplier of Brazil’s June Festivals in the Northeast through a regionally disaggregated interregional IO model.

Our main contribution is to identify the sectors that generate the highest employment and income effects in the state during the June Festivals, as well as any spillover effects outside the state, and to evaluate the impacts that event tourism can have on a region. To gauge the broader labor-market context in which these effects occur, National Household Sample Survey (PNAD in Portuguese) published by Brazilian Institute of Geography and Statistics indicates that, between 2023 and 2025, Sergipe’s informality rate fluctuated around 50%. To our knowledge, this is the first study to carry out such an evaluation in Sergipe. Moreover, the use of primary data combined with an IO matrix constructed from electronic invoices should provide robust and unprecedented results. Furthermore, unlike previous studies conducted for

Brazil, we also consider gross mixed income in addition to wages, which includes payments to self-employed workers.

Previous studies show that estimates of the economic impact of tourism and cultural events vary substantially depending on methodological choices and the treatment of visitor-attributable expenditures (Diedering, 2015; Van Wyk, 2015). Such heterogeneity makes direct cross-study comparisons difficult and highlights the importance of adopting context-specific empirical strategies. Recent reviews also document the coexistence of different modelling approaches, particularly IO and computable general equilibrium (CGE) models, each grounded in distinct theoretical assumptions and analytical scopes (Hu et al., 2023). Therefore, the choice of modelling framework should be aligned with the research objective and the structure of the available data. For short-run impact assessments based on observed visitor expenditures, IO models are widely employed due to their transparency and lower data requirements, whereas CGE models incorporate broader equilibrium mechanisms and behavioural adjustments.

The remainder of this research note is structured as follows: the next section describes the methodological approach and data sources, including the impact analysis in an inter-regional IO model and primary expenditure data. Section 3 presents the main findings on economic and employment impacts; and the final section discusses policy implications, limitations, and directions for future research.

2. IO model and impact analysis

The IO model, originally developed by Leontief (1936), provides a static representation of an economy at a specific point in time. It is a linear production framework that simplifies the economic system into matrices capturing the intersectoral flows of inputs and outputs. In summary, the IO model can be defined by $x = Ly$, where x is the total output; $L = (I - A)^{-1}$ is the Leontief Inverse matrix; and f is the final demand vector. A is the Technological matrix given by $A = a_{ij} = \frac{z_{ij}}{x_j}$ and z_{ij} is the trade between sectors i and j .

We use an inter-regional IO model (Miller & Blair, 2022¹) to conduct an impact analysis. Considering the closed model, we have:

$$\Delta \mathbf{x} = (\mathbf{I} - \bar{\mathbf{A}})^{-1} \Delta \mathbf{y} \quad (1)$$

$$\Delta \mathbf{v} = \hat{v} \cdot \Delta \mathbf{x} \quad (2)$$

In Equation 1, \mathbf{I} is an Identity matrix; $\bar{\mathbf{A}}$ is the Technological matrix² incorporating household income and consumption. In Equation 2, v is the GDP and/or employment coefficient; and \hat{v} is this coefficient diagonalized. Given an exogenous shock in final demand ($\Delta \mathbf{y}$) and considering the fixed productive structure, this will result in an impact on output ($\Delta \mathbf{x}$), which can be derived in terms of employment and GDP.

Both the labor market in Sergipe (Ribeiro *et al.*, 2023a) and the tourism sector in Brazil (Ribeiro *et al.*, 2021) have high levels of informality. This is due to the seasonal nature of tourism, particularly in the Brazilian Northeast. Tourist flows increase significantly from December to February, for instance, as a result of the summer season. For this reason, in closing the model, we consider the gross mixed income in addition to wages, which includes payments to self-employed workers.

¹ For a more detailed view of the interregional IO model, see Chapter 3 of Miller and Blair (2022).

² $A[a_{ij}] = \frac{z_{ij}}{x_j}$. Where, z_{ij} is the trade flow between sectors i and j .

The variation in final demand corresponds to the public investment made by the Government of Sergipe for the June Festivals in 2023 to attract tourists, as well as tourist expenditure itself during this period.

The state invested a total of R\$ 22,047,431, distributed as follows according to the Portal da Transparência de Sergipe (2023): i) communication and advertising (R\$ 3,500,000); ii) assembly and physical structure of the event (R\$ 4,111,700); iii) additional payments to public employees involved in organizing the event (R\$ 3,711,841); iv) hiring local performers (R\$ 3,033,890); and v) hiring performers from outside the state of Sergipe (R\$ 7,630,000). These amounts were allocated to the corresponding sectors listed in the IO matrix: television, radio, cinema, and sound and image recording/editing activities, construction, public administration, and artistic, creative, and entertainment activities. We assume that Item v is final demand consumption from Sergipe realized in the rest of Brazil.

The França Instituto de Pesquisa, Inteligência e Opinião (2023) interviewed 1,750 attendees of the cultural event “Arraiá do Povo” held in the capital of Sergipe, Aracaju, between June 22 and July 14, 2023³. They found that 61.5% of the attendees were from Aracaju, 22.2% were from other states/tourists, and 16.3% were from the state’s interior. Santos (2023)⁴ identified similar figures: 22.7% from other states/tourists, 12.2% from the state’s interior, and 65.1% from the capital.

According to the Government of Sergipe (Imprensa 24h, 2023), attendees’ expenditures during the June Festivals of 2023 totaled R\$ 67.2 million. Based on the two surveys previously referenced, an average of 22.5% of these attendees are domestic tourists. We then assume that 22.5% of total tourist expenditure is attributed to domestic tourists. This ratio is a reasonable baseline for tourist expenditure since evidence suggests that, in general, expenditure on tourism activities by domestic tourists from other states far exceeds that of residents in Sergipe (FIPE, 2012). Consequently, we estimate tourist expenditures at R\$ 15.2 million. In the absence of more detailed information, we assume that these tourism expenditures follow the sectoral distribution of tourism employment, as presented in Table 1.

Hence, the analysis considers the public investment for the festivities’ organization and R\$ 15.2 million in tourist expenditures. We are therefore assuming that the spending pattern is the same among tourists. This assumption is not restrictive, since international tourism is almost non-existent in the state.

As these surveys did not identify the destination of tourist spending, we adopt the strategy proposed by Ribeiro et al. (2017; 2023b), which uses the employment share in each Tourism Characteristic Activity (ACT) to disaggregate sectorally the destination of tourist spending in Sergipe during the June Festivals of 2023. Table 1 presents this share and its correspondence in the IO matrix.

³ “Arraiá do Povo” was the main cultural event during the June Festivals of 2023 in Sergipe.

⁴ A total of 435 attendees of the "Arraiá do Povo" were interviewed between June 15 and July 1, 2023.

Table 1. Tourism Employment Share in each ACT in Sergipe.

ACT	Sectors	%
Accommodation	Accommodation	19
Food services	Food services	54
Road Transportation	Road Transportation	14
Water Transportation	Water Transportation	0
Air Transportation	Air Transportation	1
Transport Rent	Non-real estate rentals and intellectual property asset management	5
Travel Agencies	Other administrative activities and complementary services	4
Culture and Leisure	Artistic, creative, and entertainment activities	3
Total		100

Source: IPEA Employment Extractor. Base-Year 2013.

The allocation of tourist expenditure based on employment shares may introduce biases if sectoral productivity differs substantially. However, given the service-oriented structure of Sergipe's tourism economy and the dominance of labor-intensive sectors such as food services, we expect the qualitative magnitude and ranking of impacts to remain stable.

We consider the closed IO model⁵, meaning that household consumption is endogenized in the model, aiming to measure the induced effect by households.

3. Database

The IO matrix used was estimated by Oliveira (2020) based on records of electronic invoices from the Brazilian Federal Revenue Service, which allowed for a more accurate estimation of purchase and sale transactions between regions. Although this type of data is crucial for increasing the accuracy and reliability of inter-regional models, it is not always accessible, which limits the ability to update the models. This matrix, for the base year 2013, was built for the 27 Brazilian states and 68 sectors. The system was aggregated into two regions: Sergipe and the rest of Brazil. Ribeiro *et al.* (2023b) present the main advantages of this matrix.

As previously discussed, we also used data from the Sergipe Transparency Portal (2023) to identify public expenditures allocated to the festival; primary survey information from the França Instituto de Pesquisa, Inteligência e Opinião (2023) and Santos (2023) to determine the number of tourists; data from the Government of Sergipe (Imprensa 24h, 2023) on total spending during the festival; and employment data from IPEA to disaggregate tourist spending by ACT.

4. Findings

Tables 2 and 3 present the economic impacts on output, GDP, and employment, considering tourist spending and the public investment for hosting the June Festivals of 2023 in Sergipe. Since we use an inter-regional model, the impacts are projected for Sergipe (SE), the rest of Brazil (RB, spillover effects), and Brazil.

⁵ Appendix 1 provides a detailed description of the model closure.

Table 2. Macroeconomic impacts of the June Festivals

Region	Output (in R\$ millions)	GDP (in R\$ millions)	Employment
SE	66	39	1,361
RB	53	23	667
Brazil	118	62	2,028

Source: Author's own.

Public investment in the June Festivals, plus the tourist spending during the celebrations throughout the state would be responsible for a 0.12% growth in the state's GDP compared to the baseline scenario. This means that for every R\$ 1 invested in the June Festivals (public investment and tourist expenditures), R\$ 1.75 would be generated for Sergipe's output. This would represent an impact of R\$ 118 million nationwide, R\$ 66 million retained in Sergipe, and R\$ 53 million spilling over to other states. By way of comparison, Ribeiro *et al.* (2024) estimated an interregional input-output system for the tourist regions of Sergipe for the year 2015, finding an average regional output multiplier of 1.65.

The expansion of the workforce would represent the generation of 2,028 direct, indirect, and induced jobs in the Brazilian economy, with 667 jobs generated in the rest of Brazil, demonstrating that one-third of generated jobs occur outside the host state, a clear sign of productive fragmentation and low self-sufficiency. On the other hand, these benefits beyond Sergipe's borders could stimulate a federal co-funding of regional festivals with demonstrable national impact. Ribeiro *et al.* (2013) estimated the impact of the National Tourism Development Program (PRODETUR) in Sergipe. According to these authors, the program increased the state's GDP by 0.75% and generated 3,212 direct and indirect jobs.

Table 3 further shows that direct effects are relatively modest (R\$7 million and 125 jobs), while indirect supply-chain linkages account for nearly half the output impact (R\$33 million) and 678 jobs. Induced household consumption then contributes R\$26 million and 558 jobs, underscoring the critical role of both upstream production effects and downstream spending feedback loops.

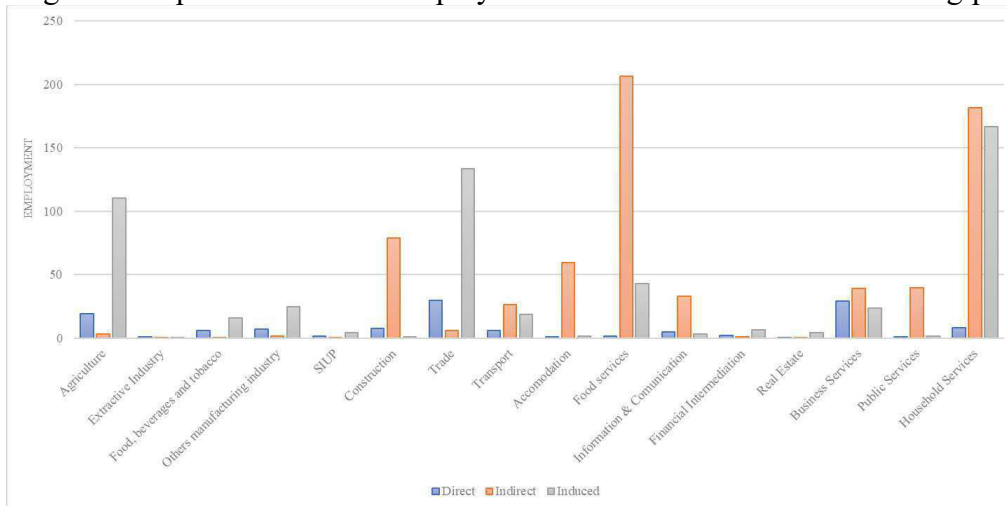
Table 3. Disaggregated impacts of June Festivals in Sergipe

Region	Output (in R\$ millions)	GDP (in R\$ millions)	Employment
Direct	7	4	125
Indirect	33	18	678
Induced	26	16	558
Total	66	38	1,361

Source: Author's own.

Figures 1 and 2 present the sectoral impacts on GDP and employment. For better visualization, the impacts were aggregated into 16 sectors. Figure 1 reveals that Household services lead employment gains in Sergipe (356 jobs), reflecting increased local demand for domestic services, followed by Food services (251 jobs), driven by tourists' dining preferences, which absorb 54% of total tourism spending, and Trade (169 jobs), where visitor retail purchases ripple through local supply networks.

Figure 1. Impacts on sectoral employment from the June Festivals in Sergipe.

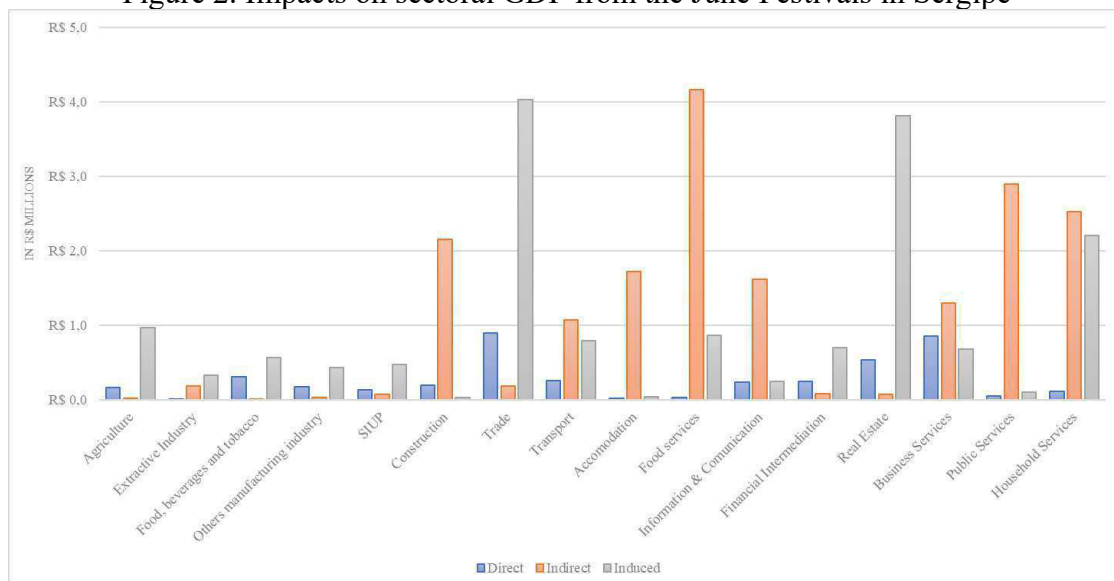


Source: Author's own.

As expected, the impacts on the sectoral GDP of Sergipe (Figure 2) are similar to those portrayed in Figure 1 due to the economic correlation between these two variables. Trade and Food services each contribute R\$ 5.1 million, indicating strong direct and indirect economic contributions, while Household services add R\$ 4.8 million, highlighting the potency of induced effects in a service-oriented economy. The close alignment between employment and GDP impacts across these key sectors underscores the tight coupling of consumption and production in Sergipe's event-driven growth.

The results overall highlight the Food services sector, which absorbed 54% of tourist spending in Sergipe, which may explain this outcome. Similar findings were also reported by Ribeiro et al. (2017; 2023). Unlike our findings, which show that indirect and induced impacts are generally greater than direct impacts (Figures 1 and 2), Tohmo (2005), using an IO model, found that direct impacts on the hotel and food, real estate, and food sectors were greater at the Kaustinen Folk Music Festival. While Tohmo (2005) finds relatively stronger direct effects in a small local festival, our results indicate a predominance of indirect and induced effects, which is consistent with recent international evidence highlighting the role of supply-chain linkages and visitor-attributable expenditures in event impact assessments (Kang *et al.*, 2024).

Figure 2. Impacts on sectoral GDP from the June Festivals in Sergipe



Source: Author's own.

The predominance of indirect and induced effects in Sergipe can also be understood considering the state's underlying economic structure. The limited diversification of the regional production system and its strong dependence on inputs sourced from other states amplify intersectoral linkages and, consequently, the magnitude of indirect effects. Moreover, the relatively large scale of the June Festivals compared with the size of Sergipe's economy increases the demand for goods and services that cannot be fully supplied locally, generating additional import leakages to the rest of Brazil. Taken together, these factors help explain why, unlike the case examined by Tohmo (2005), a smaller festival embedded in a more self-sufficient local economy, our results point to a stronger predominance of indirect and induced impacts.

An important feature of this study is the explicit incorporation of gross mixed income into the interregional IO model to account for informal and self-employed labor, a critical step given Sergipe's labor market structure, as previously mentioned. The state, like much of Brazil's Northeast, exhibits high levels of labor informality, particularly in tourism-related sectors such as food services, household services, and creative industries (Ribeiro *et al.*, 2023a). By including mixed income alongside formal wages, the model captures the income received by self-employed workers and unregistered microentrepreneurs who are often overlooked in standard formal-sector impact assessments.

This methodological decision is particularly relevant for estimating induced effects, i.e., the additional output and jobs generated by household consumption. In Sergipe's case, 558 of the total 1,361 jobs created are induced, underscoring the importance of accurately representing household-level income redistribution mechanisms.

Excluding mixed income from the model would have significantly underestimated these effects, thereby misrepresenting the true employment-generating potential of the festivities in a region where informal livelihoods dominate. These findings reinforce the need for tailored economic impact methodologies in developing regions where informality tends to be high, and where inclusive growth through cultural tourism represents a rare and promising policy lever.

5. Conclusions and policy implications

Our findings can assist in the formulation and implementation of public policies in Sergipe by enabling the identification of spillovers and their multiplier effects on output and employment resulting from the June Festivals. This study, therefore, contributes to evaluating the impacts of cultural events in host destinations, highlighting the importance of measuring and understanding the benefits of such events, which are on the rise in the country.

The state government should maintain or increase investment in events like those in June, which have proven to have positive impacts on GDP, production, and employment. Investing in sectors such as culture, construction, and communication not only boosts the economy but also enhances local culture. Tourism companies and event organizers need to strengthen partnerships with the government to maximize the benefits of these investments, improving infrastructure and services, which benefit both tourists and the local community.

The main limitations of this study are as follows: i) limited scope, as the analysis focuses exclusively on the June 2023 Festivals; ii) data constraints, particularly the time lag associated with the 2013 IOM; iii) disregard of non-economic impacts, such as cultural and environmental ones. In other words, our results represent short-run, partial-equilibrium effects under strong assumptions about tourist spending.

Efforts to conduct annual surveys of tourist demand should be ongoing. Furthermore, new studies focused on more detailed data on tourist spending patterns, potential variations in spending behavior among different tourist segments, such as domestic vs. international tourists or those with varying income levels, and a more holistic assessment explicitly addressing potential social, cultural, or environmental impacts would provide a more comprehensive

understanding of the overall impact of the festivities and would enhance the accuracy and reliability of the findings. These potential new evidences can assist both in formulating and implementing public policies and in the decision-making process of policymakers.

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