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ARTICLE

What Are the Benefits of Hosting a Sporting Mega Event? Evidence From Industrial Firms in China

Ted Hayduk New York University
Johan Rewilak Aston University

It is acknowledged that the economic benefits of hosting a sporting mega event 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 sporting mega event funnels a nation's resources into one specific region at the expense of others. Therefore, this article 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 nonhost cities. Using a difference-in-difference estimation strategy, the authors find no disproportionate impact of the Olympic Games on Beijing firms' invested capital or profitability.

Keywords: Beijing, China, difference-in-difference, Olympic Games, sporting mega events

Research on the economic impact of sporting mega events (SMEs), such as the Olympic Games and the Fédération Internationale de Football Association (FIFA) World Cup, is extensive (Hotchkiss, Moore, & Zobay, 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 (Allmers & Maennifg, 2009; Baade & Matheson, 2004; Li, Blake, & Thomas, 2013; Solberg & Preuss, 2007).

These studies often focus on the hospitality and tourism industries as SMEs are marketed toward tourists, and international arrivals increase during an SME (Baade, Baumann, & Matheson, in press; Baumann & Matheson, 2018; Dansero & Puttilli, 2010; Vierhaus, 2019). 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 (Baade & Matheson, 2016; Dollinger, Li, & Mooney, 2010). Thus, it makes sense that the nonservice sector stands to benefit from hosting an 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 an 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 article 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 an 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 article also informs our understanding of how these effects accrue (or dissipate) when SME-related infrastructure and resources are (or are not) repurposed. This article also contributes to our knowledge of how firms in host regions engage in anticipatory adjustments prior to the SME.

The remainder of this article is organized 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 provides a concluding overview of the paper.

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, 2006; Coates & Depken, 2011; Coates & Humphreys, 2002; Feddersen, & Maennig, 2012; Matheson & Baade, 2005).

Hayduk is with New York University, New York, NY, USA. Rewilak is with Aston Business School, Aston University, Birmingham, United Kingdom. Hayduk (ted.hayduk@nyu.edu) is corresponding author.

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 remains mixed. For example, Depken and Stephenson (2018) found that sporting contests increase hotel registrations, yet Depken and Fore (2020) showed no significant changes in revenue, customers served, and revenue per customer at a full service 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 and Matheson (2018) showed, 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 (Dollinger et al., 2010; Preuss & Solberg, 2006). 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 2 and 4 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 and Matheson (2004) found, 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, Lo, and Lin (2011) showed that based upon a sample of 24 Summer and Winter Olympics, there is only weak evidence that hosting an 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 and Holladay (2012) showed limited evidence to support any long-term impacts from hosting the Olympics. Furthermore, Lamla, Straub, and Girsberger (2014) found 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 and Spiegel (2011) showed that hosts of SMEs do enjoy a permanent increase in trade openness.

The majority of studies that examine the impact of hosting an 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 an SME. Confirming this, Brückner and Papa (2015) found 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 is 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 with sporting contests, the scale of international visitors is much larger and the duration of their stay much longer (Vierhaus, 2019). Baade et al. (in press) highlighted this by showing that the 2014 FIFA World Cup in Brazil increased tourist arrivals by approximately one million visitors and that just under 100,000 international tourists arrived for the 2016 Summer Olympics in Rio de Janeiro. Linked to our study, Li et al. (2013) showed 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 and Fletcher (2008) did show that hotel occupancy rose during both the Atlanta Summer Olympics and Salt Lake City Winter Olympics. Allmers and Maennifg (2009) further found that 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 are permanent. Dansero and Puttilli (2010) claimed that although 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 and Preuss (2007) showed that the Sydney Olympics resulted in a brief increase in tourism, but this was followed by an extended period of stagnation.

To leverage the greatest gains from these sports tourists, firms in the host region may increase their pre-event investment to maximize future profits (Dollinger et al., 2010; Preuss & Solberg 2006). One such way would be via the construction of extra infrastructural capacity commonly associated with hosting SMEs. These upgrades 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 (Baade & Matheson, 2016; Dollinger & Mooney, 2010). 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 providing 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. In addition, the technological sector may provide products and services to ensure that appropriate levels of security are met throughout the entire time frame.[1] In comparison with 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 is when event stadia fail to become repurposed and become known as white elephants (Davis, 2020). This may transcend to infrastructure built specifically for the SME. As Teigland (1999) showed

following the 1994 Winter Olympics, 40% 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 and Shiller (2010) stated, the actions of market participants depend on human judgment 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 an SME place large, time-constrained demands on the host region's production and manufacturing factor markets (Dollinger et al., 2010; Preuss, 2004, 2006). 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 in July 2001 to Beijing, which had 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 selected 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 policy makers. If the decision to host two nonconcurrent events stimulated important outcomes in China for a prolonged period, then it would imply a successful strategy. Such information is objectively important as policy makers decide when (or whether) to bid for an 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) contended 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 nonstadium 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 nonstadium-related infrastructure would be typically less for other SMEs.

Development of Hypotheses

Prior to the 2008 Games, the Chinese government invested heavily in new facilities and infrastructure because it had never hosted an SME of international significance. The 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 (Davis, 2020; Ren, 2008). 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 that 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 for the Chinese government to hit pollution targets. The majority of these closures were temporary and short term in nature, approximately 2 months prior to the Games; thus, this impact may be less pronounced than anticipated (Chen et al., 2019; Li et al., 2011).

Our focus is on firms that are physically located and produce in the host region and those that are located and produce in comparable nonhost 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 spread across China.

Alternatively, policy may be geared to ensure that the economic benefits remain 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; if the economic benefit remains within Beijing, we may find a pronounced effect of the Games, but if these effects dissipate further afield, our findings may be more subdued.

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

Nevertheless, we posit that in advance of the Games, nonservice firms must aim to increase productive capacity to meet the sizeable demand shift described earlier 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 this effect within the host region to be disproportionately greater than in nonhost regions, and this is consistent with Shin (2009), who argued 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 favoritism literature may further determine whether there would be a disproportional benefit in the host city compared with others. In a worldwide panel, Holder and Raschky (2014) showed that regional nighttime lighting is more intense in regions that share the birth region of the political leader, indicating regional favoritism. Burgess, Jedwah, Morjaria, and Pador I Miquel (2015) extended this in their study on roadbuilding in Kenya and showed that this regional favoritism stemming from politics occurs during periods of autocracy, but disappears during democracy.

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

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

This suggests that in our study context, given political favoritism, 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 the first hypothesis:

> Hypothesis 1: In the run up to the 2008 Games, we anticipate nonservice sector firms in Beijing to have greater capital investment relative to nonservice 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 (Cieslik & Kaniewska, 2004; Demurger, 2001; Hong, Chu, & Wang, 2011) via a reduction in the transaction costs on traded goods. Indeed, both Jedwab, Kerby, and Maradi (2017) and Donaldson (2018) showed 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 nonservice sector firms in Beijing to have greater earnings relative to nonservice 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 reused. 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 nonservice sector firms in Beijing to have greater capital investment relative to nonservice 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 center 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

Data set. The data used for the analysis was an unbalanced panel data set of 1,470 Chinese industrial firms spanning the years 2000–2017 ($N = 17{,}205$). We created three nonoverlapping periods wherein we studied the run up to the Games from 2000 to 2004 inclusive, the Olympic Games effect from 2005 to 2012, and the announcement effect of Beijing being selected as host for the Winter Games from 2013 to 2017.

Technically, the run up to the Summer Games encompassed 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 proceeded with our strategy of having three nonoverlapping periods as our preferred way of splitting the sample given that extending the data had no effect on the findings.

Table 1 shows the makeup of the firms by industry classification, and Table 2 shows the summary statistics for the full sample. The firm-level data were collected from *Compustat Capital IQ Database*, which is very common in branches of microeconomics, finance, and strategic management (e.g., Ulbricht & Weiner, 2005). Compared with other finance databases, *Compustat's* Global data, in particular, have been shown to cover the most expansive set of firms and provide the widest range of financial and accounting items (Dai, 2012).

In our data, we felt that we were identifying production within a location, for example, the host versus nonhost, as the financials were produced at the subsidiary level. In the Compustat system, production accounts are not consolidated to firms' headquarters, meaning we were accurately able to capture production within each province based on the indicated location of the firm.

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.

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

Note. Sectors are categorized by general industry classification codes.

Model and specification. To investigate Hypotheses 1–3, we implemented 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 indicates firms, s indicates Chinese states, and t indicates 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 for Beijing-headquartered firms versus firms headquartered in all other Chinese cities.

The first time period did create some concerns because we could not access data prior to 2000; hence, as in Card and Kruger (1994), we implicitly assumed parallel trends, but both lines appeared flat until the intervention point. It then appeared that host investment fell at a faster rate than the nonhost region. This appeared to go against the theory from Hypothesis 1.

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

Figure 3 shows that prior to the intervention period, both host and nonhost capital investment was relatively flat. However, after the intervention period, there appeared to be some divergence in the

Table 2 Summary Statistics

Variable	Operationalization	Mean	*SD*	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	ΔΔTertiary 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 and Tianjin)	Indicator; Beijing and Tianjin = 1	0.28	0.45	0	1

Note. Summary statistics based upon 16,722 observations. The variable is winsorized at the 5th and 95th percentile. The same transform is applied to total invested capital with the exception that the variable is not in percentage 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 enter as their natural logarithms, whereas economic growth, inflation, and urban unemployment enter in percentages. Schooling is measured as the growth in university students in percentage terms. EBIT = earnings before interest and taxes; GDP = gross domestic product.

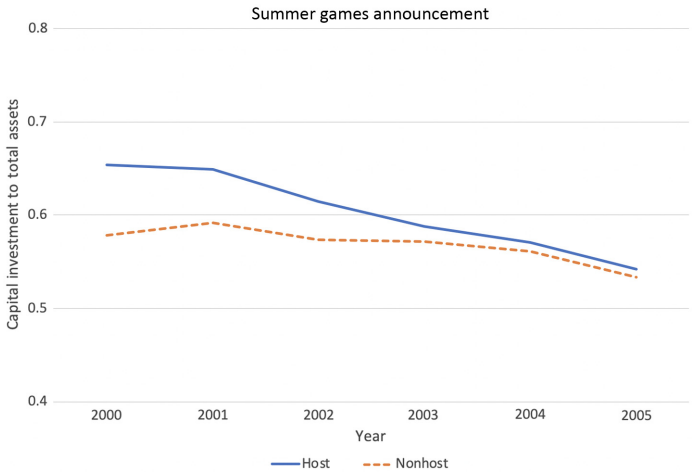

Figure 1 — Parallel trends for Invested Capital, 2000–2005.

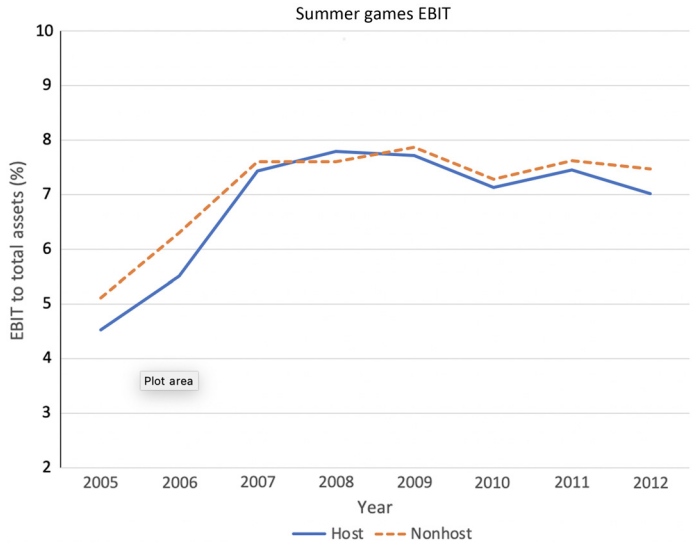

Figure 2 — Parallel trends for Earnings, 2005–2012. EBIT = earnings before interest and taxes.

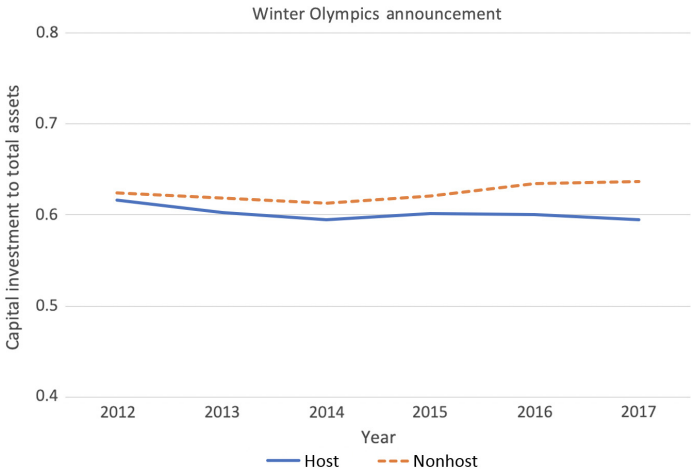

Figure 3 — Parallel trends for Invested Capital, 2012–2017.

trends, although it appeared that firms in nonhost areas increased their capital investment in comparison with host region firms, similar to Figure 1.

To ensure the parallel trends assumption is met, scholars often implement a placebo test similar to Schanbl (2012). Typically, this is done to test whether a statistically significant treatment becomes insignificant upon the placebo. As the images seemed to propose a rejection of our hypotheses, this test may not have been appropriate in this context. Nevertheless, we randomly assigned 26% 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, which provided confidence that our difference-in-differences set up was accurate.

Robustness checks. We included two main robustness checks to ensure our findings were accurate. First, we included 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 restricted our sample to only contain firms that were present throughout the entire time series. Thus, we created a balanced data set containing 411 firms. This was carried out because as the time series progressed, more firms entered the database, which may have biased the findings. We acknowledge that this procedure introduced survivorship bias into our model, but it permitted 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 conducted several other pieces of sensitivity analysis. These included 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 contained 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 was the firms' total capital investment divided by total assets (total invested capital). We focused on total capital investment as it encompassed investment in both capital devoted to business objectives, such as investing in manufacturing plants, real estate, or machinery, and working capital, which included inventory stock. Given that in the run up, and during an SME, firms would be keen to increase their inventories to ensure they did not miss out on sales, this element of capital should not be ignored.

In Hypothesis 2, the dependent variable was the firms' earnings before interest and taxes divided by its total assets. We preferred this measure as opposed to net income as it avoided confounding values that may arise by carrying over tax losses from one year to the next. Given the presence of influential observations for the earnings before interest and taxes variable, which we defined as values that lie several SDs outside the mean, we took the common approach of winsorizing the variable at the 5th and 95th percentile. This was opposed to dropping data and reducing the sample size.

Covariates. We had two categories of covariates. The subset at the firm-level included firm revenue (revenue), long-term debt to

measure leverage (long-term debt), and capital expenditure (capex). These variables were logged in the regression to create more normal distributions.

The state-level variables were available from the National Bureau of Statistics China and included several macroeconomic regional controls. They included: regional population (population), GDP per capita, 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 controlled for regional government expenditure (government).

To our knowledge, provincial-level government expenditure was not publicly available; hence, we proxied for provincial public spending that would be non-Olympic related. The preferred variable was 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 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, *SD*, minimum, and maximum. Most variables showed plenty of variation; however, GDP per capita and population had far less variation given their mean values, which was somewhat expected. With 24% of the firms in the sample located in Beijing and 28% located in both Beijing and Tianjin, there was a notable proportion in the treatment group to warrant our empirical strategy.

In addition, multicollinearity did not appear to be a problem as when examining the VIF in preliminary unreported least squares regressions, the mean variance inflation factor was 3.17, which was well below the threshold 5. Only GDP per capita and total assets had variance inflation factors exceeding 5, although both values were well below the individual threshold of 10 proposed by Myers (1990) and Hair, Black, Babin, and Anderson (2018).

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. They display the results related to Hypothesis 1–3 where each table contains three regressions.

When examining the impact of the Summer Games announcement, all four treatment variables in all three regressions were statistically insignificant. This proposes that firms in Beijing did not

Table 3 Difference-in-Difference Estimates for Hypothesis I

	Beijing firms		Beijing and Tianjin firms		Balanced	
Variable	**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	(.97)	0.241	(.88)	0.250	(.88)
Log provincial GDP per capita	–0.181	(–.85)	–0.075	(–.38)	–0.191	(–.89)
Log provincial economic growth	–0.003	(–1.34)	–0.002	(–.79)	–0.002	(–1.10)
Provincial inflation	0.005	(1.19)	0.004	(1.07)	0.005	(1.08)
Provincial schooling	–0.000	(–.16)	0.000	(.82)	–0.000	(–.30)
Provincial urban unemployed	–0.023	(–.92)	–0.001	(–.11)	–0.026	(–1.02)
Provincial hospitals per capita	0.021	(.81)	0.032	(1.26)	0.011	(.42)
Treatment year 2001	0.013	(.67)	–0.006	(–.31)	0.017	(.83)
Treatment year 2002	–0.088	(–1.03)	–0.012	(–.38)	–0.096	(–1.12)
Treatment year 2003	–0.041	(–1.24)	–0.043	(–1.56)	–0.037	(–1.12)
Treatment year 2004	–0.031	(–.87)	–0.035	(–1.22)	–0.032	(–.90)
Dependent variable	Capital		Capital		Capital	
R^2	.10		.10		.12	
Firms	497		497		411	
Observations	2,147		2,147		1,966	

Note. Each column represents a different regression. *SE*s are clustered by the firm where *t* statistics are reported in parentheses. 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 that are present throughout the full sample period. GDP = gross domestic product. Significance levels: *10%; **5%; ***1%.

Table 4 Difference-in-Difference Estimates for Hypothesis II

	Beijing firms		Beijing and Tianjin firms		Balanced	
Variable	**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	(.76)	0.019	(.77)	–0.101***	(–3.16)
Log capex	–0.620***	(–7.39)	–0.621***	(–7.41)	0.030	(.29)
Log provincial population	–4.084	(–.60)	–3.481	(–.41)	–3.543	(–.52)
Log provincial GDP per capita	2.148	(.74)	2.854	(.85)	–2.573	(–.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	(.29)
Provincial schooling	0.088**	(2.08)	0.093**	(2.18)	0.025	(.58)
Provincial urban unemployed	–1.848***	(–4.23)	–2.078***	(–4.67)	–0.391	(–.91)
Provincial hospitals per capita	–2.670*	(–1.91)	–2.540*	(–1.80)	1.556	(1.04)
Treatment year 2008	1.186**	(2.48)	0.677	(1.57)	–0.250	(–.44)
Treatment year 2009	–0.100	(–.19)	–0.487	(–.86)	–1.180*	(–1.91)
Treatment year 2010	–0.379	(–.57)	–0.804	(–1.13)	–0.150	(–.20)
Treatment year 2011	0.773	(1.15)	0.501	(.63)	–0.110	(–.15)
Treatment year 2012	0.540	(.73)	0.663	(.73)	–0.217	(–.27)
Dependent variable	EBIT		EBIT		EBIT	
R^2	.15		.15		.06	
Firms	1,386		1,386		411	
Observations	7,345		7,345		3,219	

Note. Each column represents a different regression. *SE*s are clustered by the firm where *t* statistics are reported in parentheses. 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 that are present throughout the full sample period. EBIT = earnings before interest and taxes; GDP = gross domestic product.
Significance levels: *10%; **5%; ***1%.

Table 5 Difference-in-Difference Estimates for Hypothesis III

	Beijing firms		Beijing and Tianjin firms		Balanced	
Variable	**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	(.75)
Log provincial GDP per capita	–0.070	(–.45)	–0.166	(–1.02)	–0.044	(–.16)
Log provincial economic growth	0.001	(.45)	0.000	(.23)	0.003	(1.03)
Provincial inflation	–0.006*	(–1.96)	–0.006*	(–1.94)	0.001	(.18)
Provincial schooling	0.002	(.93)	0.002	(.86)	–0.009	(–1.44)
Provincial urban unemployed	–0.031	(–1.21)	–0.014	(–.51)	–0.059	(–1.15)
Provincial hospitals per capita	0.366	(1.26)	0.464	(1.56)	0.635	(1.04)
Treatment year 2015	0.005	(.70)	0.002	(.33)	0.008	(.47)
Treatment year 2016	–0.009	(–1.13)	–0.010	(–1.29)	–0.011	(–.59)
Treatment year 2017	–0.011	(–.96)	–0.018	(–1.48)	–0.006	(–.24)
Dependent variable	Capital		Capital		Capital	
R^2	.06		.06		.05	
Firms	1,468		1,468		411	
Observations	7,230		7,230		2,039	

Note. Each column represents a different regression. *SE*s are clustered by the firm where *t* statistics are reported in parentheses. 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 that are present throughout the full sample period. GDP = gross domestic product.
Significance levels: *10%; **5%; ***1%.

increase their total capital investment relative to firms in comparable Chinese cities in the run up to the Summer Olympic Games.

Three control variables were statistically significant in Regressions 1 and 2. They were all firm-level covariates: revenue, which entered negatively; and leverage and capex, which entered positively (as expected). Interestingly, all state-level variables were 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 had 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 became statistically insignificant, although when the conditioning set of covariates was altered, it became positive and statistically significant—as in the previous two columns. Once again, these changes did not influence the treatment variables.

Factually, the run up to the Beijing Games for our sample encompassed the years 2000–2007 inclusive; however, the results in Table 3 only considered 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 these additional data.

In Table 4, we examined the impact of the Summer Olympic Games on pretax profits. We had five treatment years, but in Column 1, only the treatment effect for the year 2008 was positive and statistically significant at the 5% level. This proposed that only in 2008 did firms in Beijing receive higher pretax profits than firms located elsewhere in China during the Olympic Games. However, as previous studies have shown, this effect was short lived with the remaining treatment variables statistically insignificant.

However, this finding was not robust in the following two columns as the 2008 treatment effect became statistically insignificant when the region of Tianjin was added to the treatment group and for the balanced sample. Likewise, no other treatment variable was positive and statistically significant with the exception of the 2009 treatment dummy in the balanced sample. Peculiarly, it was 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 nonhost cities.

Examining the covariates in the first column, two firm level variables and four regional level variables were statistically significant. They included: 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 became statistically insignificant when Tianjin was added to the treatment group. In the final regression, only firm sales, leverage, and regional economic growth were statistically significant.

Table 5 examines the announcement effect of Beijing winning the bid to host the 2022 Winter Games on total capital invested. No treatment variable was 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 that in Hypothesis 3, we speculated that the announcement effect of the 2022 Winter Games would be more subdued than the Summer Olympic announcement. Therefore, by transitivity, if no positive effect was found for the Summer Games, it makes sense that no effect was found concerning the subsequent Winter Games.

Examining the covariates, all three firm-level variables were significant in the first and second columns, but in the third, capex became statistically insignificant. In addition, from the state-level variables, the inflation rate was statistically significant in the first two regressions but became insignificant when the sample was 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 pretax profits for firms located in Beijing compared with other cities in China arising due to the SME. However, these results should not be interpreted to indicate that there were no economic benefits in Beijing that arose due to hosting the Olympic Games.

Discussion of Findings

One criticism of hosting an 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 that counties within close proximity to Olympic activity benefited from the Atlanta 1996 Summer Games in comparison with 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 with 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 and Papa (2015) showed that the ex ante effect of hosting the Olympic Games stimulates economic growth. Although we did 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 and Duggan (2008) found that Beijing's economy was boosted by 0.8% due to the Summer Olympics. Hence, if Beijing prospered because of the Games by 0.8%, then the local economy in cities such as Shanghai, Tianjin, and others 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's. However, our results may differ for several reasons. First, Shin (2009) focused 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 (2020) proposed 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 for the Chinese government to hit pollution level targets. However, under further investigation, many of these closures in Beijing were temporary and approximately 2 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) used a reference category that included the whole of the Chinese economy. This may explain why our results contrast as the corresponding reference category in

this article 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 centers, Shanghai and Shenzhen (Chen, Yan, & Yang, 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 that, in China, there was a national effort of leveraging the Beijing Olympics rather than a localized 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 favoritism may have impacted the findings. If contracts for the Games were awarded to favored regions outside the host city, then it is no surprise that Beijing did not disproportionally benefit compared with other comparable cities. In China, and during the early part of our sample under President Jiang Zemin, political favoritism 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 with the Summer Games. The former is associated with far fewer nation participants and features fewer 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 policy makers, academics, business managers, and entrepreneurs. Difficulties may arise when lobbying the central government to support a city's bid for an SME because (a) the benefits are typically overestimated and short lived and (b) it may be difficult to win public support due to the perception 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 nonhost regions, policy makers have some evidence to refute this second argument.

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

We believe that our findings showcase such a result 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 an 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 an SME. This could then guide policy makers 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 an SME require further development. Theoretically, the demand influxes created by an 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 occurred between 2007 and 2009—which places the 2008 Games directly in the middle. Thus, our results may be confounded by stimulus programs in those particular years. As regional government spending data are not freely available to our knowledge, we proxied for such expenditures using the quantity of public good provision within these areas. In addition, to account for this, we attempted to control for these factors using variables such as economic growth, unemployment, and income.

Second, we did 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 focused 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, nonsporting 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 that 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 nonstadium infrastructure development that was required. In particular, the enormity of the nonstadium expenditures of the Beijing Games stood out and were heavily discussed prior to the Games. This is in comparison with other SMEs where this scale of the nonstadium 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 that 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, policy makers, 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 with firms in similar cities across China.

Note

[1.] For convenience throughout the article, we refer to construction, manufacturing, technology, and defense firms as "nonservice" industry firms.

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