To Host or Not to Host? A Comparison Study on the Long-Run Impact of the Olympic Games

Anita Mehrotra[1]
University of California, Berkeley

Abstract

Macroeconomic research on sporting mega-events, like the Olympic Games, often focuses on the short-run economic impact of individual countries. In this paper, I explore the long-run effect of the Olympics on host countries, in general. I analyze hosts in relation to "runner-up" countries, i.e. countries that come in second to the hosts in the bidding process. Upon rectifying anomalies in the data set and including control variables for the initial state of the economy and population, I find that hosts' long-run GDP per capita (GDPpc) is negative in comparison to runner-up countries' at a statistically significant level. This suggests that a one-time spike in government expenditure may lead to long-run detrimental effects: a "reverse multiplier effect" perpetuates the fall in investment demand and consumption levels back to pre-Olympic levels. My results extend the view that individual countries experience a negative economic impact, to the group of host countries in general.

1 Anita Mehrotra graduated with a double major in Pure Mathematics and Economics from the University of California, Berkeley in 2011. This paper was completed as an honors thesis under the guidance of Professor Emmanuel Saez. The author extends a special thanks to Slavic Languages librarian Alan Urbanic, Vladimir Asyrian, Professor Roger Craine, and especially to her family for their love and support.

I. Introduction

When the first Olympic Games were hosted in Olympia, Greece in 776 BC, perhaps few knew that they would go on to become one of the most widely watched mega-events in the world. Today, the Games have morphed into a display of the host country's ability to sponsor an international, mega-sporting event. In this paper, I attempt to determine the long-run economic impact of hosting the Olympic Games. I define "long-run" as the ten-year period after the year the Games are held, consistent with current literature in which "[t]he longer-term impact" of the Olympics is identified as "last[ing] for at least a decade after the Games (PricewaterhouseCoopers 2004, p. 18)."

Much of the existing research in this area focuses on the immediate, short-run effects of hosting the Games. Few studies have assessed the long-run economic impact of hosting the Games on a large group of countries. In addition, most of the existing research provides analysis and insight on only one or two countries at a time (Hotchkiss et al 2003; Madden and Gisecke 2007; Matheson 2006; Veraros et al 2004). As a result, it is difficult to draw general conclusions about whether there is economic justification in bidding for and hosting the Olympics (Brunet 1995; Owen 2005; Whitson and Horne 2006). In this paper, I extend the current research by analyzing long-run effects on hosts' gross domestic product per capita (GDPpc). A positive effect will support some existing literature that suggests an economic benefit to hosting the Games (Hotchkiss et al 2003; Veraros et al 2004). A negative economic impact, on the other hand, will reinforce the remaining majority of existing literature (Jones 2001; Matheson 2006; PricewaterhouseCoopers 2004). Ultimately, this paper aims to provide future host countries with a better understanding of the long-run, macro-economic impact of hosting the Olympics.

I compare the group of countries that hosted the Olympics from 1972 to 1998 (inclusive) with the corresponding group of "first runner-up" countries (the group of countries that bid to host the Olympics but do not receive the right to do so, and are second only to the host country). I analyze relative GDPpc, adjusted for inflation and in current USD. The year that the Games are hosted is considered year "0," and data for ten years before and ten years after the Games are averaged per year, across each group. Since the host country is announced seven years prior to the year that the Games are hosted (Olympic.org), this data is normalized to year "–7," or seven years before the Olympics are held. Upon graphing the resulting data points, I notice a relatively negative impact on the average, normalized GDPpc for host countries starting at approximately year "–3," or three years before the Games are held, and continuing till year "+10," or ten years after the Games are held. I test this null

hypothesis using a simple ordinary least squares regression and find that there is a statistically significant, negative impact on hosts' GDPpc. This suggests a long-run, negative economic impact on hosts' output per capita.

II. Literature Review

For a brief two weeks after the Opening Ceremony flame is lit, an international spotlight is focused on the host country. Similarly, research in sports economics often highlights the short-term macroeconomic impact of hosting the Olympics. Such research, however, focuses on only one or two countries at a time. This analysis therefore fails to provide substantive evidence for future host countries, and especially for those that are concerned about the long-run impacts on their economies.

2.1: Short-Run Economic Impact on Individual Host Countries

Some macroeconomists suggest that hosting the Games increases international awareness and therefore results in a positive, albeit short-lived, economic effect on real output (GDPpc). For example, Hotchkiss et al (2003) used standard and modified differences-in-differences techniques to determine whether regions near Atlanta saw a change in employment levels after the 1996 USA Olympics. They concluded that the Games boosted employment by 17% in counties "affiliated with and close to Olympic activity." Hotchkiss et al additionally used a random-growth model test across multiple metropolitan statistical areas (MSA's) and found that employment rose by an additional 11% in these MSA's post-Olympics, relative to other similar MSA's that were not near Atlanta. Then in 2004, Veraros et al extended such short-term analysis to the financial sector, studying the impact of the 2004 Olympic host announcement (which occurred in 1997) on investment levels. They observed an increase in foreign direct investment and concluded that there was a statistically significant, positive effect on the Athens Stock Exchange. On the other hand, the Milan Stock Exchange, located in the runner-up country, was barely impacted. Such research indicates that in the short-run, the macroeconomic impact of hosting the Olympics may be beneficial for the host.

On the other hand, a large realm of existing literature indicates the exact opposite: that the Olympics actually have a negative short-run impact on host GDPpc. Jones (2001) notes that countries are often disillusioned by biased pre-Games estimates about the positive economic rewards of hosting. As a result, they are economically unprepared to deal with the after-effects of a more modest (or negative) profit. This can, in turn, affect short-run expenditure allocations and the government's budget. For instance, although the 1988

Calgary Games in Canada successfully generated a recorded profit of more than $130 million, "the few scholarly studies that examined the economic impacts… suggest that the direct impacts [were] not as a great as official rhetoric implie[d] (Whitson and Horne 2006)." Such embellishments are not an anomaly to sporting mega-events in general: in his paper on the regional economic effects of hosting the Rugby World Cup, Jones (2001) concludes that the commonly-used input-output (IO) tables[2] "over-represent [ex ante tourism] activity resulting from special events." These complex IO tables are rooted in inter-industry relationships that are, in turn, based on a region's "normal production patterns." However, these "normal" patterns clearly do not hold during a sporting mega-event. As Matheson (2006) notes, ex ante estimates also "exaggerate the net economic benefits" because they are biased by committees that need an infusion of taxpayers' money. Even without this bias, however, ex ante studies can suffer from any one of three primary theoretical deficiencies:

1. The substitution effect. This occurs when local spending, rather than additional foreign spending, is poured into the sporting mega-event. The result is "not new economic activity [but] rather a reshuffling of local spending." Matheson goes on to suggest that a more accurate estimate would entirely exclude local resident spending from economic impact estimates.
2. Crowding out. An influx of tourists "supplant, rather than supplement, the regular tourist economy," minimizing additional profits that are generated from hosting the Olympics. Since host cities tend to be popular tourist destinations, Olympic tourists substitute regular tourists and lead to nearly no additional profit for host countries.
3. Leakages. These occur if tourist spending does not "wind up in the pockets of local residents... [even if] the taxes used to subsidize these events are paid for by local taxpayers. Profits may "leak" to out-of-town companies who set up temporary booths during the Games. Since many do not employ in-town residents, nor do they lose a large percentage of their profit to the city or national government, a majority of the returns are pocketed by the companies rather than utilized for

2 Input-output tables are used to model the dynamic time path of the economy that "tracks towards continually shifting equilibria." They are used as a way to present a realistic picture of the impacts of dynamic characteristics of "economic structure and change (West and Jackson, 1998)." Recently, computable general equilibrium models (CGE models), which have improved upon IO models with their incorporation of fixed factors and substitution effects, are slowly displacing IO tables. However, they, too, are at risk of making over-optimistic estimates of the net benefits (Giesecke and Madden, 2007).

the city and its residents.

Smith (2009) also suggests that countries are often unprepared to deal with ephemeral spikes in employment in the construction and tourism sectors. Workers who are temporarily hired and become unemployed after the Olympics can affect the economy adversely, although indirectly. Unemployment rates that return to higher, pre-Olympic levels can dampen buyer optimism. This macroeconomic "uncertainty," statistically defined as increased variance of individual income, can negatively impact national consumption levels and lower domestic output. Such uncertainty has historically impacted countries adversely, as shown in Romer's analysis on the US during the Great Depression (Romer 1990) and in Baker et al's recent report on the Great Recession (Baker et al 2011). Others, like Owen (2005), note that host countries may also endure sunk costs in the form of unused athletic housing and derelict stadiums that were expensive to build. This, coupled with biased pre-Game estimates and dampened consumer optimism, can thus have short-run, negative impacts on hosts' economies.

2.2: Long-Run Economic Impact on Individual Host Countries

A small portion of the existing literature discusses the long-run impact on host countries. Of those that do (PricewaterhouseCoopers (PWC) 2004; Giesecke and Madden 2007), most document a negative impact on hosts' economies. In an analysis on the five to seven years after Spain and Australia hosted the Games (1992 Barcelona and 2000 Sydney, respectively), PWC's 2004 European Economic Outlook reported a sharp slowdown in investment expenditure as "preparations were finalized in [both] the run-up to the Olympics," as well as after the Games were over (p. 21). This, in turn, lowered GDPpc levels. Gieseke and Madden (2007) compared estimates from ex ante computable general equilibrium (CGE) models to ex post analyses, and found that in the long-run, the Sydney Olympics generated a net consumption loss of approximately $2.1 billion. This therefore provides the motivation for the first component of my two-pronged analysis: I attempt to extend such research and determine if there is a long-run economic effect of hosting the Games. I conclude that, consistent with a large portion of the existing literature, there is a relatively negative macroeconomic impact on hosts' real GDPpc.

2.3: Economic Impact on the Group of Host Countries

In both short- and long-run analyses, most researchers – like Brunet (2005) and Shoval (2002) – focus on individual host countries. Rose and Spiegel's 2010 study, however, stands out as an exception. In discussing their re-

sults (generated from a comparison study of hosts with all other countries, including "non-bidders"), the authors reveal an apparent "Olympic effect" on host and bidding countries. On average, countries that bid to host the Games experience a positive impact on net exports. Rose and Spiegel suggest that bidding actually signals a country's desire to be more "open," or globally integrated. They use historical data to substantiate their theory:

> Our explanation seems to accord well with the facts, at least superficially. In July 2001, Beijing was awarded the right to host the Games of the XXIX Olympiad. Just two months later, China successfully concluded negotiations with the World Trade Organization, thus formalizing its commitment to trade liberalization. Nor is this a one-off coincidence. Rome was awarded the 1960 Games in 1955, the same year Italy started to move towards currency convertibility, joined the UN, and, most importantly, began the Messina negotiations that led two years later to the Treaty of Rome and the creation of the European Economic Community (EEC). The Tokyo Games of 1964 coincided with Japanese entry into the IMF and the OECD. Barcelona was awarded the 1992 Games in 1986, the same year Spain joined the EEC; the decision to award Korea the 1988 Games coincided with Korea's political liberalization. [Furthermore, this] correlation extends beyond the Olympics; the 1986 World Cup was held in Mexico coincident with its trade liberalization and entry into the General Agreement on Tariffs and Trade, the predecessor to the World Trade Organization.

Such research thus begs the following question: what has been the GDPpc impact of hosting the Olympics, in general? This motivates the second component of my analysis, in which I focus my tests on the group of host countries in general.

This paper therefore attempts to draw a conclusion about whether hosting the Olympics, in general, has a negative long-run macroeconomic impact. I define the group of "host" countries as my treatment group, while the "first runners-up" comprise a naturally formed control group. As a result, the implicit assumption is that the group of runner-up countries is nearly identical to the group of host countries with the main difference being that countries in the "control group" are not awarded the right to host the Games. I find that, on average, host countries experience a statistically significant, negative impact on real GDP per capita beginning approximately three years before the Games are hosted, and continuing in a negative direction for the next thirteen years.

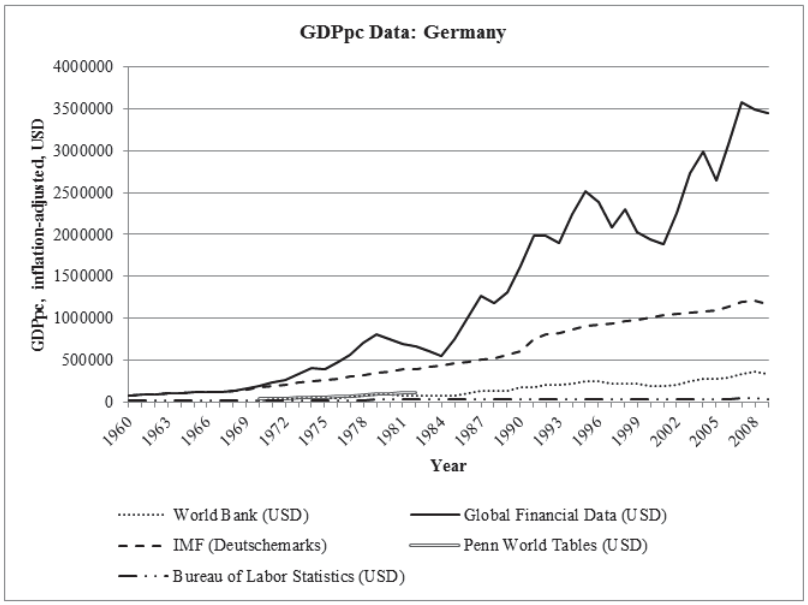
III. Data and Descriptive Statistics

3.1: General Information

To determine if there is an impact on host countries' GDPpc, I use data from the World Bank Databank and the US Bureau of Labor Statistics. I chose this data based on the lists of bidding and host countries compiled from the International Olympic Committee's Voting Results (1933 – 2010). However, since there was no runner-up country for the 1984 USA Games in Los Angeles, the list of host countries was slightly longer than the list of bidding countries.

The majority of my data comes from the World Bank Databank. Other databases were sparser, missing information for a number of the countries on my lists. One viable alternative, Global Financial Data (GFD), provided GDP-pc for nearly all countries beginning from 1950. However, I noticed a wide disparity in trends exhibited by GFD data compared with trends of data from other sources, like Penn World Tables, International Monetary Fund, and the US Bureau of Labor Statistics. Figure 1 provides an example of the large discrepancy in the GFD trend for one country's GDPpc data (Germany, 1960 to 2008). Though this incongruity was true for only some countries, World Bank data provided consistent data trends across all countries of interest. It was thus a more reliable data source.

Figure 1. Gross domestic product per capita for Germany, 1960-2008



Although more precise, the World Bank Databank only contained data from 1960 to 2008. Since I was interested in GDPpc for the ten years before each of the Olympic Games, I refined my lists to begin with the country that hosted the first Olympics after 1970 (ten years after 1960). Similarly, I needed GDPpc for the ten years after each of the Games, and thus further narrowed my list to end with the country that hosted the 1998 Olympics (ten years before 2008). My resulting panel data set included observations across twenty-nine countries (fifteen host countries and fourteen runner-up countries).

3.2: Constructing the Data Set

My data set was missing GDPpc for three countries:

- Yugoslavia, for the years before 1994 (Yugoslavia hosted the 1984 Winter Olympics, so I needed data from 1974 to 1994);
- Germany, for the years before 1970 (Germany hosted the 1972 Summer Olympics, so I needed data from 1962 onwards);
- Russia, for the years before 1998 (Russia hosted the 1980 Summer Olympics and was a runner-up for the 1976 Olympics, so I needed data from 1966 onwards).

During the process of researching missing data points, I determined that in some cases, it would be more accurate to eliminate certain subsets altogether. Since my set of macroeconomic data is small, I believe it is important to provide brief explanations of any decisions I made in this regard.

3.2.1: Data on Yugoslavia

Present-day Yugoslavia is comprised of Slovenia, Macedonia, Croatia, Serbia, Montenegro, Kosovo, and Bosnia and Herzegovina. However, very little documentation of GDPpc exists before 1994 for Kosovo and Montenegro. This was further complicated by the fact that some regions were parts of others (i.e. significant geographic overlap existed among various provinces). For example, parts of Croatia and Kosovo used to be a part of Serbia before they gained independence in 1991 and 2008, respectively. Since so much data was missing, and given the inevitable accounting difficulties that would arise even if such data was found, it was more precise to drop Yugoslavia altogether from my data set.

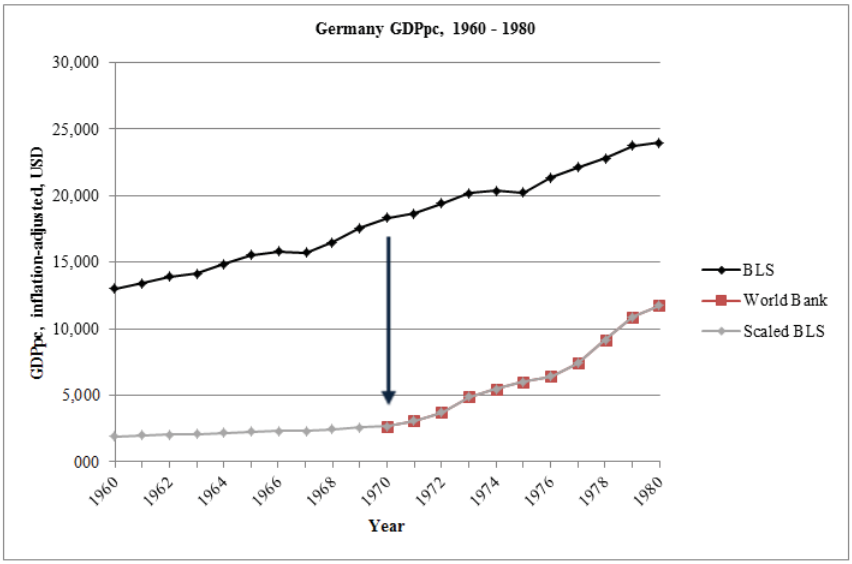
Yugoslavia hosted the Winter Games in 1984, and because there was no runner-up country to the 1984 Summer Games, the lists (and thus the data) were now made up of an equal number of host and runner-up countries.

3.2.2: Data on Germany

Data included for Germany is entirely of West Germany because only West Germany's GDPpc was documented before the fall of the Berlin Wall in 1989. The 1972 Olympic Games were hosted in Munich, located in West Germany. Since I was only interested in data from 1962 to 1982, all of the data I used is from West Germany.

Inflation-adjusted, current USD GDPpc data for Germany is available from the US Bureau of Labor Statistics (BLS). Although this data exhibits similar trends to data from the World Bank post-1970, I needed to "match" the BLS data to the World Bank data. I scaled the BLS GDPpc from the first overlapping year (1970) so that it was equal to the 1970 World Bank GDPpc level. I then applied this scaling factor to previous years' worth of data from the BLS. Figure 2 provides a visual representation of this process.

Figure 2. Method for filling holes in Germany data set



3.2.3: Data on Russia

Data on Russia's GDPpc was the most difficult to obtain for multiple reasons. First, I needed to gather data from before 1988, when Russia was still a part of the USSR. Thus, such data would have to include information on only the (geographical) portion of the USSR that comprises present-day Russia. This isolated data set was not available in English, so I turned to Russian Statistical Yearbooks from 1962 to 1981. However, translation from Rus-

sian to English proved difficult, in part because of differing macroeconomic terminology. After extensive research, historical documentation revealed that "manufacturing national income" and "national social product" referred to what is now known as GDP and GNP (Gross National Product), respectively (Khomenko 2006).

The currency's standard units proved to be the final hurdle, as yearly data during the 1960's, 1970's and 1980's were listed in terms of a baseline of 100 from the closest five-year mark before the year of interest (for example, 1967 data was listed with 1965=100, 1971 data was listed with 1970=100, etc). The data was inflation-adjusted, but only to the most recent five-year mark. Then, in the 1990's, recorders switched to tabulating data in terms of billions of Russian rubles.

Given the above complexities in gathering GDPpc data for Russia, I concluded that my data set would be more accurate, albeit less complete, if I removed Russia entirely. Since Russia was a bidder in 1976 and then hosted the Summer Games in 1980, I dropped one country from both the host and runner-up lists. The number of countries in each list therefore remained equal.

My current data set consists of twenty-six countries (thirteen in each of the host and runner-up groups), is in current USD, and is adjusted for inflation.

Table 1. Summary statistics of panel data (number of observations = 540)

Group	Country and Year	No. of Observations	Mean	Standard Deviation	Min	Max
Host	Japan 1972	21	4058.935	3314.966	633.6403	10062.14
Host	Germany 1972	21	5200.999	3328.18	2035.105	11744.24
Host	USA 1976	21	9557.146	4743.748	3972.123	18427.29
Host	Canada 1976	21	8223.085	3898.543	3010.706	14076.75
Host	USA 1980	21	12784.15	5837.602	4997.757	23053.96
Host	USA 1984	21	16476.07	6318.374	6948.198	26719.14
Host	Canada 1988	21	16523.84	4281.311	8931.293	21260.29
Host	South Korea 1988	21	5349.766	3639.551	1382.921	12249.17
Host	France 1992	21	19396.12	5785.909	9246.708	26421.36
Host	Spain 1992	21	11622.21	4394.79	4354.135	16610.54
Host	Norway 1994	21	31426.92	10410.69	14758.11	56311.5
Host	USA 1996	21	29961.49	7815.266	18427.29	44663.47
Host	Japan 1998	21	33042.25	4775.065	24145.25	41967.65
Runner-up	Canada 1972	21	6102.673	3360.628	2255.23	12217.37
Runner-up	Spain 1972	21	2453.041	1845.162	519.4755	6045.136
Runner-up	Switzerland 1976	21	10544.15	6108.153	2784.734	22150.27
Runner-up	Canada 1980	21	11192.54	4976.208	4047.269	20968.04
Runner-up	USA 1980	21	12784.15	5837.602	4997.757	23053.96
Runner-up	Japan 1984	21	16164.8	10600.36	4218.375	38243.87
Runner-up	Sweden 1988	21	21147.18	7329.043	11709.86	31262.71
Runner-up	Japan 1988	21	22035.65	11475.93	8547.392	41967.65
Runner-up	Bulgaria 1992	21	1818.279	552.5468	1063.944	3168.992
Runner-up	France 1992	21	19396.12	5785.909	9246.708	26421.36
Runner-up	Sweden 1994	21	26188.73	6729.439	12167.4	40268
Runner-up	Greece 1996	21	12432.7	4905.296	5445.024	23682.01
Runner-up	USA 1998	21	32628.83	8374.535	20698.24	47208.54

IV. Methodology

I first tabulate the average, normalized GDPpc for host and runner-up countries from ten years before the Olympics are hosted to ten years after they are hosted in two matrices (Appendix, Tables B and C). Each column corresponds to one of thirteen countries, and each row is labeled with a year n, where $n \in [-10, +10]$.

Second, I average the GDPpc across all countries for each year, in order to obtain an "average GDPpc per year" for both the host and runner-up groups. I normalize these numbers to the year "–7," i.e. the year in which the host country is announced (Olympics.org). Finally, I plot the normalized numbers in a line graph, and note a relatively negative impact on the host group's average GDPpc beginning at approximately year "–2.5*."

Figure 3. Graph of difference in average, normalized GDPpc

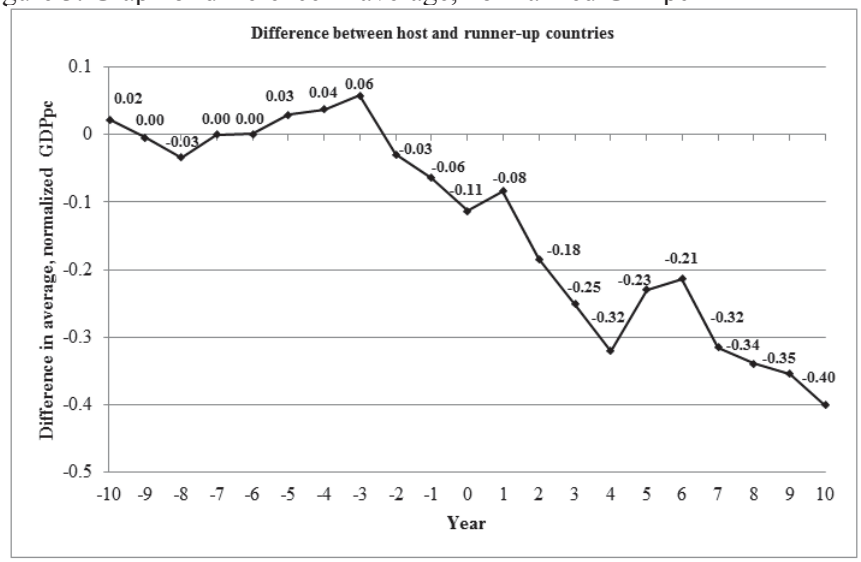
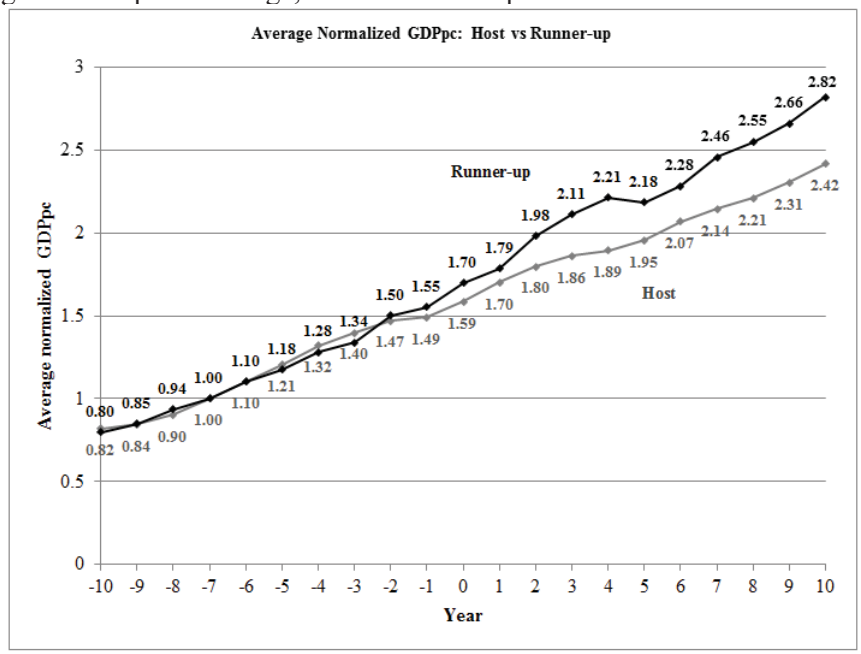


Figure 4. Graph of average, normalized GDPpc



I run two regressions to test if this gap is statistically significant. Regression (1) uses the difference in GDPpc data (as depicted in Figure 3):

$$\text{Average normalized GDPpc} = \alpha+\beta_1\cdot\text{Host}+\beta_2\cdot\text{Time}+\beta_3\cdot(\text{Host}\times\text{Time})+\varepsilon$$

Regression (2a) tests whether the gap is statistically significant using the original numbers from Figure 4:

$$\text{GDPpc} = \alpha+\beta_1\cdot\text{Host}+\beta_2\cdot\text{Time}+\beta_3\cdot(\text{Host}\times\text{Time})+\varepsilon$$

In both regressions,

Host = a binary variable; 1 if the country hosted the Olympics, 0 otherwise
Time = a binary variable; 1 if year ≥ -3 (from the discussion* on page 16), 0 otherwise

The variable of interest is the interaction variable Host×Time. It measures the impact on GDPpc in a particular year depending on whether or not the country hosted the Games.

Upon gathering additional data on initial GDPpc and population (at year –10), I run regression (2b):

$$\text{GDPpc} = \alpha+\beta_1\cdot\text{Host}+\beta_2\cdot\text{Time}+\beta_3\cdot\text{InitialGDPpc}+\beta_4\cdot\text{InitialPop}+\beta_5\cdot(\text{Host}\times\text{Time})+\varepsilon$$

Regression (2b) improves upon (2a) greatly because it controls for the initial state of the country's economy and population. The interaction variable's coefficient now has a lower standard deviation and p-value, suggesting an improvement in the fit of the regression. I initially conclude that the coefficient on the interaction variable is negative, though not statistically significant.

Finally, I graph and study the GDPpc of individual pairs of countries (Appendix, Figures D1 to D12). I find that in 1992, there is a large positive impact on the host's GDPpc relative to the runner-up country, and hypothesize that this pair is an anomaly. I check historical narrative evidence to ensure that I am not cherry-picking from my data set and discover an interesting fact: of the compared pairs, the 1992 Olympics is the only one in which a non-Communist host country and a post-Communist, war-torn regime are compared. As a result, the host country sees a relatively (huge) positive effect of hosting the Games, even if this economic benefit is partially because the runner-up coun-

try was actually transitioning to a democratic country. This substantiates my hypothesis. Removing the pair of 1992 countries leads to a better fit (the R2 term moves up to 0.801). In addition, the negative coefficient on the interaction variable becomes statistically significant at the 95% level.

I conclude that the effect of hosting the Olympics results in a statistically significant negative, long-run impact on host countries' GDPpc in general.

V. Results

5.1: Evaluation of Findings

Table 2 lists results from regression (1) in which I test average, normalized GDPpc. On average, an individual could lose 23.65 percent of their annual GDPpc as a result of increased spending in for the Olympic Games. However, this relationship is not statistically significant (p-value=0.250).

Table 2. Regression (1) Results:

Dependent variable: Average, normalized GDPpc per country

Olympic Games 1970 - 1988 Excluding Yugoslavia 1984, Russia 1976, Russia 1980

(Number of observations = 540)

Variable	Coefficient	P>|t|
Constant	1.06066***	0.000
	(0.1126131)	
Host dummy	0.0136011	0.932
	(0.159259)	
Time dummy	1.077978***	0.000
	(0.1431288)	
Interaction dummy (host×time)	-0.2365452	0.250
	(0.2024147)	
R^2	0.7102	

Notes: Standard errors in parenthesis; ***p<0.001; **p<0.05; *p <0.1

Table 3 (page 21) has two components: the first portion (3(i)) lists regression (2a) results, while 3(ii) lists regression (2b) results. The results indicate a negative long-run impact of hosting the Olympics on GDPpc relative to runner-up countries as shown in Figure 4. In Table 3(i), there is an estimated negative impact of approximately USD $1500 per person and a standard deviation of approximately USD $1800. To improve regression results, I include

control variables for the initial state of the economy (InitialGDPpc) and initial population (InitialPop). I also experiment with the time value, i.e. the year in which Time switches from 1 to 0. Recall that from my graphical analysis, the negative trend begins somewhere between year "–3" and year "–2." In (2a), Time=1 if the year is greater than or equal to –3, and 0 otherwise. In (2b), I test what happens when Time=1 if the year is greater than or equal to –2, and 0 otherwise. Table 3(ii) captures these results. Both the standard deviation and p-value for the coefficient on Host×Time fall (standard deviation=854.8066, p-value=0.130). Although this relationship is not statistically significant, it is close to the 0.1 threshold required for statistical significance at the 90% level. Interpreted in terms of real GDPpc I conclude, though not confidently, that in host countries, an average individual loses anywhere from $450 and $2150 (Table 3).

Table 3. Regression (2) Results

Dependent variable: Real GDP per capita per country

Olympic Games 1970-1988 Excluding Yugoslavia, Russia 1980, Russia 1976
(Number of observations = 540)

Variable	Coefficient	P>|t|
Constant	11350.76***	0.000
	(786.9263)	
Host dummy	1219.18	0.274
	(1112.882)	
Time dummy	9556.811***	0.000
	(1274.966)	
Interaction dummy (host×time)	-1436.722	0.426
	(1803.075)	
R^2	0.1522	

Adjusting Time (1 if year≥ –2), Including independent variables: initial GDP-pc, population

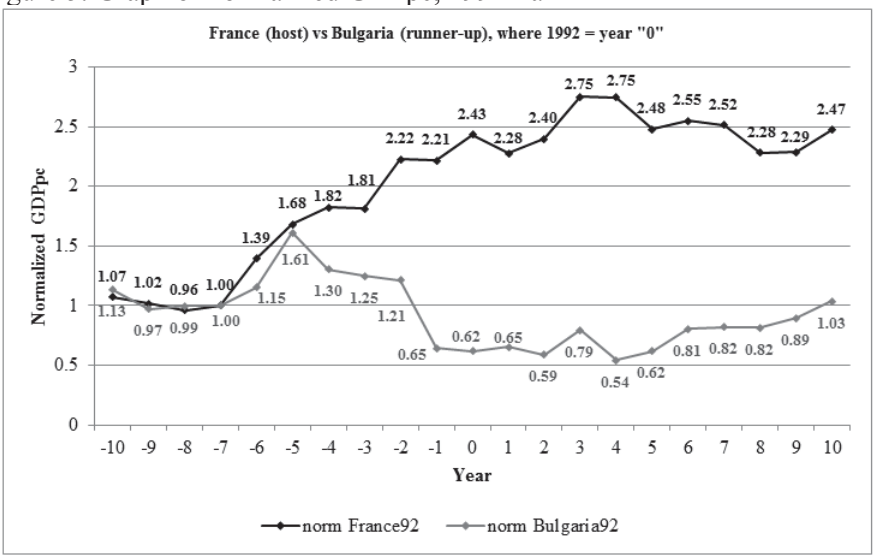
Constant	515.0503**	0.295
	(491.411)	
Initial GDPpc	1.420097***	0.000
	(0.0363207)	
Initial Population	1.48E-06	0.562
	(2.54e-6)	
Host dummy	-379.661	0.526
	(558.0778)	
Time dummy	9553.716***	0.000
	(604.4395)	
Interaction dummy (host×time)	-1294.6	0.130
	(854.8066)	
R^2	0.1597	

Notes: Standard errors in parenthesis; ***p<0.001; **p<0.05; *p <0.1

Because the p-value in Table 3(ii) is close to the required 0.10 measure in order to be statistically significant at the 90% level, I hypothesize that one pair of countries may be acting in the opposite direction. In particular, perhaps there is an anomalous pair of countries in which the host country experiences a large positive impact.

To test this theory, I graph each pair of host and runner-up countries (Appendix, Figures D1 to D12). I notice a large positive gap between France (host country) and Bulgaria (runner-up country) in 1992. France's GDPpc increases dramatically compared to Bulgaria's beginning at year "–5," or five years before the Olympics are actually held. This is the only pair in which the host is not impacted negatively, and is depicted in Figure 5 below.

Figure 5. Graph of normalized GDPpc, 1992 Pair



I use narrative historical evidence to ensure I am justified in eliminating this pair from my data set. (A more detailed explanation follows in section 5.2.) I then re-run regression (2b), sans the 1992 pair, and obtain a statistically significant p-value after year "–3" of 0.019, as well as an increase in the R2 term to 0.8099 (Table 4). This suggests an improvement in the fit of the regression. It also allows me to conclude with 95% confidence that the average long-run impact on hosts' GDPpc is negative.

Table 4. Regression (2b) Results without France/Bulgaria 1992
Dependent variable: Real GDP per capita per country

Olympic Games 1970-1988 (Number of observations =498)		
Variable	Coefficient	P>|t|
Constant	938.5938**	0.085
	(544.5595)	
Initial GDPpc	1.387646***	0.000
	(0.0370251)	
Initial Population	-1.04e-7	0.969
	(2.64e-6)	
Host Dummy	-480.2042	0.459
	(647.4855)	
Time Dummy	10612.4***	0.000
	655.233	
Interaction Dummy (host*time)	-2182.724**	0.019
	(925.7363)	
R^2	0.8099	

Notes: Standard errors in parenthesis; ***p<0.001; **p<0.05; *p <0.1

The negative impact on the two to three years before the Games are hosted is intuitively plausible: host countries prepare for the Games well in advance, with expenditures ramping up two to three years before they are held. Hosts spend on stadiums and athletic housing, restoration (or building) of mass transit networks, and improvements of expansive sewage systems leading to an increase in hosts' expenditures.

What is most interesting, however, is that there appears to be a negative impact on host countries for several years after the Games are held. Though an increase in government spending contributes to expansionary fiscal policy, spending on the Olympic Games may have a smaller multiplier effect than current research suggests (Ball, 1999). For example, host countries see an increase in foreign awareness and domestic investment. This, in turn, can lead to a rise in domestic and international demand for host countries' products. It is subsequently propagated via the consumption channel of the classic macroeconomic equation for output:

$$Y=C(Y-T)+ G+I(r)+ NX(r)$$

However, this spike in consumption would be relatively short-lived. Coupled with Olympic infrastructure that often goes unused post-Games, negative capacity effects can result in a decline in long-run output, mitigating the effect of increased consumption.

After the Olympics, host countries face a sort of reverse multiplier effect, where the multiplier works in the opposite direction: the non-recurring boost to expenditure results in a longer-run fall in demand as the economy returns to its pre-Olympic equilibrium income (PricewaterhouseCoopers 2004, Giesecke and Madden 2007). It further provides a potential explanation for why the impact is negative for a long period of time after the Games are hosted.

5.2: The 1992 Summer Olympic Games

I analyze historical evidence about France and Bulgaria during the early 1990's in order to determine whether my hypothesis – that they are an anomalous pair in my data set – is valid.

I find that out of all the pairs of countries on my list, France and Bulgaria are the only post-Cold War coupling that compares a non-Communist country (France) with a post-Communist regime (Bulgaria).

Like other countries transitioning to capitalism, Bulgaria experienced a painful shift as it emerged from the throes of Communism in the early 1990's, when the first fully democratic parliamentary elections were held (the Union of Democratic Forces won). Characterized by massive unemployment, failure of uncompetitive industries, and national infrastructure backwardness, this period of severe social and economic turmoil eventually culminated in an economic and financial crisis (late 1996 – early 1997). France, on the other hand, remained a capitalist state, entering the 1990's shortly after trente glorieuses ("thirty glorious years") of steady national economic development. As a result, the Olympics appear to have had a positive economic impact on France relative to Bulgaria. However, narrative evidence indicates that this wasn't the sole economic factor: France did not face the formidable economic challenges of transitioning from a Communist to non-Communist government during the early 1990's as Bulgaria did ("Bulgaria – Historical Highlights").

Although my regression accounts for the initial state of the economy, it does not capture the economic impact during the middle years. As a result, my results are skewed because they do not take into account the economic disadvantage that Bulgaria faced. This is because I treat all years as equal, renumbering 1982 to year "–10," 1983 as year "–9," and so on. This method, though helpful in determining the overall effect on host countries in general, is susceptible to missing historical events as exemplified by the 1992 Olympic Games.

In using narrative historical evidence, I confirm that unlike other pairs, France and Bulgaria are an exception. The increase in French GDPpc relative to Bulgaria during the ten years following the Games is not attributable solely to hosting the Olympics. Excluding this pair from my analysis results

in a more accurate measure of the effect of hosting the Olympics in general. I ultimately conclude that there is a statistically significant, negative impact of the Games on host countries in general.

5.3: Difficulties and Possible Improvements

5.3.1: Expanding the Data

The impact on host countries may be smaller than what it would have been if I had included additional countries in my tests. In particular, all of the countries analyzed in this paper are "advanced economies," according to the International Monetary Fund (Appendix, Table A). I hypothesize that in the past, the process of bidding for the Olympics created a natural self-selection process in which developed countries engaged in the bidding,and eventual hosting, process. This makes sense intuitively: the cost associated with bidding for the Games can be very burdensome financially. However, this trend has recently begun to change, as less-developed countries are hosting mega-sporting events. Examples include China (hosted the 2008 Olympic Games), India (hosted the 2010 Commonwealth Games), South Africa (hosted the 2010 World Cup), and Brazil (will host the 2016 Summer Olympics). In order to accurately quantify the long-run economic impact of hosting the Games in general, an ideal data set would include information and analysis on less-developed host countries. Other improvements include finding a consistent method of handling GDPpc data from Yugoslavia and Russia (sections 3.2.1 and 3.2.3 respectively). Though economists must wait till such data is collected and becomes available, future research will provide an even more comprehensive picture of the general economic impact of hosting the Games.

If researchers obtain accurate early data of the Olympics in the future, they will need to control for multiple important variables. I include some here:

- The advent of television and the beginning of televised Games in 1960. Games held after 1960 may have seen an increase in international viewership, awareness, and thus a potential increase in profits. As television-broadcasting rights became more valuable to both host countries and TV networks during the 1970's and 1980's, government spending on the bidding process increased dramatically ("Olympics and Television"). Inclusion of a binary variable e.g. Televised (1 if the Olympics were hosted before 1960 and 0 otherwise) may help mitigate such bias.

Table 5. Television broadcasting rights and its role in the Olympics, 1960 – 1998

Revenue, inflation-adjusted
Source: (Moreland) "Olympics and Television"

Year	Games	Location	Network	Hours	Revenue
1960	Winter	Squaw Valley	CBS	15	$50,000
	Summer	Rome	CBS	20	$394,000
1964	Winter	Innsbruck	ABC		
	Summer	Tokyo	ABC	14	$1.5 million
1968	Winter	Grenoble	ABC	27	$2.5 million
	Summer	Mexico City	ABC	44	$4.5 million
1972	Winter	Sapporo	NBC	37	$6.4 million
	Summer	Munich	ABC	63	$7.5 million
1976	Winter	Innsbruck	ABC	44	$10 million
	Summer	Montreal	ABC	77	$25 million
1980	Winter	Lake Placid	ABC	54	$15.5 million
	Summer	Moscow	NBC	150	$87 million
1984	Winter	Sarajevo	ABC	63	$91.5 million
	Summer	Los Angeles	ABC	180	$225 million
1988	Winter	Calgary	ABC	95	$309 million
	Summer	Seoul	NBC	180	$300 million
1992	Winter	Albertville	CBS, TNT	116, 50	$243 million, $50 million
1994	Summer	Barcelona	NBC	50	$401 million
	Winter	Lillehammer	CBS, TNT		$300 million, $50 million
1996	Summer	Atlanta	NBC		$456 million
1998	Winter	Nagano	CBS		$375 million

- The influence of international conflict. One of the biggest difficulties I faced in attempting to isolate the macroeconomic effect of the Olympic Games was the occurrence – and thus the impact – of other political events that occurred at or around the same time as the Games. The data set I used was from 1962 to 2008, so my countries of interest were limited to having hosted/been a runner-up for the Games from 1972 to 1998. Using control variables and historical narrative evidence to eliminate data points as necessary minimized such variance to a large degree. If, on the other hand, future research includes countries from earlier years, there must be a method to account for the economic after-effects of World War I and II, the Balkan Wars, the First and Second Sino-Japanese Wars, and the Vietnam War, among others. These wars had far-reaching effects that were often global in

scale, and can adulterate results.

5.3.2: Regressions: Areas of Improvement

As is common with macroeconomic research in general, an econometric issue that I faced in this paper was omitted variable bias. A post-regression analysis situated in context of narrative evidence reveals that substitution effects and leakages (section 2) can exaggerate the impact: reshuffling of spending and returns to taxpayers may be inaccurately measured. Although my analysis attempts to account for other forms of bias, future research may include variables to better capture the substitution effect, like year-to-year changes in the average number of tickets purchased for sporting events before and after the Games are held. A spike in sporting-event ticket sales during or immediately before the Olympic year may account for the sudden increase in spending, and control for the substitution effect. Additional methods include using CGE models (described in footnote 2), as is demonstrated by Giesecke and Madden in their 2007 report on the 2000 Sydney Olympics.

An analysis on profits for domestic versus foreign country-companies can help capture leakages, although this effect may prove more difficult to account for.

VI. Conclusion

The analysis in this paper provides some insight into the economic impact of hosting the Olympics. My results go beyond this in an effort to provide a better understanding of the long-run macroeconomic effect of hosting the Olympics in general.

So why do host countries experience long-run negative economic effects, on average? This may be due in part to the fact that host countries experience a one-time increase in domestic investment. Hosts may also experience a spike in consumption of domestic assets. Instead of remaining at higher output levels, host countries' GDPpc falls. Current literature suggests that this "return to normal[cy]" is then subject to a reverse multiplier-effect, decreasing long-run GDP per capita. However, because my data does not include GDPpc levels of less-developed economies, and my analysis is limited to the Games before the 1998 Olympics, it is challenging to determine the specific drivers of this negative difference. Other challenges common to sports macroeconomic studies persist, like the difficulty in measuring Matheson's (2006) substitution effect and leakages. These may contribute to omitted variable bias.

Ultimately, my results provide a launching pad for additional research on the general long-run impact of hosting the Olympics. In this paper, I attempt

to provide researchers and governments with a better idea about the effect of hosting the Games in general, rather than a case-by-case analysis. This study aims to enable potential bidding countries and researchers to better assess the economic impact of hosting the Olympics on their citizens, and to focus investment in areas that will contribute to the growth of the country. The Olympic Games can undoubtedly be wielded as a tool to increase normal output above current levels, but only if policy-makers strategically align their expenditures with infrastructure that will have a long-run economic benefit (like building stadiums that can later be used by universities). Thus, my research opens the door to further analysis on why countries that host the Olympics experience long-run, negative effects on output in general.

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Appendix A
A.1 Table A

Table A. IMF Classification of Advanced Economies

Country Name
Australia
Austria
Belgium
Canada
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hong Kong SAR
Iceland
Ireland
Israel
Italy
Japan
Korea
Luxembourg
Malta
Netherlands
New Zealand
Norway
Portugal
Singapore
Slovak Republic
Slovenia
Spain
Sweden
Switzerland
Taiwan Province of China
United Kingdom
United States

A.2 Table B

Table B. Data for host countries

Year	Japan 1972	Germany 1972	USA 1976	Canada 1976	USA 1980	USA 1984	Canada 1988	South Korea 1988	France 1992	Spain 1992	Norway 1994	USA 1996	Japan 1998	Average	Host, normalized to 1
-10	633.640	2035.105	3972.123	3010.706	4997.757	6948.198	8931.293	1382.921	10285.49	5015.465	14758.11	18427.29	24230.98	8549.498	0.818317908
-9	717.8669	2072.217	4152.02	3173.076	5360.178	7516.68	9831.079	1746.73	9781.433	4354.135	15472.48	19394.2	24145.25	8803.761	0.842654761
-8	835.6572	2188.065	4491.424	3411.06	5836.224	8297.292	10933.73	1674.388	9246.708	4366.061	18518.32	20698.24	24754.03	9421.928	0.901822831
-7	919.7767	2279.738	4802.643	3703.99	6461.736	9142.795	12075.02	1845.654	9610.317	4570.409	22079.72	22038.82	28120.9	10447.65	1
-6	1058.504	2322.386	4997.757	4047.269	6948.198	10225.31	12217.37	1938.112	13388.15	6335.019	23772.17	23053.96	30557.39	11544.93	1.10502705
-5	1228.909	2309.854	5360.178	4503.181	7516.68	11301.68	13113.17	2117.53	16176.12	8015.911	23839.72	23492.67	34929.76	12632.96	1.20916771
-4	1450.62	2427.053	5836.224	5048.482	8297.292	12179.56	13506.37	2306.86	17511.43	9439.678	27731.81	24526.93	38243.87	13839.93	1.324693046
-3	1669.098	2583.504	6461.736	5764.261	9142.795	13526.19	13711.52	2367.782	17418.83	10387.58	28077.39	25447.54	41967.65	14661.86	1.403365024
-2	1974.171	2687.499	6948.198	6915.889	10225.31	13932.68	14076.75	2702.641	21382.16	13414.57	29931.64	26719.14	36915.61	15428.23	1.47671795
-1	2201.392	3087.093	7516.68	7354.269	11301.68	15000.09	15876.84	3367.543	21278.3	14391.62	27404.53	27637.66	33799.73	15594.19	1.492603303
0	2874.736	3685.727	8297.292	8624.614	12179.56	16539.38	18522.66	4465.67	23364.66	15680.04	28713.56	28894.11	30512.05	16555.69	1.584633567
1	3873.467	4882.617	9142.795	8731.679	13526.19	17588.81	20289.77	5438.252	21881.58	13009.1	34155.93	30363.79	34494.55	17707.99	1.694926177
2	4218.375	5456.212	10225.31	8931.293	13932.68	18427.29	20968.04	6153.094	23039.37	13109.74	36557.48	31687.05	36789.22	18669.91	1.786996569
3	4514.173	6034.591	11301.68	9831.079	15000.09	19394.2	21234.38	7122.701	26421.36	15150.96	35926.31	33332.14	32210.12	19286.6	1.846023018
4	5036.101	6422.276	12179.56	10933.73	16539.38	20698.24	20320.47	7555.272	26390.9	15766.41	34101.79	35080.73	30745.3	19612.32	1.877199811
5	6138.679	7434.309	13526.19	12075.02	17588.81	22038.82	19549.02	8219.896	23806.13	14466.97	35660.38	35898.09	33112.77	20173.4	1.93090322
6	8547.392	9176.937	13932.68	12217.37	18427.29	23053.96	19390.49	9525.436	24508.73	15126.43	37472.37	36796.57	36051.07	21254.15	2.034347654
7	8821.871	10919.92	15000.09	13113.17	19394.2	23492.67	20117.1	11467.81	24170.49	15475.53	37873.45	38195.68	35627.25	21895.78	2.09576118
8	9170.907	11744.24	16539.38	13506.37	20698.24	24526.93	20684.95	12249.17	21914.07	14421.94	42293.31	40308.69	34147.82	22538.48	2.157277942
9	10062.14	9878.186	17588.81	13711.52	22038.82	25447.54	21260.29	11234.78	21991	14958.28	49313.3	42534.48	34264.05	23700.42	2.268493025
10	9290.162	9593.457	18427.29	14076.75	23053.96	26719.14	20390.39	7462.839	23751.3	16610.54	56311.5	44663.47	38267.91	24918.77	2.385108111

Real GDP per capita in current USD, inflation adjusted
Sources: World Databank, Bureau of Labor Statistics

A.3 Table C

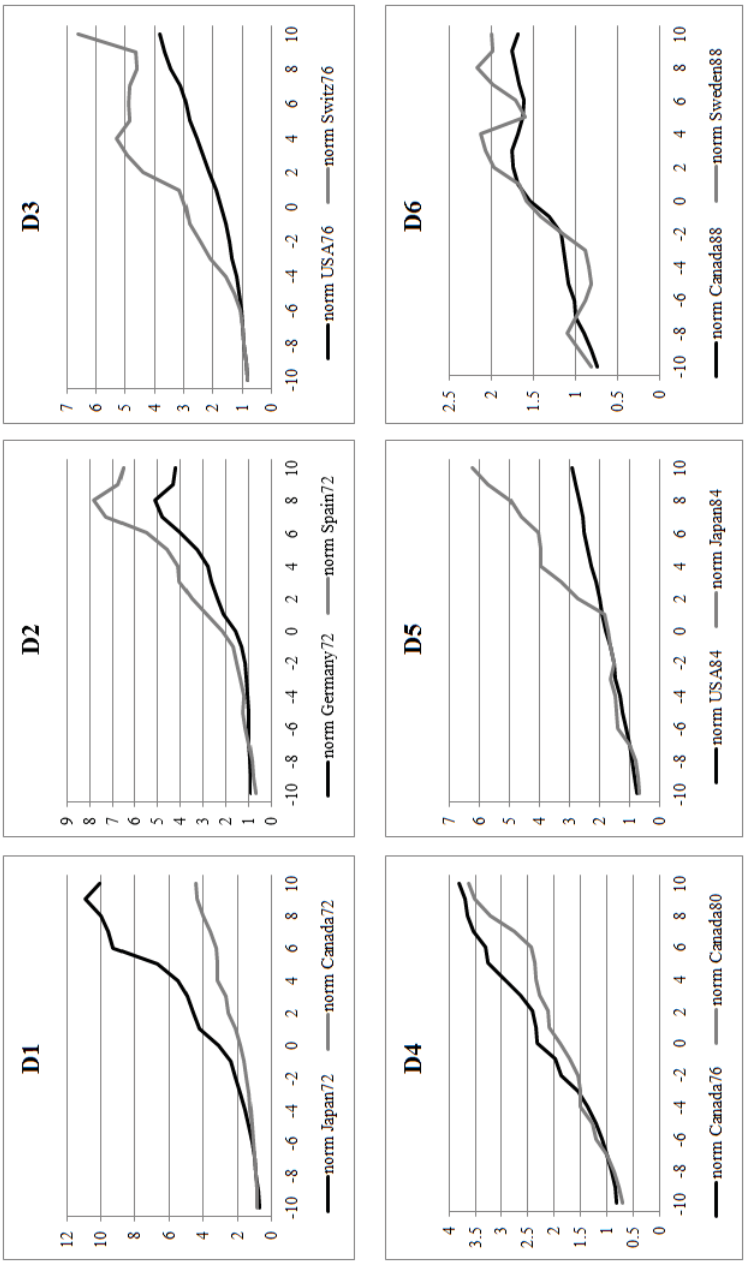
Table C. Data for runner-up countries

Year	Canada 1972	Spain 1972	Switzerland 1976	Canada 1980	USA 1980	Japan 1984	Sweden 1988	Japan 1988	Bulgaria 1992	France 1992	Sweden 1994	Greece 1996	USA 1998	Average	Runner-up, normalized to 1
-10	2255.23	519.4755	2784.734	4047.269	4997.757	4218.375	11717.28	8547.392	2226.68	10285.49	12167.4	5445.024	20698.24	6916.1805	0.79718879
-9	2354.839	607.6168	2960.616	4503.181	5360.178	4514.173	13807.21	8821.871	1903.624	9781.433	12719.7	6317.148	22038.82	7360.800754	0.848437638
-8	2529.518	672.8192	3121.742	5048.482	5836.224	5036.101	15869.82	9170.907	1950.83	9246.708	16800.75	7311.588	23053.96	8126.880708	0.936739317
-7	2739.586	772.2794	3344.995	5764.261	6461.736	6138.679	14466.99	10062.14	1964.224	9610.317	20415.88	7550.501	23492.67	8675.712185	1
-6	3010.706	886.6167	3648.086	6915.889	6948.198	8547.392	12748.67	9290.162	2262.053	13388.15	22972.12	9270.822	24526.93	9570.445746	1.103130849
-5	3173.076	966.767	4344.391	7354.269	7516.68	8821.871	11709.86	10063.7	3168.992	16176.12	24066.49	9861.558	25447.54	10205.48569	1.176328292
-4	3411.06	951.5266	5277.497	8624.614	8297.292	9170.907	12167.4	10628.1	2561.236	17511.43	28561.55	10785.27	26719.14	11128.23251	1.282688069
-3	3703.99	1078.132	7046.664	8731.679	9142.795	10062.14	12719.7	11297.05	2449.793	17418.83	29923.98	10004.51	27637.66	11632.071	1.340762666
-2	4047.269	1178.303	8105.676	8931.293	10225.31	9290.162	16800.75	16633.91	2377.415	21382.16	30819.72	10632.63	28894.11	13024.516	1.501261882
-1	4503.181	1323.92	9347.933	9831.079	11301.68	10063.7	20415.88	20056.14	1267.788	21278.3	23173.19	12386.53	30363.79	13485.62392	1.554411169
0	5048.482	1666.693	9868.701	10933.73	12179.56	10628.1	22972.12	24230.98	1214.508	23364.66	24775.52	13007.14	31687.05	14736.71108	1.69861687
1	5764.261	2193.466	10571.83	12075.02	13526.19	11297.05	24066.49	24145.25	1278.565	21881.58	28726.07	12608.99	33332.14	15497.454	1.78630338
2	6915.889	2687.216	14761.39	12217.37	13932.68	16633.91	28561.55	24754.03	1150.549	23039.37	31262.71	12599.33	35080.73	17199.748	1.982517128
3	7354.269	3137.887	16556.22	13113.17	15000.09	20056.14	29923.98	28120.9	1555.844	26421.36	28609.49	12350.27	35898.09	18315.20846	2.111089911
4	8624.614	3201.82	17738.26	13506.37	16539.38	24230.98	30819.72	30557.39	1063.944	26390.9	28776.43	11500.65	36796.57	19211.30985	2.214378421
5	8731.679	3536.195	16168.7	13711.52	17588.81	24145.25	23173.19	34929.76	1209.503	23806.13	29220.04	11966.42	38195.68	18952.529	2.184550224
6	8931.293	4239.851	16366.75	14076.75	18427.29	24754.03	24775.52	38243.87	1581.783	24508.73	27879.15	13414.1	40308.69	19808.29285	2.283189256
7	9831.079	5615.134	16262.99	15876.84	19394.2	28120.9	28726.07	41967.65	1611.644	24170.49	25563.24	17654.71	42534.48	21333.03285	2.458937364
8	10933.73	6045.136	15438.07	18522.66	20698.24	30557.39	31262.71	36915.61	1600.936	21914.07	28122	20857.33	44663.47	22117.79631	2.549392584
9	12075.02	5217.536	15561.54	20289.77	22038.82	34929.76	28609.49	33799.73	1753.3	21991	35139.95	21880.08	46627.1	23070.23815	2.659175139
10	12217.37	5015.465	22150.27	20968.04	23053.96	38243.87	28776.43	30512.05	2030.651	23751.3	40268	23682.01	47208.54	24452.15046	2.818460311

Real GDP per capita in current USD, inflation adjusted
Sources: World Databank, Bureau of Labor Statistics

A.4 Figures D.1 – D.6

Each line graph is a plot of normalized GDPpc (ie. GDPpc=1 at year –7), and corresponds to the pair labeled in the legend.
Year is on the x-axis and normalized GDPpc is on the y-axis. In 1980, there was no runner-up country to the host (USA); thus there is no pair-wise graph for that year.


D1
norm Japan72
norm Canada72
D2
norm Germany72
norm Spain72
D3
norm USA76
norm Switz76
D4
norm Canada76
norm Canada80
D5
norm USA84
norm Japan84
D6
norm Canada88
norm Sweden88

A.5 Figures D.7 – D.12