

Macro Through the Lens of Olympics

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Abstract

The Olympics Games have long been the monument of excellence, sportsmanship, solidarity, international collaboration and global integration. Being a fascinating mega sporting event, the Olympics Games provide not only sporting benefits but also economic growth opportunities. In many ways hosting the Olympics games resembled making an investment by the host nation. If executed properly, the costs associated with hosting the games would bring the long-term sustainable economic growth for the host country. Our datathon project focuses on the systematic macro impact of the Olympics Games by visualizing the economic structural impact and aims to answer to the question of how a well-organized Olympics Games first improves host countries' fundamentals, which includes income, employment and foreign investment, and infiltrates the benefits to the host city into a longer-term.

I. Introduction

British sociologist Maurice Roche has laid out the critical characteristics that define mega-events and guide mega-event research:

*"Mega-events (large scale leisure and tourism events such as Olympic Games and World Fairs) are short-term events with long-term consequences for the cities that stage them. They are associated with the creation of infrastructure and event facilities often carrying long-term debts and always requiring long-term use programming. In addition, if successful, they project a new (or renewed) and perhaps persistent and positive image and identity for the host city through national and international media, particularly TV, coverage. This is usually assumed to have long-term positive consequences in terms of tourism, industrial relocation, and inward investments."*¹

In order to have a full figure of the macro effect of hosting the Olympics, we specifically inspect four aspects in the hosting nation: 1) Employment. 2) Foreign Direct Investment. 3) Stock market. We will focus on explaining how they interact and integrate with each other.

¹ <https://www.sheffield.ac.uk/socstudies/people/emeritus-professors/maurice-roche>

II. Employment

Olympics is usually considered as beneficial for a country's employment, as it provides job opportunities for the host city. Meanwhile, Olympic games draw tourists from all over the world, which positively affects the growth of tourism-related industries and thus lead to higher employment in these sectors. In this section, employment in industries related to the Olympics will be examined, followed by a discussion of the overall employment rate for hosting countries.

1) Construction and tourism

Construction and tourism are two major sources of employment that should be created by the Olympics. We did exploratory data analysis on the number of visits at different periods for Vancouver, Rio de Janeiro and London. The relative figures are all included in the appendix.

For Vancouver and Rio de Janeiro, the visits increased even before the Olympics were announced, and no significant increase afterward is observed for all cities. A boost in tourism was seen during the period of Olympic Games in Vancouver and Rio as expected, and it dropped afterward even slightly lower than before the Olympics were announced.

For London, the visits didn't boost when the Olympics was held and a steady rate of increase is observed unaffected by the end of the Olympics. The reason might be that London is a popular city for tourism no matter whether the Olympics is held or not, and visitors avoid the expected peak of tourism in the Olympic periods.

2) Employment by industries

We looked at the composition of employment in Vancouver and London and compared their changes between when the Olympics was announced and when the Olympics ended. We also looked at the increase in job numbers for the target industries in comparison to other industries for both countries. For Rio de Janeiro we only have travel related job data, but we still analyzed it to provide limited comparison.

For Vancouver, the Olympics seem to create a significant number of jobs in construction, which is maintained even after the Olympics finished. The construction also becomes a more important component for the overall employment after the Olympics are held. (table a.1)

This result follows the observation that employment in construction is significantly increased after the Olympic games were announced to be held in Vancouver, as shown in figure E.3 in appendix. The trend of the number of construction jobs is altered sharply around that year, indicating that the change is correlated to the announcement of the event. The increase stopped in 2008, likely affected by the 2008 economic regression. The total number of jobs in construction

slightly decreased afterwards but generally has not changed much since then and even after the Olympics.

No other statistically significant increase in tourism related industries or construction is observed.

Industry name	Accommodation and food services	Transportation and Warehousing	Construction	Other
Vancouver announced (2003)	7.96%	5.73%	5.89%	80.42%
Vancouver Olympic (2010)	7.76%	5.29%	8.92%	78.03%
London announced (2005)	17.15%	13.12%	7.47%	62.26%
London Olympic (2012)	16.3%	12.25%	6.88%	64.57%

Table A.1: Composition rate of industries in each city

In tourism-related industries for Rio de Janeiro, some temporary accelerated increase in the number of jobs is observed after the announcement and before the game, presumably related to the Olympics, potentially influenced by the 2014 drought where a sharp decrease is observed. While the change cannot be proved statistically significant and correlated to the Olympics, such difference is offset after the Olympics finished. Thus we can conclude that Rio de Janeiro's employment does not directly benefit from tourism brought by the Olympics in the long run.

3) Influence on a overall employment

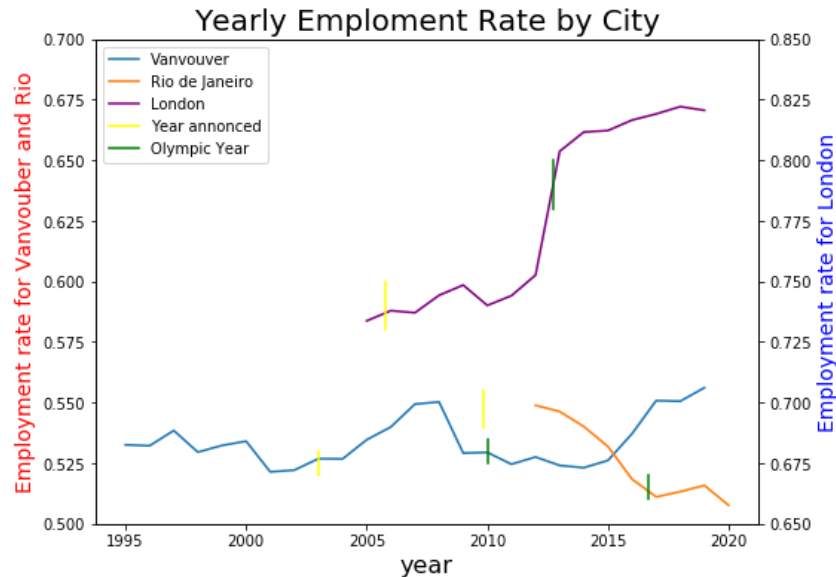


Figure A.1: Yearly Employment Rate by City

A temporary increase in overall employment for Vancouver is observed, corresponding to the increase in construction jobs in Vancouver as previously observed, which stopped growing after the Olympics were held. We missed the early part of data for Rio de Janeiro, but the trends look similar.

Differently, only a sharp increase in employment is observed in London around the time when Olympics are held, and no temporary increase is observed after the hosting is announced. It makes sense as from the previous section, no change in employment is observed that is directly associated with the Olympics. However, the general increase in employment indicates that at least around the time when the Olympics is hosted, the employment is in good condition for London, indicating a good economic situation unaffected by the end of the Olympics.

4) General Approach and Data dependency

The graphs and results in this dataset are mostly obtained through data processing using the given datasets. Multiple grouping and procession are used to create the combined results and t-tests are used to prove that some observed differences are statistically significant when applicable.

The results of employment by industry in London are summarized using a dataset from London Data Store², and to calculate employment ratio, external data about the workforce in Vancouver is also employed. The workforce in Vancouver is estimated from data in Vancouver of limited years³ and Canada workforce yearly data since 1995⁴.

² <https://data.london.gov.uk/dataset/employment-industry-borough>

³ <https://www.statista.com/statistics/787267/labor-force-size-forecast-canada/>

⁴ <https://fred.stlouisfed.org/series/LFWA64TTCAM647S#0>

III. Foreign Direct Investment

Hosting the Olympics Games requires large investment and thus the announcement of hosting mega-event games generally releases positive signals to global investors. According to Geurts in 2009, hosting the Olympics could increase the foreign investment in real estate because international real estate investors are always looking for indicators for promising risk-adjusted returns and countries that bid for an Olympics will see such an improved return.

1) Olympics FDI Impact

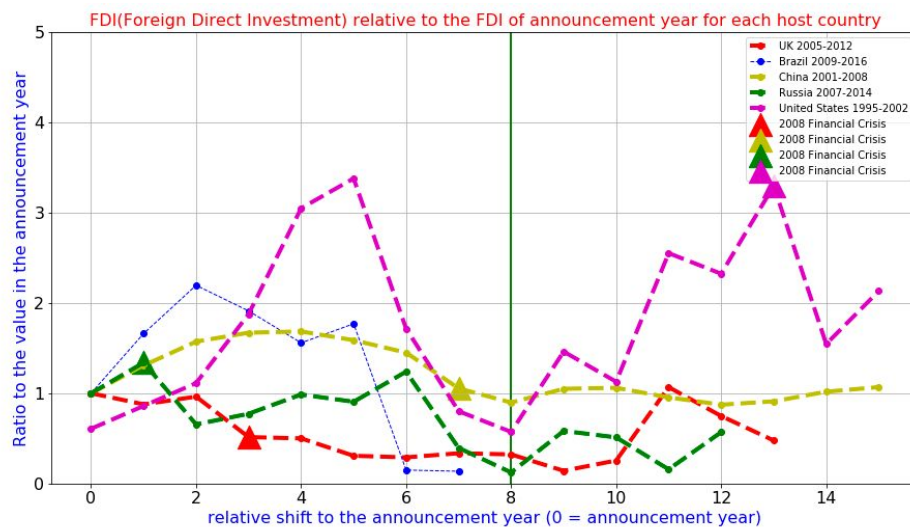


Figure B.1:

This figure shows the value of FDI relative to FDI in the bid-year. X-axis is the number of years after the bid-year. The green horizontal line represents the Olympic year and the triangle points represent the 2008 financial crisis.⁵

First of all, we can see that the Olympics has a significant short-term impact on foreign investment. China, Brazil and the United States have improved their FDI within 4 years after the announcement of hosting the Olympic Games. The 2008 global financial crisis may account for the non-increasing pattern in London 2012 and the Russia 2014 Olympic Games.

However, the FDI short-term boosting brought by the Olympics generally started to decrease in the middle of the preparation stage, until the year when the Olympics are held the FDI has become the lowest and even decreased compared to before. For example, the FDI of the United States began to decrease significantly around 2000. Given the macro environment of the United States at that time, we believe that this part may be attributed to the quantitative easing policy of the Federal Reserve (the federal reserve interest rate was reduced from 6.5% in 2000 to 1.5% in

⁵ datasource: Official National Statistics website for each country and World Development Bank.

2003), resulting in a decrease of investment income. So investors quickly withdrawn their capital and left the market. But did the original growth before 2000 come from the US policy of raising interest rates instead of the Olympic benefits? We found that the United States has raised interest rates since 1999, and the growth of FDI has begun since 1996, so it can be concluded that hosting the Olympic Games is still conducive to the increase in FDI in the United States. Brazil also experienced a sharp decline in FDI in 2015, which we believe may be related to the political turmoil in Brazil in 2015. Greece also hosted an Olympic Games in 2000. However, because his growth rate is too abnormal we exclude him.

2) Reverse U-shape Explanation Insight

In general, the impact of the Olympic Games on FDI is an inverted U-shape. The short-term effects exist, however, the long-term effects are not significant. In other words, investors generally leave even if this investment pays off, and will not consider investing in a country in the long-run just because of the hosting of the Olympic Games. Therefore, the host country of the Olympic Games should not take the short-term FDI growth as the major reason for deciding to host a game or not, but should focus on the long-term impact of these investments on the local economy. For example, the positive impact of FDI on the employment rate. The increase in FDI will generate additional job opportunities, thereby increasing the employment rate. From the previous analysis, we can find that hosting the Olympic Games can indeed increase the employment rate. In addition to the development of tourism that we will mention later, we believe that a large amount of overseas investment in infrastructure is also the main reason for the increase in the employment rate.

IV. Stock

The stock market reflects the economic fundamentals as well as the investor's perspective or expectation. A successful bid for the Olympics indicates major investment in infrastructure, and a potential rise in employment. To study the event effect of the hosting Olympics Games, we collect major market indexes of nice recent Olympics host countries and calculate the cumulative return relative to the benchmark index (MXWO INDEX MSCI World Index)⁶.

Year	2018	2016	2014	2012	2010
Country	South Korea	Brazil	Russia	United Kingdom	Canada
Index	KOSPI Index	IBOV Index	IMOEX Index	UKX Index	SPTSX Index
Year	2008	2006	2004	2002	-

⁶ Data source: Bloomberg

Country	China	Italy	Greece	United States	
Index	CHCOMP Index	TESMIB Index	ASE Index	SPX Index	

Table 2: The index used to represent the macro economic profile of the country.

Announcements of the Olympics have a positive impact on the local host market after adjusted by the benchmark MSCI World Index, which makes sense according to the previous analysis. We expect the investor's expectation effect of hosting Olympics to be fully priced-in shortly after the announcement, this is verified by the next graph 'Relative Return above the benchmark MXWO after Olympics Opening' where stock index performance after opening exhibits random walk except Beijing Olympics back in 2008 amidst the global economic crisis.

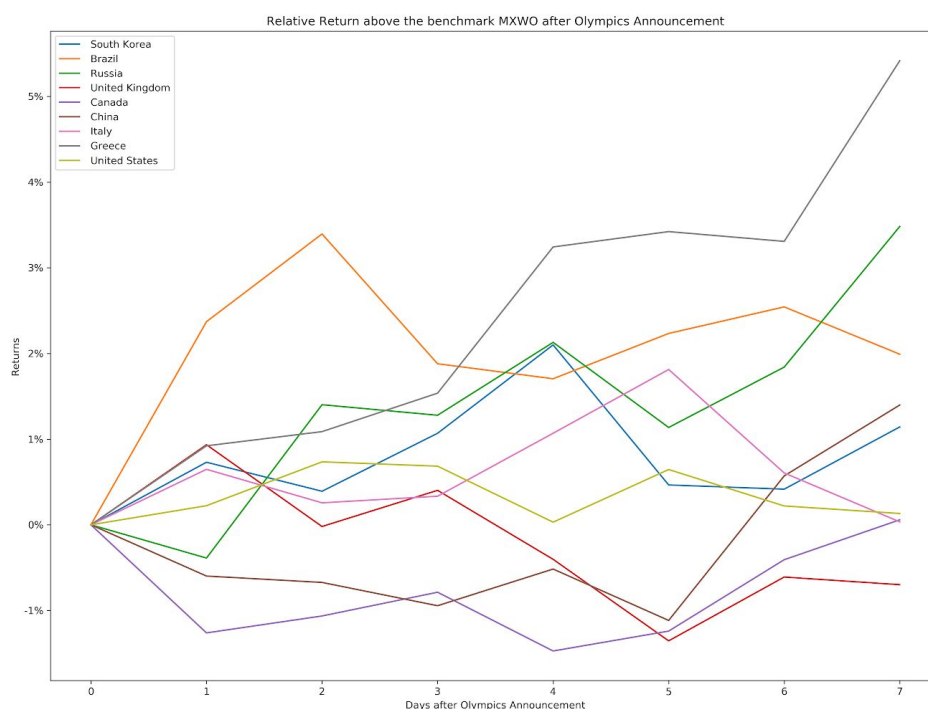


Figure C.1: Relative Return above the benchmark MXWO after Olympics Opening

What remains interesting, however, is the cumulative return during the two weeks of Olympics Games and the following two-week cumulative return after the end of the game. There are clear patterns in the two-week returns especially after the closing of the game. During the Olympics, the local nation stock index will fluctuate a little but most countries will have a surge in the stock market during the two weeks indicating their positive feedback of the game. The following two-week return is significant because it reflects how the local investors evaluate the impact of the game and most importantly local investor's most direct assessment of the Olympics Games' longer-term macroeconomic benefits. Taking China's 2008 Olympics Games, for example, the final operating budget was \$44 billion in comparison to Greece 2004's \$14 billion final operating

budget. Huge investment in building the sports stadium could not justify its benefit for long term infrastructure and structural benefits, which along with the global crisis caused the slash of SHCOMP. A well-structured Olympics Games like UK 2012 (\$10.4 billion final operating budget) on the other hand, is capable of achieving both employment improvement in the short term as described in the sections above, and longer-term income boosting. For the next section, we are going to dig further deep into the UK and study under a finer spectrum of how the UK revitalized a part of their boroughs.

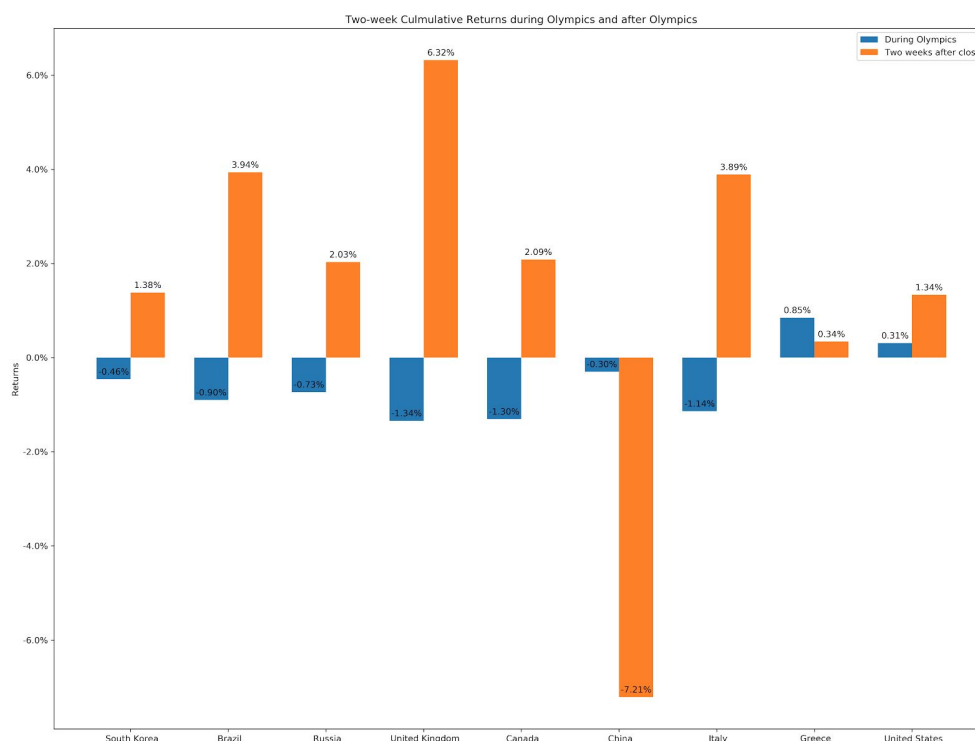


Figure C.2: Two-week cumulative returns during Olympics and after Olympics

V. Long term effects -- Case Study: London Olympic Game in 2012

Many economists are skeptical about the economic benefits of hosting the Olympics Games, considering that Olympics often have large overall costs and relatively little revenues in terms of ticket sales, broadcasting and sponsorships, etc. (Table 3). Even though there are some significant increases in tourism as shown in Section 2.2), they appear to increase only in a short period of time near the Olympics hosting days and decrease afterward. It is hard to tell how the Olympics would benefit tourism in the long term.

	<i>IOC 2009–12</i>	<i>Vancouver 2010 organizing committee</i>	<i>London 2012 organizing committee</i>
Revenue source			
Broadcast rights	\$2,723	\$414	\$713
International sponsors	\$475	\$175 (est.)	\$300 (est.)
Domestic sponsors	\$0	\$688	\$1,150
Ticketing	\$0	\$250	\$988
Licensing	\$0	\$51	\$119
Total	\$3,198	\$1,578	\$3,270
Hosting costs	-	\$7,556	\$11,401

Table 3: shows data on revenues generated by the International Olympic Committee for the Vancouver and London Games in 2010 and 2012.

In addition to these short term benefits, the Olympics can actually bring significant gains for the host country, especially the regions near the host city. A good investment taking into account post-Olympics planning could lead to better productivity for the host city and the country's economy. In this section, we mainly study the London 2012 Olympics with a focus on income and housing prices to better understand how the post-Olympic planning influences London as a whole. In particular, we will discuss how this help revitalize Newham, one of the most disadvantaged boroughs in London, where the Olympics park was built.

To investigate the long-term effects of the London 2012 Olympics, we study the growths of income and average housing prices in London from 2000 to 2019. Average income can capture the economic strength of communities, and housing prices can indicate the infrastructure development and economic potential in a community. According to Figure D.1, compared to 2000, the income growth in London is similar to England, while Newham overtakes both the income growths in London and England starting from the host year of the 2012 Olympics game. Moreover, from Figure D.2, we can also see the great change in income growth in Newham starting from 2012. This shows that the 2012 Olympics has a great impact on the income amount at the borough level, especially in the region benefiting from the infrastructure development, but does not show too much impact at the city or country level.

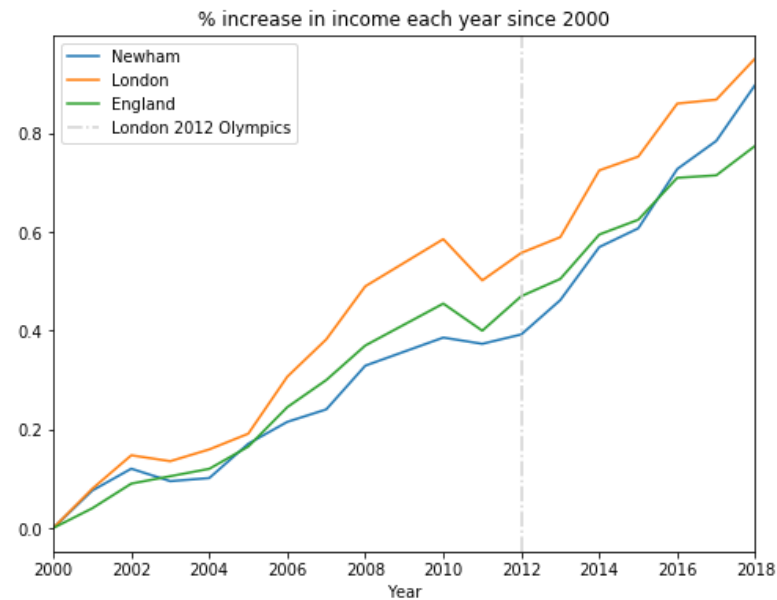


Figure D.1: Comparison of % increase in income since 2000 for Newham, London, and England

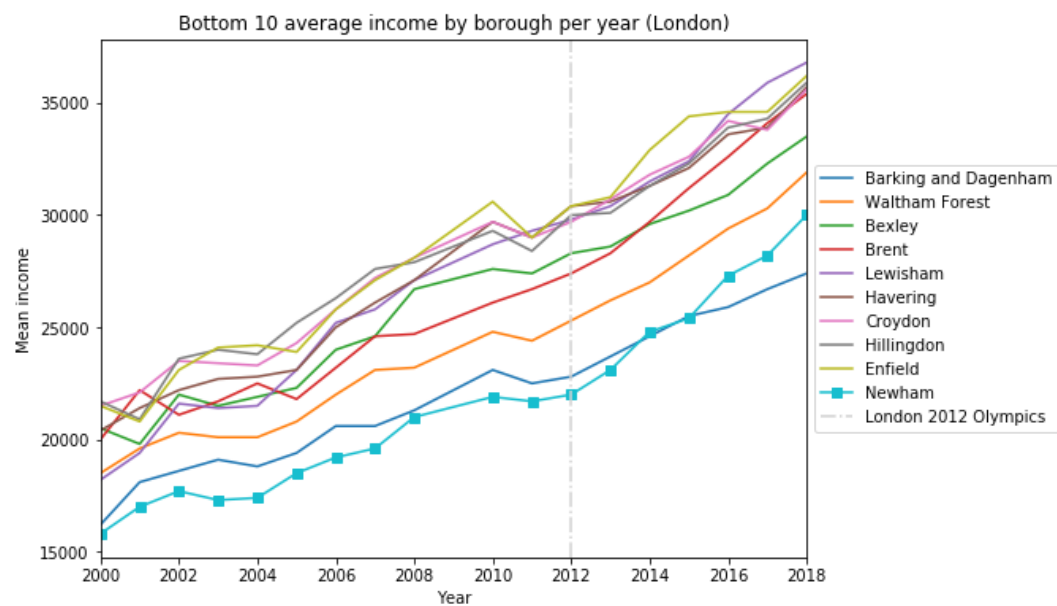


Figure D.2: Average income by borough in bottom 10 boroughs (London)

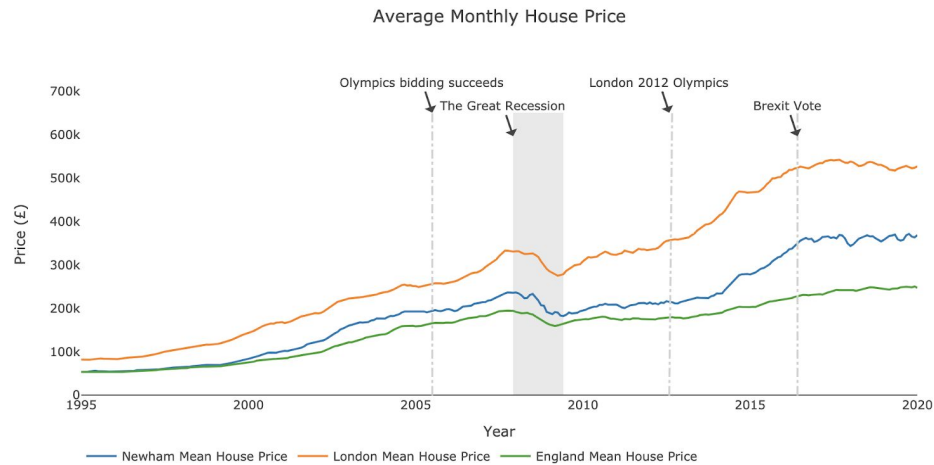


Figure D.3: Average monthly house prices in Newham, London, and England

In addition, we studied the housing prices in London. The strength of the overall economy significantly impacts the real estate market as consumers' ability to support housing prices largely depends on key factors like unemployment and income growth. An increase in housing prices can indicate the economy's strength as a whole. From Figure D.3 and Figure D.4, starting from 2012, the growth rate of housing prices in both London and Newham overtakes England. Compared to 1995, Newham's housing price has an increase of 589%, which swells compared with England-wide average increases of 365% and a London average of 544% in the past 25 years.

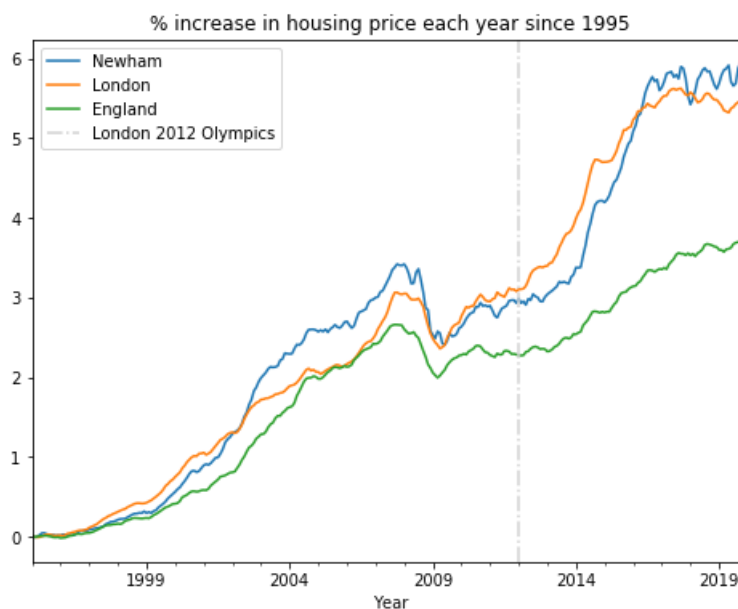


Figure D.4: Comparison % increase in housing prices for Newham, London, and England since 1995

Post-Game planning is essential to the overall success of hosting an Olympic game. Instead of creating infrastructure specifically for the Games, with no plans for them afterward, it's vital to consider their use after the influx of visitors leaves the city. Many Olympics host cities put forth effort well in advance of the Games, but fall short afterward, leaving infrastructure abandoned and witnessing a drastic fall in spirit following the peak of the Games. London proved to the world that there's a great benefit in continuing to put effort into strategies post-Games, through its successful community revitalization of one of its previous notorious areas.

VI. Conclusion

The Olympics Games resemble an investment made by the host nation with potential economic growth opportunities. We carefully inspected the different situations of the recent 9 host nations and went into depth into three of them: Brazil, UK, and Canada. Through the logistics of investment, between announcement and opening, the Olympics Games first increase employment by building stadiums and infrastructure, then foreign investment follows during the period. Short term benefits also include boosting specific industries like tourism. However, these short term benefits will soon disappear after the Olympics.

Our key findings suggest that long term economic improvement backed by reusable infrastructure, like UK's boroughs continued growth in income level and employment after the Olympics, is the key determinant of a successful and sustainable Olympics. In addition, the local stock index is a very important and informative indicator of economic outlook (announcement) and macro consensus of sustainable Olympics legacy.

The significance of our findings is multi-dimensional. For host nations, they should consider more about properly utilizing the opportunities to span out through longer-term and focus more on structural change. And perhaps more crucially for investors, keeping track of pertaining macro indicator changes like continued employment growth as well as the local consensus is the key to telling a good Olympics-related macroeconomic growth and understanding the impact of Olympics for the macroeconomic.

Appendix

Percentage increase in Visits in Vancouver, compared to the same month in 1996

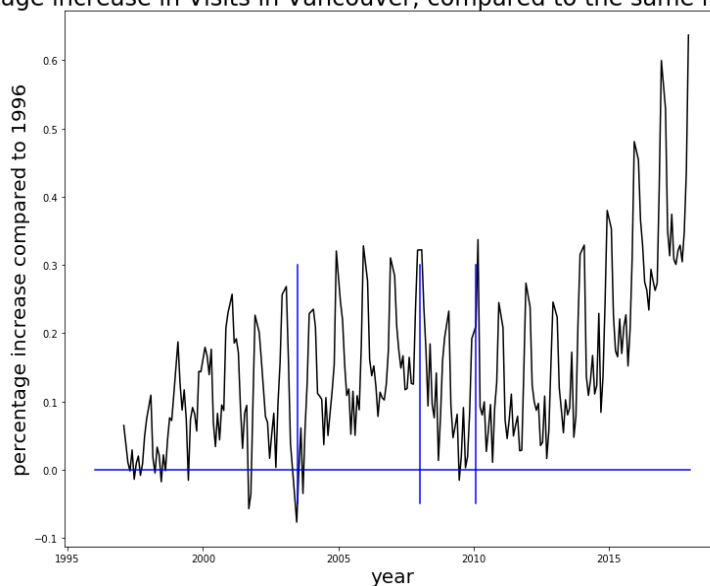


Figure E.1 visits in Vancouver

Percentage increase in Visits in Brazil, compared to the same month in 2005

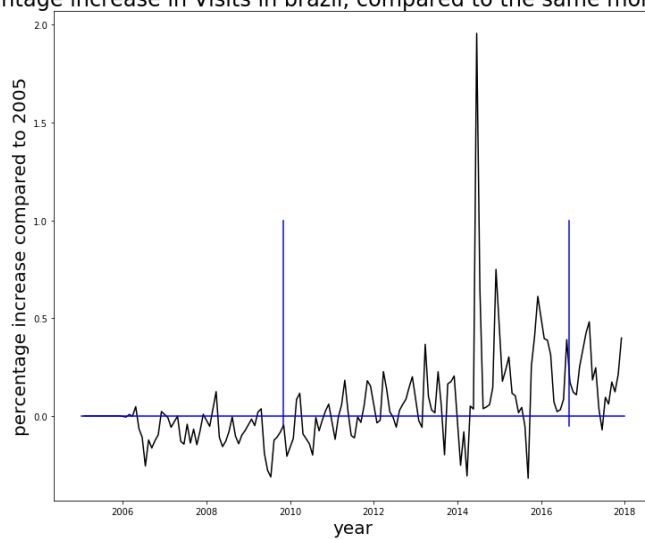


Figure E.2 visits in Rio

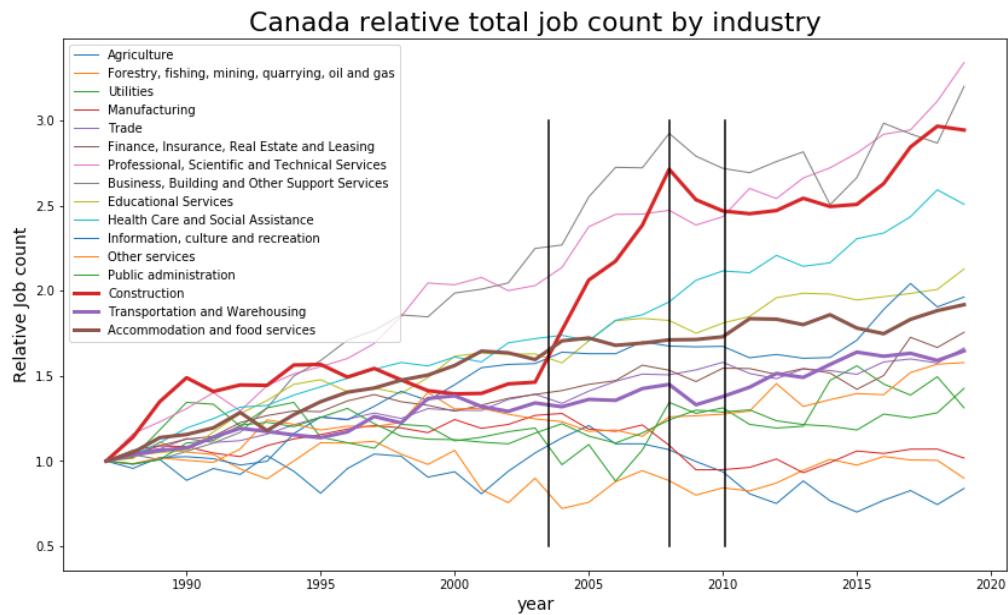


Figure E.3: Number of jobs in Vancouver

Yearly Percentage increase in tourism related jobs in Brazil, compared to 2006

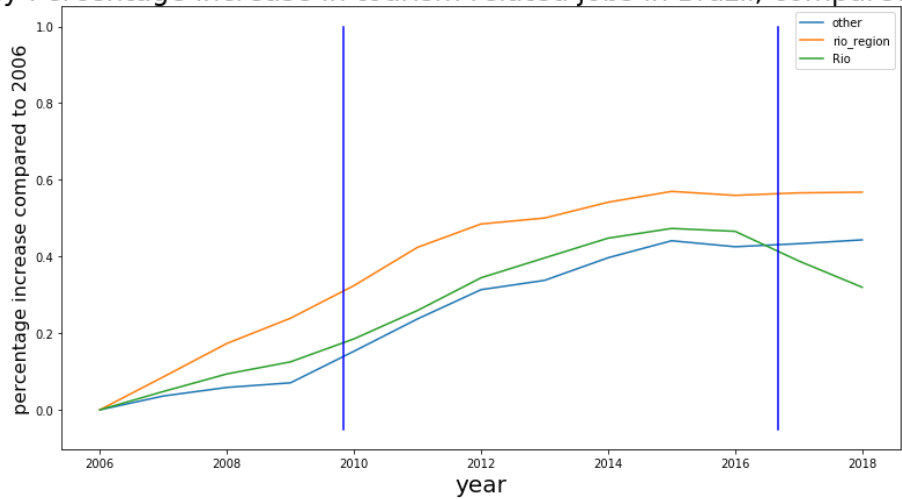


Figure E.4: Number of jobs in Rio

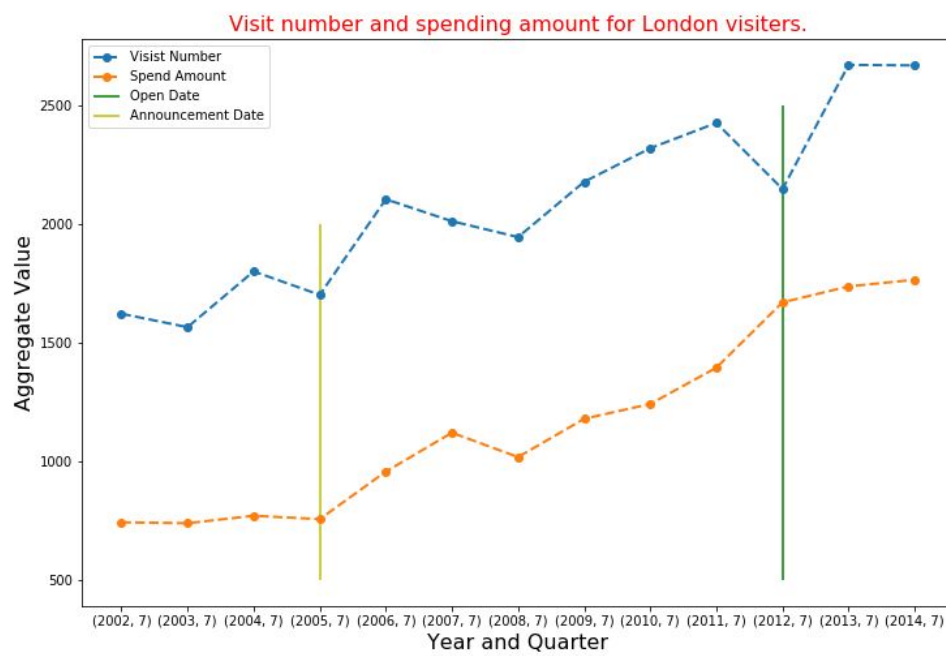


Figure E.5: tours in London

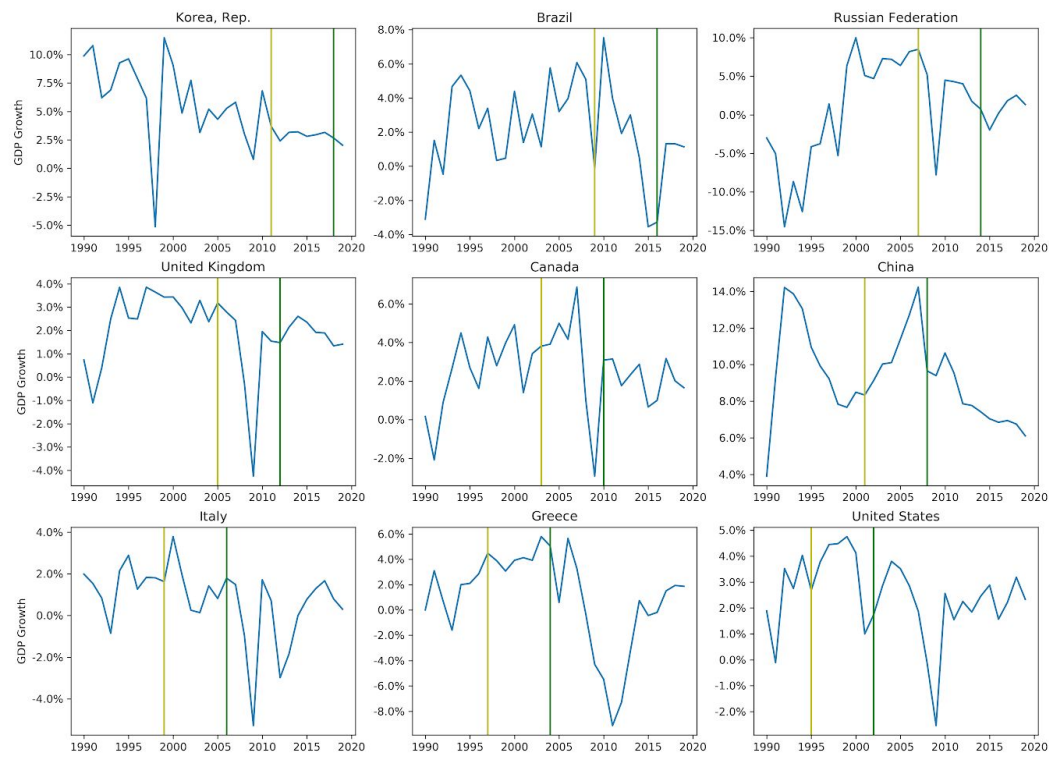


Figure E.6: GDP