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The Net Effect of Giant Sports Competition on Local Economy: Evidence from Olympic Games and World Cup

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Abstract. The Qatar World Cup, with a staggering investment of up to $220 billion, has been concluded for half a year. However, considering the financial returns solely from the World Cup, it falls far short of breaking even. This raises the question of whether hosting large-scale sports events is worthwhile. This study provides new evidence on the economic impact of hosting major sports events in the host country through a natural experiment. Based on data from the Olympics and World Cups held between 1991 and 2021, the experimental results indicate the following: 1. Hosting major sports events has a net positive effect on the local economy by influencing the employment rate and promoting the development of the service sector, thereby boosting GDP. 2. The hosting of major sports events can yield better economic benefits for developing countries under specific circumstances. Based on the research findings, policymakers should prioritize considering the development of infrastructure in the host country and the return period of investment costs for hosting major sports events. They should also contemplate whether the events align with the local culture and level of community participation.

Keywords: Giant Sport Competition; Local Economy; World Cup; Olympic Games.

1. Introduction

On February 14, 2022, the 56th Super Bowl was held in Los Angeles, with the Los Angeles Rams hosting the Cincinnati Bengals. The Rams emerged victorious with a score of 30-23, securing a win on their home turf. However, the focus of this article is not on the game's outcome. The 56th Super Bowl took place at the renowned SoFi Stadium, touted as the most expensive sports arena in history, with a staggering cost of $5.5 billion. The stadium had a live attendance of 100,000 spectators, while an additional 101 million people watched the Super Bowl online. The halftime show featured rap icons such as Dr. Dre, Snoop Dogg, Eminem, Kendrick Lamar, and Mary J. Blige, which led to a peak in viewership surpassing the pre-game period. The Super Bowl garnered immense attention, but did it ultimately recoup its "ticket price"?

The expenses associated with the SoFi Stadium alone far exceeded the projected revenue of $477 million from the Super Bowl. While the appearance fees for the halftime show guests may be negligible, the stadium's cost alone surpassed the expected income. However, the economic impact of large-scale sporting events extends far beyond these figures. SoFi Stadium is set to host the Olympic Games, college football leagues, and other events in the future. The halftime show generated significant traffic for the featured guests, such as Lady Gaga's appearance in 2017, which propelled her new album to second place on the Billboard charts. The Super Bowl also brings substantial economic benefits to new media platforms. Both participating teams in Super Bowl 56 gained over 100,000 followers on TikTok within 24 hours, while the Rams increased their Instagram followers by 140,000. These economic values are difficult to measure solely in terms of dollars (Conviva, 2022; ChicMyGeek, 2022; Cao, 2022; Li, 2021; Tenxun, 2022).

Therefore, the main focus of this article is to discuss the economic value that large-scale sporting events bring and whether it is worthwhile to invest such a significant amount of human and financial resources, as well as attention. Large-scale sporting events mentioned in this article refer to those with viewership exceeding 5 million, including both online and offline audiences. Examples include the NBA Finals, Super Bowl, World Cup, and Olympic Games. The economic value they bring encompasses various factors, such as infrastructure, ticket sales, advertising, broadcasting rights, service industry consumption, and streaming media attention, particularly in the mobile era. Since the

rise in mobile viewership of sports events, their economic value to streaming media platforms has been immense. They not only generate tremendous attention for the participants but also bring substantial economic value to platforms like TikTok, Instagram, Tencent, and others(conviva, 2022).

Previous research on large-scale sporting events can be broadly classified into three categories. The first category focuses on the direct economic value of such events. Studies in this category examine the economic impact of large-scale sporting events on host cities and their surrounding areas, analyzing the direct expenditures related to sports events and the economic changes before and after hosting such events. The limitation of this research is its narrow focus on the impact on host cities and their immediate vicinity. However, hosting sports events in different cities and countries may yield different results, emphasizing the regional nature of such studies (Baade & Matheson, 2004; Szymanski, 2010; Matheson & Baade, 2006;Coates & Humpreys, 2002; Firgo, 2021; Li&Blake, 2009; Zhang & Zhao, 2007; Preuss,2004; Maennig, 2007; Kasimati &Dawson, 2009).

The second category of literature primarily focuses on the indirect economic impact of large-scale sporting events. These studies concentrate on the endogenous growth in host regions due to major sports events, examining the influence of such events as new driving factors on resident consumption. Additionally, this category of research explores the positive implications of sports events for related sports industries (Cornelissen, 2007; Scandizzo& Pierleoni, 2017; Kima& Gursoya, 2003; Bob& Swart, 2009; Shipway, 2007).

The third category of literature encompasses comprehensive studies on the economic and social impact of large-scale sporting events. These studies are more holistic compared to the first and second categories. However, the viewpoints in these three categories are based on the economic impact related to traditional media, without fully considering the economic influence of large-scale sporting events on new media platforms. With the emergence of "influencers" as a new and popular profession, the importance of traffic and attention has become increasingly prominent. This article aims to integrate new media research into the economic benefits and value of large-scale sporting events (Wolfe&Müller, 2018; Baade& Matheson, 2008; Jones, 2001; Horne& Manzenreiter, 2004).

This article examines the economic impact of large-scale sporting events in multiple countries and regions, emphasizing the potential value brought by these events to streaming media platforms, as well as the economic value derived from new media perspectives.

2. Hypothesis

Large-scale sporting events not only have a profound impact on the local economy but also bring about significant social effects. Therefore, it is essential to comprehensively consider the socio-economic impact when evaluating the influence of such events. However, it is important to note that hosting a major sports event incurs substantial expenses, imposing a significant financial burden on the organizers. In the case of the Olympic Games, the expenditures can be categorized into the following areas:

Operating Expenditures: This includes the costs associated with organizing and managing the event, such as venue rentals, logistics, security, and staffing.

Olympic-Related International Tourism Expenditures: Hosting a major sports event often attracts a large number of international tourists, leading to increased spending on accommodations, transportation, dining, and entertainment. These expenditures contribute to the local economy and can have a positive impact on sectors such as hospitality and tourism.

Exports and Foreign Investment Legacies: Major sports events provide a platform for host countries to showcase their products, services, and investment opportunities to a global audience. This exposure can lead to increased exports and foreign direct investment, stimulating economic growth in the long term.

Investment in Olympic Venues and Related Facilities: Host countries typically invest in constructing or upgrading sports venues, infrastructure, and related facilities to meet the requirements

of the event. These investments can enhance the local sports and recreational infrastructure, providing long-term benefits for the community.

Investment in Olympic-Related Infrastructure: In preparation for hosting a major sports event, host countries often invest in improving transportation networks, urban development, and public amenities. These infrastructure investments can have lasting positive effects on the local economy and quality of life for residents.

Given the substantial financial commitments associated with hosting large-scale sporting events, it is crucial to accurately assess the positive economic effects that these events can generate. Therefore, we propose Hypothesis 1, which aims to evaluate the economic impact of hosting major sports events comprehensively.

Expanding upon the mentioned points, it is essential to consider the multiplier effects of the event on the local economy. These effects include job creation, increased business activities, and tax revenues. Additionally, the event can enhance the host city's global reputation, attracting future investments and boosting tourism even after the event concludes.

By considering a comprehensive range of factors and conducting a thorough analysis, we can gain a better understanding of the economic benefits and potential drawbacks associated with hosting large-scale sporting events. This knowledge will enable policymakers and organizers to make informed decisions and optimize the socio-economic impact of such events.

Hypothesis 1: Large-scale sporting events generate positive economic effects and promote local economic growth.

Both developing and developed countries have experiences in hosting large-scale sporting events. However, the hosting of such events has resulted in significant financial liabilities for certain cities. For example, the 1976 Montreal Olympics burdened the citizens of Montreal with a debt lasting for 30 years. The 1980 Moscow Olympics, held just four years later, cost the Soviet Union around 9 billion USD, but the return on investment was close to zero. On the other hand, the 1984 Los Angeles Olympics was undoubtedly a successful event. Furthermore, the 2008 Beijing Olympics is a prime example of a successful Olympic Games. The investment for the 2008 Beijing Olympics was enormous due to the need for constructing new venues and infrastructure. However, it also generated substantial revenue, bringing approximately 12.1 billion yuan to Beijing.

Therefore, the economic effects brought about by large-scale sporting events may depend on the economic environment, social background, and level of development of the host city and country. To discuss this issue, the social context at the time of hosting a large-scale sporting event must be taken into account. For example, the 1980 Moscow Olympics faced significant economic consequences due to the Soviet Union's invasion of Afghanistan, leading to boycotts from nearly half of the participating countries. Similarly, the 1986 FIFA World Cup in Mexico greatly stimulated the Mexican economy at a time when it was experiencing economic stagnation. Hence, it is hypothesized that large-scale sporting events may have a greater economic impact on developing countries, thus leading to Hypothesis 2.

Hypothesis 2: It is hypothesized that large-scale sporting events generate greater economic benefits for developing countries compared to developed countries.

When evaluating the economic effects of large-scale sporting events, it is crucial to consider not only the direct revenue generated but also the broader economic impact. While direct revenue represents only a fraction of the overall economic effects, the substantial growth in consumption within the local service industry due to these events should be considered. Thus, it is hypothesized that large-scale sporting events promote local economic growth by fostering the development of the local service industry (Hypothesis 3).

The successful hosting of the 1986 FIFA World Cup in Mexico played a significant role in rejuvenating the country's economy. One contributing factor was the substantial employment opportunities created as a result of hosting the World Cup. Despite Mexico's economic downturn during that period, there was an available surplus of labor. Consequently, it is undeniable that large-scale sporting events can generate employment and stimulate economic growth. Hence, the

hypothesis is proposed that large-scale sporting events promote local economic growth by creating employment opportunities (Hypothesis 4)(Jones, 2001; Li and Blake, 2009; Viktoria et al., 2017).

3. Method

3.1 Data

In this paper, secondary data from the National Bureau of Statistics of China, indicators of the World Bank, CNKI database, China National Statistical Yearbook and other sources are used for the period from 1986 to 2021. Samples are collected at the national level. In this paper, the economic indicators of all the countries that have hosted the Olympic Games and the World Cup and the neighboring countries that have not hosted the Olympic Games and the World Cup in the past 30 years are collected, including GDP, per capita gross National income (GNI) measured by purchasing power parity (PPP), urban population (as a percentage of total population), Tax revenue (as a percentage of GDP).

3.2 Variables

The main dependent variable of this paper is GDP, which is the most intuitive economic indicator used to measure economic changes. Meanwhile, the Olympic Games is held as a unit of city, while the World Cup is held as a unit of country, and a World Cup will include many cities in a country. This paper studies the GDP data during the period from 1991 to 2021. Through whether large-scale sports events are held as the basic index, economic data of countries that have held large-scale sports events and neighboring countries that have not. Meanwhile, the other dependent variable is the employment rate, which is used to study whether hypothesis 4 is true.

The control variable selected in this study is: Per capita gross national income (GNI) measured by purchasing power parity (PPP) (current international dollars), urban population (proportion of total population), tax revenue (proportion of gross national product (GDP)), there are many factors affecting economic changes, especially macro changes will have a greater impact on GDP. We hope that by adding these control variables, we can minimize the influence of macro factors on the experimental results.

The primary dependent variable of this study is the GDP of various countries. GDP is considered the most significant indicator of domestic economic development and is influenced by various factors. It can effectively reflect the economic boost resulting from the hosting of major sporting events.

Dependent variable:

GDP measures local economic growth.

Independent variables:

Natural experiment:

Dummy variable: World Cup. If a country hosts the FIFA World Cup, it is assigned a value of 1; otherwise, neighboring countries that did not host it are assigned a value of 0.

Time after hosting = 1; time before hosting = 0.

Olympics:

Dummy variable: If a country hosts the Olympics, it is assigned a value of 1; otherwise, neighboring countries that did not host it are assigned a value of 0.

Time after hosting = 1; time before hosting = 0.

Control variables:

Population: Percentage of urban population, indicating the level of urbanization.

GNI: Average purchasing power, representing the economic status.

Service: Percentage of the tertiary sector, a crucial variable for assessing the development of local services. It can be used to test hypothesis 3.

Employment: Employment rate, an essential variable for measuring the current economic situation. It can be used to evaluate hypothesis 4.

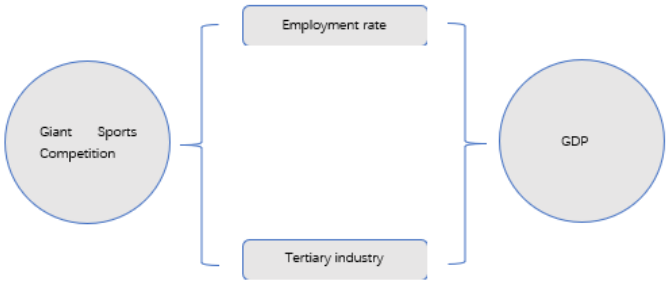

Fig.1 mode

3.3 Model

Hosting major sporting events can be considered as a natural experiment that overcomes endogeneity issues. Assuming that the hosting of the World Cup and Olympics is exogenous, we can treat the hosting of these events as a natural experiment to examine their impact on local economic growth. To do so, we can employ a Difference-in-Differences (DID) model, where the treatment group consists of countries hosting the World Cup or Olympics, and the control group consists of neighboring countries that did not host these events. The time period for the experiment corresponds to the years when the Olympics and World Cup were held. Thus, we can propose the following basic regression equation:

$$Growth_{it} = \alpha_0 + \alpha_1 WorldCup/Olympics + \alpha_2 Control_{it} + Year_t + v_i + \mu_{it}$$

To examine the mediating effects of increased employment rates and the development of the service industry, we can propose the following equations

$$Growth_{it} = \alpha_0 + \alpha_1 WorldCup/Olympics * Employment/Service + \alpha_2 Control_{it} + Year_t + v_i + \mu_{it}$$

4. Empirical results

4.1 Olympic Games

The empirical results of Olympic Games on local economy without control variables is as below:

Table1 Olympic Games on local economy without control variables

DV	gdp
Olympics	3.0 e+12
	(11.026)
Time Effect	Yes
Control	No
Individual Effect	Yes
N	464

t statistics in parentheses. $^{*}p < 0.1$,$^{**}p < 0.05$,$^{***}p < 0.0$.

Table1 shows that Olympics of model in Table1 is significant at the 1% level, and the absolute value is 3.0e+12, Table1 shows that Olympics of model in table1 is significant at the 1% level, and the absolute value is 3.0e+12, This shows that the gdp of the country that hosted the Olympics is 3.0e+12 (US) dollars higher on average than that of the neighboring country that did not host the Olympics. This proved Hypothesis 1: Large sports events will bring positive economic effects and promote local economic growth.

Then is the empirical results of Olympic Games on local economy with control variables is as below:

Table2 Olympic Games on local economy with control variables

	gdp
Olympics	1.9 e+12
	(6.711)
Time Effect	Yes
Control	No
Individual Effect	Yes
N	372

t statistics in parentheses. * $p < 0.1$,** $p < 0.05$,*** $p < 0.0$.

Table 2 shows that Olympics of models is signifificant at the 1% level, and the absolute value is 1.9e+12, Table 2 shows that Olympics of models is signifificant at the 1% level, and the absolute value is 1.9e+12, In this experiment, we added four control variables: the proportion of urban population, the proportion of tertiary industry, the purchasing power level and the employment rate, which shows that the GDP of the country that hosted the Olympics is still significantly higher than that of the neighboring country that did not host the Olympics under the influence of the four control variables. This experiment further verifies hypothesis 1: Large-scale sports events will bring positive economic effects and promote local economic growth.

Table3. Olympic data between Developing countries and developing countries

	gdp Developed Countries	gdp Developing Countries
Development	1.1 e+12	3.0 e+12
	(3.350)	(4.347)
Time Effect	Yes	Yes
Control	Yes	Yes
Individual Effect	Yes	Yes
N	374	90

Table 3 represents developed countries that have hosted the Olympic Games, when control variables are added and the significance level is 1%, and the absolute value is 1.1e+12. For a developing country that has hosted the Olympic Games at the same time, add control variable and the significance level is 1%, and the absolute value is 3.0e+12. The results of this comparative experiment show that, under the same control variables, the average impact of the Olympic Games on the local economy of developing countries is significantly higher than that of developed countries, which verifies hypothesis 2: large-scale sports events can bring greater economic benefits to developing countries compared with developed countries.

Third is the mediation effect of Service Industry on the effect of Olympic Games on local economy:

Table4 Mediation of service industry on the effect of Olympics on local economy

	gdp
Service	3.5 e+10 * * *
	(5.809)
Time Effect	Yes
Control	Yes
Individual Effect	Yes
N	464

Table 4 shows that Olympics of models is signifificant at the 1% level. Under the influence of Olympics on gdp, the proportion of tertiary industry increases by 3.5e+10 per unit of gdp. The results of this experiment verify that large-scale sports events can promote local service industry, which verifies hypothesis 3: large-scale sports events can promote local economic growth through the development of local service industry.

Fourth is the mediation effect of Employment Rate on the effect of Olympic Games on local economy:

Table5 Mediation effect of employment on the effect of Olympics on local economy

	gdp
employment	3.6 e+10 * * *
	(5.643)
Time Effect	Yes
Control	Yes
Individual Effect	Yes
N	464

Table5. shows that Olympics of models is significant at the 1% level, for every unit increase in employment, gdp increases by 3.6e+10, This shows that the holding of large-scale sports events can improve the local employment rate, which proves hypothesis 4: large-scale sports events promote the local economic growth by creating job opportunities. All of the above results are based on experimental results in the context of the Olympic Games, a large sporting event, and all of the experimental results agree with the hypothesis.

4.2 World Cup

The results of experiments based on the World Cup context are discussed below.

The empirical results of World Cup on local economy without control variables is as below:

Table 6 Empirical results of World Cup on local economy without control variables

	gdp
World Cup	1.7 e+12 ***
	(7.187)
Time Effect	Yes
Control	No
Individual Effect	Yes
N	232

Table 6 shows that worldcup of models is signifificant at the 1% level, and the absolute value is 1.7e+12, Table 6 shows that Worldcup of models is signifificant at the 1% level, and the absolute value is 1.7e+12, This shows that the countries that hosted the worldcup had an average gdp of 1.7e+12 (US) dollars higher than their neighbors that did not. This proves hypothesis 1 in the context of the World Cup: large-scale sports events will bring positive economic effects and promote local economic growth.

Table.7 Economic impacts of large-scale sports events in developing countries

	gdp
World Cup	7.8 e+11 * * *
	(3.260)
Time Effect	Yes

Control	Yes
Individual Effect	Yes
N	232

Table 7 shows that worldcup of models (1) and (2) is signifificant at the 1% level, and the absolute value is -7.8e+11, This shows that the country that hosted the worldcup has a lower gdp on average -7.8e+11 (US) dollars than its neighbors that did not. The results of this experiment are contrary to our hypothesis that large-scale sports events can bring more economic benefits to developing countries than to developed countries.

5. Conclusion and Discussion

This study provides a new research direction for understanding the economic and social impacts of major sporting events. While previous research has generally focused on the event costs and overall economic benefits, there has been limited analysis of the specific effects of these events on local economies. This study utilizes a natural experiment approach to analyze the impact of hosting major sporting events by considering factors such as the economic background of the host location, employment rates, the share of the service industry, average purchasing power, and the proportion of urban population.

GDP, as the most direct indicator of economic development, is used as the dependent variable. Hypothesis 1 compares the GDP growth before and after hosting major sporting events in the host city or country. Control variables such as the proportion of urban population, the share of the service industry, purchasing power, and employment rates are included to analyze their effects on the experimental results. The findings indicate that both the Olympics and World Cup have a positive and significant impact on local GDP, resulting in substantial increases. This demonstrates the long-term positive benefits of hosting major sporting events. However, it should be noted that there may be some exceptional cases within these findings, as the results are based on the average values from various Olympic Games and World Cups over a span of 20 years (Pasquale Lucio Scandizzo Maria Rita Pierleoni, 2017)

This study provides a new research direction by examining the economic and social impacts of hosting major sporting events. Previous research has primarily focused on the costs and overall economic benefits of these events, while neglecting the specific effects on local economic development. This study employs a natural experiment approach to analyze the impact of major sporting events, taking into account factors such as the host's economic background, employment rates, the share of the service industry, average purchasing power, and the proportion of the urban population.

Hypothesis 2 aims to compare the effects of major sporting events on the economy under different economic backgrounds. The level of development in the host location can influence the ultimate income generated by sporting events, considering factors such as public transportation, social security, and infrastructure. Developing countries, for instance, may offer cheaper labor and have a more flexible economic structure with higher rates of class mobility and wealth redistribution. It is generally believed that developed countries have more advanced infrastructure and public transportation compared to developing countries. Thus, this study compares developed and developing countries as two distinct groups for analysis. The results reveal that, on average, major sporting events have a significantly higher impact on the economy of developing countries compared to developed countries when considering the Olympics as the background. However, the results are the opposite when considering the World Cup as the background (Heintz, Pollin &Garrett-Peltier, 2009).

Therefore, based on the comparison between the Olympics and the World Cup, we speculate that the underlying reason for these results lies in the fact that the Olympics are organized on a city-by-city basis, while the World Cup involves multiple cities within a single country. The costs associated

with constructing large sports stadiums and improving infrastructure, as well as the labor costs required for the renovation of multiple cities, differ between the two cases. Hosting major sporting events requires substantial upfront investment and preparation, with a longer period needed for the return on investment. Developed countries have less disparity in infrastructure among different cities compared to developing countries, where regional development imbalances are more apparent. Hence, in the case of the World Cup, where multiple cities and regions are involved, the upfront costs for developed countries are lower than those for developing countries, resulting in better economic effects. This insight suggests that the selection of host locations for major sporting events should consider the level of local infrastructure development and the time required for urban construction investment (Zhang &Zhao, 2007; Kenessey, 1987).

In our hypotheses, we posit that major sporting events stimulate local economic growth by driving the development of the service industry. Hypothesis 3 aims to examine the effect of major sporting events on the share of the service industry in the host location. The experimental results, regardless of whether based on the Olympics or the World Cup, indicate a positive impact on the local service industry. This finding aligns with our expectations, as the share of the service industry is a crucial indicator of regional development.

Hypothesis 4 focuses on the hypothesis that the preparation and successful hosting of major sporting events generate a substantial number of job opportunities, thereby increasing employment rates and driving economic development. The experimental results confirm that hosting major sporting events can indeed enhance local employment rates and promote economic development through increased employment opportunities and a higher share of the service industry. Post-pandemic, hosting major sporting events could potentially serve as an opportunity for economic recovery.

Overall, this study offers valuable insights into the economic and social impacts of hosting major sporting events. By considering a comprehensive set of factors and employing a natural experiment approach, this research provides a deeper understanding of the complex dynamics between major sporting events and local economic development, offering practical implications for policymakers and event organizers.

This study has several limitations. Firstly, the sample size of the study is relatively small. The research focuses on countries that have hosted the World Cup and the Olympics in the past twenty years, along with neighboring countries that did not host these events. Expanding the sample size to include more countries and events would enhance the generalizability of the findings.

Secondly, the study only considers the impact of major sporting events such as the World Cup and the Olympics. There are numerous other large-scale sporting events, such as the Super Bowl, NBA, and Formula 1, each with its own focus, format, and audience. Different sporting events attract distinct audiences, leading to varying economic impacts. For example, PGA TOUR and NBA have significantly different spectators, resulting in divergent economic values. Each major sporting event has its unique economic dynamics, and compared to the Olympics, professional commercial leagues like the NBA and NFL may generate greater economic value through ticket sales and related product revenues.

Thirdly, there are numerous objective factors that influence economic development, and this study's control variables may not capture all these factors. It is important to consider how changes in the external economic environment may impact the experimental results. The study should account for other macroeconomic factors that could potentially influence the observed effects.

Lastly, this research can be seen as a starting point for studying the economic development impact of major sporting events. It is important to explore the comprehensive effects of these events on society beyond just economic factors. Factors such as social cohesion, cultural exchange, and infrastructure development should be considered to gain a more holistic understanding of the impact of major sporting events.

In conclusion, while this study contributes valuable insights into the economic and social impact of major sporting events, it is essential to acknowledge its limitations. Future research should address

these limitations by expanding the sample size, considering a wider range of sporting events, accounting for additional control variables, and examining the broader socio-cultural impacts of these events.

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