

SPORTS POLICY, FISCAL INCENTIVES, AND SOCIAL OUTCOMES: EVIDENCE FROM THE “SPORTS ICMS” PROGRAM IN MINAS GERAIS, BRAZIL

POLÍTICA ESPORTIVA, INCENTIVOS FISCAIS E RESULTADOS SOCIAIS: EVIDÊNCIAS DO PROGRAMA "ICMS ESPORTIVO" EM MINAS GERAIS, BRASIL

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Abstract

This study examines the impact of the “ICMS Esportivo,” a Brazilian policy that redistributes municipal tax revenue based on sports performance indicators, on social outcomes in municipalities of Minas Gerais. Using panel data from 2002 to 2018, we compare 111 treated municipalities (participating for seven or more years) with 191 non-participants across Education, Health, and Formal Employment indicators. The Synthetic Control Method (SCM) estimates policy effects. Results indicate heterogeneous impacts, with positive effects in Education and modest improvements in Formal Employment in some municipalities, while Health indicators show negative effects. Municipalities with higher Sports Quality Index (SQI) and stronger policy performance tend to present more favorable outcomes overall.

Keywords: Fiscal Policy. Sport-for-Development. Synthetic Control Method. Impact Evaluation. Local Governance. *

Resumo

Este estudo examina o impacto do ICMS Esportivo, uma política brasileira que redistribui receitas tributárias municipais com base em indicadores de desempenho esportivo, sobre resultados sociais nos municípios de Minas Gerais. Utilizando dados em painel de 2002 a 2018, comparam-se 111 municípios tratados (participantes por sete anos ou mais) com 191 municípios não participantes, considerando indicadores de Educação, Saúde e Emprego Formal. O Método de Controle Sintético (SCM) é utilizado para estimar os efeitos da política. Os resultados indicam impactos heterogêneos, com efeitos positivos na Educação e melhorias modestas no Emprego Formal em alguns municípios, enquanto os indicadores de Saúde apresentam efeitos negativos. Municípios com maior Índice de Qualidade do Esporte (SQI) e melhor desempenho na política tendem a apresentar resultados mais favoráveis no geral.

Palavras-chave: Política Fiscal. Desenvolvimento pelo esporte. Controle Sintético. Avaliação de Impacto. Governança Local.

Introduction

Sport policies play an important role in the process of building social capital (Bendrath & Basei, 2019), insofar as their formulation entails the need to address structural shortcomings in the inclusion of marginalized groups (Waardenburg, 2016), as well as groups that are socially excluded from access to sport participation. In this context, sport promotion policies seek to expand access to sport facilities, foster social integration, and contribute to the development of education and health outcomes (Houlihan et al., 2009).

In Brazil, however, the effectiveness of such policies is constrained by economic, social, and administrative disparities among federative entities, which compromise the equitable distribution of public resources (Costa et al., 2015) and exacerbate inequalities in the financing of the sport sector. Sport policy and federal decentralization are closely interconnected issues that play significant roles in public policy design and sport governance (Garcia-Unanue et al., 2021). Nevertheless, sport legislation and policies are not necessarily established by the central government (Matias et al., 2015; Almeida et al., 2019), nor do they display uniformity across subnational entities (Matias et al., 2015).

Among Brazilian subnational entities, this study focuses on municipalities in the state of Minas Gerais, which has the largest number of municipalities in the country, totaling 853. Economic, social, financial, and managerial disparities among municipalities in Minas Gerais directly affect development outcomes, positioning the state as a relevant unit of analysis for examining how decentralized policies operate under conditions of pronounced heterogeneity. Within this context of decentralized autonomy and state-level resource redistribution, the government of Minas Gerais enacted Law No. 18,030 on January 12, 2009, commonly referred to as the Robin Hood Law or Solidarity ICMS (FJP, 2023).

The law regulates the allocation of 25% of the Value-Added Tax on Goods and Services (ICMS) according to 18 predefined criteria. Initially, ICMS distribution was based on a tripartite structure comprising fiscal value added (VAF), mining municipalities, and financial compensation for district secession (FJP, 2023). This distribution model concentrated resources in economically more developed municipalities, which prompted the adoption of fiscal equalization mechanisms to promote statewide socioeconomic development with greater equity among municipalities.

Among the criteria established by Law No. 18,030 of 2009 is the Sport criterion. This criterion was regulated by Decree No. 45,393 of June 9, 2010 and corresponds to 0.1% of the total 25% allocation (Minas Gerais, 2023). The policy operates as a fiscal incentive mechanism, evaluating municipalities based on sport performance indicators such as the quantity and quality of events held, the number of registered athletes, available infrastructure, and the implementation of social sport projects. In addition, municipalities are required to maintain a fully functioning Community Sport Council (Diniz & Silva, 2016; Reis et al., 2022).

The ICMS Sport policy seeks to counter inequalities in access to sport by promoting the development of social and sport projects and encouraging broader participation (FJP, 2023). Silva et al. (2013) argue that the policy has become an important instrument for fostering sport participation in Minas Gerais, as it directly influences municipal administrative practices and strengthens interactions among local sport actors and municipal governance structures.

Although the ICMS Sport policy rewards municipalities with better sport-related performance, several studies have warned of risks to its effectiveness. Miranda et al. (2014) and Reis et al. (2022) suggest that the policy may face limitations if funding levels are not increased or if mechanisms are not developed to better target municipalities with greater needs. This concern is largely associated with the growing number of participating municipalities, which has led to a dilution of transferred resources and, consequently, reduced policy impacts. Diniz and Silva (2016) further note that while the policy facilitates access to transfers for smaller municipalities, these local governments often face greater

challenges in sustaining governance structures capable of meeting the policy’s established criteria.

Despite the growing body of literature on public sport expenditure and the implementation of sport policies at the local level, empirical evidence on the social impacts of decentralized fiscal incentive mechanisms in sport remains limited. Existing studies have primarily focused on budgetary patterns, institutional arrangements, or governance challenges (Costa et al., 2015; Garcia-Unanue et al., 2021), while fewer analyses have examined whether such policies effectively translate into broader social outcomes. In a highly decentralized federative context such as Brazil, systematic assessments of how sport-related fiscal incentives affect municipal-level social indicators are still scarce.

This article seeks to address this gap by providing an empirical assessment of the ICMS Sport policy in the state of Minas Gerais. By examining the relationship between sport-related fiscal incentives and selected social indicators, the study contributes to the literature on sport policy and public governance by advancing evidence on the social returns of sport-oriented fiscal policies at the local level. The findings offer insights into how decentralized sport financing mechanisms operate in practice and under what conditions they may contribute to social development in subnational contexts.

Based on these premises, this study aims to analyze the impact of the ICMS Sport policy on social indicators in municipalities in Minas Gerais and their interrelationships with sport-related indicators. To support this analysis, a Sport Quality Index was developed. In addition to this introduction, the article is structured as follows: a Literature Review addressing governance aspects in public policies and fiscal incentive policies in sport; the Methodology; Results and Discussion; and Final Considerations.

Theoretical Framework

This section reviews the literature on the institutional arrangements of sport public policies and the role of sport as a driver of social development. First, it discusses the governance structures, financing patterns, and decentralization dynamics that shape municipal sport policies. Next, it examines the social impacts associated with sport participation and the mechanisms through which sport policies may influence social outcomes, providing the basis for the hypotheses tested in this study.

Arrangements in Sport Public Policies

Studies indicate that although municipalities are the primary financiers of sport and leisure policies, the distribution of resources varies substantially. This variation is further intensified by the absence of a more robust regulatory framework for sport policies and by discretionary practices in the allocation of investments (Alves & Araujo, 2024; Carneiro et al., 2021; Hoffbauer et al., 2022; Litvin & Arkalov, 2021).

Souza et al. (2023) analyzed the distribution of scholarships for high-performance athletes across Brazilian municipalities categorized by population size. The authors identified a concentration of resources in municipalities with larger populations and higher fiscal capacity, as well as a greater migration of athletes from smaller municipalities to major urban centers.

Complementarily, Alves and Araujo (2024) demonstrate that municipalities experiencing increases in fiscal revenue also tend to increase their expenditures on sport and leisure activities. However, the authors suggest that these municipalities prioritize administrative and personnel expenses at the expense of investments in infrastructure and essential services. Regarding the relationship between local and central governments, Alves and Araujo (2024) further argue that although decentralization is intended to strengthen local governments, in practice it may lead to fiscal inefficiencies and increased dependence on federal transfers.

Schut and Collinet (2016), in their analysis of the decentralization of sport policies in France, argue that local authorities tend to prioritize elite sport, whereas the national government focuses on education

and social integration. As a result, the lack of coordination among different levels of government and sport federations leads to inefficiencies and resource waste. Complementarily, Ferguson et al. (2023) emphasize that the effectiveness of decentralized sports policies depends on the transition of outcomes from the micro level (local projects) to the macro level (population indicators), just as the modernization of the public sector requires results-based management models (Outcomes-Based Accountability), which demands from subnational entities not only financial resources but also strong organizational capacity.

The authors further emphasize that governance and administrative structure are essential mediators between fiscal incentives and social returns, indicating that organizations with greater network capital and bureaucratic capacity are able to maximize the impact of sport-for-development policies (Ferguson et al., 2023). Therefore, the success of a redistributive fiscal policy such as the Sports ICMS depends on municipalities' ability to convert financial transfers into sustainable governance structures capable of aligning local practices with governmental strategic guidelines.

With respect to the impact of municipal sport expenditures and sport policy programs on individual sport participation in the Netherlands, Hoekman et al. (2017) assert that municipal sport subsidies positively affect youth participation in sport clubs. Moreover, these subsidies help reduce inequalities in access to sport among young people from different socioeconomic backgrounds. These findings resonate with the results of Santos and Carvalho (2019), who show that in Brazil, despite the absence of comprehensive federal regulation, municipalities have become the main financiers of sport and leisure policies. This evidence suggests that decentralized, locally driven policy initiatives may be more effective than top-down approaches implemented by the central government.

Sport as a social driver

Mendes and Codato (2015) argue that the administrative arrangements associated with Brazilian sport policy give rise to four structural problems in public management: (1) deficiencies in organizational structure, human resources, and social participation mechanisms; (2) disconnection among institutions; (3) inadequate planning for policy implementation; and (4) the lack of evaluation and continuity in sport public policies. Therefore, analyzing the effects of public policies aimed at promoting sport participation is essential for understanding how institutional arrangements are shaped and how they may be improved to foster sport development.

Additionally, social participation through management councils functions as a mechanism that encourages the organization and implementation of sport public policies (Mello et al., 2020; Ungheri & Isayama, 2020, 2022). Ungheri and Isayama (2020), in their study of sport and leisure policies in Brazilian cities, report that although approximately half of the municipalities analyzed did not have municipal sport and leisure councils, more than 60% implemented such councils due to the mandatory nature of the policy, following guidelines similar to those established by the ICMS Sport policy.

Toh and Jamieson (2000) employed factor analysis to identify key competencies of sport managers. Their findings indicate that managerial competencies are associated with the development of governance principles, control over sport-related budgets, financial risk management, the presence of sport foundations, information technology skills, and communication abilities. These competencies are intrinsically related to the objectives of the ICMS Sport policy and to the professional demands placed on municipal sport managers (Santos, 2019).

In this context, it is important to highlight that individuals who benefit from sport-related initiatives report positive effects on their sense of control, competence, and self-efficacy. Beyond providing leisure and recreation, such initiatives promote positive social interactions, improve self-concept, and enhance self-esteem (Bourdieu, 1983; Silveira, 2013). Furthermore, individuals engaged in sport activities tend to exhibit improvements in academic performance, confidence, emotional stability,

positive affect, and physiological outcomes (Melo et al., 2022; Milistetd et al., 2021).

Regarding its social dimension, sport has long been recognized as a powerful tool for addressing social vulnerability. Due to its subjective social impact, sport encompasses multiple dimensions. Bourdieu (1983), Silveira (2013), and Vieira (2010) emphasize its role in social integration, human development, and health promotion, including self-esteem, confidence, physical-motor development, and cognitive and psychological aspects. In addition, sport contributes to peacebuilding, social and economic development, and the formation of community leaders and managers, which are crucial elements for strengthening the national sport industry and its productive chain.

Thus, the first hypothesis of this study emerges from the impacts generated by the promotion of sport participation through the ICMS Sport policy:

H1: Municipal participation in the ICMS Sport policy leads to improvements in social indicators when compared to non-participating municipalities.

Beyond supporting discussions on sport policies, testing this hypothesis contributes to the consolidation of such policies and reinforces sport and leisure as social rights and as responsibilities of the State. Moreover, because the ICMS Sport policy is closely associated with principles and mechanisms of public governance, the assessment of the first hypothesis also serves to validate the linkage between sport policies and good governance practices.

The second hypothesis is grounded in the premise that the impacts of public policies are often mediated by institutional capacity and the availability of local resources. In the case of the ICMS Sport policy, municipalities that already display higher levels of sport quality and greater scores in sport activities recognized by the policy tend to be better positioned to implement and benefit from the incentives offered. As a result, these municipalities are more likely to maximize the policy's effects on social indicators (Alves & Araujo, 2024; Diniz & Silva, 2016).

This reasoning is consistent with the literature indicating that performance-based or infrastructure-dependent policies generate stronger effects in contexts characterized by higher managerial capacity and adequate local resources (Gomide & Pires, 2014; Pires & Gomide, 2021). Accordingly, it is expected that the impact of the ICMS Sport policy will be greater in municipalities with higher sport quality indices and higher scores in sport activities validated by the policy.

H2: The impact of the ICMS Sport policy is greater in municipalities with higher sport quality indices and higher scores in sport activities validated by the ICMS Sport policy.

Well-structured public policies aimed at sport and leisure are therefore an important component in the process of valuing sport, particularly because they reinforce actions already established in legislation and contribute to the effective recognition of sport as a citizen's right and a governmental responsibility (Saldanha-Filho, 2003).

Methods

This quantitative, explanatory, and descriptive study seeks to analyze the impact of the ICMS Sport policy, implemented in 2009 in the state of Minas Gerais, on municipalities classified into treated and control groups. The analysis is based on indicators related to Education, Health, and Employment. Of the 853 municipalities in Minas Gerais, 111 were assigned to the treatment group due to their participation in the policy for seven years or more, a criterion adopted to mitigate potential bias arising from unobservable characteristics. In contrast, the control group consisted of municipalities that never participated in the policy, totaling 191 cases. Municipalities that participated in the policy for one to six years were excluded from the analysis, as they did not exhibit statistically consistent impacts between the treated units and their synthetic counterparts, as evidenced by pre-policy data tests that revealed

significant discrepancies in pre-intervention fit.

Data Collection

Secondary data were collected from the João Pinheiro Foundation through the Minas Gerais Social Responsibility Index (IMRS, 2019). All variables were organized to cover the years 2002, 2004, 2006, and 2008, corresponding to the pre-policy period, and 2010, 2012, 2014, 2016, and 2018, corresponding to the post-policy period. Although the policy remained in effect after 2019, the COVID-19 pandemic substantially affected both the promotion of sport activities and the availability and consistency of municipal-level data, which justified limiting the analysis to the period prior to the pandemic.

The indicators were selected based on data availability for the specified years and on guidance from the sport policy literature. The dependent variables include the IMRS Health Index, the IMRS Education Index, and the Employment Rate, while the key explanatory variable is per capita expenditure on sport and leisure. These variables are not only associated with socioeconomic indicators used to assess municipal performance, but have also been identified in the literature as relevant for understanding sport management and policy outcomes (Freitas et al., 2022). Accordingly, the evaluation of the impact of the ICMS Sport policy on municipal social indicators is empirically justified, as summarized in Table 1.

Table 1. Characterization of Dimensions and Variables

Variable	Index Construction Variables	Database	Authors
IMRS Health	Mortality rate from chronic non-communicable diseases, Pentavalent vaccine coverage in children under 1 year old, Proportion of live births whose mothers had 7 or more prenatal visits, Proportion of deaths from ill-defined causes, Proportion of hospitalizations for conditions sensitive to primary care (Ordinance No. 221 of April 17, 2008), Proportion of medium-complexity hospitalizations of SUS patients referred to another microregion.	IMRS (FJP, 2024)	Hoekman et al. (2019); Milistetd et al. (2021); Zhang (2021).
IMRS Education	Education Quality Index, Age-Grade Distortion Rate in the Final Years of Elementary School, Age-Grade Distortion Rate in High School, Percentage of Teachers with Training Classified as Group 1 in Early Childhood Education, Percentage of Teachers with Training Classified as Group 1 in the Initial Years of Elementary School, Percentage of Teachers with Training Classified as Group 1 in the Final Years of Elementary School, Percentage of Teachers with Training Classified as Group 1 in High School, Basic Education Enrollment Rate.	IMRS (FJP, 2024)	Melo et al. (2022); Machado et al. (2007)
Employment rate	Number of employees in the formal sector	IMRS (FJP, 2024)	Hoekman et al. (2019); Silveira (2013); Bradbury et al. (2023)
Sport	Per capita spending on sports and leisure; Score of sports activities validated by the Sports ICMS policy.	IMRS (FJP, 2024)	Toh e Jamieson (2000); Yong (2021); Hoekman et al. (2019)

Source: Research data.

The dimensions presented above were defined with the objective of evaluating the impact of the ICMS Sport policy on selected social outcome variables and their effects on municipalities in the state of Minas Gerais.

Alongside the dependent outcome variables, and in order to address the proposed research objectives, two explanatory variables were selected: the Sport Quality Index (SQI) and the scores assigned to municipalities participating in the ICMS Sport policy for the period from 2010 to 2018.

Construction of the Sport Quality Index

The construction of the index was based on Exploratory Factor Analysis (EFA). Factor analysis was employed not only to aggregate the selected variables but also to construct the index using the eigenvalues and factor loadings derived from the extracted factors. This method facilitates the identification of latent structures by revealing correlations among variables and enables the ranking of municipalities according to their engagement in sport-related activities.

By uncovering underlying dimensions of sport-related actions, the index provides a more comprehensive assessment of municipal sport quality, thereby supporting more informed, effective, and targeted decision-making processes. In this sense, the index contributes to the optimization of limited public resources by helping to prioritize areas with greater potential social impact.

After the extraction and identification of factors and the calculation of the respective factor scores, an additional transformation step was required to ensure that all factor score values (F_{ji}) were greater than or equal to zero. Following Lemos (2001), the scores were shifted to the first quadrant using the following algebraic expression:

$$F_{ji} = \frac{F - F_{min}}{F_{max} - F_{min}} \quad (1)$$

where F_{ji} represents the j -th factor score, and F_{min} e F_{max} denote the minimum and maximum factor loadings observed among municipalities in the state of Minas Gerais, respectively.

All variables included in the dimensions presented in Table 2 are grounded in the existing literature. Accordingly, for the construction of the index, the explanatory variables were initially grouped into factors. After this step, the factor scores were transformed using Equation (1) and subsequently aggregated according to Equation (2).

$$INDICE_i = \sum_{j=1}^p \frac{y_j}{\sum y_j} \cdot F_{ji}^* \quad (2)$$

where $INDICE_i$ denotes the Sport Quality Index of the i -th municipality; y_j represents the j -th eigenvalue; p corresponds to the number of factors extracted in the analysis; F_{ji}^* is the j -th factor score of the i -th municipality; and $\sum y_j$ denotes the sum of the eigenvalues associated with the p extracted factors. The relative contribution of factor j to the explanation of the total variance captured by the p factors is given by the ratio $\frac{y_j}{\sum y_j}$.

The construction of the Sport Quality Index (SQI) supports discussions on areas requiring improvement by guiding public policies and investments toward a more efficient promotion of sport development. The SQI was constructed using a dataset from the Brazilian Institute of Geography and Statistics (IBGE) in conjunction with data from the IMRS for the year 2016, as this year provides more robust explanatory variables for assessing municipal sport quality. Data availability for these variables is limited to the years 2016 and 2021; however, the year 2021 was excluded from the sample because it corresponds to the post-pandemic period and could introduce bias into the analysis.

Accordingly, based on the variables presented in the table below, a cross-sectional index of sport quality for municipalities in the state of Minas Gerais was constructed for the year 2016.

Table 2. Variables used to construct the Sports Quality Index

Index	Variables	Database	Authors
SQI	var1 – Manager’s level of education; var2 – Summed scale: Sport-related legal	IBGE	Dong, Yu

	framework (Type 1);Municipal Organic Law addresses sport;Establishment of a Municipal Sport System (legal instrument);Existence of sport-specific legislation; var3 – Summed scale: Sport-related legislation (Type 2);Regulation of tax incentives and fiscal exemptions for sport;Regulation of athlete scholarship programs;Regulation of agreements and/or partnerships;Regulation of subsidies granted to sport;Regulation of sport projects;Other regulations; var4 – Existence of a Municipal Sport Council; var5 – Summed scale: Type of Municipal Sport Council;Advisory council;Deliberative council;Normative council;Oversight council; var6 – Existence of a Municipal Sport Fund; var7 – Summed scale: Agreements and partnerships;Acted as the main executor of agreements in the last 24 months;Participated in agreements in the last 24 months;Existence of partnerships; var8 – Summed scale: School sport actions and projects;Curricular school sport;Extracurricular school sport;University sport;Sponsorship or maintenance of school teams;Human resource training;Construction, expansion, or maintenance of school sport facilities and equipment;Programs for persons with disabilities;School sport competitions;Other initiatives; var9 – Summed scale: Performance sport actions and projects;Grassroots sport;Sponsorship or maintenance of municipal sport teams;Programs for older adults;Programs for persons with disabilities;Human resource training;Construction, expansion, or maintenance of sport facilities and equipment;Talent identification and development;Sport competitions;Other initiatives; var10 – Summed scale: Leisure sport actions and projects;Programs for children;Programs for youth and adults;Programs for older adults;Programs for women;Programs for persons with disabilities;Programs for low-income communities;Programs for traditional communities and peoples;Construction, expansion, or maintenance of recreational and leisure facilities and equipment;Human resource training;Other initiatives; var11 – Summed scale: Social inclusion sport actions and projects;Federal government initiatives;State government initiatives;Initiatives in partnership with other municipalities;Initiatives exclusively led by the municipal government;System S initiatives;Private sector initiatives;Programs for children;Programs for youth and adults;Programs for older adults;Programs for women;Programs for persons with disabilities;Programs for low-income communities;Programs for traditional communities and peoples;Construction, expansion, or maintenance of recreational and leisure facilities and equipment;Human resource training;Other initiatives; var12 – Summed scale: School sport events;Regular events;Non-regular events;Olympic events;Paralympic events;Non-Olympic events; var13 – Summed scale: Performance sport events;Regular events;Non-regular events;Olympic events;Paralympic events;Non-Olympic events		e Dong (2011), Ye et al. (2023), Zhang (2021).
	var12 - Percentage of students in schools with a sports court.	IMRS	

Source: Research data.

The Sport Quality Index (SQI) is intended to complement the Synthetic Control, RMSPE, Dynamic Effects Analysis, and Average Gap Analyses, as it incorporates a broader set of variables related to the sport policy domain. In this sense, the index allows for increased robustness of the findings through a comparative regression analysis, in which the SQI and the ICMS Sport policy score are used as explanatory variables, and the average gaps of treated municipalities serve as the dependent variable.

Synthetic Control Analysis

To estimate the effect of the ICMS Sport policy on social indicators in municipalities in the state of Minas Gerais, the Synthetic Control Method (SCM) was employed, as proposed by Abadie and Gardeazabal (2003). This approach constructs a counterfactual for municipalities that adopted the policy, representing a hypothetical scenario of outcomes had the municipality not participated in the policy.

Accordingly, the SCM generates a synthetic version of the treated municipality by using a weighted combination of other municipalities that did not receive the treatment. This procedure allows for a comparison between post-intervention outcomes and this artificial control unit. In other words, the method creates a synthetic municipality for each treated municipality, constructed as an optimal weighted combination of municipalities from the control group that never participated in the policy, with the aim of replicating the pre-intervention trajectory of the dependent variable (Abadie et al., 2010).

The selection of control municipalities and the assignment of weights are determined by an optimization algorithm that minimizes the distance between the treated municipality and the weighted combination of control units with respect to predictor variables and pre-intervention outcomes (Abadie et al., 2010).

In this study, treated municipalities are defined as those that participated in the ICMS Sport policy for seven years or more during the period of analysis. In contrast, control municipalities are those that never adhered to the policy. The policy was implemented in 2009, and the available time series includes the years 2002, 2004, 2006, and 2008, corresponding to the pre-intervention period, and 2010, 2012, 2014, 2016, and 2018, corresponding to the post-intervention period.

For each treated municipality, a synthetic control was constructed as a weighted combination of municipalities from the control group. The weights assigned to each control unit were chosen to minimize the distance between the treated municipality and its synthetic counterpart during the pre-intervention period, based on the values of the social indicators of interest and the selected predictor variable, the Tax and Economic Development Index (IDTE). The inclusion of this variable is justified by its direct relationship with ICMS tax revenue, which constitutes a central component of both eligibility and resource allocation under the policy analyzed.

Formally, let Y_{1t} denote the observed value of the social indicator for the treated municipality at time t , and let, $\hat{Y}_{1t}^N$ represent the estimated value for this municipality in the absence of the intervention, obtained from the weighted combination of control municipalities. The counterfactual estimate, based on the model proposed by Abadie et al. (2015), is expressed as follows:

$$\hat{Y}_{1t}^N = \sum_{j=2}^{J+1} w_j Y_{jt} \quad \text{para } t \geq T_0 \quad (3)$$

where Y_{jt} represents the value of the social indicator for control municipality j at time t ; w_j denotes the weight associated with municipality j in the construction of the synthetic control; and T_0 corresponds to the year in which the policy was implemented (2009). The weights w_j are non-negative and sum to one, ensuring that the synthetic control constitutes a convex combination of the control units.

To deepen the understanding of policy impacts over time, a dynamic treatment effects analysis is conducted. This analysis consists of evaluating the evolution of the causal effect of the ICMS Sport policy for each treated municipality in each year following its implementation.

This approach allows for the identification of gradual changes, delayed effects, or persistent policy impacts, which is particularly relevant for public policies that may not yield immediate results. Based on the construction of the counterfactual, the causal effect of the public policy in each post-intervention period is estimated as the difference between the observed value and the estimated counterfactual value for the treated municipality (Abadie et al., 2015):

$$\tau_t = Y_{1t} - \hat{Y}_{1t}^N \quad (4)$$

This difference, τ_t , represents the estimated effect of the policy on the social indicator at time t for the treated municipality. Accordingly, the Synthetic Control Method allows for inference on the impact of

the ICMS Sport policy on the social indicators IMRS Health, IMRS Education, and the Employment Rate by comparing the treated municipality with its respective synthetic counterpart. Additional analyses were conducted to assess the robustness of the results, including comparisons of pre- and post-intervention root mean squared prediction errors (RMSPE), the application of placebo tests, and the examination of dynamic effects over the periods considered.

Complementary Analyses and Robustness Tests: RMSPE

The root mean squared prediction error (RMSPE) is a key metric for assessing the quality of the model fit during the pre-intervention period. Specifically, it is used to evaluate how well the synthetic municipality replicates the behavior of the treated municipality prior to the implementation of the policy (Abadie, 2021; Abadie et al., 2010).

The RMSPE is calculated as the square root of the mean of the squared differences between the observed values and the values estimated by the synthetic control during the pre-intervention period. A lower pre-treatment RMSPE indicates a better pre-intervention fit and, consequently, greater reliability of the model's estimates of the post-treatment counterfactual.

$$\text{RMSPE} = \sqrt{\left[(1/T_0) \sum^{t(T_0)} (Y_{1t} - \sum_j^{(J+1)} w_j * Y_{jt})^2 \right]} \quad (5)$$

where:

- T_0 represents the number of pre-intervention periods, which in this study correspond to the years 2002, 2004, 2006, and 2008, totaling four periods;
- Y_{1t} denotes the value of the social indicator (IMRS Health, IMRS Education, or the Employment Rate) for the treated municipality at time t ;
- Y_{jt} corresponds to the value of the same indicator for control municipality j at time t ;
- w_j^* is the optimal weight assigned to control municipality j , determined so as to minimize the distance between the treated municipality and the synthetic control during the pre-intervention period;
- J denotes the number of control units available for constructing the synthetic control.

The RMSPE obtained during the pre-intervention period is used to assess how well the synthetic control replicates the behavior of the treated municipality prior to the implementation of the public policy. Lower values indicate a better model fit, which enhances the credibility of the estimated impacts in the post-intervention period (Abadie, 2021; Abadie et al., 2010).

In addition, RMSPE values are also employed in placebo analyses, allowing for comparisons between the prediction error of the treated municipality and the prediction errors of control units that are falsely assigned to treatment. This procedure enables the assessment of the statistical significance of the estimated effects (Abadie et al., 2010, 2015).

To evaluate the relative magnitude of the estimated policy impact and to test the robustness of the results, the RMSPE Ratio was calculated as the ratio between the post-intervention RMSPE and the pre-intervention RMSPE. This procedure is recommended by Abadie et al. (2010, 2015) as a strategy to assess whether the deviation observed after the intervention is substantially larger than the deviation observed prior to the policy, while controlling for the quality of the pre-intervention fit.

This indicator is particularly informative when compared with results from placebo analyses applied to control municipalities. If the RMSPE Ratio for the treated municipality is considerably larger than those obtained for placebo units, this provides stronger evidence that the estimated effect is consistent and not driven by random fluctuations or unrelated trends (Abadie, 2021; Abadie et al., 2015).

The empirical p-value was computed as the proportion of placebo municipalities whose post-to-pre RMSPE ratio is greater than or equal to that of the treated municipality. This measure serves as the basis for assessing the robustness of the estimated effects (Abadie, 2021; Abadie et al., 2015).

Complementary Analyses and Robustness Tests: Average Gap Analysis

Beyond individual analyses, an average gap analysis was conducted by aggregating the differences between treated municipalities and their synthetic counterfactuals. This approach aims to identify the average effect of the ICMS Sport policy across the set of treated municipalities.

Gaps were calculated for each post-intervention year and subsequently aggregated to obtain an average measure of policy impact. This procedure enables comparisons across indicators and over time, contributing to the generalization of the estimated effects and providing quantitative evidence of the average impact of the policy on municipal social indicators (Abadie, 2021).

All synthetic control analyses and robustness tests were performed using the Synth package in the R statistical environment.

Multiple Linear Regression

The Sport Quality Index (SQI) was constructed to complement the analyses of the impact of the ICMS Sport policy. To explore associations between average and accumulated gaps and municipal characteristics, a multiple linear regression model was estimated, as specified below:

$$GAP_i = \alpha + \beta_1 \cdot IQE_i + \beta_2 \cdot ICMS_i + \varepsilon_i \quad (6)$$

where:

- IQE_i denotes the Sport Quality Index for municipality in 2016;
- $ICMS_i$ represents the average score obtained from participation in government sport programs under the ICMS Sport policy between 2010 and 2018;
- GAP_i corresponds to the difference between the treated municipality and its synthetic counterpart.

A positive relationship is expected for both explanatory variables, meaning that the GAP is anticipated to be explained by the Sport Quality Index as well as by the municipality's score in activities validated under the ICMS Sport policy. In addition, standard residual diagnostics were conducted, including the Shapiro–Wilk test for normality, the Breusch–Pagan test for heteroskedasticity, and the Durbin–Watson test for autocorrelation (Wooldridge, 2016).

Results and Discussion

The results obtained from the application of the Synthetic Control Method provide evidence on the impact of the ICMS Sport policy.

Impact of the ICMS Sport policy on social indicators

Given the relatively large number of treated municipalities (111), which is uncommon in Synthetic Control applications, results are reported only for statistically significant cases. Significance was assessed using the Root Mean Squared Prediction Error (RMSPE), calculated for the pre-intervention (2002–2008) and post-intervention (2010–2018) periods (Abadie, 2021). Placebo distributions were generated using non-treated municipalities, and empirical p-values were computed as the proportion of placebo units with an RMSPE ratio equal to or greater than that of each treated municipality.

Municipalities with p-values below 0.1 were classified as statistically significant:

- IMRS Education: Curvelo, Governador Valadares, Guarani, Guidoal, Inimutaba, José Raydan, Leme do Prado, Mar de Espanha, Pirapora, São Tomás de Aquino, Tocantins.
- IMRS Health: Além Paraíba, Campestre, Coluna, Conceição do Rio Verde, Curvelo, Diamantina, Guaxupé, Ipatinga, Ituiutaba, Itutinga, Lagoa da Prata, Passos, Peçanha, Rio Doce,

- Santos Dumont, São João Nepomuceno, Uberaba, Vespasiano.
- Formal Employment Rate: Campestre, Dona Euzébia, Oliveira, Pimenta, Santa Vitória.

Municipalities with p-values between 0.1 and 0.2 were classified as exhibiting trend effects, while values above 0.2 were not distinguishable from the placebo distribution and were excluded from individual graphical analysis.

Figure 1 presents the evolution of average gaps between treated municipalities and their synthetic controls for IMRS Education, IMRS Health, and the Formal Employment Rate from 2002 to 2018. The dashed vertical line marks the implementation of the ICMS Sport policy in 2009.

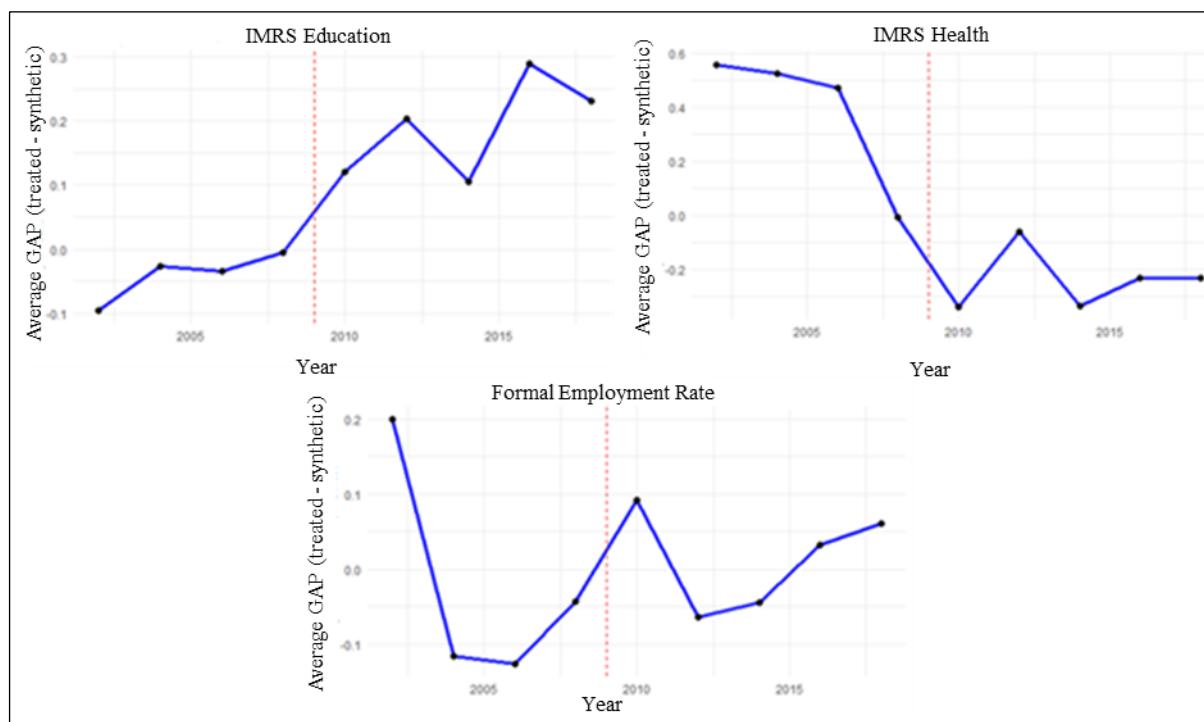


Figure 1. Evolution of average gaps between treated municipalities and their synthetic controls for IMRS Education, IMRS Health, and the Formal Employment Rate

Source: Research data.

When jointly analyzing all municipalities that participated in the ICMS Sport policy for seven years or more (Figure 1), a positive trend is observed for IMRS Education across the three outcome variables. Although already increasing since 2002, the education indicator exhibits a clear shift from a negative gap in 2008 to a positive gap in 2010. The average gap, initially negative (-0.096 in 2002), became positive after 2010 and peaked in 2016 (0.290), suggesting progressive improvements, albeit with some fluctuations, including declines in 2014 and 2018. Importantly, average gaps in the pre-intervention period remained close to zero (ranging from -0.09 to -0.004), indicating a satisfactory pre-treatment fit and supporting the validity of the synthetic control.

For IMRS Health, the pattern differs markedly. Gaps were positive until 2006 (0.560 in 2002) but declined sharply from 2008 onward, becoming negative. The lowest value was observed in 2014 (-0.335), suggesting potential post-crisis adjustments or changes in the efficiency of public health spending. The findings contrast with the classical literature of Bourdieu (1983), Silveira (2013), and Vieira (2010), which regards sport as a fundamental tool for the promotion of health and human development. Conversely, they support the argument of Reis et al. (2022), who found no direct causal relationship between transfers associated with this fiscal incentive and improvements in public health indicators.

In turn, the Formal Employment Rate displayed a more heterogeneous trajectory, alternating between negative gaps (2004–2008) and positive gaps (2002, 2010, and 2016–2018). The modest recovery after 2010 coincides with periods of economic recovery, while intermediate years reflect greater instability.

Overall, the results point to heterogeneous policy effects, with a substantial share of municipalities exhibiting positive average gaps. These findings underscore the importance of indicator-specific analyses. While the policy appears to have contributed positively to education outcomes, effects on health were adverse, and impacts on formal employment were more modest and gradual. For comparison, placebo tests were conducted using municipalities that never participated in the ICMS Sport policy (Figure 2).

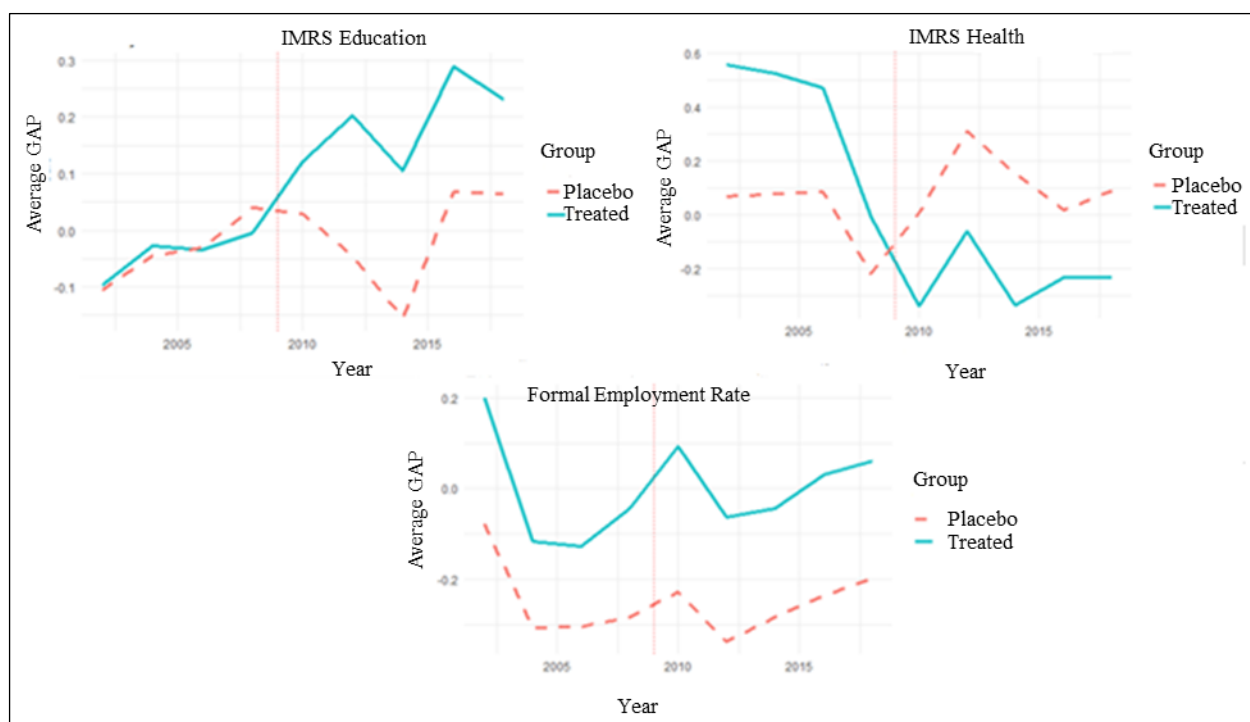


Figure 2. Dynamic Treatment Effects: Treated vs. Placebos

Source: Research data.

The figures illustrate the dynamic evolution of average effects (gaps) between municipalities treated by the ICMS Sport policy and their synthetic counterfactuals, as well as the average gaps of placebo municipalities (in this case, assuming hypothetical participation in the policy), for the IMRS Education, IMRS Health, and Formal Employment Rate indicators over the period from 2002 to 2018.

For IMRS Education, treated and placebo gaps fluctuate similarly and remain close to zero until 2009, indicating a good pre-intervention fit. After 2009, the gaps for treated municipalities increase steadily, while placebo gaps remain stable around zero. Between 2010 and 2018, the average gap for treated municipalities becomes positive, reaching approximately 0.3 in 2016. This pattern suggests a positive, cumulative, and sustained effect of the ICMS Sport policy on educational outcomes.

In contrast, IMRS Health exhibits a different trajectory. Prior to 2009, treated municipalities show positive gaps relative to placebos. Following the intervention, an inflection occurs, with treated gaps turning negative and remaining below those of the placebo group through 2018. This reversal suggests either an adverse or null effect of the policy on health outcomes, or the influence of external factors that affected treated municipalities more strongly than placebos.

For the Formal Employment Rate, treated and placebo gaps are similar and close to zero before 2009. After the intervention, treated municipalities display a gradual improvement, with gaps shifting from

slightly negative to positive values, while placebo gaps remain negative. From 2010 onward, treated gaps follow an upward trend, reaching approximately 0.15 in 2018, indicating a modest but positive relative effect of the policy on formal employment.

Overall, the Synthetic Control analysis reveals heterogeneous policy effects across indicators and municipalities. While some treated units exhibit sustained gains or losses in the post-intervention period, others follow trajectories closer to those of the control group. Although informative, these results should be interpreted with caution, given potential variability in municipal time series and the construction of synthetic controls. To strengthen the reliability of the inferences, complementary robustness analyses are required (Abadie, 2021; Abadie et al., 2015).

Complementary Analyses and Robustness of Results

To assess the quality of the synthetic control fit and further evaluate the effects of the ICMS Sport policy, complementary analyses were conducted using the Root Mean Squared Prediction Error (RMSPE) and comparisons of average gaps between treated municipalities and placebos in the pre- and post-intervention periods (Abadie, 2021; Abadie et al., 2015).

RMSPE measures the average squared difference between observed outcomes and those estimated by the synthetic control for each municipality, with lower values indicating a better fit. Pre-intervention RMSPE (2002–2008) was used to assess how closely the synthetic control replicates the behavior of the treated municipality prior to policy implementation, serving as a criterion for match quality, as illustrated in Figure 3.

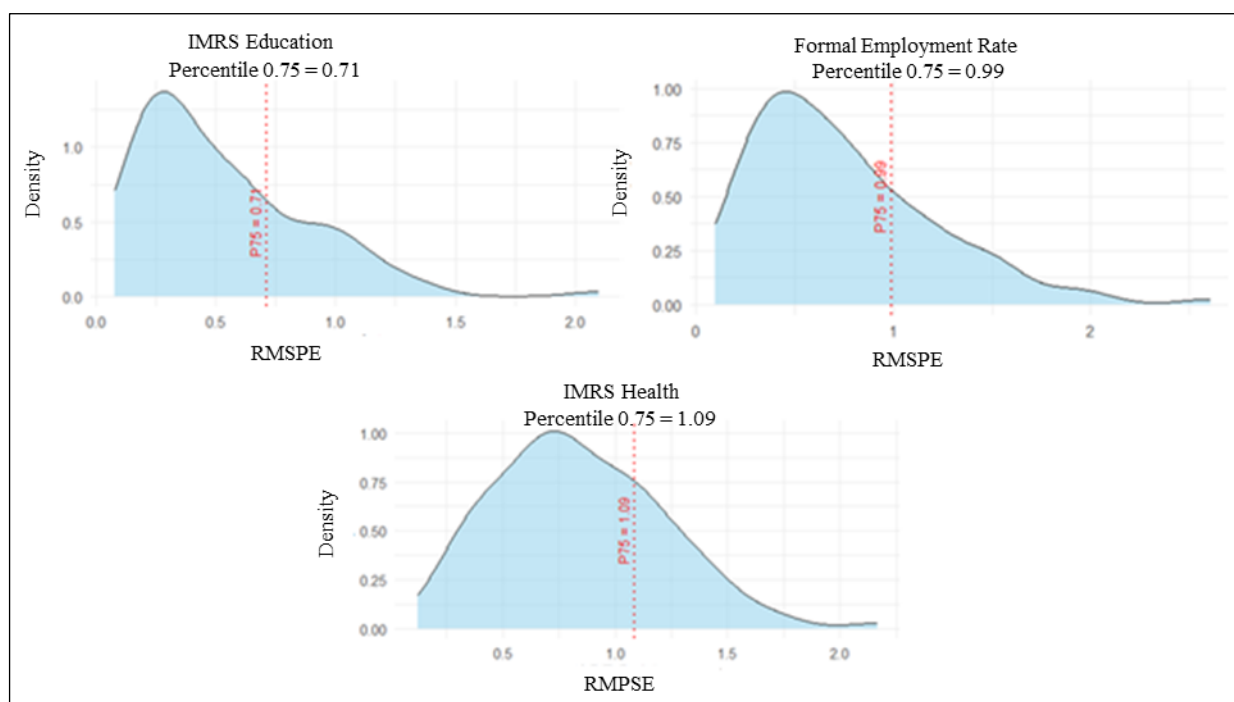


Figure 3. Pre-Intervention RMSPE Distribution of Treated Units

Source: Research data.

For the pre-intervention RMSPE distribution graphs of treated municipalities, values corresponding to the 75th percentile were highlighted. Results show that 75% of treated municipalities had RMSPE below 0.71 for IMRS Education, 0.99 for Formal Employment Rate, and 1.09 for IMRS Health, indicating generally good pre-intervention fit, especially for Education, where error dispersion is lowest.

However, several municipalities exhibited above-average RMSPE, suggesting the need for additional robustness checks, as poor pre-intervention fit can compromise post-intervention effect inferences. To

standardize comparisons across units and account for pre-intervention fit, the RMSPE Ratio was calculated, defined as the post- to pre-intervention RMSPE for each municipality. This metric assesses whether observed post-policy deviations exceed pre-intervention levels (Abadie, 2021).

To evaluate significance, a placebo approach was applied, comparing treated municipalities’ RMSPE Ratios to the distribution of non-treated municipalities (placebos), as shown in Figure 4.

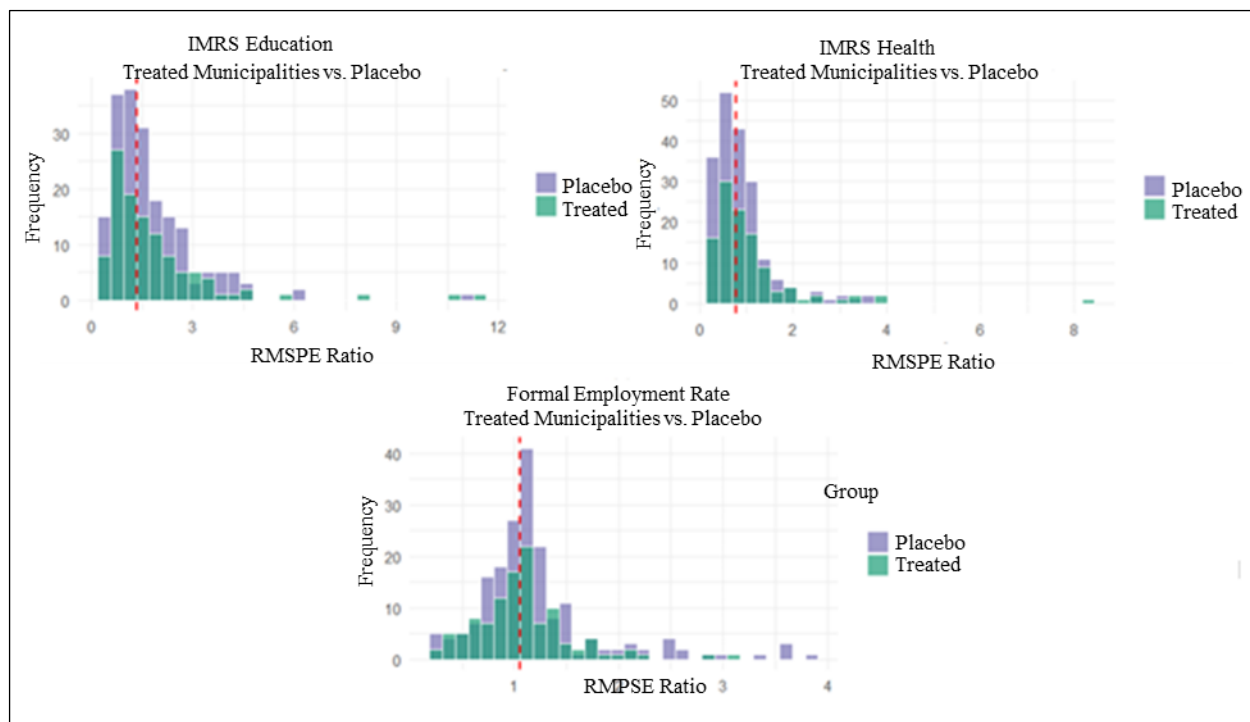


Figure 4. Distribution of RMSPE Ratios

Source: Research data.

The red dashed line represents the median RMSPE Ratios of treated municipalities. For IMRS Education and IMRS Health, most RMSPE Ratios remain low for both treated and placebo groups, though some treated observations exhibit higher ratios, suggesting relevant effects in these cases. Nevertheless, several treated municipalities show considerably elevated values, similar to the pre-intervention analysis, falling in the upper tails of the distribution. These cases indicate substantial discrepancies between observed outcomes and the counterfactual post-intervention, potentially reflecting the effects of the ICMS Esportivo.

For the Formal Employment Rate, the distribution of treated municipalities closely overlaps that of the placebos, with the median near 1, indicating limited systematic impact of the policy on this indicator. Overall, results suggest that while the policy has limited effects for most municipalities, specific cases show consistent evidence of changes in Education and Health indicators post-intervention, as reflected by the statistical significance estimated via the proportion of placebos with ratios equal to or exceeding those observed for each treated municipality, as shown in Table 3.

Table 3 - Synthetic Control Analysis of Social Indicators in significant Municipalities

Indicador Social	Município com p-valor < 0.1	RMSPE Ratio	Gap Médio	RMSPE (pré)
IMRS Education	Curvelo	8.17	0.497	0.092
	Governador Valadares	3.77	0.674	0.206
	Guarani	5.89	-0.571	0.105
	Guidoval	4.27	0.057	0.155
	Inimutaba	3.35	-0.490	0.245
	José Raydan	3.35	-0.399	0.159
	Leme do Prado	10.8	0.823	0.078
	Mar de Espanha	4.76	0.210	0.121
	Pirapora	11.34	0.933	0.087
	São Tomás de Aquino	3.37	0.957	0.293
	Tocantins	4.68	-0.091	0.091
IMRS Health	Além Paraíba	2.01	-1.40	0.725
	Campestre	2.05	-0.881	0.468
	Coluna	8.17	-0.844	0.123
	Conceição do Rio Verde	2.37	-0.699	0.308
	Curvelo	3.95	-1.14	0.315
	Diamantina	1.57	-1.18	0.783
	Guaxupé	1.89	-0.420	0.344
	Ipatinga	2.06	-0.589	0.426
	Ituiutaba	3.96	-0.963	0.256
	Itutinga	1.52	0.534	0.472
	Lagoa da Prata	1.56	0.032	0.183
	Passos	1.54	-0.624	0.549
	Peçanha	3.19	-0.713	0.244
	Rio Doce	2.15	0.597	0.419
	Santos Dumont	3.37	-1.04	0.323
	São João Nepomuceno	1.51	-0.722	0.503
	Uberaba	2.95	-0.918	0.352
	Vespasiano	2.57	-1.36	0.580
	Campestre	2.21	-0.203	0.096
Formal Employment Rate	Dona Euzébia	2.85	0.238	0.106
	Oliveira	2.12	0.440	0.212
	Pimenta	2.12	0.334	0.198
	Santa Vitória	3.17	1.64	0.522

Source: Research data.

For the IMRS Education indicator, 11 municipalities showed significant results, notably Pirapora (RMSPE Ratio = 11.34), Leme do Prado (10.8), and Curvelo (8.17), reflecting substantial divergence between observed and counterfactual trajectories post-intervention, alongside low pre-intervention RMSPE values (0.087, 0.078, and 0.092, respectively), indicating good synthetic control fit. Positive average gaps in Pirapora (0.933), São Tomás de Aquino (0.957), and Leme do Prado (0.823) suggest relative improvement, indicating potential positive policy effects. In contrast, Guarani (-0.571), Inimutaba (-0.490), and José Raydan (-0.399) exhibited negative gaps, implying relative declines in educational performance compared to their counterfactuals. The findings corroborate those of Bendrath and Basei (2019) by showing that sport, when incorporated as a complementary curricular activity, a characteristic similar to the projects supported through the Sports ICMS policy, strengthens initiatives aimed at improving educational quality. The results associate investment in sport with better educational outcomes and, given the relationship between educational development and the accumulation of social capital, suggest that such investments may contribute to the generation of social capital (Bendrath & Basei, 2019).

For IMRS Health, 18 municipalities displayed significant results. Coluna (RMSPE Ratio = 8.17), Curvelo (3.95), and Ituiutaba (3.96) had the highest RMSPE Ratios, though with higher pre-

intervention RMSPE than observed for Education. Most municipalities showed negative average gaps, indicating relative deterioration in health post-intervention. Notably, Além Paraíba (-1.40), Vespasiano (-1.36), Curvelo (-1.14), and Diamantina (-1.18) recorded the largest negative gaps, suggesting the policy may have been insufficient or influenced by other adverse factors. A few municipalities, such as Rio Doce (0.597) and Itutinga (0.534), showed positive gaps, indicating possible localized benefits.

For the Formal Employment Rate, five municipalities showed significant results. Santa Vitória stood out with the highest RMSPE Ratio (3.17) and largest positive average gap (1.64), suggesting a marked increase in employment formalization post-intervention. Oliveira (0.440) and Pimenta (0.334) also displayed relevant positive gaps, whereas Campestre (-0.203) showed a negative gap, indicating relative deterioration.

Beyond RMSPE analyses, robustness can be further assessed by examining the full structure of average gaps between municipalities actively participating in the ICMS Esportivo policy and those that never participated. The post-policy gap distribution is shown in Figure 5.

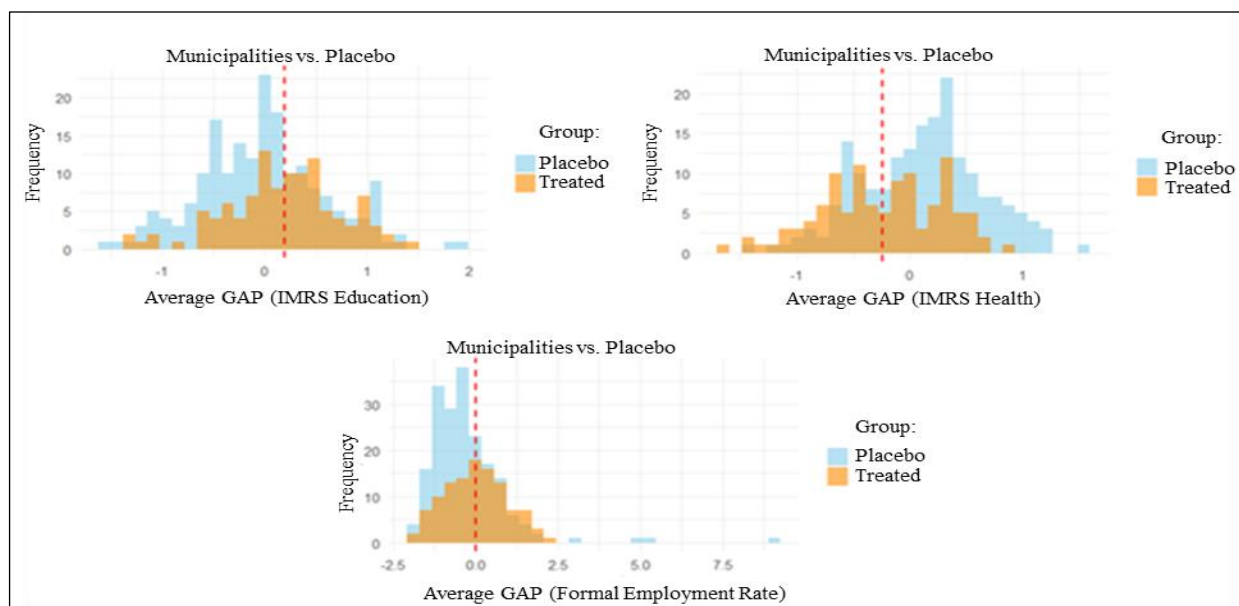


Figure 5. Distribution of Average Gaps Post-2009

Source: Research data.

The average gaps for the Education indicator varied considerably among treated municipalities. Most gaps were positive, indicating observed values exceeded synthetic control estimates, suggesting potential positive policy effects. For IMRS Education, the mean gap for treated municipalities (0.04) was slightly above that of placebos (-0.07), although the distribution was highly uneven.

Municipalities with the largest positive gaps included Uberlândia (1.48), Ipatinga (1.32), Formiga (1.20), João Monlevade (1.26), and Itajubá (1.10). Conversely, Jaguaráçu (-1.37), Ladainha (-1.32), São Geraldo (-1.21), and Oliveira Fortes (-1.11) had substantial negative gaps, indicating observed outcomes below the counterfactual. Among placebos, Muzambinho exhibited the highest average gap (1.98), suggesting that other factors, such as local policies or educational investments, may have influenced the indicators more than ICMS Esportivo.

For IMRS Health, the mean gap of treated municipalities (-0.23) was below that of placebos (0.08), indicating that the policy generally failed to promote improvements and may have coincided with relative declines. The largest negative gaps occurred in Água Boa (-1.63), Além Paraíba (-1.40), Vespasiano (-1.36), Itambacuri (-1.39), and Curvelo (-1.14). Smaller positive gaps were observed in Inimutaba (0.560), Oliveira Fortes (0.638), Goianá (0.596), and Rio Doce (0.597), indicating slight

relative improvements. Notably, Curvelo, Além Paraíba, and Vespasiano also exhibited significant RMSPE Ratios (Table 2), reinforcing robustness. Among placebos, Belmiro Braga had the largest average gap (1.56), highlighting the influence of external factors.

For the Formal Employment Rate, gaps were heterogeneous, with both substantial positive and negative values. The mean gap for treated municipalities (-0.03) was near zero but below the placebo mean (-0.11). Largest positive gaps occurred in Arcos (1.64), Andradas (1.24), and Capinópolis (0.582), suggesting relative increases in employment, while Cristália (-1.53), Chapada Gaúcha (-1.52), Água Boa (-1.46), and Coluna (-1.12) showed negative gaps, indicating relative declines. Extreme placebo cases included Tapiraí (5.14) and Icarai de Minas (-2.00).

To further contextualize these results, the next section explores the relationship between observed gaps, the Sports Quality Index, and municipal sports scores.

Sports Quality Index and Multiple Linear Regression

The Sports Quality Index (SQI) was calculated for 832 municipalities (mean = 0.372; range 0–1, from São Roque de Minas to Juiz de Fora) and validated using Bartlett's test and the Kaiser-Meyer-Olkin measure (KMO = 0.811 for 2016). Factor analysis identified a single factor explaining over 50% of the variance, encompassing cumulative scales of agreements and partnerships, school sports actions, performance-oriented and leisure sports projects, social inclusion activities, and school sports events. The SQI reflects key aspects promoted by the ICMS Esportivo policy, including social inclusion, performance sports, and school-based programs.

Table 4 presents the descriptive analysis of the index.

Table 4. Comparison of Means, Dispersions, and Difference Tests between Treated and Control Municipalities

Variable	Group	Mean	Median	Std.dev	IQR	n	Test t (p-value)	Mann-Whitney (p-value)	Normality test (p-value)
SQI	Control	0,288	0,251	0,173	0,231	191	<0,001	<0,001	<0,001
	Treated	0,482	0,474	0,191	0,250	111			0,295
Per capita expenditure (R\$)	Control	27,14	14,50	49,60	26,10	191	0,394	0,403	<0,001
	Treated	22,56	12,50	41,80	18,30	111			<0,001

Note: interquartile ranges (IQR)

Source: Research data.

Treated municipalities had a higher mean Sports Quality Index (SQI) of 0.482 compared to 0.288 for controls, with medians of 0.474 versus 0.251 and interquartile ranges (IQR) of 0.250 and 0.231, indicating a slightly more concentrated distribution among beneficiaries. Student's t-test confirmed a statistically significant difference ($t = -8.74$; $p < 0.001$; 95% CI: -0.238 to -0.150), corroborated by the Mann-Whitney test ($W = 4402$; $p < 0.001$). Normality was satisfied for treated municipalities ($p = 0.295$) but rejected for controls ($p < 0.001$), supporting the use of both parametric and non-parametric tests.

In contrast, per capita spending on sports and leisure in 2016 showed no significant difference. Controls averaged R\$ 27.14 versus R\$ 22.56 for treated municipalities, with medians of R\$ 14.50 and R\$ 12.50, respectively. Both t-test ($p = 0.394$) and Mann-Whitney ($p = 0.403$) confirmed the lack of significance, and normality was rejected for both groups ($p < 0.001$), reflecting high dispersion (maximum values of R\$ 570 and R\$ 383).

Based on these analyses, a multiple linear regression was performed to explain the 2016 gaps for municipalities participating in the policy, including as an explanatory variable the score for participation

in programs validated by ICMS Esportivo (Table 5).

Table 5. Multiple Linear Regression: 2016 Social Indicator Gaps vs. SQI

Variável Dependente	Coef. SQI	p-valor SQI	Coef. ponto_ICMS	p-valor ponto_ICMS
IMRS Education Gap	0.828	0.003***	0.169	0.025**
IMRS Health Gap	-0.493	0.125	-0.124	0.154
Formal Employment Rate Gap	1.629	0.00023***	0.206	0.078*

Note: p-value < 0.01 = “***”; p-value < 0.05 = “**”; p-value < 0.1 = “*”

Source: Research data.

For IMRS Education, both the Sports Quality Index (SQI) and ICMS Esportivo activity score were statistically significant. SQI had a positive coefficient (0.828; $p = 0.003$), indicating that higher sports quality is associated with larger average gaps in Education in 2016. The policy activity score also had a positive effect (0.169; $p = 0.025$). Assumption tests confirmed normality of residuals ($p = 0.998$), homoscedasticity ($p = 0.7994$), and absence of autocorrelation ($p = 0.1521$).

For IMRS Health, neither explanatory variable was statistically significant at the 10% level. SQI had a negative coefficient (-0.493; $p = 0.125$) and ICMS Esportivo participation -0.124 ($p = 0.154$). Residual tests showed normality ($p = 0.1501$), no heteroscedasticity ($p = 0.7494$), and no autocorrelation ($p = 0.1651$).

For the Formal Employment Rate, SQI had a positive and highly significant effect (1.629; $p = 0.00023$), while ICMS Esportivo participation had a marginally significant positive effect (0.206; $p = 0.078$), relevant at the 10% level. Model assumptions were satisfied (normality $p = 0.7843$; homoscedasticity $p = 0.3729$; no autocorrelation $p = 0.2648$).

These results suggest that municipal sports quality and ICMS Esportivo participation exert differential effects across indicators. While no significant relationship was observed for Health, both Education and Formal Employment showed positive and significant effects, particularly for SQI. The next section discusses these findings.

Discussion

The findings reveal important information about the impact of the Sports ICMS policy, especially in the context of municipal social indicators. Municipalities that participated in the Sports ICMS policy presented better educational and employment indicators than their counterfactuals. In contrast, the health indicator showed adverse results. In this sense, Hypothesis 1 is partially confirmed.

The positive and sustained results observed in the IMRS Education index for the treated municipalities (Figure 1), particularly the trajectories of Pirapora, São Tomás de Aquino, and Leme do Prado, support the argument that sport functions as an articulating axis for educational and social protection policies. According to Bendrath and Basei (2019), by strengthening networks of trust, reciprocity, and a sense of belonging, such initiatives enhance both academic performance and the holistic development of students. This relationship is empirically validated by the study of Melo et al. (2022) on the Olympic Villages Project (VIES), which demonstrated that students engaged in systematic sports activities achieve higher average academic performance than non-participants.

In the context of Minas Gerais, the positive correlation between the Sports Quality Index (SQI) and educational gains suggests that the Sports ICMS not only redistributes resources but also induces the creation of environments that foster the development of cognitive and psychosocial skills, such as discipline and concentration, which are essential for success in the schooling process. These findings are consistent with the literature that positions sport as a catalyst for socioeconomic development (Czupich, 2020; Luz et al., 2018), including its reflection in the reduction of school dropout rates (Reis et al., 2022).

In contrast, the findings related to the IMRS Health index reveal a mismatch between the theoretical potential of sport and its practical effectiveness within the context of the Sports ICMS policy. This phenomenon may be interpreted in light of the warnings raised by Miranda et al. (2014) and Reis et al. (2022) regarding the “dilution of resources”: the increasing number of municipalities adhering to the policy, without a proportional increase in the financial fund, reduces the real impact of per capita expenditure and compromises the capacity for structural intervention in health. Thus, although sport possesses a subjective value in promoting social integration and well-being, as emphasized by Silveira (2013) and Vieira (2010), the fragmentation of resources and the absence of targeting mechanisms for municipalities with greater needs prevent individual benefits from being translated into population-level health indicators.

The statistical significance of the Sports Quality Index (SQI) in explaining social gains (Table 5), in contrast to the lack of significance of per capita financial expenditure (Table 4), reinforces the central role of state capacities in the implementation of decentralized policies. As argued by Gomide and Pires (2014) and Pires and Gomide (2021), the effectiveness of an institutional arrangement depends not only on the availability of resources but also on the capacity of local bureaucracies to plan, coordinate partnerships, and systematically implement actions. In Minas Gerais, the fact that treated municipalities presented a significantly higher SQI (0.482) than the control group (0.288), despite spending similar amounts, suggests that the Sports ICMS functions less as a direct transfer fund and more as a driver of institutional capacity. This evidence supports the perspective of Ferguson et al. (2023), who identify governance and administrative structure as essential mediators between fiscal incentives and social returns. Therefore, the results indicate that the success observed in Education and Employment in municipalities such as Pirapora and Santa Vitória is not merely the result of higher budgets, but also of qualified management that, by meeting the quality criteria required by the policy, ultimately strengthens the institutional environment necessary for socioeconomic development.

This analysis of the financial efficiency of participating municipalities reveals an important contrast with the recent literature on fiscal decentralization in Brazil. While Alves and Araujo (2024) warn that increases in exogenous revenues may generate “perverse incentives,” whereby managers prioritize the expansion of the administrative apparatus and politically appointed positions at the expense of infrastructure investments, the Sports ICMS data from Minas Gerais suggest a phenomenon of efficiency induction. The fact that treated municipalities presented lower average per capita expenditure than the control group while maintaining a significantly higher Sports Quality Index (SQI) indicates that the policy is not merely transferring resources but also requiring their more effective application. This finding raises the question of whether the meritocratic nature of the Sports ICMS, which rewards performance and institutional organization, is capable of mitigating the fiscal inefficiencies and transfer dependency highlighted by Alves and Araujo (2024). Therefore, unlike other redistributive transfers that may lead to stagnation in local capacity, the Sports ICMS appears to function as a corrective mechanism that encourages the delivery of better social services through greater state capacity (Pires & Gomide, 2021).

Nevertheless, implementation difficulties still persist in some localities. Diniz and Silva (2016) argue that smaller municipalities face obstacles in maintaining teams of public servants capable of properly recording sports activities, which may explain the non-adherence of certain municipalities. Studies such as Silva et al. (2013) highlight that the policy improved the organization of sports-related information and that, in cases such as the municipality of Arcos, local investment substantially exceeds the financial transfer received. These findings are consistent with Hoekman et al. (2017), who identified that municipal sports promotion policies positively influence social integration and equal access to opportunities.

Given the lack of statistical significance for most municipalities participating in the policy, as well as the heterogeneous results across the variables analyzed, it is possible that the effects of the policy are being

masked by external indicators with greater influence. This suggests that, even with the confirmation of Hypothesis 2 for the IMRS Education and Formal Employment Rate variables, the actual impact of the policy remains difficult to assess and requires in loco research in the municipalities that presented significant results. Nevertheless, the SQI confirms that the municipalities that adhered to the policy are those with better structures for implementation.

The results of this study reinforce the importance of the state of Minas Gerais as a unit of analysis for representing national realities, demonstrating that the benefits of the Sports ICMS extend beyond financial issues and reach the very governmental structure and the arrangements through which public policies are implemented.

Conclusions

This study evaluated the impact of the Sports ICMS policy in Minas Gerais using the Synthetic Control Method (SCM) and the Sports Quality Index (SQI). The results confirm that this fiscal incentive policy functions not only as a mechanism for income transfer but also as a driver of state capacities in municipalities across Minas Gerais.

The research demonstrated that participation in the policy generates real and sustained benefits for the IMRS Education index, validating the argument that sport acts as a catalyst for social capital and academic achievement. However, the negative or null impacts observed for the IMRS Health index reveal that the individual benefits of sports participation do not automatically translate into population-level indicators when there is a “dilution of resources.” The growing adherence of municipalities without a proportional increase in financial resources reduces the intensity of intervention, thereby compromising the effectiveness of the policy as a public health strategy.

The study demonstrates that the quality of sports management (SQI) is a more robust predictor of social success than the volume of per capita expenditure. Treated municipalities presented significantly higher quality indicators than their counterfactuals, even while investing similar financial amounts. This finding reinforces that the Sports ICMS strengthens bureaucratic institutional capacity by requiring municipalities to plan and implement systematic actions in order to access the resources, which translates into more favorable environments for socioeconomic development.

The study provides a counterpoint to the fiscal decentralization literature. While exogenous transfers such as the Municipal Participation Fund (FPM) may generate “fiscal laziness” or administrative expansion, the Sports ICMS operates as a corrective mechanism. Due to its meritocratic nature, the policy induces municipalities to deliver higher-quality public services with more efficient cost structures, mitigating the “perverse incentives” commonly associated with other government transfers.

The existence of a selection bias is acknowledged, whereby municipalities with stronger organizational structures are more likely to adhere to and benefit from the policy. This suggests that the Government of Minas Gerais should consider targeting mechanisms or technical support for smaller localities that face implementation barriers. Given its extensive municipal heterogeneity, Minas Gerais constitutes a valuable case for analyzing the Brazilian context, demonstrating that the success of decentralized policies depends less on the amount of financial resources available and more on the activation of local state capacities.

As a future research agenda, it is suggested to investigate how the governance induced by the Sports ICMS affects other areas of municipal administration, as well as to conduct longitudinal studies capable of capturing the effects of the policy in the post-pandemic context. The temporal limitation of the data to the pre-pandemic period is not merely a technical restriction but also reflects the structural problem of the lack of continuity and systematic evaluation in Brazilian public policies, as discussed by Mendes and Codato (2015).

References

- Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. *Journal of economic literature*, 59(2), 391–425. <https://doi.org/10.1257/jel.20191450>
- Abadie, A., Diamond, A., & Hainmueller, J. (2010). Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program. *Journal of the American Statistical Association*, 105(490), 493–505. <https://doi.org/10.1198/jasa.2009.ap08746>
- Abadie, A., Diamond, A., & Hainmueller, J. (2015). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, 59(2), 495–510. <https://doi.org/10.1111/ajps.12116>
- Abadie, A., & Gardeazabal, J. (2003). The economic costs of conflict: A case study of the Basque Country. *American economic review*, 93(1), 113–132. <https://doi.org/10.1257/000282803321455188>
- Alves, P. J. H. F., & Araujo, J. M. (2024). The effects of intergovernmental transfers on the local fiscal incentives of Brazilian municipalities. *Journal of Government and Economics*, 13, 100104. <https://doi.org/10.1016/j.jge.2024.100104>
- Bendrath, E. A., & Basei, A. P. (2019). O esporte como atividade complementar curricular: Uma análise a partir da teoria do capital social. *Eccos Revista Científica*, 48, 219–237. <https://doi.org/10.5585/EccoS.n48.7509>
- Bourdieu, P. (1983). Como é possível ser esportivo. *Questões de sociologia*, 136–153.
- Bradbury, J. C., Coates, D., & Humphreys, B. R. (2023). The impact of professional sports franchises and venues on local economies: A comprehensive survey. *Journal of Economic Surveys*, 37(4), 1389–1431. <https://doi.org/10.1111/joes.12533>
- Carneiro, F. H. S., Reis, N. S., Pereira, C. C., da Silva Magalhães, Y. C., & Mascarenhas, F. (2021). O esporte nas eleições brasileiras de 2018: Análise das propostas de governos dos presidenciáveis. *Conexões*, 19, e021012–e021012. <https://periodicos.sbu.unicamp.br/ojs/index.php/conexoes/article/view/8660344>
- Costa, C. C. de M., Ferreira, M. A. M., Braga, M. J., & Abrantes, L. A. (2015). Fatores associados à eficiência na alocação de recursos públicos à luz do modelo de regressão quantílica. *Revista de Administração Pública*, 49, 1319–1347. <http://dx.doi.org/10.1590/0034-7612130868>
- Czupich, M. (2020). Sport as an instrument of social development-the example of London. *Journal of Physical Education & Sport*, 20. <https://efsupit.ro/images/stories/octombrie2020/Art%20390.pdf> <https://doi.org/10.7752/jpes.2020.s5390>
- Diniz, R. S., & Silva, L. P. D. (2016). O ICMS Esportivo e o Financiamento das Políticas Municipais de Esporte em Minas Gerais. *Movimento (ESEFID/UFRGS)*, 22(4), 1223. <https://doi.org/10.22456/1982-8918.64264>
- Dong, D., Yu, Y., & Dong, D. (2011). The Efficiency Evaluation of Resources Allocation in Mass Sport in China's Three Gorges Reservoir Area. In Q. Zhou (Org.), *Advances in Applied Economics, Business and Development* (V. 209, p. 389–394). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-23020-2_57
- Ferguson, K., Hassan, D., & Kitchin, P. (2023). Policy transition: Public sector sport for development in Northern Ireland. *International Journal of Sport Policy and Politics*, 15(2), 211–228. <https://doi.org/10.1080/19406940.2023.2183976>
- FJP. (2023). Icms—Lei Robin Hood. Fundação João Pinheiro. <https://fjp.mg.gov.br/icms-lei-robin-hood/>
- FJP. (2024). Índice Mineiro de Responsabilidade Social. IMRS. <https://imrs.fjp.mg.gov.br/>
- Freitas, G. da S., Miguel, I. G. S., Fernandes, D. V., Reis, M. C. dos, Dias, T. M., Borges, D. S., Rodrigues, L. de S., Teixeira, J. C., & Graeff, B. (2022). O Esporte para o Desenvolvimento ea Paz nas revistas acadêmicas brasileiras: Uma revisão de literatura integrativa. *Movimento*, 28, e28045. <https://doi.org/10.22456/1982-8918.121670>
- Gomide, A. de Á., & Pires, R. (2014). Capacidades estatais e democracia: A abordagem dos arranjos institucionais para análise de políticas públicas. Ipea. <https://web.bndes.gov.br/bib/jspui/handle/1408/13999>
- Hoekman, R., Breedveld, K., & Kraaykamp, G. (2017). Providing for the rich? The effect of public

- investments in sport on sport (club) participation of vulnerable youth and adults. *European Journal for Sport and Society*, 14(4), 327–347. <https://doi.org/10.1080/16138171.2017.1421510>
- Hoekman, R., van der Roest, J.-W., & van der Poel, H. (2019). From welfare state to participation society? Austerity measures and local sport policy in the Netherlands. Em *Sport policy and politics in an Era of Austerity* (p. 127–142). Routledge. <https://www.taylorfrancis.com/chapters/edit/10.4324/9780429057625-9/welfare-state-participation-society-austerity-measures-local-sport-policy-netherlands-remco-hoekman-jan-willem-van-der-roest-hugo-van-der-poel>
- Hoffbauer, M., Ács, P., Stocker, M., & Paár, D. (2022). Application of portfolio matrix for resource allocation purposes in sports: The case of Hungary. *Health Problems of Civilization*, 16(4), 351–359. <https://doi.org/10.5114/hpc.2022.120223>
- Houlihan, B., Bloyce, D., & Smith, A. (2009). Developing the research agenda in sport policy. *International Journal of Sport Policy and Politics*, 1(1), 1–12. <https://doi.org/10.1080/19406940802681186>
- Lemos, J. de J. S. (2001). Níveis de degradação no Nordeste brasileiro. *Revista Econômica do Nordeste*. <https://repositorio.ufc.br/handle/riufc/32894>
- Litvin, A. V., & Arkalov, D. P. (2021). SROI methodology as a vector of sports’ development. *IBIMA Business Review*, 2021, 122637–122637. <https://ibimapublishing.com/articles/JELHE/2021/122637/>
- Luz, R., da Silva Triani, F., de Seixas Filho, J. T., & Moreira, J. F. F. (2018). O Esporte Social como instrumento de Desenvolvimento Local: Análise da expectativa de jovens do Instituto Irmãos Nogueira sob a influência da mídia. *Semioses*, 12(1), 1–13. <https://doi.org/10.15202/1981996x.2018v12n1p1>
- Machado, P. X., Cassepp-Borges, V., & Koller, S. H. (2007). O impacto de um projeto de educação pelo esporte no desenvolvimento infantil. *Psicologia Escolar e Educacional*, 11, 51–62. <https://doi.org/10.1590/S1413-85572007000100006>
- Matias, W. B. et al. A lei de incentivo fiscal e o (não) direito ao esporte no Brasil. *Movimento*, [s. l.], v. 21, n. 1, p. 95–109, 2015.
- Mello, J. O., Ribeiro, V. M. O., Lotta, G. S. O., Bonamino, A. O., & Carvalho, C. P. de O. (2020). Implementação de políticas e atuação de gestores públicos: Experiências recentes das políticas de redução das desigualdades. <https://repositorio.ipea.gov.br/handle/11058/9862>
- Melo, L. B. S. de, Rocha, H. P. A. da, Ribeiro, L. G., Souza, M. L. L. de, Silva, J. E. da, Lima, M. L. F. de, Leite, M. B., & Soares, A. J. G. (2022). O esporte como auxílio à educação: Análise do Projeto Vilas Olímpicas e Escolas (VIES). *Revista Brasileira de Ciências do Esporte*, 44, e20220074. <https://doi.org/10.1590/rbce.44.e20220074>
- Mendes, A., & Codato, A. (2015). The institutional configuration of sport policy in Brazil: Organization, evolution and dilemmas. *Revista de administração pública*, 49, 563–593. <http://dx.doi.org/10.1590/0034-7612125903>
- Milistetd, M., Camiré, M., Ciampolini, V., Quinaud, R. T., & Nascimento, J. V. do. (2021). Desenvolvimento psicossocial e saúde mental em jovens atletas: Examinando os efeitos da idade, tipo de esporte e nível de experiência. *Revista Brasileira de Cineantropometria & Desempenho Humano*, 23, e78769. <https://doi.org/10.1590/1980-0037.2021v23e78769>
- Minas Gerais. Lei No 18.030, de 12 de Janeiro de 2009. Dispõe sobre a distribuição da parcela da receita do produto da arrecadação do ICMS pertencente aos Municípios. Belo Horizonte, 2009. Disponível em: <https://www.almg.gov.br/legislacao-mineira/texto/LEI/18030/2009/?cons=1>. Acesso em: 18 abr. 2024.
- Miranda, A. E. V., Barbosa, M. R., & Santana, T. S. (2014). Análise do Repasse Constitucional do ICMS aos Municípios: O caso do ICMS Esportivo de Minas Gerais-Participação dos Municípios e Recursos Repassados. *Revista Vianna Sapiens*, 5(2), 19–19. <https://viannasapiens.emnuvens.com.br/revista/article/view/133>
- Pires, R. R. C., & Gomide, A. (2021). Arranjos de implementação e ativação de capacidades estatais para políticas públicas: O desenvolvimento de uma abordagem analítica e suas repercussões. <https://repositorio.ipea.gov.br/handle/11058/10635>
- Reberte Almeida, V.; Torquato Vanucci, L. H.; Cunha Bastos, F. A Lei De Incentivo Ao Esporte No Município De Santos-Sp: Aplicação E Captação De Recursos De 2010 A 2017. *Revista*

- Intercontinental de Gestão Desportiva, [s. l.], v. 9, n. 1, 2019. Disponível em: <http://www.revista.universo.edu.br/index.php?journal=gestaoesportiva&page=article&op=viewArticle&path%5B%5D=7418>. Acesso em: 12 dez. 2023.
- Reis, B. S., Galvão, C. A., & Adamczyk, W. (2022). Avaliação ICMS Esportivo de Minas Gerais: Impactos sobre indicadores sociais. <https://repositorio.enap.gov.br/handle/1/7377>
- Saldanha-Filho, M. (2003). Formulando políticas públicas do esporte e lazer no âmbito da cidade. Congresso Brasileiro de Ciências do Esporte (CBCE), 25. <https://mid.curitiba.pr.gov.br/2015/00162765.pdf>
- Santos, E. S. dos. (2019). Gasto na função desporto e lazer pelos municípios do Estado de Minas Gerais. Conexões, 17, e019035–e019035. <https://periodicos.sbu.unicamp.br/ojs/index.php/conexoes/article/view/8653139>
- Santos, E. S., & Carvalho, M. J. (2019). Gasto na subfunção desporto comunitário na região sul do Brasil. Movimento (ESEFID/UFRGS), 25, e25089. <https://doi.org/10.22456/1982-8918.89583>
- Schut, P.-O., & Collinet, C. (2016). French sports policies for young people: Fragmentation and coordination modes. International Journal of Sport Policy and Politics, 8(1), 117–134. <https://doi.org/10.1080/19406940.2014.936961>
- Silva, A. G., Miranda, A. E. V., da Rocha, E. M. P., & Pereira, L. M. (2013). O impacto da política do ICMS Esportivo sobre a gestão esportiva municipal de Minas Gerais. Cadernos da Escola do Legislativo, 15(24), 13–41. <https://cadernosdolegislativo.almg.gov.br/cadernos-cle/article/view/148>
- Silveira, J. (2013). Considerações sobre o esporte e o lazer: Entre direitos sociais e projetos sociais. LICERE-Revista do Programa de Pós-graduação Interdisciplinar em Estudos do Lazer, 16(1). <https://periodicos.ufmg.br/index.php/licere/article/view/687>
- Souza, J. V. M. de, Ordonhes, M. T., Cavichioli, F. R., & Mezzadri, F. M. (2023). Influence of the size of the cities of birth and residence in the sports career: An analysis through the Bolsa-Atleta program. Journal of Physical Education, 34, e3414. <https://doi.org/10.4025/jphyseduc.v34i1.3414>
- Toh, K. L., & Jamieson, L. M. (2000). Constructing and Validating Competencies of Sport Managers (COSM) Instrument: A Model Development. Recreational Sports Journal, 24(2), 38–55. <https://doi.org/10.1123/nirsa.24.2.38>
- Ungheri, B. O., & Isayama, H. F. (2020). Controle e participação social no Programa Esporte e Lazer da Cidade (PELC): Reflexões sobre o papel e a atuação das instituições. Movimento, 26, e26055. <https://doi.org/10.22456/1982-8918.100711>
- Ungheri, B. O., & Isayama, H. F. (2022). Municipalização das políticas públicas de esporte e lazer: Reflexões sobre o legado do programa esporte e lazer da cidade. PODIUM Sport, Leisure and Tourism Review, 11(3), 528–562. <https://doi.org/10.5585/podium.v11i3.20204>
- Vieira, L. H. S. (2010). Estudos sobre a gestão do Programa Esporte e Lazer da Cidade. <https://www.locus.ufv.br/handle/123456789/1944>
- Waardenburg, M. (2016). Which wider social roles? An analysis of social roles ascribed to voluntary sports clubs. European Journal for Sport and Society, 13(1), 38–54. <https://doi.org/10.1080/16138171.2016.1153883>
- Wooldridge, J. M. (2016). Introductory Econometrics: A Modern Approach 6rd ed. Cengage learning.
- Ye, J., Guo, G., Yu, K., & Lu, Y. (2023). Allocation Efficiency of Public Sports Resources Based on the DEA Model in the Top 100 Economic Counties of China in Zhejiang Province. Sustainability, 15(12), 9585. <https://doi.org/10.3390/su15129585>
- Yong, W. (2021). Analytic Hierarchy Process and Intelligent Evaluation of Regional Sports Economic Data. 2021 International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS), 371–374. <https://doi.org/10.1109/ICITBS53129.2021.00098>
- Zhang, X. (2021). The construction of urban public sports service from the perspective of public health. Revista Brasileira de Medicina do Esporte, 27, 69–72. http://dx.doi.org/10.1590/1517-8692202127012020_0104