The value of investing in the Olympics

Abstract

This paper will involve an investigation into the pros and cons of investing in the Olympics, whether it is investing in sporting infrastructure, funding or even hosting the Olympics. Data is compiled to analyse the value of investment in the Olympics and the findings section will provide background for how countries have invested into the Olympics. In the conclusion, reasoning and advice will be given for how a country should invest into the Olympics to gain more success, especially when the budget is not that of a rich country. Not only will the benefits be examined but also the disadvantages of each type of investment.

Introduction

Throughout history there have been many successes and failures at the Olympics. These include individual performances, team performances or the event itself. It is a spectacle that the entire world is focused on during one short time period. Often, the work that goes into creating the Olympics, the economics of the event (not just at the time) and the performance of the athletes are overshadowed by the drama and controversy of the games.

For this paper, data will be collected that is solely relevant to a country's performance at the Olympics. This data will be contextualised and analysed in order to see if there is a direct link between performance and the finances/infrastructure in place, as well as how strong or weak these links are. By using mathematical tests, it will be determined if there is enough evidence to state how each factor affects a country's chance of success at the Olympics as well as the value of each potential investment.

Overview

With modern technology today, sports around the world are becoming ever more accessible to people from all around the globe, none more so than the Olympics. The ancient games were held in Olympia, Greece, from 776 BC through 393 AD and mainly consisted of athletics events. It was not until 1503 years later that it would return. The first modern Olympics was held in Athens, Greece, in 1896 with 14 nations participating across 43 events in 9 sports and with 241 athletes (all male) competing. Since its reintroduction, the competition has rapidly expanded, and 206 states had planned to compete in the 2020 Tokyo Olympics before its postponement. It also now has 339 events in 33 sports with 11,091 athletes (both male and female) competing. The introduction of the Paralympics for athletes with a range of disabilities in 1960 along with the fact that male and female athletes can both compete, show how the world and the Olympics have changed for the better in recent times. An event that even with all the conflicts that go on in the modern world today, can still bring together so many athletes together to compete, no matter their sexuality, race or background.

Methodology

In this paper, 95% confidence intervals (CI) will be used. 99% confidence intervals could have been used as these are usually more accurate because it captures a broader spectrum of the data distribution. However, it would be less precise, and the margin of error is greater, therefore, a 95% CI will be used as it provides a good balance of accuracy and precision.

A confidence interval is a measure of the uncertainty around the effect estimate. It is an interval composed of a lower and an upper limit around the sample mean and the width of the interval represents the precision of the effect estimate. Therefore, the narrower the CI the more precise is the effect estimate. If the standard deviation and standard errors are small, then the degree of uncertainty will be smaller, and a narrower CI will be obtained which means the CI will have more statistical significance. When interpreting confidence intervals, it is important to note that if the limits for each variable don't overlap then it is statistically significant.

Confidence intervals are calculated by the following formula:

Equation 1

$$\bar{X} \pm Z * \frac{S}{\sqrt{N}}$$

Where $\bar{X} = mean,\ Z = Z\ value$ (explained below), $S = Standard\ Deviation$ (explained below), $N = number\ of\ observations.$

The margin of error is $Z * \frac{S}{\sqrt{N}}$.

The mean is calculated by the sum of the data divided by the number of data points.

The Z value depends on what confidence interval we are using and find below the Z value table:

Table 1

Confidence Interval	Z value
80%	1.282
85%	1.440
90%	1.645
95%	1.960
99%	2.576

As a balance of accuracy and precision is desirable, the Z Value for a 95% CI will be used which is 1.960.

The standard deviation is calculated by the formula:

Equation 2

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$$

Where $\sigma = population\ standard\ deviation,\ N = size\ of\ the\ population,\ x_i = each\ value\ from\ the\ population,\ \mu = the\ population\ mean.$

However, excels in built function for calculating the standard deviation will be used.

Multiple R values will also be calculated as this tells you how strong the linear relationship is. A value of 1 or close to 1 implies that the linear relationship is strong, and it will, therefore, support the hypothesis. However, a value less than 0.5 implies that the linear relationship is weak, and it will, therefore, disprove the hypothesis as there is no/little correlation.

As well as this, R squared values will be calculated as it is a statistical measure of how close the data is fitted to the regression line. A value close to 1 indicates that the model explains all the variability of the response data around its mean.

Multiple R values and R squared values will be calculated using Excel's in build functions.

Limitations

The main limitation of this paper is that there have been 28 Olympics games since the modern Olympic games started in 1896. As there are 195 countries in the world it would be a hugely time-consuming task to collect data for every country since the formation of the modern Olympics. Hence, the top 20 teams from the medal table in the 2000 Olympics will be used and only data collected for these nations will be used throughout. This should not affect or influence the data as 21st place and below had at most 3 gold medals and had many countries with the same amount of gold medals. This means the data would carry less weight as the top 20 has much more variation and will be easier to see trends and evaluate any correlations.

Another reason for why this data has been selected is because it contains countries with a variety of size and economic power. Also, Since the start of the new millennium, athletes have a much more professional approach and therefore the data will be much more relevant.

A further limitation is determining what population data to use as it is rather difficult to find population data for specific years. Also, it would be extremely time-consuming to use a different set of data for every different year. Only the population in 2005 and 2020 will be used in this paper because as you will see, population ranks stay very similar and there is only 7 countries out of the 20 that change population rank and they are all only by one place over a period of 15 years.

Data

For this paper, data has been collected from a variety of different sources and with different intentions. Different aspects of performance will be compared with many different variables in order to determine where investment will be most effective in relation to success at the Olympics. Whether it may be to get the highest number of medals or how hosting an Olympics could benefit or be a disadvantage to a country.

Data has been compiled through a variety of sources that will be linked at the end of the paper in the references section.

Population Data

The first set of data looked at in this paper is how population may affect a country's performance at the Olympics. The size of a country, as well as the top 3 and bottom 3 countries for population change will be analysed. These variables will be compared with how their performance changes in order to draw conclusions about how population affects performance.

Figure 1

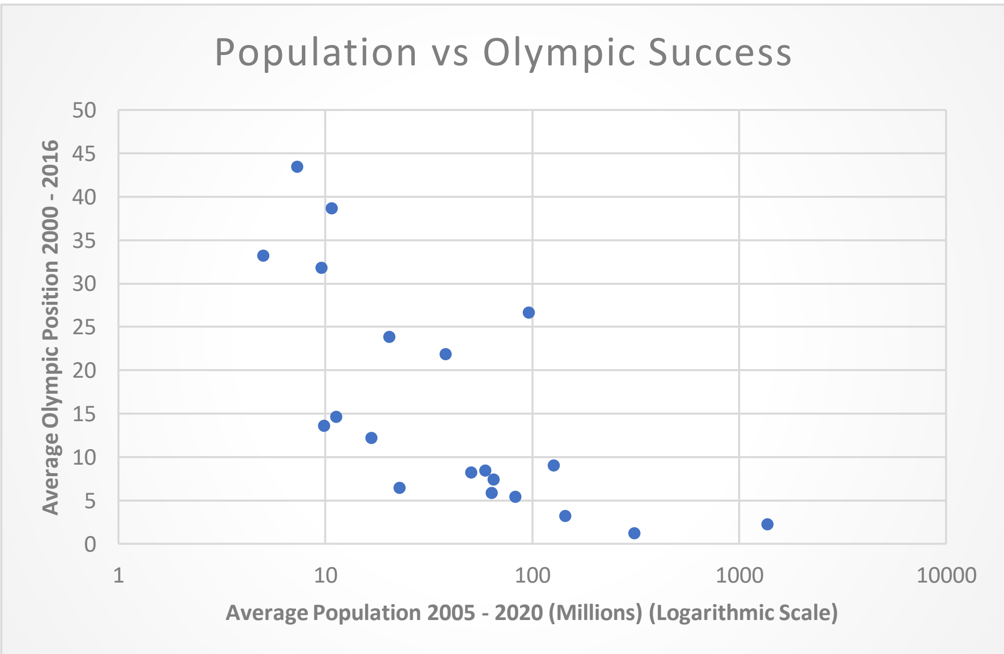

Table 2

Population Change	Country	Population Change (%)	Olympic Position 2000	2004	2008	2012	2016
Top 3	Ethiopia	48.47	20	28	17	24	44
	Australia	26.52	4	4	6	8	10
	Norway	17.34	19	17	22	34	74
Bottom 3	Greece	-6.27	17	15	60	75	26
	Bulgaria	-10.07	16	33	42	60	66
	Romania	-11.39	11	14	18	29	47

Table 3

	Average population between 2005 and 2020	Average Olympic position 2000 - 2016
Mean ($\bar{x}$)	126.46	15.84
Z Value (Z)	1.96	1.96
Standard Deviation (S)	302.24	12.89
# of Observations (N)	20	20
Margin of Error	132.46	5.65
95% CI Upper Limit	258.92	21.49
95% CI Lower Limit	-6.00	10.19

Population vs Performance Findings

First, how population affects performance at the Olympics will be discussed. Looking at Figure 1, there is a slight correlation between the population of a country and their average Olympic position since the 2000 Olympics. Since the evidence is not enough to draw conclusions from, confidence intervals will be calculated in order to see if population significantly affects performance. First, the individual data will be looked at in more detail. The 4 biggest average population countries take the 4 best average Olympic positions. In contrast, none of the 8 smallest average population countries (1) manage to have an average Olympic position of above 12th. This suggests that having a bigger population does improve how a given country performs at the Olympics. However, other than the aforementioned extremes of population, the countries around the average population did not seem to follow the trend. For example, in ascending order of population, Cuba, Australia and Poland have 11.298, 22.83 and 38.19 (millions) respectively (2-3). They had an average Olympic position over the 5 most recent Olympics of 14.6, 6.4 and 21.8 respectively.

Clearly, the most populated country out of the 3, Poland, performed the worst out of the 3. Australia performed excellently and managed to finish 4th twice. China, a dramatically larger country that has over 60 times the amount of people Australia does, yet they only managed to finish 2nd and 3rd in the same two Olympics.

To follow on from this information, countries that have had the biggest population rise/fall from 2000 to 2020 will be analysed to see how the decline/increase of population has affected their performance, if any.

Looking at Table 2, Ethiopia, the country with the biggest population change between 2005 and 2020, fluctuated around 20th until in 2016 it placed 44th. Australia's population increased by 26.5% but their Olympic position was 4th for 2000 and 2004 and then steadily declined to 10th. Norway's population increased by 17% but their Olympic position maintained about 20th before 2 big declines to 74th position in 2016. Greece had the 3rd biggest decline in population and their Olympic position fluctuated the most and ranged from 15th to 75th so this carries the least weight when analysing the data. Bulgaria and Romania both had the biggest decline in population and both countries Olympic position declined every year. They both finished in the top 20 in 2000 but in 2016 neither managed to surpass the 45th mark. All this data shows that there is very little/no evidence that if a countries population increased rapidly, the performance improved and vice versa. It is important to note that once again, the countries with the most extreme changes in population all performed worse or fluctuated a little before declining.

Now, looking at Table 3, one can see that the confidence intervals calculated overlap. This implies that population does not significantly affect performance at the Olympics and will be considered when suggesting the best potential investments that could lead to success at the Olympics.

Clearly, having a larger population has the potential to be an advantage and having a smaller population has the potential to be a disadvantage but after looking at countries like Australia, population does not define how successful you can be at an Olympics. Without serious, new, potentially unethical laws and a long period of time, changing a country's population isn't feasible so we cannot look at this to improve performance at the Olympics. However, this data tells us that the most effective ways to invest to improve performance may be with countries with a relatively average population as these countries tend to fluctuate the most. As well as this, after looking at how a country's performance changed with the more dramatic population changes, it can be concluded that a sudden spike or drop in population has no benefit to how a given country performs. The majority of countries excluding the top 4 having success at the Olympics comes from countries with a more average population size (this can be seen from the cluster of data points in Figure 1) and therefore this will be kept in mind when suggesting what size of country will most benefit from investment into the Olympics.

Sporting Facilities Data

The next set of data will investigate the relationship between the number of facilities a country has for a specific sporting discipline and the performance of that given country in that given sport.

Figure 2

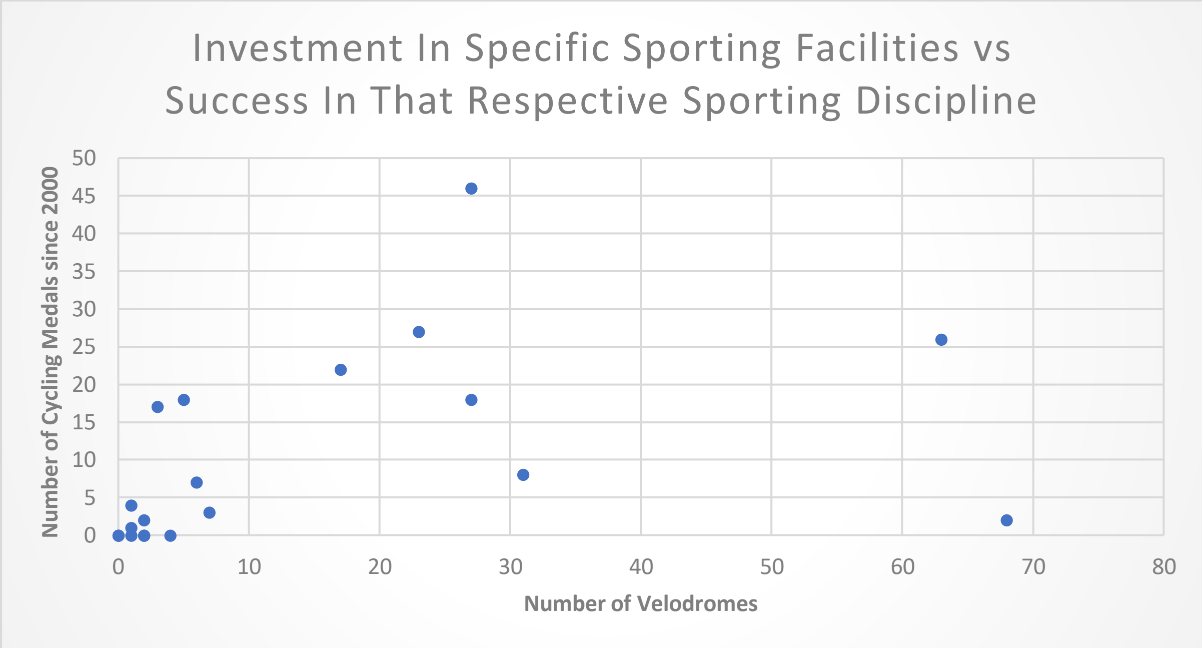

Table 4

Multiple R	0.418
R Squared	0.175

Sporting Facilities as an Investment Findings

Data has been collected for each country in the sample to see how many velodromes they have compared to the number of medals obtained for cycling in the Olympics. This should help decide whether investing in facilities for a specific sport might improve the number of medals they get in that sport. Upon initial glance of Figure 2, there seems to be no relationship between the two variables. The data points follow no pattern and therefore imply that there is no/very little correlation. Looking at Table 4, the value for R Squared is 0.175. As discussed in the methodology section, the value for R Squared represents a statistical measure of how close the data is fitted to the regression line. As this value is very close to 0 it implies that the model explains very little of its variability of the response data around the mean. As well as this the multiple R value is 0.418. The value for multiple R shows how strong the linear relationship is and since this value is less than 0.5, it can be concluded that the linear relationship is weak and there is little/no correlation.

Individual data points will now be looked at in more detail. One can see that Ethiopia and Bulgaria are the only countries without a single velodrome (4) and neither of these countries obtained a single cycling medal (5) from 2000-2016. Of the 9 countries that had between 2 and 5 velodromes, 5 of these countries obtained at least one medal for cycling.

Figure 2 *and* Table 4 were analysed in order to determine the value of investing in specific sporting facilities to gain more success in that discipline. As well as this, individual data points were looked at in more detail and now, it can be concluded that although investing in sporting facilities in no way implies success in that discipline, if a country has 1 or more velodromes there is a greater chance that at least 1 medal could be obtained in cycling compared to not having a single velodrome. However, there is not enough evidence to suggest that investing in sporting facilities will bring success in that discipline. Perhaps having at least one velodrome would provide budding cyclists to have somewhere to train at an Olympic standard venue or just having a velodrome would inspire people to take up cycling. Although there is some potential when investing in sporting facilities, it would be a very risky investment and therefore the paper will not investigate further into investing in facilities as a way for any given country to have a bigger impact at the Olympics.

Number of Athletes Data

Now, the relationship between the number of athletes a country takes to the Olympics and the number of medals that country obtains will be analysed.

Figure 3

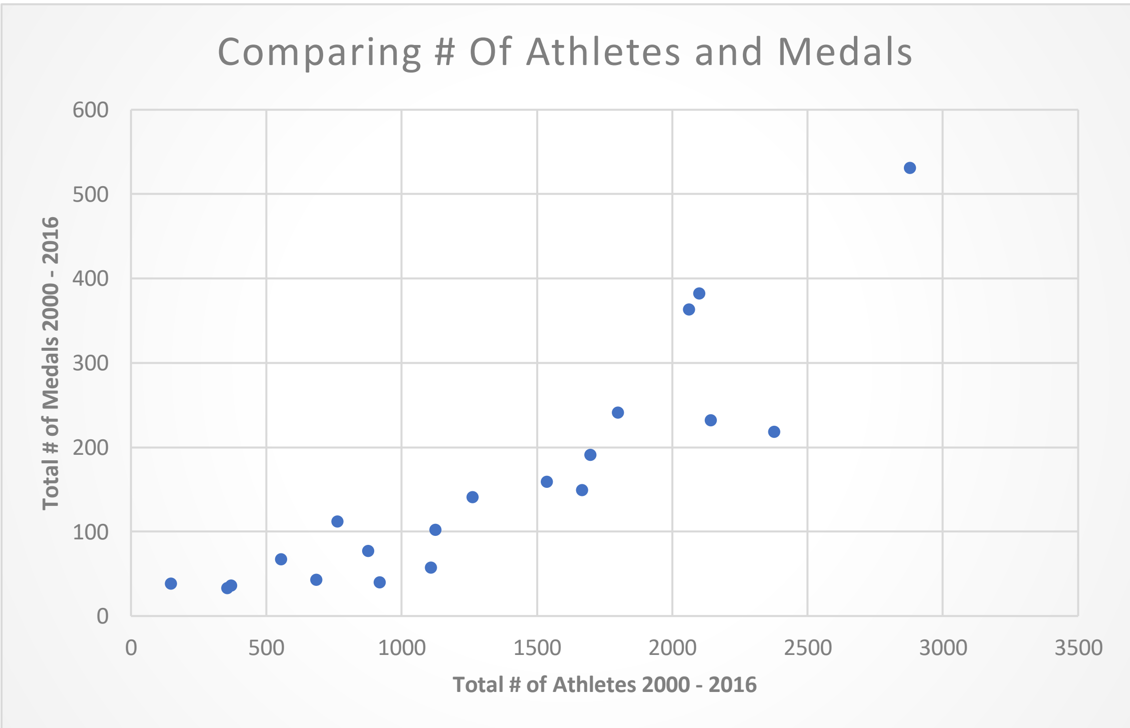

Table 5

Multiple R	0.89
R Squared	0.80

Table 6a and 6b

2000		
	Total Athletes	Total Medals
Mean (x̄)	269	33.35
Z Value (Z)	1.96	1.96
Standard Deviation (S)	159.23	25.08
# of Observations (N)	20	20
Margin of Error	69.79	10.99
95% CI Upper Limit	338.79	44.34
95% CI Lower Limit	199.21	22.36

2000

Multiple R	0.85
R Squared	0.71

Table 7a and 7b

2004		
	Total Athletes	Total Medals
Mean (x̄)	273.2	32.9
Z Value (Z)	1.96	1.96
Standard Deviation (S)	160.06	26.46
# of Observations (N)	20	20
Margin of Error	70.15	11.60
95% CI Upper Limit	343.35	44.50
95% CI Lower Limit	203.05	21.30

2004

Multiple R	0.83
R Squared	0.69

Table 8a and 8b

2008		
	Total Athletes	Total Medals
Mean (x̄)	278.6	32.1
Z Value (Z)	1.96	1.96
Standard Deviation (S)	173.26	30.61
# of Observations (N)	20	20
Margin of Error	75.93	13.42
95% CI Upper Limit	354.53	45.52
95% CI Lower Limit	202.67	18.68

2008

Multiple R	0.90
R Squared	0.80

Table 9a and 9b

2012		
	Total Athletes	Total Medals
Mean (x̅)	252.15	31.8
Z Value (Z)	1.96	1.96
Standard Deviation (S)	158.70	29.51
# of Observations (N)	20	20
Margin of Error	69.55	12.93
95% CI Upper Limit	321.70	44.73
95% CI Lower Limit	182.60	18.87

2012

Multiple R	0.89
R Squared	0.79

Table 10a and 10b

2016		
	Total Athletes	Total Medals
Mean (x̅)	249.3	30.45
Z Value (Z)	1.96	1.96
Standard Deviation (S)	150.98	29.90
# of Observations (N)	20	20
Margin of Error	66.17	13.10
95% CI Upper Limit	315.47	43.55
95% CI Lower Limit	183.13	17.35

2016

Multiple R	0.85
R Squared	0.73

Number of Athletes vs Medal Return Findings

Looking at Figure 3, one will notice that there is a clear trend between the 2 variables. The data points form a narrow ascending diagonal line showing that the more athletes taken to an Olympics, the more medals they can expect to obtain. To test how accurate the previous statement was, one can look at the value of R Squared in Table 5 which is 0.80. This shows that the data is closely fitted to the regression line and thus indicating that statement is likely to be true. Again, in Table 5, the value for multiple R is 0.89 which shows that the linear relationship is very strong as it is close to 1, further backing the idea that more athletes equals more success.

Next, confidence intervals for each individual Olympics will be considered to see if they are statistically significant and secondly, provide more detail as to how to invest in the number of athletes a country should train and then take to an Olympics.

Looking at the 5 confidence intervals (Table 6a and 6b– Table 10a and 10b) one will notice that they are all very similar. A few values do fluctuate a little but ultimately, they all give the same result. The mean number of athletes taken to each Olympics by one country ranges from 249.3 to 278.6 (14) which is a very small interval when you consider that this is for 20 different countries across a 16-year period. The mean number of medals obtained by one country at each Olympics ranges from 30.45 to 33.35 (1) which is, once again, a very small interval. The values for standard deviation and the calculated margin of error for each Olympics are also very similar to each other. The fact that the results are similar across all Olympic Games in the dataset, means that there is enough evidence to say there is a clear relationship between these two variables. Therefore, these results will be taken into consideration when determining where an investment would have the greatest impact on the success of a country at the Olympics.

Now, the confidence intervals themselves will be analysed. As it is clear by now, the results are very similar for each of the 5 Olympics in the sample, therefore, only the confidence interval for the 2016 Olympics will be looked at in more detail. Not only because all 5 confidence intervals are similar but also because this confidence interval is the most recent and relevant of the 5 which in turn is a good representative of the sample.

Table 11

	Total Athletes	Total Medals
95% CI Upper Limit	315.47	43.55
95% CI Lower Limit	183.13	17.35

Above, is the confidence interval previously seen (Table 10a and 10b*)* for the 2016 Olympics comparing total number of athletes to the total number of medals obtained. As the intervals for each variable do not overlap, the data is statistically significant. This results in the statement that, with 95% confidence, if a country takes between 183 and 315 athletes to an Olympics, they can expect a return of between 17 and 43 medals. This will be kept in mind when deciding how a country should invest in the number of athletes taken to the Olympics in order to gain success. The other confidence intervals for the other 4 Olympics were very similar and ultimately give the same result as the example above.

After analysing the data in the sample, it is obvious that the greater number of athletes taken to an Olympics, the greater number of medals a country can expect to obtain. When looking at this as a way of investing into more athletes to take to the Olympics as an attempt to gain more success, it will be kept in mind that a country cannot just take an extra 500 people expecting to win the Olympics. Instead, a calculated decision will be made when explaining which area has the most value to invest in, with the hopeful outcome of better performance at the Olympic Games. The cost of training, wages and travel costs for the athletes will also be taken into consideration whilst valuing this potential investment.

Funding for Individual Sports Data

Here, performance data specifically for Great Britain will be compared with how much funding each individual sport has received since the Olympics in 2008. It'll determine whether there is a correlation between how much funding sports get and whether there is a clear impact on the performance in that discipline.

For figures 4, 5 and 6:

= amount of funding

= number of medals

The data is arranged from greatest to smallest amount of funding in £millions.

Figure 4

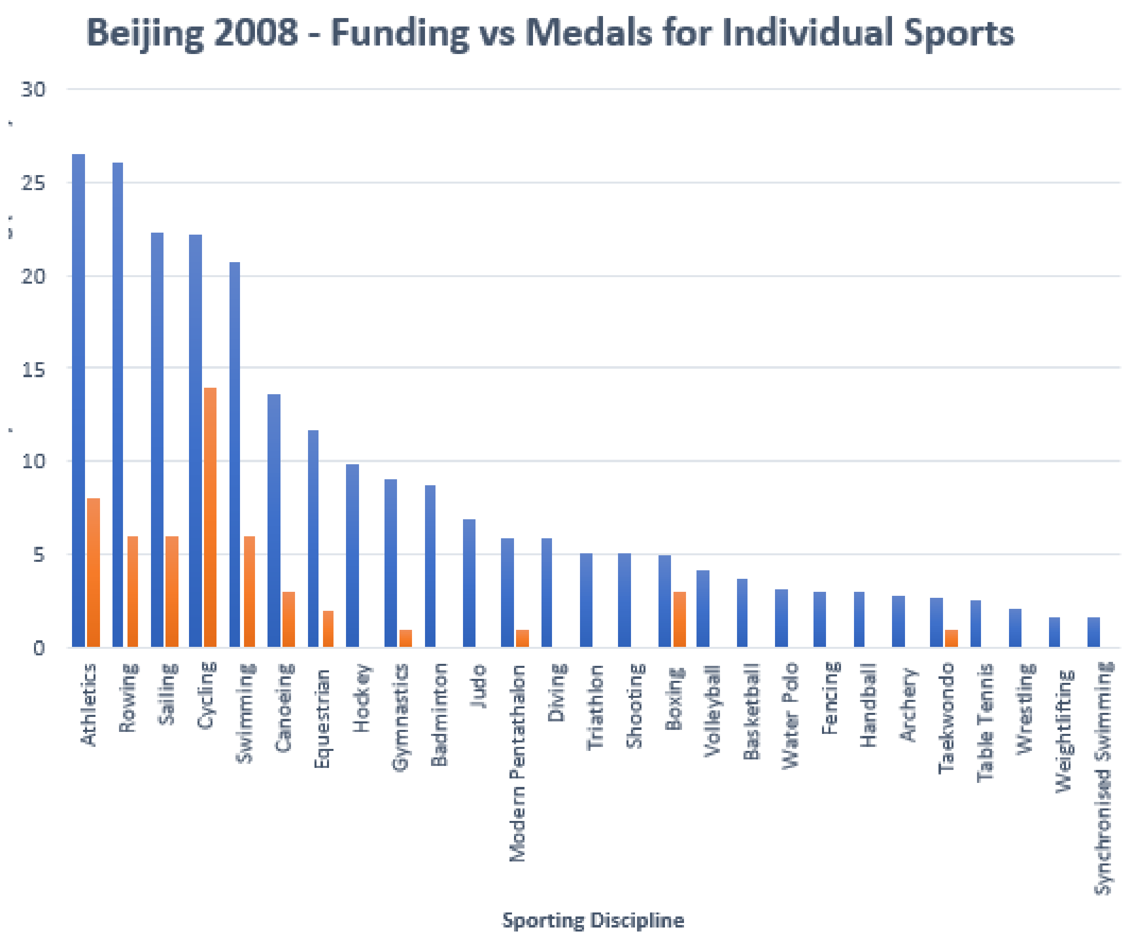

Figure 5

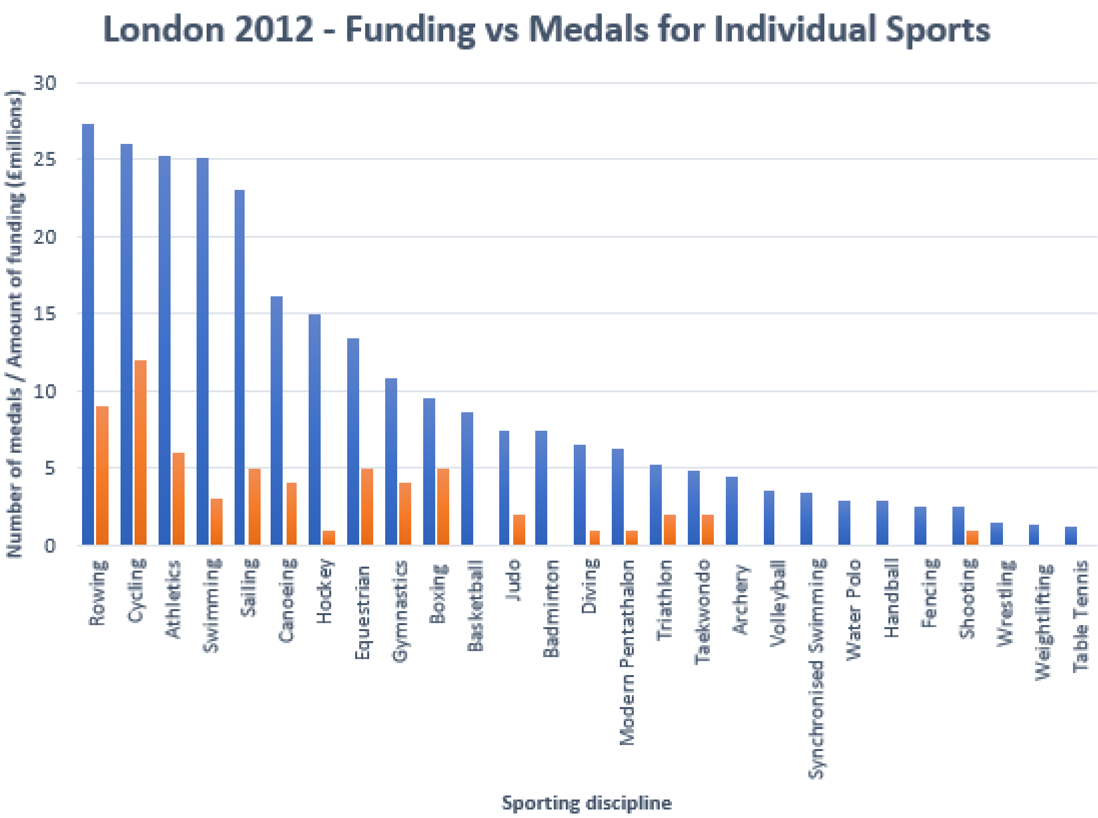

Figure 6

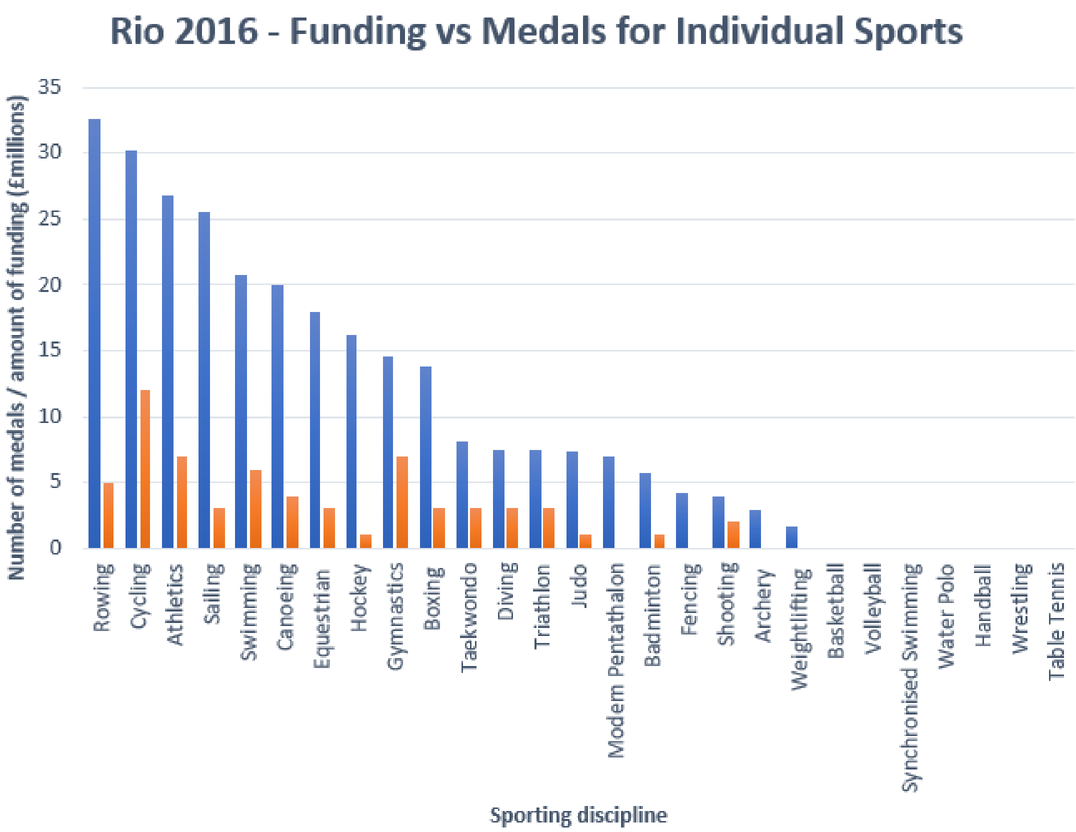

Table 12

Average Cost Per Medal 2008	4.61
Average Cost Per Medal 2012	4.19
Average Cost Per Medal 2016	4.29

Table 13a and 13b

2008 Confidence Interval		
	Funding (£millions)	Total Medals
Mean (x̅)	8.71	1.89
Z Value (Z)	1.96	1.96
Standard Deviation (S)	7.88	3.38
# of Observations (N)	27	27
Margin of Error	2.97	1.27
95% CI Upper Limit	11.68	3.16
95% CI Lower Limit	5.74	0.61

2008

Multiple R	0.85
R Squared	0.73

Table 14a and 14b

2012 Confidence Interval		
	Funding (£millions)	Total Medals
Mean (x̅)	9.78	2.33
Z Value (Z)	1.96	1.96
Standard Deviation (S)	8.55	3.08
# of Observations (N)	27	27
Margin of Error	3.22	1.16
95% CI Upper Limit	13.01	3.49
95% CI Lower Limit	6.56	1.17

2012

Multiple R	0.83
R Squared	0.70

Table 15a and 15b

2016 Confidence Interval		
	Funding (£millions)	Total Medals
Mean (x̅)	10.17	2.37
Z Value (Z)	1.96	1.96
Standard Deviation (S)	10.26	2.96
# of Observations (N)	27	27
Margin of Error	3.87	1.12
95% CI Upper Limit	14.04	3.49
95% CI Lower Limit	6.29	1.25

2016

Multiple R	0.82
R Squared	0.67

Funding vs Medal Return Findings

How funding in previous Olympics compares with the respective medal return will now be analysed. Only Great Britain at the Olympics will be looked at specifically as finding the funding for individual sports proved difficult for other countries. It would also be difficult to compare as different countries participate in different sports. Data was collected for 27 different sports for Team GB (Great Britain) across the 2008, 2012 and 2016 Olympics as before this, many sports received no funding. One may argue that as Great Britain was the host nation in 2012, this may skew the data as the host nation often performs better. However, as will be shown shortly, 2012 follows the same pattern that 2008 and 2016 did and therefore this statement can be dismissed.

Figure 4 and Figure 5 clearly show that most medals were obtained in disciplines with the most funding apart from a few anomalies. In 2008 (Figure 4*)* the 17 least funded disciplines obtained 5 medals in total, compared to the top 10 funded sports receiving 46 medals. 2012 (Figure 5) was very similar where the 17 least funded disciplines received 9 medals (12-13) compared to the top 10 funded sports receiving 54 medals. As one can see, the return of medals is heavily weighted towards the sports with the highest level of funding. Both the 2008 and 2012 Olympics data back up the hypothesis that the greater amount of funding in a sporting discipline, the greater chance of obtaining medals in that same sport.

Looking at Figure 6, it has a very similar outcome to the previous two figures. It is very interesting to see that 7 sports had their funding cut to £0 and none of these 7 disciplines managed to obtain a single medal. It is noticeable that between the sports that still received funding, the spread of medals was a little more even. Although, the 17 least funded sports still only managed to obtain 13 medals compared to the top 10 most funded sports receiving 51 medals between them. This further strengthens the claim that the greater level of investment in a sport, the greater chance of obtaining at least 1 medal.

Boxing across the 3 Olympics will now be looked at specifically. Boxing received 5.005, 9.551 and 13.764 (all in £millions) across the 2008, 2012 and 2016 Olympics respectively. At these Olympics, boxing athletes obtained 3, 5 and 3 medals respectively. This shows that increasing funding from the 2008 Olympics did result in greater medals obtained in 2012, however, funding was further increased for 2016 Olympics, yet only 3 medals were obtained. This explained by the fact that increasing funding does increase the chances of obtaining more medals, however, it does not guarantee that you will get more medals, it simply improves your chances.

Now, looking at Table 12, one can see the average cost of each medal based on the total amount of funding for a given year and the number of medals won that same year. The average cost of each medal does not differ much between the 3 Olympics, which is interesting considering the amount of funding does. This supports the hypothesis that if a country invests more into funding of each sport, it should expect to see more success. This is backed up by the original data as funding increased greatly from 2008 to 2012 (£235 million to £264 million) (12) and then only slightly increased from 2012 to 2016 (£264 million to £274 million) and the number of medals won follows the same trend. Team GB obtained 51 medals in 2008 (13), which jumped to 63 medals in 2012 and then a minimal increase to 64 medals in 2016. Again, this supports the hypothesis. Something that is important to note that is not in the sample is that for the Atlanta Olympics in 1996, Great Britain had a total funding of £5 million (16) where only a single gold medal was won, and they finished 36th in the medal table. Considering only 12 years later, £235 million was invested in funding for the Olympics in 2008 and Great Britain managed a total of 51 medals and finished 4th with 19 gold medals, it is evidently clear that more funding equals more medals.

Next, Table 13a and 13b - Table 15a and 15b will be looked at. The values in the tables fluctuate a little, however, they ultimately give the same results. As the intervals for each variable do not overlap across all 3 CI's, it is clear that the data is statistically significant. This allows the statement that when looking at the 2008 CI, one can say that with 95% confidence, if between £5.7 million and £11.68 million is invested into any one discipline, one can expect a return of between 0.61 and 3.16 medals in that specific sport. Looking at the 2012 CI, one can say that with 95% confidence, if between £6.56 million and £13 million is invested into any one discipline, one can expect a return of between 1.17 and 3.49 medals in that specific sport. Looking at the 2016 CI, one can say that with 95% confidence, if between £6.29 million and £14.04 million is invested into any one discipline, one can expect a return of between 1.25 and 3.49 medals in that specific sport. As slightly more money was invested in 2012 and 2016, the expected return of medals is also slightly greater but other than this, all 3 CI's provide similar results.

Looking at Table 13a and 13b - Table 15a and 15b, the Multiple R values for each set of data ranges from 0.82 to 0.85. As all 3 values are close together, one can conclude that the linear relationship is strong as this value is close to 1. The R Squared values range from 0.67 to 0.73. This suggests that the data is closely fitted to the regression line, which is what one would expect if there were two data sets closely linked.

After analysing all the data, graphs and confidence intervals, it is clear that there is a direct link between the amount of funding a sport receives and the performance of the athletes in that respective discipline. It is obvious from Figure 4 -

Figure 6, that the most heavily funded sports get the most medals and the sports with the least funding get 0 or close to 0 medals. When looking specifically at boxing, the amount of funding increased at each Olympics and the data explains that whilst there is certainly no guarantee, the more money that was invested in boxing, the greater chance there was of obtaining more medals. One can also explicitly state that from the confidence intervals for the sample, how much money would need to be invested to get a specific number of medals. These intervals were consistent across all 3 Olympics and provides guidance on what a country could expect if the same amount of funding was invested into each sporting discipline. All these factors will be considered when suggestions are made on where the greatest value of investment would be for a country looking to make a greater impact at the Olympics.

Hosting an Olympics Data

The benefits and disadvantages of hosting the Olympic Games will now be examined. The cost and profitability of hosting as well as the effect on tourism pre and post hosting the Olympics will be looked at.

Table 16

Location	Year	Profit ($ Billion's)	Cost of Hosting ($ Billion)
Sydney	2000	-2.9	6.9
Athens	2004	-14.5	16
Beijing	2008	≈ 0	45
London	2012	≈ 0	18
Rio de Janeiro	2016	-2	20

Table 17

	Visitor Arrivals (Million's)		
Country	Year Before Hosting Olympics	Year After Hosting Olympics	Change (%)
Australia visitor arrivals	4.460	4.856	8.884
UK visitor arrivals	30.8	32.7	6.169
Greece visitor arrivals	13.969	14.765	5.698
China visitor arrivals	131.873	126.476	-4.093
Rio visitor arrivals	6.306	6.589	4.488

Hosting the Olympics Findings

Looking at Table 16, the cost of hosting an Olympics immediately looks like a huge cost and proposes the question of where the value is in hosting an Olympics. The cost of hosting ranges from $6.9 billion in 2000 to $45 billion in 2008 (17-18). Obviously, these are huge amounts of money and it must be asked as to whether this would be a sensible investment for a less developed country without great economic stability. An example of the risk of this level of investment is the 2004 Olympics in Athens, Greece. Looking at the profit/loss for this Olympics, it had a total net loss of $14.5 billion (from Table 16) which is a substantial amount for any country in the world to lose. Many people believe this had a huge impact on Greece's debt crisis and therefore, should be highly analysed before any country makes the decision to host.

Most of the cost of hosting comes down to investing money into infrastructure of the hosting city to cope with the huge influx of hundreds of thousands of people. This includes but is not constrained to; expanding/improving airports; rail networks; road systems; stadiums; Olympic village and the opening and closing ceremonies. If a country already has the infrastructure to cope with this influx of people, then it is already at an advantage. An example of what can happen if a country does not have good enough infrastructure already was the Olympics in Rio (15) in 2016. There was very little infrastructure already in place so Brazil relied on investing into this infrastructure which can be of benefit for the hosting country if this infrastructure is needed for the people of that country. However, if not executed well, many of the stadiums, rail networks and road systems become derelict like in Rio and many of the facilities built for the Olympics have very limited post-Olympics use. A huge impact of the 2016 Olympic games was that Rio De Janeiro required a $900 million bailout from the federal government to cover the policing costs and as a result of this, they are unable to pay all of its public employees which some say has contributed to a rising crime rate in the city. This is another example of how hosting the Olympics can negatively affect a country's society.

As well as this, the cost of maintaining this infrastructure is huge and therefore there is such a small margin of error if investing in infrastructure is going to turn into a successful Olympics as well as benefitting the country's long-term development. This is clear as China's 'bird nest' stadium built especially for the 2008 Olympics cost $460 million (16) to build and $10 million per year to maintain even though it is hardly used.

Looking at Table 17, one can see the change in tourism for each hosting country the year before and year after the Olympics. All games except the 2008 Olympics in China had an increase in tourism after the Olympics, which at first looks like a substantial benefit to hosting. However, after more research, what seems like progression is just following a stable trend. All these increases in visitors to the country are on par with the increases in previous years and therefore, there is very little change to tourism pre and post Olympics.

The final thing to note is the cost of bidding to host an Olympics. Tokyo spent around $150 million in total to launch their 2016 Olympic bid which failed before securing their bid for the 2020 Olympics with this costing a further $75 million (11), showing that the cost to launch a bid alone to host an Olympics is immense.

Having looked at the advantages and disadvantages of hosting the Olympics, the many risks as well as the wasteful infrastructure created specifically for hosting the games certainly outweigh the rewards. There are certainly some potential benefits of hosting an Olympics, but it is important to note that this success depends highly on many different variables of the hosting country. An Olympics has the potential to be a benefit to the hosts if it already has a good amount of facilities and good enough infrastructure to deal with the demands of the huge influx of people visiting in a short period of time. Unfortunately, most countries in the world do not have these structures already in place and therefore hosting the Olympics would come with a long list of risks that just do not seem worth it, especially with how volatile the worlds finances are at this moment in time with many countries deciding against hosting post bidding to host the Olympics.

Conclusion

For a wealthy country, hosting the Olympics is an appealing option because chances are, they already have a good level of rail networks, road systems and airports in place with perhaps minor improvements to be made to adapt for the event. Even if they do not have advanced infrastructure already in place, a wealthy country would be able to afford to build these important structures. There are still some risks and the country should have a stable economy if deciding to host but also it is imperative that it be planned effectively with post-Olympic usage at the forefront of their ideas as this would benefit and improve the host country further and would be an asset to the population that lives there. In terms of performance success, most of the investment should be on the funding of individual sports. This investment has the greatest value for performance success and therefore should be utilized. Along with funding, mixing this with taking more athletes to the games should be a recipe for medals and therefore, as many athletes as possible should be taken.

For a country with a smaller budget and less economic stability, hosting an Olympics immediately looks like a bad idea. There are so many risks and as discussed already, Brazil and Greece (15) know all too well the implications of hosting an unsuccessful Olympic Games and therefore the paper does not suggest hosting will benefit the country. The most important factor for improving performance at the Olympics is without a doubt increasing funding for individual sports. This investment carries the least risk and the greatest rewards. Even for a wealthier country like Great Britain, they only spend around £250 million (12) on funding for individual sports which when compared with the cost of hosting in the billions, it is a no brainer as it almost guarantees improving the number of medals obtained. The other investment that is not essential but should be considered is the number of athletes taken to each Olympics. Having more athletes at the games would give a greater chance of more medals, especially when mixed with increased funding. However, having more athletes compete means more repetitive outgoings with travel costs, training costs and wages. Therefore, the country should take more athletes than they have at previous Olympics but not so many as to waste money on athletes with no chance of competing against those athletes near the medals.

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