Analyse the Costs and Benefits of Hosting the Olympic Games

Reg No. 2005327

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EC831 Economic Project

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Word Count: 4996

Date: 25th April 2023

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Contents

Abstract

This paper looks at the effects that the Olympic Games can have on a host country, considering both benefits and costs. By exploring the current literature this paper looks at macroeconomic indicators; employment, exports, GDP and also social aspects to explore both short and long-term effects. Studies provide evidence that hosting the games can increase employment, exports and GDP, however much of this seems to be transitory and inconsistent across different research methods used. The intangible impacts can be argued as being more beneficial for a country, but due to them being hard to quantify it makes it difficult to determine if these outweigh the costs of the event. Past games provide evidence as to how the games can be beneficial but highlight that a lot of prior planning is needed for this outcome.

1. Introduction

Hosting a mega event, such as the Olympic Games, comes at a large cost for the host country who wins the bid, although does it ultimately bring about more costs or benefits for the nation? "The promise of worldwide exposure and economic gain has made hosting these major…. [events] a goal for aspiring cities around the world." (Short et al., 2000)

Hosting the Olympic Games requires large amounts of investment, which comes, on a large part, from taxpayers' money and national governments need to justify this spending. Countries express a various array of rationales behind their motivation to host the games and the large investment can't be rationalised on the basis of the sporting competition and spectacle alone. Weed (2014) discusses how much "debate surrounding the aims and goals for hosting the Olympics [….] increasingly focus on their instrumental role in generating immediate and longer term benefits." This shows the importance of assessing whether the monetary inflows into the games are favourable for the host country and a worthwhile investment from the government to help stimulate both short and long-term benefits.

Owing to the costly nature of hosting the games, in order for a country to be able to justify the substantial cost, a thorough assessment of all long-run benefits is needed. (Chong and Hui, 2013) Monetary inflows are easy to assess, however, to look at the Olympic 'legacy' on factors such as employment, we need to be able to isolate the natural changes which would have occurred despite the Olympics taking place (Hotchkiss et al., 2003). There is support in ex-ante studies for optimistic expectations regarding economic effects of hosting the games, in the short-term, owing to the accessibility of methodology on multiplier analyses (Jasmand and Maenning, 2008).

This paper contributes to the current discussion on this topic in the form of an extended literature review and discusses possible reasons for some of the disagreements in the research. This project is organized as follows. In Section 2 we look at the employment and wage effects from hosting the games, Section 3 discusses impacts on trade and outlines the proposed 'signaling model' (Rose and Spiegel, 2011) and Section 4 looks at how GDP is affected. In Section 5, we move on to analyse the intangible impacts of hosting and review the main literature on wellbeing, sustainability and urban development. Section 6 concludes.

2. Employment and Wage Effects

Baade and Matheson (2000) carried out a short-run study on employment effects of hosting the games. They assessed changes in employment, in both the LA (1984) and Atlanta (1996) games, attributable to hosting the games. They constructed an equation to estimate the employment growth path and compared the predicted employment growth to the actual value of gains in employment. They found the co-efficient for the Olympic Games' contribution to employment as not statistically significant for either city.

Research suggests similar effects for European cities as Jasmand and Maennig (2008) looked at the employment effects of hosting the games by investigating the Munich games of 1972.

They investigated longer-term effects by studying a 27-year period from 1961-88. A difference-in-differences approach was used, with dummy variables allowing for oil price shocks and urbanisation. Control variables in the model reduced any impact of residual variance. Their results found no significant positive employment effects in venue regions. The study did, however, only look for differences between venue and non-venue regions, but not investigate whether hosting the Olympics could have had a positive effect over all regions.

Hotchkiss et al. (2003) look at a mid-term period of 4 years and use a standard difference-in-differences technique to look at the effect on employment in the 1996 Olympics in Georgia, Atlanta. By comparing venue and near-venue counties (VNV) of Georgia to non-venue, they found a 17% increase in employment in the VNV counties. The use of a random growth estimation in their analysis also confirmed that the changes found were not merely attributable to systematic differences across these counties. They also found evidence for increased rates in the growth of employment of about 0.002 percentage points per quarter in the VNV counties which were affiliated with Olympic activity.

Hotchkiss et al. (2003) plotted the average employment per quarter indexed by employment in the first quarter of 1985. The graph [Figure 1] shows that prior to the early 1990s employment grew in all counties at a similar rate and also declined comparably due to the recession of the early 1990s. However, in the 3rd quarter of 1992, the two county categories begin to diverge, and this disparity opens further between 1995-96. (Hotchkiss et al. 2003) This depiction of the data helps to understand the size of growth in employment in the VNV counties compared to the non-venue counties and allows us to see when these effects begin to be seen.

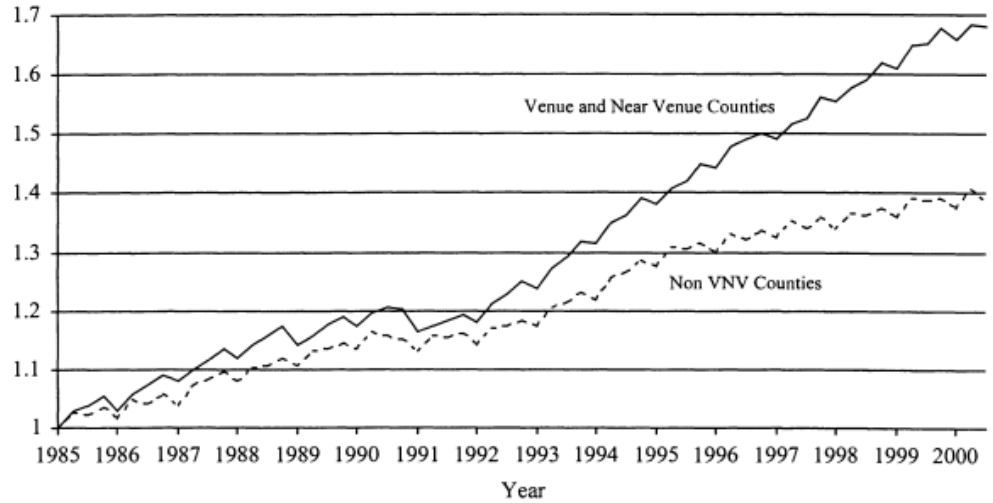

Figure 1: Employment Ratios by County Categories.
Source: Hotchkiss, J. L. et al. (2003)

Hotchkiss et al. (2003) also used their difference-in-differences analysis to explore the impact of hosting the Olympics on real wages, converted from nominal per-worker wages using the CPI (of average prices from 1982-84). Initial findings suggested an increase of about 7 percentage points in real per-worker wages in the venue and near-counties compared to the non-venue, and an increased rate of growth in wages of 0.001% per

quarter in the VNV counties. “While it is widely accepted that population growth in VNV counties also outstripped population growth in non-VNV counties, this wage increase indicates that increases in demand for labour in the VNV counties was greater than the growth in supply, driving wages up.” (Hotchkiss et al. 2003) However, the evidence of Olympic impact on wages is weak and the random growth estimator robustness check indicated the amount of noise around the wage series was too high in order to be able to draw any reliable conclusions.

Figure 2 plots, for the 2 county categories, the average wages for that quarter indexed by wages for the first quarter of 1985. In their graph, Hotchkiss et al. (2003), used a 4-period moving average in order to smooth seasonality, but it is possible to see a divergence in wages between the 2 categories, however it is not as prominent as the findings for employment.

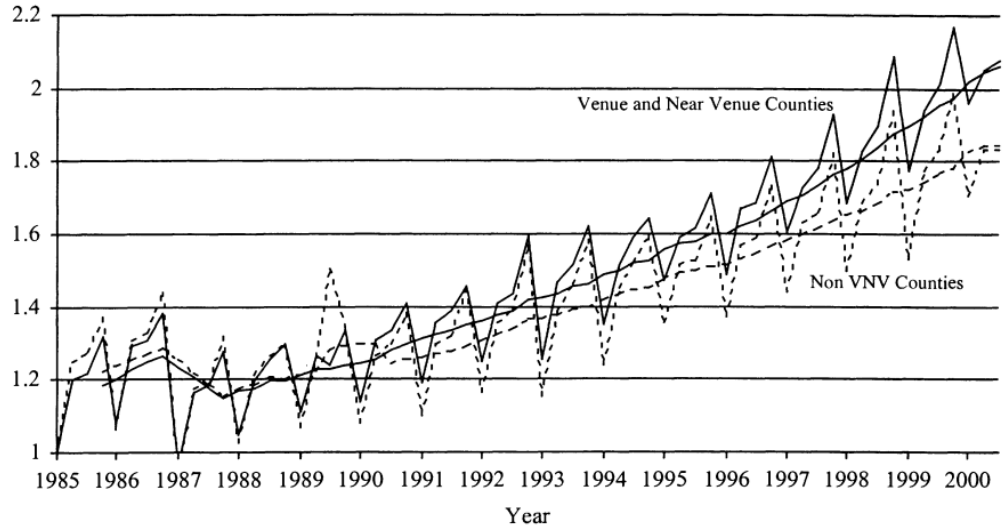

Figure 2: Real Per-Worker wage Ratios by County Categories (Overlaid with Four-Period Moving Average).
Source: Hotchkiss, J. L. et al. (2003)

Hotchkiss et al.’s study used quarterly data, but “use of ‘high-frequency’ (monthly or daily, data) is rare in the literature on regional economic impact of sports.” (Feddersen and Maennig, 2013) This could be an important limitation for many studies on effects of the Olympic Games as they only take place over a few weeks and effects may be short-lived. There is much evidence to suggest a short-lived and transitory effect from hosting the Olympic Games, rather than a steady-state change (Baade and Matheson, 2000). Job growth estimates for 1997, derived by adjusting the model to reflect Olympic induced higher rates of job growth, find that at least 40% of the jobs were transitory from the 1996 Atlanta Games (Baade and Matheson, 2000). Feddersen and Maennig (2013) used monthly data when assessing effects on the 1996 Atlanta Games. The econometric analysis of aggregated employment for counties in Georgia found a very localised effect, and despite 29,000 additional jobs being attributed to the games, they were found as transitory and lasted for only the one month of July 1996 (Feddersen and Maenning, 2013). A similar effect was found in LA as 5,043 jobs were found to contribute to the economy as a result of the

Olympic Games in 1984, but no net job gains were found beyond 1985, again indicating these jobs were transitory (Baade and Matheson, 2000). Much of the literature agrees on any job gains being transitory, despite disagreements in overall employment effects. Shockingly, Zimbalist (2017) stated that post the Rio 2016 Olympics thousands of workers were left unpaid, including hundreds who had been directly involved in the games. Therefore, despite the promise of job opportunities brought in by the games, it is suggested that this may not always be positive if workers don't receive the necessary compensation.

Owen (2005) suggests economies at full employment are crowding out private investment with public investment. By employing workers to build stadiums and other important infrastructures it takes them away from what else they would have been doing. Therefore, unless a country has high unemployment, employment gains in construction can't be seen as an economic benefit as they come at a cost of employment losses in other industries (Baade and Matheson, 2016). Despite some studies showing increases in employment, it is important to look at the sectors that people are being employed in and whether these effects are long-term or just for the duration of the event.

3. Exports

Rose and Spiegel (2011) carry out research to see the effect of hosting the games on a countries trade balance and more specifically if it can increase their exports. They use the gravity model of international trade and find there to be an 'Olympic Effect' on trade whereby exports grow, and trade is over 20% higher for host countries, ceteris paribus. By adjusting their data, they also account for different external factors and conclude that their result is statistically robust and permanent. They identify a strong motivation to host the mega-event as the "economic benefit in the form of greater openness." (Rose and Spiegel, 2011) Research by Lucas (2009) suggests that increased openness of a country may have the ability to enhance its growth, giving potential for large positive welfare effects.

Song (2010) also uses the gravity model of international trade and finds evidence of increased exports for host countries of + 38%. They find this to be a slow increase, but persist for a long time, creating a permanent increased level of exports. Song (2010) concludes that these significant effects on exports begin only after the event has begun, but their results imply hosting the games increases exports by 0.43% every year.

3.1 Signalling Model

Rose and Spiegel (2011) found that countries which bid to host the games, but were unsuccessful, also experience a very similar effect on their exports. They attribute this identified 'Olympic Effect' to the signal a country sends when submitting a bid rather than actually hosting the games. Their signalling model posits that countries send a policy signal that will be followed by liberal trade policies in the future when bidding to host. This signal has a payoff in that "countries which expect to liberalise receive increased investment in the export sector." (Rose and Spiegel, 2011) This sector in which prices will rise through liberalisation.

Maennig and Richter (2012) do, however, dispute this 'Olympic Effect' on the basis that Rose and Spiegel's research suffered from a selection bias. Rose and Spiegel (2011) compare Olympic host countries (US, Japan, Germany, Italy, Canada etc.), which are among the world's leading export nations, to all other nations, which includes the world's most disadvantaged nations. Maennig and Richter (2012) instead compare Olympic countries to structurally similar nations, identified through matching strategies. By removing this potential bias, they find there to be no positive effect on exports. They also look at unsuccessful bids and once again, after controlling for countries similarities/ dissimilarities, find no systematically significant positive effects for bidding countries. Maenning and Richter (2012) hence conclude in providing a warning that "the hopes for export growth should not part of rational motivations."

3.2 Tourism

While considering the impact that hosting the games can have on trade and exports, it is important to explore the effect that it has on tourism alone. Tourism is the third-largest export category and accounted for 7% of global trade in 2019. (World Tourism Organisation, no date) Tourism is a component of trade services provided by a country and the tourism balance within trade is the exports of tourism services minus imports of tourism services. (ONS, 2019)

The Olympic Games are promised to "attract hoards of wealthy visitors." (Matheson and Baade, 2004) A large influx of tourists usually sees increased spending in the host cities, but how large is the impact and does it only last for the year of the event? This increased spending would raise the overall exports of a country through an increase in the balance of tourism services. Weed (2014) discusses that positive tourism legacy effects at national level, rather than just in the host city, has been an important objective for many recent games. An example being the 2012 London Games, which hoped to see a '£2billion tourist boost' and a 'million more international visitors.' (BBC, 2005)

Vierhaus (2019) analyses country-level effects through changes in international tourism arrivals in order to see whether hosting the games is able to help promote international tourism on a longer-term basis. They look at games that took place in the years 1964 to 2020, using data from 8 years pre- and 20 years post- the event and establish a positive tourism effect, ceteris paribus. Their 'bilateral trade gravity model adapted to international tourist arrivals' avoids bias in the form of selection and omitted-variables to help draw conclusions. The results show an increase in tourism of 41.4% in the year of the games and an average of + 25.9% 8 years before and 20 years after.

Fourie and Satana-Gallego (2011) also use a standard gravity model of bilateral tourism flows for the time period 1995 to 2006 and find that hosting the Olympics can promote tourism. They find positive effects in the year of the event of about 19.4%, but fail to identify any longer-term effects. Song (2010) uses a similar model and agrees that the positive effects on tourism are very short-lived and their data even indicates that hosting the games can lead to a decrease in tourism of 1.44% every year. It is suggested that some studies on tourist visits may be overstated if transitory effects on tourism are not considered. (Song, 2010)

Vierhaus (2019) also looked at the effect that a failed bid was able to have on the country and did find a weak, but nonetheless, significant positive impact of +9.4% in the year of the games and those surrounding it. Fourie and Santana-Gallego (2011) also find a positive, albeit smaller, tourism effect for unsuccessful bids. These positive effects seen for unsuccessful bidders may be put down to the 'signalling effect' discussed by Rose and Spiegel (2011).

Tourism legacy effects of the games can be attributed to many factors but Vierhaus (2019) establishes 3 main influences: high priority for promotion of tourism followed by a dedicated strategy and corresponding actions, impact of media content on the broadcasting audience and the participating countries. Fourie and Santana-Gallego (2011) note that hosting the games can also cause tourism displacement and crowding out effects, whereby a countries 'normal' tourists may choose not to visit due to the event taking place. This could be down to demand and supply-side reasons such as: escalating prices, constraints on accommodation, security concern or just personal preference. (Fourie and Santana-Gallego, 2011) It could, however, be important to establish whether the games are taking place in peak or off-peak season to determine the size of this crowding-out affect and if it more prevalent during a cities peak season.

Research on tourism tends to show a mostly positive effect from hosting the Olympics at a regional level, for the year of the games and those following. However, the studies vary in scope and approach with different research methods used, short versus long-term and regional or country effects studied. Nonetheless, we are able to see evidence for the games being successful in helping to promote the much sought after 'tourism legacy', and some of the most recent games (Spain, Australia, China and the UK) are seen to experience country level growth in international tourism in years surrounding the event. (Vierhaus, 2019)

4. GDP

An important area of research on effects of hosting the Olympics Games is that demonstrated by Bruckner and Pappa (2015) on macroeconomic indicators, such as Investment, Consumption and Output. Bruckner and Pappa (2015) looked at data from 1950-2009 for 188 countries and used an estimation model to explore GDP effects. Their results indicated positive effects on GDP per capita up to 5 years before the event and a peak impact of increases of 2.5 percentage points 4 years prior to hosting. Firgo (2021) looked at how hosting the Olympic Games affects regional GDP per capita. Runners-up in the bidding process were used as counterfactual for host regions. The results found there to be a positive short-run effect on regional GDP per capita in host regions by about 3-4 percentage points relative to the national level in the year of the event and the year before. The study by Bruckner and Pappa (2015) disagrees with this is in the respect that they found any positive GDP effects in the year of the event to be insignificant. Firgo (2021) found no evidence for any positive long-run effects, however the results are not statistically robust and therefore we cannot conclude this is a reliable statement. Again, the research by Bruckner and Pappa (2015) differs in that they find hosting the games to lead to a permanently higher GDP. The difference in findings could be due to disparate models being used.

Chong and Hui (2012) used World Development Indicators from the World Bank to look at how GDP and GDP per capita were affected by assessing 126 host and non-host countries from 1956 to 2012. They used dummy variables to enable them to assess the impacts at different stages of the games, pre-, during and post-Olympics. They find an additional 1 to 2% GDP per capita growth in host countries from the announcement year (7 years prior) to 1 year before the games. They also, like Firgo (2021), find the greatest impact in the year of the games, with the Olympics contributing an additional 2.5% per capita GDP growth. This study is taken further than those discussed previously as they find an estimate for short-term cost as a ratio of GDP which is about 1 to 3% of GDP in the hosting year. Suggestions that post-game benefits can last for up to 8 years, gives rise to the conclusion that long-term benefits of the games may outweigh the short-term cost. (Chong and Hui, 2021)

Research has also been carried out regarding the effects of hosting the Winter Olympics on GDP per capita. Firgo (2021) found the event to have no positive effect on host regions. Their results even suggested that hosting the Winter Games could lead to a temporal decline in regional GDP per capita in the years around the event. A difference-in-differences estimator study carried out by Žečkytė (2022) looked at data from 1972 to 2014 to examine post-Olympic impacts for host countries. Regression results provided no evidence for additional long-term impacts on GDP per capita from hosting the Winter Olympics. It would be beneficial to look at why the Summer Games can have a positive impact while the same is not seen for the Winter Games.

Despite some evidence which shows positive effects of hosting the Olympic Games, there is a lot of research which suggests not all countries, nor all residents of a particular country feel the effects in the same way. Regardless of any positive 'legacy' effects felt from hosting the games, it has been recognised by Hall (1992) that hosting the games can "generate catastrophic financial losses, with sometimes irreparable political, social, or environmental damage." Baade and Matheson (2016) suggest that the cost-benefit proposition of hosting the games is worse for cities in developing countries rather than those in the industrialised world, evidence that positive and/or negative effects do not affect all hosts equally.

5. Social Effects

Hosting a mega event, such as the Olympics, can obviously impact a country in many ways, some of which have been discussed already, however we find that "the research has tended to focus upon the tangible legacies of the economy, infrastructure and urban renewal." (Dickson et al., 2011) The vast amounts of research in this area can be owed to these effects being easier to quantify, evaluate and hence draw conclusions.

Nevertheless, when considering the impact that hosting the Olympics can have, it is not only necessary to look at the economic effects, but also the intangible (hard to quantify) benefits and costs. "Many proponents of the Olympics have suggested that one of the main benefits of hosting would be the intangible impact on people in the host city" (Dolan et al. 2019) The UK government focused on some of these ideas in their bid to host the games when mentioning it would use the games to; inspire youth, promote intercultural understanding and enhance community engagement. (Henry, 2016)

5.1 Well-being

Dolan et al. (2019) use subjective well-being data from the 2012 London Olympics to consider the well-being impact of hosting the games. In their study they used a difference-in-differences design, surveys and collected panel data in order to draw conclusions. London, as the treatment city which hosted the games, was compared to 2 control cities, Berlin and Paris. 26,000 residents of these cities were interviewed in the summers 2011-13 to look for any well-being impacts of hosting the Olympics in the year during, before and after. Comparison of London to Paris and Berlin (pooled) pre-Olympics suggests no significant differences in life satisfaction between the two (Dolan et al. 2019), allowing them to be used as a counterfactual and add credibility to their results. The main findings from their study indicate that Londoners have an increase in subjective well-being compared to the other cities, and life satisfaction is seen to increase by around 0.11 standard deviations. This increase can be estimated to be equivalent to raising gross annual household income by £650.

Figure 3 depicts subjective well-being data for all 3 cities in 2012, the vertical lines indicating the opening and closing ceremonies. It allows us to see an increased well-being in all 3 cites, but this effect is heightened in London. Overall, the increases are most closely linked to the opening and closing ceremonies, for those in London, and any increase is seen to rapidly fall after the closing ceremony. (Dolan et al., 2019) This suggests that any increase in subjective well-being is very short lived and this is in line with other literature on subjective well-being which find that "after an initial strong reaction to bad and good events, individuals tended to return to baseline SWB levels." (Clark et al. 2008)

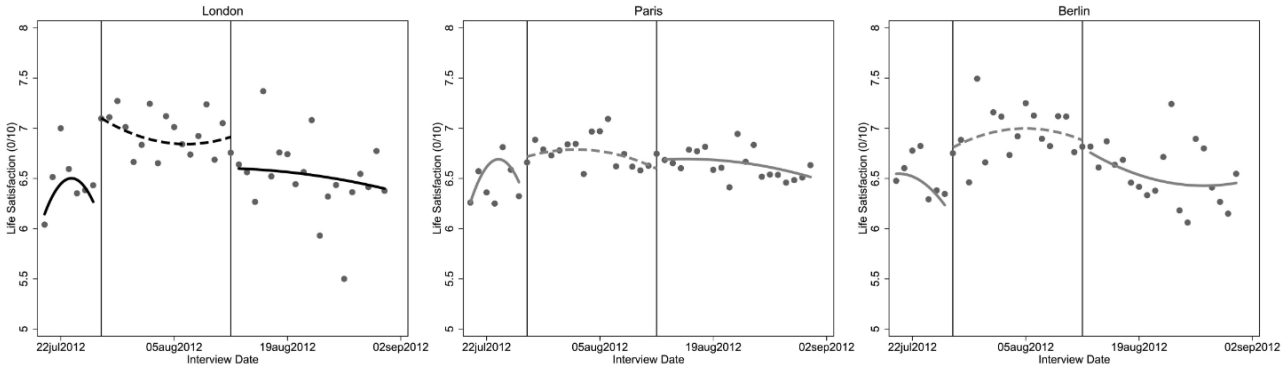

Figure 3: Quantifying the intangible impact of the Olympics using subjective well-being data. Source: Dolan et al. (2019)

It is important to note in the findings that there is an increase in well-being across all three cities and could suggest the Olympics are actually an international public good which countries are able to free-ride due to positive spill-over effects. (Dolan et al. 2019)

Teare et al. (2021) used time-series analysis on data from the Canadian Community Youth Survey to explore the impact of hosting the 2010 Vancouver Winter Olympics on perceived sense of belonging and life satisfaction for 12-19 year olds. It may, however, be plausible to conjecture similar findings across a wider selection of a population as akin literature

suggests “the impact of the Olympics on subjective well-being is independent of age or gender but tends to be higher among higher-income households.” (Dolan et al. , 2019) Teare et al. (2021) recognised the importance of looking at the wellbeing impact on the youth of a host country, as these are the people who will feel the longer-term effects and allow for an assessment of legacy effects. Their results found that after the games took place there was an increased number of youths who reported a strong sense of belonging and high life-satisfaction compared to before the games.

5.2 Sustainability

Sustainability is becoming a lot more widely talked about across world leaders and wider populations as everyone becomes more aware of the issue and how it is affecting us. The role of sustainability is now featured as an important part of the bidding process for mega-events such as the Olympics. (Holmes, 2015) Despite the games claiming to be sustainable, a study by Müller et al. (2021) develops and applies a model using nine indicators to assess sustainability of both Summer and Winter Games from 1992 to 2020. The International Olympic Committee (IOC) lay out strategy aims, one being to: “ensure the Olympic Games are at the forefront in the field of sustainability.” (IOC, 2017)

In Müller et al.’s (2021) study a definition is used for ‘sustainable Olympic Games’ along three dimensions: “having a limited ecological and material footprint, enhancing social justice and demonstrating economic efficiency.” (Müller et al., 2021)

Each of the nine indicators, shown in [Figure 4] is scored on a scale of 0 to 100 (least to most sustainable). The results from Müller et al. (2021) find an average scoring of 48 (out of 100) points across all 16 games and this is steady across the three dimensions they use. They do find a lot of inconsistency across all indicators though and some areas scoring below average are: budget balance (consistent cost overruns), new construction and social safety. However, there are some areas in which countries scored higher: long-term viability of venues and public approval, which indicates that it is possible to make the events more sustainable. Their overall results do also seem to suggest that over time, the average sustainability of the games is decreasing.

The definition and model assign equal weight to the classic three dimensions of sustainability (inner ring—ecological, social and economic), evaluating them with three indicators each (outer ring).

Figure 4: Definition and conceptual model of sustainability in the Olympic Games. Source: Müller et al. (2021)

Suggestions have been made of ways in which the games could be made more sustainable, as evidence shows it may be possible. Changes to improve this could be to downsize the event (hence reducing carbon emissions of visitors), rotate the games among the same cities (minimizes the need for new infrastructure and resulting ecological damage) and improve sustainability governance. (Müller et al., 2021) However, before any changes are made, it would be necessary to see if this would cause a negative impact on other aspects such as employment and GDP. Then the IOC would have to decide what they value more, be it, potentially, short-term employment gains for various countries, or improved sustainability of the event. By quantifying the ecological damage and well-being impacts of hosting the games and giving it a monetary value, it would enable an easier comparison of all costs and benefits to a country.

5.3 Urban Development

Newman (1999) discussed the neighbourhood impacts, a social effect, to Georgia of hosting the Atlanta 1996 Games. Preparation for the games took place, by large part, through a city urban renewal program. The Corporation for Olympic Development in Atlanta (CODA) did succeed in building middle and upper-income housing through privately financed projects (Rutheiser, 1996). However, “planning for urban renewal was initiated and guided largely by

the private sector for the benefit of business interests." (Newman, 1999) Newman outlined how any plans to revitalise older neighbourhoods were abandoned and many low-income residents were relocated to make way for growth. Rutheiser (1996) observed that Atlanta "failed to use the games to regenerate its poverty-stricken heart." Hereby suggesting that the lower-income families had to make sacrifices for their city, which was treated simply as a commodity rather than a place to live and be enjoyed by its residents. (Brahman et al. 1989)

The literature does not suggest that this is the same for all countries, however, as the Barcelona 1992 Olympic Games were the catalyst for $8.1 billion of investment in infrastructure and housing (French and Disher 1997). Chong and Hui (2013) discuss that the economic benefits from hosting the games may last for up to 16 years, and this infrastructure investment pre-event may lay the foundations for further economic development. Research comparing investment into infrastructure and urban development compared to the source of Olympic funding, either private or public, may be important to help understand the large disparities across countries.

6. Conclusion

The objective of this paper was to investigate the benefits and costs to a country of hosting the Olympics Games. The research finds lots of evidence for short-run benefits from hosting, however much of it is transitory and minimises its impact. Evidence suggests that hosting the games has the capacity to create positive impacts, however, it does require governments to make careful investment choices and plan early to best realise any long-term benefits. Tessa Jowell, Minister for the London 2012 Olympics, recognised that "too often in the past, governments have expected major events to bring automatic windfall benefits. But […] nothing is guaranteed without careful planning and initiative from the outset." (Department for Culture Media and Sport [DCMS], 2008) This highlights that simply hosting the Games is not enough in itself to secure lasting legacy effects which many cities hope for but rather the "strategies employed to harness the Games that seek to deliver legacy outcomes that are the intervention." (Weed, 2014)

Many studies suffer from a great deal of criticism due to misapplications within their research, such as: treating costs as benefits, ignoring opportunity costs, and using gross spending instead of net changes. (Song, 2010) For example, household spending on the event is their maintained level of entertainment spending, but reallocated towards sports-related events and away from close substitutes. Coates and Humphreys (2003) report that this spending on the Olympics is simply being redirected from one part of the economy to another and not additional spending driven by hosting the games. Therefore, we must be careful in what we count as a benefit from hosting the games as much private spending, but also public (for building infrastructure to host), has simply been taken from elsewhere and this opportunity cost may negatively impact the country in other ways.

It is difficult to draw any firm conclusions regarding the effect of hosting the games owing to unquantifiable impacts and many disagreements across studies due to bias in the methodology and different approaches to the topic. To improve our understanding on the issue, there can be research conducted on different types of economies. By separating developed and developing economies, it could potentially give a more helpful assessment

on the impact of hosting the games with respect to different countries. Furthermore, more macroeconomic indicators can be examined to see the effects of hosting the games in the short and long run.

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Acknowledgements

I would like to thank all my family for their support during my time at University and whilst completing my dissertation. Especially to my sister, Paige, for her constant support and belief in me during the process. I must also thank my dogs, as without their cuddles, I'm not sure I could have done it. (Less thankful for their barking, however!)

And to my Granny, who never got to see this adventure, I hope I'm making you proud.