

# Regional Economic Impact on Host Countries from Olympic Games

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## Introduction

Hosting the Olympic Games has been a coveted position from its inception, touted as an incredible honor intended to showcase the opulence of the host country and an opportunity to earn a windfall of billions with the influx of tourists and international recognition. Countries spend hundreds of millions on their bids to the International Olympic Committee (IOC) alone, vying for the chance to bring the windfall to their doorstep. However, the claim to economic fame as a result of the Olympics has come under question in recent years, with continued cost overruns inflating costs and the IOC taking increasing cuts from the host countries' revenue. In combination with the travel restrictions and limitations on large group gatherings in the post-COVID-19 world, the financial future of the Olympic Games is uncertain – countries must be cautious, should they bid to host the Olympics, to be aware of the financial implications of such a decision.

This study attempts to provide further granularity to such an understanding by comparing the economic impacts of hosting the Olympics for a given country at the regional level. We examine the tourism, GDP, and unemployment data at the regional level for three different case study countries – Canada for Vancouver 2010, the United Kingdom for London 2012, and Brazil for Rio 2016 – leading up to and following an Olympics hosting. Through tourism, we aim to be able to break down a commonly cited source of revenue from the Olympics; GDP provides insight into the total economic growth of the event; unemployment, similar to tourism, tracks one of the claimed long-term effects of the Olympics. With this analysis, we hope to provide insight into the regional breakdown of the economic effects, or lack thereof, of hosting an Olympics and how in aggregate they contribute to the more widely known national economic impacts of the games.

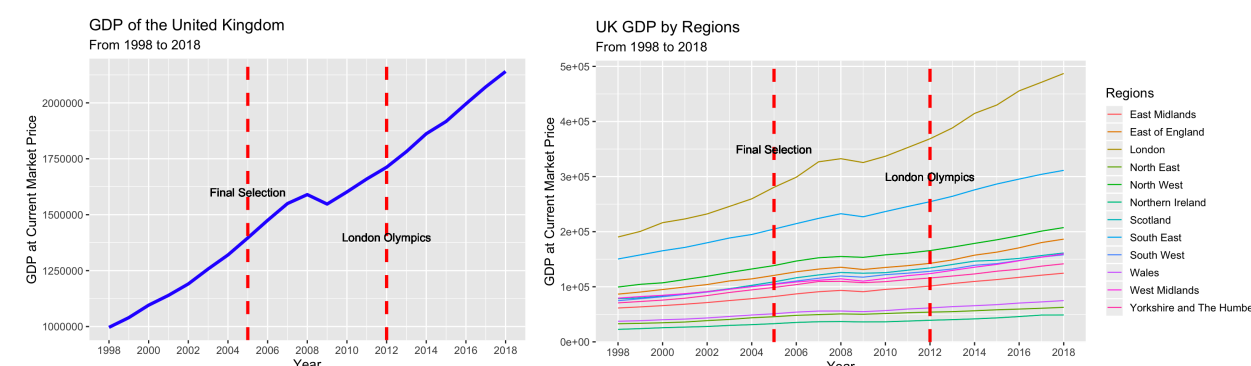
## United Kingdom – London 2012

In this part of our report, we discuss the impact of the 2012 London Olympics on the UK as a whole, as well as its constituent subregions. We divide the UK into 12 regions, with London, which hosted the Olympics, being one of them. The regions consist of the normal division of England as well as separate regions for Scotland, Wales, and Northern Ireland.

These regions are:

- |                     |                              |
|---------------------|------------------------------|
| 1. South West       | 7. West Midlands             |
| 2. Wales            | 8. East Midlands             |
| 3. East             | 9. South East                |
| 4. North East       | 10. Scotland                 |
| 5. Northern Ireland | 11. London                   |
| 6. North West       | 12. Yorkshire and The Humber |

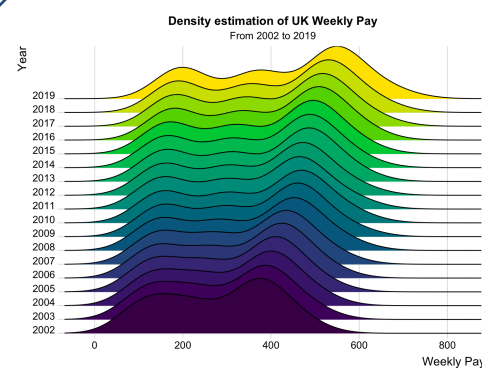
### UK National & Regional GDP



In order to understand the economic impact of the Olympics on the UK and its subregions, we first detail its total effect on the GDP of the UK from 1998 to 2018, then further break down the GDP growth into the aforementioned 12 regions and analyze GDP growth by region. Together, the plots suggest that though there may be a slight difference in regional impact and its affect on GDP, the growth rates are similar enough across all parties that we are unable to statistically verify the significance of this difference.

### UK Weekly Pay

This plot reinforces the conclusion that the 2012 Olympic Games had no impact on the distribution of pay nationally or regionally. We conclude through inspection that this shift begins around 2004 and is nearly complete by 2008. All the years after 2008 appear to have nearly identical distributions, including 2012 and beyond. In fact, the near uniformity of the regional distributions calls into question whether any meaningful regional distinctions among worker pay are to be had in the UK.



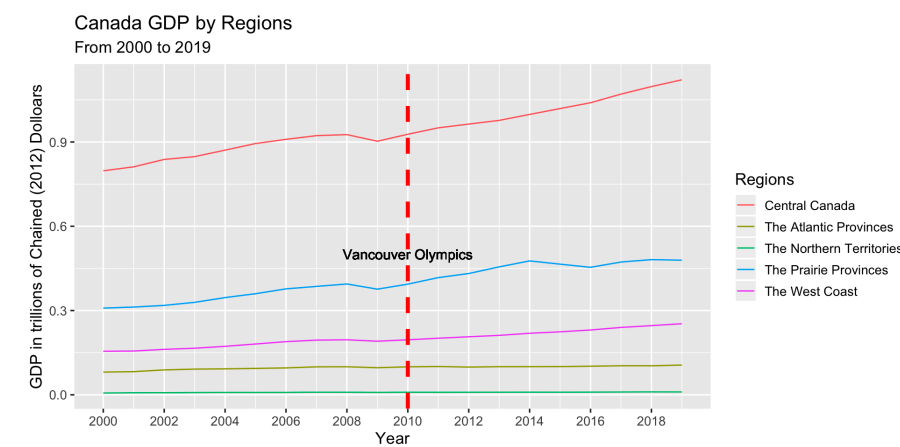
## Canada – Vancouver 2012

In this section, we analyze the regional economic impacts on Canada by the 2010 Winter Olympic Games. We divided Canada to 5 regions, where Vancouver is in the West Coast region.

1. The Atlantic Provinces: Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick
2. Central Canada: Quebec, Ontario
3. The Prairie Provinces: Manitoba, Alberta, Saskatchewan
4. The West Coast: British Columbia
5. The Northern Territories: Nunavut, Northwest Territories, Yukon Territories

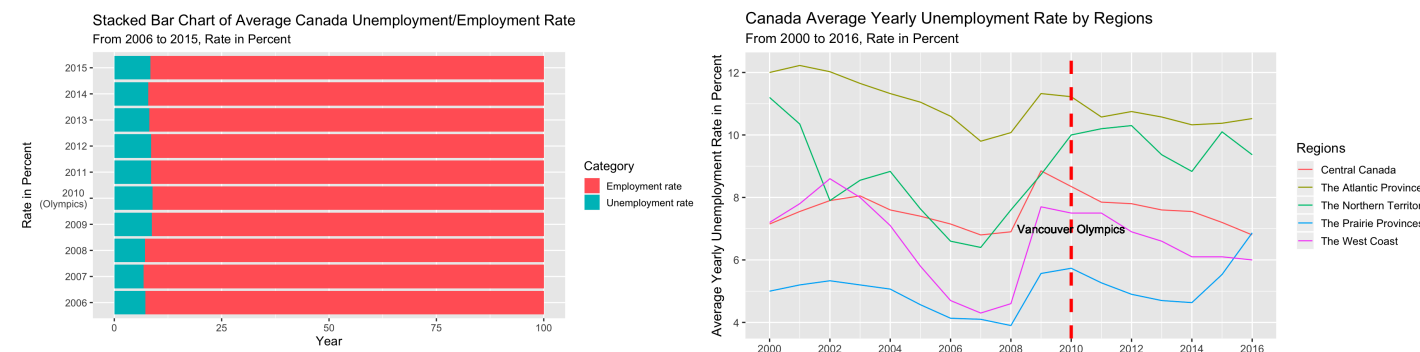
### Canada National & Regional GDP

The first potential economic outcome of the Olympics that we consider is GDP growth. We make a multiple time series plot to visualize the regional GDP in Canada. The plot shows that the 2010 Olympics does not impact regional GDP growth significantly. GDP on the West Coast (British Columbia) appears to improve after 2010 (when the Olympics were held), but as indicated in the table below, the improvement did not outpace that of other regions after the Olympics.



### Canada Unemployment Rates

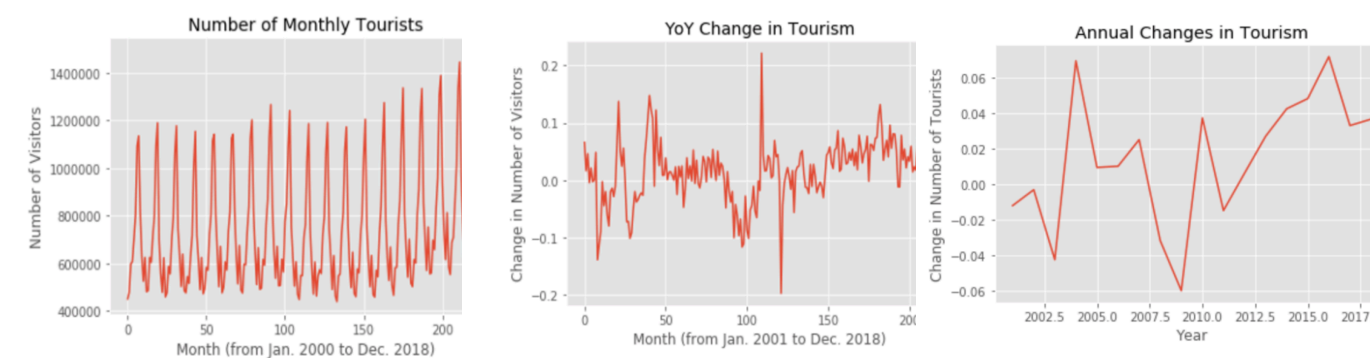
Next, we consider possible gains in employment resulting from the Olympic games by visualizing the overall unemployment rate in Canada over years. This helps us to better understand the national unemployment rate.



From the stacked bar chart on the left, we find that the lowest unemployment rate appears in 2007 whereas the highest rate appears in the Olympic year 2010. Unemployment appears to increase slightly from 2018 to 2010 and remains steady (but not decrease) after the Olympics.

To better understand the impact of the Olympics, we plot unemployment over time in different regions to compare how unemployment changed in British Columbia (where the Olympics were held) versus other regions. From 2004 to 2006, the unemployment rate decreases for all 5 regions, but increases from 2008 to 2009. After 2010, the West Coast (British Columbia) has a decreasing pattern in unemployment but not one that was significantly different from the decrease in other regions. This trend can also be observed in the below table, in which the West Coast does not appear to outperform other regions in employment gains after 2010.

### Canada Tourism



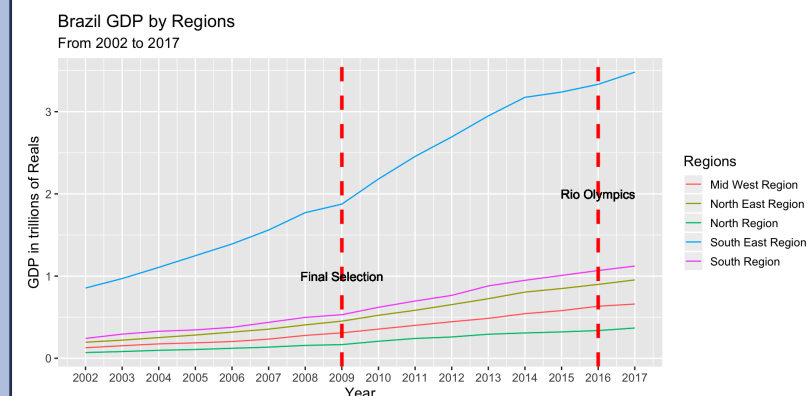
The last part for our analysis is on Canada tourism over years. We first visualize the monthly tourists in Vancouver (left). Note: the 2010 Olympics occur around month 120. Since this data is highly cyclical, we graph the year-over-year change in tourism (starting from January 2001) so that changes are measured between corresponding points in the cycle (center). We notice a spike slightly after the month 100, which corresponds to the 2010 Olympics, and a dip slightly after, which corresponds to the year after the Olympics. However, the year-over-year changes do not appear to have an upward trend or spike after the Olympics. We also graph the change overall, where total annual tourism appears to have an upward trend. However, trends in tourism growth do not appear to change over time. Growth remains steady during previous periods of stable markets. We note that declines in tourism occurred during recessions (early 2000s, 2008-2009). There is no evidence that the increases in tourism during the recovery (2010-) are greater than other increases in previous periods.

## Brazil – Rio 2016

In this section, we discuss the regional difference of economic impacts on Brazil by the 2016 Olympic Games by analyzing GDP, unemployment rate, and tourism over years. We divide Brazil to 5 regions, where Rio de Janeiro, the city hosted Olympics, is in the South-East Region.

1. North region
2. Northeast region
3. Midwest region
4. Southeast region
5. South region

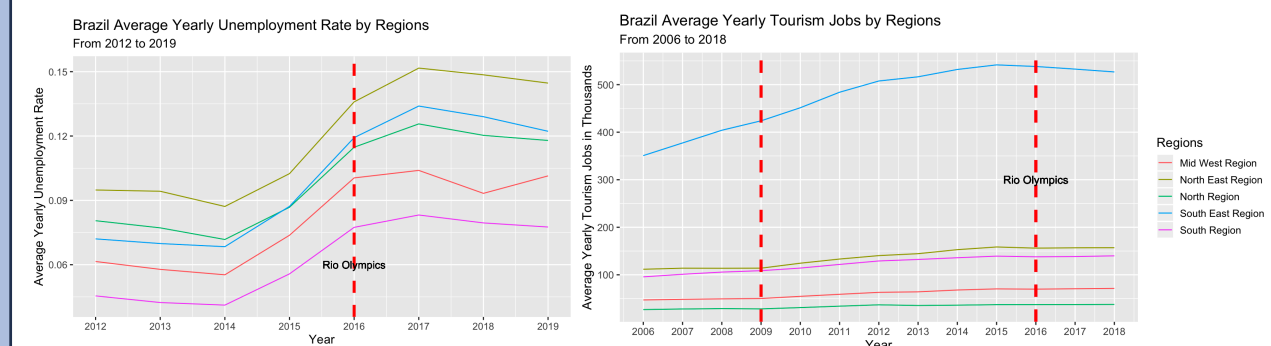
### Brazil National & Regional GDP



First, we want to visualize the regional GDP of Brazil, so we make a multiple time series plot. Also, we add two vertical lines to mark the year of final selection (2009) and the year of the Olympics (2016). From this plot, we find that from year 2002 to 2017, South East region always has a higher GDP than other 4 regions.

In order to test the hypothesis that the success of Olympic bid brought a more significant GDP growth for South East region, we run a one-way ANOVA. Unfortunately, when comparing the mean GDP growth rates by region, we fail to reject the null hypothesis, and are unable to discover a statistically significant distinction of the growth rate of the South East region.

### Brazil Tourism



Another way we can analyze the potential impact of the Olympic Games on Brazil is through analyzing the unemployment rate over time by region (left). The highest increasing rate appears at year 2016, the Olympics year, for all 5 regions. The unemployment rate drops starting from 2018. Therefore, the 2016 Rio Olympic games did not benefit Brazil's unemployment rate. This is in line with the tourism data, where the decreasing number of tourism jobs in South East region complies with the pattern of Brazil unemployment rate.

## Conclusion

In this project, we analyzed both the National and Regional impact of hosting the Olympics on a country's economic and tourism indicators.

We drew conclusions on a country by country basis:

The United Kingdom:

There was a large amount of economic heterogeneity. While tourism data showed more regional distinction, we did not find that any changes intra-region could be attributed to the Olympics.

Brazil:

Extensive analysis of indicators for economic and tourism data demonstrated through both observation and statistical measurements that there were no meaningful changes that could be attributed to the Olympics on the regional level.

Canada:

Although there was growth in tourism within Vancouver following the 2010 Olympics, we did not find any differential effects on economic outcomes across different regions within British Columbia or Canada, suggesting that economic growth after 2010 could not be attributed to the Olympics.

In the future, we believe additional work can be done in this direction by collecting and analyzing more indicators and performing additional statistical tests. Specifically, we think one could further explore the breakdown of GDP by industries as well as perform statistical tests that can determine whether the Olympics had a statistically significant impact, as most of our analysis is done by inspection. We hope to see these topics explored in the future.