The Impact of Mega-Sporting Events on Stock Markets

Xi Li

A dissertation submitted to

Auckland University of Technology

in partial fulfilment of the requirements for the degree of

Master of Business (MBus)

2007

School of Business

Primary Supervisor: Dr. Jedrzej Bialkowski

Table of Contents

List of Tables

List of Figures

Attestation of Authorship

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."

Signature:

Date:

Acknowledgements

After four months work, my dissertation is finally finished. I would like to take this opportunity to acknowledge many people, with gratitude for the generous help that I have received. Without their support and encouragement, this dissertation would not be completed.

Firstly, I am so appreciative of my primary supervisor Dr. Jedrzej Bialkowski for his guidance and assistance during the working process of my dissertation. Without his invaluable ideas, suggestion and support, I could not finish this dissertation.

Secondly, a great thanks to Marianne Todd for her editing and proofreading.

I would like to extend my thanks to all my lovely friends, for their encouragement, suggestions and friendship.

Last but not least, I would like to express my sincere thanks for the support of all my family members, without their great encouragement, I could not have achieved this result.

Abstract

This dissertation examines the impact of four major international mega-sporting events, namely Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships on stock markets of host countries. In particular, this dissertation uses an event study methodology to investigate the stock market reaction on events defined as announcement date, beginning date and the event end date. The empirical results indicate that there is no announcement date effect on whole stock markets. Despite splitting the host countries based on the sizes of market capitalization and the age of stock markets, the impact remains insignificant. Moreover, there is no beginning date effect on whole stock markets. However, there is a significant negative effect after the end date of mega-sporting events.

In addition, this dissertation analyses the performance of stock market in host country in mega-sporting event year as well as the impact of mega-sporting event on emerging stock market is a subject of detailed analysis.

The study of annual returns showed that the stock market in four countries performed extremely well in the year when they hosted a particular event: Greece regarding the 2004 Summer Olympic Games, South Korea regarding the 2002 FIFA World Cup, Portugal regarding the 2004 European Football Championships and United States regarding the 1996 Summer Olympic Games. Finally, the sector analysis for emerging markets shows that sectors like the Consumer Goods sector - especially the Beverages,

Brewers and Soft Drinks sub sectors - and the Industrial sector - especially the Heavy Construction, Industrial Goods and Construction Material sub sectors - performed better than the rest of market.

1 Chapter 1 Introduction

Looking back to the recent mega-sporting events, with the unforgettable memories of the vibrant and brilliant competition scenes, highlights an important topic and the need to be concerned about the investment opportunities for the country hosting the event. This dissertation aims to investigate the impact of stock market reaction to the countries hosting four major international mega-sporting events: Summer Olympic Games, Winter Olympic Games, the FIFA World Cup and the European Football Championship. In this chapter, firstly the definition of mega-events will be introduced and why the four international events mentioned above qualify as mega-sporting events. Next, the motivation of this dissertation will be presented, followed by the structure of this dissertation.

1.1 Definition of mega-events

Numerous existing works in the literature have defined mega-events based on the event size, the reputation, the economic impact, tourism impact, the number of game audiences. In the 37th Congress of the International Association of Scientific Experts in Tourism conference report, Witt (1988, p76) concluded that a mega-event can be broadly defined in terms of:

1. "volume, e.g. a certain minimum number of visitors attracted over a period of time."
2. "value, e.g. a certain minimum amount of revenue generated in a locality over a period of time or minimum capital cost of constructing facilities."

3. "in terms of psychological effect, e.g. the worldwide reputation of the event generates 'must see' feelings in potential tourists."

Greene (2003, p.164) concluded that *"mega-events, also referred to as 'hallmark' or landmark' events, are large-scale events intended to renew investment in host cities, usually in the tourism sector, by projecting a positive image of the city."* Moreover, Greene (2003, p.164) also indicated "*mega-events can be distinguished from smaller events – such as routine conferences, celebrations, or sporting events – by the tremendous amount of resources that go into their implementation and the physical legacies for host cities*." Roche (1994, p.1) stated "*mega-events with large scale leisure and tourism events such as Olympic Games and World Fairs are short-term events with long-term consequences for the cities that stage them*." Baade and Matheson (2002) stated that with millions of venue attendance, and billions of television attendance to viewing the game, the World Cup and Olympic Games without question qualify as mega-events.

Therefore, based on a number of various definitions, mega-sporting events generally refer to the growth of tourism, wide media coverage, the size of the event and how the event assists the host nation in winning a good reputation and gain tremendous economic impacts. International events such as the Olympic Games, FIFA World Cups and European Football Championships without doubt qualify as mega-sporting events.

In recent decades, there has been increased competition among countries to host mega-sporting events. It is a proven fact that successfully organising major mega-sports

events will bring tremendous tangible and intangible value for the host city and the state. Therefore, there are many countries (or cities), and more recently developing nations such as South Korea, Mexico, China and South Africa, that are entering the bidding competition for the major international sports events in order to utilise them as a opportunities to improve national or regional economics.

1.2 Motivation for the study

Mega-sports events have a reasonable history of correlation with financial markets. One of the major events in the sporting industry, the Olympics, strongly affects stock market activity in the host country. Table A1 shows the stock market indices performance in the year prior to the games among the six most recent Olympics hosts. We can see that the local stock index of the host country has risen 36 percent on average in the 12 months before the Games year, with the most significant impact on the 1988 Games of the XXIV Olympiad hosted by Seoul, South Korea. The South Korean local stock index, KOSPI increased by 90 percent in the year prior to the Olympic Games starting (China Daily, 2007).

Table A1: *Stock market performance in the year prior to the Olympic Games among the six most recent Summer Olympic Games*

Year	Host country	Index	Impact (%)
1984	USA	S&P 500	↑ 17
1988	South Korea	KOSPI	↑ 90
1992	Spain	IBEX	↑ 33
1996	USA	S&P 500	↑ 33
2000	Australia	ASX	↑ 14
2004	Greece	ASE	↑ 29
Average			**↑ 36**

Source: Olympics to keep stock market boom alive. (2007, January 12). Retrieved September 10, 2007, from China Daily Website: http://www.chinadaily.com.cn/2008/2007-01/12/content_782050.htm[1]

Moreover, the mega-sporting events impact financial stock markets in various ways. It is important to note that any major sporting event such as the Olympic Games, the FIFA World Cup and the European Championships, create a surge in patriotism. Such feelings are not visible in domestic games where victory of one team is one fan's joy and another's gloom and thus the overall mood in the country may not be the same. If however, the overall mood in the country is elated, it is often reflected in investment decisions and in returns in the stock markets. Research by Edmans, García and Norli (2007) indicates that with losses in critical soccer matches, elimination from the World Cup tournament is linked with a next-day return on the national stock market index that is 38 basis points lower than average. Similar losses are also seen in sports like cricket, rugby and basketball, but the impact is minor in size.

The decision of where a major sporting tournament will take place also holds significance. In 2006, the shock announcement by the world soccer governing body,

[1] Appendix A of Table A2 shows the detailed calculation results of local stock market index returns one year before game start among four recent mega-sporting events, which were Summer Olympic Games, Winter Olympic Games, FIFA World Cup and European Football Championships, respectively.

FIFA, declaring Germany as the hosts of the tournament for the 2006 FIFA World Cup resulted in the nose dive and slump of South African stocks (Sports Business, 2001). This was primarily because the majority of South Africans believed that their country would be awarded the honour of hosting the World Cup. The stock market reflected the general gloom in the country. Subsequently, stocks in the building and industrial sector, construction companies and beer companies fell.

Furthermore, there is a limited number of works in the literature that focus on analysis of the stock market reaction to the announcement of mega-sporting events by using event study methodology (Berman, Brooks & Davidson, 2000; Martins & Serra, 2007; Veraros, Kasimati & Dawson, 2004). The expectation is that the announcement of the Olympics mega-event will create a positive reaction on the hosting country's economy and in the area of stock exchange. In turn, the losing country should experience a negative consequence.

Previous studies mainly focused on one or a few particular events and highlight a lack of existing research on analysis of the announcement date impacts on the stock market, including a dearth of existing research analysing the event beginning or end date impact on the stock market. This dissertation uses a large number of mega-sporting events to explore the cross-sectional impact of stock market reactions to the announcement date, event beginning and end date of such mega-sporting events of hosting countries. Moreover, this dissertation uses annual return performances to examine the best trading strategy based on emerging markets sector levels.

1.3 Outline of the dissertation

The structure of this dissertation is organised as follows. Chapter two will describe the economic activities and impacts of major mega-sporting events. Chapter three contains a literature review of the types of Efficient Market Hypothesis, the history of event study and the impact of event study on stock market reaction. Chapter four describes the data set and the sample selection procedure. Chapter five describes the event study methodology used to measure the whole stock market reactions on the selected mega-sporting events announcement, and start/end date. The research hypotheses will also be explored in Chapter five. The results and main findings for event study will be presented and discussed in Chapter six. Chapter seven will analyse the annual returns observed on each specific mega-sporting event. Chapter eight examines the return performance on emerging stock market sector level. In Chapter nine, the summary and dissertation conclusions will be presented.

2 Chapter 2 Economic Impacts of Recent Mega-Sporting Events

2.1 Economic activities

During the past few years an occurrence of any sporting event has added towards the uplift of the country's economy. Sporting events encourage investments into various sectors of the economy including construction, hotels, telecommunications, hospitality, food chains and tourism. Thus, one can expect that at the advent of any mega-sporting competition there is an increase in economic activity in the host country.

From a historical point of view, there is an "Olympic prosperity" which indeed impacts the hosting country's economy. The simple conclusion is that the "Olympic prosperity" normally has three phases: pre-event phase, event year phase and post-event phase. During the pre-event phase, the period after the International Olympic Committee (IOC) announces the country (or city) to host Olympic Games and six or seven years before the event actually starts, stadiums are built or renovated, roads are paved, investment is made in horticulture and in general, a lot of hustle and bustle takes place. This way the major beneficiaries include developers, building materials suppliers, and engineering and construction companies. Sportswear and sporting equipment vendors enjoy amplified sales. During the event-year phase, weeks prior to the event, air fares shoot up, hotel occupancy rises, and restaurants get more business; in some cases, even mobile phone companies enjoy greater sales, which means that the national economic growth comes more from consumption expenditure, compared to that from investments. In the

post-event phase, which is normally two or three years after the event, the hosting country's (or city's) economy continues to be impacted by the transformation of a large number of sports facilities and the commercial, transport, and tourism development, which result in long-term growth of consumption and continued promotion of national economic growth.

2.2 Economic impacts on previous and forthcoming mega-sporting events

In recent years, existing literature have studied the economic impact of mega-sporting events on hosting countries. It is a common conviction that mega-sporting events are related to fresh cash inflows, which create a "multiplier" effect on the local economy. Numerous works of academic literature emphasised how recent mega-sporting events have had significant impacts on the host nation's economic development (Baade & Matheson, 2002; Burgan & Mules, 1992; Daniels, Norman, & Henry, 2004; Gratton, Dobson, & Shibli, 2000; Kasimati, 2003; Zhang & Zhao, 2007). The following sections review the existing literature based on the economic impacts of recent mega-sporting events.

2.2.1 Summer Olympic Games

Kasimati (2003) stated that the economic impacts arise because a larger amount of the new money that flowed in and recirculated within the hosting country once the city was announced to host the Summer Olympic Games. Moreover, Kasimati (2003) reviewed the related researches on analysing the economic impact on Summer Olympic Games

and found several main modelling approaches that were usually applied to the previous studies. These were:

1. Input-output method (e.g. Humphreys & Plummer, 1992; Kasimati, 2003; KPMG, 1993; Zhang & Zhao, 2007);
2. Computable general equilibrium framework (e.g. Blake, 2005; CREA/NSW Treasury, 1997; Kasimati, 2003);
3. Ex-ante and ex-post assessments on economic impact (e.g. Baade & Matheson, 2002).

The next section reviews the literature that focuses on economic impacts of modern Summer Olympic Games, from 1988 to 2012.

2.2.1.1 Seoul 1988 – Games of the XXIV Olympiad

Willner (2007) examined the impact on the macroeconomic variable Gross Domestic Product (GDP) on the 1998 Seoul Summer Olympic Games by using the ordinary least-squares (OLS) model. He found that there is a positive and significant relationship between Olympics and economic growth and investment growth with slightly higher tourist and investment activities in the Olympics year. Moreover, he also found that there was positive and significant real GDP growth.

Kim, Rhee, Yu, Koo and Hong (1989) summarized that there was about 2,382.6 billion Korean won invested into Olympics-related projects. In addition, there were about 336,000 new jobs created during 1982 to 1988. The most impacts of investments were in the infrastructure industry, with a 38.8 percent increase followed by the

manufacturing industry with a 35 percent increase and then the construction industry with a 32.4 percent increase.

2.2.1.2 Barcelona 1992 – Games of the XXV Olympiad

Brunet (1995) quoted the resource from the Barcelona Olympic Organizing Committee' 92 Ltd (COOB'92), the budget revenue was set at 195,594 million pesetas (US $1,638,000,000) against the expenditure of 195,236 million pesetas (US $1,635,000,000). Therefore, there was a positive account of 358 million pesetas between revenue and expenditure. Moreover, there are 588,625 million pesetas or about 61.5 percent of Olympic investment, which contributed to construction investment, such as road and transport infrastructures, hotel facilities and sports venues by Barcelona Holding Olympic S.A. The total economic impact of the 1992 Barcelona Olympics was calculated as 3,108,000,000 million pesetas, which includes 1,942,000,000 million pesetas induced impacts and 1,166,000,000 pesetas million direct impacts. Unemployment had a sharp decrease from the historic maximum of 127,774 people in January 1986 to a minimum of 60,885 people in July 1992.

2.2.1.3 Atlanta 1996 – Games of the XXVI Olympiad

Glisson and Arbes (1996) pointed out that the economic benefit on Georgia's industry sectors was about $5.1 million during 1991 to 1997 and the major impacts were on lodging, drinking and transportation industries. Moreover, about 77,000 full-time and part-time jobs had been created.

Humphreys and Plummer (1995) analysed the short-term and long-term effects on Atlanta's economy when hosting the 1996 Summer Olympics. The short-term economic impacts are composed of direct, indirect, induced and total impact. The direct impacts involved the expenditure on industries such as the expenditure on equipment for international broadcasters. They concluded that there was about $1.2 billion direct spending during the period of 1991 to 1997. The indirect economic impacts were associated with visitor spending. There was about $823 million indirect spending by visitors in the 18 days before the 1996 Summer Olympics started. Moreover, the Olympic Games added $1.9 million to the host country economy, and increased over 77,000 full and part-time jobs. In addition, the wide media coverage resulted in the improvement of the hosting city and nation's reputation. There was more than 35 percent and 78 percent increase, respectively, in domestic and international travelling.

2.2.1.4 Sydney 2000 – Games of the XXVII Olympiad

There are many studies in the literature on the estimation of economic impact of the 2000 Sydney Olympic Games using the three phases modelling which are referred to as pre-event phase, event-year phase and post-event phase (CREA/NSW Treasury, 1997; Madden, 2002; Madden & Crowe, 1997). In the CREA/NSW Treasury (1997) research, results indicated that during the pre-event phases, there was an increase in international tourism and approximately AUS$2.5 billion was spent in the construction sector. During the event-year, there was an increase in demand for export of television rights and ticket sales, with an expected figure of 700,000 visitors.

Madden and Crowe (1997) concluded that there was a significant positive effect in the New South Wales and Australian economy when Sydney hosted the Summer Olympics. The significant impact was on real GDP and real household consumption with AUS$6.1 billion and AUS$2.7 billion, respectively, for Australia, while New South Wales had increases in real consumption of about AUS$6.9 billion, which was greater than the country's increasing GDP as a whole.

Madden (2002) reported that the expenditure on construction grew sharply during the pre-event phase from 1998 to 1999 by about AUS$0.7 billion. The induced international tourism expenditure reached a peak of overAUS $0.5 billion in game-year phase from 2000 to 2001. The economic impact reached a peak during the event year with highest real GDP, real household consumption, real investment and employment for Australia. The impact on real consumption was over AUS$350 million and AUS$189 million for Australia and New South Wales, respectively. Moreover, employment peaked during the game-year phase from 2000 to 2001, with approximately 26,000 new jobs for Australia and an extra 15,600 new jobs for New South Wales.

2.2.1.5 Athens 2004 – Games of the XXVIII Olympiad

The research by Tziralis, Tolis, Tatsiopoulos and Aravossis (2006) stated that the Olympics impacted Attica's economy by increasing of the labour force with extra employment. Moreover, there was an increased expansion of motorway networks and improved roads.

On the 10th October at the Athens Chamber of Commerce and Industry (ACCI), the Foundation for Economic and Industrial Research presented the sector economic impact for the 2004 Athens Olympic Games. The research showed that there was approximately USD$140 million benefit from the tourism sector. In addition, the increased turnover for the industry sector was expected to reach USD$650 million during 2001 to 2004. Moreover, the construction sector contributed a total value of USD$500 to USD$600 million from the 2004 Olympics, and there were approximately 140,000 new jobs added.

2.2.1.6 Beijing 2008 – Games of the XXIX Olympiad

Zhang and Zhao (2007) used the input-output model to analyse the economic impact on Olympic-related investment. Based on the source of Beijing 2008 Organization Committee Olympic Action Plan on November 2001, they concluded that about 23.72 billion yuan was directly contributed into Olympic venues and related facilities investments. Moreover, approximately 106.87 and 143.83 billion yuan were invested into building infrastructure and infrastructure construction, respectively, in Beijing. Therefore, they concluded that there were approximately 138.70 billion yuan for the Olympics direct investments such as on Olympic venues and newly-built infrastructures in Beijing and approximately 143.83 billion yuan indirect investments such as on environment protection and transportation projects, and then added up to a total of 382.53 billion yuan. Moreover, they analysed that with the increasing trend, the Olympic-related investments contributed 1.77 billion, 6.54 billion, 14.15 billion, 20.12

billion and 20.51 billion yuan to Beijing's Gross Regional Product (GRP), respectively, from 2002 to 2007.

2.2.1.7 London 2012 – Games of the XXX Olympiad

Blake (2005) used the computable general equilibrium modelling to examine the London economic impacts. The main results indicated that the significant impact will be the total GDP gain in year 2012 with £1,067 million and with an extra £925 million in event year. In the pre-event phase, there is a positive impact on infrastructure construction, such as transport and Olympic venues, which significantly influences impact on employment in the infrastructure sector with an extra 3,261 full-time jobs. In the event-year, there will be a £56 million gross value increase in the hotel sector. In the post-event phase, there will be an increase in GDP about £622 million and 1,948 extra full-time jobs.

2.2.2 Other mega-sporting events

Lee and Taylor (2005) reported that 57.7 percent of tourists were directly and indirectly attracted by the 2002 FIFA World Cup, with $1.35 billion dollars of sales, $305 million dollars of income, $713 million dollars of value added. There were an additional 31,349 full-time jobs added and $117 million dollars of import impact for South Korea.

URS Finance and Economics (2004) analysed the significant short-term economic impacts on the 2003 Rugby World Cup, concluding that there were AUD$494 million of additional sales in the hotel industry, finance and business services, extra full time

jobs, additional government revenue and increased GDP to the Australian economy, and long-term impact on the Australian tourism market.

2.2.3 Economic impacts of recent four major mega-sporting events

Table B1 shows the economic impacts (based on three major variables: GDP annual growth, employment, inflation) of the year when the country was announced to host the event and also averages for three-year before and three-year after by four major international mega-sporting: Summer Olympic Games, Winter Olympic Games, FIFA World Cup and European Football Championships, respectively. Panel A shows that for the Summer Olympic Games, about 80 percent of the hosting countries have a higher percentage of GDP annual growth in the announcement year than the average three-year before the announcement year. Panel B shows that in the year when the countries were announced to host the Winter Olympic Games, the percentage of GDP annual growths was lower than average three-year before the announcement year. Moreover, 50 percent of the hosting countries' unemployment in announcement year was lower than the average three-year before the announcement year. Panel C shows that above 60 percent of hosting countries have a higher percentage of GDP annual growth in the year when they were announced to host the FIFA World Cup than the average three-year before the announcement year. Panel D indicates that only the year when Belgium and Netherlands were announced to co-organized the 1995 European Football Championships, the percentage of GDP annual growth was higher than the average three-year before the announcement year.

Table B2 shows the economic impacts (based on three major variables: GDP annual growth, employment and inflation) of the year when the country hosted the event and also the average three-year before and three-year after by four major international mega-sporting events: Summer Olympic Games, Winter Olympic Games, the FIFA World Cup and the European Football Championship, respectively. Panel A and Panel C shows that approximately 70 percent of Summer Olympic Games hosting countries and FIFA World Cups hosting countries have higher annual GDP growth on the event year than the average three-year before the event year. Most countries have a lower unemployment rate on the year when they hosted mega-sporting events than the average three-year before the event year.

The overall results indicate that the economic impacts of mega-sporting events are higher in the event year compared with the year when the countries were announced to host the mega-sporting events, especially the annual GDP growth on Summer Olympic Games and FIFA World Cup.

Table B1: *Economic impacts on the announcement year for four recent major international mega-sporting events*

This table is the breakdown of the 4 mega-sporting events and 3 major economic impact variables at event announcement year, average 3-year before and average 3-year after the event announcement year.

Panel A: Summer Olympic Games

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Announcement year	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.
United States	1978	3.29	5.62	1.82	N/A	N/A	7.35	7.18	7.03	8.93
South Korea	1981	4.86	6.16	8.73	N/A	4.50	4.10	22.49	18.24	6.29
Spain	1986	1.96	3.25	5.16	19.17	20.60	18.60	10.45	10.88	6.26
United States	1990	3.67	1.86	1.94	5.67	5.60	7.07	3.33	3.87	2.70
Australia	1993	1.10	4.15	4.17	9.00	10.70	8.57	2.18	0.83	1.62
Greece	1997	2.15	3.64	3.75	9.23	9.60	11.20	9.45	6.80	3.88
China	2001	7.93	8.30	9.73	3.10	3.60	4.17	-0.02	2.05	3.37
United Kingdom	2005	2.55	1.82	N/A	4.83	N/A	N/A	2.71	1.99	N/A

Panel B: Winter Olympic Games

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Announcement year	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.
United States	1974	4.98	-0.47	3.29	N/A	N/A	N/A	4.93	9.03	7.18
Canada	1981	3.27	2.98	1.93	N/A	7.60	11.43	8.94	11.37	5.67
France	1986	1.93	2.44	3.64	9.23	10.10	10.07	7.30	4.75	2.97
Norway	1988	3.62	-0.04	2.22	2.20	3.10	5.20	3.75	4.97	3.87
Japan	1991	5.75	3.35	0.77	2.27	2.10	2.53	1.83	2.94	0.75
United States	1995	3.36	2.54	4.17	6.83	5.60	4.93	2.24	2.04	1.56
Italy	1999	1.35	1.93	1.91	11.63	11.30	9.67	3.44	1.32	2.79
Canada	2003	3.36	2.00	2.88	7.23	7.60	N/A	2.11	3.29	2.88

Continued

Table B1 Continued

Panel C: FIFA World Cup

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Announcement year	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.
Spain	1966	7.05	7.25	6.61	N/A	N/A	N/A	7.75	8.17	6.53
Mexico	1983	5.79	-4.20	0.82	N/A	N/A	N/A	40.11	90.47	63.15
Italy	1984	0.81	3.23	2.95	8.60	10.10	11.17	17.14	10.76	7.56
USA	1988	3.63	4.12	1.73	6.80	5.50	5.90	2.69	3.43	3.72
France	1992	2.63	1.78	1.05	9.23	10.00	11.67	2.53	2.12	1.53
South Korea	1996	7.95	7.00	2.43	2.50	2.00	5.30	7.19	5.12	3.45
Japan	1996	1.08	2.57	-0.20	2.87	3.40	4.07	0.04	-0.66	-0.29
Germany	2000	1.95	3.21	0.37	9.13	7.80	8.57	0.40	-0.68	1.23
South Africa	2004	3.13	4.96	N/A	29.60	27.10	N/A	7.64	5.66	N/A

Panel D: European Football Championships

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Announcement year	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.	3-year before Avg.	Announcement year	3-year after Avg.
Italy	1977	3.51	2.56	4.21	N/A	N/A	N/A	18.23	18.48	16.74
France	1981	2.89	1.45	2.21	6.10	7.00	8.43	10.25	11.03	9.45
Germany	1985	1.20	2.19	2.54	N/A	N/A	N/A	3.35	2.16	2.18
Sweden	1988	2.80	2.60	0.90	2.73	1.90	2.20	5.97	6.35	8.59
United Kingdom	1992	0.51	0.28	3.23	7.47	9.70	9.50	7.22	3.90	2.27
Belgium	1995	1.27	2.38	2.14	8.13	9.30	9.27	3.17	1.22	1.22
Netherlands	1995	1.67	3.03	3.74	6.13	7.00	5.43	2.17	2.02	1.63
Portugal	1999	4.19	3.94	2.23	6.40	4.40	4.37	3.38	3.26	3.55
Austria	2002	2.50	0.96	1.88	3.63	4.00	N/A	1.39	1.25	1.79
Switzerland	2002	1.99	0.31	1.23	2.77	2.90	N/A	0.69	1.59	0.78

Note. The three economic factors of GDP growth (annual %), unemployment total (% of total labour force) and inflation GDP deflator (annual %) are obtained from World Development Indicators Database. Due to the data availability, "N/A" means unavailable data.

Table B2: *Economic impacts on the event years for four recent major international mega-sporting events*

This table is the breakdown of the four mega-sporting events and three major economic impact variables in the event year, the average 3-year before and the average 3-year after the event year.

Panel A: Summer Olympic Games

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Event year	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.
United States	1984	1.69	7.20	3.63	8.97	7.50	6.80	6.48	3.76	2.69
South Korea	1988	9.51	10.64	8.43	3.63	2.50	2.50	5.31	7.61	8.97
Spain	1992	3.72	0.93	1.37	16.37	18.10	23.00	7.05	6.71	4.45
United States	1996	3.10	3.75	4.42	6.20	5.40	4.53	2.15	1.90	1.41
Australia	2000	4.55	1.94	3.67	7.57	5.90	6.17	1.14	4.82	2.96
Greece	2004	4.56	4.68	N/A	9.80	10.20	N/A	3.05	3.44	N/A

Panel B: Winter Olympic Games

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Event year	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.
United States	1980	4.49	-0.24	1.69	N/A	7.10	8.97	7.23	9.08	6.48
Canada	1988	3.80	4.98	0.19	9.70	7.80	8.70	3.56	4.43	3.60
France	1992	2.63	1.78	1.05	9.23	10.00	11.67	2.53	2.12	1.53
Norway	1994	3.21	5.26	4.93	5.77	5.30	4.53	1.30	-0.07	3.27
Japan	1998	1.95	-1.76	1.03	3.33	4.10	4.83	-0.21	-0.06	-1.42
United States	2002	2.98	1.61	3.38	4.30	5.80	N/A	2.01	1.75	2.56
Italy	2006	0.36	1.90	N/A	8.35	N/A	N/A	2.68	1.82	N/A

Continued

Table B2 Continued

Panel C: FIFA World Cup

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Event year	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.
Spain	1982	0.71	1.25	1.96	12.40	15.50	19.17	14.21	13.58	10.45
Mexico	1986	0.82	1.86	3.50	N/A	N/A	N/A	63.15	139.66	55.79
Italy	1990	3.59	2.05	0.47	12.07	11.40	10.87	6.29	8.39	5.28
USA	1994	1.94	4.06	3.61	7.07	6.10	5.30	2.70	2.11	1.87
France	1998	1.83	3.47	3.04	12.00	11.80	10.17	1.31	0.92	1.10
South Korea	2002	7.27	6.97	4.01	4.73	3.10	3.45	1.39	2.82	1.74
Japan	2002	1.03	0.13	2.23	4.83	5.40	4.95	-1.42	-1.57	-1.51
Germany	2006	0.80	2.80	N/A	N/A	N/A	N/A	0.76	0.29	N/A

Panel D: European Football Championships

		GDP growth (annual %)			Unemployment, total (% of total labour force)			Inflation, GDP deflator (annual %)		
Hosting country	Event year	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.	3-year before Avg.	Event year	3-year after Avg.
Italy	1980	3.92	3.43	0.81	N/A	7.60	8.60	15.96	20.82	17.14
France	1984	2.16	1.59	2.26	7.60	9.50	10.30	10.71	7.25	4.28
Germany	1988	2.03	3.74	4.91	N/A	N/A	N/A	2.40	1.50	3.03
Sweden	1992	0.90	-1.18	1.94	2.20	5.70	9.33	8.59	0.99	3.09
United Kingdom	1996	3.23	2.72	3.14	9.50	8.10	6.33	2.27	3.47	2.62
Belgium	2000	2.78	3.86	1.16	8.97	6.60	6.93	1.25	1.74	1.76
Netherlands	2000	4.06	3.47	0.46	4.43	3.30	3.37	1.76	3.94	3.86
Portugal	2004	0.55	1.18	N/A	5.20	6.70	N/A	3.43	2.79	N/A

Note. The three economic factors of GDP growth (annual %), unemployment total (% of total labour force) and inflation GDP deflator (annual %) are obtained from World Development Indicators Database. Due to the data availability, "N/A" means unavailable data.

3 Chapter 3 Literature Review

The aim of this chapter is to provide a review of existing literature which is related to the event study field. This chapter begins with the description of the Efficient Market Hypothesis (EMH) theory, and the semi-strong form of EMH used in the event study to examine how fast the information is reflected onto the stock market price. Secondly, this chapter provides a review of the history of event study, before reviewing the existing literature on non-sporting event study and mega-sporting event study.

3.1 Efficient Market Hypothesis (EMH)

Fama (1970) refined the efficient market hypothesis theory, which stated that the stock prices on financial markets are fast and fully reflect all relevant information, so the investor cannot make abnormal returns based on the information they have collected, because when the market is efficient, the stocks are traded on their fair price. The market relevant information includes past information and all public available information is fully reflected to stock market prices. When the financial market is under equilibrium, then investors cannot outperform the market. Fama (1970) defined three forms of EMH:

1. "Weak-form hypothesis" claims that the stock market prices already reflect all information, including historical prices, trading volume, interest and so on. Past information is publicly available and has no cost, so it is already known by investors and has already lost the value. The filter rules are the most appropriate appraisal methodology.

2. “Semi-strong form hypothesis” states that the stock market prices already fully reflect all publicly available information. The information, in addition to the history of past price includes - but is not limited to - balance sheets, earning forecasts and patents held. Because the information has already been reflected by stock prices, the investors cannot make abnormal returns. The event study is the most appropriate appraisal methodology to examine how fast the information is reflected to the stock price.
3. “Strong-form hypothesis” states that the stock market prices fully reflect all relevant information, including the information only available to company insiders. Investors cannot outperform the market either by using the public information or insider information. Where insider trading is considered as breaking the law, the strong-form version of efficient market becomes impossible.

According to the above statements, there are three different notions of what is meant by available information. If the strong-form hypothesis exists, semi-strong form and weak-form EMH are naturally formed. In contrast, if the weak-form EMH does not exist, the strong-form and semi-strong form EMH do not exist as well.

3.2 History of event study

Economists often analyse the impact of a specific event on the stock price of a specific firm or stock market. The event study is a widely used methodology, which measures how the event impacts on stock prices. Under rational financial market hypotheses, the

impact of an event will be reflected immediately in stock prices, and the impact of the event is measured by the short term changes in stock prices.

The event study can be traced back to the earliest empirical research in the 1930s. Dolley (1933) analysed the impact on stock price by stock split-ups in what was considered as the first event study. Dolley (1933) used the sample of 95 splits that were listed on the New York Stock Exchange during the period from 1921 to 1931 and studied the price changes by stock splits. He found that in 95 stock split events, there were 57 stock split events leading to increasing share prices, 26 stock split events caused decreases on share prices, while 12 stock split events did not cause any significant reaction on stock prices.

In the 1960s, the event study had become increasingly widely used and also become more complex. Ball and Brown (1968) used a sample of 261 companies listed in the New York Stock Exchange from 1957 to 1965 to conduct empirical research on the stock market reaction 12 months before and six months after the company annual earnings announcements. Fama, Fisher, Jensen and Roll (1969) introduced the methodology, which is still in use today. They used a sample of 940 splits covering the period from January 1927 to December 1959 on the New York Stock Exchange to study the stock price reaction to stock splits and also verified whether there was an efficiency of the stock market with the stock splits announcement. They found that the stock market is efficient with the stock prices rapidly and fully reflected to new information. Moreover, they found that there was no evidence to indicate that the stock splits could

increase expected returns. With an efficient stock market under a semi-strong form hypothesis, and under a particular time of the event, the stock market prices are fast and fully reflect the new available information. Therefore, the investors are unable to obtain abnormal returns. As a result, the event study is the best approach to observe the stock price changes before and after the event, and to identify whether the efficiency stock market supports a semi-strong form hypothesis.

Brown and Warner (1980) were the first to use the simulation method for the event study. The advantage of this method is that researchers can repeat the experiment of taking various abnormal models and test the method. The principle is to randomly select securities and randomly assign event dates. Due to the usage of different models, the methods will be different. The significance test can be divided into parametric test and non-parametric test. Brown and Warner (1980) used a sample of monthly return data available on the Centre for Research in Security Prices (CRSP) databases, and analysed the abnormal performance using methodologies based on Mean Adjusted Returns Model, the Market Adjusted Returns Model and Market Model. Moreover, Brown and Warner (1980) pointed out that during the event study the methodologies used to calculate abnormal performance were embodied in different characteristics. Therefore, deciding on a suitable methodology requires comparing different markets at different times, then choosing suitable methodology to ensure the strict event study.

Brown and Warner (1985) applied the same approach in testing these three models based on Mean Adjusted Returns Model, the Market Adjusted Returns Model and

Market Model by using daily stock returns. The research found similar conclusions to the monthly data, which demonstrates that the market model used has significant advantages under a variety of conditions.

3.3 Non-sporting event study

Bodie, Kane and Marcus (2005, p.383) stated that, "*event study methodology has become a widely accepted tool to measure the economic impact of a wide range of events*." The event study methodology is commonly used in measuring the impact of stock split announcement on the stock market. Elfakhani and Lung (2003) examined the market behaviour before and after stock split announcements in the Canadian market for the period from 1977 to 1993. They found that there was a positive cumulative abnormal return for Canadian stock after split announcements. Moreover, the result indicated that there was statistically insignificant increase in the number of transactions and the trading volume in the period of stock split resulted in a decrease in bid-ask spread. Moreover, the event study methodology has been widely used in measuring of the impact of a variety of non-economic events on stock market reaction. Subramani and Walden (2001) examined the effects of the 251 e-commerce announcements between October and December 1998 and found the e-commerce announcements did have a significant positive effect for firms' shareholders and the cumulative abnormal returns for business-to-consumer announcements were significant higher than those for business-to-business announcements.

Dos Santos, Peffers and Mauer (1993) researched a sample of 97 information technology investments regarding how the announcement on information technology impacted the market value of the firm. The study indicated that the average excess returns are not statistically significantly different from zero for either the whole sample or breakdown by manufacturing and financial industries.

Huang, Ho and Wu (2007) investigated how the tsunami in Asia on the morning of 26th December 2004 affected Thailand's tourism industry stock market by using cross-country analysis. The countries included in the investigation were Taiwan, Hong Kong, New Zealand and Australia, from the period of June 2004 to March 2005. They found that there was significant negative abnormal return on the tourism and leisure industry of Thailand. Moreover, there was a partial significant positive abnormal return for the construction development and construction materials industries of Thailand, and there was no significant effect to Taiwan, Hong Kong, New Zealand and Australia after the tsunami occurred.

3.4 Mega-sporting event study

There is a dearth of literature using the event study methodology to investigate the effect on stock market reaction caused by the announcement of hosting a sporting event. Veraros et al. (2004) analysed the impact of the announcement date on the hosting city for the 2004 Olympic Games on the stock exchanges of Greece (winner) and Italy (loser). They summarised that Athens, as the hosting city for the Olympic Games of 2004 had positive abnormal returns on the Athens Stock Exchange (ASE) index. On the

first trading day the whole market gained eight percent, and on the second day it gained another 1.5 percent. Moreover, they found that only the constructions and industrials indices had significant positive abnormal returns. Therefore, they concluded that there is a positive impact of announcement on infrastructure development. In addition, they also did the same analysis for the losing bid city, Milan. They pointed out that there was no significant effect on the Milan Stock Exchange (MSE) general index, the same result as for majority of the MSE industries that were not affected by the event.

Berman et al. (2000) researched whether there was any market reaction to the announcement of the Sydney 2000 Olympic Game. They found that there was no significant effect on overall stock market, and only a limited significant positive effect on infrastructure-related companies based on specific industry areas. There were: building materials suppliers, developers and contractors, engineering and miscellaneous service providers. Moreover, they found that the companies in the Olympic Games host state of New South Wales enjoyed a significant positive effect on stock prices.

Martins and Serra (2007) studied the market reaction to the announcement of the selected country hosting the Summer Olympic Games and Winter Olympic Games, the World Football Cup, the European Football Cup and World specialized Exhibition. They found that there is no evidence supporting that industries were more likely to extract direct benefit from the events, and there are insignificant cumulative abnormal returns for losing bidders. Their overall findings are supportive of rational asset pricing and partial anticipation: when the announcement news is total surprise, market reaction

is significant, positive for winners and negative for losers, reflecting that investors evaluate these mega events announcements as positive news.

Other than examining the stock market reaction on mega-sporting event announcement (Berman, et al., 2000; Martins & Serra, 2007; Veraros et al., 2004), Ashton, Gerrard and Hudson (2003) studied how the English national football team's performance in the Football World Cup impacted on stock reaction on the London Stock Exchange from the period of 6th January 1984 to 3rd July 2002. They found that there was a positive mean return after the national football team won a game, and a negative mean return after the team drew or lost a game. Moreover, they found that the average mean return for FTSE 100 index was statistically greater than the unconditional mean for tournament finals and qualifying games. Therefore, they concluded that there is a statistically significant relationship between the English national football team's performance and next day's stock market return.

4 Chapter 4 Data

The event announcement date, event beginning/end date, hosting country, candidate countries and the list of bid losing countries at the last round are collected from 1980 until 2012 from the Official Website of the Olympic Movement for the Summer Olympic Games and Winter Olympic Games, FIFA World Cup™ Website for the FIFA World Cup and Europe's Football Website for the European Football Championships. There are 39 events in total: the four mega-sporting events, which consist of nine Summer Olympic Games, nine Winter Olympic Games, nine FIFA World Cups and 12 European Football Championships.[2] The full details are shown in Appendix B of Table C1.

[Appendix B of Table C1 here]

4.1 Major samples

The samplings are selected from the total 39 events, and the criteria must satisfy the following two scenarios:

1. The hosting countries must have Morgan Stanley Capital International (MSCI) country equity indices.[3]

[2] Some events not only having one host country, sometimes they are co-organized by two countries. For example, the 2002 FIFA World Cup was co-organized by South Korea and Japan, the 2000 European Football Championship was co-organized by Belgium and Netherlands, the 2008 European Football Championship will be co-organized by Austria and Switzerland and the 2012 European Football Championship will co-organized by Poland and Ukraine. In this study, I consider them as separate events.

[3] Morgan Stanley Capital International (MSCI) country equity indices code in Thompson Financials DataStream: MSCI USA (MSUSAML); MSCI Korea (MSKOREL); MSCI Spain (MSSPANL); MSCI Australia (MSAUSTL); MSCI Greece (MSGDEEL); MSCI China (MSCHINL); MSCI UK (MSUTDKL); MSCI Canada (MSCNDAL); MSCI France (MSFRNCL); MSCI Norway (MSNWAYL); MSCI Japan (MSJPANL); MSCI Italy (MSITALL); MSCI Canada (MSCNDAL); MSCI Mexico (MSMEXFL); MSCI Germany (MSGERML); MSCI South Africa (MSSARFL); MSCI Sweden (MSSWDNL); MSCI Belguim

2. The event's daily returns must have at least 250 trading days prior to and 60 days after the announcement dates or event starting/ending date, and the daily prices are must be available on Thompson Financials DataStream

Table D1 shows the first sample of this dissertation, a breakdown of announcements by sport event type and by hosting country. There are 32 announcement dates consisting of six Summer Olympic Games, eight Winter Olympic Games, seven FIFA World Cups and 11 European Football Championships.[4] In this sample, the first announcement date was on 23rd October 1974 regarding the 1980 Winter Olympic Games hosted by the United States and the last announcement date was on 18th April 2007 regarding the 2012 European Football Championships which will be co-hosted by Poland and Ukraine. Counting the number of events announced by country, the United Stated is the top host with five mega-sporting events, followed by France and Italy with three mega-sporting events each.

(MSBELGL); MSCI Netherlands (MSNETHL); MSCI Portugal (MSPORDL); MSCI Austria (MSASTRL); MSCI Switzerland (MSSWITL); MSCI Poland (MSPLNDL).

[4] Several events are excluded because the events are not qualify in the scenarios where the event announcements are before the availability of MSCI country indices which are available on Thompson Financials DataStream Database and the event hosting countries do not have MSCI country indices such as the hosting countries of Ukraine, Soviet-Union and Yugoslavia.

Table D1: *Number of events covered by MSCI country equity indices based on announcement date (32 events)*

This table shows the announcement dates for the four types of mega-sporting events.

Hosting country / Type of sport event	Announcement date of Summer Olympic Games	Announcement date of Winter Olympic Games	Announcement date of FIFA World Cup	Announcement date of European Football Championships
USA (5)	18th May 1978 18th Sep 1990	23rd Oct 1974 16th Jun 1995	4th Jul 1988	
South Korea (1)			31st May 1996	
Japan (2)		15th Jun 1991	31st May 1996	
Spain (1)	17th Oct 1986			
Australia (1)	23rd Sep 1993			
China (1)	13th Jul 2001			
UK (2)	6th Jul 2005			5th May 1992
Canada (2)		20th Sep 1981 2nd Jul 2003		
France (3)		17th Oct 1986	1st Jul 1992	10th Dec 1981
Norway (1)		15th Sep 1988		
Italy (3)		19th Jun 1999	19th May 1984	12th Nov 1977
Germany (2)			6th Jul 2000	14th Mar 1985
South Africa (1)			15th May 2004	
Belgium (1)				31st Mar 1995
Netherlands (1)				31st Mar 1995
Sweden (1)				16th Dec 1988
Portugal (1)				12th Oct 1999
Austria (1)				12th Dec 2002
Switzerland (1)				12th Dec 2002
Poland (1)				18th Apr 2007

To test market efficiency on not only the speed of the stock market reaction on announcement date, but also how fast the event start date and end date information are reflected on stock market prices are also of interest in this dissertation. Therefore, the next two samples gather the event beginning and end dates for mega-sporting events. Tables D2 and Table D3 show the samples with a breakdown of event beginning date and event end dates, respectively by sport event type and by hosting country. There are 27 events consisting of five Summer Olympic Games, seven Winter Olympic Games, seven FIFA World Cups and eight European Football Championships, for event beginning date and event end date sample, respectively. The event beginning date and event end date samples started from 1980, which was the 1980 Winter Olympic Games

hosted in United States, and the last event beginning date was on 12th June 2004, and the last event end date was on 4th July 2004, which was for the 2004 Portugal European Football Championships.

Table D2: *Number of events covered by MSCI country equity indices based on event beginning date (27 events)*

This table shows the event beginning dates for the four types of mega-sporting events.

Hosting country / Type of event	**Beginning date of Summer Olympic Games**	**Beginning date of Winter Olympic Games**	**Beginning date of FIFA World Cup**	**Beginning date of European Football Championships**
USA (5)	28th Jul 1984 19th Jul 1996	13th Feb 1980 8th Feb 2002	17th Jun 1994	
South Korea (1)			31st May 2002	
Japan (2)		7th Feb 1998	31st May 2002	
Spain (2)	25th Jul 1992		13th Jun 1982	
Australia (1)	15th Sep 2000			
Greece (1)	13th Aug 2004			
UK (1)				8th Jun 1996
Canada (1)		13th Feb 1988		
France (3)		8th Feb 1992	10th Jun 1998	12th Jun 1984
Norway (1)		12th Feb 1994		
Italy (3)		10th Feb 2006	8th Jun 1990	11th Jun 1980
Germany (2)			9th Jun 2006	10th Jun 1988
Belgium (1)				10th Jun 2000
Netherlands (1)				10th Jun 2000
Sweden (1)				10th Jun 1992
Portugal (1)				12th Jun 2004

Table D3: *Number of events covered by MSCI country equity indices based on event end date (27 events)*

This table shows the event end dates for the four types of mega-sporting events.

Hosting country / Type of event	End date of Summer Olympic Games	End date of Winter Olympic Games	End date of FIFA World Cup	End date of European Football Championships
USA (5)	12th Aug 1984	24th Feb 1980	17th Jul 1994	
	4th Aug 1996	24th Feb 2002		
South Korea (1)			30th Jun 2002	
Japan (2)		22nd Feb 1998	30th Jun 2002	
Spain (2)	9th Aug 1992		11th Jul 1982	
Australia (1)	1st Oct 2000			
Greece (1)	29th Aug 2004			
UK (1)				30th Jun 1996
Canada (1)		28th Feb 1988		
France (3)		23rd Feb 1992	12th Jul 1998	27th Jun 1984
Norway (1)		27th Feb 1994		
Italy (3)		26th Feb 2006	8th Jul 1990	22nd Jun 1980
Germany (2)			9th Jul 2006	25th Jun 1988
Belgium (1)				2nd Jul 2000
Netherlands (1)				2nd Jul 2000
Sweden (1)				26th Jun 1992
Portugal (1)				4th Jul 2004

4.2 Robustness issues

The major sample of sample one (see Table D1) consists of 20 countries: United States, South Korea, Japan, Spain, Australia, China, United Kingdom, Canada, France, Norway, Italy, Germany, South Africa, Belgium, Netherlands, Sweden, Portugal, Austria, Switzerland and Poland. If the 20 countries are split into two equal groups, two interesting robustness issues arise, which will be explored in this dissertation:

1. Whether the stock market reaction on countries with a longer history of stock markets or countries that have a shorter history of stock markets are consistent with sample one
2. Whether the stock market reaction on countries with small market capitalisation or large market capitalisation are consistent with sample one

The next section introduces how the first sample (see Table D1) is divided into two different groups based on the age of the stock exchange market and the size of market capitalisation.

4.2.1 Age of stock exchange market

The Handbook of World Stock (1998) showed that different countries have a different length of stock exchange market history.[5] Therefore, based on the year of establishment of stock market, which is shown in the Handbook of World Stock (1998), twenty countries are divided into two groups of ten. Table D4 shows sample four with a breakdown of event announcement date and longer history establishment of stock market (considered as 'mature market') and shorter history establishment of stock market (considered as 'emerging market') by hosting country. Panel A, shows that there are 12 events under the emerging market category, and Panel B shows that there are 20 events involved in the mature market category.

[5] See Appendix B of Table C2

Table D4: *Number of events covered by MSCI country equity indices based on announcement date and the age of stock market*

This table shows the announcement dates for the two different ages of stock market for the four types of mega-sporting events.

Hosting country / Type of sport event	Announcement date of Summer Olympic Games	Announcement date of Winter Olympic Games	Announcement date of FIFA World Cup	Announcement date of European Football Championships
Panel A: Mature Market				20 events
Germany (2)			6th Jul 2000	14th Mar 1985
Netherlands (1)				31st Mar 1995
Austria (1)				12th Dec 2002
UK (2)	6th Jul 2005			5th May 1992
USA (5)	18th May 1978 18th Sep 1990	23rd Oct 1974 16th Jun 1995	4th Jul 1988	
Belgium (1)				31st Mar 1995
Italy (3)		19th Jun 1999	19th May 1984	12th Nov 1977
Norway (1)		15th Sep 1988		
Portugal (1)				12th Oct 1999
France (3)		17th Oct 1986	1st Jul 1992	10th Dec 1981
Panel B: Emerging Market				12 events
Spain (1)	17th Oct 1986			
Australia (1)	23rd Sep 1993			
Sweden (1)				16th Dec 1988
Canada (2)		20th Sep 1981 2nd Jul 2003		
Japan (2)		15th Jun 1991	31st May 1996	
South Africa (1)			15th May 2004	
China (1)	13th Jul 2001			
Switzerland (1)				12th Dec 2002
South Korea (1)			31st May 1996	
Poland (1)				18th Apr 2007

4.2.2 Size of market capitalisation

According to the World Development Indicator Database,[6] the total 20 countries are separated in two group, ten countries with small market capitalisation in the year when they were announced to host the events, and the other ten countries with large market capitalisation in the year when they were announced to host the events. Table D5 shows sample five with a breakdown of event announcement date and the type of market

[6] See Appendix B of Table C3

capitalisation. There are 12 events involved in the small market capitalisation category, and 20 events are involved in the large market capitalisation category.

Table D5: *Number of events covered by MSCI country equity indices based on announcement date and the size of market capitalisation*

This table shows the announcement date for two different sizes of market capitalisation stock market for four types of mega-sporting events.

Hosting country / Type of sport event	**Announcement date of Summer Olympic Games**	**Announcement date of Winter Olympic Games**	**Announcement date of FIFA World Cup**	**Announcement date of European Football Championships**
Panel A: Small market capitalization				12 events
South Korea (1)			31st May 1996	
Spain (1)	17th Oct 1986			
Norway (1)		15th Sep 1988		
South Africa (1)			15th May 2004	
Belgium (1)				31st Mar 1995
Sweden (1)				16th Dec 1988
Portugal (1)				12th Oct 1999
Austria (1)				12th Dec 2002
Poland (1)				18th Apr 2007
Italy (3)		19th Jun 1999	19th May 1984	12th Nov 1977
Panel B: Large market capitalization				20 events
USA (5)	18th May 1978 18th Sep 1990	23rd Oct 1974 16th Jun 1995	4th Jul 1988	
Japan (2)		15th Jun 1991	31st May 1996	
Australia (1)	23rd Sep 1993			
China (1)	13th Jul 2001			
UK (2)	6th Jul 2005			5th May 1992
Canada (2)		20th Sep 1981 2nd Jul 2003		
France (3)		17th Oct 1986	1st Jul 1992	10th Dec 1981
Germany (2)			6th Jul 2000	14th Mar 1985
Netherlands (1)				31st Mar 1995
Switzerland (1)				12th Dec 2002

5 Chapter 5 Research Methodology

The event study is a simple method and tests how the particular event impacts on stock market. The event study is the most popular and frequently used methodology by researchers and has accumulated a great deal of literature, with over six hundred references to event study in leading journals. Based on the event study discussion on the relevant research, Bowman (1983) and Henderson (1990) divided the historical literature into four different types of event studies.

1. "Market efficiency test study." This study assesses whether the stock market rapidly and fully reflects to all new available information (e.g. Fama, Fisher, Jensen & Roll, 1969).
2. "Information content usefulness study." This study assesses the degree of stock market price reactions to a particular piece of new information (e.g. Ball & Brown, 1968).
3. "Metric (extra return) explanation study." The aim of this study is to explore in depth which factors can cause abnormal returns (e.g. Collins, Rozeff & Dhaliwal, 1981).
4. "Model evaluation study." This study focuses on the discussion of the improvement of the methodology and usually uses the simulation models to find out the best way to run the event study (e.g. Beaver & Dukes, 1972).

In this research study, the market efficiency test event study will be explored. The main aim of using market efficiency test event study is on studying the stock market reaction to the relevant information such as announcement date, event beginning date and event

end date related to the mega-sporting events. The following sections will introduce a systematic structure of the event study.

5.1 Defining the event date

This dissertation focuses on how the mega-sporting event announcement date, or event beginning and end date affect stock market prices. In this dissertation, there are three different types of event date: the mega-sporting event announcement date; the mega-sporting event beginning date; and mega-sporting event end date. However, an important issue needs to be considered; that the event date is not necessarily when the event occurred, but when the stock market anticipates and receives the relevant news related to the event. Therefore if the announcement date or event beginning/end date is a non-trading day such as the weekend or holiday the market is not open for transaction, therefore next available trading date is defined as the event date.

5.2 Estimation window and event window

In this section, the definition of estimation window and event window will be introduced.

This dissertation has two different time lines, which are shown as follows:

Figure A: *Time Line 1: named as symmetric window*

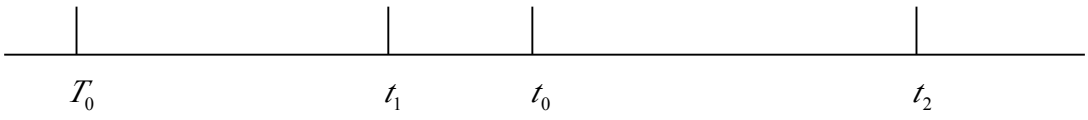
window. The estimation window is the time period prior to the event window. In this

research study, the estimation window is set by 250 trading days (that is approximately one trading year). Let t_1 to t_2 represent the event window. This is the duration required to capture the price effects on the event date. Seven different event windows will be used in this dissertation:

1. Around 3-month trading days: [-60, 60] denotes t_1 to t_2 for event window
2. Around 2-month trading days: [-40, 40] denotes t_1 to t_2 for event window
3. Around 1-month trading days: [-20, 20] denotes t_1 to t_2 for event window
4. Around 2-week trading days: [-10, 10] denotes t_1 to t_2 for event window
5. 5 trading days: [-5, 5] denotes t_1 to t_2 for event window
6. 2 trading days: [-2, 2] denotes t_1 to t_2 for event window
7. 1 trading day: [-1, 1] denotes t_1 to t_2 for event window

For the symmetric window, which shows on Time Line 1, the event date t_0 is in the middle of the event window.

Figure B: *Time Line 2: named as asymmetric window*



According to Time Line 2, t_0 is the event date, denoted as date 0. Let T_0 to $t_1 - 1$ represent the estimation window. There is a time gap between estimation window and event window, which is defined as the period of t_1 to $t_0 - 1$. For each announcement, the 20 trading days represent the length of time gap, i.e. [-20, -1], which is approximately one trading month. The estimation window is the time period prior to the

event window. For Time Line 2, the estimation window is still 250 trading days (approximately one trading year), i.e. [-270,-21] prior to the time gap. Let t_0 to t_2 be the length of the event window. Moreover, there are seven different event windows; the selection of event windows is consistent with Time Line 1. However, the only difference is that for the asymmetric window, the event window starts from the event date, which means that the event date t_0 is at the beginning of the event window. The seven event windows are shown as follows:

1. Around 3-month trading days: [0, 60] represents t_0 to t_2 for event window
2. Around 2-month trading days: [0, 40] represents t_0 to t_2 for event window
3. Around 1-month trading days: [0, 20] represents t_0 to t_2 for event window
4. Around 2-week trading days: [0, 10] represents t_0 to t_2 for event window
5. 5 trading days: [0, 5] represents t_0 to t_2 for event window
6. 2 trading days: [0, 2] represents t_0 to t_2 for event window
7. 1 trading day: [0, 1] represents t_0 to t_2 for event window

There are two important periods: it is necessary to distinguish between estimation window and event window. The estimation window is the period to define the expected returns. The event window is the period to observe the price effects on related information.

5.3 Abnormal returns calculation

The abnormal return is used to evaluate the event's impact on stock performance. It uses the actual returns over the event window, minus the normal returns. The normal returns can be obtained from the estimation window. The following section will describe how to calculate the stock returns first. Next, the three approaches of how to calculate the normal returns will be introduced. .

5.3.1 Returns calculation

The stock prices are directly gathered from Thompson Financials DataStream, therefore the stock prices need to be converted to stock returns first. This section will introduce the form of returns that are going to be used. Henderson (1990, p.287) mentioned, "*most event studies barely mention how they calculate returns*." Thompson (1988, p.81) said, "*return form also does not seem to be an important consideration in event studies*." Then this dissertation chooses the common way of defining returns, which is the continuously compounded return.

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

where $R_{i,t}$ denotes the continuously compounded return on the i^{th} stock on day t. $P_{i,t}$ equals the price on the i^{th} stock on day t.

5.3.2 Three approaches of calculating normal returns

This dissertation follows the approaches described in Brown and Warner (1980, 1985) to calculate daily abnormal returns by using Mean Adjusted Returns Model, Market Adjusted Returns Model and Market Model.

5.3.2.1 Mean-adjusted returns model

Brown and Warner (1980, 1985) stated that the Mean Adjusted Returns Model assumes that the average normal returns for each event during its estimation window are constant. Therefore, the normal returns for the estimation window can be calculated as follows:

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

where $E(R_{i,t})$ denotes the average normal returns during the estimation window of T returns.

Based on the result of expected returns, for every stock, the abnormal returns for each day during the event period are calculated using actual logarithmic return minus normal return. The formula is shown as follows:

$$AR_{i,t} = R_{i,t} - E\left(R_{i,t}\right) \tag{3}$$

where $AR_{i,t}$ denotes the abnormal returns of stock i on day t during the event period.

5.3.2.2 Market-adjusted returns model

Brown and Warner (1980, 1985) concluded that the expected returns are equal across all securities for a market portfolio of risky assets m during an estimation window. Therefore, the normal returns for the estimation window can be calculated as follows:

$$E(R_{i,t}) = E\left(R_{m,t}\right) \tag{4}$$

Abnormal returns $AR_{i,t}$ for each day during the event period are calculated using actual logarithmic return minus normal return by using benchmark of $E\left(R_{mt}\right)$. The formula is shown as follows:

$$AR_{i,t} = R_{i,t} - E\left(R_{mt}\right) \tag{5}$$

5.3.2.3 Market model

Brown and Warner (1980, 1985) described the model of Market and Risk Adjusted Returns, which assumes that there is a linear relationship between individual stock returns and market index return during the estimation window. Therefore, the expected returns for the estimation window can be calculated by using ordinary least-squares (OLS):

$$E(R_{i,t}) = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} \tag{6}$$

where R_{mt} is the logarithmic return on market index on day t during the estimation window. $\hat{\alpha}_i$ and $\hat{\beta}_i$ are parameter estimates. $\hat{\alpha}_i$ is the average return for each stock compared to market index average return. $\hat{\beta}_i$ is the market risk for each stock.

Abnormal returns $AR_{i,t}$ for each day during the event period can be expressed as follows:

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \tag{7}$$

5.4 Cumulative average abnormal returns calculation

According to Bodie, Kane and Marcus (2005, p.382-383), the abnormal return is the common way to measure the stock market impact of the new information around each event date. However, there is one concern that the leakage of information may occur days or weeks before public information release. As a result, the abnormal return is not a good indicator to measure the total impact of all release information, and the cumulative average abnormal return becomes a better indicator which aggregates all abnormal returns and captures the total stock market effect over the entire event window. Moreover, the pattern for abnormal returns is possibly positive or negative depending

on the effect of the good or bad new information. However, the pattern of cumulative average abnormal returns trending upward means the large and positive abnormal returns capture by good news on event date and a downward pattern means large and negative abnormal returns capture by bad news. Therefore, to better evaluate the impact of an event on the performance of stock index during the entire event window, the cumulative average abnormal returns (CAAR) needs to be measured. This section presents how to calculate CAAR.

According to the previous section, the difference between mean-adjusted model, market-adjusted model and market model is the way of calculating abnormal returns. This step to calculate CAAR is common for all three approaches.

Firstly, the average abnormal returns cross all stock at each day is obtained as follows:

$$AAR_t = \frac{1}{n}\sum_{i=1}^{n} AR_{i,t} \tag{8}$$

where AAR_t is the average abnormal return for day t. n is the number of events in the sample.

Next, let $CAAR_{t_1,t_2}$ denote cumulative average abnormal return, which is computed by cumulating the average abnormal returns across the event window t_1 to t_2. The formula is expressed as follows:

$$CAAR_{t_1,t_2} = \sum_{t=t_1}^{t_2} AAR_t \tag{9}$$

5.5 Testing the significance of cumulative average abnormal returns

5.5.1 Standard parametric t-test

The cumulative average abnormal returns need to be tested under the null hypothesis, that a given event has no impact on the mean of cumulative average abnormal returns, which means to test whether the mean of cumulative average abnormal returns equals zero. The test statistic is the ratio calculated using the cumulative average abnormal return on event day, to its standard deviation of average abnormal return across all events in the estimation window. The formulas of test statistics for any event on day t during the event window are quoted from Brown and Warner (1980, 1985) and Wilkens and Wimschulte (2005) are shown as follows:

$$CAAR_{t_{1,}t_2}\ t-stat = \frac{CAAR_{t_1,t_2}}{\sigma\left(AAR_t\right)\sqrt{t_2 - t_1}} \tag{10}$$

where the standard deviation of the average abnormal returns during the estimation window, i.e. for the estimation window of [-310, -61][7], $n-1$ is 249 trading days.

$$\sigma\left(AAR_{t,\,pre}\right) = \sqrt{\frac{\sum_{t=-310}^{t=-61}\left(AAR_{t,pre} - \frac{1}{250}\sum_{t=-310}^{t=-61} AAR_{t,pre}\right)}{249}} \tag{11}$$

Where $AAR_{t,pre}$ the average abnormal return obtained from the estimation window is:

$$AAR_{t,pre} = \frac{1}{n}\sum_{i=1}^{n} AR_i \tag{12}$$

Under the null hypothesis, this test statistic has the Student's t-distribution with $n-1$ degrees of freedom where n equals 250. Because n is large, it can be assumed that the test statistic has standard normal distribution.

[7] The same calculation will do for the other symmetric and asymmetric windows.

5.5.2 Cross-sectional independence test

Considering that the event dates are not clustered, one of the assumptions to test under the null hypothesis is whether the mean of cumulative average abnormal returns is equal to zero, by using cross-sectional independence test. the By quoting the formulas from Brown and Warner (1980, 1985) and Kusnadi and Sohrabian (1999), the formulas of test statistics for cumulative average abnormal returns, assuming cross-sectional independence, are shown as follows:

The test statistic for cumulative average abnormal returns is:

$$CAAR_t t-stat = \frac{CAAR_t}{\sigma_{n,pre}} \tag{13}$$

where

$$\sigma_{n,pre} = \sqrt{\frac{\sum_{i=1}^{n} \sigma_{i,pre}^2}{N}} \tag{14}$$

$$\sigma_{i,pre} = \sqrt{\frac{\sum_{-310}^{-61} \left(AR_{i,t} - AR_{i,t}^*\right)^2}{249}} \tag{15}$$

$$AR_{i,t}^* = \frac{1}{250} \sum_{t=-310}^{t=-61} AR_{i,t} \tag{16}$$

where $\sigma_{i,pre}$ denotes the standard deviation of abnormal returns for each event on $n-1$ days in the estimation window: i.e for the estimation window of.[-310, -61][8], $n-1$ is 249 trading days.

$AR_{i,t}^*$ is the average abnormal returns for each event on n days of the estimation window : i.e. for estimation window of [-310, -61], the n is 250 trading days. N denotes the number of events is considered.

[8] The same calculation will do for the other symmetric and asymmetric windows.

The test statistic for cumulative average abnormal returns, which is assuming cross-sectional independence, also follows a student's t-distribution with $N-1$ degrees of freedom.

5.6 Hypothesis development

This section explores the following hypothesis that needs to be examined by using significance test.

Despite the fact that quadrennial Olympic Games, FIFA World Cups and European Football Championships events usually only last for 20 days, to prepare for these events often requires at least six to seven years. With a great deal of literature analysing the economic impacts of mega-sporting events (Baade and Matheson, 2002; Burgan & Mules, 1992; Daniels, Norman, & Henry, 2004; Gratton, Dobson, & Shibli, 2000; Kasimati, 2003; Zhang & Zhao, 2007), there is a large amount of new money inflow into investment such as on construction, hotels and transportation. Therefore, one can expect that the mega-sporting event's announcement date is good news for the hosting country's stock market and is good for investor value maximization on their investment.

Therefore, the first hypothesis is described as:

Hypothesis 1 (H1)*: The announcements of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships are associated with a positive effect on host countries' MSCI country indices.*

For the mega-sporting events hosting countries, the ages of the stock exchange markets are different. In Chapter 4, sample one has already been split (see Table D1) into two equal groups based on shorter history of stock market ('emerging market') and longer history of stock market ('mature market') (see Table D4). Therefore, hypothesis 2a and hypothesis 2b focus on testing whether the mega-sporting events announcement date has an impact on the mature stock market or emerging stock market in order to see within which is the effect more pronounced. H2a and H2b are proposed as follow:

Hypothesis 2a (H2a)*: The announcements of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships have an impact on 'mature markets' based on host countries' MSCI country indices.*

Hypothesis 2b (H2b)*: The announcements of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships have an impact on 'emerging markets' based on host countries' MSCI country indices.*

In order to analyse whether the stock market has a manifest impact by announcement date on a large market capitalization stock market or small capitalization stock market, hypothesis 3a and hypothesis 3b are proposed:

Hypothesis 3a (H3a)*: The announcements of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships have an impact on large capitalization markets based on host countries' MSCI country indices.*

Hypothesis 3b (H3b)*: The announcements of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships have an impact on small capitalization markets based on host countries' MSCI country indices.*

There is no existing research on analysis of the stock market reaction on event beginning date and event end date. With my expectation that even the larger investments usually take place during the pre-event period, the event beginning date and end date is the extension period for the investment especially on the broadcasting, transportation and airline industries. Due to the above assumptions, the following hypothesis 4a and hypothesis 4b are proposed:

Hypothesis 4a (H4a)*: There is a positive effect on host countries' MSCI country indices on the beginning date of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships.*

Hypothesis 4b (H4b)*: There is a positive effect on host countries' MSCI country indices on the end date of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships.*

6 Chapter 6 Empirical Results for Event Study

In this chapter, the results of the event study analysis will be presented and discussed. The following results present the cross-sectional analysis for the whole stock market reaction, which is measured by MSCI country indices to the related information such as announcement date, event beginning date and event end date on mega-sporting events.

6.1 Impacts of announcement dates on whole stock markets

The pattern of cumulative average abnormal returns (CAARs) on each day for 60-day, 40-day, 20-day, 10-day and 5-day symmetric windows are shown in Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, respectively. Figure 1 indicates that the CAARs start negative for mean-adjusted and market-adjusted model and positive for market model, and then remain in the positive zone since there is a sudden decrease eight days prior to the announcement date and a drop to negative from five days prior to the announcement date. Just one day before the announcement date, there is a slight increase until two days after the announcement. The obvious increases start from 36 days after the announcement date until day 57, then with a little decrease. Figure 2 shows that there is a decreasing trend of CAARs for all three models. One day before the announcement date, the CAAR drops to the lowest negative point, and then starts to increase a little bit and continues in the negative zone with two significant decreases on day 10 and day 23 after the announcement date. Figure 3 shows the CAARs start positively and then become negative during the pre-event and post-event period. Figure 4 shows the CAARs are all negative during the period of [-20, 20], and the movement of CAARs are almost the same for mean-adjusted and market-adjusted models. Figure 5 shows the

similar results as Figure 4, where the difference is that there is a significant increase one day before the announcement date.

[Appendix C of Figure 1, Figure 2, Figure 3, Figure 4 and Figure 5 here]

Figure 6, Figure 7, Figure 8, Figure 9 and Figure 10 shows the pattern of CAARs on each day for 60-day, 40-day, 20-day, 10-day and 5-day of asymmetric window, respectively. Figures 6 to 10 indicate that the CAARs are positive at event day for 60-day, 40-day, 20-day, 10-day and 5-day asymmetric windows. During the sixty days after the event day, the CAARs fluctuate and end at the positive value, which is approximately 1.36 percent, 1.41 percent and 0.34 percent when using the mean-adjusted model, market-adjusted model and market model as benchmarks, respectively. A similar pattern is shown in Figure 9, ten days after the event day, the CAARs is approximately 0.94 percent, 0.86 percent and 0.41 percent when using the mean-adjusted model, market-adjusted model and market model as benchmarks, respectively. Figure 7 and Figure 8 show that CAARs fluctuate sharply and end at negative value for both 40-day and 20-day asymmetric windows, respectively. Figure 10 points out that the CAARs are positive five days after the event day by only using market model to calculate abnormal returns.

[Appendix C of Figure 6, Figure 7, Figure 8, Figure 9 and Figure 10 here]

The CAARs around the announcement date by hosting countries are reported in Table 1, and the abnormal returns are calculated by using the mean-adjusted model, market-adjusted model and market model. Panel A reports the values of CAARs for five

symmetric windows of [-60, 60], [-40, 40], [-20, 20], [-10, 10] and [-5, 5]. Moreover, the table provides test statistics over these six symmetric windows. The CAARs is insignificant and is positive only in the period of [-60, 60], 1.58%, 0.78% and 0.94% respectively for mean-adjusted returns model, market-adjusted returns model and market model. For the other windows, the CAARs are insignificant and negative for all three models with two exceptions: Using the market-returns model as benchmark, the parametric t-test and cross-sectional independent test show there is a statistically significant negative effect of 2.19% on the CAARs for the symmetric window of [-20, 20]; Use of the mean-adjusted returns and market-adjusted returns models leads to a cross-sectional independently significant and negative effect over the symmetric window of [-40, 40].

Panel B reports the values of CAARs for five asymmetric window of [0, 60], [0, 40], [0, 20], [0, 10] and [0, 5]. The impact on CAARs on the post-event period is similar to the symmetric windows. There are insignificant and positive CAARs occurring on the [0, 60] interval and [0, 10] time interval. Ten trading days after the announcement, the CAARs is lower than 60 trading days after the announcement. However, the results for CAARs for all asymmetric windows are statistically insignificant.

Summarising the results in Table 1, the CAARs indicates that there is insignificant and positive effect occurring on the longer symmetric window of [-60, 60] with 1.58%, 0.78% and 0.94% CAARs and on the asymmetric window of [0, 60] with 1.36%, 1.41% and 0.34% CAARs for the mean-adjusted model, market-adjusted model and market

model, respectively. For other windows, it seems there is a small insignificant and negative effect for hosting countries with two exceptions: a cross-sectional significant negative effect occurs 40 days prior and after the announcement by using mean-adjusted returns and market-adjusted returns; and the use of market model shows a significant negative effect over the window of [-20, 20]. Therefore, test statistic results do not support H1 (see previous chapter Hypothesis 1) that there is no positive effect on the stock market, which is measured by MSCI country indices around the announcement date.

Table 1: *Cumulative average abnormal returns around the announcement dates for whole stock markets*

This table shows the CAARs around the mega-sporting event announcement dates on several event windows both for symmetric windows and asymmetric windows for whole stock markets. The abnormal returns are calculated based on the three approaches: mean-adjusted model, market-adjusted model and market model, respectively.

PANEL A. Symmetric window — 32 events

	Mean-adjusted Return Model		**Market-adjusted Return Model**		**Market-Model**	
Time Windows	CAARs		CAARs		CAARs	
[-60,60]	1.58%		0.78%		0.94%	
t-test 1	(0.5377)		(0.2668)		(0.4051)	
t-test 2	(1.1050)		(0.5474)		(0.8007)	
[-40,40]	-2.10%		-2.41%		-1.36%	
t-test 1	(-0.8655)		(-0.9937)		(-0.7047)	
t-test 2	(-1.4834)	*	(-1.7009)	**	(-1.1587)	
[-20,20]	-1.59%		-1.50%		-2.19%	
t-test 1	(-0.9584)		(-0.9067)		(-1.6230)	*
t-test 2	(-1.1172)		(-1.0736)		(-1.8805)	**
[-10,10]	-0.30%		-0.30%		-0.35%	
t-test 1	(-0.2549)		(-0.2507)		(-0.3639)	
t-test 2	(-0.2136)		(-0.2098)		(-0.3002)	
[-5,5]	-0.59%		-0.59%		-0.13%	
t-test 1	(-0.7027)		(-0.7084)		(-0.1883)	
t-test 2	(-0.4094)		(-0.4193)		(-0.1091)	

PANEL B. Asymmetric window — 32 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**
Time Windows	CAARs	CAARs	CAARs
[0,60]	1.36%	1.41%	0.34%
t-test 1	(0.6715)	(0.7044)	(0.2068)
t-test 2	(0.9754)	(1.0111)	(0.1658)
[0,40]	-0.31%	-0.40%	-0.67%
t-test 1	(-0.1866)	(-0.2429)	(-0.4991)
t-test 2	(-0.2214)	(-0.2846)	(-0.4489)
[0,20]	-0.21%	-0.33%	-1.11%
t-test 1	(-0.1779)	(-0.2845)	(-0.1706)
t-test 2	(-0.1492)	(-0.2358)	(-0.1247)
[0,10]	0.94%	0.86%	0.41%
t-test 1	(1.1377)	(1.0527)	(0.6068)
t-test 2	(0.6746)	(0.6169)	(1.0752)
[0,5]	-0.08%	-0.20%	0.32%
t-test 1	(-0.1431)	(-0.3446)	(0.6792)
t-test 2	(-0.0600)	(-0.1428)	(0.9635)

Note. The t-statistic test reported here is for the one-tailed test, and ***, **, *denote the rejection of null hypothesis rate at 1%, 5% and 10% statistic significance levels. Moreover, t-test 1, t-test 2 are Brown and

Warner (1980, 1985) the standard parametric t-test statistic and cross-sectional independent test, respectively.

According to the results presented, the announcement date does not affect the performance of the whole stock market, which is measured by MSCI country indices. Therefore, to have better understanding of the announcement date impact on stock markets, the following sections examine the impact of announcement date on two separate types of stock market, respectively: market capitalization (large and small market capitalization) and the age of stock market (mature and emerging stock market).

6.2 Impacts of announcement dates on 'mature markets'

Hypothesis 2a (see previous chapter) is to test whether the mega-sporting event announcements have either a positive effect or negative effect for hosting countries with early establishment of stock exchange. Table 2 shows the CAARs around the announcement date by the hosting countries which had early establishment of their stock exchange. Panel C shows the three shorter symmetric windows of [-5, 5], [-2, 2] and [-1, 1] and Panel D details the CAARs earned for three asymmetric windows of interest, of [0, 5], [0, 2] and [0, 1]. As seen in Panel C, the CAARs are positive in both symmetric windows and the 5-day CAARs is slightly higher than the 1-day CAARs, while the CAARs are not statistically significantly positive from zero in both symmetric windows. The same results are present in Panel D except a positive statistically significant effect is earned by the hosting countries under the mature market in the [0, 5] asymmetric window when using market model as benchmark to calculate the mean. Therefore, the sport event announcements have a positive but statistically insignificant

effect on the hosting countries with early establishment of exchange in both the event windows that are of interest, except there is a statistically significant positive effect five days after the event announcements, using only the market model as benchmark and using the parametric t-test.

Table 2: *Cumulative average abnormal returns around the announcement dates by 'mature market'*

The table below shows the CAARs around the mega-sporting event announcement dates on several event windows both for symmetric windows and asymmetric windows for mature markets. The abnormal returns are calculated by three approaches: mean-adjusted model, market-adjusted model and market model, respectively.

PANEL C. symmetric window — 20 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**	
Time Windows	CAARs	CAARs	CAARs	
[-5,5]	0.97%	0.88%	0.84%	
t-test 1	(1.0208)	(0.9266)	(1.0682)	
t-test 2	(1.0857)	(0.9848)	(1.2484)	
[-2,2]	0.29%	0.25%	0.39%	
t-test 1	(0.4832)	(0.4091)	(0.7931)	
t-test 2	(0.3271)	(0.2768)	(0.5879)	
[-1,1]	0.07%	0.04%	0.26%	
t-test 1	(0.1649)	(0.0962)	(0.7272)	
t-test 2	(0.0789)	(0.0460)	(0.3832)	

PANEL D. asymmetric window — 20 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**	
Time Windows	CAARs	CAARs	CAARs	
[0,5]	0.94%	0.88%	1.01%	
t-test 1	(1.4054)	(1.3223)	(1.8421)	*
t-test 2	(1.0952)	(1.0295)	(1.5335)	
[0,2]	0.37%	0.35%	0.47%	
t-test 1	(0.8874)	(0.8195)	(1.3630)	
t-test 2	(0.4373)	(0.4035)	(0.7176)	
[0,1]	0.26%	0.24%	0.31%	
t-test 1	(0.8749)	(0.8090)	(1.2649)	
t-test 2	(0.3049)	(0.2817)	(0.4709)	

Note. The t-statistic test reported here is for the two-tailed test, and ***, **, *denote the rejection of null hypothesis rate at 1%, 5% and 10% statistic significance levels. Moreover, t-test 1, t-test 2 are Brown and Warner (1980, 1985) the standard parametric t-test statistic and cross-sectional independent test, respectively.

6.3 Impacts of announcement dates on 'emerging markets'

Similar to hypothesis 2a, hypothesis 2b (see previous chapter) is to test whether the mega-sporting event announcements have either a positive effect or negative effect for hosting countries within emerging stock markets. The results are presented in Table 3, indicating the impact of announcements of the sporting events on hosting counties that have late establishment of exchange. Panel E shows that the CAARs are negative for 5-day, 2-day and 1-day symmetric windows, and the negative effect is larger in the 5-day event window; especially the CAARs is statistically significant on the 5-day symmetric window when using both mean-adjusted model and market-adjusted model. Panel F indicates that the CAARs are negative five days, two days and one day after the announcements, while the parametric t-test shows that the negative impact is not statistically significant except the window period of [0, 5] and only if mean-adjusted returns and market-adjusted returns are used.

In comparison with the results shown in Table 2, the mega-sporting event announcements have negative but not statistically significant impact on hosting countries, which have late establishment of exchange. However, it seems that the stock market treats the mega-sporting event announcements date as a negative signal for an emerging stock market in the 5-day symmetric and asymmetric windows.

Table 3: *Cumulative average abnormal returns around the announcement dates by 'emerging market'*

The table below shows the CAARs around the mega-sporting event announcement dates on several event windows for both symmetric and asymmetric windows for emerging stock markets. The abnormal returns are calculated by three approaches: mean-adjusted model, market-adjusted model and market model, respectively.

PANEL E. symmetric window — 12 events

	Mean-adjusted Model		**Market-adjusted Model**		**Market-Model**
Time Windows	CAARs		CAARs		CAARs
[-5,5]	-3.18%		-3.05%		-1.73%
t-test 1	(-2.3841)	***	(-2.2818)	**	(-1.5765)
t-test 2	(-2.2298)	**	(-2.1318)	**	(-1.4254)
[-2,2]	-0.18%		-0.11%		-0.09%
t-test 1	(-0.2095)		(-0.1338)		(-0.1307)
t-test 2	(-0.1242)		(-0.0792)		(-0.0743)
[-1,1]	-0.10%		-0.06%		0.13%
t-test 1	(-0.1712)		(-0.1043)		(0.2591)
t-test 2	(-0.0717)		(-0.0437)		(0.1040)

PANEL F. asymmetric window — 12 events

	Mean-adjusted Model		**Market-adjusted Model**		**Market-Model**
Time Windows	CAARs		CAARs		CAARs
[0,5]	-1.79%		-1.64%		-0.83%
t-test 1	(-1.8929)	*	(-1.7437)	*	(-1.0651)
t-test 2	(-1.2546)		(-1.1558)		(-0.6816)
[0,2]	-0.13%		-0.06%		0.24%
t-test 1	(-0.2217)		(-0.1037)		(0.4873)
t-test 2	(-0.0929)		(-0.0435)		(0.1972)
[0,1]	-0.23%		-0.18%		0.19%
t-test 1	(-0.5448)		(-0.4336)		(0.5486)
t-test 2	(-0.1615)		(-0.1285)		(0.1570)

Note. The t-statistic test reported here is for the two-tailed test, and ***, **, *denote the rejection of null hypothesis rate at 1%, 5% and 10% statistic significance levels. Moreover, t-test 1, t-test 2 are Brown and Warner (1980, 1985) the standard parametric t-test statistic and cross-sectional independent test, respectively.

6.4 Impacts of announcement dates on 'large capitalisation markets'

Hypothesis 3a (see previous chapter) tests whether the mega-sporting event announcements have either a positive effect or negative effect on hosting counties that have large market capitalisation. The results of CAARs earned by hosting countries that have big market capitalisation are provided in Table 4. The results in Panel G suggest that there is little negative and insignificant CAARs on the period of [-5, 5] and [-2, 2], and a small positive and insignificant effect on the period of [-1, 1] regardless of whether mean-adjusted returns, market-adjusted returns or market returns are used as benchmarks to calculate the mean. Similarly, the CAARs in Panel H are insignificant and negative for the period of [0, 5] and [0, 2] and insignificant and positive one day after the announcements.

Table 4: *Cumulative average abnormal returns around the announcement dates by hosting countries with 'large market capitalisation'*

The table below shows the CAARs around the mega-sporting event announcement dates on several event windows for both symmetric and asymmetric windows for large market capitalisation stock markets. The abnormal returns are calculated by three approaches: mean-adjusted model, market-adjusted model and market model.

PANEL G. symmetric window — 20 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**
Time Windows	CAARs	CAARs	CAARs
[-5,5]	-0.79%	-0.75%	-0.25%
t-test 1	(-0.7998)	(-0.7623)	(-0.3125)
t-test 2	(-0.7657)	(-0.7294)	(-0.3120)
[-2,2]	-0.24%	-0.23%	-0.16%
t-test 1	(-0.3783)	(-0.3582)	(-0.3276)
t-test 2	(-0.2302)	(-0.2178)	(-0.2058)
[-1,1]	0.08%	0.09%	0.13%
t-test 1	(0.0856)	(0.2068)	(0.3638)
t-test 2	(0.0820)	(0.0889)	(0.1615)

PANEL H. asymmetric window — 20 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**
Time Windows	CAARs	CAARs	CAARs
[0,5]	-0.27%	-0.27%	0.04%
t-test 1	(-0.8701)	(-0.3868)	(0.0719)
t-test 2	(-0.2686)	(-0.2669)	(0.0505)
[0,2]	-0.23%	-0.23%	-0.09%
t-test 1	(-0.7257)	(-0.5133)	(-0.2606)
t-test 2	(-0.2241)	(-0.2241)	(-0.1157)
[0,1]	0.04%	0.04%	0.12%
t-test 1	(0.1442)	(0.1421)	(0.4771)
t-test 2	(0.0445)	(0.0439)	(0.1498)

Note. The t-statistic test reported here is for the two-tailed test, and ***, **, *denote the rejection of null hypothesis rate at 1%, 5% and 10% statistic significance levels. Moreover, t-test 1, t-test 2 are Brown and Warner (1980, 1985) the standard parametric t-test statistic and cross-sectional independent test, respectively.

6.5 Impacts of announcement dates on 'small capitalisation markets'

Hypothesis 3b (see previous chapter) tests whether the mega-sporting event announcements have either a positive effect or negative effect on hosting counties that have small market capitalisation. Table 5 presents the results of CAARs earned by the hosting countries that have small market capitalisation around mega-sporting event announcements. Panel I shows the CAARs results in the symmetric windows of interest, of 5-day, 2-day and 1-day. The result shows the CAARs are insignificantly negative in the time period of [-5, 5] and [-1, 1]. Even though there is a small positive effect in the period of [-2, 2], this is still not statistically significant. Panel J shows the results of CAARs 5-day, 2-day and 1-day after the announcements. Showing a different result, the CAARs indicate that after the mega-sporting event announcements, the stock markets have insignificant positive impact on hosting countries that have small market capitalisation. The parametric t-test shows that there is 1.18 percent significant positive effect two days after the announcements when the market model was used as benchmark to calculate the mean.

Table 5: *Cumulative average abnormal returns around the announcement dates by hosting countries with 'small market capitalisation'*

The table below shows the CAARs around the mega-sporting event announcement dates on several event windows for both symmetric and asymmetric windows for small market capitalisation stock markets. The abnormal returns are calculated by three approaches: mean-adjusted model, market-adjusted model and market model.

PANEL I. symmetric window — 12 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**	
Time Windows	CAARs	CAARs	CAARs	
[-5,5]	-0.25%	-0.32%	0.07%	
t-test 1	(-0.1760)	(-0.2295)	(0.0612)	
t-test 2	(-0.1683)	(-0.2190)	(0.0559)	
[-2,2]	0.71%	0.67%	0.84%	
t-test 1	(0.7987)	(0.7627)	(1.1320)	
t-test 2	(0.4842)	(0.4615)	(0.6555)	
[-1,1]	-0.13%	-0.15%	0.34%	
t-test 1	(-0.2018)	(-0.2355)	(0.6420)	
t-test 2	(-0.0865)	(-0.1007)	(0.2632)	

PANEL J. asymmetric window — 12 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**	
Time Windows	CAARs	CAARs	CAARs	
[0,5]	0.23%	0.27%	0.80%	
t-test 1	(0.2278)	(0.2736)	(0.9617)	
t-test 2	(0.1543)	(0.1850)	(0.6186)	
[0,2]	0.87%	0.89%	1.18%	
t-test 1	(1.3791)	(1.4153)	(2.2542)	**
t-test 2	(0.5910)	(0.6053)	(0.9171)	
[0,1]	0.13%	0.15%	0.51%	
t-test 1	(0.2934)	(0.3276)	(1.3876)	
t-test 2	(0.0889)	(0.0991)	(0.3992)	

Note. The t-statistic test reported here is for the two-tailed test, and ***, **, *denote the rejection of null hypothesis rate at 1%, 5% and 10% statistic significance levels. Moreover, t-test 1, t-test 2 are Brown and Warner (1980, 1985) the standard parametric t-test statistic and cross-sectional independent test, respectively.

To conclude, the impact of announcement date is not statistically significant on either a mature or an emerging stock market. However, the announcement dates do have positive and insignificant effect for the mature stock market, and have negative and

insignificant effect on the emerging stock market. In addition, there is no significant announcement impact of hosting countries either with small market capitalisation or big market capitalisation. Therefore, the results reject hypotheses 2a, 2b, 3a and 3b, which indicate that the announcements of mega-sporting events of Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football Championships do not have statistical significant impact on either large or small capitalisation markets, and either mature or emerging stock market based on MSCI country indices.

According to the results presented, the announcement dates do not have statistically significant impact on whole stock market; even dividing the stock market into groups of different age of stock market and different size of market capitalisation, the impacts are still statistically insignificant. As a result, the following sections emphasise the stock market reaction on mega-sporting event beginning date and end date.

6.6 Impacts of event beginning dates on whole stock markets

Table 6 presents the results of CAARs around the event beginning dates received by the hosting countries. Panel K shows the CAARs in the symmetric windows of interest, of [-20, 20], [-5, 5], and [-1, 1]. Interestingly, the use of mean-adjusted returns, market-adjusted returns and market returns for the benchmark to calculate the mean, resulted in negative and insignificant effects for hosting countries, though there is a 1.15 percent negative effect which is significant in the period of [-5, 5] when using mean-adjusted returns and parametric t-test. Moreover, the results indicate that the longer event windows such as [-20, 20] even have higher negative effect than the shorter event

window of [-1, 1]. Correspondingly, the results in Panel L show that CAARs are negative and insignificant 20 days, five days and one day after the announcements by using all three models as benchmarks.

Table 6: *Cumulative average abnormal returns around the event beginning dates for whole stock markets*

The table below shows the CAARs around the mega-sporting event beginning dates on several event windows for both symmetric and asymmetric windows for whole stock markets. The abnormal returns are calculated by three approaches: mean-adjusted model, market-adjusted model and market model.

PANEL K. symmetric window — 27 events

	Mean-adjusted Model		**Market-adjusted Model**	**Market-Model**
Time Windows	CAARs		CAARs	CAARs
[-20,20]	-1.02%		-0.55%	-0.73%
t-test 1	(-0.6116)		(-0.3278)	(-0.5572)
t-test 2	(-0.8404)		(-0.4497)	(-0.1630)
[-5,5]	-1.15%		-1.03%	-0.66%
t-test 1	(-1.3940)	*	(-1.2473)	(-1.0289)
t-test 2	(-0.9444)		(-0.8435)	(-0.6605)
[-1,1]	-0.29%		-0.26%	0.03%
t-test 1	(-0.7791)		(-0.7110)	(0.1189)
t-test 2	(-0.2287)		(-0.2130)	(0.0336)

PANEL L. asymmetric window — 27 events

	Mean-adjusted Model	**Market-adjusted Model**	**Market-Model**
Time Windows	CAARs	CAARs	CAARs
[0,20]	-0.95%	-0.71%	-1.06%
t-test 1	(-0.5717)	(-0.4264)	(-0.8115)
t-test 2	(-0.7677)	(-0.5725)	(-1.0396)
[0,5]	-0.68%	-0.61%	-0.58%
t-test 1	(-0.8143)	(-0.7313)	(-0.8872)
t-test 2	(-0.5467)	(-0.4910)	(-0.5682)
[0,1]	-0.22%	-0.20%	-0.01%
t-test 1	(-0.6035)	(-0.5416)	(-0.0337)
t-test 2	(-0.1812)	(-0.1626)	(-0.0096)

Note. The t-statistic test reported here is for the one-tailed test, and ***, **, *denote the rejection of null hypothesis rate at 1%, 5% and 10% statistic significance levels. Moreover, t-test 1, t-test 2 are Brown and Warner (1980, 1985) the standard parametric t-test statistic and cross-sectional independent test, respectively.

6.7 Impacts of event end dates on whole stock markets

The CAARs around the event end dates earned by hosting countries are displayed in Table 7. Panel M shows that there are 3.88 percent, 3.54 percent and 1.98 percent highly significant and negative CAARs in the period of [-20, 20] when using mean-adjusted returns, market-adjusted returns and market returns, respectively, as benchmarks to calculate the mean. The CAARs are insignificant and positive in the periods of [-5, 5] and [-1, 1]. Panel L shows that there is highly significant and negative effect for hosting countries just 20 days after the event's end; the CAARs are -3.03 percent and -2.9 percent when using mean-adjusted returns and market-adjusted returns, respectively as benchmarks. The use of market returns as benchmarks only shows negative and insignificant effect in the period of [0, 20]. Five days after the event finished, the CAARs are insignificant and positive for all three models. The parametric t-test indicates that there is significant negative effect in CAARs occurring one day after the event finishing date when using only mean-adjusted returns and market-adjusted returns as benchmarks.

Table 7: *Cumulative average abnormal returns around the event end dates for whole stock markets*

The table below shows the CAARs around the mega-sporting event end dates on several event windows for both symmetric and asymmetric windows for whole stock markets. The abnormal returns are calculated by three approaches: mean-adjusted model, market-adjusted model and market model.

PANEL M. symmetric window — 27 events

	Mean-adjusted Model		**Market-adjusted Model**		**Market-Model**	
Time Windows	CAARs		CAARs		CAARs	
[-20,20]	-3.88%		-3.54%		-1.98%	
t-test 1	(-2.4989)	***	(-2.1047)	**	(-1.6662)	**
t-test 2	(-3.1732)	***	(-2.6628)	***	(-1.9714)	**
[-5,5]	0.76%		0.87%		0.33%	
t-test 1	(0.9810)		(1.1218)		(0.5514)	
t-test 2	(0.6223)		(0.7103)		(0.3238)	
[-1,1]	0.11%		0.13%		0.01%	
t-test 1	(0.3168)		(0.3894)		(0.0538)	
t-test 2	(0.0878)		(0.1077)		(0.0141)	

PANEL L. asymmetric window — 27 events

	Mean-adjusted Model		**Market-adjusted Model**		**Market-Model**	
Time Windows	CAARs		CAARs		CAARs	
[0,20]	-3.03%		-2.90%		-1.11%	
t-test 1	(-1.9526)	**	(-1.7280)	**	(-0.9371)	
t-test 2	(-2.4310)	***	(-2.1461)	**	(-1.0898)	
[0,5]	0.33%		-0.03%		0.14%	
t-test 1	(0.4294)		(-0.0383)		(0.2443)	
t-test 2	(0.2673)		(-0.0238)		(0.1421)	
[0,1]	-0.46%		-0.84%		-0.26%	
t-test 1	(-1.3161)	*	(-2.2283)	**	(-0.9878)	
t-test 2	(-0.3664)		(-0.6188)		(-0.2569)	

Note. The t-statistic test reported here is for the one-tailed test, and ***, **, *denote the rejection of null hypothesis rate at 1%, 5% and 10% statistic significance levels. Moreover, t-test 1, t-test 2 are Brown and Warner (1980, 1985) the standard parametric t-test statistic and cross-sectional independent test, respectively.

Summarising the CAARs performances, it was observed that there is no evidence that the mega-sporting event announcements have a positive impact on stock markets measured by MSCI country indices. Moreover, the announcements do have positive and

insignificant effect for hosting countries that have a longer history of stock market, and have negative and insignificant effect for hosting countries with shorter establishment of stock market. There is no significant announcement impact of hosting countries with either small or large market capitalisation. The result of CAARs analysis show that around the event starting date by hosting countries is quite an interesting period. The expectation of the hypothesis is that there is a positive impact around the event starting date. However, the results indicate that there is negative and insignificant effect prior to and after the event starting. There is negative and significant event ending date effect occurring in the period of [-20, 20], and also 20 days after the date the event finished. Moreover, the results show that there is positive and insignificant effect in the shorter window of [-5, 5] and [-1, 1]. The CAARs are significant negative 20 days and one day after the event finish when using mean-adjusted returns and market-adjusted returns as benchmarks.

Based on the results presented in this chapter, there is no effect related to the mega-sporting event announcement date, even when splitting the sample into different sizes of market capitalisation and different ages of stock market. Moreover, there is no effect on event beginning date, and small significant negative effect on the 20 days and one day event windows after the event end date for whole stock markets which are measured by MSCI country indices. Therefore, the remaining extension research questions are indicated as follows:

1. Is there any effect on the stock market in the year when the country hosted the mega-sporting event?

2. What is the impact of mega-sporting event announcement date on emerging stock market sector level?

Chapters 7 and 8 will answer these two questions, respectively.

7 Chapter 7 Annual Return Performances on Individual Stock Market

In the previous chapter, the event study results have shown that there is no impact by event beginning dates on stock markets. It brings an interesting question that if the examining period is extended, will there be any effect on individual stock markets in the year when the country hosts the mega-sporting events? This chapter will analyse the annual returns observed on individual stock markets in the year of hosting the mega-sporting event.

The sample used in this section is the same as the previously observed, which is shown in Table D2. There are in total 27 events consisting of five Summer Olympic Games, seven Winter Olympic Games, seven FIFA World Cups and eight European Football Championships, involving 16 countries hosting the mega-sporting events starting from the 1980s. To examine whether there is an impact on individual stock markets in the year when the mega-sporting event was taking place, the comparison period needs to be considered. The sample of events was selected from the 1980s, thus the comparison period is chosen from January 1980 to January 2007 with 28 yearly observations[9]. For each event, the annual MSCI indices prices of each hosting country from January 1980 to January 2007 are obtained from Thompson Financials DataStream and then the prices are converted into returns. The significance of annual return in a particular event year

[9] The sample is gathered from January 1980 to January 2007, but due to the data availability on Thompson Financials DataStream, MSCI country indices start from 1989, 2002, and 1989 for South Korea, Greece and Portugal respectively. For the remaining 13 countries, the yearly observation is 28 for each, but for South Korea, Greece and Portugal, the yearly observation is 18, 5 and 18 respectively.

and difference in the mean of annual returns for the whole sample was tested using both one-tailed and two-tailed test of Student's t-distribution with n-1 degrees of freedom, because of the small sample sizes (number of year observations), which are less than 30. The null hypothesis is that there is no difference between annual return in a particular event year and the mean annual return for the whole sample.

Table 8.1 shows the descriptive statistics based on the annual returns for the hosting countries. The result shows a breakdown of the exact annual return for a particular event year by hosting country, and the position in ranking of annual returns. The position in ranking of annual returns is defined as one to four. One is the lowest position, which means the annual return in a particular event year is between minimum and 1st quartile, if the position is two this means the annual return in a particular event year is between 1st quartile and median. If the position is three, the annual return in a particular event year is between median and 3rd quartile and position four is the highest which means the annual return in a particular event year is between 3rd quartile to maximum. The result shows that for the annual return in a particular event year for Greece (+63.22 percent) regarding the hosting of the 2004 Summer Olympic Game which is the highest, South Korea (+45.97percent) for hosting the 2006 FIFA World Cup, Portugal (+39.26 percent) for hosting the 2004 European Football Championships and United States (+34.74 percent) for hosting the 1996 Summer Olympic Games, the positions in ranking annual returns are all the highest. To summarise the position for the four different types of events separately, there are five Summer Olympic Games and the average position in

ranking annual returns is 3.4. Only Greece (4)[10] with 63.22 percent annual return for hosting the 2004 Summer Olympic Games and the United States (4) with 34.74 percent annual return for hosting the 1996 Summer Olympic Games are above this average. There are seven Winter Olympic Games and the average position in ranking annual returns is 2. France (3) with an annual return of 15.78 percent regarding the 1992 Winter Olympic Games and Norway (3) with an annual return of 41.57 percent regarding the 1994 Winter Olympic Games are above this average. There are seven FIFA World Cups and the average position in ranking annual returns is 2.3. Italy (3) with an annual return of 16.68 percent and South Korea (4) with an annual return of 45.97 percent are above the average. Moreover, there are eight European Football Championships and the average position in ranking annual returns is 2.4. Italy (3) with an annual return of 14.3 percent, France (3) with an annual return of 30.75 percent, the United Kingdom (3) with an annual return of 17.24 percent and Portugal (4) with an annual return of 39.26 percent during the 1980, 1984, 1996 and 2004 European Football Championships, respectively.

On the other hand, Table 8.1 shows there are negative annual returns for a particular event year on hosting countries. For instance, during the years of 1980 to 2007, Japan hosted two events: the 1998 Winter Olympic Games and the 2002 FIFA World Cup. The mean of annual returns is 11.16 percent during the years of 1980 to 2007, whereas, the annual returns for Japan were -24.16 percent and -29.89 percent, respectively when the 1998 Winter Olympic Games and the 2002 FIFA World Cup were hosted.

[10] The number in bracket is the position in ranking annual returns, which is shown on Table 8.1.

Furthermore, the means were: United States (-13.23 percent) regarding the 2002 Winter Olympic Games, Germany (-25.98 percent) regarding the 1988 European Football Championships and Belgium (-15.65 percent) regarding the 2000 European Football Championships.

Table 8.2 presents the results of testing on the mean. There are two alternate hypotheses:

1. The annual return in a particular event year is not equal to the mean.
2. The annual return in a particular event year is higher than the mean.

Based on the alternate hypothesis 1, the two-tailed test is used and the results reject the null hypothesis for 15 events (out of 27 events) that the annual returns for the majority of mega-sporting events do have significant difference from the mean annual returns in a particular event year. For the following countries, the annual returns for a particular event year are highly significantly positive from the mean at the 1% significance level:

- Norway (annual return = +41.57%, t-stat = 2.91) regarding the 1994 Winter Olympic Game;
- Portugal (annual return = 39.26%, t-stat = 5.07) regarding the 2004 European Football Championships;
- United States (annual return = +34.74%; -13.23%, t-stat = 8.26; -8.37, respectively) regarding the 1996 Summer Olympic Games and the 2002 Winter Olympic Games;
- France (annual return = +30.75%, t-stat = 3.35) regarding the 1984 European Football Championships.

Whereas, the annual returns were significantly lower than the mean at the 1% significance level in a particular event year for the following countries:

- Germany (annual return = -25.98%, t-stat = -6.23) regarding the European Football Championships;
- Japan (annual return = -24.16%; -29.89%, t-stat = -6.23; -7.24, respectively) regarding the 1998 Winter Olympic Games and the 2002 FIFA World Cup;
- Belgium (annual return = -15.65%, t-stat = -5.51) regarding the 2000 European Football Championships;

Moreover, results from one-tailed test used to test alternate hypothesis 2 indicate that there are 8 events (out of 27 events) that have significant higher annual returns than the mean in a particular event year for the following countries:

- United Stated (annual return = 18.54%; 34.74%, t-stat = 2.65; 8.26, respectively), regarding the 1984 and 1996 Summer Olympic Games;
- South Korea (annual return = 45.97%, t-stat = 2.77) regarding the 2002 FIFA World Cup;
- Greece (annual return = 63.22%, t-stat = 2.52) regarding the 2004 Summer Olympic Games;
- United Kingdom (annual return = 17.24%, t-stat = 2.11) regarding the 1996 European Football Championships;
- France (annual return = 30.75%, t-stat = 3.35) regarding the 1984 European Football Championships;

- Norway (annual return = 41.57%, t-stat = 2.91) regarding the 1994 Winter Olympic Games;
- Portugal (annual return = 39.26%, t-stat = 5.07) regarding the 2004 European Football Championships.

Six events out of eight have highly significant higher annual returns than the mean at the 1% significance level: United Stated regarding the 1984 and 1996 Summer Olympic Games; South Korea regarding the 2002 FIFA World Cup; France regarding the 1984 European Football Championships; Norway regarding the 1994 Winter Olympic Games and Portugal regarding the 2004 European Football Championships.

To conclude, the individual market's annual return performance in a particular event year are ranked in the middle according to the results of position in ranking the annual returns. However, there are four countries in which the stock market performed extremely well in the year when they hosted the particular event: Greece regarding the 2004 Summer Olympic Games, South Korea regarding the 2002 FIFA World Cup, Portugal regarding the 2004 European Football Championships and the United States regarding the 1996 Summer Olympic Games.

On the other hand, the following hosting countries' stock markets performed badly with negative annual returns in the year when they hosted the particular event: Japan regarding the 1998 Winter Olympic Games and 2002 FIFA World Cup, Germany regarding the 1988 European Football Championships, Belgium regarding the 2000 European Football Championships and the United States regarding the 2002 Winter

Olympic Games. Alternatively, in my sample, there is a situation where two mega-sporting events were co-hosted by two countries: the 2002 FIFA World Cup was co-organised by South Korea and Japan and the 2000 European Football Championships were co-organised by Belgium and Netherlands. Interestingly, to look at the stock market performance for the co-hosted events, South Korea performed well with statistically significant higher returns than the mean, compared with Japan with statistical significant lower returns than the mean when they co-hosted the 2002 FIFA World Cup. Although the annual return for Netherlands is positive, it is significantly lower than the mean annual returns, and Belgium had a significantly lower annual return than the mean when they co-hosted the 2000 European Football Championships.

Table 8.1: *Descriptive statistics of hosting countries' annual returns*

Table 8.1 summarises the mean, standard deviation, minimum, 1st quartile, median, 3rd quartile, maximum and the number of observations (in years) of annual returns for each host country, and the table also gives a breakdown of the exact annual return for a particular event year by hosting country, and the position in ranking of annual returns with 4 as the highest position and 1 as the lowest position.

Event hosting country	Mean	Std. Dev.	Min	1st Quartile	Med	3rd Quartile	Max	Observations (in years)
United States	10.91%	15.26%	-23.97%	0.91%	12.41%	24.00%	34.74%	28
South Korea	13.64%	49.51%	-67.25%	-13.94%	9.13%	32.14%	137.54%	18
Japan	11.16%	30.00%	-36.43%	-11.63%	11.06%	25.38%	98.15%	28
Spain	13.22%	31.39%	-38.59%	-9.45%	8.34%	28.65%	112.77%	28

Type of events	Event year start from 1980	Annual return in particular event year	Position in the ranking of Annual Returns (1-low to 4-high)
Summer Olympic Games	1984	18.54%	3
Summer Olympic Games	1996	34.74%	4
Winter Olympic Games	1980	8.16%	2
Winter Olympic Games	2002	-13.23%	1
FIFA World Cup	1994	6.76%	2
FIFA World Cup	2002	45.97%	4
Winter Olympic Games	1998	-24.16%	1
FIFA World Cup	2002	-29.89%	1
Summer Olympic Games	1992	11.59%	3

Continued

Table 8.1 continued

Event hosting country	Mean	Std. Dev.	Min	1st Quartile	Med	3rd Quartile	Max	Observations (in years)	Type of events	Event year start from 1980	Annual return in particular event year	Position in the ranking of Annual Returns (1-low to 4-high)
Australia	11.37%	22.86%	-27.08%	-5.96%	10.84%	29.93%	48.84%	28				
									Summer Olympic Games	2000	16.18%	3
Greece	24.15%	34.65%	-28.18%	11.78%	31.72%	42.23%	63.22%	5	Summer Olympic Games	2004	63.22%	4
United Kingdom	10.83%	16.08%	-17.77%	1.98%	13.09%	20.98%	46.31%	28				
									European Football Championships	1996	17.24%	3
Canada	10.86%	20.02%	-21.41%	-6.03%	11.95%	19.73%	52.54%	28				
									Winter Olympic Games	1988	11.65%	2
France	13.48%	27.27%	-34.44%	-7.49%	13.98%	30.60%	78.44%	28				
									Winter Olympic Games	1992	15.78%	3
									FIFA World Cup	1998	10.57%	2
									European Football Championships	1984	30.75%	3
Norway	18.09%	42.69%	-31.71%	-10.21%	4.37%	41.59%	173.66%	28				
									Winter Olympic Game	1994	41.57%	3

Continued

Table 8.1 continued

Event hosting country	Mean	Std. Dev.	Min	1st Quartile	Med	3rd Quartile	Max	Observations (in years)	Type of events	Event year start from 1980	Annual return in particular event year	Position in the ranking of Annual Returns (1-low to 4-high)
Italy	15.52%	37.35%	-27.90%	-5.58%	6.93%	27.87%	127.51%	28				
									Winter Olympic Games	2006	0.06%	2
									FIFA World Cup	1990	16.68%	3
									European Football Championships	1980	14.30%	3
Germany	12.29%	32.49%	-34.06%	-11.04%	10.39%	24.49%	131.45%	28				
									FIFA World Cup	2006	8.67%	2
									European Football Championships	1988	-25.98%	1
Belgium	12.52%	27.08%	-26.01%	-7.24%	8.60%	24.81%	71.86%	28				
									European Football Championships	2000	-15.65%	1
Netherlands	12.23%	18.25%	-23.53%	4.05%	11.50%	24.54%	54.25%	28				
									European Football Championships	2000	6.92%	2
Sweden	19.29%	30.30%	-31.47%	-0.49%	17.35%	38.04%	82.88%	28				
									European Football Championships	1992	12.09%	2
Portugal	8.65%	25.59%	-31.73%	-11.87%	2.26%	31.94%	43.96%	18				
									European Football Championships	2004	39.26%	4

Continued

Table 8.1 continued

Note. Due to the data availability on Thompson Financials DataStream, MSCI country indices starts from 1989, 2002, 1989 for South Korea, Greece and Portugal, respectively. For the other 13 countries, the number of observation is 28 (in year) for each, but for South Korea, Greece and Portugal, the number of observation is 18 (in year), 5 (in year) and 18 (in year), respectively. The Table 8.1 shows the descriptive statistics of Mean, Standard Deviation (Std. Dev), Minimum (Min), 1st quartile, Median (Med), 3rd quartile and Maximum (Max) and the number of observations (in years) of the hosting countries annual returns.

Table 8.2: *Significance test of annual return in a particular event year difference in the mean*

Table 8.2 shows the two types of significance test of annual returns in particular event year difference in the mean. The two-tailed test is to test alternate hypothesis 1 that under the null hypothesis the annual return in a particular event year is not equal to the mean. The one-tailed test is to test the alternate hypothesis 2 that under the null hypothesis the annual return in a particular event year is higher than the mean.

Event hosting country	Mean	Observations (in years)	Type of events	Event year	Annual return in event year	t-statistic	One-tailed test	Two-tailed test
United States	10.91%	28	Summer Olympic Games	1984	18.54%	2.65	***	++
			Summer Olympic Games	1996	34.74%	8.26	***	+++
			Winter Olympic Games	1980	8.16%	-0.95		
			Winter Olympic Games	2002	-13.23%	-8.37		+++
			FIFA World Cup	1994	6.76%	-1.44		
South Korea	13.64%	18	FIFA World Cup	2002	45.97%	2.77	***	++
Japan	11.16%	28	Winter Olympic Games	1998	-24.16%	-6.23		+++
			FIFA World Cup	2002	-29.89%	-7.24		+++
Spain	13.22%	28	Summer Olympic Games	1992	11.59%	-0.27		
			FIFA World Cup	1982	1.15%	-2.03		+
Australia	11.37%	28	Summer Olympic Games	2000	16.18%	1.11		
Greece	24.15%	5	Summer Olympic Games	2004	63.22%	2.52	**	+
United Kingdom	10.83%	28	European Football Championships	1996	17.24%	2.11	**	++
Canada	10.86%	28	Winter Olympic Games	1988	11.65%	0.21		
France	13.48%	28	Winter Olympic Games	1992	15.78%	0.45		
			FIFA World Cup	1998	10.57%	-0.57		
			European Football Championships	1984	30.75%	3.35	***	+++
Norway	18.09%	28	Winter Olympic Games	1994	41.57%	2.91	***	+++
Italy	15.52%	28	Winter Olympic Games	2006	0.06%	-2.19		++
			FIFA World Cup	1990	16.68%	0.17		
			European Football Championships	1980	14.30%	-0.17		
Germany	12.29%	28	FIFA World Cup	2006	8.67%	-0.59		
			European Football Championships	1988	-25.98%	-6.23		+++
Belgium	12.52%	28	European Football Championships	2000	-15.65%	-5.51		+++
Netherlands	12.23%	28	European Football Championships	2000	6.92%	-1.54		
Sweden	19.29%	28	European Football Championships	1992	12.09%	-1.26		
Portugal	8.65%	18	European Football Championships	2004	39.26%	5.07	***	+++

Note: *** (**, *) significant at 1% (5%, 10%) level for one-tailed test;
+++ (++, +) significant at 1% (5%, 10%) level for two-tailed test.

8 Chapter 8 Return Performances for Emerging Stock Market Sector Levels

In Chapter 6, the event study analysis results indicated that there are no impacts of announcement date on an 'emerging market' which is measured by MSCI country indices (the definition for 'emerging market' for Chapter 6 is a country with a short history of stock market compared within sample one, see Table D4). In this section, this dissertation evaluates the returns performance of the mega-sporting event announcement dates at sector levels for emerging markets. Investor Words (2007) stated that the emerging market means the financial market of developing country usually has had short operating history. Heakal (2003) stated that the major characteristic of emerging market economy is to increase in both local and foreign investment. Moreover, it provides a new factor for new source of revenue for investors. Nowadays, as the emerging market rapid develops, in the long-run the employment level will increase, the production level will rise and gross domestic product will rise for emerging market. The International Olympic Committee has announced that the Games of the XXIX Olympiad will be hosted in Beijing, China in 2008. In 2010, South Africa will host the FIFA World Cup, and the 2012 European Football Championships will be jointly hosted by Poland and Ukraine. It can be seen that more and more emerging markets are seeking this rare opportunity to try to achieve success in hosting mega-sporting events. To better understand how the mega-sporting events impact on stock market sector indices, this section focuses on the analysis of trading strategy. That is, to buy the sector indices on the date when the emerging market was announced to host the mega-sporting event and holding the sector indices for 1-day, 5-day, 10-day, 15-day and 20-day after the announcement date.

During the research period of interest from 1980 to 2007, there were six mega-sporting events consisting of two Summer Olympic Games, three FIFA World Cups, and one European Football Championships announced to be hosted by five emerging markets. These are: on 30th September 1981, South Korea was announced to host the 1988 Summer Olympic Games; on 13th July 2001, China was announced to host the 2008 Summer Olympic Games; on 20th May 1983, Mexico was announced to host the 1986 FIFA World Cup; on 31st May 1996, South Korea was announced to host the 2002 FIFA World Cup[11]; on 15th May 2004, South Africa was announced to host the 2010 FIFA World Cup; and on 18th April 2007, Poland was announced to host the 2012 European Football Championships.[12]

When examining the announcement date impact on sector indices, this study uses the daily data. Moreover, this study uses the DataStream based sector indices as the benchmark, so firstly the daily returns on the announcement date need to be included into the base date of DataStream sector indices. Due to this restriction, the announcement date for Mexico regarding the 1986 FIFA World Cup and the announcement date for South Africa regarding the 1988 Summer Olympic Game are earlier than the base date of DataStream sector indices. Consequently, this study only covers four mega-sporting events consisting of four emerging markets: China regarding the 2008 Summer Olympic Games; South Korea regarding the 2002 FIFA World Cup; South Africa regarding the 2010 FIFA World Cup; and on 18th April 2007, Poland, regarding the 2012 European Football Championships. The main reason for analysis of the observed returns for these four emerging markets, rather than using event study is that taking into account the small sample which is only four events consisting of four

[11] On the announcement date of 31st May 1996, South Korea and Japan were announced to co-host the 2002 FIFA World Cup. In this study, they are considered as separate events.
[12] On the announcement date of 18th April 2007, Poland and Ukraine were announced to co-host the 2012 European Championship. In this study they are considered as separate events.

countries, the results for event study may not be significant. Therefore, analysis is limited to trading strategy.

There are ten main sector indices for both China A share and South Korea: Oil and Gas, Basic Materials, Industrials, Consumer Goods, Health Care, Consumer Services, Telecom, Utilities, Financials and Technology, respectively. Under those ten main sector indices, there are a total of 93 sub sector indices and 61 sub sector indices for China A share and South Korea, respectively. In addition, there are nine main sector indices for Poland: Oil & Gas, Basic Materials, Industrials, Consumer Goods, Health Care, Consumer Services, Telecom, Financials and Technology. There are also 46 sub sector indices. Moreover, there are eight main sector indices for China B&H share: Oil and Gas, Basic Materials, Industrials, Consumer Goods, Consumer Services, Utilities, Financials and Technology. Under those eight main sector indices, there are a total of 30 sub sector indices. For South Africa, there are eight main sector indices: Oil & Gas, Basic Materials, Industrials, Consumer Goods, Health Care, Consumer Services, Telecom, and Financials, and 66 sub sector indices[13].

The study period for China A share, China B&H share, South Africa, Poland starts from 1st October 1999 to 1st October 2007 with 2087 observations (in daily) which are used to rank the position for 1-day, 5-day, 10-day, 15-day and 20-day main sector indices returns. For South Korea, the announcement date is earlier compared to others. Therefore, the study period for South Korea starts from 2nd October 1995 to 1st October 2007 with 3131 observations (in daily) which are used to rank the position for 1-day, 5-day, 10-day, 15-day and 20-day main sector indices returns. It is important to note that

[13] For China, the DataStream based sector indices are divided into two separate part: China A share and China B&H share.

if the announcement date is a non-trading day, then the next available trading day is defined as the event day.

Table 9 shows the breakdown of emerging markets main sector indices 1-day, 5-day, 10-day, 15-day and 20-day returns after the announcement date and ranking of distribution according to the whole observations. Panel A reports the China A share main sector indices returns; the results indicate that taking a long position on the main sector indices 5-day after the announcement is the better trading strategy than the other four which can make positive returns especially on Health Care, Financials and Technology main sector indices, but not Telecom and Industrials sector indices.

The results in Panel B show that the stock prices for China B&H sector indices were decreasing after the announcement, therefore, taking the short position will make a profit.

The results in Panel C indicate that there are obvious impacts on Poland's main sector indices. The significant impact is on the Industrials index, 20 days after the announcement, the stock price is still higher than the price on announcement date and the best trading strategy is to take a long position on 5-day after the announcement where the profit is the highest, which is about 7.5 percent. Moreover, during the period of interest from 1st October 1999 to 1st October 2007, the 1-day, 5-day, 10-day, 15-day and 20-day returns on the Industrials index are all in the higher ranking position at 9, 10, 10, 10 and 8, respectively. In addition, for the Consumer Goods index, the stock price increased significantly 5-day after the announcement. Taking the long position, 10-day after the announcement on the Financials index and 20-day on the Technology index, the investor can make higher and positive returns. Panel D shows that in holding the

sector indices longer, the profit is larger. This is especially true for the Basic Materials index, and if a long position is taken on 20-day after the announcement, the profit is about 5.34 percent. Moreover, taking a long position on Telecom and Financials indices 15-day after the announcement, the profits are 15.88 percent and 7.58 percent, respectively. The results in Panel E show that there is only small short-term positive impact if a long position is taken on the Oil and Gas index and Technology index 1-day and 5-day after the announcement date, respectively.

Table 9: *Emerging markets main sector indices returns and the ranking of distribution*

The table 9 shows the several short-term returns for the emerging stock market main sector indices and the ranking position for 1-day, 5-day, 10-day, 15-day and 20-day main sector indices returns. Dividing the total number of observations into 10 equal groups, the position of each return is ranking from 1 for the smallest to 10 for the biggest.

Main sector indices	1-day return	Dist.	5-day return	Dist.	10-day return	Dist.	15-day return	Dist.	20-day return	Dist.
Panel A: China A share										2087 observations
Oil & Gas	-1.48%	2	0.62%	7	-5.01%	1	-9.74%	1	-11.31%	1
Basic Materials	-0.50%	4	0.81%	8	-3.14%	1	-6.56%	1	-7.69%	1
Industrials	-0.41%	4	-0.19%	5	-10.11%	1	-17.37%	1	-18.37%	1
Consumer Goods	-0.94%	3	0.16%	6	-5.46%	1	-10.80%	1	-11.55%	1
Health Care	0.64%	8	2.41%	10	-1.97%	1	-8.00%	1	-6.67%	1
Consumer Services	-0.51%	3	0.41%	7	-4.90%	1	-10.62%	1	-10.23%	1
Telecom	-1.92%	3	-2.05%	2	-14.96%	1	-19.87%	1	-18.84%	1
Utilities	-0.74%	3	0.16%	6	-6.22%	1	-9.27%	1	-8.28%	1
Financials	-0.03%	5	2.61%	10	-1.50%	2	-6.93%	1	-9.82%	1
Technology	-0.38%	4	1.16%	8	-11.11%	1	-14.53%	1	-12.83%	1
Panel B: China B&H share										2087 observations
Oil & Gas	-3.32%	1	-6.45%	1	-2.39%	1	-6.61%	1	-9.61%	1
Basic Materials	-0.77%	3	-8.80%	1	-13.22%	1	-23.03%	1	-19.03%	1
Industrials	-0.18%	4	-5.45%	1	-12.23%	1	-24.53%	1	-19.48%	1
Consumer Goods	-0.06%	5	-6.97%	1	-10.48%	1	-19.44%	1	-16.35%	1
Consumer Services	-1.47%	2	-5.99%	1	-5.19%	1	-14.77%	1	-13.38%	1
Utilities	0.11%	6	-4.76%	1	-4.96%	1	-12.73%	1	-9.46%	1
Financials	0.62%	7	1.69%	9	-9.49%	1	-17.48%	1	-12.53%	1
Technology	-0.98%	2	-8.48%	1	-11.41%	1	-18.27%	1	-18.83%	1
Panel C: Poland										2087 observations
Oil & Gas	-0.40%	4	-2.78%	1	0.00%	6	0.87%	7	6.92%	10
Basic Materials	-1.25%	2	-3.49%	1	-1.08%	2	0.05%	5	-3.07%	1
Industrials	1.14%	9	7.50%	10	6.14%	10	2.89%	10	0.69%	8
Consumer Goods	-1.01%	2	-1.02%	2	3.22%	10	-1.66%	1	3.11%	10
Health Care	0.99%	9	-0.49%	2	-2.46%	1	-3.45%	1	-6.41%	1
Consumer Services	-0.30%	5	-2.73%	1	-0.98%	3	-3.73%	1	-9.19%	1
Telecom	-0.40%	4	-6.35%	1	-5.42%	1	-6.71%	1	-6.70%	1
Financials	-1.10%	2	1.42%	9	3.00%	10	2.83%	10	0.29%	7
Technology	-0.74%	3	-2.50%	1	-0.59%	3	-1.97%	2	4.49%	10
Panel D: South Africa										2087 observations
Oil & Gas	-2.89%	1	-0.02%	5	6.26%	10	3.24%	10	-1.87%	2
Basic Materials	-0.65%	3	1.49%	9	2.02%	9	3.52%	10	5.34%	10
Industrials	-1.60%	1	-0.72%	3	1.01%	9	-0.19%	4	-0.75%	3
Consumer Goods	-2.35%	1	-3.58%	1	4.82%	10	1.98%	9	3.46%	10
Health Care	-1.21%	1	-0.97%	2	1.47%	10	1.80%	10	0.68%	8
Consumer Services	-0.56%	3	-0.87%	2	2.51%	10	3.48%	10	4.38%	10
Telecom	0.23%	6	2.77%	10	10.43%	10	15.88%	10	7.45%	10
Financials	-0.72%	4	0.71%	7	7.18%	10	7.58%	10	6.94%	10

Continued

Table 9 continued

Main sector indices	1-day return	Dist.	5-day return	Dist.	10-day return	Dist.	15-day return	Dist.	20-day return	Dist.
Panel E: South Korea									3131 observations	
Oil & Gas	3.47%	10	2.42%	9	2.72%	9	0.06%	6	-3.73%	1
Basic Materials	-1.06%	3	-1.78%	2	-5.53%	1	-5.32%	1	-9.88%	1
Industrials	-0.18%	5	-2.88%	1	-3.45%	1	-5.65%	1	-9.03%	1
Consumer Goods	-0.10%	5	-0.58%	4	-2.44%	2	-5.72%	1	-10.09%	1
Health Care	0.17%	6	4.24%	10	-5.97%	1	-1.09%	3	-7.59%	1
Consumer Services	-0.77%	3	0.49%	7	-8.84%	1	-9.80%	1	-13.78%	1
Telecom	-0.46%	4	1.73%	9	-11.70%	1	-11.89%	1	-14.47%	1
Utilities	-0.62%	4	-0.19%	5	-4.77%	1	-6.31%	1	-7.30%	1
Financials	-2.61%	2	-0.60%	4	-5.59%	1	-4.82%	1	-7.13%	1
Technology	6.31%	10	12.77%	10	-5.83%	1	-1.66%	3	-0.06%	5

Note. Dist. denotes the ranking of distribution.
The ranking of distribution can only be 1 to 10 from the smallest to the largest. e.g. 1 is the return on the lowest 10% of total observation, and 10 is the return on the highest 10% of total observation.

Table 10 shows the ranking of emerging market sub sector indices 1-day, 5-day, 10-day, 15-day and 20-day returns, respectively. Panel A shows the results of the highest three and lowest three sub sector indices for China A share. The significant impacts are on the Beverages sub sector index, which is under the Consumer Goods main sector index, and on Real Estate, Real Estate Hold and Develop sub sector indices under the Financials main sector index especially 5-day after the announcement. Moreover, there is a significant negative impact on the Computer Service index, which is under the Technology main sector index.

The results shown in Panel B indicate that there is an obvious positive 1-day impact on the Beverages, Food & Beverages, and Brewers indices under the Consumer Goods main sector indices on China B&H share. Panel C reports the results of the impacts on Poland's sector indices. The results show that the most impacts are on the Heavy Construction, Construction Material, Industry Goods and Services sub sector indices under the Industrials main index; Steel and Aluminium sub sector indices under the Basic Material main index; and Personal Goods, Clothes & Accessories sub sector indices under the Consumer Goods main sector index. Panel D shows the South Africa sub sector indices impacts. The main impacts are also on the Investment Services,

Heavy Construction sub indices under the Industrials main sector index; Steel, Aluminium and Industry Materials sub sector indices under the Basic Material main index; Broadcast & Entertainment sub index under the Consumer Services main index; and Mobile & Telecom sub sector indices under the Telecom main sector index. The results in Panel E indicate the same as with China A share, most impacts are on the Beverage, Soft Drink, and Brewers sub sector indices under the Consumer Goods main sector index.

Summarising the results on emerging market sector indices, for China A share, there are positive and higher returns 5-day after the announcement on the Beverages sub sector index under the Consumer Goods main sector index and on the Real Estate sub sector index under the Financials main sector index. Moreover, it seems that there is short-term impact just 1-day after the announcement on the Beverage, Brewers sub sector indices under the Consumer Goods main sector index, and a 5-day positive impact on Financial Services and Real Estate sub indices under Financials main sector index for China B share. In addition, there are longer impacts on the Industrials, Basic Material main sector index for Poland and South Africa. Furthermore, the Beverages, Brewers and Soft Drink sub sector indices under the Consumer Goods main sector index have the most significant impact on 1-day, 5-day, 10-day, 15-day and 20-day returns especially 5-day after the announcement. Consequently, it seems that for the emerging markets, the most significant impacts are on the Consumer Goods sector especially the Beverages, Brewers and Soft Drinks sub sector, and on the Industrials sector especially the Heavy Construction, Industrial Goods, Construction Material sub sectors, and the related Basic Material sector.

Table 10: *Ranking of emerging markets sub sector indices returns*

The table 10 shows the highest three and lowest three 1-day, 5-day, 10-day, 15-day and 20-day returns for emerging market sub sector indices

1-day return		5-day return		10-day return		15-day return		20-day return	
Panel A: China A share								93 sub sector indices	
				Highest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Beverages	4.64%	Beverages	8.13%	Beverages	4.21%	Real Estate	-0.54%	R/E Hld & Dvlp	0.46%
Industry Energy	2.93%	Real Estate	6.99%	Tires	2.04%	R/E Hld & Dvlp	-0.54%	Real Estate	0.46%
Food & Bev	1.80%	R/E Hld & Dvlp	6.99%	Industry Energy	1.79%	Beverages	-1.70%	Beverages	-0.52%
				Lowest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Computer Services	-4.13%	Food Products	-8.19%	Computer Services	-25.92%	Computer Services	-34.63%	Computer Services s	-28.90%
Food Producers	-3.36%	Computer Services	-8.08%	S/W & Comp Svs	-17.93%	S/W & Comp Svs	-26.03%	Industry Energy	-23.96%
Food Products	-2.37%	S/W & Comp Svs	-4.20%	Food Products	-16.28%	Telecom Eq	-24.50%	S/W & Comp Svs	-23.49%
Panel B: China B&H share								30 sub sector indices	
				Highest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Food & Beverages	5.60%	Coal	2.36%	Travel & Tourism	-0.73%	Int Oil & Gas	-5.32%	Int Oil & Gas	-9.20%
Beverages	5.60%	Financial Services	1.69%	Int Oil & Gas	-1.90%	Oil & Gas Prod	-5.32%	Oil & Gas Prod	-9.22%
Brewers	5.60%	Real Estate	1.69%	Oil & Gas Prod	-1.90%	Travel & Tourism	-9.34%	Electricity	-9.46%
				Lowest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Industry Machinery	-13.05%	Industry Machinery	-13.92%	Tch H/W & Eq	-22.65%	Tch H/W & Eq	-30.10%	Build Mat/Fixt	-27.17%
Travel & Tourism	-5.76%	Brewers	-13.09%	Build Mat/Fixt	-19.45%	Coml Veh/Truck	-29.58%	Tch H/W & Eq	-25.93%
Coal	-3.94%	Food & Bev	-13.09%	Coml Veh/Truck	-17.21%	Industry Energy	-27.57%	Commodity Chem	-23.51%

Continued

Table 10 continued

1-day return		5-day return		10-day return		15-day return		20-day return	
Panel C: Poland								46 sub sector indices	
				Highest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Heavy Con	3.47%	Heavy Con	13.49%	Cloth & Access	12.70%	Aluminium	11.78%	Investment Services	18.13%
Apparel Retail	2.07%	Con & Mat	7.92%	Personal Goods	12.69%	Steel	11.08%	General Finance	18.13%
Retail	1.93%	Inds Gds & Svs	3.24%	Pers & H/H Gds	12.67%	Heavy Con	6.09%	Steel	16.48%
				Lowest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Pers & H/H Gds	-3.74%	Int Oil & Gas	-6.37%	Int Oil & Gas	-6.37%	Real Estate	-10.81%	Brdcst & Ent	-16.00%
Cloth & Access	-3.74%	Fxd Line T/Cm	-6.35%	Nonferrous Met	-6.08%	R/E Hld & Dvlp	-10.81%	Media	-12.89%
Personal Goods	-3.74%	Personal Goods	-5.04%	Brdcst & Ent	-5.42%	Computer Services	-6.29%	Nonferrous Met	-11.67%
Panel D: South Africa								66 sub sector indices	
				Highest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Brdcst & Ent	2.05%	Consumer Financials	7.98%	Mobile T/Cm	14.88%	Steel	20.10%	Steel	21.55%
Int Oil & Gas	1.50%	Steel	7.40%	Brdcst & Ent	13.18%	Industrial Material	20.09%	Industrial Material	21.54%
Oil & Gas Prod	1.33%	Industrial Material	7.39%	Industrial Material	11.54%	Mobile T/Cm	17.97%	Brdcst & Ent	17.29%
				Lowest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Heavy Con	-5.04%	Distil & Vint	-6.54%	Distil & Vint	-6.54%	Distil & Vint	-5.30%	Heavy Con	-7.19%
General Mining	-4.82%	Build Mat/Fixt	-3.75%	Build Mat/Fixt	-3.72%	Spec Chem	-4.49%	Gold Mining	-6.93%
Mining	-4.10%	Pers & H/H Gds	-3.59%	Con & Mat	-2.61%	Broadline Rtl	-3.70%	Distil & Vint	-5.24%

Continued

Table 10 continued

1-day return		5-day return		10-day return		15-day return		20-day return	
Panel E: South Korea								61 sub sector indices	
				Highest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Tch H/W & Eq	6.31%	Support Services	15.33%	Soft Drinks	12.04%	Beverages	14.29%	Beverages	4.44%
Beverages	5.08%	Bus Support Services	15.33%	Marine Transport	11.11%	Brewers	14.28%	Brewers	4.44%
Brewers	5.08%	Soft Drinks	13.09%	Tires	2.60%	Soft Drinks	9.42%	Soft Drinks	2.62%
				Lowest 3					
Sector index	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**	**Sector index**	**returns**
Industry Machinery	-3.16%	Automobiles	-4.43%	Mobile T/Cm	-17.26%	Mobile T/Cm	-15.42%	Airlines	-17.47%
Banks	-3.10%	Steel	-4.10%	Cloth & Access	-12.79%	Airlines	-13.54%	Cloth & Access	-17.44%
Elec Compo/Eq	-2.87%	Industry Machinery	-3.68%	Fxd Line T/Cm	-11.70%	Fxd Line T/Cm	-11.89%	Industry Transport	-17.27%

Note: The sub indices name are obtained from Thompson Financials DataStream, for the following sub indices names are abbreviated: R/E Hld & Dvlp (R/E Hold & Development); Telecom Eq (Telecom Equipment); S/W & Comp Svs (S/W & Computer Services); Int Oil & Gas (Industry Oil & Gas); Tch H/W & Eq (Technology H/W Equipment); Coml Veh/Truck (Commercial Vehicle & Truck); Commodity Chem (Commodity Chemicals); Heavy Con (Heavy Construction); Con & Mat (Construction & Material); Cloth & Access (Clothes & Accessories); Inds Gds & Svs (Industry Goods & Services); Pers & H/H Gds (Personal H/H Goods); Brdcst & Ent (Broadcast & Entertainment); Fxd Line T/Cm (Fixed Line Telecom); Spec Chem (Special Chemicals); Broadline Rtl (Bord line Retail); Elec Compo/Eq (Electronic Component/Equipment); Mobile T/Cm (Mobile Telecom).

9 Chapter 9 Conclusions

The main aim of this research has been to analyse the stock market reaction on four major international mega-sporting events: Summer Olympic Games, Winter Olympic Games, FIFA World Cups and European Football championships. This research not only uses the event study methodology to evaluate the speed at which the information such as the announcement date, event beginning date, event end date is reflected to the stock price, but also uses return performances to examine the individual stock markets in the year of hosting the mega-sporting event and the best trading strategy on emerging markets sector indices.

9.1 Key research findings for event study

In Chapter 6, the cumulative average abnormal performances have been presented by using three models: mean-adjusted model, market-adjusted model and market model, respectively and also tested by using the standard Student's t-test and cross-sectional independent test.

The results of analysis of the announcement date impact of a mega-sporting event on the whole stock market indicate no evidence that the mega-sporting event announcement date has a positive effect on hosting countries cross-sectionally for 32 events. This finding is consistent with the results of Martins and Serra (2007). However, Martins and Serra used the abnormal returns measurement and the result showed that no significant benefit would be generated from the Summer and Winter Olympic Games, the World Football Cup, the European Football cup and World and specialized exhibitions. Moreover, by splitting the sample into different ages of stock market, the announcement dates do not have effect on either 'mature market' or 'emerging market'.

In addition, there is no significant announcement impact of hosting countries with either small or larger market capitalization. On the other hand, the analysis of event beginning date and end date impact of mega-sporting events on the whole stock market indicates that there is no impact of event beginning date on the whole stock market. However, there is a significant negative impact of event end date occurring in the period of [-20, 20], and also for [0, 20] and [0, 1] asymmetric window when using mean-adjusted returns and market-adjusted returns as benchmarks.

9.2 Key research findings on individual stock market

Chapter 7 examines the annual return performance in the year when the country hosted the mega-sporting events. In total, 27 events were covered since the 1980s, which include five Summer Olympic Games, seven Winter Olympic Games, seven FIFA World Cups and eight European Football Championships.

The results show that for 15 events out of 27 events the annual returns are significantly different from the mean returns. Especially for the following four countries in which the stock market performed extremely well in the year when they hosted the particular event: Greece with the annual return of 63.22 percent regarding the 2004 Summer Olympic Games, South Korea with the annual return of 45.97 percent regarding the 2002 FIFA World Cup, Portugal with the annual return of 39.26 percent regarding the 2004 European Football Championships and United States with the annual return of 34.74 percent regarding the 1996 Summer Olympic Games. On the other hand, in the following hosting countries the stock market performed badly with negative annual returns in the year when they hosted the particular event: Japan had negative annual return of 24.16 percent, and 29.89 percent regarding the 1998 Winter Olympic Games and 2002 FIFA World Cup, respectively, Germany had negative annual return of 25.98

percent regarding the 1988 European Football Championships, Belgium with negative annual return of 15.65 percent regarding the 2000 European Football Championships and the United States with negative annual return of 13.23 percent regarding the 2002 Winter Olympic Games.

9.3 Key research findings for emerging market sector levels

In Chapter 8, this dissertation evaluated the 1-day, 5-day, 10-day, 15-day and 20-day return performances in order to examine the trading strategy for emerging market sector indices.

Summarising the results on emerging market sector indices, the best trading strategy is to buy China A share on announcement date and take a long position 5-day after the announcement, on the Beverages sub sector index under the Consumer Goods main sector index and Real Estate sub sector index under the Financials main sector index, which can make 8.13 percent return. Moreover, there is short-term benefit when using 1-day strategy on the Beverage and Brewers sub sector indices under the Consumer Goods main sector index for China B share. Furthermore, there are positive returns on Industrials, Basic Material main sector index for Poland and South Africa especially using the 20-day trading strategy. The Beverages, Brewers and Soft Drink sub sector indices under the Consumer Goods main sector index have the most significant impact on 1-day, 5-day, 10-day, 15-day and 20-day returns especially 5-day after the announcement for South Korea.

Consequently, the event study analysis results of this dissertation suggest that there is no announcement effect on the overall stock market, despite splitting the stock market into different ages of stock market or different size of market capitalization. Moreover,

there is also no event beginning date effect on the overall stock market. However, there is a significant negative effect on event end date by [-20, 20], [0, 20] and [0, 1] event window. The annual return performance results in the year of hosting the mega-sporting event indicate that 15 out of 27 events do have annual returns that are significantly different from the mean. Moreover, 8 out of the 27 events have significant higher annual returns than the mean; especially for the following events, the hosting countries have significantly higher annual returns at 1 percent significance level: United States regarding the 1984 and 1996 Summer Olympic Games; South Korea regarding the 2002 FIFA World Cup; France regarding the 1984 European Football Championships; Norway regarding the 1994 Winter Olympic Games and Portugal regarding the 2004 European Football Championships. Furthermore, the result of annual return performance around announcement dates for the emerging markets sector indices shows that the most significant impacts are on the Consumer Goods sector especially the Beverages, Brewers and Soft Drinks sub sector, and on the Industrials sector especially the Heavy Construction, Industrial Goods, Construction Material sub sectors, and the related Basic Material sector.

References

Ashton, J. K., Gerrard, B., & Hudson, R. (2003). Economic impact of national sporting success: evidence from the London stock exchange. *Applied Economics Letters, 10*, 783-785.

Baade, R., & Matheson, V. (2002). Bidding for the Olympics: fools gold? In C. P. Barros, M. Ibrahimo, & S. Szymanski (eds), *Transatlantic Sport: The comparative economics of North American and European sports (pp.* 127-151). London: Edward Elgar

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, *6(2),* 159-178.

Beaver, W., & Dukes, R. (1972). Inter-period tax allocation, earnings expectations, and the behaviour of security prices. *The Accounting Review, 47*(2), 320-332.

Berman, G., Brooks, R., & Davidson, S. (2000). The Sydney Olympic Games announcement and Australian stock market reaction. *Applied Economics Letters, 7*, 781-784.

Binder, J. J. (1998). The event study methodology since 1969. *Review of Quantitative Financial and Accounting, 11*, 111-137.

Blake, A. (2005). *The economic impact of the London 2012 Olympics*. Retrieved October 29, 2007, from http://www.nottingham.ac.uk/ttri/pdf/2005_5.pdf

Bodie, Z., Kane, A., & Marcus, A. J. (2005). *Investments* (6th ed.). New York: McGraw-Hill / Irwin.

Boehmer, E., Musumeci, J., & Poulsen, A. B. (1991). Event-study methodology under conditions of event-induced variance. *Journal of Financial Economics, 30*(253-272).

Bowman, R. G. (1983). Understanding and conducting event studies. *Journal of Business Finance & Accounting, 10*(4), 561-584.

Boyle, G., & Walter, B. (2001, May). *Reflected glory and failure: international sporting success and the stock market.* Retrieved September 9, 2007, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=269288

Boyle, G., & Walter, B. (2003). Reflected glory and failure: international sporting success and the stock market. *Applied Financial Economics, 13*(3), 225-236.

Brown, S. J., & Warner, J. B. (1980). Measuring security price performance *Journal of Financial Economics, 8*, 205-258.

Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: the case of event studies. *Journal of Financial Economics, 14*, 3-31.

Brunet, F. (1995). *An economic analysis of the Barcelona' 92 Olympic Games: resources, financing and impact.* Retrieved October 23, 2007, from http://olympicstudies.uab.es/pdf/wp030_eng.pdf

Burgan, B., & Mules, T. (1992). Economic impact of sporting events. *Tourism Management, 19*(4), 700-710.

Campbell, J. Y., Lo, A. W., & Mackinlay, A. C. (1997). *The econometrics of financial markets*. Princeton, New Jersey: Princeton University Press.

China Daily. (2007, January 12). *Olympics to keep stock market boom alive*. Retrieved September 10, 2007, from http://www.chinadaily.com.cn/2008/2007-01/12/content_782050.htm

Collins, D. W., Rozeff, M. S., & Dhaliwal, D. S. (1981). The economic determinants of the market reaction to proposed mandatory accounting changes in the oil and gas industry: a cross-sectional analysis. *Journal of Accounting and Economics, 3*(1), 37-71.

CREA/ NSW Treasury. (1997). *The economic impacts study of the Sydney Olympic Games* (No. TRP97-10). Sydney: New South Wales Treasury Research and Information Paper.

Daniels, M. J., Norman, W. C., & Henry, M. S. (2004). Estimating income effects of a sport tourism event. *Annals of Tourism Research, 31*(1), 180-199.

Dolley, J. C. (1933). Characteristics and procedure of common stock split-ups. *Harvard Business Review*, 316-326.

Dos Santos, B. L., Peffers, K., & Mauer, D. C. (1993). The impact of information technology investment announcements on the market value of the firm. *Information Systems Research, 4*(1), 1-23.

Edmans, A., García, D., & Nor, Ø. (2007). Sports sentiment and stock returns. *Journal of Finance, 6*(4), 1967-1998.

Elfakhani, S., & Lung, T. (2003). The effect of split announcements on Canadian stocks. *Global Finance Journal, 14*, 197-216.

Europe's Football Website. (2007). *UEFA European Championship*. Retrieved July 27, 2007, from http://www.uefa.com/competitions/euro/history/index.html

Fama, E. F. (1970). Efficient capital market: a review of theory and empirical work *The Journal of Finance, 25*(2), 383-417.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. *International Economic Review, 10*(1), 1-21.

FIFA World Cup™. (2007). *Previous FIFA World Cups™*. Retrieved July 27, 2007, from http://www.fifa.com/worldcup/archive/index.html

Glisson, P. C., & Arbes, T. P. (1996). Economic impact on the State of Georgia of hosting the 1996 Olympic Games. *Government Finance Review, 12*(3), 19-21.

Gratton, C., Dobson, N., & Shibli, S. (2000). The economic importance of major sports events: a case-study of six events. *Managing Leisure, 5*(1), 17-28.

Greene, S. J. (2003). Staged cities: mega-events, slum clearance, and global capital. *Yale Human Rights and Development Law Journal, 6*, 161-188.

Heakal, R. (2003, July 30). *What is an emerging market economy?* Retrieved September 25, 2007, from http://www.investopedia.com/articles/03/073003.asp

Henderson, G. V. (1990). Problems and solutions in conducting event studies. *The Journal of Risk and Insurance, 57*(2), 282-306.

Huang, C. J., Ho, S. H., & Wu, C. Y. (2007). The impact of the Asian tsunami attacks on tourism-related industry stock return. *Journal of American Academy of Business, Cambridge, 12*(1), 77-82.

Humphreys, J. M., & Plummer, M. K. (1995). The economic impact of hosting the 1996 Summer Olympics. Retrieved September 25, 2007, from http://www.selig.uga.edu/forecast/olympics/OLYMTEXT.HTM

The Impact of the 2004 Olympic Games on Sectors of the Economy. Retrieved September 27, 2007, from http://www.acci.gr/trade/No19/04-11.pdf

Investor Words. (2007). *Emerging market*. Retrieved September 25, 2007, from http://www.investorwords.com/1693/emerging_market.html

Kasimati, E. (2003). Economic aspects and the Summer Olympics: a review of related research. *The International Journal of Tourism Research, 5*, 433-444.

Kim, J. G., Rhee, S. W., Yu, J. C., Koo, K. M., & Hong, J. D. (1989). *Impact of the Seoul Olympic Games on national development*. Seoul: Korea Development Institute.

KPMG Peat Marwick. (1993). *Sydney Olympic 2000: Economic impact study*. Volumes 1 and 2. Sydney: Sydney Olympics Bid Ltd.

Kusnadi, J., & Sohrabian, A. (1999). The impact of insurance mergers on shareholder returns. *Cal Pomona Journal of Interdisciplinary Studies, 12*, 109-116.

Lee, C. K., & Taylor, T. (2005). Critical reflections on the economic impact assessment of a mega-event: the case of 2002 FIFA World Cup. *Tourism Management, 26*, 595-603.

Madden, J. R. (2002). The economic consequences of the Sydney Olympics: the CREA/Arthur Andersen study. *Current Issues in Tourism, 5*(1), 7-21.

Madden, J. R., & Crowe, M. (1997). Estimating the economic impact of the Sydney Olympic Games. Retrieved September 27, 2007, from http://www.ersa.org/ersaconfs/ersa98/papers/498.pdf

Martins, A. M., & Serra, A. P. (2007). Market impact of international sporting and cultural events. *FEP Working Papers*. Retrieved June 15, 2007, from http://www.holycross.edu/departments/economics/RePEc/spe/SerraMartins_MarketImpact.pdf

Matheson, V. A., & Baade, R. A. (2004). Mega-sporting events in developing nations: playing the way to prosperity. *The South African Journal of Economics, 72*(5), 1085-1092.

Official Website of the Olympic Movement. (2007). *Olympic Games*. Retrieved July 28, 2007, from http://www.olympic.org/uk/games/index_uk.asp

Ramanathan, R. (2002). *Introductory Econometrics with Applications* (5th ed.). Ohio: South-Western College Publishers.

Roche, M. (1994). Mega-events and urban policy. *Annals of Tourism Research, 21*(1), 1-19.

Sports Business. (2001, September 27). *2006 Decision: South Africa stocks slump after shock decision.* Retrieved September 10, 2007, from http://www.sportbusiness.com/news/139549/2006-decision-south-africa-stocks-slump-after-shock-decision

Subramani, M., & Walden, E. (2001). The impact of e-commerce announcements on the market value of firms. *Information Systems Research, 12*(2), 135-154.

The Handbook of World Stock. (1998). *Derivative and commodity exchanges*. London: IFR Publishing.

Thompson, J. E. (1988). More method that make little difference in event studies. *Journal of Business Finance & Accounting, 15*, 77-86.

Tian, J. (2006). *The 2008 Olympic Games: leveraging a "best ever" Games to benefit Beijing*. Unpublished master thesis, Auckland University of Technology, Auckland.

Tziralis, G., Tolis, A., Tatsiopoulos, I., & Aravossis, K. G. (2006). *Economic Aspects and Sustainability Impact of the Athens 2004 Olympic Games*. Retrieved October 27, 2007, from http://gtziralis.googlepages.com/EconomicAspectsSustainabilityImpactO.pdf

URS Finance and Economics. (2004). *Economic impact of the Rugby World Cup 2003 on the Australian economy – post analysis.* Retrieved September 29, 2007, from http://www.ausport.gov.au

Veraros, N., Kasimati, E., & Dawson, P. (2004). The 2004 Olympic Games announcement and its effect on the Athens and Milan stock exchanges. *Applied Economics Letters, 11*, 749-753.

Wilkens, S., & Wimschulte, J. (2005). Price and volume effects associated with 2003's major reorganization of German stock indices. *Financial Markets and Portfolio Management, 19*(1), 61-98.

Willner, J. (2007, April 8). *1988 Korean Olympics and macro effects: what's there?* Retrieved October 23, 2007, from https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=SERC2007&paper_id=171

Witt, S. F. (1988). Mega-events and mega-attractions. *Tourism Management, 9*(1), 76-77.

World Development Indicators Database. Retrieved August 25, 2007, from http://devdata.worldbank.org/query/default.htm

Zhang, Y., & Zhao, K. (2007). Impact of Beijing Olympic-related investments on regional economic growth of China: interregional input–output approach. *Asian Economic Journal, 21*(3), 261-282.

Appendix A

Table A2: *Local stock market index returns one year before games start among four recent major international mega-sporting events*

Event year	Host country	Index	Returns
Panel A. Summer Olympic Games			
1984	USA	S&P 500 COMPOSITE	19.22%
1988	Korea	KOSPI	92.62%
1992	Spain	IBEX 35	15.76%
1996	USA	S&P 500 COMPOSITE	34.11%
2000	Australia	S&P ASX 200	14.72%
2004	Greece	ASE	29.46%
Panel B. Winter Olympic Games			
1980	USA	S&P 500 COMPOSITE	12.31%
1988	Canada	S&P/TSX COMPOSITE	3.06%
1992	France	FRANCE CAC 40	16.32%
1998	Japan	TOPIX	-20.12%
2002	USA	S&P 500 COMPOSITE	-13.04%
2006	Italy	MILAN MIDEX	6.24%
Panel C.FIFA World Cups			
1994	USA	S&P 500 COMPOSITE	6.82%
2002	South Korea	KOSPI	37.47%
2002	Japan	TOPIX	-19.59%
2006	Germany	MDAX FRANKFURT	36.13%
Panel D. European Football Championships			
1992	Sweden	OMX STOCKHOLM 30	11.01%
1996	UK	FTSE 100	20.35%
2000	Belgium	BEL 20	-5.79%
2000	Netherlands	AEX	25.46%
2004	Portugal	PORTUGAL PSI-20	15.84%

Note: The data were collected from Thompson Financials DataStream

Appendix B

Table C1: *Total mega-sporting events information: event announcement dates, event beginning/end dates, hosting countries, candidate countries and bid losing countries*

Panel A. Summer Olympic Games

Event taking place year	Event starting date	Event ending date	Announcement date	Hosting country	Candidate countries	Losing country at the last voting round
1980	19th Jul 1980	3rd Aug 1980	23rd Oct 1974	Soviet Union	USA	USA
1984	28th Jul 1984	12th Aug 1984	18th May 1978	USA	None	none
1988	17th Sep 1988	2nd Oct 1988	30th Sep 1981	South Korea	Japan	Japan
1992	25th Jul 1992	9th Aug 1992	17th Oct 1986	Spain	Netherlands, Yugoslavia, UK, Australia, France	France
1996	19th Jul 1996	4th Aug 1996	18th Sep 1990	USA	Greece, Yugoslavia, UK, Australia, Canada	Greece
2000	15th Sep 2000	1st Oct 2000	23rd Sep 1993	Australia	China, Germany, Turkey, UK	China
2004	13th Aug 2004	29th Aug 2004	5th Sep 1997	Greece	Argentina, South Africa, Italy, Sweden	Italy
2008	8th Aug 2008	24th Aug 2008	13th Jul 2001	China	Turkey, Japan, France, Canada	Canada
2012	27th Jul 2012	12th Aug 2012	6th Jul 2005	UK	Spain, Russia, USA, France	France

Source: Official Website of the Olympic Movement

Panel B. Winter Olympic Games

Event taking place year	Event starting date	Event ending date	Announcement date	Hosting country	Candidate countries	Losing country at the last voting round
1980	13th Feb 1980	24th Feb 1980	23rd Oct 1974	USA	Canada	none
1984	8th Feb 1984	19th Feb 1984	18th May 1978	Yugoslavia	Japan, Sweden	Japan
1988	13th Feb 1988	28th Feb 1988	20th Sep 1981	Canada	Italy, Sweden	Sweden
1992	8th Feb 1992	23rd Feb 1992	17th Oct 1986	France	USA, Germany, Italy, Sweden, Norway, Bulgaria	Bulgaria
1994	12th Feb 1994	27th Feb 1994	15th Sep 1988	Norway	USA Sweden, Bulgaria	Sweden
1998	7th Feb 1998	22nd Feb 1998	15th Jun 1991	Japan	Italy, Spain, Sweden, USA	USA
2002	8th Feb 2002	24th Feb 2002	16th Jun 1995	USA	Sweden, Canada, Switzerland	Switzerland
2006	10th Feb 2006	26th Feb 2006	19th Jun 1999	Italy	Finland, Austria, Slovakia, Switzerland, Poland	Switzerland
2010	12th Feb 2010	28th Feb 2010	2nd Jul 2003	Canada	Switzerland, South Korea, Austria	South Korea

Source: Official Website of the Olympic Movement

Panel C. FIFA World Cups

Event taking place year	Event starting date	Event ending date	Announcement date	Hosting country	Candidate countries	Losing country at the last voting round
1982	13th Jun 1982	11th Jul 1982	6th Jul 1966	Spain	None	None
1986	31st May 1986	29th Jun 1986	20th May 1983	Mexico	Canada, USA Brazil	None *Unanimously by FIFA Executive Committee*
1990	8th Jun 1990	8th Jul 1990	19th May 1984	Italy	England, Greece, Soviet Union	Soviet Union
1994	17th Jun 1994	17th Jul 1994	4th Jul 1988	USA	Morocco, Brazil, Chile	Morocco
1998	10th Jun 1998	12th Jul 1998	1st Jul 1992	France	Morocco	Morocco
2002	31st May 2002	30th Jun 2002	31st May 1996	Korea & Japan	None	None *Unanimously by FIFA Executive Committee*
2006	9th Jun 2006	9th Jul 2006	6th Jul 2000	Germany	Brazil, England, Morocco, South Africa	South Africa
2010	11th Jun 2010	11th Jul 2010	15th May 2004	South Africa	Morocco, Egypt, Libya, Tunisia	Morocco

Source: FIFA World Cup™ Website

Panel D. European Football Championships

Event taking place year	Event starting date	Event ending date	Announcement date	Hosting country
1980	11th Jun 1980	22nd Jun 1980	12th Nov 1977	Italy
1984	12th Jun 1984	27th Jun 1984	10th Dec 1981	France
1988	10th Jun 1988	25th Jun 1988	14th Mar 1985	Germany
1992	10th Jun 1992	26th Jun 1992	16th Dec 1988	Sweden
1996	8th Jun 1996	30th Jun 1996	5th May 1992	England
2000	10th Jun 2000	2nd Jul 2000	31st Mar 1995	Belgium & Netherlands
2004	12th Jun 2004	4th Jul 2004	12th Oct 1999	Portugal
2008	7th Jun 2008	29th Jun 2008	12th Dec 2002	Austria & Switzerland
2012	9th Jun 2012	1st Jul 2012	18th Apr 2007	Poland & Ukraine

Note. The information for European Football Championships candidate countries and bid losing country at the last voting round is not available.
Source: Europe's football Website

Table C2: *The year of establishment of main stock markets*

Old markets		New markets	
Country	**Establishment of main stock market**	**Country**	**Establishment of main stock market**
Germany	1585	Sweden	1863
Netherlands	1600	Turkey	1866
Austria	1771	New Zealand	1870
United Kingdom	1773	Greece	1876
United States	1792	Canada	1878
Ireland	1793	Japan	1878
Belgium	1801	Mexico	1894
Italy	1808	Finland	1912
Norway	1819	Denmark	1919
Portugal	1825	Switzerland	1938
France	1826	Korea	1956
Spain	1831	Hungary	1990
Australia	1859	Poland	1991
		Czech Republic	1992

Source: The Handbook of World Stock*, Derivative and Commodity Exchanges* (1998). The dates for Hungary, Poland, and Czech Republic correspond to the re-establishment of their main exchanges.

Table C3: *Market capitalization of list mega-sporting event hosting countries in announcement year*

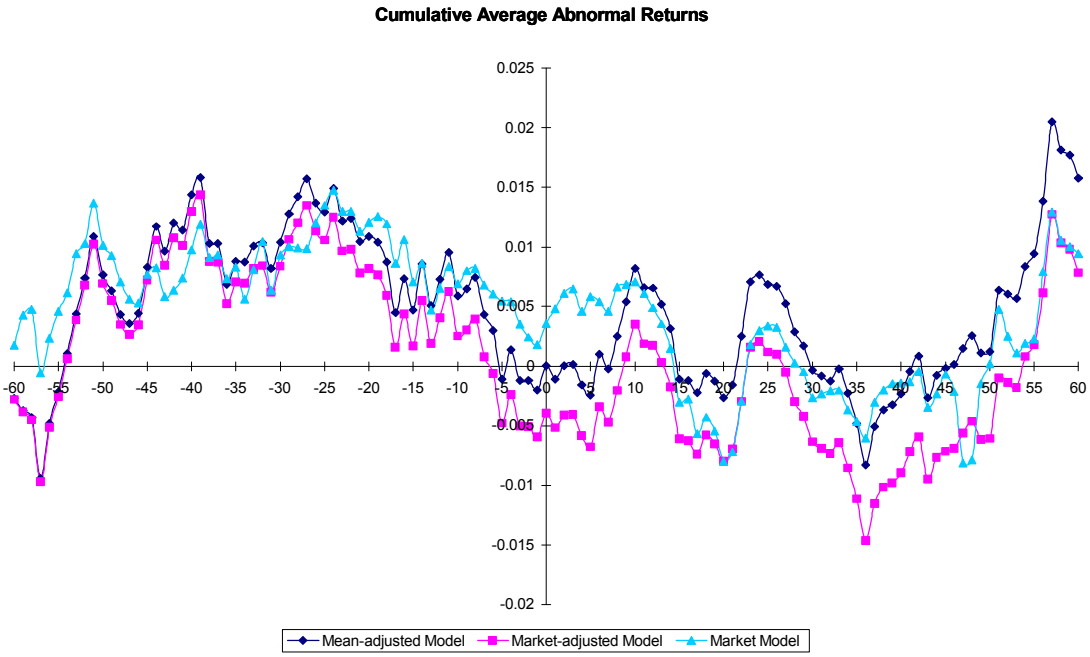
Event hosting country	Type of events	Announcement year	Market capitalization in announcement year (current US$)
Australia	Summer Olympic Games	1993	204,866,000,000
Austria	European Football Championships	2002	31,899,470,000
Belgium	European Football Championships	1995	104,960,000,000
China	Summer Olympic Games	2001	523,951,500,000
Canada	Winter Olympic Games	2003	893,950,300,000
France	FIFA World Cup	1992	351,000,000,000
Germany	FIFA World Cup	2000	1,270,243,000,000
Italy	Winter Olympic Games	1999	728,273,300,000
Japan	Winter Olympic Games	1991	3,130,000,000,000
	FIFA World Cup	1996	3,088,850,000,000
Netherlands	European Football Championships	1995	356,481,000,000
Norway	Winter Olympic Games	1988	14,300,000,000
Portugal	European Football Championships	1999	66,488,100,000
South Africa	FIFA World Cup	2004	455,536,200,000
South Korea	FIFA World Cup	1996	138,817,000,000
Sweden	European Football Championships	1988	100,000,000,000
Switzerland	European Football Championships	2002	552,549,500,000
United Kingdom	Summer Olympic Games	2005	3,058,182,000,000
	European Football Championships	1992	927,000,000,000
United States	Summer Olympic Games	1990	3,060,000,000,000
	Winter Olympic Games	1995	6,857,622,000,000
	FIFA World Cup	1988	2,790,000,000,000

Source: World Development Indicators Database

The value of market capitalization which is shown on World Development Indicators Database is only available from 1988 to 2006.

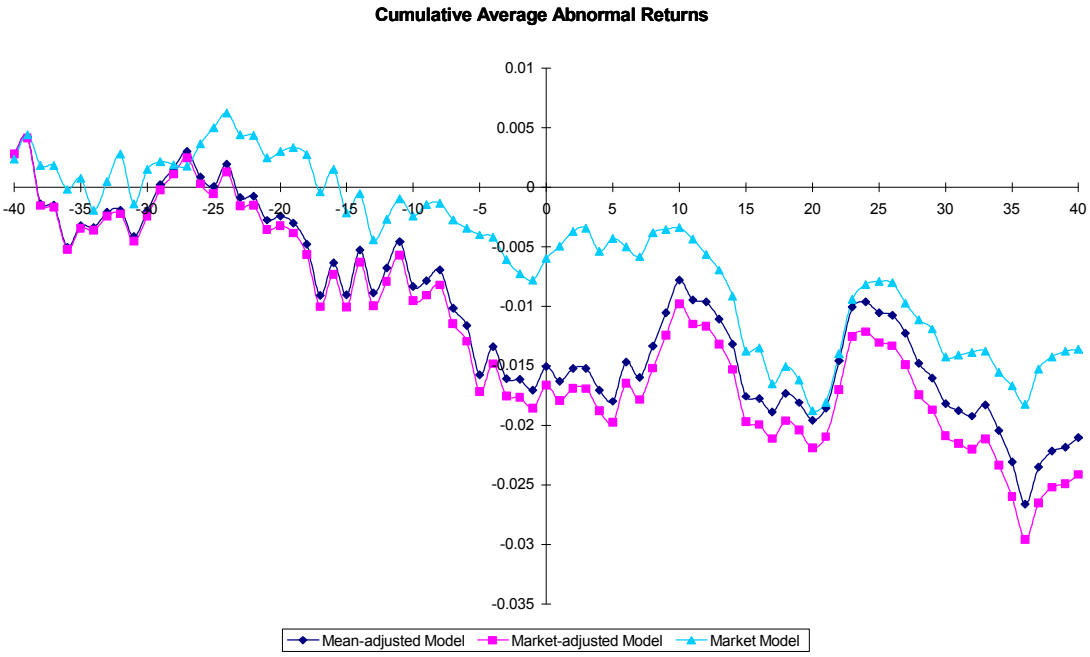
Appendix C

Figure 1: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 60-day symmetric window*



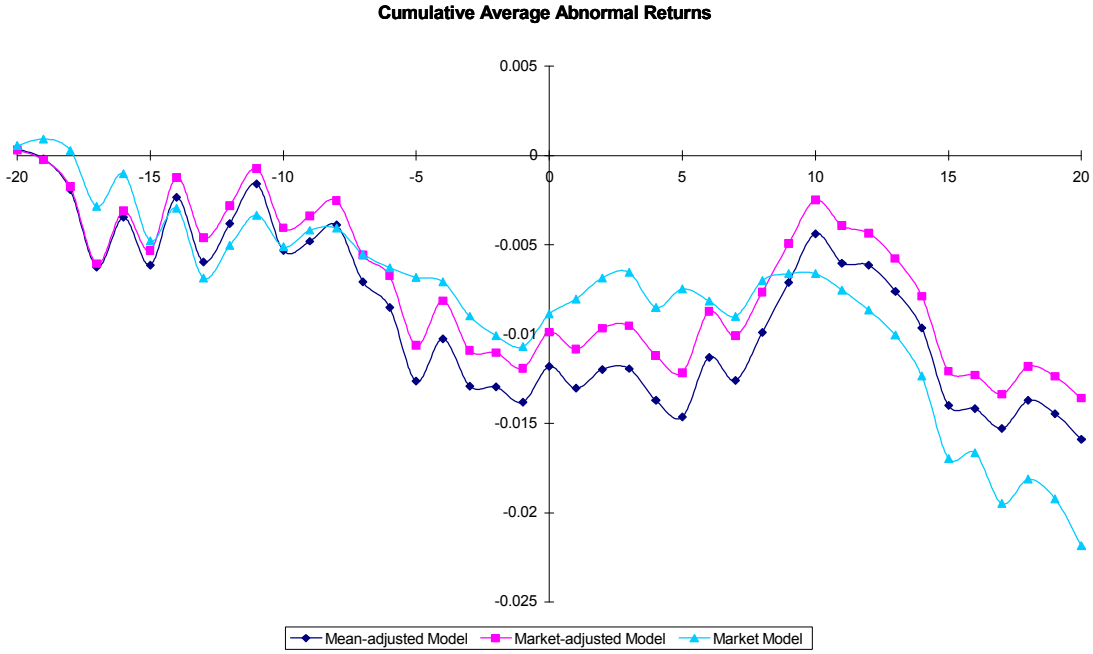
Note. The graph shows the cumulative average abnormal returns on each of the days 60 days prior to and 60 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 2: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 40-day symmetric window*



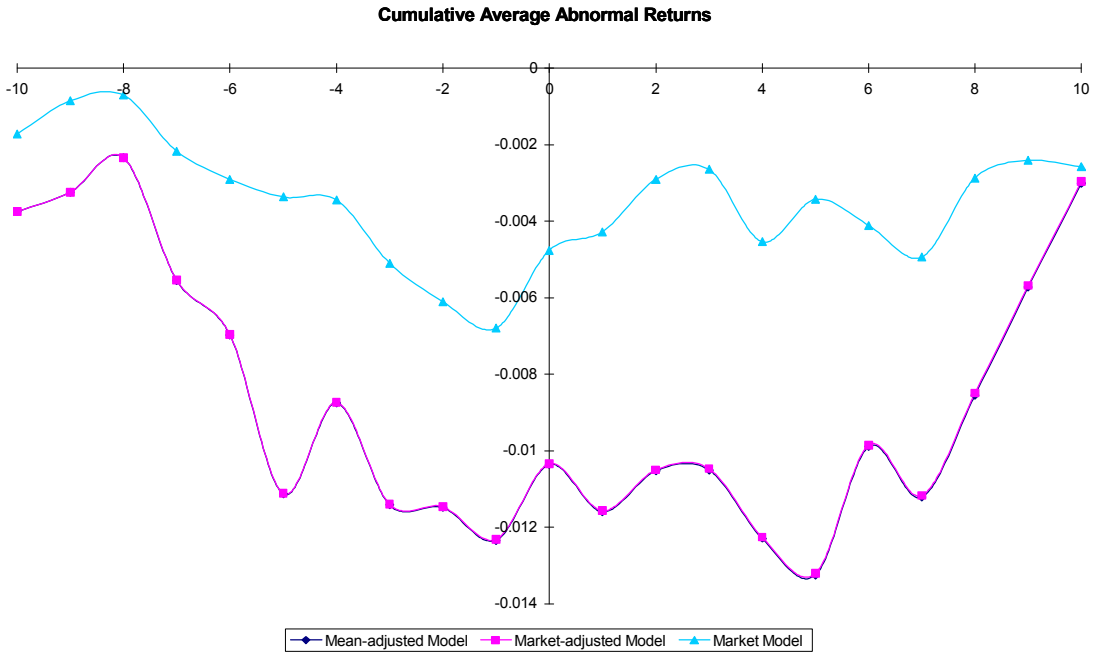
Note. The graph shows the cumulative average abnormal returns on each of the days 40 days prior to and 40 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 3: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 20-day symmetric window*



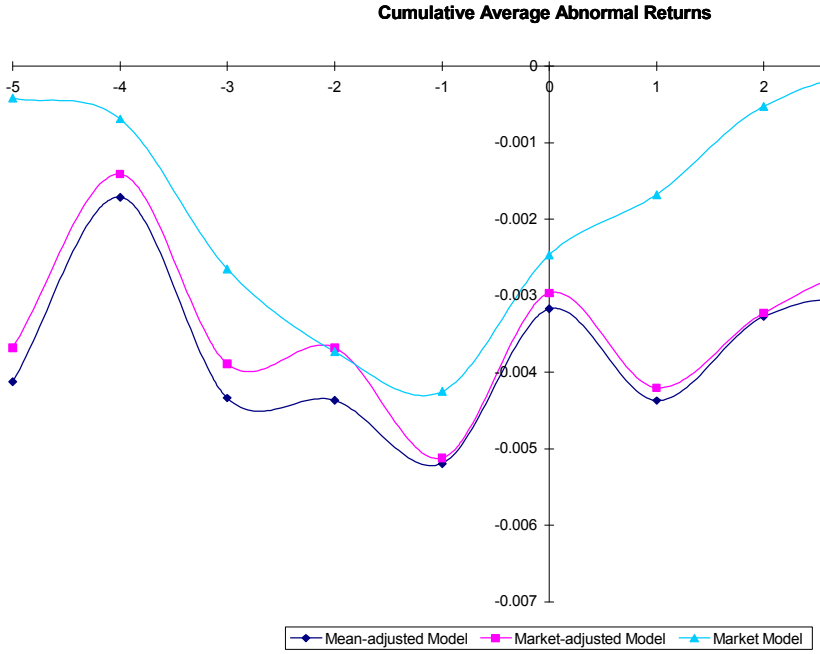
Note. The graph shows the cumulative average abnormal returns on each of the days 20 days prior to and 20 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 4: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 10-day symmetric window*



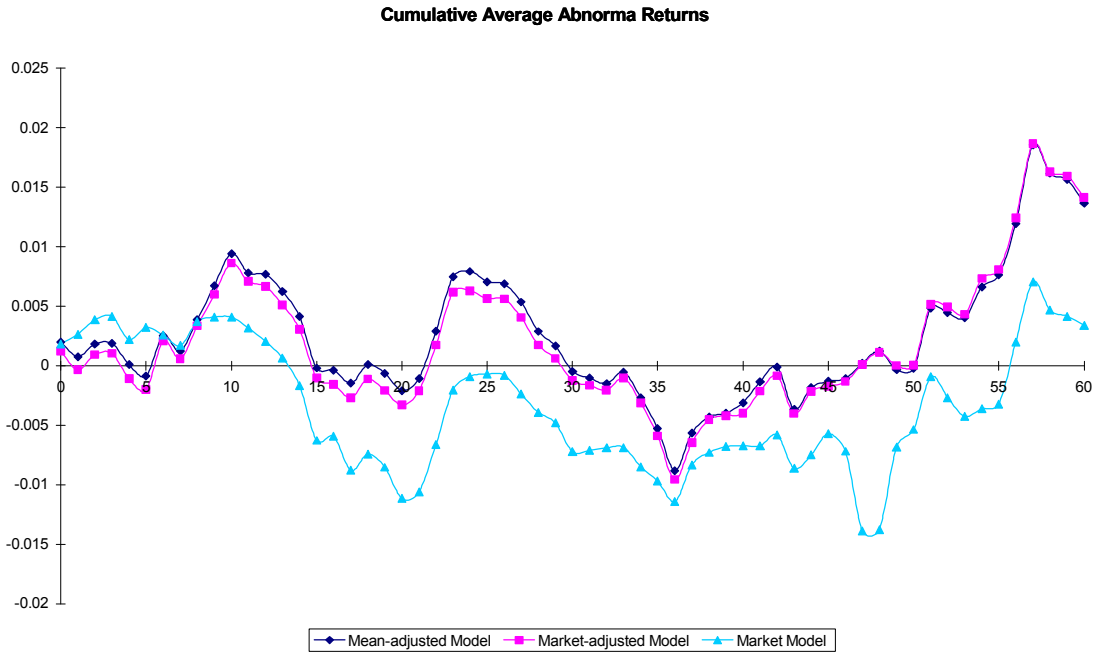
Note. The graph shows the cumulative average abnormal returns on each of the days 10 days prior to and 10 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 5: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 5-day symmetric window*



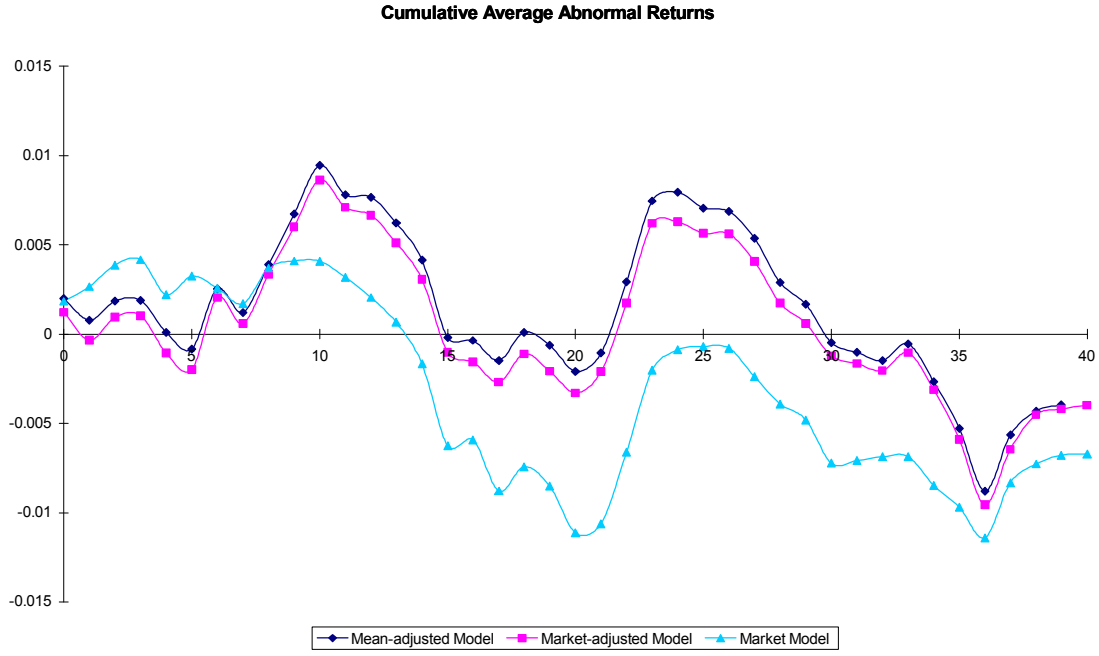
Note. The graph shows the cumulative average abnormal returns on each of the days 5 days prior to and 5 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 6: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 60-day asymmetric window*



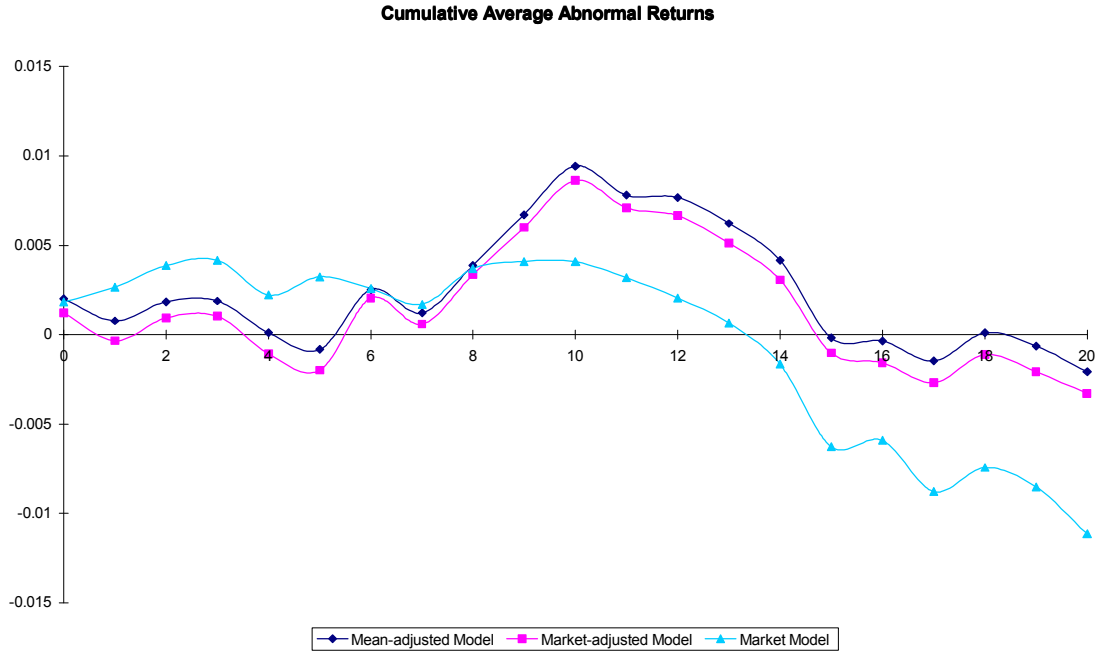
Note. The graph shows the cumulative average abnormal returns on each of the days 60 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 7: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 40-day asymmetric window*



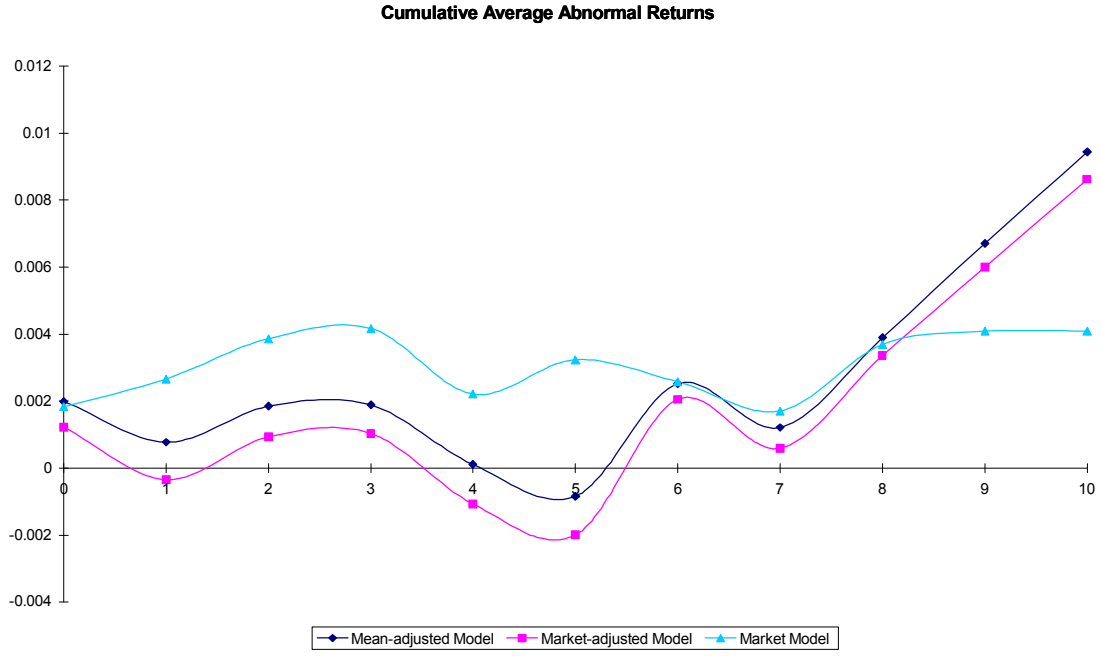
Note. The graph shows the cumulative average abnormal returns on each of the days 40 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 8: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 20-day asymmetric window*



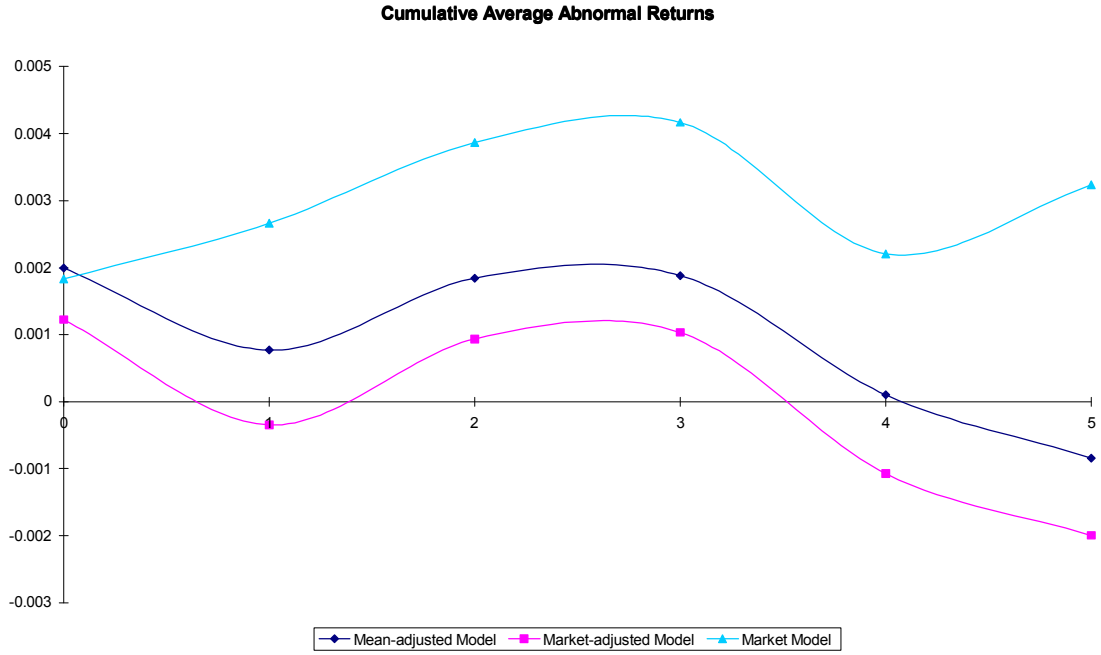
Note. The graph shows the cumulative average abnormal returns on each of the days 20 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 9: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 10-day asymmetric window*



Note. The graph shows the cumulative average abnormal returns on each of the days 10 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.

Figure 10: *Cumulative average abnormal returns around the announcement date by hosting countries on each of the days in the 5-day asymmetric window*



Note. The graph shows the cumulative average abnormal returns on each of the days 5 days after the announcement date by three mean returns model of mean-adjusted, market-adjusted and market model.