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FIFA World Cup and corruption: an analysis by the Synthetic Control Method applied to the host countries from 2006 to 2014[1]

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Abstract

The exogenous impact on public expenditures and the short time frame for their execution, represented by investments and other expenses, required to host the FIFA World Cup, create a scenario more propitious for corrupt practices that are not properly monitored by society due to the enthusiasm generated by the preparations for the event. The objective of this study is to evaluate the effect of preparation for and realization of the World Cup in the host countries on the public perception of corruption in those countries. For this purpose, we employ the synthetic control method as described by Abadie, Diamond and Hainmueller (2010), who utilized the announcement of the host country as a shock to the Corruption Perception Index formulated by Transparency International. The host countries analyzed are Germany (2006), South Africa (2010) and Brazil (2014). The announcement of the host country was related to an increase in the perception of corruption in the countries analyzed, but this effect tended to wane as the event approached. The lower corruption perception evidenced by the method does not jibe with the scenario of corruption scandals that emerged after the event, mainly in South Africa and Brazil.

Keywords: perception of corruption; Synthetic Control; FIFA World Cup

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Copa Mundial de la FIFA y corrupción: un análisis por el Método de Control Sintético aplicado a los países anfitriones de 2006 a 2014

Resumen

El impacto exógeno en los gastos públicos y el corto plazo para su ejecución, representado por las inversiones y otros gastos, requeridos para albergar la Copa Mundial de la FIFA, crean un escenario más propicio para prácticas corruptas que no son debidamente monitoreadas por la sociedad debido al entusiasmo generado por los preparativos del evento. El objetivo de este estudio es evaluar el efecto de la preparación y realización de la Copa del Mundo en los países anfitriones sobre la percepción pública de la corrupción en esos países. Para ello empleamos el método de control sintético descrito por Abadie, Diamond y Hainmueller (2010), quienes utilizaron el anuncio del país anfitrión como un shock al Índice de Percepción de la Corrupción formulado por Transparencia Internacional. Los países anfitriones analizados son Alemania (2006), Suráfrica (2010) y Brasil (2014). El anuncio del país anfitrión estuvo relacionado con un aumento en la percepción de corrupción en los países analizados, pero este efecto tendió a desvanecerse a medida que se acercaba el evento. La menor percepción de corrupción evidenciada por el método no concuerda con el escenario de escándalos de corrupción surgidos tras el hecho, principalmente en Suráfrica y Brasil.

Palabras clave: percepción de la corrupción; Control Sintético; FIFA Copa del Mundo

Introduction

The World Cup always attracts a bevy of countries bidding to host the event. However, hosting this event requires large expenditures on infrastructure and public services to satisfy the requirements of the International Federation of Association Football (FIFA), the body in charge of global professional football and responsible for choosing the countries to host the games. Among the investments necessary are those for the construction/upgrade of stadiums and improvement of urban infrastructure, especially roads and airports, to facilitate the circulation of participants and fans.

Among the alleged benefits to the host country, the literature indicates reduced unemployment, increased revenues from taxes and public concessions, attraction of tourists and foreign investments, and promotion of a good image of the country among foreigners, in addition to encouraging people to practice sports (Lertwachara, Tongurai & Boonchoo, 2021; Bondarik, Pilatti & Horst, 2020; Domareski-Ruiz et al, 2020; Patreze, Silva & Robinson, 2020; Viana; Barbosa & Sampaio, 2018; UNODC, 2017).

However, such events, despite bringing social benefits, also attract transnational organized crime and local corrupt practices, such as overbilling of construction work (Zeimers & Constandt, 2022; Olmos, Bellido & Román-Aso, 2020; Patreze, Silva &

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Robinson, 2020; Marques, Alves, Wada, 2020; Polli, 2021; UNODC, 2017). Because of the exogenous impact on public expenditures and the short time frame for their execution, the games tend to create a scenario more propitious for corrupt practices. These tend not to be properly monitored by society due to the enthusiasm generated by the preparations for the event.

The objective of this study is to analyze the effects of the FIFA World Cup on the perception of corruption in the host countries, with the announcement and holding of the games.

The paper is organized in five sections including this introduction. In the second section, we present the theoretical framework and a brief review of the literature with the main considerations related to the economics of crime and corruption associated with public investments. In the third section, we describe the methodology and variables employed. In the fourth, we present the results and robustness tests. The fifth section contains our final considerations.

Sports megaevents and corruption

According to Müller (2015) the definition and classification of a megaevent is based on four factors: attraction of tourists; media attention; costs for realization; and transformative impact. The World Cup and Olympic Games are the chief examples of global sports megaevents.

The financial resources earmarked for urban and airport infrastructure, as well as the expenses for organizing the event and enhancing public and private security are high (Jennings, 2012). According to Gaffney (2014), the total cost of the World Cup in South Africa to host the 2010 World Cup was US$ 7.5 billion, a figure that increased to US$ 14 billion in Brazil for the 2014 Cup. Improvements are necessary to improve infrastructure, such as stadiums for the World Cup and Olympic Games, besides improvements in transportation systems to meet the need for circulation of large numbers of people (Mills and Rosentraub, 2013).

According to Getz (2008), the expenditures made to host a megaevent can have favorable effects on long-term local economic growth, as well as causing improvements in the image and perceptions of the venues, with positive socioeconomic effects, such as burnishing the country's image as a tourist destination (Domareski-Ruiz et al, 2020, Patreze, Silva & Robinson, 2020, Wan & Song, 2019), attracting local and external investments in infrastructure (Lertwachara, Tongurai, Boonchoo, 2021) and increasing the practice of sports in general (Patreze, Silva & Robinson, 2020).

Despite these legacies, their effect on economic growth is still questionable (Omer, 2023; Wan & Song, 2019; Viana, Barbosa & Sampaio, 2018). And even the expectation of a better international image of the host country may not come to pass, as reported by Almeida (2023) about the effects of hosting the FIFA World Cup in Brazil, South Africa, Russia and Qatar.

The complexity of megaevents is also related to their dependence on many interest groups, and many times urgent needs arise. They are also marked by close interconnection of various projects, where a delay in one has negative consequences on others (Müller, 2015). Therefore, the organization and governance of hosting these events are fundamental

factors for their success and to deter corruption (Zeimers & Constandt, 2022; Kulczycki & Koenigstorfer, 2016).

Lechner and Solberg (2021) analyzed the financing of large sports events by the Norwegian government. The criteria for choosing to finance these events are not firmly established. This absence of criteria favors the actions of lobbyists and ad hoc solutions, seeking to meet specific interests. The three events analyzed that received the most government support also received additional funding when unexpected problems emerged during the preparations.

In this environment, Kulczycki and Koenigstorfer (2016) considered corruption to be a syndrome of sports megaevents, as also concluded by Olmos, Bellido and Román-Aso (2020:07): "opportunity increases illegal behaviors or, at least, increases the public perception of corruption".

Marques (2020) mentioned the various accusations of overbilling of construction projects in Brazil in the preparation to host the World Cup. Works such as modernization of Maracanã Stadium cost double the initial budget (R$ 1.2 billion versus R$ 600 million).

Maennig (2005) analyzed corruption in international sporting events and sports management, describing the forms, tendencies, extent and possible countermeasures. In this respect, he contended that to undertake a valid analysis of the measures to combat corruption in sports, one must refer to economic causes, because corruption emerges both from a desire to corrupt and to be corrupted.

Neoclassical studies define corruption as the use of public power for personal gain, and this intuition seeks to distinguish criminality between the public and private spheres, in the former case focusing on the role of bureaucrats in corrupt activity. Public agents act rationally, considering their opportunities versus the potential drawbacks. Considering the balance between the pros and cons makes it easier to understand why individuals become corrupt. According to Albuquerque and Ramos (2006), this involves three aspects: presence of decision-making power; opportunity for rent-seeking; and fragile institutions.

Campos and Pereira (2016), Rose-Ackerman (2002) and Tanzi and Davoodi (1997) described a direct association between corruption and higher public investments. The positive effect of allocating more budgetary resources to public works and services can be largely offset by the diversion of money to corrupt officials. The negative effects also include earmarking money to areas that are not priorities, lower quality of infrastructure, reduced future government revenue and lower spending for operation and maintenance (Henrique & Ramos, 2011; Mauro, 1995, Tanzi & Davoodi, 1997).

Rocha and Ramos (2011) analyzed the variables that encourage municipal government managers in the Brazilian state of Pernambuco to engage in misappropriation of funds from federal revenue sharing. Among the patterns found was that the average level of education of the population had an inverse relationship with corruption. A higher education level was associated with greater perception of corruption, with a deterrent effect[2]. Along with this, they concluded that municipalities that depend more on federal resources tend to have more cases of corruption and misappropriation. Besides this, the authors showed that municipalities that were relatively free of irregularities had per capita income up to 4.71% higher in comparison with their expenditures.

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2   Mauro (1995) described the same relationship.

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Methodology

1. *Synthetic control method[3]*

In comparative case studies, one or more units exposed to an event or intervention of interest are compared to unexposed units. But it is often difficult to select these units. On the one hand, a degree of arbitrariness in selection is necessary, while on the other hand it is necessary for the units to be mutually comparable.

According to Silveira Neto et al. (2014), synthetic control has various advantages in relation to other non-experimental methods. It relies on a combination of a matching process, which reduces the imbalance between the treated and control units, with the difference-in-differences method. Finally, a process purely based on data is applied to select counterfactuals.

As proposed by Abadie and Gardeazabal (2003) and Abadie, Diamond and Hainmueller (2010), the synthetic control method involves constructing a control unit that is adequate to compare with a unit that received a certain intervention or treatment. By using predictor variables of a variable of interest, the weight of each "donor" unit is established in composition of the control so that the synthetic unit behaves exactly as the treated unit before the intervention. Differences observed after the treatment are considered to be impacts of this treatment on the variable of interest.

Formally, consider $J + 1$ regions so that only the first region is exposed to the intervention of interest, with the remaining regions being potential controls. During the time period $t = 1,..., T$, suppose that the first region is uninterruptedly exposed to the intervention of interest for a certain initial period T_0. In other words, T_0 denotes the number of pre-intervention periods, with $1 \leq T_0 < T$.

Y_{it}^N is the observed result in region at time in the absence of intervention, for units $i = 1,...,J + 1$. Thus, Y_{it}^I the result observed for unit i at time t if the unit is exposed to the intervention in periods $T_0 + 1$ to T. It is assumed that the intervention does not have an effect on the result before the implementation period, so that for $t \in \{1,..., T_o\}$ and all $i \in \{1,..., N\}$, we have $Y_{it}^I = Y_{it}^N$.

It is further assumed that the results of the untreated units are not affected by the intervention implemented in the treated unit. Therefore, let $\alpha_{it} = Y_{it}^I - Y_{it}^N$ be the effect of the intervention on unit at time and be a dummy that assumes value 1 if unit is exposed to the intervention at time and zero otherwise. The observed result of unit i at I time t is given by:

$$Y_{it} = Y_{it}^N + \alpha_{it}D_{it} \qquad (1)$$

Since only the first region (region 1) is expose to the intervention, and this only happens after the period T_o (with $1 \leq T_0 < T$), we have that:

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[3]   In this section, we follow the method described by Abadie, Diamond and Hainmueller (2010) and Viana, Barbosa and Sampaio (2018).

$$D_{it} = \begin{cases} 1 & if \; i = 1 \; and \; t > T_0 \\ 0 & otherwise. \end{cases} \quad (2)$$

Hence, the objective is to estimate $(\alpha_{1T0+1,...,} \alpha_{1T})$. For $t > T_o$,

$$\alpha_{1t} = Y_{1t}^I - Y_{1t}^N = Y_{1t} - Y_{1t}^N. \quad (3)$$

Since Y_{1t}^I is observed, to estimate α_{1t} it is only necessary to calculate Y_{it}^N Abadie, Diamond and Hainmueller (2010) assumed that Y_{it}^N is given by the model:

$$Y_{it}^N = \delta_t + \theta_t Z_i + \lambda_t \mu_i + \varepsilon_{it} \quad (4)$$

where δt is a common unknown factor among the units, Z_i is an $(r \times 1)$ vector of observed covariates (not affected by the intervention), θt is a $(1 \times r)$ vector of unknown parameters, λt is a vector of common unobserved coefficients, μi is a vector of unknown factor loadings, and the error terms are transitory unobserved shocks at the region level with mean zero.

In this fashion, for a $(J \times 1)$ vector of weights $W = (w\_2,...,w_{J+1})$ such that $W_j \geq 0$ for $j = 2,...,J + 1$ and $w_2 + \cdots + w_{J+1} = 1$, each value of the vector W represents a potential synthetic control, i.e., a particular weighted average of the control regions. The value of the resulting variable for each synthetic control indexed by W is:

$$\sum_{j=2}^{J+1} w_j Y_{jt} = \delta_t + \theta_t \sum_{j=2}^{J+1} w_j Z_j + \lambda_t \sum_{j=2}^{J+1} w_j \mu_j + \sum_{j=2}^{J+1} w_j \varepsilon_{jt.} \quad (5)$$

Under standard conditions, we obtain a good estimate of Y_{it}^N when the number of pre-intervention periods is large in relation to the transitory shocks. This suggests the use of:

$$\hat{\alpha}_{1t} = Y_{1t} - \sum_{j=2}^{J+1} w_J^* Y_{jt} \quad (6)$$

for $t \in \{T_o + 1,...,T\}$ as an estimator of α_{1t}.

The method searches for a vector W* that minimizes the distance from the variable of the result before the intervention between the treated unit and the "donor units" with the support of the relevant predictors of this variable.

After estimating the effects of the variable of interest on the event in question, we carry out the recommended placebo tests. These tests calculate synthetic controls for all the control units and analyze the discrepancy after the intervention date. The expectation is that the discrepancy between the control and original units is evident for the unit that is really treated.

2. Data and variables

We consider the existence of panel data for a set of countries in a period T, between 1996 and 2018[4], where some of them were affected by hosting the FIFA World Cup at a determined T_0 and the rest of the countries were not affected, making them candidates for controls. The countries that hosted the World Cup and are analyzed in the period are Germany, South Africa and Brazil, host countries in 2006, 2010 and 2014, respectively.

According to Viana, Barbosa and Sampaio (2018), there are two possibilities to determine the pretreatment period, T_0. The first is to use the year when FIFA announced the host country, in which case it would be Germany in 2000, South Africa in 2004 and Brazil in 2007. The second is to use the year when the World Cup actually occurred, namely Germany in 2006, South Africa in 2010 and Brazil in 2014.

We decided to formulate our model using the year of announcement, as suggested by Viana, Barbosa and Sampaio (2018) and Olmos, Bellido and Román-Aso (2020), since the great majority of public investments are made before the event happens.

The countries selected for creation of the synthetic controls are all those for which the Corruption Perception Index (CPI) was calculated between 1996 and 2018. Therefore, besides the three treated countries (Germany, South Africa and Brazil), we removed the countries that hosted the Cup in the 1990s (USA and France), in 2002 (South Korea and Japan) and 2018 (Russia). Following the logic of large events, we also removed countries that hosted the Summer Olympic Games in the period analyzed, namely Australia in 2000, Greece in 2004 and England in 2012. Furthermore, we excluded countries classified as not free, according to Freedom House, an organization dedicated to the promotion of democracy in the world (Freedom House, 2021), namely: China, Russia, Thailand, Turkey and Venezuela. Finally, due to difficulties of obtaining some data, we excluded Hong Kong. Twenty-nine countries remained as controls[5], plus the three treated ones.

We used data from three sources. The data on the main variable of interest were obtained from Transparency International (2020). Two of the covariables included in the vector of pre-intervention characteristics were obtained from the Penn World Tables 9.0, constructed by the Growth and Development Center of the University of Groningen in Holland. Finally, it was necessary to include in the vector of characteristics other covariables extracted from the World Bank's database.

The summary of these variables is contained in Chart 1, with the abbreviation adopted for extrapolation of the model in the statistical software and to identify the data source of each one.

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4   These periods, and the host countries, were selected due to the availability of the variable of interest, the Corruption Perception Index, which began to be calculated in 1995.

5   Argentina, Austria, Belgium, Bolivia, Canada, Switzerland, Chile, Colombia, Czech Republic, Denmark, Spain, Finland, Hungary, Indonesia, India, Ireland, Israel, Italy, Mexico, Malaysia, Nigeria, Holland, Norway, New Zealand, Philippines, Poland, Portugal, Singapore and Sweden.

Chart 1 – **Description and source of the data on the countries**

Variable	Description	Data Source
CPI	Corruption Perception Index	Transparency International
GDP	Gross Domestic Product (in US$)	World Bank
VAR_GDP	GDP Growth (annual %)	World Bank
IND_VA	Value Added by Industry (including construction) (%GDP)	World Bank
IGP	Inflation by the GDP Deflator (annual %)	World Bank
GFCF_GDP	Gross Fixed Capital Formation in relation to GDP	World Bank
HCI	Human Capital Index, based on years of schooling and returns on education	Penn World Table 9.0
CSH_G	Share of Government Consumption (% of GDP)	Penn World Table 9.0
INV_EXT	Foreign Direct Investment, net (current US$)	World Bank
GE_EST	Government Efficacy (proxy for governability)	World Bank
PS_EST	Political Stability and Absence of Violence/Terrorism (proxy for political stability)	World Bank
VAR_GFCF	Variation of Gross Fixed Capital Formation (current US$)	World Bank

Source: Own elaboration (2021).

The main variable of interest is the Corruption Perception Index (CPI), published by Transparency International (2000). It is composed of the results of 13 surveys and evaluations of corruption, conducted by a variety of renowned institutions. Produced since 1995, until 2012 it classified countries and territories on a scale of 0 to 10, where 0 meant highly corrupt and 10 meant extremely honest. In 2013 this scale was changed to 0 to 100. Therefore, to maintain the coherence of our estimates, we divided the later results by 10 (Silva and Ferreira, 2019).

With respect to the variables used to construct the synthetic controls, we sought long-range variables that improved the pretreatment adjustment. Unlike the need for theoretical consideration in the selection of the predictor variables of traditional regression models, our selection sought to adjust the series adequately for the purpose of prediction (Zabler, 2019).

It is necessary to describe some of the chosen variables regarding their meaning and/or construction.

The Human Capital Index is formed by the average years of schooling, measured as defined by Barro and Lee (2013), combined with a rate presumed by Psachropoulos (1994) of the return of education, based on the Mincer earnings equation.

The government efficacy metric captures the perceptions regarding the quality of public services, the degree of independence from political pressures, the quality of the formulation and implementation of policies and the credibility of the government's commitment to these policies, as described by Kaufmann, Kraay and Zoido-Lobaton (1999). The estimation yields a score for each country in units that follow a standard normal distribution. According to Blackburn, Bose and Haque (2006) and Ryvkin and Serra (2012), the governance structure really affects the incidence of corruption, whether by impacting the uncertainty about the results of corruption or by changing the incentives for corruption.

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Another important variable is political stability and the absence of politically motivated violence, including terrorism. The estimate is measured by an aggregate indicator in units of the standard normal distribution, denoting the strategic capacity and autonomy of each country's institutions. Mo (2001), Sobral, Ferreira and Besarria (2016) and Silva and Ferreira (2019) used similar indicators to estimate this effect.

Table 1 presents the descriptive statistics of the group containing all the countries that served as synthetic controls.

Table 1 – **Descriptive statistics of the variables**

Variables	Mean	Median	Stand. Dev.	Minimum	Maximum
CPI	6.116	6.300	2.470	0.690	10.000
VAR_GDP	3.184	3.181	3.100	-13.127	25.163
IND_VA	28.083	27.061	6.181	17.638	48.530
IGP	4.352	2.558	6.254	-5.992	75.271
GFCF_GDP	0.227	0.223	0.044	0.117	0.431
HCI	2.941	3.034	0.519	1.360	4.154
CSH_G	0.165	0.163	0.054	0.005	0.303
INV_EXT*	20,446,284	8,815,393	51,105,066	-361,467,375	733,826,502
GE_EST	1.003	1.155	0.906	-1.215	2.437
PS_EST	0.345	0.792	1.035	-2.374	1.760
VAR_GFCF	3.927	4.057	8.905	-42.966	52.872

Note: * Values expressed in millions.
Source: Own elaboration (2021).

Results

Figure 1 presents the evolution of the CPI for the host countries of the World Cup, with the darker color representing the period between the announcement and realization of the event. Recall that the higher the index, the lower the perception of corruption is, i.e., the more honest the country is according to the perception of its citizens.

Figure 1 – **Evolution of the CPI of the host countries of the World Cup in 2006, 2010 and 2014**
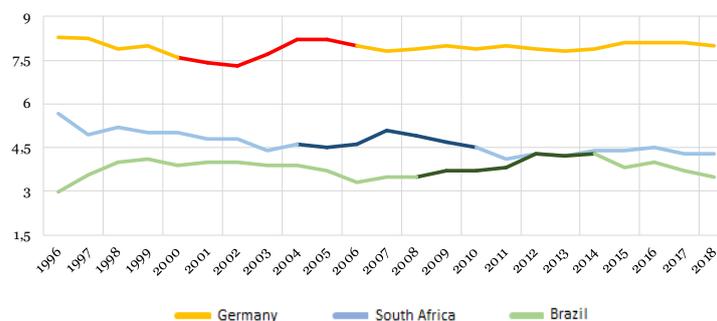
Source: Own elaboration, based on data from Transparency International (2021).

Figure 1 shows that the three countries reached peak values of the series in the periods before the occurrence of the Cup, indicating lower perception of corruption by society in the interval between announcement and realization of the event. However, unlike Germany, these higher indices for Brazil and South Africa declined in the ensuing years.

These evolutions are explored separately below with application of the synthetic control method, which seeks to determine to what extent these movements occurred in response to hosting the World Cup in these countries. Initially, Table 2 shows the weights assigned to each country in the set of countries with control potential for the World Cup announcement year.

In the case of Brazil, due to the intense structural shocks in the political scenario experienced in the period before its announcement as the host country, we performed an additional test using the disclosure of the congressional vote buying scandal known as "Mensalão" as a shock (treatment). Therefore, Table 2 also presents information regarding this analysis.

Table 2 – **Weights assigned to the countries used as synthetic controls**

Country	Germany	South Africa	Brazil (announcement)	Brazil ("Mensalão" scandal)
Bolivia		0.548		
Colombia	0.021			0.002
Denmark		0.071		
Philippines			0.400	
Holland			0.002	
Hungary				0.378
India				0.132
Israel	0.414	0.251		
Italy			0.382	0.152
Mexico			0.214	
Nigeria				0.247
Norway		0.130		
Portugal				0.090
Switzerland	0.565			

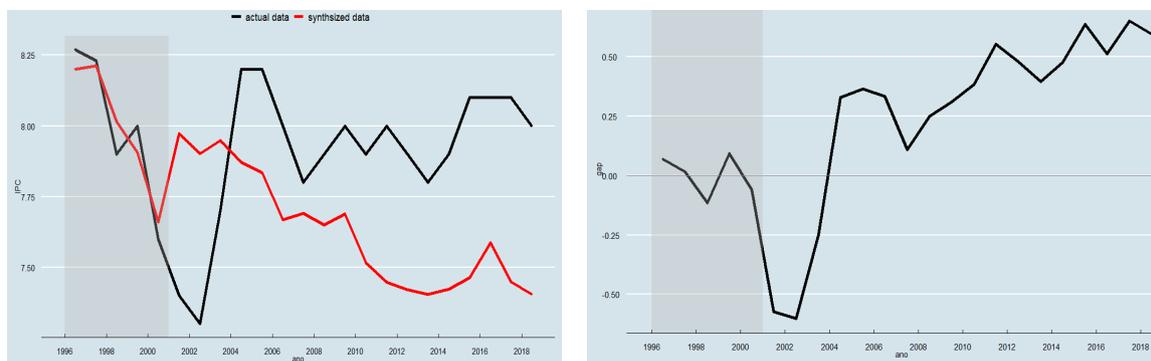Source: Own elaboration (2021).

a. FIFA world cup in Germany

The minimum value of the country's CPI was 7.3 in 2002. However, after the games were held in 2006, the index was concentrated between 7.8 and 8.1, meaning lower perceived corruption levels.

In the period from announcement of Germany as the host country until the year before the event occurred (2000 to 2005), the country suffered from economic stagnation. According to Hagn and Meanning (2009), cited in Viana Barbosa and Sampaio (2018), the Cup did not have a significant impact on the country's GDP.

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In this context, as shown in Figure 1, the announcement of hosting the Cup caused an initial decline of the index (higher corruption perception), followed by elevation of the index (lower corruption perception).

Figure 2 contains two graphs. The first presents the time series of the variable CPI for the treated unit (black line) and the synthetic control unit (red line). The shaded region represents the pretreatment period (the period leading up to the year FIFA announced the choice of the host country). The comparison between the black and red lines before the treatment shows the goodness of fit. The second graph shows the gap between the treated and control units.

Figure 2 – Analysis of synthetic control for the CPI starting from announcement (2000) of the FIFA World Cup in Germany

Source: Own elaboration

The data indicate a greater perception of corruption soon after the announcement (lower CPI). Although following a trend present in the country before the shock, it differs from the behavior of the corresponding control. The gap just after the announcement was around 0.6 point, indicating the synthetic country had lower levels of corruption perception (greater CPI) while Germany continued to have an upward trend in the perception (decline of the CPI). The scenario reversed in the following years, so that in 2006, when the Cup occurred, the sign of the gap was negative, and continued to be in the remaining period.

With respect to the differences observed after the shock, consistent estimates require the index to be higher in the pre-event than in the post-event period (Abadie et al., 2010; Castro & Almeida, 2019). Therefore, the growth in the gap after the Cup occurred should be viewed with this caveat in mind.

In summary, despite the doubts regarding the impact after the event on the corruption perception, there was greater mistrust of society, with a relatively lower CPI, after the announcement, followed by better vision as the event approached. This behavior will be observed for the other countries analyzed.

With respect to the goodness of fit of the synthetic country, Table 3 reports the values of the variables used for Germany, the synthetic country and the average of the donor pool countries for the pretreatment period (1996-2000). The CPI before the announcement of the World Cup hosting presented a gap of 0.001 between the average of the treated country and the average of the synthetic control. In turn, the difference of the average CPI of the donor pool countries was near 1.9 in comparison with the average of the treated country.

This is considered an indication of a good adjustment of the perception of corruption series in treated Germany and synthetic Germany. In general, the variables of the synthetic country also were near those of the real country, except the variables external investment (INV_EXT) and political stability (PS_EST).
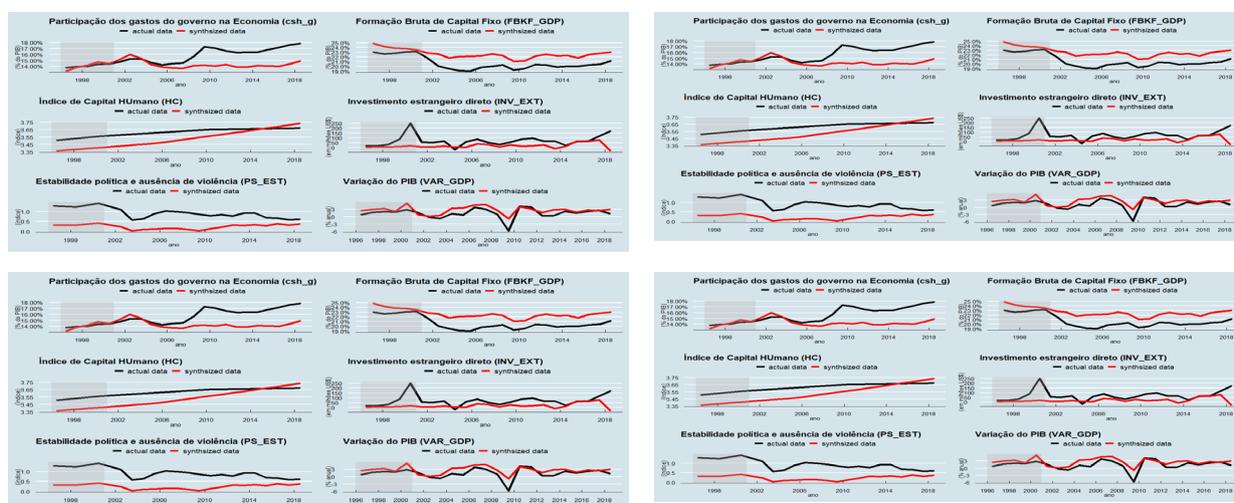
Table 3 - **Average forecast of the CPI and control variables for Germany (1996-2000)**

Variables	Treated	Synthetic	Average of the Donor Pool	Gap (Treated – Synthetic)	Gap in % (Synthetic / Treated)
CPI	8.000	7.999	6.075	0.001	-0.011%
VAR_GDP	1.882	3.262	3.742	-1.380	73.294%
IND_VA	28.237	25.668	29.377	2.569	-9.099%
IGP	0.283	3.553	6.235	-3.270	1153.592%
GFCF_GDP	0.229	0.241	0.240	-0.011	4.915%
VAR_GFCF	2.095	2.540	5.017	-0.445	21.253%
HCI	3.539	3.388	2.770	0.150	-4.246%
CSH_G	0.141	0.141	0.160	0.000	0.000%
INV_EXT	79559.960	8504.772	10292.540	71055.188	-89.310%
GE_EST	1.831	1.492	1.026	0.338	-18.489%
PS_EST	1.314	0.351	0.489	0.964	-73.304%

Note: * values expressed in millions of dollars.
Source: Own elaboration (2021).

Figure 3 presents the behavior of the main covariables used for the synthetic control, before and after the treatment date.

Figure 3 – **Individual synthetic control variables used for the announcement of Germany as host of the World Cup**
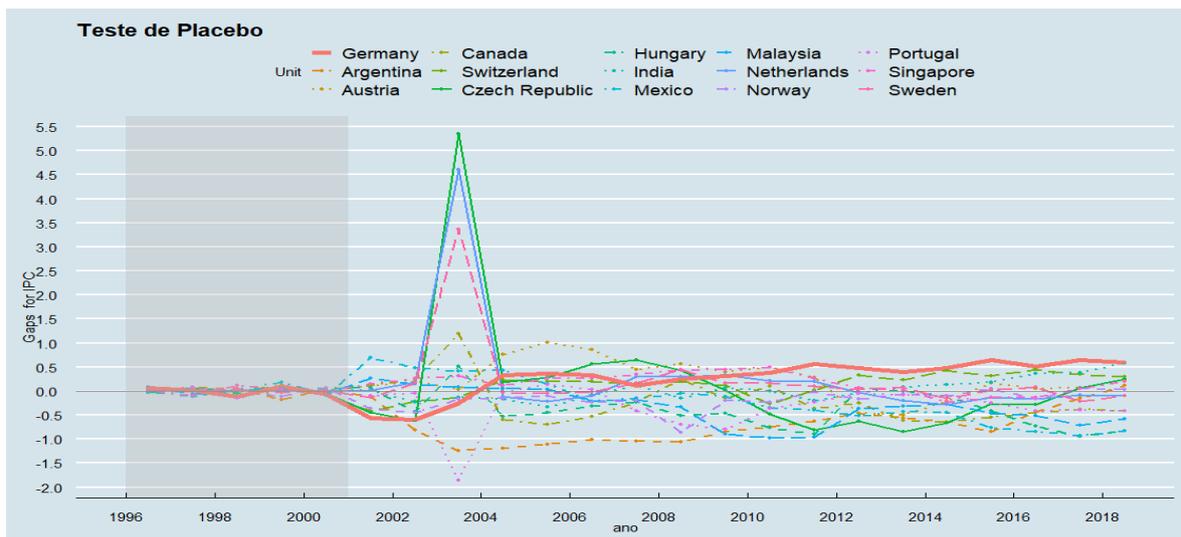

Source: Own elaboration (2021).

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Initially, a large gap can be seen in the variable foreign direct investment (INV_EXT) in the pretreatment period between the real and synthetic countries in 2000 (Figure 3). This explains why in the period, in comparison with other countries, Germany received large foreign investments, around US$ 248.01 billion, according to data from the World Bank (2020), exactly when FIFA announced it would be the host country of the 2006 World Cup[6].

Besides this, after the intervention period, the variable CSH_G, which measures the share of the government in the economy, strayed from the synthetic control. According to Dauderstädt (2013), the German economy recovered slowly in 2006 after a period of weak growth, but with the advent of the global financial crisis in 2008, the country's economy stagnated again. In this circumstance, the variable VAR_GDP declined, concomitantly with elevation of CSG_H, thus demonstrating the fundamental role of the government in renewed growth.

Figure 4 presents the results of the placebo test, restricted to the countries that presented an estimate up to twice the value of the mean squared prediction error (MSPE) in relation to the synthetic country, so that 15 countries remained for comparison. The red line denotes the gap between Germany and its control and the other lines represent the gaps of the other countries in relation to the synthetic control.

Figure 4 – **Placebo test considering the year Germany was announced as host of the 2006 World Cup (2000)**

Source: Own elaboration, with application of the R software (2021).

After the shock in 2000, the gap of the CPI between Germany and its control was at the lower bound of the gaps of the other countries, highlighting the significance of the impact on greater corruption perception. However, this result reversed as of 2004, with maintenance of values higher than those of all the others in practically the entire period after the Cup occurred.

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6   We also tested the shock of the announcement one year previously due to the immediate impact of external investment, but the results were almost the same.

b. FIFA world cup in South Africa

Between 1996 and 2005, South Africa presented a decline of more than 1 point in the Corruption Perception Index, denoting an increase in the perceived level of corruption. However, after the announcement of the country as the host of the World Cup in 2004, this trend reversed. Between 2004 and 2007, the CPI rose by 0.6 point, but this change in viewpoint of society was temporary. Even before the event occurred, the indices indicated an increase in perception, and in 2011, one year afterward, the index reached 4.1, the lowest level in the period from 1996 to 2018 (indicating high corruption perception by society).
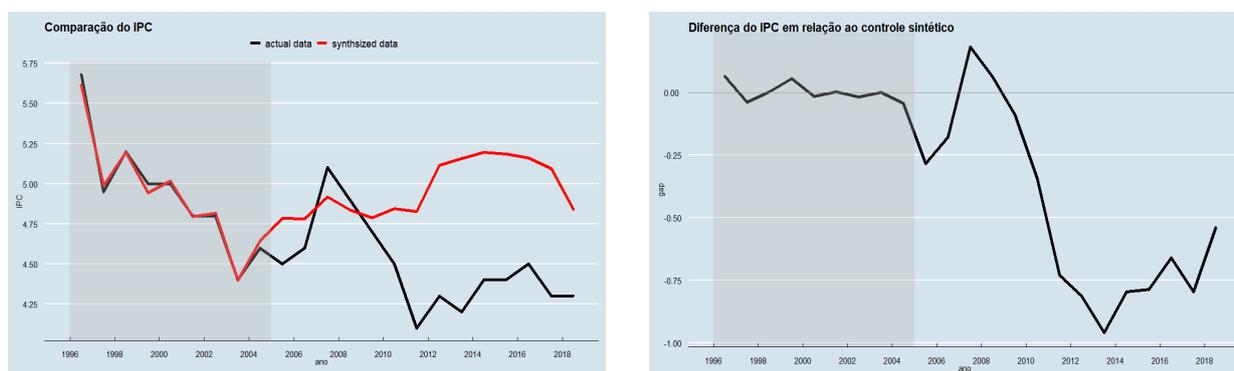
As pointed out by Tavares and Romão (2021), political interference and pressure are behaviors that diverge from the public interests in South Africa and contribute to increase the perception of corruption. In line with these claims, Cottle, Capela and Meirinho (2013) alleged that the increase of the costs of hosting the World Cup in South Africa was initially attributed to global vulnerability due to the economic crisis of 2008. For example, the costs to build stadiums initially allocated were 10 times lower in the last estimate performed by the authors, a huge increase in costs, strengthening indications of overbilling.

According to Bellido, Olmos and Román-Aso (2021), the lack of regulation and control encourages multinationals to engage in anticompetitive actions, as happened in the country during the World Cup. According to Cottle, Capela and Meirinho (2013), there is evidence of overbilling amounting to more than R$ 1 billion.

As described by Cottle (2011), the realization of the World Cup in 2010 had a huge negative impact, causing increased public and individual indebtedness, high opportunity costs associated with the event, displacement of local expenditures and aggravation of the already large social and economic inequalities in the country.

Figure 5 shows an analysis of the synthetic control for the CPI during the period from the announcement (2004) and the year of occurrence of the event (2010) in South Africa. The adjustment between the treated and synthetic variables for South Africa was the best among the three countries studied here.

Figure 5 – **Analysis of synthetic control for the CPI during the period from the announcement (2004) to occurrence (2010) of the FIFA World Cup in South Africa**

Source: Own elaboration

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The announcement of the event was associated with a change in the sign of the gaps, as occurred for Germany, albeit to a lesser magnitude. The behavior is more evident due to the quality of the adjustment. In other words, the announcement of the country as host of the World Cup generated a mismatch between the treated and synthetic countries, in the sense of worse corruption levels perceived at the start, followed by rapid improvement and then reversal of the gap in relation to the synthetic control. On the other hand, unlike the case of Germany, the lower perception of corruption was not sustained after the event was held, also straying from the behavior of its control. This difference in the legacy of the event is in line with the considerations of Wan and Song (2019) regarding the results of developed versus developing host countries.

We performed a test for the year of occurrence of the event, 2010, as the treatment year, to see if the results would be the same (worse corruption perception in the country after the Cup). The results were consistent, even over the longer term. Furthermore, the similar results between Germany and South Africa also reinforce the consistency of the behavior indicated so far.

Figure 6 depicts the relationship of some of the control variables for South Africa and the synthetic control[7]. Of particular note, after the announcement of the Cup, the variable CSH_G, which represents government consumption, grew significantly: government consumption represented 15.18% of GDP in 2004, while in 2006, the year of the Cup, it represented 18.78%, an increase of more than 3 percentage points, according to data from the World Penn Table (2021), a fact that can be associated with the holding of the event.

As expected, however, unlike the case of Germany, there was a peak in government investments as a proportion of GDP in the period between announcement and occurrence of the event. The same happened for foreign direct investments in the country.

Another variable that deserves special mention is PS_EST, denoting political stability. After the announcement of the Cup, the country's stability increased. Indeed, South Africa was the first country on the African continent to host the World Cup, and according to Branski et al. (2013), this was an important political conquest for the country and Africa as a whole. However, just before the occurrence of the event, this political stability started to erode.

Figure 6 – **Individual synthetic control variables used for the period after announcement of South Africa as host of the World Cup**
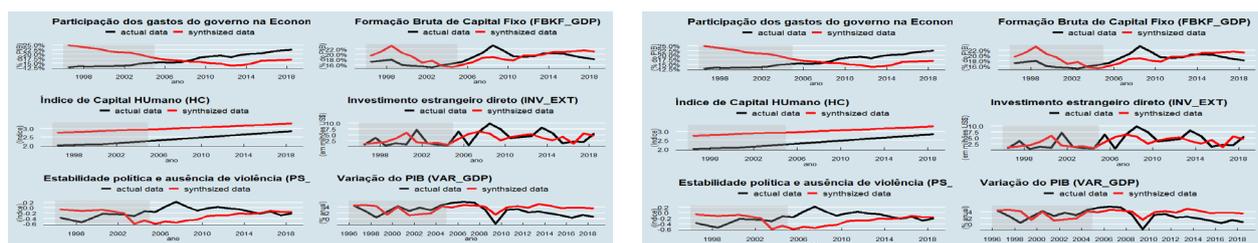
Cont... Figure 6
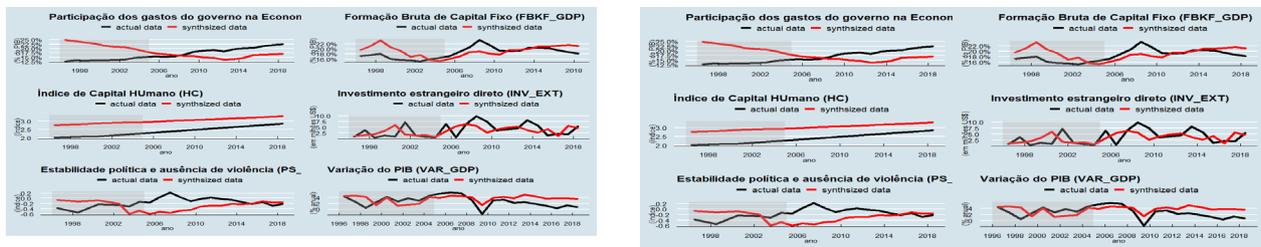
Source: Own elaboration (2021).

Furthermore, Figure 7 presents the proposed placebo test. The analysis is restricted to the countries that presented adjustment of more than 20 times[8] the value of the MSPE in relation to the synthetic country. Thus, we remained with 10 other countries for comparison.

Figure 7 – **Placebo test for South Africa considering the year of announcement of the World Cup (2004)**
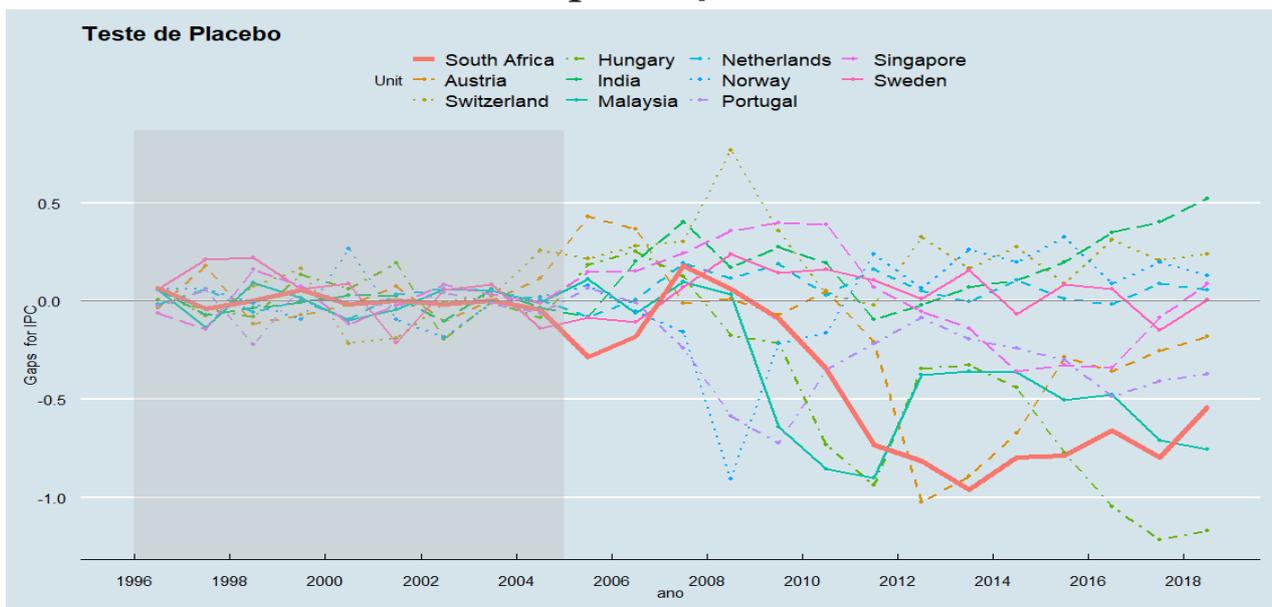
Source: Own elaboration, with application of the R software (2021).

Of special significance is the behavior just after the announcement of the country in 2004 as host of the Cup in 2010, although the adjustment of the other countries was not as good as that of South Africa. This effect lost significance in 2007, when four other countries presented greater effects and 6 lower effects. After the games occurred, the index resumed being significant, with the corruption perception rising (behavior that differs from that of Germany).

e. FIFA world cup in Brazil

As can be seen in Figure 1, Brazil has the lowest indices among the three host countries analyzed. According to Abramo (2005), the common characteristics of countries

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with high corruption perception are pervasive impunity, war and other conflicts, deficient governance and fragile institutions.

In the period before the announcement by FIFA in 2007, a huge political corruption scheme was discovered in 2005, called Mensalão ("Big Allowance"). This case began with a complaint filed by the Federal Prosecution Service with the Supreme Court, which resulted in Criminal Action 470[9], referring to payments by members of the executive branch to congressional representatives in return for legislative support. With the disclosure of the Mensalão, Brazil's Corruption Perception Index plummeted from 3.9 in 2004 to 3.3 in 2006.

In 2014, the year the Cup occurred, there was disclosure of an even larger corruption scandal, called "Operação Lava Jato" ("Operation Car Wash"), involving kickbacks on contracts with Petrobras (the government-controlled oil company, with the bulk of the illegal payments going to political parties and Petrobras executives). This operation was one of the greatest initiatives to control corruption and money laundering in the country's history.

Furthermore, because of the firm deadline for conclusion of the various public works projects needed to host the Cup, (and later the Olympics in 2016), the so-called Differential Contracting Regime was implemented, according to which the normal rules on public tenders for contracting of projects were relaxed.

In this context, there were many accusations of corruption in the national media (Marques, Alves & Wada, 2020). Besides this, Melo-Silva, Lourenço and Angotti (2021) found that the companies that received the most to construct infrastructure for the 2014 World Cup also were among those later found to be involved in corruption by the "Operação Lava Jato" investigation.

Another case of official misdeeds happened in 2015, when the Chamber of Deputies approved a motion for impeachment of then President Dilma Rousseff for violation of the Fiscal Responsibility Law during her reelection campaign. She was convicted by the Senate in 2016 and the vice president served the rest of her term (2016 to 2018).

After several attempts to adjust the synthetic control, unlike the cases of the other countries, we were unable to obtain satisfactory results (MSPE = 0.034)[10]. Because of the low quality of the synthetic control, casting doubt on the comparison of the post-treatment results, we assumed that the impacts of the Mensalão scandal on the perception of corruption impaired the adjustment for determination of the synthetic control for Brazil. According to Ribeiro (2014), in the run-up to the Cup, Brazil was marked by street protests, with the main demands being reduction of bus fares, combat of corruption, and better infrastructure and policies aimed at improving the lives of the people instead of preparing for the Cup.

As shown in Figure 8, the shock on the corruption perception was changed to the date of disclosure of the Mensalão, in 2005[11]. With this, we obtained a more significant fit.

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9   For more information, access the link: <https://portal.stf.jus.br/processos/detalhe.asp?incidente=11541>.

10   Figure B1 (Appendix B) presents the comparison of Brazil and its control.

11   Besides this, in a further attempt to find a better control, we removed the data for 1996 and 1997, so that the adjustment before the scandal was better able to capture the variations of the observed index, mainly between 1998 and 2004.

Figure 8 - **Synthetic control analysis for the CPI with shocks in the year of disclosure of the Mensalão scandal (2004)**
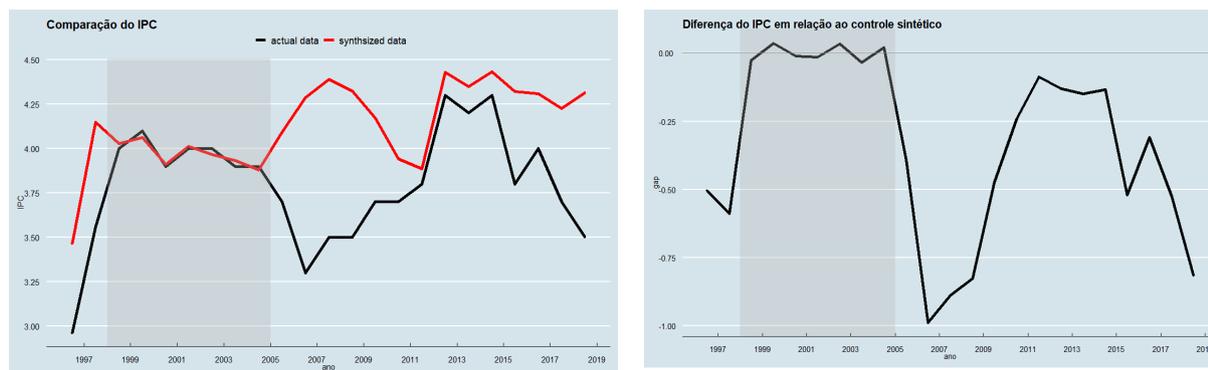
Source: Own elaboration (2021)

As expected, after 2005, year of disclosure of the Mensalão scandal, the perception of corruption intensified significantly, as indicated in Figure 11 by the gap of 1 point in 2006. However, even when considering the Mensalão as a shock, the decline of the corruption perception (increase of the index) with the approach of the year of the event is in line with what was observed for Germany and South Africa. Between 2011 and the realization of the Cup in Brazil, in 2014, the difference between the control and treated almost disappeared, but afterward the gap started to grow, as also observed in South Africa.

This reduced corruption perception could have been a reflection of an actual reduction of corruption due to greater fear of discovery and punishment of public agents. In this case, the observed behavior regarding the World Cup in Brazil would be a spurious correlation. However, Figure 9 presents the number of cased judged irregular by the Federal Audit Tribunal (TCU)[12], often used in the literature as a measure of corruption in Brazil[13] (Boll, 2010). The number of cases judged irregular increased as the Cup approached and in the year of its occurrence, with 1,268, 1,510 and 1,537 cases judged irregular in 2012, 2013 and 2014, respectively. And despite the reduction of the number of cases judged irregular in 2015, from 1,537 to 725, the monetary value of the cases definitively judged (after inflation adjustment), was approximately 3 billion reais (around US$760 million) in 2015.

Figure 9 – **Number of cases of rendering of public accounts judged**

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[12] The financial amounts are updated by the National Consumer Price Index (IPCA) until May 31, 2021, when the information was obtained by us.

[13] According to Boll (2010), after examination of accounts, they are judged regular, regular with reservation, irregular or not subject to judgment. When there are the circumstances of irregularity, there are the occurrences of loss to the public purse caused by acts of managers deemed illegitimate or intentionally wasteful, due to diversion or misappropriation of funds. Besides this, once judged irregular, the penalties are fines in cases of infraction of rules or repeat failure of the duty to comply with the determinations or recommendations of the TCU, whereby the miscreants can be ordered to repay the amount unduly gained (as also applicable when there is failure to render accounts properly). In line with the practice of Boll (2010), we excluded from the database of "Accounts Judged Irregular" (Cadirreg) the cases of fines applied and double payment of joint and several debts, considered here as cases of governmental corruption. Access to the Cadirreg database was formalized through Request for Access to Information submitted to the TCU Ombuds Office, under no. 338183 in 2021.

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irregular in Brazil and financial amounts attributed as unjustified cost overruns of the responsible parties from 2000 to 2017
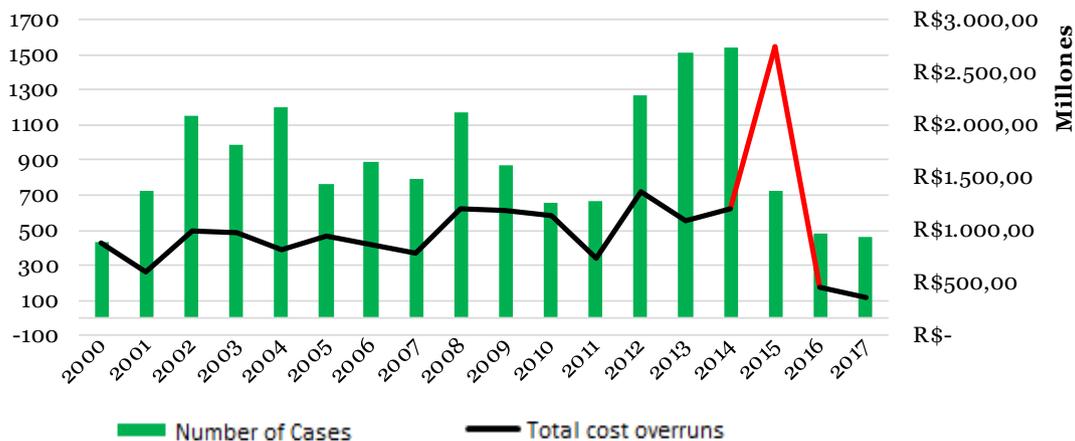

Source: Own elaboration, based on data from Cadirreg (2021).

Based on these findings, the decline in the perception of corruption in Brazil, denoted by the CPI, cannot be explained by a decrease in the number of cases judged irregular in the years under analysis. This strengthens the theory that of the effect of the FIFA World Cup improving the index.

Therefore, despite the difficulties of analyzing the impact of corruption in Brazil in the period before the Cup, the following findings stand out: 1) the period was marked by two major corruption scandals ("Mensalão" and "Operação Lava Jato"); 2) there was no reduction of corruption according to the most objective corruption measure used (public accounts judged irregular by the TCU) in the years when the CPI fell; and 3) the behavior was similar to that observed in the other two countries analyzed previously.

Figure 10 shows the comparison between Brazil and the synthetic controls of the main control variables used[14]. The variable INV_EXT, which denotes foreign direct investment in Brazil, rose considerably after the announcement the country would host the World Cup in 2014 and would also host the Olympic Games (city of Rio de Janeiro) in 2016. This situation is similar to that experienced by Germany after being chosen as the host country of the World Cup for 2006.

Figure 10 – **Individual synthetic control variables applied to the announcement of Brazil as World Cup host country.**
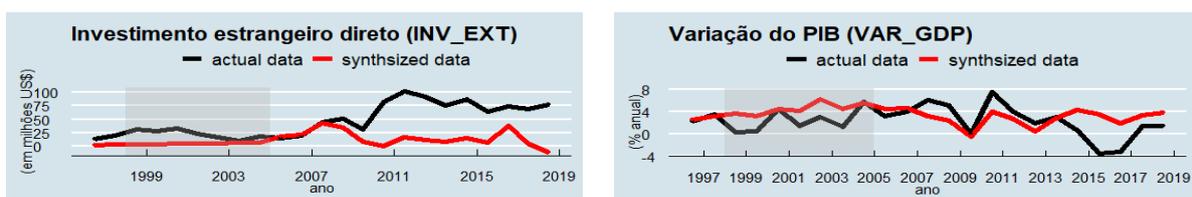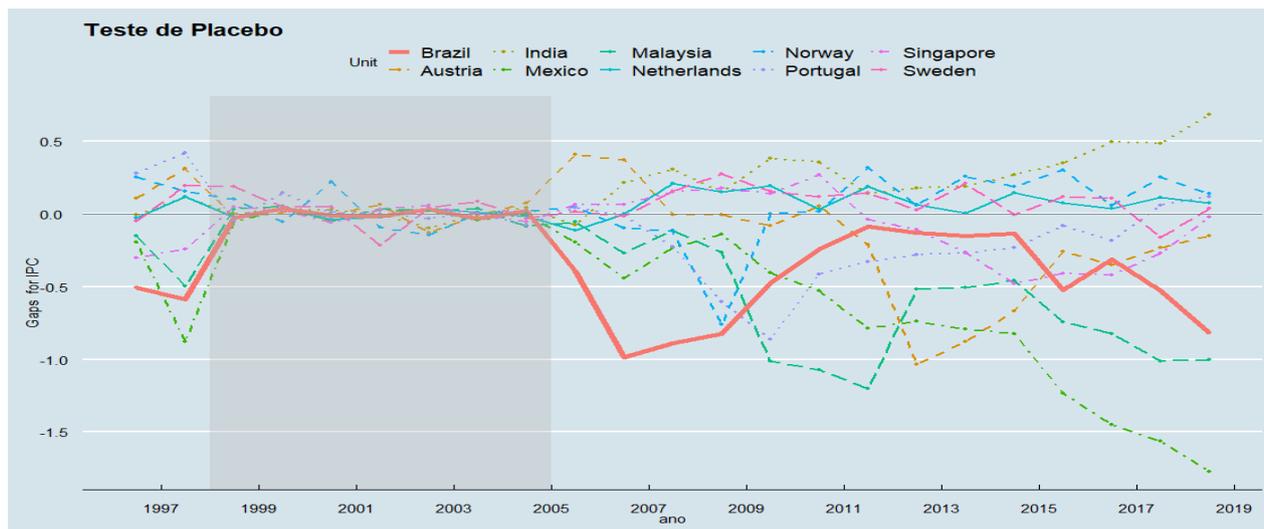

Source: Own elanoration with aplication of thr R (2021)

Figures 11 present the results of the placebo test. The analysis is restricted to countries

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14 Table B2 (appendix B) presents complete analysis.

that presented an adjustment of up to 20 times the value of the MSPE obtained for Brazil in relation to the synthetic country, with the placebo test only applied to 10 countries (9+1). We observed a significant shock on the perception of corruption after 2005, followed by a rapid return to the level of results found for other countries, i.e., the shock lost significance as 2014 approached.

Figure 11 - **Placebo test for Brazil considering the Mensalão scandal as a shock (2004)**

Source: Own elaboration, with application of the R software (2021).

Final considerations

The objective of this study was to measure and analyze the corruption perception in three countries due to hosting the World Cup. The results indicated changes in corruption perceptions from the announcement of the host country until the holding of the event.

Despite the prestige and positive effects claimed by proponents of hosting the games, the mistrust of the public in general in the three countries studied seems to have increased in relation to the behavior of the controls from announcement of host the FIFA World Cup. However, as the event approached, this trend reversed, with reduction in the country's level of perception of corruption, indicating to a drop in corruption or the population being distracted from the actual corruption present. Only Germany managed to maintain low levels of corruption perception after the event.

In South Africa the padding of construction contracts noted by Cottle, Capela and Meirinho (2013) and Brazil with the "Operação Lava Jato", the overbilling and the increase in the number of federal accounts judged irregular by the TCU during the period of preparation for the event, are relevant findings. Therefore, the data suggest that the FIFA World Cup affected the population's perception of corruption, irrespective the actual corruption in the country.

These results were obtained by applying the synthetic control method of Abadie and Dimanond (2010). We stress the difficulty of obtaining well-adjusted controls for Brazil, due to the "Mensalão" corruption scandal widely reported in the media, and in Germany

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because of the short time period for pretreatment of data. Nevertheless, the similarity of the results obtained for the three countries brings greater certainty to these final conclusions.

In summary, investigating the perception of corruption is not an easy task, mainly in this macro approach. Besides this, as pointed out by Abramo (2005), measuring the perception of corruption requires prudence, since it adds little information about the empirical phenomenon. In this study, however, the results obtained indicated possible deviation of perception, not of corruption itself.

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Appendix

A- Analysis: South Africa

Table A1- **Average forecast of the CPI and control variables for South Africa (1996-2004)**

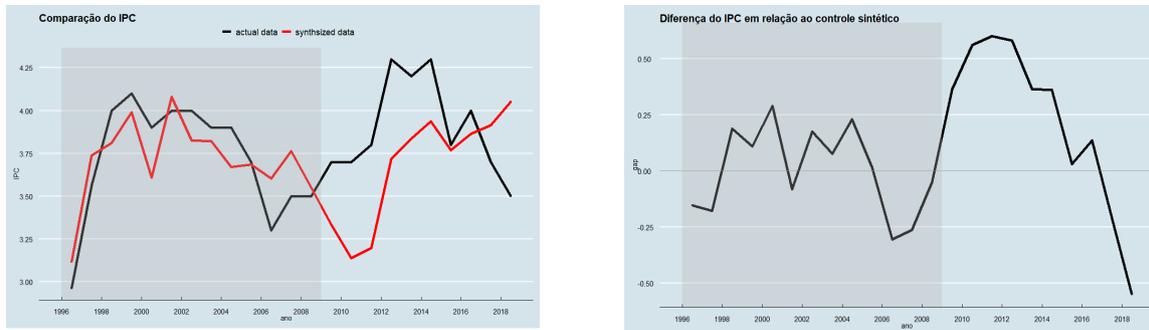| Variables	Treated	Synthetic	Average of the Donor Pool	Gap (Treated – Synthetic)	Gap in % (Treated / Synthetic)
CPI	4.937	4.935	6.081	0.002	-0.032%
VAR_GDP	3.100	3.063	3.452	0.037	-1.206%
IND_VA	29.179	25.902	29.203	3.277	-11.231%
IGP	7.964	4.989	5.304	2.975	-37.352%
GFCF_GDP	0.164	0.188	0.231	-0.024	14.776%
VAR_GFCF	5.027	2.487	3.881	2.540	-50.521%
HCI	2.109	2.861	2.807	-0.752	35.633%
CSH_G	0.137	0.219	0.160	-0.081	59.395%
INV_EXT	1987.127	2251.553	10455.590	-264.426	13.307%
GE_EST	0.736	0.507	1.043	0.229	-31.145%
PS_EST	(0.307)	(0.259)	0.408	-0.048	-15.683%

Note: * values presented in millions of dollars.
Source: Own elaboration (2021).

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B- Analysis: Brazil

Figure B1 – **Synthetic control analysis for the CPI with shocks in the year of announcement of Brazil as host of the FIFA World Cup (2007).**

Source: Own elaboration (2021)

Table B2 – **Average forecast of the CPI and the control variables for Brazil (1998-2004)**

Variables	Treated	Synthetic	Average of the Donor Pool	Gap (Treated – Synthetic)	Gap in % (Synthetic / Treated)
CPI	3.971	3.971	6.089	0.001	-0.015%
VAR_GDP	2.363	4.459	3.204	-2.097	88.75%
IND_VA	22.771	26.700	29.070	-3.929	17.26%
IGP	8.344	8.330	5.017	0.014	-0.17%
GFCF_GDP	0.177	0.264	0.228	-0.087	48.80%
VAR_GFCF	0.020	4.243	2.547	-4.223	21,547.24%
HCI	2.088	2.365	2.827	-0.277	13.25%
CSH_G	0.221	0.158	0.159	0.063	-28.63%
INV_EXT*	23.058.340	4.735.750	11.922.140	18.322.590	-79.46%
GE_EST	0.057	0.323	1.060	-0.266	463.18%
PS_EST	-0.018	0.117	0.380	-0.135	-749.66%

Source: Own elaboration (2021).