Economic Impact of Mega Sporting Events on Host Country

Kang-yu REN\textsuperscript{1, *} and Yuan-jie Li\textsuperscript{2}

\textsuperscript{1}International Business School, Beijing Foreign Studies University, Beijing, China
\textsuperscript{2}The London School of Economics and Political Science, London, UK

\textsuperscript{*}Corresponding author

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Abstract. Mega sporting events such as Summer Olympic Games and World Cup have mass popular appeal and international significance. However, there are academic controversies over whether these events could have a measurable and long-lasting contribution to the host country. This paper will empirically measure the direction and magnitude of the effect of hosting such events, by utilizing a panel data set consisting of 132 countries over 1960-2016. We also incorporated qualitative economic indexes indicating the macroeconomic, regulatory and legal environment of the host countries into the model to figure out certain features which can help generate a more favorable economic outcome. The results show that Summer Olympic Games is the only mega events that exert an overall positive influence on the economy, and those countries with weak economic fundamentals significantly benefit from hosting mega sporting, while high-quality regulatory and legal environment is essential to preserve the positive legacy effect of the events.

Introduction

Driven by economic benefit, both developing and developed countries are nowadays actively bidding to stage mega sporting events. These large-scale events are the largest global sporting events in terms of publicity, financial budgets and international participation [1]. Specifically, we include Summer Olympic Games, Winter Olympic Games and FIFA Football World Cup.

So far, there are lively academic controversies over whether major sporting events have a measurable and long-lasting contribution to the economy of the host country. Recent literatures arrive at conflicting conclusions regarding the direction and the magnitude of the event-specific economic impact. In other words, the economic benefits vary widely across different types of sporting event and distinctive characteristics of host countries.

This paper empirically measures the difference of per capita real GDP growth rate between the host countries and other countries. We use a modified economic growth model with dummy variables for mega sporting event based on the model proposed by Elmer to estimate economic impact from hosting three different types of events over the period 1960-2016 [2]. Using the most recent economic data fetched from the World Bank and more observations, the paper provides an updated answer regarding the general hypothesis whether a mega sporting event introduces an overall positive influence on the economic development and whether there is a systematic difference in the economic impact induced by the three types of events.

A further hypothesis is tested whether countries with weaker economic foundation benefit more than developed countries from participating in the mega events. The test is relevant as classic literatures point out that convergence effect will help developing countries catch up, and it is meaningful for policy makers in developing countries if the test result supports the conclusion that mega events can boost the real GDP growth rate. We also compare mega events hosted by countries where doing business is easier, regulation is more sound and legal system is more complete with their counterparties respectively.
Mega Sporting Events and Their Impacts on Economy

Economic Impact Classified by Stage

For these mega sporting events we can broadly split them into three stages and then observe the impact on each stage: Pre-events impact is mainly due to preparatory activities required to stage the Games, the impacts first initiate when the country decides to bid for the mega event. The effect become more prominent after the country wins the bid. During the preparatory phrase, tourism and construction activity boost the economic growth [3]. But investment expenditure and cost from displaced projects will partially offset the gains. Events direct impact is the contemporary impact of the event, including booming tourism, jobs and revenues generated from tickets sales and commercial advertisement. However, huge operational budget might be a heavy burden. Post-events impact is the legacy effect, which occurs after the event and can last for at least several years. Prosperous tourism, human capital, urban regeneration and international reputation are the major positive contributions from the event [4].

Economic Impact Classified by Market Structure

There are demand-side and supply-side benefits based on structure. Thanks to the extensive media exposure and enhanced international reputation during the mega sporting event, a tremendous number of visitors are attracted by the city. Johan & Maria found out mega sporting events increase predicted tourism by roughly 8% in the same year on average [5]. As visitors spend money on food, transportation, accommodation and entertainment in the host country, the induced demand will boost the local economy, referred to as “direct economic impact”. This expansionary effect will be further exaggerated by additional rounds of expenditure, called “multiplier effect”. Although the initial investment on preparatory projects can be expensive, the creation or enhance of infrastructure will benefit the host country in the longer run. For instance, productivity could be raised by the improved logistic facilities and transportation capacity [6]. Additional public facilities may generate further revenue by hosting other sports events. Furthermore, extensive media exposures can attract foreign investment and international trade for an extended period of time. Such benefits may include enhancement of stock of human capital, management expertise and health condition of citizens. These are the supply-side benefits.

Model and Data

Modeling the Impact of Major Sporting Events

According to the model proposed by Elmer Sterken [7], a vector of dummy variables denoting the organization of mega sporting events is included in a simple empirical growth model in order to access the impact of mega sporting events on the per capita GDP growth rate while holding other determinants of economic growth fixed. Also, we use a vector of dummy variables representing each year to better account for the business cycle and secular trend.

Modeling the Differential Impact of Events across Countries

In order to answer the question “which types of quality or characteristics of the host country affect the impact of mega sporting events on economic growth”, we classify the 132 countries in our data set into two groups according to four qualitative appraisal indexes from Global Opportunity Index (2015), a control group and an experiential group. All the countries are sorted according to the Index, and those countries ranked in the top one third belong to the experiential group and the rest of the countries belong to the control group. Theoretically, countries should be assigned into groups annually. However, the Global Opportunity Index is not available very far into the past, and annual variation of the relative ranking is subtle, thus for simplicity those indicators are assumed to be time-invariant and the classification is solely based on the ranking of 2015.
Afterwards, each pair of regression is conducted in the following ways: 

\( a. \) Data for countries which once host the Summer Olympic Games and belong to the control group is picked out; 
\( b. \) Data for countries which never host the Summer Olympic Games is added to the data above; 
\( c. \) The regression for the control group is conducted using the preceding two sources of data; 
\( d. \) Data for countries which once host the Summer Olympic Games and belong to the experimental group is picked out; 
\( e. \) Data for countries which never host the Summer Olympic Games is added to the data above; 
\( f. \) The regression for the experimental group is conducted using the preceding two sources of data.

### Data Description

The classic growth determinants are obtained from World Development Indicators published by World Bank. This set includes GDP per capita, gross fixed capital formation, and trade data for 208 countries from 1960 onwards. However, in order to facilitate our next stage research, we deliberately reduce the set to 132 out of the 208 countries by excluding countries missing a significant amount of data. Therefore, our set is a panel data set containing 132 countries over the period 1960-2016. We also take good care of extreme values by deleting negative value of trade data and inflation rate exceeding 50%. Finally, the dummies variables denoting the mega sporting events are obtained from their official websites.

Global Opportunity Index (2015) consists of four indexes:

\( a. \) Economic Fundamentals Index measures the extent to which a country’s macroeconomic environment is conducive to foreign direct investment. The components of the index include macroeconomic performance, openness to trade, financial and physical infrastructure. 
\( b. \) Ease of Doing Business Index measures explicit and implicit costs associated with business operations. Factors such as accounting and disclosure requirements, tax burden and costs of starting a business are included. 
\( c. \) Quality of Regulation Index assesses the effectiveness of policymaking and enforcement in a country, taking into account the extent and burden of regulation, corruption, and bureaucratic transparency. 
\( d. \) Rule of Law Index reflects the extent to which a country’s legal system protects investors and enhances business investment, calculated by averaging the component score for legal infrastructure, protection of property rights and protection of investor rights.

Each index is measured according to a numerical rating ranging from 0 to 10, and a value of 10 indicates highly favorable environment, while a value of 0 indicates relatively weak conditions.

### Results and Discussion

#### Pooled Estimation

To access the impact of mega sporting events on economic growth, namely real Gross Domestic Product per capita, a pooled estimation consisting of all 132 countries in the sample from 1960 to 2016 is carried out for all three types of mega events. To save space here, all the model equations, data and regression results will be available at request to the author. The results show that the fundamental explanatory variables in each regression are highly significant and make economic sense. Consistent with our ex-ante prediction, an increase in the growth rate of gross real fixed capital formation as a percentage of real GDP or an increase in the log of trade of share of GDP contribute positively to economic growth, with one percent change of each variable leading to about 4.6% and 2.4% increase in GDP per capita growth rate respectively. An increase in the inflation rate will hamper economic growth; however, in our estimation, the negative impact is minimal though it’s highly significantly different from zero.

For Summer Olympic Games, all the dummy variables represent the host of the events is positive throughout the nine-year estimation window, indicating that the host of Summer Olympic Games not only boosts the economy of the host countries in the preparatory period but also produce certain contemporary and legacy effects. The effect increases gradually from several years before the events and reach its peak when the events are held, in which year the GDP growth rate outperforms the general trend by 1.85%, a statistically and economically significant figure. The legacy effect still
produces more than 1% increase in GDP growth rate two and three years after the events are held, after which the effect ebbs away gradually.

But Winter Olympic Games tell a totally different story, all the dummy variables are negative except the dummies representing three and four years before the events, the coefficients on both of which are less than 1% and statistically insignificant, suggesting the Winter Olympic Games lead to an overall negative impact on economic growth. The dummy representing two years after the events is the only one significant at 5% level, indicating that the host of the event decreases the real GDP per capita growth rate by 1.79%. The rest of the dummies are not highly significant and their impact on economic growth is minimal. Similarly, the effect of World Cup is not ideal. Most of dummies are insignificant, indicating that the effect of World Cup on economic development is uncertain.

**Regressions without Interaction Terms**

From the pooled estimation, the Summer Olympic Games seem to be the only mega sporting events that could generate a positive and lasting effect on the economic development of the host countries. However, each country will tell a different story. The event-specific effects may vary widely across different countries, and the findings drawn above may not hold from a disaggregate perspective. Therefore, we decompose the sample and try to find out whether certain characteristics or features of a country will cause the effect of mega sporting events to differ.

a. Quality of economic fundamentals. Intuitively, a lower Economic Fundamental Index indicates worse macro-performance, poor physical infrastructure, and immature financial markets and etc., and a country with those characteristics has sufficient space for improvement and strong potential to catch up developed country according to the convergence effect mentioned by Robert J. Barro (1996). The host of mega sporting events could serve as catalyst to fasten the speed of convergence. In contrast, country with strong economic fundamentals may not be able to push economic growth further as the opportunities of improvement and investment become fewer. By regression we found out: For Summer Olympic Games, its pre-event economic impact is consistently positive and large in magnitude for countries with weak economic fundamentals, generating a 2.3% increase of per capital GDP growth rate three years before the event. The contemporary impact is dramatic and highly significant, increasing the growth rate by 4.3%, though partially offset by drop one year later, but the legacy effect tends to be quite uncertain with both positive and negative coefficients occurring alternatively. For Winter Olympic Games, separate regressions of two sub-samples provide us a much clearer picture. All the coefficients on the dummy variables for countries with weak economic fundamental are positive and most of them are highly significant, suggesting the event benefits the host counties throughout our estimation window. The event seems to trigger faster economic growth as the coefficients on dummies represent years after the events are much larger in magnitude and highly significant. For World Cup, similar pattern can be observed. Countries with weak economic fundamentals benefits from the event, but the magnitude of its impact is comparable to that of Summer Olympic Games but far smaller than that of Summer Olympic Games. The event, however, has a negative impact on countries with strong economic fundamentals.

b. Ease of Doing Business. For Summer Olympic Games, the events lead to an increase in GDP growth rate in both groups of countries, its legacy effects tend to differ in the two groups. The event could not produce lasting positive effect on counties where doing business is more difficult, but countries where doing business is easier continue to benefit from the events, with around 2% increase in growth rate two to four years after the even. For Winter Olympic Games, it fails to produce noticeable impact on both groups of counties. The only significant dummy is the one representing two years after the event, countries where doing business is easier seems to behave better than its counterpart, with a decrease of 1.7% at 5% significance level. The results for World Cup run counter to our prediction. The coefficients on the dummies for countries where doing business is more difficult are almost positive, and several significant coefficients indicate an increase of growth rate around 1.3%. In contrast, the coefficients on dummies from countries where doing business is easier are insignificant except the only coefficient suggesting a decrease growth rate of 1.7%.
c. Quality of Regulation. For Summer Olympic Games, the economic growth of countries with worse regulation performs better before and during the event as indicated highly significant coefficients ranging from 1.5% to 2%. However, those countries could not sustain such rapid economic growth, as the growth rates are not significantly different from zero after the event. In contrast, though countries with better regulation may not benefit as much as their counterparts before the event, the legacy effect on those counties are highly significant and large in magnitude, around 2% increase in growth rate two to four years after the event. For Winter Olympic Games, the coefficients on dummies from countries with worse regulation are universally negative, and there is a significant drop of 3.2% in growth rate two year after the event. In contrast, positive and negative coefficients occur alternatively throughout the estimation window for host countries with better regulation, suggesting that the impact of the event is uncertain, but it still outperforms their counterparty. The results for the World Cup run counter to our expectation. Countries with worse regulation benefits a little before the event, while countries with better regulation suffer from a negative impact from the event.

d. Quality of Rule of Law. For Summer Olympic Games, it generates positive impact on both groups before the event, while the control group has higher and more significant increase in growth rate ranging from 1% to 1.5%. The positive impact on the control group diminish quickly once the event is over; however, countries with better rule of law persistently enjoy even higher growth rates, which are more than 2% on average during and after the event. For Winter Olympic Games, countries with weaker rule of law consistently suffer from loss in economic growth throughout the estimation window, and the decrease in growth rate of 3.19% two years after the event is most significant. In contrast, positive and negative impacts on the economy occur alternatively over the nine years for countries with better rule of law, and its losses are less prominent and smaller in magnitude. For World Cup, the estimation results run counter to our expectation. While countries with weaker rule of law slightly benefit from the event and the most significant increase of 2.17% happens two years before the event, countries with stronger rule of law suffer from economic slowdown during the estimation window, with drop of 2.15% three years after the event being most prominent.

In conclusion, the results obtained from above regressions for Summer and Winter Olympic Games are almost consistent with our ex-ante expectation. Countries with desirable characteristics will benefit more or suffer less loss from hosting mega sporting events, and such effect is especially obvious after the event. World Cup, on the contrary, always produce a surprising result which run counter to our ex-ante estimate; therefore, our finding cannot be generalized to the World Cup, and countries hosting World Cup should be studies on a case by case basis.

Regression with Interaction Terms

The coefficients on variables without interaction terms represent the effect of mega sporting events on the control group. The coefficients on variable with integration terms could represent the difference of mega-sporting-event effect between the high rating group and the low rating group. Hypothesis tests are also conducted to find out whether the event induced effect or the difference in effect between groups over a certain period of time is significant.

For Summer Olympic Games, the events generate an accumulate excess GDP per capita growth rate of 4.63% during the four years before event for countries with a worse economic fundamental, but the effect is only marginally significantly at 10% significance level. And countries with better economic fundamentals behave similarly. In terms of contemporary effects, countries with worse economic fundamentals witness a 3.67% increase in growth rate, much higher than their counterparties. After the event, only countries with better economic fundamental enjoy a dramatic increase in growth of more than 7%.

For Winter Olympic Games, the event boosts the economic development of countries with weak economic fundamentals noticeably to a greater degree than that of countries with better economic fundamentals, generating an increase in growth rate of 3.62%, 2.07% and 5.07% before, during and after the event respectively. In contrast, countries with better economic fundamentals cannot achieve
such high growth rate throughout the estimation window. They underperform their counterparties by 1.98%, -2.55% and -4.2% respectively.

For World Cup, the event could help countries with weak economic fundamentals generate a moderate increase in growth rate of 3.29% before the event, and 3.98% after the event, though the two coefficients are only marginally significant around 10%. It is noticeable that countries with better economic fundamentals perform much worse than the control group, the difference is highly significant, being -6.8% before the event and -7.8% afterwards.

Summary
The objective of this paper is to study the impact of mega sporting events on the economic development and factors that affect the direction and the magnitude of the impact. We began with a pooled estimation for three types of mega events. Summer Olympic Games, on average, have a positive effect on the per capita GDP growth rate, with statically significantly pre-event effect, contemporary effect and legacy effect being found, while Winter Olympic Games have an overall negative impact on the economy. The effect of World Cup is highly uncertain, and it should be studies on a disaggregated basis.

Then, we decomposed the data set into groups according to the Economic Index to assess how mega sporting events affect the host economies with different characteristics, and formal hypothesis tests are conducted to confirm our findings using a new model with interaction terms. Countries with weak economic fundamentals consistently benefit from hosting mega sporting events regardless the type, though the magnitude differs. In contrast, countries with strong economic fundamentals receive significantly less economic benefit, and in some case, the impact turns out to be negative.

Given the conclusion summarized above, we have following suggestions regarding the host of major sporting events, such that host country can maximize the economic benefits derived from the event while avoiding potential heavy costs.

Developing countries with a low level of economic fundamentals are strongly recommended to host a mega sporting events, as the event could magnify the convergence effect. Due to the high requirement and competitiveness of hosting Summer Olympic Games, which is the largest scale sporting events, developing countries could first try to bid for mega events requiring a much smaller financial budget.

It is not of the best interest for developed countries to host mega sporting events other than Summer Olympic Games. But the economic benefits of Summer Games are still lucrative.

In order to continuously benefit from the legacy of mega sporting events or reduce its negative impact, a sound business environment where doing business is easier is critical. So the country should take measure to make it less costly to start a business, improve accounting standard and information disclosure and relieve the corporate tax burden.

Similarly, hosting countries should improve the regulatory quality, such as enhancing the quality of policy making, relaxing the control of capital flow or fighting for corruption, and improve the rule of law, such as building comprehensive legal infrastructure, protecting property rights or strengthening investor protection, such that the positive effect of hosting mega sporting events can be better grasped and magnified.

References

