Abstract

It is acknowledged that the economic benefits of hosting a sporting mega event (SME) are overestimated and/or short-lived. However, many studies neglect the impact of the industrial sector, preferring to focus on service sector activity. It is further claimed that hosting a SME funnels a nation's resources into one specific region at the expense of others. Therefore, this paper empirically investigates whether industrial firms in Beijing disproportionately (a) increased their invested capital ahead of the 2008 Olympic Games, and (b) became more profitable after the Games, relative to similar firms from comparable Chinese non-host cities. Using a difference-in-difference estimation strategy, we find no disproportionate impact of the Olympic Games on Beijing firms' invested capital or profitability.

Keywords: *Sporting Mega-Events, Olympic Games, Beijing, China, Difference-in-difference*

What are the benefits of hosting a Sporting Mega Event? Evidence from industrial firms

Research on the economic impact of sporting mega-events (SMEs) such as the Olympic Games and the FIFA (Fédération Internationale de Football Association) World Cup is extensive (Hotchkiss et al. 2003; Matheson, 2008; Szymanski, 2010), and has predominantly focused on economic outcomes, such as personal income, employment, and taxable business sales. However, this work has consistently only found subdued and/or short-term economic benefits (Baade & Matheson, 2004; Solberg & Preuss, 2007; Allmers & Maennig, 2009; Li, Blake & Thomas, 2013).

These studies often focus on the hospitality and tourism industries since SMEs are marketed towards tourists, and given that their numbers increase during a SME (Dansero & Puttilli, 2010; Baumann & Matheson, 2018; Vierhaus, 2019; Baade et al., 2021). In anticipation of these tourism influxes, host nations are often required to increase their pre-event investment in hotels or infrastructure, such as beautifying the city, constructing and expanding stadia, updating physical and digital infrastructure, and building entertainment districts (Dollinger & Mooney, 2010; Baade & Matheson, 2016). Thus, it makes sense that the non-service sector stands to benefit from hosting a SME in addition to previously studied sectors.

However, examining the impact on industrial firms has been largely overlooked. Focusing on this sector may address why the empirical research has documented only minimal effects, as they may be neglecting supply chains that stand to benefit from the SME for a longer period of time. Furthermore, the heavy focus on demand-side effects of hosting a SME discounts any anticipatory supply-side outcomes ahead of the SME. Therefore, current work does not robustly address whether firms deviate from status-quo business practices ahead of the SME to take advantage of additional demand influxes. Due to these limitations, this paper investigates demand-

and supply-side outcomes of the Beijing Olympics using 1,470 industrial Chinese firms from several Chinese cities.

Using a difference-in-difference estimation strategy, we find no statistically significant effect between invested capital and/or earnings of firms located in the treatment city of Beijing and comparable firms located in similar cities used as a control group. This remains true for three scenarios: upon the announcement of the Summer Olympics in 2001, during the 2008 Olympics, and upon the announcement of the Winter Olympics in 2015. This suggests that supply- and demand-side fluctuations from the Olympic Games did not remain isolated in a specific host region. This offers evidence that the economic benefits of hosting a SME may be distributed nationwide.

This study contributes to the literature by broadening the discussion of SMEs and their economic outcomes (and/or lack thereof). Beijing was awarded SMEs twice during the sample period – first in 2001 for the 2008 Summer Olympics, and again in 2015 for the 2022 Winter Olympics. Therefore, the paper also informs our understanding of how these effects accrue (or dissipate) when SME-related infrastructure and resources are (or are not) repurposed. This paper also contributes to our knowledge of how firms in host regions engage in anticipatory adjustments prior to the SME.

The remainder of this paper is organised as follows. Section 2 presents the existing literature and Section 3 discusses the Beijing Olympics, which assists us in developing our testable hypotheses in Section 4. Section 5 outlines our methodology and data to address our research question. Section 6 presents the results, analysis and policy implications. Finally, Section 7 concludes.

Literature Review

Studies on the economic impact of sporting contests typically focus on: the number of jobs created, personal income and wages, and taxable income (Matheson, 2008). Overwhelmingly, research shows that with respect to jobs and personal income, the effect is negligible or even negative (Baade & Matheson, 2002; 2004; Coates & Humphreys, 2002; Matheson & Baade, 2005; Coates 2006; Coates & Depken, 2011; Fedderson & Maenning, 2012).

With the limited impact found using these measures of economic activity, research has expanded to study the economic benefits that arise from the service sector. This is understandable as sporting events require attendees to travel, then use hotels, restaurants, and other services. Numerous studies focus on one-off events and empirically, the evidence remans mixed. For example, Depken & Stephenson (2018) find that sporting contests increase hotel registrations, yet Depken & Fore (2020) show no significant changes in revenue, customers served, and revenue per customer at a fast-food restaurant.

However, short-run capacity constraints may restrict any potential benefits, in particular when it comes to seasonal events or one-off games, (Porter, 1999). Thus, to leverage additional benefits, the construction of extra infrastructural capacity may be required, which is commonly associated with SMEs.

This holds true, even when SMEs are hosted in cities with an existing and well-established infrastructural network. As Baumann & Matheson (2018) show, Rio de Janeiro was required to construct 15,000 new hotel rooms for the 2016 Olympic Games despite already being an established and popular tourist destination.

Therefore, the literature related to much larger sporting contests, classified as SMEs, may provide clearer insights in relation to our research question. We define these as, internationally-relevant sporting events organized by international and national sport governing bodies (Preuss & Solberg, 2006; Dollinger et al., 2010). SMEs also utilize rotating host locations, which are determined via an open bidding and selection process that takes place years ahead of the event itself. SMEs typically last between two and four weeks and examples include the Olympic Games and the FIFA World Cup.

When investigating the impact of SMEs, the majority of past studies exhibit similar findings to those of smaller sporting contests. As Baade & Matheson (2004) find, when the United States hosted the FIFA World Cup, using income as a proxy for the amount of economic activity, 13 host cities actually accumulated net losses during this period.

In addition, Tien et al. (2011) show that based upon a sample of 24 Summer and Winter Olympics, there is only weak evidence that hosting a SME is economically beneficial. Their findings show that the benefits accrued are only found in the run up to the Olympic Games and are short-lived. Confirming this finding, Billings & Holladay (2012) show limited evidence to support any long-term impacts from hosting the Olympics. Furthermore, Lamla et al. (2014) find no significant economic effects at the macroeconomic level when investigating the impact of the European 2008 Football Championships in Switzerland. On the other hand, Rose & Spiegel (2011) show that hosts of SMEs do enjoy a permanent increase in trade openness.

The majority of studies that examine the impact of hosting a SME concentrate their attention to the event window itself or ex-post the event. This is perhaps why there appears to be a lack of evidence that showcases a positive effect of hosting a SME. Confirming this, Brückner & Pappa (2015) find that hosting the Olympic Games leads to an ex-ante positive impact on

economic growth. This ex-ante effect leads to a surge in investment and output, both in the short and long-term for the future host. However, there was still a positive impact in the short-run for unsuccessful bidders.

Given the weak evidence of a positive impact of SMEs on the traditional measures of economic activity, research has again redirected its focus on the outcomes of the services sector arising from sports tourists. In comparison to sporting contests, the scale of international visitors is much larger, and the duration of their stay much longer (Vierhaus, 2019). Baade et al. (2021) highlight this by showing that the 2014 FIFA World Cup in Brazil increased tourist arrivals by approximately one million visitors and that just less than 100,000 international tourists arrived for the 2016 Summer Olympics in Rio de Janeiro. Linked to our study, Li et al. (2013) show a significant increase in international visitors to Beijing in 2008, however, their numbers were constrained due to the lengthy process to obtain entry visas to attend the Beijing Olympics, which may have discouraged further sports tourists to attend (Li & Song, 2013).

Proponents of hosting the Olympics state that during the event window, these tourist arrivals create a significant increase in both hotel occupancy and local retail, (Rudkin & Sharma, 2020). The evidence largely supports the view, as Porter & Fletcher (2008) do show that hotel occupancy rose during both the Atlanta Summer Olympics and Salt Lake City Winter Olympics. Allmers & Maennig (2009) further find the 2006 FIFA World Cup in Germany produced an increase of approximately 700,000 additional hotel night stays by foreigners, but no impact was found during the 1998 World Cup in France.

Nevertheless, there is a lack of support that these increases in tourist arrivals is permanent. Dansero & Puttilli (2010) claim that whilst tourist numbers did increase in the city of Torino and its metropolitan area after the 2006 Winter Games, this rise was short-lived. Similarly, Solberg &

Preuss (2007) show the Sydney Olympics resulted in a brief increase in tourism, but this was followed by an extended period of stagnation.

In order to leverage the greatest gains from these sports tourists, firms in the host region may increase their pre-event investment to maximize future profits (Preuss & Solberg 2006; Dollinger et al., 2010). One such way would be via the construction of extra infrastructural capacity commonly associated with hosting SMEs. These upgrades and are not just limited to sporting facilities. They include improvements in generic infrastructure, such as city-wide beautification efforts, enhancing transportation and telecommunications infrastructure, and constructing hotels, bars, restaurants, and entertainment districts (Dollinger & Mooney, 2010; Baade & Matheson, 2016). The level of this infrastructural development may differ between cities (Solberg & Preuss, 2007), but the required level of investment is still large. Moreover, even if visitors increase in the short-run, and only around the window of the SME, it may be anticipated that firm-level investments and profits will potentially increase.

With that in mind, this study suggests that there is value in examining the impact on manufacturers and industrial firms of these large-scale preparatory efforts. Investigating firms located in the industrial sector is both interesting and vital as they are often involved in building intermediate goods and other essential factors required for the SME. For example, manufacturing firms may be tasked with providing inputs for new hotels and stadia or to provide new furniture and cooking equipment for eateries and bars. Other firms may support these efforts by providing telecommunications hardware, metallurgical fabrication, textiles, petrochemicals, mineral, and mechanistic componentry. Additionally, the technological sector may provide products and services to ensure appropriate levels of security are met throughout the entire time frame[1]. In

[1] For convenience throughout the paper, we refer to construction, manufacturing, technology, and defence firms as 'non-service' industry firms.

comparison to seasonal events, where tourists return year-on-year, demand for the host region may never be as great as it was during the mega event window. Compounding these problems, are when event stadia fail to become repurposed and become known as white elephants (Davis, 2019). This may transcend to infrastructure built specifically for the SME. As Teigland (1999) shows, following the 1994 Winter Olympics, 40 percent of Lillehammer's full-service hotels became bankrupt due to lack of demand. However, this infrastructure still requires construction for the SME even if it won't be used in the long run, demonstrating that industrialists may still prosper.

Needs assessment

As evidenced by the previous literature, scholarship tends to discount how SMEs affect the factors of production (i.e., fluctuations in supply-side variables) in a host location. As Akerlof & Shiller (2010) state, the actions of market participants depend on human judgement and evaluation of market dynamics. Within that framework, we would expect economic agents (i.e., firms) to alter their behavior between the period that the winning bid is announced and the SME. A positive impact on supply side variables may occur, whereby host-region firms perceive future demand increases for various factors of production and adjust their behavior in the run up to the event.

The outcomes most relevant to industrialists are typically overlooked. This is problematic because the years and months prior to a SME place large, time-constrained demands on the host region's production and manufacturing factor markets (Preuss, 2004; 2006; Dollinger et al., 2010). Given that research has not captured the actions taken *from within firms* to adjust to anticipated market dynamics we examine how individual firms adjust internal resource flows, and how that resource adjustment impacts eventual profitability.

Study Context: The 2008 and 2022 Olympics in Beijing

The Beijing Olympics in 2008 were the 29th modern Olympiad and held in China for the very first time. The Games were awarded to Beijing in July 2001, having beaten rival bids from Toronto, Paris, Istanbul and Osaka. Following the success of the 2008 Games, Beijing bid and won the rights to host the Winter 2022 Olympics, which were announced in 2015.

Thus, we select SMEs in Beijing for our study because the city was awarded two SMEs within a relatively short time period. This provides an opportunity to assess the implications of hosting two events close together but not concurrently, as witnessed in Russia and Brazil. The unique timing of these two successive SMEs makes this study important for policymakers. If the decision to host two non-concurrent events stimulated important outcomes in China for a prolonged period, then it would imply a successful strategy. Such information is objectively important as policymakers decide when (or whether) to bid for a SME.

This context is also valuable because given China's economic and political structure, the majority of production for the Games would have been executed internally. Thus, we are confident that we capture firm-level investment and profits in China, and not abroad. In support of that, Gottwald and Duggan (2008) contend that the Beijing Games were an opportunity for China to display political and economic self-sufficiency on the world's largest stage.

China also serves as an interesting case purely because of the large scale of development required prior to the Games. The development of both stadium and non-stadium infrastructure was enormous, in particular the generic infrastructural development, which included the construction of new transportation networks, power plants and more. The only other SME to date that has had a similar level of pre-event expenditure is the 2014 Sochi Winter Olympics. This implies that we

need to be cautious about making generalizations from our findings because the scale of this non-stadium related infrastructure would be typically less for other SMEs.

Development of Hypotheses

Host-city effects

Prior to the 2008 Games, the Chinese government invested heavily in new facilities and infrastructure because it had never hosted a SME of international significance. Beijing airport was renovated and a new terminal built, the subway system doubled in length, and 20 new venues were constructed to host the events, with many more upgraded specifically for the Olympics, (Ren, 2008; Davis, 2019). Funds were also invested into new power plants, water and sewage units, and other projects. Overall, a total of $40 billion USD was spent on infrastructure development, (Okada & Greyser, 2018; Street & Matelski, 2019). In particular, many of these new facilities had to be purpose-built (Preuss, 2006) and the construction industry was not only commissioned with building the stadia and physical infrastructure, but also tasked with building approximately 1.5 million new residences, due to citizens being rehoused because of the Games between 2000 and 2008 (Shin, 2009).

However, given a condition of the Beijing Games was to improve air quality, certain sectors were said to have been harmed by the Olympic Games. In particular, manufacturers were forced to close down plants in order for the Chinese government to hit pollution targets. The majority of these closures were temporary and short-term in nature, approximately two months prior to the Games, thus this impact may be less pronounced than anticipated. Moreover, the growth rate of firms in the provinces of Beijing and Tianjin was not too dissimilar to that of the

two economic zones in Guangdong and Shanghai, further demonstrating that this effect may be negligible.

Our focus is on firms that are physically located and produce in the host region, and those that are located and produce in comparable non-host regions. Still, when developing our hypotheses, we are aware that despite initially allocating funds to firms located in Beijing, supply chains may not necessarily be confined in the host region. Thus, wealth from hosting the SME may have spread across China.

Alternatively, policy may have been geared to ensure that the economic benefits remained within the host region of Beijing, as opposed to going further afield. Of course, this may lead to two different outcomes dependent on which effect dominates, where if it remains within Beijing, we may find a pronounced effect of the Games, but if it dissipates further afield, our findings may be more subdued.

As witnessed above, the Beijing Olympics had an enormous amount of non-stadia expenditure related to it, in addition to all the spending directly on sport facilities. Given all this governmental investment, when building our hypotheses below, whilst they naturally apply to this study context, they may not necessarily transcend to other SMEs.

Nevertheless, we posit that in advance of the Games, non-service firms must aim to increase productive capacity in order to meet the sizeable demand shift described above, and that this increase is most notable in the years immediately after the announcement of the host location. Thus, we suspect that firms may increase their level of investment in anticipation of additional demand (Dollinger et al., 2010). We feel that this effect within the host region to be disproportionately greater than in non-host regions, and this is consistent with Shin (2009) who

argues that local businesses and residents shared the brunt of disproportional costs and benefits associated with the Games.

That being said, Beijing may not have all the resources necessary and freely available to prepare and build all the infrastructure required for the Games. Therefore, it would require support from other Chinese regions. Thus, the benefits from the Games may not remain in the host region.

The political favouritism literature may further determine whether there would be a disproportional benefit in the host city compared to others. In a worldwide panel, Hodler & Raschky (2014) show that regional night-time lighting is more intense in regions that share the birth region of the political leader, indicating regional favouritism. Burgess et al. (2015) extend this in their study on roadbuilding in Kenya, and show that this regional favouritism stemming from politics occurs during periods of autocracy, but disappears during democracy.

These issues could easily transcend to China, who over our sample period operated under a strict authoritarian regime and politically had the ability to easily influence initial resource allocation. Indeed, Chen et al. (2017) state that politicians may favour a nation's capital, either because national leaders favour the place they live or that they garner key political support from the capital's population.

Empirically, Chen et al. (2017) find evidence of regional favouritism in China, both based on historical ties and towards the political capital. Under Jiang Zemin's presidency, the historical ties approach dominated, as Zemin who hailed from Yangzhou in Jiangsu province, favoured Shanghai (located 250km from Yangzhou) and the West relative to Beijing and Tianjin. However, this favouritism reversed under Hu Jintao, who favoured Beijing and Tianjin despite also hailing from Jiangsu.

This suggests, that in our study context, given political favouritism, it is an empirical question to ascertain whether there may be more investment in Beijing relative to other regions arising due to the Olympic Games and leads us to the development of Hypothesis 1:

> *Hypothesis 1: In the run-up to the 2008 Games, we anticipate non-service sector firms in Beijing to have greater capital investment relative to non-service sector firms in other comparable Chinese cities.*

Around the period of the Olympic Games (immediately prior, during, and immediately after), manufacturing firms would have sold intermediate products that went into final good production, or sold consumer products including event memorabilia. Thus, we would anticipate that the sales of consumer and producer durables should increase, as restaurants purchase additional equipment such as a second coffee machine or refrigerator for the expected surge in demand. Alternatively, more manufacturing and production products may be purchased and kept as inventory stock, to ensure that firms do not miss out on sales during the event window.

With the improvements in logistics arising from the infrastructural upgrades, firms in Beijing face cheaper transport costs. These infrastructural improvements may lead to greater economic prosperity (Demurger, 2001; Cieslik & Kaniewska, 2004; Hong et al., 2011) via a reduction in the transaction costs on traded goods. Indeed, both Jedwab et al. (2017) and Donaldson (2018) show that investment in infrastructure decreased trade costs in India and Kenya respectively, resulting in increased interregional and international exports. Therefore, by overcoming the supply-side constraints, the beneficial effects may appear before, and continue beyond, the SME. Thus, we expect the preparatory increase in capital investments should pay off in the form of increased profit. This leads us to our second hypothesis:

Hypothesis 2: In the periods preceding and following the 2008 Games, we anticipate non-service sector firms in Beijing to have greater earnings relative to non-service sector firms in other comparable Chinese cities.

We use the same foundational thought processes described in our development of Hypothesis 1 to examine the effect on capital investment in Beijing upon the announcement that it would host the 2022 Winter Olympic Games. For the 2022 Olympics, China will need to build five new venues, renovate an existing venue and build a brand new Olympic village. Therefore, much of the existing infrastructure built in 2008 will be re-used. Second, the budget for the Winter Olympics is only 10% of the budget for the Summer Games given the lower number of sports, nation participants, and athletes in the Winter Games. For these reasons, the Winter Olympics is typically of a smaller scale than the Summer Olympics. Thus, the third hypothesis is proposed:

Hypothesis 3: In the run-up to the 2022 Games, we anticipate non-service sector firms in Beijing to have greater capital investment relative to non-service sector firms in other comparable Chinese cities, but we expect this increase to be less than for the 2008 Games.

Of course, it may be naïve to assume that all the benefits from the Olympic Games would remain in the host city or region. There are a number of reasons as to why this would be the case. First, no city would have all the resources at its disposal for that much construction. Second, it is unlikely that all the necessary supply chains are located in the host city. Third, specifically in the context of this study, the city of Beijing is a political and cultural centre rather than purely industrial in nature. Thus, it would make sense for a number of production activities to be awarded to firms located in existing cities with core economic engines. Therefore, it is entirely possible that we

reject our hypotheses and find that the Beijing Games did not have a disproportional impact in the host region.

Methodology

Dataset

The data used for the analysis is an unbalanced panel dataset of 1,470 Chinese industrial firms spanning the years 2000-2017 (N = 17,205). We create three non-overlapping periods where we study the run-up to the Games from 2000-2004 inclusive, the Olympic Games effect from 2005-2012, and the announcement effect of Beijing being selected as host for the Winter Games from 2013-2017.

Technically, the run-up to the Summer Games encompasses the years up to and including 2007. In our robustness testing we added these three subsequent years to our sample as additional treatment effects, although we proceed with our strategy of having three non-overlapping periods as our preferred way of splitting the sample given that extending the data had no effect on the findings.

Table 1 shows the make-up of the firms by industry classification, and Table 2 shows the summary statistics for the full sample. The firm-level data is collected from *Compustat Capital IQ Database*, which is very common in branches of microeconomics, finance, and strategic management (e.g., Ulbricht & Weiner, 2016). Compared to other finance databases, *Compustat's* Global data in particular have been shown to cover the most expansive set of firms and provides the widest range of financial and accounting items (Dai, 2017).

In our data, we feel that we are identifying production within a location, e.g. the host versus non-host, as the financials are produced at the subsidiary level. Furthermore, speaking to

Compustat we were informed the accounts are not consolidated where the location variable indicates production is taken place, providing us with greater confidence we are capturing production within each province.

Only firms that have no government ownership were included in the sample. This was to avoid confounding effects of capturing an involuntary Olympic Games effect on firms if contracts were awarded to struggling state-owned businesses. We are aware that this may result in a downward bias in our findings, but are happy with this trade-off to ensure accuracy.

Nevertheless, this bias may not be so severe as initially anticipated, given the multiplier effect. It is likely that many firms in the sample would benefit as secondary recipients of government investment. This should offset some of this downward bias by not including firms with government ownership in the sample. State-level variables are available from the National Bureau of Statistics China, which is accessible at data.stats.gov.cn.

[Tables 1 and 2 about here]

Model and Specification

To investigate Hypotheses 1-3, we implement a difference-in-differences estimation strategy shown in Equation 1.

$$Y_{i,s,t} = \alpha_i + \tau_t + \gamma_{i,t} + \beta_1 X1_{i,t} + \beta_2 X2_{s,t} + \varepsilon_{i,s,t} \quad (1)$$

In Equation 1, (i) indexes firms, (s) indexes Chinese states, and (t) indexes time. The dependent variable is denoted (Y), our time-invariant firm-specific effect is denoted (α_i), and our year dummies are denoted (τ_t). We are interested in the effect that the Olympic Games has on Beijing, denoted as the treatment effect ($\gamma_{i,t}$), which represents the difference in the trend over time that is

attributable to being a firm located in a city hosting the Olympic Games. In matrix (X1) we include firm-level covariates and in matrix (X2) we include state-level covariates.

The estimator requires that the parallel paths assumption is met. This assumes that the average change in the control group represents the counterfactual change in the treatment group in absence of treatment. Figures 1-3 show the line graphs over our three time periods.

[Figures 1, 2, and 3 about here]

The first time period does create some concerns because we cannot access data prior to 2000, hence, as in Card & Krueger (1994) we implicitly assume parallel trends, but both lines appear flat until the intervention point. It then appears that host investment falls at a faster rate than the non-host region. This appears to go against the theory from Hypothesis 1.

Examining the parallel trends path for 2008, the host and non-host series appear to follow each other almost perfectly through time, even after the intervention period. Once more, this appears to provide anecdotal evidence that may reject Hypothesis 2.

Figure 3 shows that prior to the intervention period, both host and non-host capital investment is relatively flat. However, after the intervention period there appears to be some divergence in the trends, although this appears that firms in non-host areas increased their capital investment in comparison to host region firms, similar to Figure 1.

To ensure the parallel trends assumption is met, scholars often implement a placebo test similar to Schnabl (2012). Typically, this is done to test whether a statistically significant treatment becomes insignificant upon the placebo. As the images seem to propose a rejection of our hypotheses this test may not be appropriate in this context. Nevertheless, we randomly assign 26

percent of observations into a treatment group to examine the trends in the two groups. This placebo led to multiple crossing points throughout the series. In the regressions, the majority of treatment variables remained statistically insignificant, that provides confidence that our difference-in-differences set up is accurate.

Robustness Checks

We include two main robustness checks to ensure our findings are accurate. First, we include firms from the city of Tianjin in our treatment group. Due to the proximity of Tianjin to Beijing, it may be reasonable to assume that they too benefited from the regional infrastructural development arising due to the SME.

Second, we restrict our sample to only contain firms that are present throughout the entire time series. Thus, we create a balanced dataset containing 411 firms. This is carried out because as the time series progresses, more firms enter the database which may bias the findings. We acknowledge that this procedure introduces survivorship bias into our model, but permits us to compare the results from the three hypotheses with a consistent sample. Both of these robustness tests appear alongside the main findings in the results tables.

In addition, we conduct several other pieces of sensitivity analysis. These include altering the conditioning set of variables and running all the reported regressions for both dependent variables. For example, we replaced our proxy for government spending with other measures of public good usage to see whether they had any influence on the overall findings. Finally, we restricted our sample of firms to form different subsets from Table 1, such as only focusing on firms with general industrial classification codes that contain materials and industrials, and omitted

the city of Shenzhen from our study, given that the enterprise zone of Guangdong had a higher rate of firm growth than other provinces.

Dependent Variables

The dependent variable in Hypotheses 1 and 3 is firms' total capital investment divided by total assets (*Total Invested Capital*). We focus on total capital investment as it encompasses investment in both capital devoted to business objectives, such as investing in manufacturing plants, real estate or machinery, and working capital, which includes inventory stock. Given that in the run up, and during a SME, firms would be keen to increase their inventories to ensure they do not miss out on sales, this element of capital should not be ignored.

In Hypotheses 2, the dependent variable is firms' earnings before interest and taxes divided by its total assets (*EBIT*). We prefer this measure as opposed to net income, as it avoids confounding values that may arise by carrying over tax losses from one year to the next. Given the presence of influential observations for the EBIT variable, which we define as values that lie several standard deviations outside the mean, we take the common approach of winsorising the variable at the 5^{th} and 95^{th} percentile. This is opposed to dropping data and reducing the sample size.

Covariates

We have two categories of covariates. The subset at the firm-level include firm revenue *(Revenue)*, long-term debt to measure leverage *(Long-term Debt)*, and capital expenditure *(CAPEX)*. These variables are logged in the regression to create more normal distributions.

The state-level variables are available from the National Burau of Statistics China, and include several macroeconomic regional controls. They include: regional population *(Population)*,

GDP per capita *(GDPPC)*, percentage change in GDP *(Economic Growth)*, human capital - measured by the percentage growth of students enrolled in tertiary education *(Schooling)*, urban unemployment *(Unemployment)* and the inflation rate to control for macroeconomic stability *(Inflation)*. Finally, we control for regional government expenditure *(Government)*.

To our knowledge provincial level government expenditure is not publicly available, hence, we proxy for provincial public spending that would be non-Olympic related. The preferred variable is the number of hospitals in each region per 1,000 residents. Given that health expenditure is a major component of public spending (Zhu & Cai, 2016), increases in this provision should proxy well for state spending at the regional level, even if initial allocations are made at the national level. Alternative variables to proxy for regional government expenditure were also explored, including the number of post offices per 1,000 residents, provincial rural investment in fixed assets, and the post network length divided by provincial area given their nature as a public good (Chaudhary & Rubin, 2016).

From the state level variables, only population and GDP per capita were transformed by their natural logarithms to create a more normal distribution, with the remaining state-level variables not benefiting from this transform. As certain variables had negative values, rather than manipulating the data in order to take their natural logarithm, our preference was to keep them in percentage terms. This further permitted us to report their effects as percentage point increases.

Descriptive Statistics

In Table 2, six columns are reported: the variables' names, operationalization, mean, standard deviation, minimum, and maximum. Most variables show plenty of variation; however, GDP per capita and population have far less variation given their mean values, which is somewhat expected.

With 24% of the firms in the sample located in Beijing, and 28% located in both Beijing and Tianjin, there is a notable proportion in the treatment group to warrant our empirical strategy.

In addition, multicollinearity does not appear to be a problem, as when examining the variance inflation factors (VIF) in preliminary unreported least squares regressions, the mean VIF was 3.17, which is well below the threshold 5. Only GDP per capita and total assets had VIFs exceeding 5, although both values were well below the individual threshold of 10 proposed by Myers (1990) and Hair et al. (2009).

Estimation Results

Host City Effects

Tables 3-5 present the difference-in-difference results investigating whether the Olympic Games had a disproportional effect on Beijing relative to similar Chinese cities. It displays the results related to Hypothesis 1, 2, and 3 where each table contains three regressions.

[Table 3 about here]

When examining the impact of the Summer Games announcement, all four treatment variables in all three regressions are statistically insignificant. This proposes that firms in Beijing did not increase their total capital investment relative to firms in comparable Chinese cities in the run up to the Summer Olympic Games.

Three control variables are statistically significant in regressions 1 and 2. They are all firm level covariates: revenue which enters negatively, and leverage and capex, which enter positively (as expected). Interestingly, all state-level variables are statistically insignificant. But in our

robustness tests, when altering the conditioning set in regression 1, three became statistically significant: population, inflation rate, and GDP per capita. However, this has no impact on the findings of any of the four treatment variables. In the third regression (i.e. balanced panel), the firm-level covariate capex becomes statistically insignificant, although when the conditioning set of covariates is altered, it becomes positive and statistically significant – as in the previous two columns. Once again, these changes do not influence the treatment variables.

Factually, the run up to the Beijing Games for our sample encompasses the years 2000-2007 inclusive, however, the results in Table 3 only considers treatment effects up to and including the year 2004. This was done to create three distinct periods within our sample with no overlap. However, as part of our sensitivity analysis, we extended the sample up to and including the year 2007 and our results remained robust upon the inclusion of this additional data.

[Table 4 about here]

In Table 4, we examine the impact of the Summer Olympic Games on pre-tax profits. We have five treatment years, but in column 1, only the treatment effect for the year 2008 is positive and statistically significant at the 5% level. This proposes that only in 2008 did firms in Beijing receive higher pre-tax profits than firms located elsewhere in China during the Olympic Games. However, as previous studies show, this effect is short-lived with the remaining treatment variables statistically insignificant.

However, this finding is not robust in the following two columns, as the 2008 treatment effect becomes statistically insignificant when the region of Tianjin is added to the treatment group and for the balanced sample. Likewise, no other treatment variable is positive and statistically

significant, with the exception of the 2009 treatment dummy in the balanced sample. Peculiarly, it is negative and statistically significant at the 10% level. Thus, it is fair to conclude that firms located in the host region during the Summer Olympics of 2008 did not receive higher profits than firms located in comparable Chinese non-host cities.

Examining the covariates in the first column, two firm level variables and four regional level variables are statistically significant. They include: firm sales, capex, regional economic growth, schooling, the urban unemployment rate, and the number of hospitals per capita. However, in the second column, economic growth becomes statistically insignificant when Tianjin is added to the treatment group. In the final regression, only firm sales, leverage, and regional economic growth are statistically significant.

[Table 5 about here]

Table 5 examines the announcement effect of Beijing winning the bid to host the 2022 Winter Games on total capital invested. No treatment variable is significant, thus firms located in Beijing did not increase their capital investment disproportionately compared with firms located in similar cities across China. This finding is unsurprising given in Hypothesis 3, we speculated that the announcement effect of the 2022 Winter Games would be more subdued to the Summer Olympic announcement. Therefore, by transitivity, if no positive effect was found for the Summer Games, it makes sense that no effect is found concerning the subsequent Winter Games.

Examining the covariates, all three firm level variables are significant in the first and second columns, but in the third, capex becomes statistically insignificant. In addition, from the state level variables, the inflation rate is statistically significant in the first two regressions but

becomes insignificant when the sample is restricted to a balanced sample. In unreported robustness tests, occasionally both state variables, the urban unemployment rate and the schooling rate became statistically significant at the 10% level. However, these alternative specifications had no impact on the treatment effects which remained statistically insignificant.

Overall, the results reject Hypotheses 1-3. This suggests that that there was no significant difference in capital expenditure or pre-tax profits for firms located in Beijing compared with other cities in China, arising due to the SME. However, these results should not be interpreted that there were no economic benefits in Beijing that arose due to hosting the Olympic Games.

Discussion of Findings

One criticism of hosting a SME is that it channels public funds into the host region, redistributing wealth into a specific area (Chen & Misener, 2019). Supporting this, Hotchkiss et al. (2003) found counties within close proximity to Olympic activity benefited from the Atlanta 1996 Summer Games, in comparison to counties further afield.

As the Beijing Summer Olympics reportedly cost $40 billion USD, a significant sum to be invested into a small pocket of China, the social and economic repercussions could be large in magnitude. However, we find that there was no disproportionate firm-level activity in Beijing compared to other comparable cities in China, challenging this idea when focusing on firm-level investment and profits. Only in one specification was a disproportional benefit found, and this was only for the Olympic Games year, 2008. The treatment dummies beyond this period were statistically insignificant, which echoes prior findings that if there are any benefits to the host, they will be short-lived.

In addition, Brückner & Pappa (2015) show that the ex-ante effect of hosting the Olympic Games stimulates economic growth. Whilst, we do not directly test ex-ante growth effects or quantify them, we can claim that if they did occur, then this growth in Beijing was not disproportionately different to other cities in China. For example, Gottwald & Duggan (2008), found that Beijing's economy was boosted by 0.8 percent due to the Summer Olympics. Hence, if Beijing prospered because of the Games by 0.8 percent, then the local economy in cities such as Shanghai, Tianjin etc. would have faced similar benefits.

Our findings do contradict Shin (2009), who found that during 2000-2006, Beijing's economy expanded at a greater rate than China. However, our results may differ for several reasons. First, Shin (2009) focuses on aggregate growth rather than firm level characteristics, which ultimately are different outcome variables. Second, by including a greater number of sectors rather than focusing on industrialists, our results may naturally differ. Indeed, Davis (2019) proposes that many of the industrial and manufacturing facilities constructed in support of the Games were underused, supporting this idea. Furthermore, because a goal of the Beijing Games was to improve air quality, some manufacturers were forced to close down plants in order for the Chinese government to hit pollution level targets. However, under further investigation, many of these closures in Beijing were temporary and approximately two months prior to the Summer Games. Thus, this impact may be less serious than perceived, but still may explain some of the differences in the findings. Finally, Shin (2009) uses a reference category that includes the whole of the Chinese economy. This may explain why our results contrast, as the corresponding reference category in this paper omits many small Chinese cities that we expect would be depressing the growth rate in Shin's control group.

Focusing on our results we offer several potential reasons why no disproportional impact was found. First, the infrastructure development in Beijing required the construction of multiple inputs and these were manufactured in various hubs throughout China – not just Beijing, in particular China's economic centres, Shanghai and Shenzhen (Chen et al., 2020). Case-study evidence supports this claim as the steel that was used to construct the Bird's Nest Stadium in Beijing was imported from Shanghai. Therefore, industrial firms, in particular steel manufacturers outside the host region (but within China), could have received the financial benefits arising due to this SME.

Another possible explanation why firms located in Beijing did not receive greater economic benefits vis-à-vis firms in similar cities, is because in China there was a national effort of leveraging the Beijing Olympics, rather than a localised effort. Furthermore, Beijing's core competencies as a city are not industrial in nature – they are political and cultural. Thus, more contracts related to industrials and manufacturing may have had to be awarded to firms located in cities with those core economic engines.

Furthermore, political favouritism may have impacted the findings. If contracts for the Games were awarded to favoured regions outside the host city, then it is no surprise that Beijing did not disproportionally benefit compared to other comparable cities. In China, and during the early part of our sample, under President Jiang Zemin, political favouritism was linked to Shanghai and the West rather than Beijing and Tianjin (Chen et al. 2017), despite this being reversed under President Hu Jintao. Nevertheless, it may be such policies that potentially explain why no disproportional effect has been found in the host city.

A further point to reinforce is that we may fail to find an impact for the 2022 Winter Games announcement because we did not find an effect for the Summer Olympics in 2008. Given the

short time period between these two SMEs there may have been less of a need for extensive infrastructural development. It is reported that the Beijing Winter Games budget is approximately 10 times smaller than that for the Summer Games. It is well acknowledged that there is far less demand for new stadia for the Winter Games in comparison to the Summer Games. The former is associated with far fewer nation participants and features less events. Therefore, even if Beijing's infrastructure required sizable enhancements or replacement, there would have been less infrastructure development required overall.

Implications for policy, academics, and businesses

Our findings are important for policymakers, academics, business managers and entrepreneurs. One difficulty when lobbying the central government to support a city's bid for a SME is that (i) the benefits are typically overestimated and short-lived and (ii) it may be difficult to win public support due to the perception is that it focuses resources to a small area. As we provide evidence that industrial firms in the host region do not receive any disproportional benefits over those located in non-host regions, policymakers have some evidence to refute this second argument.

However, policymakers should not confuse our findings with those that state that there was no overall effect of the Olympic Games in China. This paper does not test that particular hypothesis. It may have been that manufacturing firms in Beijing did increase their capital investments and pre-tax profits over our sample period at an equal rate to firms located in non-host regions.

We believe that our findings showcase such a result because we because we focus on industrialists located outside the host region, who are part of the supply chain, and may prosper via the manufacture of intermediate goods, or final products that are assembled in the host region.

Thus, our research is important to business managers and budding entrepreneurs, who despite not being located in the host region, should still attempt to leverage the potential opportunities that a SME may provide.

Finally, academics benefit from this research as it provides evidence to extend the scope of firms commonly investigated in *ex-post* analyses. Furthermore, the interesting finding showing no investment impact for the Winter Games in 2022 opens up future academic research to investigate the longevity of the infrastructural development arising due to a SME. This could then guide policymakers when seeking to prioritize bids if they want to stimulate the economy via SME-induced infrastructural development.

Our results also suggest that academic frameworks of production and consumption ahead of a SME require further development. Theoretically, the demand influxes created by a SME do suggest increased activity from industrial firms (e.g., Billings & Holladay, 2012; Dollinger & Mooney, 2010) and integrating this theory with further empirical evidence would be beneficial for this field of study.

Limitations

Our study is not without limitations. First, we acknowledge that there were other major social and economic forces occurring simultaneously alongside the Olympic Games in China during the sample time frame. For example, the global financial crisis (GFC) occurred between 2007-2009 – which places the 2008 Games directly in the middle. Thus, our results may be confounded by stimulus programmes in those particular years. As regional government spending data is not freely available to our knowledge, we proxy for such expenditures using the quantity of public good

provision within these areas. In addition, to account for this, we attempt to control for these factors using variables such as economic growth, unemployment, and income.

Second, we do not find a way to remedy any confounding effects from international firms and their role in the infrastructural development of the Games. However, we are confident that this is not an issue, given that the majority of production for the Games was contained within China, and we focus only on firms that are located and produce within certain regions.

Third, over our sample period we may also critique whether we have selected appropriate control groups for Beijing. The effects may be muted due to other large scale, non-sporting events that occurred in those cities over our sample period. For example, Shanghai held the World's Fair in 2010.

A further limitation is that our effects may be drowned out by government contracts being awarded to partially-owned government firms. However, by choosing firms with no government involvement, we have attempted to control for this factor. We do not expect this to excessively impact our findings, as even if we omit firms who received this initial government injection, we would assume that the multiplier effect may offset some of this bias. This is because we would anticipate that many firms in our sample would benefit from the subsequent rounds of the initial spending via their supply chain links, although we do acknowledge that we may be omitting some of the Olympic Games-effect by ignoring such firms.

Likewise, we cannot be certain that we are capturing all production from a firm whose location is stated to be in Beijing and Tianjin. Examining, the *Compustat* data and after speaking to *Compustat*, we have been informed that the accounts are not consolidated and are at the subsidiary level, so the location provided is the subsidiary's headquarters. This should at least mitigate some of these concerns.

Finally, we caution scholars and practitioners about the generalizability of our results. The 2008 Games (and to a lesser extent, the 2022 Games) are particularly unique because of the initial scale of stadium and non-stadium infrastructure development that was required. In particular, the enormity of the non-stadium expenditures of the Beijing Games, stood out and were heavily discussed prior to the Games. This is in comparison to other SMEs where this scale of the non-stadium expenditures would typically be smaller than those witnessed in the run up to Beijing 2008. To date, it is only the 2014 Sochi Winter Olympics that has had total pre-event expenditures to rival the Beijing Games.

Conclusion

This study finds that hosting the Olympic Games did not provide industrial firms located in Beijing with disproportional benefits in terms of capital investment or earnings relative to other comparable cities in China. This complements previous evidence that SMEs typically have limited to no disproportional positive impact on the local economy.

In terms of capital investment, we find that the host region had no differential effect for both the Summer and the Winter Games. Given we found no significant result in 2008, it is somewhat unsurprising to find an insignificant result for the 2022 Winter Games. This is because the budget for Beijing 2022 is only 10% of what was spent in 2008, and/or alternatively, as the necessary infrastructure has already been built, it has yet to depreciate sufficiently to warrant investment in its replacement.

Our results are interesting for academics, policymakers, businesses and entrepreneurs. One criticism of having cities host the Olympics is that it funnels public funds into a specific region or area of a country. However, our findings do not support that hypothesis. Specifically,

manufacturing firms in the host city did not receive greater economic benefits compared to firms in similar cities across China.

References

Akerlof, G. A., & Shiller, R. J. (2010). *Animal spirits: How human psychology drives the economy, and why it matters for global capitalism*. Princeton, NJ: Princeton university press.

Allmers, S., & Maennifg, W. (2009). Economic impacts of the FIFA Soccer World Cups in France 1998, Germany 2006, and outlook for South Africa 2010. *Eastern European Journal,* 35, 500-519.

Baade, R, Baumann, R. and Matheson, V. (2021) Mega-Events and Tourism: The Case of the 2014 FIFA World Cup and the 2016 Rio Summer Olympic Games," (in A Modern Guide to Sports Economics, Stefan Kesenne, Ruud Koning, and Levi Perez, eds., (Edward Elgar), *In Press.*

Baade, R. A., & Matheson, V. (2002). Bidding for the Olympics: Fool's Gold? in Transatlantic Sport: The Comparative Economics of North American and European Sports, Carlos Pestana Barros, Muradali Ibrahimo, and Stefan Szymanski, eds., London: Edward Elgar Publishing, 127-151.

Baade, R. A., & Matheson, V. A. (2004). The quest for the cup: assessing the economic impact of the world cup. *Regional Studies, 38*(4), 343-354.

Baade, R., & Matheson, V. (2016). Going for the Gold: The Economics of the Olympics. *Journal of Economic Perspectives,* 30(2), 201-218.

Baumann, R. & Matheson, V. (2018) Mega events and tourism: The case of Brazil. *Contemporary Economics Policy,* 36(2), 292-301.

Billings, S., & Holladay, J. (2012) Should cities go for the gold? The long term impacts of hosting the Olympics. *Economic Inquiry,* 50(3), 754-772.

Brückner, M., & Papa, E, (2015). News Shocks in the Data: Olympic Games and Their Macroeconomic Effects. *Journal of Money, Banking and Credit*, 47(7), 1339-1367.

Burgess, R., Jedwah, R., Morjaria, A., & Pador I Miquel, G. (2015). The value of democracy: Evidence from road building in Kenya. *American Economic Review*, 105(6), 1817-1851.

Card, D., & Kruger, A. (1994) Wages and employment: A case study of the fast-food industry in New Jersey and Pennsylvania. *American Economic Review*, 84, 772-793.

Chaudhary, L., & Rubin, J. (2016) Religious identity and the provision of public goods: Evidence from the Indian Princely States. *Journal of Comparative Economics*, 44(3), 461-483.

Chen, Y., Henderson, V., Wei, C. (2017). Political favouritism in China's capital markets and its effects on city sizes. *Journal of Urban Economics*, 98, 69-87.

Chen, S., Misener, L., (2019) Event Leveraging in a Non-Host Region: Challenges and Opportunities. *Journal of Sport Management* 33, 275-288.

Chen, S., Preuss, H., Hu, X., Kenyon, J., Liang, X. (2019) Sport Policy Development in China: Legacies of Beijing's 2008 Summer Olympic Games and 2022 Winter Olympic Games. Journal of Global Sport Management, DOI: 10.1080/24704067.2019.1566756.

Chen, S., Yan, X., & Yang, B. (2020) Move to success? Headquarters relocation, political favouritism and corporate performance. Journal of Corporate Finance, 64.

Cieslik, A., Kaniewska, M. (2004). Telecommunications infrastructure and regional economic development: The case of Poland, *Regional Studies*, 38, 713-725.

Coates, D. (2006). The tax benefits of hosting the Super Bowl and the MLB All-Star game: the Houston experience. *International Journal of Sport Finance*, *1*(4), 239-252.

Coates, D. and Depken, C.A. (2011), 'Mega-Events: Is the Texas-Baylor game to Waco what the Super Bowl is to Houston?' Journal of Sports Economics, Vol 12, No 6, pp 599-620.

Coates, D., & Humphreys, B. R. (2002). The economic impact of postseason play in professional sports. *Journal of Sports Economics, 3*(3), 291-299.

Dansero, E., & Puttilli, M. (2010). Mega-events tourism legacies: the case of the Torino 2006 Winter Olympic Games – a territorialisation approach. *Leisure Studies,* 29, 321-341.

Davis, J. (2019) Avoiding white elephants? The planning and design of London's 2012 Olympic and Paralympic venues, 2002-2018. *Planning Perspectives* In Press.

Demurger, S. (2001). Infrastructure development and economic growth: An explanation for regional disparities in China? *Journal of Comparative Economics,* 29, 95-117.

Depken, C., & Fore, B. (2020). Firm-Level Economic Activity Before, During and After Local Events: A Case Study. Journal of Sports Economics, 21(4), 327-334.

Depken, C., & Stephenson, E. F. (2018). Hotel demand before, during and after sports events: Evidence from Charlotte, North Carolina. *Economic Inquiry,* 56(3), 1746-1776.

Dollinger, M. J., Li, X., & Mooney, C. H. (2010). Extending the resource-based view to the mega-event: Entrepreneurial rents and innovation. *Management and Organization Review, 6*(2), 195-218.

Donaldson, D. (2018). Rise of the Raj: Estimating the impact of Transportation Infrastructure. *American Economic Review,* 108, 899-934.

Feddersen, A., & Maennig, W. (2012). Sectoral labour market effects of the 2006 FIFA World Cup. *Labour Economics, 19*(6), 860-869.

Gottwald, J-C., & Duggan, N., (2008). China's Economic Development and the Beijing Olympics. *International Journal of the History of Sport,* 25(3), 339-354.

Holder, R., & Raschky, P. (2014). Regional favouritism. *Quarterly Journal of Economics*, 129(2), 995-1033.

Hong, J., Chu, Z., Wang, Q. (2011) Transport infrastructure and regional economic growth: Evidence from China, *Transportation,* 38, 737-752.

Hotchkiss, J. L., Moore, R. E., & Zobay, S. M. (2003). Impact of the 1996 Summer Olympic Games on employment and wages in Georgia. *Southern Economic Journal*, 691-704.

Jedwab, R., Kerby, E., Maradi, A., (2017). History, Path Dependence and Development: Evidence from Colonial Railways, Settlers and Cities in Kenya. *The Economic Journal*, 127, 1467-1494.

Lamla, M., Straub, M., & Girsberger, M. (2014). On the economic impact of international sporting events: microevidence from survey data at the Euro 2008. *Applied Economics*, 46(15), 1693-1703.

Li, S., Blake, A., & Cooper, C. (2011) Modelling the economic impact of international tourism on the Chinese economy. A CGE analysis of the Beijing 2008 Olympics. *Tourism Economics,* 17(2), 279-303.

Li, S., Blake, A., & Thomas, R. (2013). Modelling the economic impact of sports events: The case of the Beijing Olympics. *Economic Modelling,* 30, 235-244.

Li, S., & Song, H., (2013) Economic impacts of visa restrictions on tourism: A case of two events in China. *Annals of Tourism Research*, 43, 251-271.

Matheson, V., (2008) "Mega-Events: The Effect of the World's Biggest Sporting Events on Local, Regional, and National Economies," in The Business of Sports, Vol. 1," Dennis Howard and Brad Humphreys, eds., Westport, CT: Praeger Publishers, 81-99.

Matheson, V. A., & Baade, R. A. (2005). Striking Out? The Economic Impact of Major League Baseball Work Stoppages on Host Communities. Working Papers 0507, College of the Holy Cross, Department of Economics.

Myers, R. (1990). *Classical and modern regression with applications.* Duxbury Press, Boston, MA.

Okada, I., Greyser, S., (2018). After the carnival: Key factors to enhance Olympic legacy and prevent Olympic sites from becoming white elephants. *Working Paper, No 09-19,* Harvard Business School, Harvard University.

Porter, P. (1999). *Mega-sports events as municipal investments: A critique of impact analysis.* Sports Economics: current research, ed: Fizel, J., Gustafson, E. & Hadley, L. 61-73. New York: Praeger Press.

Porter, P., Fletcher, D. (2008). The economic impact of the Olympic Games: Ex ante predictions and ex post reality. *Journal of Sport Management,* 22, 470-486.

Preuss, H. (2004). *The economics of staging the Olympics: a comparison of the Games, 1972-2008.* Cheltenham, UK: Edward Elgar Publishing.

Preuss, H. (2006). The Olympics. Chapters, in: Wladimir Andreff & Stefan Szymanski (ed.), Handbook on the Economics of Sport, Chapter 17. Cheltenham, UK: Edward Elgar Publishing.

Preuss, H., & Solberg, H. (2006). Attracting Major Sporting Events: The Role of Local Residents. *European Sport Management Quarterly,* 6(4), 391-411.

Ren, X. (2008) Architecture and nation building in the age of globailization: Construction of the national stadium of Beijing for the 2008 Olympics. *Journal of Urban Affairs,* 30(2), 175-190.

Rose, A., & Spiegel, M. (2011) The Olympic Effect. *The Economic Journal,* 121, 652-677.

Rudkin, S., & Sharma, A. (2020) Live football and tourism expenditure: match attendance effects in the UK. *European Sport Management Quarterly,* 20(3), 276-299.

Schanbl, P. (2012) The international transmission of bank liquidity shocks: Evidence from an emerging market. *Journal of Finance,* 67, 897-932.

Shin, H. B. (2009) Life in the shadow of mega-events: Beijing Summer Olympiad and its impact on housing. *Journal of Asian Public Policy,* 2(2), 122-141.

Solberg, H., & Preuss, H. (2007) Major Sporting Events and Long-Term Tourism Impacts. *Journal of Sport Management,* 21, 215-236.

Street, N., Matelski, M., (2019) *American Businesses in China: Balancing culture and communications 3rd edition.* McFarland and Company, Jefferson, NC.

Szymanski, S. (2010). *The Economic Impact of the World Cup.* Football Economics and Policy. Palgrave Macmillan, London.

Teigland, J. (1999). Mega-Events and Impacts on Tourism: The Predictions and Realities of the Lillehammer Olympics. *Impact Assessment and Project Appraisal,* 17(4), 305-317.

Tien, C., Lo, H., & Lin, H. (2011). The economic benefits of mega events: A myth or a reality? A longitudinal study of the Olympic Games. Journal of Sport Management, 25, 11-23.

Vierhaus, C. (2019). The international tourism effect of hosting the Olympic Games and FIFA World Cup. *Tourism Economics,* 25(7), 1009-1028.

Zhu, L. & Cai, Y. (2016) Institutions and Provision of Public Goods in Rural China: An Empirical Study Based on Villages in Guandong Province. *China Review*, 16(2), 55-83.

Tables and Figures

Table 1. Firms in the sample

Sector	Firms	Observations
Energy	26	341
Materials	157	1,885
Industrials	425	4,863
Consumer Discretionary	239	2,834
Consumer Staples	50	687
Health Care	127	1,503
Financial	4	72
Information Technology	375	3,998
Communications	9	106
Utilities	43	646
Real Estate	15	270
Total	*1,470*	*17,205*

Notes: Sectors are categorised by general industry classification codes.

Table 2. Summary statistics

Variable	Operationalization	Mean	Std. Dev.	Minimum	Maximum
EBIT	EBIT / Total Assets	6.39	6.17	-2.91	20.75
Total Invested Capital	Capital Investment / Total Assets	0.6	0.2	0.22	0.91
Revenue	ln(Revenue)	7.03	1.65	-6.91	13.87
Total Assets	ln(Total Assets)	7.57	1.56	-4.61	14.25
Long-term Debt	ln(Long-term Debt)	0.19	5.18	-5.52	12.6
Capex	ln(Capital Expenditure)	4.11	2.07	-6.91	11.54
Population	National Population (millions)	17.49	0.74	16.12	18.53
GDP per capita	ln(GDP Per Capita)	10.94	0.6	8.46	11.77
Economic Growth	ΔGDP	11.43	3.98	3.64	24.62
Inflation	Inflation rate, %	0.99	2.03	-4.5	6.3
Schooling	ΔTertiary Enrollment	5.36	7.87	-17.59	52.34
Unemployment	ΔUrban Unemployment	2.87	1.09	-1.4	4.9
Host (Beijing)	Indicator; Beijing = 1	0.24	0.43	0	1
Host (Beijing & Tianjin)	Indicator; Beijing & Tianjin = 1	0.28	0.45	0	1

Notes: Summary statistics based upon 16,722 observations. EBIT is a ratio of earnings before interest and taxation divided by total assets in percentage terms. The variable is winsorised at the 5^{th} and 95^{th} percentile. The same transform is applied to total invested capital with the exception that the variable is not in percent terms. Revenue, total assets, long term debt and Capex all enter as their natural logarithms. From the state level variables, population and GDP per capita enters as their natural logarithms, whereas economic growth, inflation urban unemployment enter in percentages. Schooling is measures as the growth in University students in percentage terms.

Table 3: Difference in difference estimates for hypothesis I

	Beijing Firms		Beijing & Tianjin Firms		Balanced	
	Coefficient	T-Statistic	Coefficient	T-Statistic	Coefficient	T-Statistic
Log Sales	-0.044***	(-4.38)	-0.045***	(-4.46)	-0.043***	(-4.24)
Log Long Term Debt	0.002*	(1.66)	0.002*	(1.64)	0.002**	(2.06)
Log Capex	0.006*	(1.89)	0.006*	(1.92)	0.005	(1.45)
Log Provincial Population	0.275	(0.97)	0.241	(0.88)	0.250	(0.88)
Log Provincial GDP Per Capita	-0.181	(-0.85)	-0.075	(-0.38)	-0.191	(-0.89)
Log Provincial Economic Growth	-0.003	(-1.34)	-0.002	(-0.79)	-0.002	(-1.10)
Provincial Inflation	0.005	(1.19)	0.004	(1.07)	0.005	(1.08)
Provincial Schooling	-0.000	(-0.16)	0.000	(0.82)	-0.000	(-0.30)
Provincial Urban Unemployed	-0.023	(-0.92)	-0.001	(-0.11)	-0.026	(-1.02)
Provincial Hospitals Per Capita	0.021	(0.81)	0.032	(1.26)	0.011	(0.42)
Treatment y2001	0.013	(0.67)	-0.006	(-0.31)	0.017	(0.83)
Treatment y2002	-0.088	(-1.03)	-0.012	(-0.38)	-0.096	(-1.12)
Treatment y2003	-0.041	(-1.24)	-0.043	(-1.56)	-0.037	(-1.12)
Treatment y2004	-0.031	(-0.87)	-0.035	(-1.22)	-0.032	(-0.90)
Dependent Variable	Capital		Capital		Capital	
R-Squared	0.10		0.10		0.12	
Firms	497		497		411	
Observations	2,147		2,147		1,966	

Notes: Each column represents a different regression. Standard errors are clustered by the firm where T-statistics are reported in parentheses and (*)(**)(***) represent the (10)(5) and (1)% significance levels. Firm fixed effects, time dummies and the constant are included in the regression but unreported for brevity. Column 1 represents the full sample with only firms in Beijing in the treatment group. Column 2 adds firms in Tianjin to the treatment group. Column 3 restricts the sample to firms who are present throughout the full sample period.

Table 4: Difference in difference estimates for hypothesis II

	Beijing Firms		Beijing & Tianjin Firms		Balanced	
	Coefficient	T-Statistic	Coefficient	T-Statistic	Coefficient	T-Statistic
Log Sales	1.212***	(5.07)	1.211***	(5.07)	1.003***	(3.50)
Log Long Term Debt	0.019	(0.76)	0.019	(0.77)	-0.101***	(-3.16)
Log Capex	-0.620***	(-7.39)	-0.621***	(-7.41)	0.030	(0.29)
Log Provincial Population	-4.084	(-0.60)	-3.481	(-0.41)	-3.543	(-0.52)
Log Provincial GDP Per Capita	2.148	(0.74)	2.854	(0.85)	-2.573	(-0.92)
Log Provincial Economic Growth	0.097**	(2.30)	0.052	(1.32)	0.072*	(1.64)
Provincial Inflation	-0.126	(-1.49)	-0.105	(-1.25)	0.030	(0.29)
Provincial Schooling	0.088**	(2.08)	0.093**	(2.18)	0.025	(0.58)
Provincial Urban Unemployed	-1.848***	(-4.23)	-2.078***	(-4.67)	-0.391	(-0.91)
Provincial Hospitals Per Capita	-2.670*	(-1.91)	-2.540*	(-1.80)	1.556	(1.04)
Treatment y2008	1.186**	(2.48)	0.677	(1.57)	-0.250	(-0.44)
Treatment y2009	-0.100	(-0.19)	-0.487	(-0.86)	-1.180*	(-1.91)
Treatment y2010	-0.379	(-0.57)	-0.804	(-1.13)	-0.150	(-0.20)
Treatment y2011	0.773	(1.15)	0.501	(0.63)	-0.110	(-0.15)
Treatment y2012	0.540	(0.73)	0.663	(0.73)	-0.217	(-0.27)
Dependent Variable	EBIT		EBIT		EBIT	
R-Squared	0.15		0.15		0.06	
Firms	1,386		1,386		411	
Observations	7,345		7,345		3,219	

Notes: Each column represents a different regression. Standard errors are clustered by the firm where T-statistics are reported in parentheses and (*)(**)(***) represent the (10)(5) and (1)% significance levels. Firm fixed effects, time dummies and the constant are included in the regression but unreported for brevity. Column 1 represents the full sample with only firms in Beijing in the treatment group. Column 2 adds firms in Tianjin to the treatment group. Column 3 restricts the sample to firms who are present throughout the full sample period.

Table 5: Difference in difference estimates for hypothesis III

	Beijing Firms		Beijing & Tianjin Firms		Balanced	
	Coefficient	T-Statistic	Coefficient	T-Statistic	Coefficient	T-Statistic
Log Sales	-0.041***	(-4.72)	-0.041***	(-4.73)	-0.023**	(-2.02)
Log Long Term Debt	-0.002***	(-3.61)	-0.002***	(-3.59)	-0.002*	(-1.76)
Log Capex	0.008***	(3.14)	0.008***	(3.14)	0.006	(1.14)
Log Provincial Population	0.448	(1.52)	0.330	(1.08)	0.480	(0.75)
Log Provincial GDP Per Capita	-0.070	(-0.45)	-0.166	(-1.02)	-0.044	(-0.16)
Log Provincial Economic Growth	0.001	(0.45)	0.000	(0.23)	0.003	(1.03)
Provincial Inflation	-0.006*	(-1.96)	-0.006*	(-1.94)	0.001	(0.18)
Provincial Schooling	0.002	(0.93)	0.002	(0.86)	-0.009	(-1.44)
Provincial Urban Unemployed	-0.031	(-1.21)	-0.014	(-0.51)	-0.059	(-1.15)
Provincial Hospitals Per Capita	0.366	(1.26)	0.464	(1.56)	0.635	(1.04)
Treatment y2015	0.005	(0.70)	0.002	(0.33)	0.008	(0.47)
Treatment y2016	-0.009	(-1.13)	-0.010	(-1.29)	-0.011	(-0.59)
Treatment y2017	-0.011	(-0.96)	-0.018	(-1.48)	-0.006	(-0.24)
Dependent Variable	Capital		Capital		Capital	
R-Squared	0.06		0.06		0.05	
Firms	1,468		1,468		411	
Observations	7,230		7,230		2,039	

Notes: Each column represents a different regression. Standard errors are clustered by the firm where T-statistics are reported in parentheses and (*)(**)(***) represent the (10)(5) and (1)% significance levels. Firm fixed effects, time dummies and the constant are included in the regression but unreported for brevity. Column 1 represents the full sample with only firms in Beijing in the treatment group. Column 2 adds firms in Tianjin to the treatment group. Column 3 restricts the sample to firms who are present throughout the full sample period.

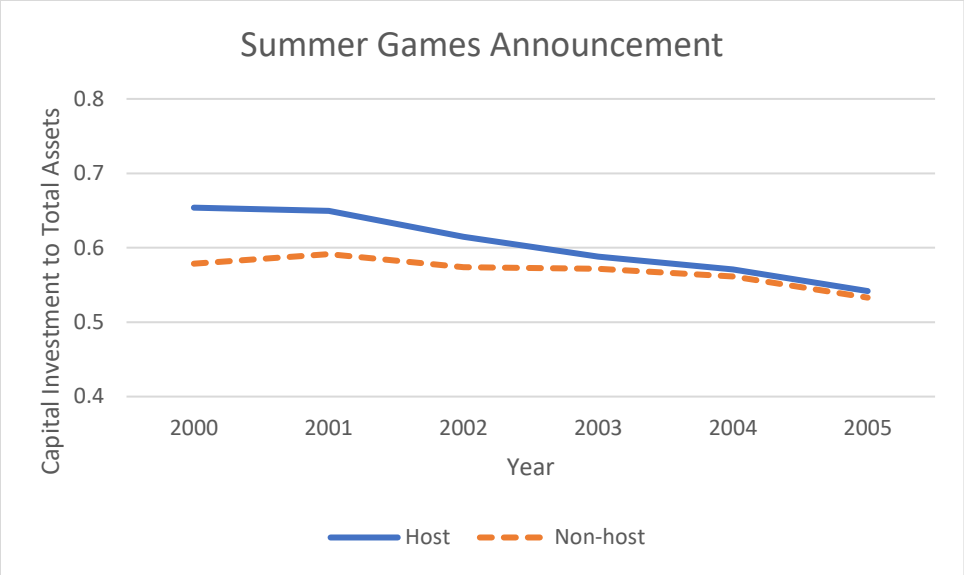

Figure 1: Parallel trends for Summer Games announcement

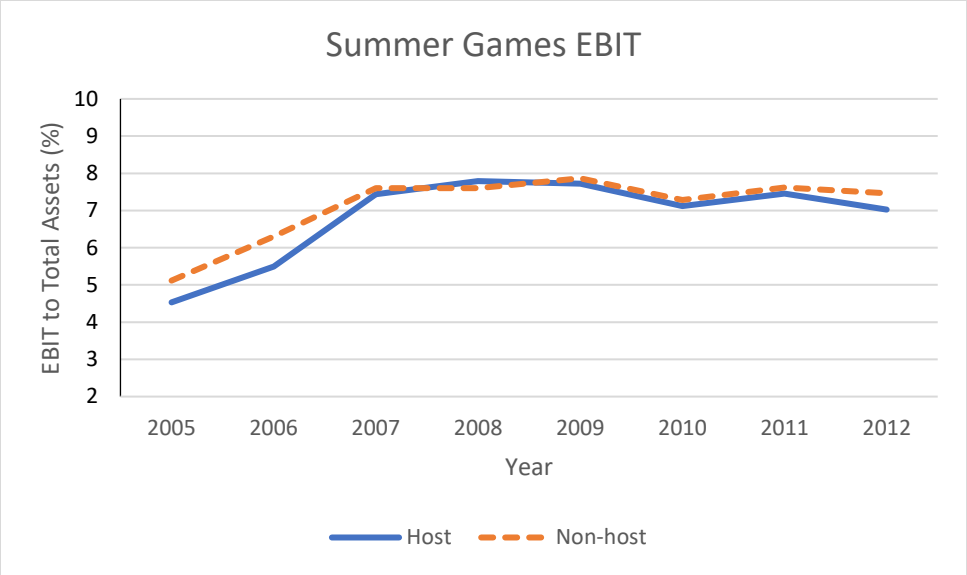

Figure 2: Parallel trends for the Summer Games Period

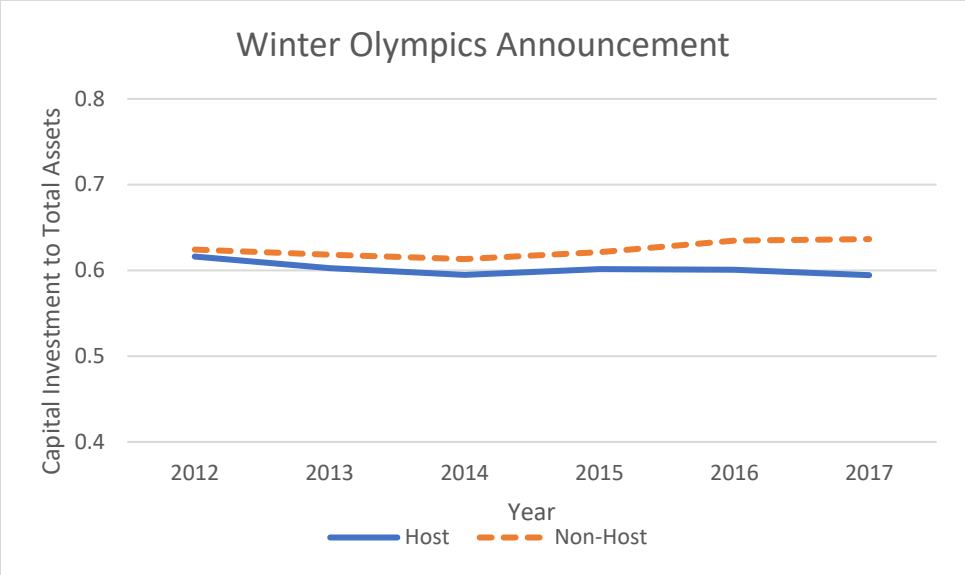

Figure 3: Parallel Trends Winter Games Announcement