MEGA-SPORTING EVENTS: THE IMPACT ON HOST STOCK MARKETS AND INVESTMENT PROSPECTS

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Abstract

The success of mega-sporting events such as the Summer Olympics and the FIFA World Cup brings pride and a focus to their host nations. This paper aims to find the effects of the announcement and the actual event on the host stock market. It then recommends an investment strategy. The paper finds that the announcement of the Olympics and World Cup creates statistically significant abnormal returns and the actual sporting event has little effect on the stock market. By factoring size of the economy, it is found that smaller economies tend to have larger abnormal returns than bigger economies. We then provide recommendation on investment strategies in order to exploit the significant abnormal return on the day of the World Cup announcement.

Keywords: Mega-sporting Events, Stock Markets, Investment Prospects

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1 Introduction

The FIFA World Cup and the Summer Olympics are both mega-sporting events that draw a worldwide audience as well as an influx of investment to bring the event to that host nation. Historical returns during the period of the FIFA World Cup and Summer Olympics are analysed and used to determine whether investors should invest in the host countries' stock market. This paper would benefit investors by improving their investment strategies and will allow them to exploit the markets during these investment periods.

There are a number of classifications of sporting events. These sporting events can be categorised by their scale into four groups, mega events, hallmark events, special events and community events (Roche, 2000). The FIFA World Cup and Summer Olympic games are classified as mega-events and as such this paper will focus on these two mega events.

Mega-sporting events attract many spectators and media attention to the host nations. There is an inflow of investments, during the preparation and for the duration of the event, that can filter into the stock markets. Therefore, when the host country is announced, a positive reaction is expected on the stock market of the host country. The 2010 FIFA World Cup alone had an average of over two billion viewers watching over 20 minutes of a match (FIFA, 2010). The host cities for events of this magnitude spend billions on infrastructure and stadia to prepare for these events.

There are a limited number of papers that have documented major sporting events and their effects on stock market returns. Research has focused on the association between stock returns and outcomes of specific football games. The majority of studies have focused on the markets' reaction to the host country's announcement as well as the effect of mega events from an economic perspective. However, this paper aims to explore historical returns to evaluate abnormal returns to the stock market due to mega-sporting events.

This paper aims to use past returns of the FIFA World Cups (henceforth referred to as the World Cup) and the Summer Olympics Games (henceforth referred to as the Olympics) to recommend a strategy for investors. An event study will be used to examine abnormal and cumulative abnormal returns over the event period and at the announcement date to determine if historical returns are significant. This will be done using a sample consisting of 14 countries that have hosted the Olympics and World Cups between 1974 and 2014. The paper will test hypotheses regarding economy sizes and abnormal returns in order to make an investment recommendation with reference to specific trading days. Investors would be able to use these findings to improve strategies and increase returns.

The rest of the paper is structured as follows: Section 2 contains the literature review, Section 3 contains research methods, Section 4 outlines the results and Section 5 concludes.

2 Literature review

The inflow of funds and media attention due to mega-sporting events is hypothesised to filter into the stock market. The literature available focuses on the association between stock returns and outcomes of World Cup games; as well as the economic impact these mega events can have on a nation in the short term and the long term (Bohlmann & van Heerden, 2005; 2008; Jones, 2001; Rose & Spiegel, 2009). There are few papers that investigate the effects of the events as a whole on their host stock markets. This review reports on the inconsistencies between several studies regarding returns at various stages of the World Cups and Olympics.

Floros (2010) examined the effect of the 2004 Athens Olympic Games on the Athens Stock Exchange (ASE) using the General Autoregressive Conditional Heteroskedasticity (GARCH) model. The paper found that there was no significant effect on the ASE index. However, there was a positive effect on the price of two of the national sponsors of the event. Floros went on to urge national companies to sponsor major sporting events. Additionally the paper found that there was a positive effect on the prices of the national sponsors' stock when Greek Olympians won medals. Similarly, Samitas, Kenourgios & Zounisc (2008) focused on the sponsors of the 2004 Athens Olympics Games and their returns in the market. The paper uses a different approach in the form of an event study methodology and a bootstrapping technique. A small positive effect was found on both national and international sponsors' stock. Their paper also reveals that the returns were more significant for smaller firms which Floros (2010) does not. This study only looks at the announcement date and the opening ceremony. The paper excludes the effects during the games and when they ended.

Ashton, Gerrard & Hudson (2003) provide evidence of the significant impact of sporting success on the London Stock Exchange by investigating the reaction of the stock market to nationwide sporting success. The paper uses an event study methodology. The London Stock Exchange movements, using the FTSE 100 as a proxy, were tracked based on England's international matches. A regression model was built based on winning or losing matches to explain variation in the FTSE. Amplified commercial importance had been placed on international matches. Stock markets revised their expectations of possible gains which may have resulted from England's national team match results. Additionally, the success of a sports team has a certain "feel good" aspect, thus producing increased confidence about future performances and match results which filters to investors.

Berman, Brooks & Davidson (2000) investigated the impact of the announcement of the 2000 Olympic Games on the stock market. Their study found that there was no significant impact on the overall stock market and only a few industry portfolios exhibited a positive effect as a result of the announcement. In addition, the positive effect was limited to the host state of New South Wales. A similar but more detailed analysis is conducted by Mirman & Sharma (2010). Their paper investigated stock market outcomes of countries which are in competition to host the Olympic Games at the time of the announcement being made. The paper examines indexes for abnormal and regular returns from the announcements between 1990 and 2006. Their results show a substantial negative reaction in the stock market for countries that host the Winter Olympics and a negligible positive reaction for countries that host the Summer Olympics.

Similar findings have been made by Li (2007) which support this fact. Li studied the effect of major sporting events on the stock markets of host countries. By investigating the stock markets reactions to the actual mega event and the news of its announcement, one would expect to see positive movements in the stock market. However, through event study methodology and three abnormal returns models, no announcement date effect is found on returns to the stock market. The paper discovered that various events had performed well in the event year. It was found that 15 out of 27 events studied had annual returns that were significantly different from the mean. Of the 27 events tested, eight have significantly higher annual returns than the mean. However, the paper states that the mega events have no impact in the stock market which is odd, given this evidence.

Li separates the host countries into developed and developing countries, as well as by market capitalisation and does not find any returns of significance in any market. In addition to these findings; the consumer goods, beverages, heavy construction, industrial goods and construction materials sectors performed better than the rest of the market. This would be expected due to the large undertaking of construction and the fact that thousands of people travel to the host nation. The paper emphasises the fact that some countries tend to prosper up to three years after the Summer Olympic Games. There is no definitive research as to how the mega events affect the country thereafter.

Obi, Surujlal & Okubena (2009) discovered that there were steadily increasing returns after the announcement date for South Africa's hosting of the World Cup, opposing the view of Li (2007). The reason for this could be the doubtful consensus over South Africa's ability to host an event of this magnitude. Over time, the change in sentiment is displayed in the increasing stock returns. However, South Africa is one country, and this finding cannot be stated for all potential hosts. The mean adjusted model was used in this event study. The use of monthly returns as opposed to daily returns may have skewed their results when looking at news events such as an announcement date.

An event study on abnormal returns to companies share prices based on black empowerment deals that affect ownership has been established by Ward & Muller (2009). This paper uses a chart to illustrate movements of abnormal and cumulative returns over the event period. The paper uses a bootstrapping technique to find the significance of each day's abnormal return and cumulative abnormal return in the event periods. This is useful when recommending investment strategies.

Most of the literature available uses an event study methodology approach but employs different methods of calculating the effects of the events on the stock markets. The mean adjusted model is the most comprehensive model used. This paper will use an updated data set and in contrast to previous studies will use daily returns. The impact of the World Cup and Olympics on the stock markets as a whole will be investigated. The methods by Ward & Muller (2009) will be adjusted to suit this paper. This paper aims to find abnormal returns and recommend a strategy to exploit these returns in the mega events. The next section describes the research methods, which includes the data used in this paper.

3 Methodology

3.1 Data

The data covers the announcement and event dates for the World Cups and Olympics from 1974 until 2013. The announcement of the host country usually takes place six to seven years prior to the event. Major stock indexes of host countries are used as proxies for market returns as seen in Appendix A. The event is approximately 30 days, although the number of trading days varies by country. Where two countries hosted the event together, the returns calculated from each index were treated as two separate events. The Olympics and World cup data consists of 20 events. Stock market data is limited due to the lack of index level data prior to 1974. The Bloomberg stock market database was used to obtain last price data. Daily returns, as opposed to monthly returns, were used as it is more appropriate given that the event occurs over a month period (Brown & Warner, 1985). The Gross Domestic Product (GDP) in current prices, was taken from the latest World Bank (2014) findings, and used as a proxy for the size of the economy.

3.2 Methods

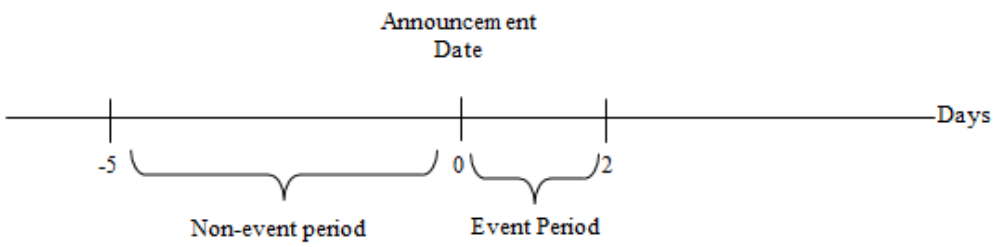
This section focuses on explaining the methods used, such as event studies and abnormal returns calculations. The event study methods used will be explored first, with an explanation of the event timeline and the non-event timeline. The abnormal returns calculation is then introduced with its significance tests. A regression is introduced to find a relationship between GDP and abnormal returns.

The question at hand is whether mega events have a significant effect on the stock markets. The most used method of measuring impacts on the stock market is that of event studies. This paper largely resembles that of a "market efficiency test study", similar to that of Fama, Fisher, Jensen & Roll (1969). These are studies which gauge how effectively the market reflects "new" information. This paper considers the new information to be the announcement date and the tournament dates. From the event study, this paper will determine whether or not abnormal returns are present.

This paper defines a "non-event" period as one in which no event or news is present and is what is used as a basis for the expectations of the market. In this case, the non-event period includes days leading up to an announcement or the days leading up to the actual sporting event. An event period is one in which news takes place. In this case, the event period would be the result of the stock market from the announcement date or the tournament dates. The following section explains these dates in more detail.

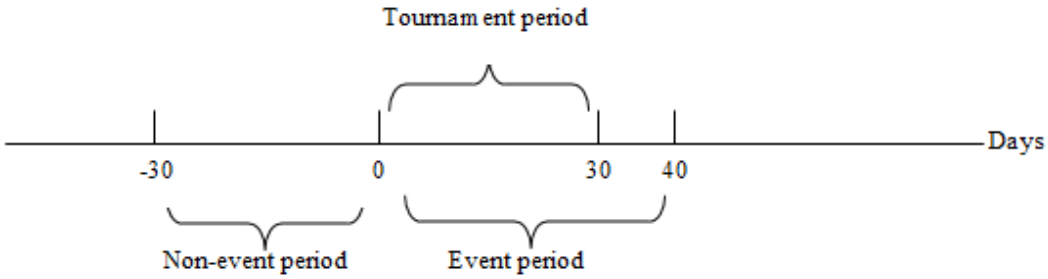
The announcement date is the date in which either the International Olympic Committee (IOC) or FIFA announce who has won the right to host the event. The effect of the announcement on the local stock market will be captured by the days leading up to, and after the announcement date. The non-event window period is captured by the five trading days leading up to the announcement date. This will represent the expected returns of the index. The event window period is between the announcement date and the next two trading days following the announcement. This is done to capture the full effect of the announcement on the index. This method is used for both the Olympics and World Cup announcements.

Figure 1. Announcement date



The effect of the Olympics is captured by the month before the tournament, the period of the tournament and five trading days after the tournament.

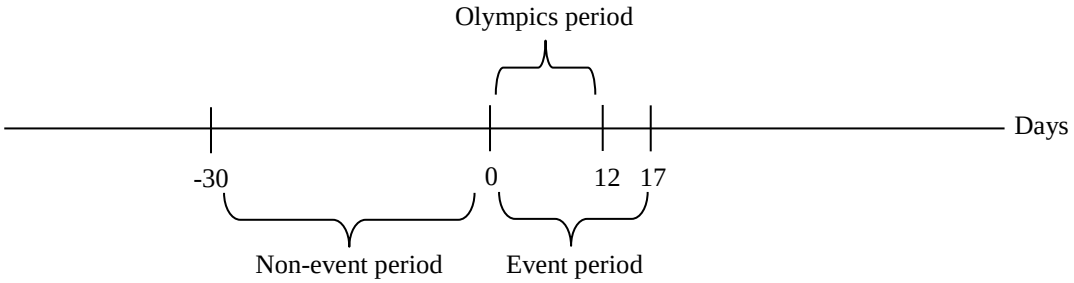
Figure 2. Tournament period



The non-event period is represented by the month before the tournament. This will represent the expected returns of the index. The event window period is the period of the actual World Cup tournament and the ten trading days following the end of the tournament.

The effect of the Olympics is captured by the month before the tournament, the period of the tournament and five trading days after the tournament.

Figure 3. Olympics period



The non-event period is represented by the month before the tournament. This will represent the expected returns of the index. The event window period is the 12 trading days of the Olympics and the five trading days following the end of the Olympics. The non-event periods chosen are used in order to minimise other factors that may skew the results. Therefore these periods are chosen to represent the state of the market returns at that time. This is germane to the abnormal returns calculation.

To calculate abnormal returns, this paper uses a standard method of log returns. Normal returns from non-event periods are used as expected returns in conjunction with the actual returns during the event periods to calculate abnormal returns.

The data collected from Bloomberg is that of daily index values. These have to be altered into returns to the index using the continuously compounded method, which follows (Chen, 2005):

$$R_{i,t} = ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right), \quad (1)$$

where

$R_{i,t}$ is the continuously compounded return on index i for the period t,
$P_{i,t}$ is the index value i for the period t,
$P_{i,t-1}$ is the index value i for the period t-1 and
ln is the natural log function.

Once the index values have been transformed into returns to the indexes, the abnormal returns are calculated. The average of the non-event returns is assumed to be the expected returns. These values are achieved using the methods explained previously. The average is calculated as follows:

$$E(R_i) = \frac{1}{T}\sum_{t=1}^{T} R_{i,t}, \quad (2)$$

where:

$E(R_i)$ is the expected returns of an index i ,
T is the total number of non-event trading days used and
$R_{i,t}$ is the returns of an index i on day t (over non-event trading days).

The abnormal returns are then calculated as the difference between the actual returns during the event periods and the expected returns previously calculated:

$$\mathrm{AR_{i,t}} = \mathrm{R_{i,t}} - \mathrm{E(R_i)}, \quad (3)$$

where:

$\mathrm{AR}_{i,t}$ is the abnormal returns from index i of the event for day t,

$\mathrm{R}_{i,t}$ is the returns of an index i in the event day t and

$\mathrm{E}(\mathrm{R}_i)$ is the expected returns of an index i.

These event periods are both the Olympic and World Cup announcement dates and event tournament or games dates as previously explained.

In order to perform accurate significance tests, the data has to be tested for normality. A histogram of the abnormal returns is inconclusive, but a Shapiro Wilks test indicated with 95% confidence that the results do not follow a normal distribution and therefore have to be standardised. (Appendix B)

In order to standardise the data the mean and standard deviation of the abnormal returns need to be calculated. The average of the abnormal returns is calculated as follows:

$$\mathrm{AAR}_t = \frac{1}{N}\sum_{n=1}^{N} \mathrm{AR}_{i,t}, \quad (4)$$

where:

AAR_t is the average of the abnormal returns from indexes for the period t,

$\mathrm{AR}_{i,t}$ is the abnormal returns from index i of the event for day t and

N is the number of abnormal returns calculated.

These values along with the standard deviation are then used to standardise the abnormal returns:

$$\mathrm{SAR}_{i,t} = \frac{\mathrm{AR}_{i,t}}{\sigma}, \quad (5)$$

where:

$\mathrm{SAR}_{i,t}$ is the standardised abnormal returns for index n on day t,

$\mathrm{AR}_{i,t}$ is the abnormal returns from index i of the event for day t,

AAR_t is the average of the abnormal returns from indexes and

σ is the standard deviation of the abnormal returns from n indexes.

Cumulative abnormal returns can be used as a more comprehensive representation of abnormal returns. It cumulates the effect of the days following the event period to include the effects that roll over into the next few days. This is useful to see the entire effect of the event over a period.

The cumulative abnormal returns calculation is shown as follows:

$$\mathrm{CAR}_t = \sum_{t=t_1}^{t_2} \mathrm{AR}_t, \quad (6)$$

where:

CAR_t is the cumulative abnormal returns from indexes over period t1 to t2 and

AR_t is the abnormal returns from indexes.

A student's t-test is performed to test the significance of the abnormal returns across the event periods. These indicate significance to the announcement period which is explained in more detail under Empirical Results and Discussion. Daily abnormal returns are analysed by testing their significance over the period of the announcement. In order to a make recommendation, a chart (Figure 1) is used to illustrate the movements of abnormal and cumulative abnormal returns. These daily returns are tested for significance. This method has its limitations in that it does not take other news events into consideration, which may skew the data at hand.

Past papers such as Li (2007) have tried to explain the phenomenon of abnormal returns to certain countries by level of development but found no significant results. However, this paper uses a related method to explain abnormal returns. Research has shown that a country's degree of development does not factor in the effect of a mega event. This paper hypothesises that countries that have similar sized economies should experience similar abnormal returns. By using log of Gross Domestic Product (GDP) as a proxy for the size of the economy, an Ordinary Least Squares (OLS) regression is created to investigate whether the size of an economy has an effect on abnormal returns. The following equation attempts to test the hypothesis:

$$\mathrm{AAR}_t = \beta_0 + \beta_1 \mathrm{GDP} + \varepsilon_i, \quad (7)$$

where:

AAR_t is the average abnormal returns from indexes over the three day announcement period,

GDP is the log of GDP for the winning host country in the year of the announcement,

β_0 the intercept of the regression output,

β_1 is the coefficient of the log GDP variable and

ε_i is the error term for the regression output.

This regression suggests that the size of a country's economy is negatively related to abnormal returns. However, this relationship could be said for any year, regardless of whether there has been an

announcement or not. In order to rectify this, an indicator variable is introduced. This will indicate whether a year's abnormal returns appeared in an announcement year or not. The regression equation follows:

$$R = \beta_0 + \beta_1 \text{Indicator} + \beta_2 \text{GDP} + \varepsilon_i, \quad (8)$$

where:

R is the average abnormal returns from indexes over the three day announcement period, and the average returns from the year before,

Indicator is a dummy variable indicating whether the returns occur in an announcement year or not,

GDP is the GDP for the winning host country in the year of the announcement of the year before,

β_0 the intercept of the regression output,

β_1 is the coefficient of the indicator variable,

β_2 is the coefficient of the log GDP variable and

ε_i is the error term for the regression output.

This regression does show the significance of the announcement year (through the indicator variable) and the size of a country's GDP. However, these values are not comparable. An abnormal return over three days cannot be accurately compared to an average for the year before.

To correct for this, a new equation is developed. The dependent variable is the three day abnormal returns for the announcement period and a comparable three day period the year before. This is to provide a more comparable analysis. An announcement indicator variable will be used to see if the announcement has a significant effect on the returns. The regression equation follows:

$$\text{AAR} = \beta_0 + \beta_1 \text{Indicator} + \varepsilon_i, \quad (9)$$

where:

AAR is the average abnormal returns from indexes over the three day announcement period, and a comparable period the year before,

Indicator is a dummy variable indicating whether the returns occur in an announcement year or not,

β_0 the intercept of the regression output,

β_1 is the coefficient of the indicator variable and

ε_i is the error term for the regression output.

Given that this factor is significant, the relationship found in equation (1) between GDP and abnormal returns holds true. The Empirical Results and Discussion section that follows, discusses the implications of this.

4 Results

In this section, the results of the event study will be analysed and discussed. The descriptive statistics can be found in Appendix C. The abnormal returns are separated by announcement date and sport event. On average the abnormal returns at the announcement date exceeds the abnormal returns over the sporting event period. The abnormal returns at the announcement date for the World Cup and the Olympics are analogous. However, in terms of the sporting event the Olympics produces slightly larger abnormal returns.

On average, the standard deviations for each mega event were at least similar or larger than the mean of the abnormal returns. The announcement that Greece would be hosting the 2004 Olympics resulted in the highest average abnormal return. This could be due to it marking the return of the Olympics to the city where it started. The announcement that South Africa would be hosting the 2010 World Cup resulted in the second highest average abnormal return. A possible reason for this could be that this was the first mega sporting event to be hosted on the African continent. The average abnormal return at the announcement date for the Brazil World Cup was the most negative. This is interesting because there was a large amount of doubt as whether Brazil would be able to stage a major sporting event due their lack of infrastructure (Downie, 2007).

The cumulative abnormal returns (Appendix D) appear to be mostly positive. The returns over the sporting event period ranges from approximately -14% to 23% whilst the returns over the announcement period ranges from approximately -3% to 9%. The difference in the size between the ranges is as a result of the sporting event period being longer than the announcement period. The next section will look at the statistical significance of the abnormal returns and cumulative abnormal returns.

Table 1. Student's t-test on the abnormal returns

	Test Statistic
All Abnormal Returns	2.2352**
Announcment	2.2835**
Sport Event	1.3313

*Note: * significant at 1% level, **significant at 5% level, ***significant at 10% level*

From Table 1, it can be seen that the abnormal returns are significantly different from zero at the 5% level of significance. Interestingly, when the abnormal returns were separated by announcement date and sport event, it was found that only the abnormal returns associated with the announcement date was significantly different from zero at the 5% level.

Table 2. Sign test on abnormal returns

		One-sided tests	
		> 0	< 0
P- values	Test 1: A=0	0.0063**	0.9952
	Test 2: S=0	0.0407	0.9675
	Test 3: ANN=0	0.0099**	0.9955

Note: A is sport event and announcement, S is sport event and ANN is announcement
** significant at 1% level, **significant at 5% level, ***significant at 10% level*

The sign test illustrates whether the abnormal returns were significantly positive or negative. The announcement date has positive abnormal returns at the one-tailed 2.5% level of significance. Together, the sporting event and announcement date have significantly positive abnormal returns. However, this could be due to the strength of the announcement dates' significance.

The sign test was then used to test whether the cumulative abnormal returns were significantly different from zero with the results displayed in Table 3. It was found that the cumulative abnormal returns across all events were not significantly different from zero.

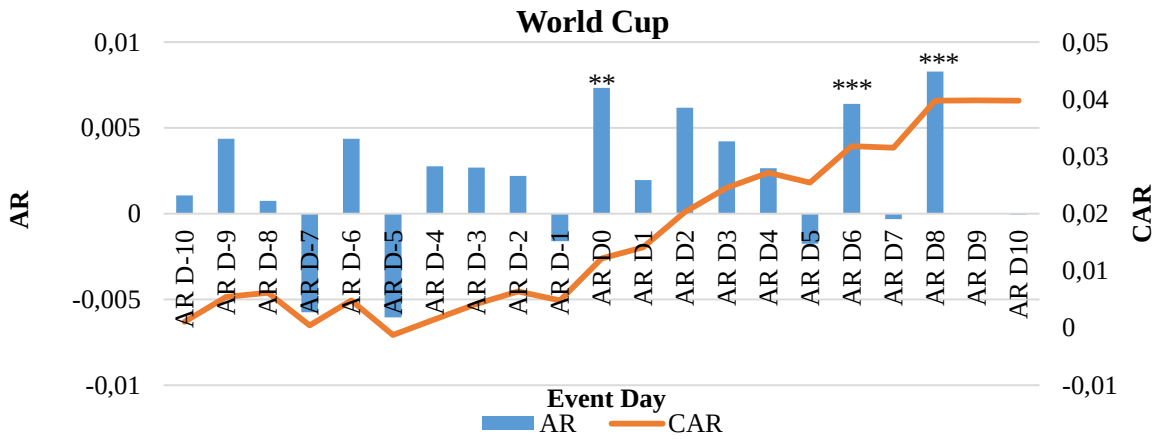
Table 3. Sign test on cumulative abnormal returns

		One-sided tests	
		> 0	< 0
P- values	Test 1: A=0	0.1147	0.9393
	Test 2: S=0	0.2272	0.8949
	Test 3: ANN=0	0.2403	0.8811

Note: A is sport event and announcement, S is sport event and ANN is announcement
** significant at 1% level, **significant at 5% level, ***significant at 10% level*

This paper uses a method similar to that of Ward and Muller (2010) to illustrate how the abnormal and cumulative abnormal returns changed over the period surrounding the announcement. A t-test was used to test whether the returns for each day were significantly different from zero. The significance of daily abnormal returns is advantageous in that it assists in the investment decision.

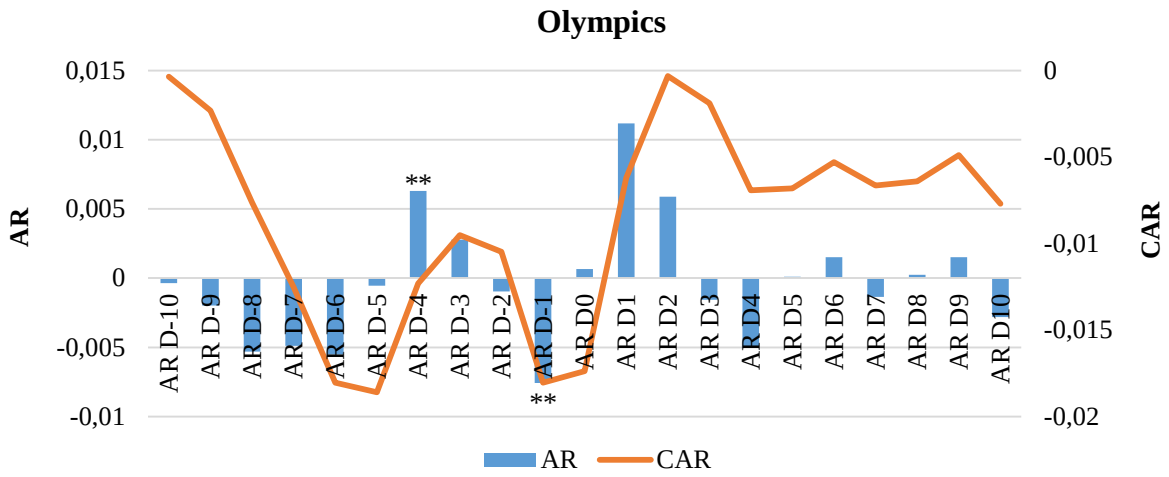
Figure 4. Abnormal and cumulative returns for the world cup events over the announcement period



Note: * significant at 1% level, **significant at 5% level, ***significant at 10% level

Figure 4 shows that for the World Cup, the returns are highest on day zero (D0) and day eight (D8) on average. Only the announcement day (D0), day six (D6) and day eight (D8) were significantly different from zero. Cumulative abnormal returns is shown to increase from the announcement date until day four.

Figure 5. Abnormal and cumulative returns for the Olympics over the announcement period



Note: * significant at 1% level, **significant at 5% level, ***significant at 10% level

Figure 5 shows that the highest abnormal return occurs on day one. The day before (D-1) and four days before (D-4) are significantly different from zero. The cumulative abnormal returns are negative throughout the period. For a chart that combines all major sport events see Appendix E.

Given that the positive abnormal returns around the announcement date are statistically significant, this paper recommends that investors invest over the announcement date period. It is never certain which country or city will win the bid; however, there are always favourites in the race leading up to the announcement.

It was hypothesised that the size of the economy could be a factor in the size of the abnormal returns. In order to test this, the natural logarithm of GDP for each host country was regressed on the average abnormal returns of each host country.

Table 4. The relationship between GDP and abnormal returns at the announcement

Number of obs	18.0000
F(1, 14)	7.7300
Prob > F	0.0134
R-squared	0.3242
Root MSE	0.0085

Abnormal returns	Coefficient	Standard Error	t statistic	P>t	95% Confidence Interval	
ln of GDP	-0.0041	0.0015	-2.7800	0.0130	-0.0073	0.0010
Constant	0.1203	0.0417	2.8800	0.0110	-0.0319	0.2087

From the regression in Table 4, it can be seen that there is an inverse relationship between the size of the economy and the abnormal returns. One explanation for this could be that smaller economies that are selected as hosts often see huge inflows of funds in the form of an increase in infrastructure. Bigger and already developed countries tend have the infrastructure in place. However, it could be that the relationship between abnormal returns and GDP holds true regardless of the announcement date. The indicator variable that was added to the regression equation (2) to counters this problem. (Appendix F)

GDP and the announcement indicator were then regressed on both abnormal and expected returns. However, this was not comparable as discussed in Section 3.2. After regressing comparable abnormal return data on the indicator alone as in equation (3) the following results is found.

Table 5. Testing if the announcement year is significant

Number of obs	34.0000
F(1,32)	4.0700
Prob > F	0.0522
R-squared	0.1128
Adj R-squared	0.0851
Root MSE	0.0143

Abnormal Returns	Coefficient	Standard Error	t statistic	P > |t|	95% confidence interval	
Indicator	0.0099	0.0049	2.0200	0.0520	-0.0001	0.0199
Constant	-0.0032	0.0035	-0.9200	0.3640	-0.0103	0.0039

From Table 5 it can be seen that the announcement year is significantly different from the non-event year at the 5.2% level. Given that the announcement year is significantly different, it can be said that the inverse relationship between GDP and abnormal returns is true for the announcement year.

The results are restricted in that we were unable to produce a model that could be used to predict future abnormal returns. This could be an area for future research. Whilst our sample of data is larger than that of previous studies, it would be more advantageous to have a bigger sample.

This paper recommends that investors ignore the actual sporting event as the returns are statistically insignificant, and focus on the announcement date instead. Given that indices are not investible, a recommendation is to use exchange-traded funds (ETF) that track the all-share index of that country as shown in Appendix G. It is evident that the World Cup announcement day (D0) has the most significant abnormal return. If investors have an appetite for risk, they could pick a country to invest in based on research and invest the day before the announcement to gain the significant abnormal return on day zero (D0). It is also suggested that for the Olympics announcement, investors invest for the period between the day before the announcement (D-1) and two days after the announcement to benefit from the cumulative abnormal returns over that period. It is advisable to invest in relatively smaller economies to benefit from the, on average, larger abnormal return.

5 Conclusion

Research shows that mega-events can be beneficial to economies and event sponsors. It does not tell us how these events may affect investors in the host markets. This paper investigates the effect of the mega-events on the local stock markets and finds that the actual sporting event provides no abnormal returns to the market. However, the announcement brings about statistically significant abnormal returns to the market. It is also clear in this paper's investigation, that there is an inverse relationship between the size of a country's economy (GDP as a proxy) and the abnormal returns received due to the announcement date. This means that the smaller the country's economy, the larger its returns to the market for a mega-event announcement. Due to this inverse relationship, a recommendation to invest in all-share ETFs of smaller countries is given. It is advised to invest the day before (D-1) the World Cup announcement to gain the significant abnormal return on day zero (D0) and from the day before (D-1) the announcement of the Olympics to day two (D2).

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Appendix A

Table A.1. Indices used as proxies for market returns

Host Country	Index	Ticker
Australia	FTSE All-Share Index	ASX
Brazil	Ibovespa Brasil Sao Paulo Stock Exchange Ind	IBOV
China	Shanghai Stock Exchange Composite Index	SHCOMP
England	FTSE 100 Index	UKX
France	CAC 40 Index	CAC
Germany	Deutsche Boerse AG German Stock Index	DAX
Greece	Athens Stock Exchange General Index	ASE
Japan	Nikkei 225	NKY
Qatar	Qatar Exchange Index	DSM
Russia	Russian Trading System Cash Index	RTSI$
South Africa	FTSE/JSE Africa All Share Index	JALSH
South Korea	Korea Stock Exchange KOSPI Index	KOSPI
Spain	IBEX 35 Index	IBEX
United States of America	Standard and Poor's 500 Index	SPX

Appendix B

Figure B.1. Histogram testing normality of the Abnormal returns

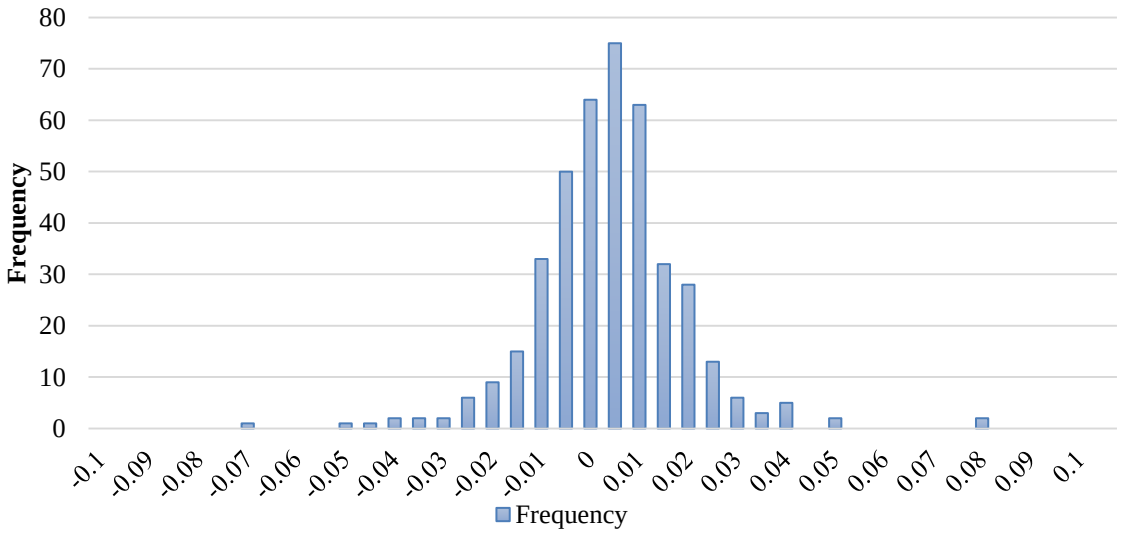


Table B.1. Shapiro-Wilks test

Variable	Observations	W	V	Z	Prob>z
Abnormal returns	415.0000	0.9438	6.0060	6.6090	0.0000

Appendix C

Table C.1. Descriptive Statistics of abnormal returns for the Olympics

	Announcements					Sporting Event				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Japan	3	0.0064	0.0123	-0.0068	0.0176	-	-	-	-	-
Brazil	3	0.0106	0.0073	0.0034	0.0180	-	-	-	-	-
England	3	-0.0012	0.0146	-0.0176	0.0103	17	0.0039	0.0083	-0.0090	0.0232
China	3	-0.0023	0.0028	-0.0055	-0.0004	17	-0.0058	0.0312	-0.0513	0.0770
Greece	3	0.0324	0.0396	0.0038	0.0776	17	0.0016	0.0076	-0.0135	0.0126
Australia	3	0.0009	0.0034	-0.0020	0.0046	17	-0.0026	0.0090	-0.0185	0.0093
USA 1996	3	-0.0042	0.0095	-0.0139	0.0050	17	0.0061	0.0083	-0.0069	0.0231
Spain	-	-	-	-	-	16	0.0096	0.0120	-0.0114	0.0356
South Korea	3	0.0198	0.0299	-0.0147	0.0380	16	0.0013	0.0107	-0.0124	0.0320
USA 1984	3	-0.0092	0.0103	-0.0174	0.0023	16	0.0047	0.0122	-0.0106	0.0265

Table C.2. Descriptive Statistics of abnormal returns for the World Cup

	Announcements					Sporting Event				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Qatar	3	0.0165	0.0165	0.0067	0.0356	-	-	-	-	-
Russia	3	0.0114	0.0034	0.0088	0.0153	-	-	-	-	-
Brazil	3	-0.0128	0.0190	-0.0249	0.0091	31	0.0005	0.0096	-0.0165	0.0238
South Africa	3	0.0236	0.0211	0.0066	0.0473	31	0.0034	0.0105	-0.0201	0.0238
Germany	3	0.0079	0.0083	0.0012	0.0171	33	0.0070	0.0132	-0.0138	0.0320
South Korea	3	0.0038	0.0099	-0.0076	0.0097	30	0.0008	0.0238	-0.0715	0.0471
Japan	3	-0.0019	0.0150	-0.0184	0.0109	32	-0.0044	0.0181	-0.0415	0.0340
France	3	-0.0035	0.0079	-0.0109	0.0049	34	-0.0038	0.0116	-0.0272	0.0171
USA	3	0.0015	0.0143	-0.0124	0.0162	31	-0.0008	0.0059	-0.0161	0.0096
West Germany	-	-	-	-	-	26	-0.0005	0.0096	-0.0276	0.0173

Appendix D

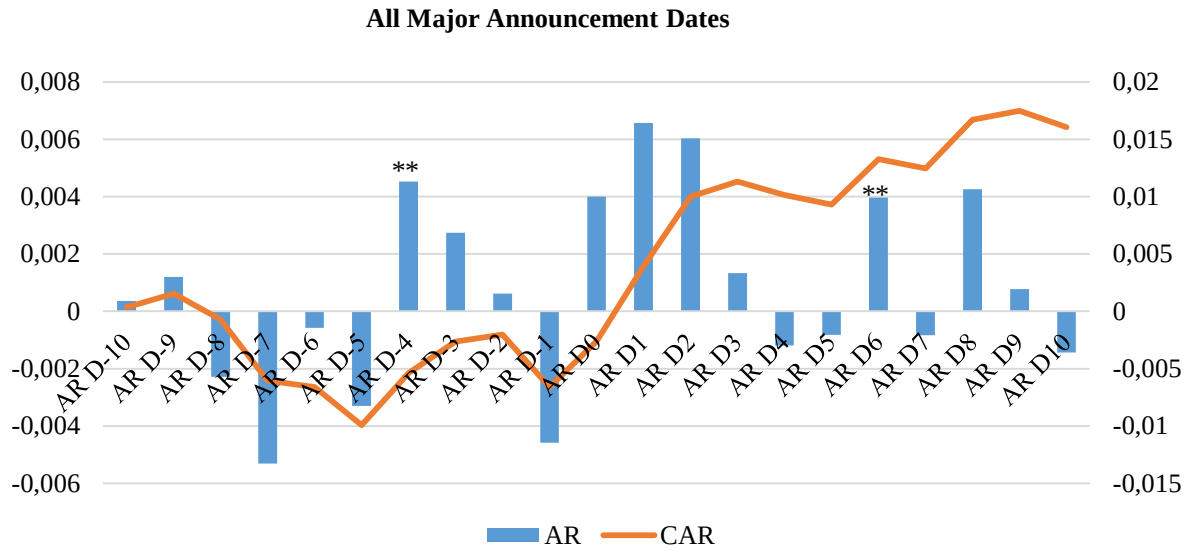
Table D.1. Cumulative Abnormal Returns for the Sporting Event and Announcement

Sporting Event	CAR
Germany '74	-0.0133
USA '84	0.0758
South Korea '88	0.0212
Spain '92	0.1542
USA '94	-0.0251
USA '96	0.1033
France '98	-0.1276
Australia '00	-0.0439
Japan '02	-0.1412
South Korea '02	0.0236
Greece '04	0.0265
Germany '06	0.2308
China '08	-0.0994
South Africa '10	0.1048
England '12	0.067
Brazil '14	0.0164

Announcement	CAR
USA '84	-0.0277
South Korea '88	0.0594
USA '94	0.0044
USA '96	-0.0127
France '98	-0.0105
Australia '00	0.0028
Japan '02	-0.0058
South Korea '02	0.0114
Greece '04	0.0972
Germany '06	0.0236
China '08	-0.0069
South Africa '10	0.0708
England '12	-0.0036
Brazil '14	-0.0383
Brazil '16	0.0318
Russia '18	0.0342
Japan '20	0.0191
Qatar '22	0.0495

Appendix E

Figure E.1. The abnormal and cumulative abnormal returns for all major sporting events



Appendix F

Table F.1. Regression with indicator and GDP (Equation 2)

Number of obs	34.0000
F(1,32)	6.1500
Prob > F	0.0056
R-squared	0.3833
Root MSE	0.0069

Abnormal Returns	Coefficient	Standard Error	t statistic	P > |t|	95% confidence interval	
GDP	-0.0028	0.0010	-2.9300	0.0060	-0.0048	-0.0009
Indicator	0.0070	0.0024	2.9300	0.0060	0.0021	0.0118
Constant	0.0772	0.0265	2.9100	0.0070	0.0231	0.1312

Appendix G

Table G.1. List of ETFs that track major all share indices

Host Country	Index	ETF
Australia	FTSE All-Share Index	iShares MSCI Australia Index Fund
Brazil	Ibovespa Brasil Sao Paulo Stock Exchange Index	iShares MSCI Brazil Index Fund
China	Shanghai Stock Exchange Composite Index	iShares FTSE/Xinhua China 25 Index Fund
England	FTSE 100 Index	iShares MSCI United Kingdom Index Fund
France	CAC 40 Index	Lyxor UCITS ETF CAC 40 DR
Germany	Deutsche Boerse AG German Stock Index	iShares MSCI Germany Index Fund
Greece	Athens Stock Exchange General Index	Global X FTSE Greece 20 ETF
Japan	Nikkei 225	MAXIS Nikkei 225 Index ETF
Qatar	Qatar Exchange Index	iShares MSCI Qatar Capped ETF
Russia	Russian Trading System Cash Index	MSCI Russia Capped Index Fund
South Africa	FTSE/JSE Africa All Share Index	iShares MSCI South Africa Index Fund
South Korea	Korea Stock Exchange KOSPI Index	Horizons Korea KOSPI 200 Exchange Traded Fund
Spain	IBEX 35 Index	db x-trackers IBEX 35 Index UCITS ETF
United States of America	Standard and Poor's 500 Index	SPDR S&P 500 ETF