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Comparing the Success of Official Sponsors and Ambush Marketers: An Event Study Analysis of Brazil Following the 2014 Fifa World Cup and 2016 Rio de Janeiro Summer Olympic Games

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COMPARING THE SUCCESS OF OFFICIAL SPONSORS AND AMBUSH MARKETERS: AN EVENT STUDY ANALYSIS OF BRAZIL FOLLOWING THE 2014 FIFA WORLD CUP AND 2016 RIO DE JANEIRO SUMMER OLYMPIC GAMES

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DEDICATION

This dissertation is dedicated to my wife, Charisse, for her unwavering support of my intellectual curiosity and academic pursuit, and to our two boys, Julian and Christian, who I hope always chase their dreams. And, to my parents, Harry and Gail Koba, who instilled a love of learning. I would not be undertaking this journey without them.

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ABSTRACT

Mega sporting event hosting and sponsorship garner billions of dollars in investments from countries and companies, but their effectiveness has yet to be definitively determined. If the announcement of a host country serves as a signal to the investors who comprise a market, then there should be an increased return in response to the announcement. Similarly, if companies are activating their sponsorships during a sporting event there may be a higher return than what would be expected otherwise. The evaluation of the 2016 Summer Olympic Games held in Rio de Janeiro demonstrates that the announcement did not impact the market of Brazil, or of the other countries who were under consideration using rate of return, log returns and seemingly unrelated regression models. There were abnormal cumulative abnormal returns that may indicate that it takes time for mega-events to exert an economic benefit. Further evaluation using similar techniques for the sponsoring companies of different levels did not demonstrate a difference in returns based on sponsorship, but did indicate that brand affiliation has a negative effect and being a sport company has a positive effect. These results further the academic literature regarding market perspectives and sport mega-events.

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LIST OF ABBREVIATIONS

BAI.....Brand Affiliation Index

CAR .....Cumulative Abnormal Return

EMH.....Efficient Market Hypothesis

GARCH..... Generalized Autoregression for Conditional Heteroskedasticity

GLM.....Global Language Monitor

IEG.....International Events Group

IOC..... International Olympic Committee

MSCI.....Morgan Stanley Capital International

NOC .....National Organizing Committee

OCOG ..... Organizing Committee of the Olympic Games

OLS .....Ordinary Least Squares

ROA ..... Return on Assets

ROR .....Rate of Return

SE.....Standard Error

SUR.....Seemingly Unrelated Regression

TOP .....The Olympic Program

USD..... United States Dollars

USOC..... United States Olympic Committee

CHAPTER 1

INTRODUCTION

According to industry sponsorship leader, International Events Group (IEG), worldwide sport sponsorship spending reached $62.7 Billion in 2017 and was forecast to reach $66 Billion in 2018, with North American companies projected to account for $24.2 Billion of that estimate (2018). This was an increase of over 25% from 2012 when $51 Billion was spent on sponsorship internationally with $19 Billion spent in North America (Crompton, 2015). Within this worldwide sport sponsorship environment, two events captured a tremendous amount of the world's attention not only when they were held, but also for an extended period of time prior to and after completion.

The International Olympic Committee (IOC) captures a sizeable share of the worldwide sport sponsorship spending by hosting summer and winter Olympics. For the four-year sponsorship timeframe that culminated in the 2016 Rio de Janeiro Olympic Games, total Olympic sponsorship revenue exceeded $3.5 billion. The 12 Olympic Program (TOP) sponsors, cumulatively paid over $1 billion for their 2016 Summer Olympic Games sponsorships (Olympics, 2019). In addition, the United States Olympic Committee (USOC) collected $70.3 million in US Olympic team sponsorships in the 2015-16 run-up to the Rio Olympics (IEG, 2016).

The *Fédération Internationale de Football Association* (FIFA) hosts a number of international soccer matches, but all pale in comparison to the World Cup. Held every four years, the World Cup captures the globe's imagination. In 2018, over 3.5 billion people watched at least some of the tournament. Over 1 billion fans watched the final match (France v. Croatia) (FIFA, 2018). In most countries, the men's national team partners with a number of high-level sponsors and in countries where the national team has achieved consistent success, the sponsorship revenues can be tremendous. For example, in Brazil, where the national team is typically successful and has a passionate following, sponsorships exceeded $130 million in 2016, despite corruption allegations (Kunti, 2017).

For both mega-events, as well as all other well-executed sponsorship agreements, in addition to the money spent on sponsorship to obtain rights fees are the additional costs accumulated in leveraging the sponsorship, with previous research indicating that a range between 1:1 to 7:1 is an appropriate ratio (IEG, 2018; O'Reilly & Horning, 2013). The rights fees and leveraging costs mean that official sponsors are often investing tens of millions of dollars to associate with the world's top sporting events and the athletes and teams who compete to win medals and championships.

For organizations to continually secure sponsorships, they must financially justify sponsors' investment, with producing a positive return often a priority (Myazaki & Morgan, 2001). Shareholder wealth is a key objective of publicly traded organizations, as is increasing a company's share price (Moyer, McGuigan & Rao, 2015). However, for some businesses that pursue sponsorships, it is often not clear they are able to achieve positive financial returns. Some consumers incorrectly identify the official sponsor of an

event which undermines a sponsor's objective to enhance brand image and recognition resulting from the event (Pavitt, 2016). Though there have been a number of empirical studies that have sought to evaluate a sport sponsorship's ability to positively impact share price (Cornwell, Pruitt, & Clark, 2005; Hino & Takeda, 2019; Kim, Jung, & Lee, 2013), Dietz, Evans, and Hansen (2012) contend sponsorship may actually generate negative financial returns. In the case of the Olympic Games, there has been some analysis of TOP sponsorship outcomes (Baim, Goukasian, & Misch, 2015; Farrell & Frame, 1997; Myazaki & Morgan, 2001; Samitas, Kenourgios, & Zounis, 2008), but little is known about sponsors who partner at a lower financial commitment or for ambushers who attempt to confuse consumers into thinking they are official partners when in reality they are not. For the World Cup, little research has been completed examining sponsorships' impact on share price (Hundt & Horsch, 2019). In a business environment where more and more analysis is conducted prior to making any decision, this lack of information regarding stock market returns for sport sponsors and ambushers is concerning for corporations looking for a market advantage, particularly in the case of the Olympic Games and the World Cup, where worldwide media attention is generated and sponsors make a considerable investment to be involved.

For many sponsors, partnering with the Olympics, World Cup, and other mega-events is seen as an opportunity to be associated with a strong event (Seguin & O'Reilly, 2008). Marketing executives and corporations consummate these deals in the belief that the event will help achieve their objectives, including increased cash flow and future sales, thus providing a positive return to the shareholders of the sponsoring corporation (Clark,

Cornwell & Pruitt, 2009). The belief that a sponsorship will lead to enhanced shareholder wealth is a major reason for such sponsorship activities (Leeds, Leeds & Pistolet, 2007).

1.1 PURPOSE OF STUDY

The purpose of this dissertation is two-fold. First, it examines the reaction of the Brazilian stock market to the unique situation of the country being announced as the host of the 2014 World Cup in 2007 and then subsequently Rio de Janeiro being awarded the 2016 Olympic Games in 2009. Hosting these two events in such close proximity is unique in the modern sport environment and offers an opportunity to explore stock market reactions. In addition, the second component of the dissertation will utilize an event-study methodology to assess the stock market returns for companies of varying sponsorship levels over the duration of the 2016 Rio de Janeiro Olympics and beyond. Specifically, this project is designed to evaluate the outcome of stock returns of identified TOP sponsors, USOC sponsors and selected ambush marketers. This portion of the dissertation attempts to identify if there are firm-level characteristics that predict abnormal returns across companies in the sample to ascertain what factors predict performance to help sponsoring companies better position themselves in the Olympic marketing space.

1.2 SIGNIFICANCE AND IMPLICATIONS OF STUDY

Although mega-events draw hundreds of millions of dollars in sponsorship revenues to the host organization, their impact on the host country is uncertain (Berman, Brooks, & Davidson, 2000; Leeds, Mirikitani, & Tang, 2009; Veraros, Kasimati, & Dawson, 2004). The uniqueness of Brazil as a back-to-back mega-event host country

(2014 FIFA World Cup and 2016 Summer Olympic Games) was discussed as a way to demonstrate and highlight Brazil as a political and economic world power (Tomlinson, Bass, & Bassett, 2011). In order to effectively host the World Cup and Summer Olympic Games, Brazil had to invest in the requisite stadia and infrastructure development, which was a means of enhancing economic development (Maharaj, 2015). This double hosting provides an opportunity to examine the impact of multiple host country announcements on a single country's stock market. Moreover, allegations of corruption for the awarding of the 2016 Summer Olympic Games were revealed (Panja, 2019), adding additional insight to the impact corruption has on international stock markets if a positive return is present.

The results of this study will help inform sport marketers, managers and mega-event operators about the potential incremental financial impact of a sponsorship's ability to increase shareholder wealth. An important potential unique contribution of the sponsorship portion of the paper is the inclusion of both official TOP and USOC sponsors, as well as non-sponsor, ambushing companies in the analysis. It is expected that official sponsors should outperform ambushers based on their affiliation and ability to activate the sponsorship during the Games to maximize impact. However, it has been suggested that ambushers may clutter the market in terms of consumer recognition (Seguin & O'Reilly, 2008), so it is possible that the decision to ambush the Olympic Games may lead to an increase in returns that would have been unexpected otherwise.

CHAPTER 2

LITERATURE REVIEW

This section will summarize the history of the FIFA World Cup and Olympic Games, detail the theoretical foundations for an examination of stock price returns and utilization of event studies. Subsequent sections will elucidate research methodologies, summarize study results, outline conclusions, and discuss theoretical and practical implications.

2.1 MEGA-EVENTS

A sporting event is considered a mega-event if it is a one-time or recurring event that enhances the international awareness of the location (Andersson, Rustad, & Solberg, 2004). A more recent definition put forth by Muller (2015) is that 'mega-events are ambulatory occasions of a fixed duration that attract a large number of visitors, have a large mediated reach, come with large costs and have large impacts on the built environment and population' (p. 638). Within this framework, this paper focuses on two mega-sport-events: the FIFA World Cup and Olympic Games.

2.1.1 FIFA WORLD CUP

Following the success of the Olympic Football Tournament in 1924 and 1928, the FIFA Executive Committee made the decision to organize its own world championship

(FIFA, 2020). Hosting bids were submitted by Hungary, Italy, Spain, The Netherlands, Sweden and Uruguay, with Uruguay ultimately prevailing in no small part from its national association's willingness to cover all costs for hosting, as well as sharing any profit and covering any financial deficits. Subsequently, the first World Cup match was held in the newly constructed Estadio Centenario in Montevideo in 1930. Since European national teams had to travel a long distance to compete, and European clubs had to continue playing without their best players for two months, only four European countries fielded highly competitive teams: France, Belgium, Romania and the former Yugoslavia. The tournament was won by host Uruguay, and despite it not truly being a "world event" given the lack of all the top worldwide players, the World Cup was deemed a success. Interestingly, Uruguay refused to defend their title four years later, becoming the first and only championship team to fail to participate in the subsequent World Cup.

The membership of FIFA steadily increased from 51 countries in the late 1930's to 73 in 1950 to over 200 in 2007 (FIFA, 2020). Following World War II, the proliferation of television aided the World Cup's expansion. The 1974 election of Dr. Joao Havelange as FIFA president helped to spur additional football growth as he led the organization from simply hosting the World Cup every four years to becoming a global brand with actions and events occurring around the world on a regular basis. As the sport developed and became more popular, so did World Cup tournaments, with 24 teams takin part in 1982 and 32 gaining entrance in 1998 (FIFA, 2020).

Though the first World Cup featured 13 teams with a total attendance of 570,549 fans (FIFA, 2019), by 2014, when the World Cup was played in Brazil, the number of teams had increased to 32 with total attendance of 3,429,873 (FIFA, n. d.). Moreover,

FIFA invested more than $850 million organizing the 2014 World Cup with Brazil receiving estimated tax revenue increases of $7.2 billion (FIFA, n. d.). To aid the recent growth of the World Cup, FIFA has elicited the help of international corporations through their sponsorship and marketing efforts with the stated objective of "generating the revenues that enable FIFA to continue developing football everywhere and for everyone" (FIFA, 2019, p. 4).

In 1982, FIFA had nine worldwide corporate sponsors: Coca-Cola, Canon, Fujifilm, Gillette, Iveco, JVC, Metaxa, RJ Reynolds, and Seiko (FIFA fact sheet, n. d.). The number of sponsorships expanded to 15 by 2006, when FIFA reorganized its sponsorship opportunities into different tiers. Currently, there are three levels of sponsorship: FIFA Partners (highest-level), FIFA World Cup sponsors (mid-level), and regional partners (lowest-level) – four sponsors per international region: Europe, North and Central America, South America, Africa and the Middle East, and Asia (FIFA, 2019). The 2014 FIFA World Cup had six FIFA Partners (Adidas, Coca-Cola, Emirates, Hyunda Kia, SONY and Visa), each of whom paid an estimated $25-50 million per year (Smith, 2014). In addition, eight FIFA World Cup sponsors, including: Anheuser-Busch, Castrol, Continental, Johnson & Johnson, McDonalds, Oi, Seara and Yingli Solar each paid an estimated $10-25 million per year (Smith, 2014). Six lower-level national sponsors also participated: Apex-Brazil, Garoto, Centauro, Banco Itau, Liberty Seguros, Wiseup (FIFA, n. d.). Currently, FIFA Partners include: Adidas, Coca-Cola, Wanda, Hyundai Kia, Qatar Airways and Visa (FIFA, 2019), with Coca-Cola being the only continuous partner since 1982.

During the World Cup cycle from 2011 to 2014, estimates place total annual sponsorship investment for the six FIFA Partners at $177 million annually, or roughly $30 Million per corporation (Wilson, 2015). However, following the 2014 World Cup, FIFA was confronted by a corruption scandal involving seven FIFA executives. Charges of racketeering, wire fraud and money laundering relating to bids for the 2018 World Cup in Russia and the 2022 World Cup in Qatar were levied (Hawkins, 2015). While some of the FIFA Partners voiced initial concern and Visa threatened to back out of its contract, they ultimately decided to remain due to the popularity of the World Cup (Hawkins, 2015). Not all the companies felt that way, however, as two of the 2014 FIFA Partner sponsors, Sony and Emirates, decided not to renew their sponsorship (Gibson, 2015). Additionally, three of the eight FIFA World Cup sponsors also decided not to renew their sponsorships, Castrol, Continental and Johnson & Johnson, which prompted FIFA to restructure its sponsorship program to include more regional partners (Gibson, 2015). While the Brazil World Cup yielded $1.63 billion in sponsorship revenue, the Russia World Cup saw that decrease to $1.45 billion, with much of the decrease likely a result of the previous administrative corruption (Chapman, 2018). FIFA's scandal helped to highlight one of the risks of sponsorship: poor ethical behavior of the organizer can be reflected back on the sponsor. Despite this, FIFA projects a $100 million budget surplus for years 2019-2022 despite lower attendance and hospitality estimates for the Qatar World Cup than previous World Cup host countries that contested matches in larger stadiums (Dunbar, 2018).

2.1.2 THE MODERN OLYMPIC GAMES

The modern Olympic Games were first organized in 1896 by Pierre de Coubertin. The 1896 Athens Games featured 241 athletes from 14 countries competing in 43 events (Olympics, 2019). Subsequently, the Games were held in four-year increments, except for 1940 and 1944 due World War II. The Winter Olympic Games were first held in 1924 in Chamonix, France with 258 athletes from 16 countries competing in 16 events. Initially, the Winter Olympic Games were held the same year as the Summer Olympic Games. However, since 1992, the Games have been on a four-year cycle for Summer and Winter with an Olympic Event occurring every two years. The most recent Summer Olympic Games hosted by Rio de Janeiro, Brazil in 2016 featured 11,238 athletes from 207 countries competing in 306 events, while the most recent Winter Olympic Games were hosted by PyeongChang, South Korea in 2018 and featured 2,833 athletes from 92 countries competing in 102 events.

From its humble beginnings in the late 19th century, the Games have grown immensely in number of countries and competitors participating. However, the growth in participation and fan consumption has not been consistent. In the 1960s and 1970s, a number of people believed the modern Olympics were too expensive and too scandal ridden to be an attractive event to host. Problems involving displaced citizens in the 1968 Mexico City Summer Games (Andranovich, Burbank, & Heying, 2010), terrorist attacks during the 1972 Munich Summer Games, Denver organizers backing out of the 1976 Winter Olympics, and the financial boondoggle that resulted from facility construction in the 1976 Montreal Summer Games caused many pundits to believe the modern Olympic games were not worth the huge trouble and expense needed to host. When the United

States and a number of other "western" countries boycotted the 1980 Moscow Summer Games over the Soviet invasion of Afghanistan, there was concern among many that the Olympic Games were on a downward trajectory (McBride, 2018; Walker 2014). However, the negative perception of hosting largely changed after the 1984 Los Angeles Summer Olympic Games.

The 1984 Summer Olympics did not initially appear to be moving the modern Olympics in a positive direction. Very few viable cities even bothered to submit a bid and Los Angeles in many ways was awarded the Games by default. However, the 1984 Los Angeles Summer Olympic Games changed the Olympic movement, largely because local taxpayers failed to pass legislation to subsidize the Games, which forced the organizers to use existing infrastructure in order to reduce costs (Chalip, Green, Taks, & Misener, 2017). This lack of taxpayer support meant the chief organizer, Peter Ueberroth, and his team had to find additional sources of funding. They were able to achieve this by being cost conscious and focusing on private fundraising, selling broadcasting rights to ABC for $225 million and extensively utilizing corporate sponsorships (Walker, 2014). While sponsorship had been in use throughout the Olympics since Kodak was involved in the 1896 Games, the 1984 Games were considered the start of mass commercialization of the Games as Ueberroth sold opportunities to sponsors across a variety of activities, many of which had never before been sponsored (Stotlar & Nagel, 2017).

Following the 1984 Games and the perceived success of the organizers in attracting sponsors who realized positive returns on investments and objectives, the IOC introduced its Olympic Partners Program (TOP) to create long-standing, mutually beneficial relationships with their top corporate partners (IOC, 2019). Since the inaugural

1896 Games, the IOC had partnered with corporate supporters (including Kodak) by selling advertisements to generate revenue (IOC, 2019). Ten companies had purchased official rights for photographs and memorabilia for the 1912 Games in Sweden, and later Olympic Games saw the rise of posters, corporate advertisements in the official program, official concessionaires (Coca-Cola in 1928), as well as international marketing and technical support. The initial advertisements tended to be simple with fully evolved, multi-tiered partnerships not becoming commonplace until after the success of the 1984 Los Angeles Games. The organizers emphasized fewer sponsors, but at a higher sponsorship cost, which, at the time, was unique. Afterwards, this was adopted by the IOC and the implementation of the TOP program would revolutionize the entire sport sponsorship industry.

The TOP program created exceptional benefits to the few official sponsors investing at the initial level. Companies such as Coca-Cola, Panasonic and Visa (who have remained sponsors throughout all the TOP cycles) were offered substantial benefits not only at Olympic venues during the Games, but also opportunities to leverage their relationship between the quadrennial competitions. TOP sponsorships offered partners exclusive global marketing rights and opportunities within the sponsor's business category, as well as the rights to utilize IOC licensing, logos and partnerships with each country's national organizing committee (NOC) and the local Organizing Committee for the Olympic Games (OCOG). The initial nine partners in TOP I paid a combined $96 million for these rights in 1985 (IOC, 2019). TOP VIII from 2013-2016 had 12 corporate partners pay a combined $1.003 billion for exclusive marketing rights (IOC, 2019).

Most recently TOP IX includes 13 international companies with all the partners from TOP VIII renewing, with the exception of McDonalds (Table 2.1). In addition, two new companies, Alibaba and Toyota have joined the TOP list. Sponsorship cost for the companies in TOP IX was estimated to be a base of $200 million for 2017-2020, with Alibaba reportedly paying $800 million for six Games over 12 years and Toyota spending a record $835 million for four games from 2017-2024 (Boudway, 2017). With such a large direct contribution for sponsorship, companies are expecting a high return in order to justify their investment.

Table 2.1. *Olympic TOP Sponsor Evolution*

Cycle	Years	Number of Sponsors	Total Revenue (millions USD)
I	1985-88	9	96
II	1989-1992	12	172
III	1993-1996	10	279
IV	1997-2000	11	579
V	2001-2004	11	663
VI	2005-2008	12	866
VII	2009-2012	11	950
VIII	2013-2016	12	1,003

Once a company pays for a sponsorship, they then have to leverage the sponsorship to maximize their investment return (Cornwell, 2008). The worldwide broadcast viewership for the 2016 Rio Summer Olympic Games was estimated to exceed 3.5 Billion (Roxborough, 2016). It is clear that both the Olympic Games and World Cup are likely to remain among the most important worldwide sporting events in the foreseeable future. NBCUniversal paid $7.65 Billion to extend their current Olympic broadcasting contract from 2020 through 2032 (IOC, 2014). To generate revenue to offset their investment, NBCUniversal expects to be able to sell $1.2 billion in advertising for

the Tokyo 2020 Olympic Games (Tan, 2019) and will likely continue to increase advertising prices for subsequent Games. For its part, FIFA sold the U.S. broadcasting rights to the 2018 and 2022 World Cup to Fox for $425 million and to Telemundo for Spanish language rights for $600 million. Globally, FIFA sold broadcasting rights for $3 billion for the 2015-2018 cycle, with an expected future cost exceeding $3.5 billion (Badenhausen, 2018; Deitsch, 2015).

As the cost for sponsorship and broadcasting continue to increase, corporations face a choice in managing their sponsorship portfolio and managing their business. With increasing costs, it can put additional financial pressure on a company to successfully integrate sponsorship into the business. One way that managers can evaluate performance is to assess the change in their business stock price resulting from an announcement. If the sponsorship announcement is viewed positively, then the company stock price will rise as investors expect to achieve greater return resulting from the sponsorship. Conversely, the opposite is true if a sponsorship is not viewed as a successful business venture. This market reaction can serve as a signal for the managers about how corporate sponsorship is perceived by investors. How quickly the market responds to new information is termed the *efficient market hypothesis*.

2.2 EFFICIENT MARKET HYPOTHESIS

The efficient market hypothesis (EMH) suggests that markets react quickly to information and that information is reflected in the share price of the firm (Fama, 1970). In general, markets are considered to be efficient, and thus stock prices absorb, integrate and reflect all available public information regarding the company (Coates & Humphreys, 2008; Kim, 2010; Moyer, McGuigan & Rao, 2015). Therefore, the current

share price is a reflection of the present value of all future expected cash flows and earnings for the company (Myazaki & Morgan, 2001). When markets are composed of buyers and sellers there exists potential differing perceptions regarding the value of the stock resulting in opinion sometimes being confused with value (Stout, 2003). It can then be understood that markets can be informationally efficient, where they reflect information quickly, but not fundamentally efficient, where the price is an accurate assessment based on the fundamentals (Stout, 2003). Publicly traded companies routinely release business performance information relating to sales, earnings, cash flow, dividends and business outlook that investors utilize in business evaluation. This release of business performance can cause a market response as investors react to this information (Fama, 1991).

If markets are priced efficiently, then what should move the price is new, pertinent information. With efficient markets it is possible to evaluate stock price change in response to a specified event, as the event would indicate new information (Coates & Humphreys, 2008). The utilization of an event study is then a suitable method for assessing how quickly new information is incorporated into the price and whether it is sustained at a new level, or fluctuates (Fama, 1991). Rather than view markets as a rational test of equilibrium, it should be understood that behavioral factors can, and sometimes do, cause the market to react in irrational ways (Thaler, 2016).

Some evidence suggests that price movements and inefficiencies exist, however, they seem to affect smaller, rather than larger, corporations (Chan, 2003). Other concerns that impact the efficiency of markets involve the emotionality of the investors and their reaction to positive and negative news with increased market volatility and trading

volume (Strycharz, Strauss & Trilling, 2018). There are two types of news that can affect changes to stock price: normal and unusual, with unusual news causing large jumps in response to their announcement (Maheu & McCurdy, 2004). Moreover, Tetlock (2007) demonstrated that negative news, or media pessimism, causes an initial decrease in price that is quickly reversed as the price reverts toward its fundamentals.

Sponsorship has become an accepted marketing strategy to increase awareness, enhance brand image and generate financial returns with announcements often predating any activation strategies, but serving as a signal to the marketplace. If a sponsorship is viewed positively then the share price of the company should increase above the current market price and its predicted (based upon fundamentals) value, thus providing an abnormal return. If, on the contrary, the market does not place a value on the sponsorship's ability to generate future cash flow, then the expected stock movement would be either neutral (zero) or negative in response to sponsorship (Leeds, Leeds & Pistolet, 2007). The type of sponsorship announcement may also impact stock returns, with evidence suggesting that new and termination announcements have no discernable impact on stock returns, but that renewal announcements are viewed positively indicating that past sponsorship activities were financially successful (Kruger & Goldman, 2014). With an assumption of efficient markets it is possible to use daily stock movements to measure consumer reaction to an event. If companies are able to effectively leverage their Olympic sponsorship then these companies should see a stock return above their benchmark (comparison) index and expected movement.

2.3 SHAREHOLDER THEORY

In his well-publicized 1970 *New York Times* article, Dr. Milton Friedman argued that the social responsibility of a corporation was to make a profit and that the individual shareholders could contribute to any organization or cause they desired. This concept helped support the view that a corporation was a vehicle for long-term wealth creation of the owners (shareholders). For publicly traded companies, the purpose of managerial decisions is to maximize the return on the shareholders' investment through increasing the share price and, subsequently, the market value of the company (Joshi & Hanssens, 2010). This purpose is in line with contemporary financial management that executives should work to enhance the value of the shareholders (Moyer, McGuigan, & Rao, 2015) and adopt effective corporate governance policies to protect the interests of shareholders (McEnally & Kim, 2012). Marketing strategies and advertising expenditures can be an effective utilization of company resources as they achieve greater-than-expected returns to the organization when effectively employed (Joshi & Hanssens, 2010).

A criticism of shareholder theory is that it can encourage and incentivize company executives to focus on short-term earnings to increase share price at the expense of making decisions that foster long-term financial growth (Nocera, 2012). To some, it is also an oversimplification of the role of a business, which also includes providing jobs, paying taxes, delivering quality goods and services, and being a good corporate citizen (Nocera, 2012). However, when defined as the creation of long-term wealth through the undertaking of all positive net present value projects, shareholder theory offers the best understanding of the function of a business (Danielson, Heck, & Schaffer, 2008). The criticisms, and difficulties, occur as a result of a principle-agent conflict, whereby

shareholders appoint managers to work on their behalf, but instead, managers work in their own self-interest and the assumption they work to maximize shareholder profits is invalid (Jensen & Meckling, 1976).

To align managers and shareholders, adopting adequate corporate governance policies and offering appropriate management incentives is necessary for the shareholders to help hold managers accountable (McEnally & Kim, 2012). Optimally, when viewed in the long run, businesses make decisions and undertake projects that lead to increased profitability for the benefit of both its shareholders and stakeholders (Danielson, Heck, & Shaffer, 2008). The concern for stakeholders (employees, customers, suppliers, creditors, etc.) is that the focus on the shareholder alone potentially rewards the corporation for making decisions for short-term gain at the expense of long-term growth (Stout, 2013). Effective companies are those that work to maximize the value to all stakeholders by making decisions for long-term growth and profitability.

Businesses are constantly faced with the challenge to balance multiple stakeholder groups in an effective manner that leads to continued performance and profitability. Some companies may have the expertise and financial resources necessary to undertake large, expensive, and elaborate sponsorship partnerships, while others may view such sponsorship opportunities as too expensive. The latter types of companies may still wish to appear to be involved and may make a strategic decision to purchase advertising or undertake ambush marketing tactics for a lower cost in hopes of achieving a positive return (Andrews, 2012). Both the option to become an official sponsor or to ambush may actually be an effective way of achieving organizational goals. The effectiveness of a

sponsor compared to an ambush marketer in regard to stock price changes has not been empirically evaluated.

2.4 SPONSORSHIP EVALUATION

Since sponsorship hinges on mutual benefit for the sponsor and event, it is underpinned by exchange theory, whereby both entities exchange resources (Crompton, 2004) in order to establish relationships and highlight the value added for both parties (Cousens, Babiak & Bradish, 2006). The use of a *spillover* effect from an event to a brand also exists, and is enhanced over time to the benefit of long-time sponsors of major events, such as the Olympics (Filis & Spais, 2012). In order for companies to continue their sponsorship, they would need to ensure that their expenditures are at least equal to benefits achieved (Stotlar, 2004). In addition to the direct sponsorship costs, additional *activation* costs are usually incurred by the organization as they market, advertise, and highlight their product during the timeframe of a sponsored event (Clark, Cornwell & Pruitt, 2002) which may understate the true cost of sponsorship. These additional costs are to promote and enhance the awareness, recognition and image of the sponsoring brand (Keller, 1993). Most companies understand the need to provide this additional, or collateral support, to the base activities of a sponsorship. Companies attempt to link their organization with the sport entity in order to reach their intended market (Cornwell, 1995). Capital can then be strategically employed to highlight the relationship between the sponsor and the sport entity by purchasing advertising, hosting hospitality events and placing signage.

One of the most straight forward ways some marketers measure their sponsorship impact is by assessing sales by comparing the event time to a control period, or through

tracking promotion and activation strategies done in conjunction with the event (Cornwell & Maignan, 1998). Increased sales as a direct result of a sponsorship would provide a good indication that the activity was financially sound. However, determining specific sales increases can be difficult in a dynamic environment where a number of marketing activities may affect consumer decision making. In addition, some sponsorships are not implemented with short-term sales as the primary goal as there are other benefits a sponsor may derive.

For a sponsorship to be effective the company has to know what they want to achieve from their relationship with the sport entity at the beginning of the sponsorship (Spanberg, 2008). For some, a globalized world provides an opportunity for the brand to expand its audience and target a new demographic, or reach a new market (Stotlar, 2013). Unfortunately, brands looking to create awareness are not always successful, since many fans display difficulty in correctly identifying sponsors (Maxwell & Lough, 2009; Shani & Sandler, 1998). For others, the sponsorship provides a way to sell merchandise or engage with consumers at the event.

Rather than utilize sponsorship as a medium for exposure or increasing awareness, brands may focus on increasing future sales through highlighting their product or building a contact list (Stotlar & Nagel, 2017). The event provides the sponsoring brand with an opportunity to highlight a product, engage with customers, gather consumer information and contact fans after the event to follow up with additional marketing messages. The sponsorship then becomes a medium for the brand to engage directly with a customer, or potential customer, and provide an opportunity to make a sale (Stotlar, 2013). As the trend continues toward individual-based marketing, the ability to

interact with the consumer and identify their needs and wants is paramount toward enhancing their understanding of the product and making a future sale (Noori, 2012). An effective sponsorship can provide access to a targeted customer market for the brand to build their customer relationship management system.

Furthermore, brands may engage in sponsorship in an effort to build an image of the brand in association with the sport entity (Meenaghan, 2001). Brands look to attain an image transfer from the popular sport entity to the brand. Such an image transfer exists in situations where the brand and the sport entity are viewed similarly, and their relationship is congruent or intuitive (Meenaghan, 2001), such as Mountain Dew's sponsorship of the X-Games (Stotlar & Nagel, 2017) and Adidas sponsorship of the New Zealand Rugby Union All Blacks (Stotlar, 2013). However, sponsorship may be unsuccessful in instances where a perception of mutual image fit is lacking (Meenaghan, 2001).

Sponsors often use their sport partnerships as a medium for entertaining clients and fostering business-to-business relationships (Stotlar, 2013). Sport events offer unique hospitality opportunities for sponsoring brands to further develop relationships with stakeholders and potential partners. These may have the appearance of lavish expenditure for a limited few and not be perceived well by stakeholders in instances where there is an ongoing labor dispute, or after a recession if companies received tax payer financial assistance (Crompton, 2015). In such instances, the company may continue to sponsor and host clients, but forego the typical signage and identification. While this decision may still fulfill the hospitality need, it likely is not beneficial for awareness, image or exposure. On the other hand, while it may not be perceived as effective, some companies

have used hospitality to increase indirect sales from clients or business partners that were among the most successful for the brand (Jacobs, Jain, & Surana, 2014).

There exists many sponsorship motivations and objectives, but there also exists many ways to evaluate them. Sponsorship effectiveness has been studied with a variety of methods, but no sure fire "perfect" mechanism has been determined. Some have noted a research gap between a sport entity and sponsor, lack of objectives prior to sponsoring, decreased understanding of the sponsorship value and differences in brand needs for sponsorship ("A Futile Search," 2008). Recently, there has been a dramatic increase in the use of analytics and advanced data analysis to determine sponsorship effectiveness. Companies like *GumGum Sports* have started utilizing artificial intelligence (AI) technology to track media exposure to improve valuation and performance for sponsors and sport leagues ("Gum Gum Sports," 2019). Research indicates that some element of sponsorship success is rooted within congruence, or fit, between the sponsor and the sport entity (Clark, Cornwell & Pruitt, 2009). Though this is often perceived as a company offering a product or service having a direct tie to an event (such as a tire sponsor should be a better fit for an automobile race than a company selling toothpaste), it instead usually extends to the work the two entities conduct to create a partnership that "fits" in the minds of consumers. Sponsorships are more effective if the partnership forms a coherent image between the two entities that the consumer can identify and remember (Clark, Cornwell & Pruitt, 2009). Sponsors with higher congruence create higher recall rates among consumers than lower congruence companies (Weeks, Humphreys & Cornwell, 2018).

Researchers have also attempted to evaluate sponsorships of publicly traded companies by using their stock price as a proxy for derived value. A company's stock return can be evaluated at the time of a sponsorship announcement to determine its effect on the company stock (Schweitzer, 1989). If the marketplace positively values the sponsorship there should be an increase in the returns that would be expected had the sponsorship not taken place, or a decline in return if the market deems the sponsorship to decrease the value of the sponsoring brand (Aaker & Jacobson, 1994). This method has potential limitations, as it relies on the sponsor being publicly traded, and thus prices being known. In addition, there must be a lack of ancillary actions or events that could confound the assessment of the event's stock price impact (Deitz, Evans & Hansen, 2012). Other positive or negative occurrences, or even just the presence of other marketing activities, could impact the stock price of a company that is engaging in sponsorship. A detailed section covering stock price change research is provided later in the literature review.

Though there is not any definitive scholarly or practitioner research that clearly evaluates the specific cost-benefit analysis of sport sponsorship, there is certainly evidence that sponsorship, in many cases, provides positive benefits. The spending trend in the 1990s and 2000s where sponsorship became a growing element of many company's marketing plans (Cornwell, 2008) has continued though sport sponsors have often altered their choice of sport and/or event with which to partner (Jensen & Turner, 2018). The cost of official sponsorship to many events has also continued to increase, causing it to potentially be cost-prohibitive for some companies. Regardless of cost, some companies have chosen to forego official sponsorship of events and instead have sought

to confuse the public by pretending to align their brand with the event through ambush marketing activities. Regardless of whether a company chooses to be an official sponsor, or engage in ambush marketing, mega events such as the Olympics and World Cup continue to draw attention from businesses looking to partner with them.

2.5 AMBUSH MARKETING

Ambush marketing is an organization's attempt to associate itself and create congruence with an event without paying a sponsorship fee to the event owner (Chadwick & Burton, 2011; Grady, McKelvey & Bernthal, 2009). The concern for ambush marketing is what led to the creation of the term "official sponsor" to help protect sponsoring companies from such ambushing tactics (Cornwell, Pruitt & Clark, 2005). "Direct (or "blatant") ambush marketing occurs when a company or brand assertively correlates itself with an event when it has not made official payments or bought legal rights as the official sponsor" (Amezquita, 2016, pp. 11). Indirect (or "subtle") ambush marketing, on the other hand, consists in "adjusting the message to the nature of the event in the manner which does not directly breach the rights of the organizers or the sponsors of the event, but rather uses the event as a pretext for the ambusher's own marketing purposes (Amezquita, 2016, pp. 11). For example, Nike's "Find your Greatness" advertisement release at the time of the opening ceremony in London 2012 did not violate any IOC copyright protection, but was effective in gaining viewership and undermining the official sponsor, Adidas (Nakamura, 2018).

When successful, the ambushing company will confuse and convince a segment of the public that it was an official partner, thus devaluing the worth of the sponsoring organization's paid sponsorship (Chadwick & Burton, 2011; Seguin et al, 2005). This is

often accomplished with a considerably lower marketing investment by the ambusher than what is paid by the official sponsor (Nakamura, 2018). Though much of the early sport sponsorship literature concerned ambushing and the Olympic Games (Seguin & O'Reilly, 2008), it is a major concern for marketers who make a decision to partner with any organization or event. In recent years, a number of prominent companies such as Nike, Under Armour and Subway have been engaged in ambush tactics and a number of companies such as McDonalds, Adidas and AT&T have noted their concern for their official sponsorships being ambushed.

Ambush marketing at the Olympics became prominent during the 1984 Games when Kodak purchased advertising airtime and devalued the association of the official sponsor, Fuji (Epstein, 2014). Interestingly, Fuji became the official film sponsor for the LA Olympic Games only after long-time Olympic sponsor Kodak decided not to participate after engaging in several months of negotiations. Kodak did, however, sponsor the U.S. Track and Field team and advertised heavily during the Games to undermine Fuji (Shiver & Yoshihara, 1985). Famously, Nike's strategy of sponsoring Olympic gold medalist, Michael Johnson, in Atlanta 1996 and its center just outside the Olympic village effectively ambushed Reebok, the official sponsor (Nakamura, 2018). More recently, Nike and Under Armour have created online social media campaigns, including their endorsement of Olympic athletes, to attract consumer attention.

All sponsored entities need to consider the needs of their sponsors and take steps to eliminate, or at least significantly lessen, the impact of ambushers. Official sponsors who feel their investment does not maximize results, especially if there are less expensive and as effective alternatives, will likely not renew their sponsorship agreements. At a

minimum, sponsors rely on event organizers to protect their sponsorships by granting special rights to their partners and restricting access to attendees for non-sponsoring brands (Blackshaw, 2011). However, in some situations, particularly in the case of sponsor recognition, ambush marketers are still able to cause confusion among consumers (Nakamura, 2018; Pitt et al., 2010; Shani & Sandler, 1998). There are other mechanisms that events may need to implement beyond just controlling the inside of their facility to protect their partners. After years of being ambushed to various levels of success, in 1997, the IOC required host cities to secure all advertising space within the city for the sole use of official sponsors (Amezquita, 2016). Other events have also taken steps to protect their sponsor's investment including FIFA protecting the World Cup by licensing to sponsors and outlining what it considers as ambushing (Blakey, 2018).

Local, state, national and, in some cases, even international government entities may be involved in helping to protect official sponsors from ambush tactics. The IOC has relied on the Lanham Act in the United States and similar laws in other countries to restrict the use of Olympic logos and phrases (Epstein, 2014). Events may rely on local laws, sometimes passed to apply only during event periods, against posting signage in front yards or on or around buildings that may be visible to event attendees. Some mega-events also seek to protect their sponsors through the use of cease and desist letters and restrictions on athletes' advertising for non-sponsoring brands, such as the IOC's Rule 40 (Nakamura, 2018). In some cases, restrictions on athlete or fan behavior has run counter to laws protecting freedom of speech (Stotlar & Nagel, 2017). In an era of increased usage of tattoos and social media, bans on certain activities have been challenged in a variety of legal settings. For example, during the last couple of Olympic cycles, a number

of athletes complained that it was unjust for their social media accounts to be restricted and for their bodies, beyond their uniform, to be controlled (Sherman, 2012). Partly in reaction to these complaints and growing sentiment among consumers, the IOC has recently loosened elements of Rule 40 so athletes will be allowed to publicize some of their non-IOC or USOC sponsor relationships. In addition, non-official sponsors will have greater freedom to participate in Olympic broadcast advertising (Taylor, 2016).

To guard against ambushers, sponsors also need to implement tactics to leverage and activate their formal association so that they can fully engage with consumers (Cornwell, 2008). It is certainly important to have assistance in protecting their relationships, but sponsors ultimately have to convey their relationship in a strong enough manner that accentuates the unique attributes of the sponsor relationship so that it is less likely that consumers are confused. Effective sponsors typically build an entire marketing campaign around their sponsorship relationship so that their consumers gain a better understanding of the partnership.

Despite these efforts, some ambush marketers have demonstrated the ability to devalue official sponsorship (Hill, 2016) and even be identified as a major sponsor, when in fact, they are not (Schwabe, 2018). The Global Language Monitor index is used as a brand awareness tool to examine the relationship between a brand and TOP sponsorship. Recently, they issued a report following the 2016 Rio Olympic Games which indicated that two of the top five, and 13 out of 20 brands on the index were ambush companies and not official sponsors (Pavitt, 2016). This suggests that even with additional investment to activate sponsorships, companies may not be able to achieve the results regarding brand equity that they anticipate due to consumer confusion (Pitt, Parent,

Berthon & Steyn, 2010). This becomes especially problematic for mega-events such as the World Cup and the Olympic Games as the rapidly escalating costs to become and remain an official sponsor necessitate that those sponsors maximize their benefits.

Within this marketplace, sponsorship managers are also faced with the difficult paradox that while consumers indicate that they do not approve of ambush marketing, they routinely demonstrate an inability to identify who the official sponsors are (Pitt, Parent, Berthon & Steyn, 2010) and they often appear to not really care when it comes to choosing products and services to consume when they receive marketing messages. Further, even when they are legally and morally correct to complain about ambush marketing tactics, large, multi-national TOP sponsors face the difficulty that a strong backlash to ambushing may make them seem like they are whining (Pitt, Parent, Berthon, & Steyn, 2010).

This lack of accurate identification creates an interesting environment where consumers say that ambushing is wrong, but they are still swayed by their tactics. At the same time, companies, both large and small, make decisions to potentially sponsor an event or engage in ambush activities without knowing the impact those decisions may have upon their stock price. For mega events such as the World Cup and the Olympics, the large variety of potential sponsorship outcomes, and ambush opportunities, present a fertile ground to study stock returns. In order to study such stock returns among the largest and smallest sponsors as well as well-known ambushers, an event study methodology must be utilized.

2.6 EVENT STUDY METHODS

Event analysis is the evaluation of a company's stock price reaction to news, or an event, and was initially introduced by Fama, Fisher, Jensen and Roll (1969). The central tenant in event study methods is the measurement of an abnormal stock return in response to the specified event (MacKinlay, 1997). Proper analysis of the impact of the event on company stock return is composed of five parts outlined by Bowman (1983): 1. Identify the event, 2. Model the security price reaction, 3. Estimate the excess returns, 4. Organize and group the excess returns, and 5. Analyze the results.

An event study methodology is characterized by comparing the actual rate of return of the firm to what would have happened had the event not occurred (MacKinlay, 1997). Initially, a baseline model is created in advance to the event being studied to have a means of comparison and to enhance the effect of unexpected news (Brown & Warner, 1985). The baseline model is generally either a means-adjusted model or a market model based on the regression of the stock to an appropriately identified benchmark (Bowman, 1983). According to MacKinlay (1997), the pre-event window should be approximately 250 trading days prior to the identified event window.

Other assumptions in the use of event studies are that the event in question is unexpected and that there does not exist the appearance of confounding factors that may result in inaccurate benchmarking (Brown & Warner, 1985). The existence of confounding occurrences around the event in question also has the potential to change the results (Brown & Warner, 1985; Deitz, Evans & Hansen, 2012). Once a baseline is constructed, the calculation of abnormal returns is performed (Fama, 1998). A positive

coefficient would indicate that investors reacted positively to the news while a negative coefficient would indicate a more pessimistic outlook (Fama, 1998).

The benchmark return regresses the daily stock return of the company of interest to the appropriate benchmark, such as the S & P 500 or the University of Chicago Center for Research in Security Prices (CRSP) value weighted index for large capitalization US stocks (MacKinlay, 1997). Once the event day is determined, the event window extends from several days before the event to several days after the event in order to determine any change that happens from the leaking of information, and to provide time for the market to respond to the event and process abnormal returns over a period of time. Typically, a 20-day pre-event window and 20-day post-event window is utilized (MacKinlay, 1997). The event window can be further isolated for specific assessment of cumulative returns over shorter time periods. The cumulative returns over this specified holding period ascertain whether movements are short term and quickly return to their baseline or rather cause a longer duration change of appreciation in value (MacKinlay, 1997).

In order to examine rate of returns in response to an event, a regression model is utilized based on the capital asset pricing model (CAPM) or simply termed market model (Brown & Warner, 1985). The utilization of this method allows for the creation of a benchmark based on the past performance of the company and its appropriate index. This then provides a means of comparing the company rate of return to its benchmark and whether an excess is achieved, where it would not normally be expected to.

The model for the calculation of returns using the market approach is constructed as follows (Bowman, 1983; Brown & Warner, 1985; MacKinlay, 1997):

$$R_{it} = \alpha_i + \beta_i Rm_t + \varepsilon_{it}$$

Where R_{it} is the return of stock i on day t, α_i and β_i are constants in the model and ε_{it} is the residual. Then, the abnormal return of the stock on day 1 would be equal to the residual or,

$$E_{it} = R_{it} - \alpha_i - \beta_i Rm_t$$

Where E is the abnormal return obtained by subtracting the actual return R by the constants (α and β) of the regression model for the market return. While the market model is the most common, it is possible to use multifactor models that include index returns, or a more simplistic means model for comparison, with the results from all being similar to each other (MacKinlay, 1997). Thus, the two-phase market model is the most consistently employed (phase 1 predicts the model, phase 2 calculates the abnormal stock return). Once the daily abnormal returns have been calculated, the cumulative abnormal returns (CAR) can be assessed, which is the summation of the daily abnormal returns for the specified time period:

$$CAR_i(t1,t2) = \sum AR_{it}$$

With multiple securities being tested, the average of each abnormal return and cumulative abnormal return is the simple mean of the daily return for each firm divided by the number of firms in the sample.

In an effort to more fully capture the expected return of a stock, Fama and French (1993) created a three factor model to estimate returns based on the market, size of the company and its value as specified by book-to-price. This model is represented as:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + S_iSMB_t + H_iHML_t + \varepsilon_{it}$$

Where R_{it} is the return of the company and R_{ft} is the risk free rate, R_{mt} is the return of the market portfolio, SMB_t is the return of small stocks minus the return of large stocks, HML_t is the difference between the return for high and low book-to-market ratios and ε_{it} is the residual. This model helps to explain that smaller companies (by market capitalization) have higher expected returns as do companies with lower book-to-market ratios (so termed value stocks). This was further adjusted by Carhart to incorporate a stock's momentum into the estimation (1997), as well as its profitability (Fama & French, 2015). In the estimation for a firm's return over time, the inclusion of additional variables seems to capture the realized return, on average. However, despite the additional variables in the estimation, it does not improve upon the market model for event studies (Binder, 1998).

Statistical tests for the interpretation of the abnormal returns is a parametric t statistic for the observed return compared to the expected return (Bowman, 1983). However, there have been some concerns for inference including non-normality of returns and the potential for serial correlation of the observations which may cause an upward bias in the test statistic (Bowman, 1983; Brown & Warner, 1985). Despite these concerns, it has been shown that using an ordinary least squares (OLS) model results in the use of a t statistic that is well specified (Bowman, 2006; MacKinlay, 1997). In spite of this, researchers have used non-parametric tests (bootstrapping) and Corrado Z tests to correct for a potential bias (Mazodier & Rezaee, 2013).

It has been argued that the use of non-parametric tests may be a more appropriate measure of returns given the potential violation of a normal distribution. Corrado (1989)

proposed a rank test for single-day event windows, however, many event windows are longer than one day (Cowan, 1992). Cowan (1992) recommends a generalized sign test where the test statistic is the fraction of having a positive abnormal return in the event window given the fraction of positive abnormal returns during a 100-day estimation period where s is dummy coded for 1 as a positive abnormal return and 0 otherwise:

$$p=1/n\sum 1/100\sum s_{jt}$$

The sign test is then a z score given the number of firms that have a positive cumulative abnormal return during the event window (w), expressed as:

$$Z_g=w-np/[np(1-p)]^{1/2}$$

The Corrado rank test utilizes the same 100-day estimation window and an 11-day event window providing a rank for the returns observed in each day 1-111, with a 1 signifying the smallest abnormal return and 111 the largest, which results in a mean of 56 ranging from day D_1 to day D_d. The test statistic is then:

$$Z_R=d^{1/2}*K_d-56/[\sum(K_t-56)^2/111]^{1/2}$$

Where K_d is the average rank of the n stocks and d days in the event window and K_t is the average rank of the n stocks on day t of the 100-day estimation window.

For shorter event windows, a rank test performs better, but as the length of the window increases, the generalized sign test is a better fit since it tests the cumulative abnormal return window as a whole, rather than individual days (Cowan, 1992). A second limitation of the rank test is that during an event window the variance of returns increases (Brown & Warner, 1985), which directly impacts the rank of returns and results

in less accurate interpretation. As events cluster (occur at the same time) the correlation amongst the companies in the sample increases, resulting in inaccuracy of the test statistics commonly utilized, both parametric and non-parametric (Kolari & Pynnonen, 2011). For this reason, it may be more appropriate to utilize a seemingly unrelated regression model (SUR) for event clusters which accounts for this correlation (Binder, 1998).

Another option is to use a derivation of the market approach, but construct a model that utilizes dummy variables for the assessment of individual days, and a summation for CAR (Leeds, 2010). This model allows for the analysis of the event in one model, as opposed to the two-step market model, as well as has less restrictive assumptions (Leeds & Leeds, 2012). The procedure is similar to a market model with the addition of dummy variables where the model is constructed compared to a relevant baseline for at least 170 days prior to the event (Leeds & Leeds, 2012). Utilizing this model, the abnormal daily returns are calculated by:

$$R_{i,t} = \beta_i 0 + \beta_{i1} Rm_t + \delta_s D_s + \varepsilon_{i,t}$$

Where R is the return of firm i at time t, β_0 is the OLS intercept of the model, βRm_t is the OLS coefficient for the market return, D is the dummy variable for the event day equal to 1 for that day and 0 otherwise, δ as the coefficient for the event day, or excess return, and ε is the residual error in the model.

To calculate the CAR, a summation is included into the model for the dummy variables for the dates to be included in the specified holding period (Leeds & Leeds, 2010):

$$R_{i,t} = \beta_i 0 + \beta_i 1\ Rmt + \sum \delta_s D_s + \varepsilon_{i,t}$$

While this model incorporates the use of a dummy variable into one equation, the effect is that the utilization of the t statistic is equivalent to other models without the same restrictive assumptions of uncorrelated errors, as the analysis relies on the covariance matrix (Leeds & Leeds, 2010).

This method has two other attractive features, the first being that the sigmas (regression estimated returns) from the model can subsequently be used as a dependent variable in a cross sectional regression model for analysis of firm-specific characteristics on returns, and the second is that the model is easily incorporated with use of SUR (Karafiath, 1988). Despite these appealing features for utilization in SUR there appears to have been few researchers who have adopted this method in the sport management context.

For firms of interest, utilizing a broad market is the usual method (Brown & Warner, 1985; Leeds & Leeds, 2012), but for countries, and economies, of interest, the market may not be an appropriate benchmark because the index itself is the market of interest. In order to test the impact of an event on a country wide economy, that country's index can be used for study and can be regressed on either a larger, international market, or a lagged return of its past performance, known as autoregression (Leeds & Leeds, 2012). An autoregressive model is specified as (Berman, Brooks, & Davidson, 2000; Leeds & Leeds, 2012):

$$R_t = \beta_0 + \beta_1 R_{t-1} + \delta_s D_s + \varepsilon_t$$

Where R_t is the index return, R_{t-1} is the lagged return of the index, δ_s is the coefficient for the estimated return on day s, D_s is a dummy variable equal to 1 for the day s and 0 otherwise and ε is the residual. For assessment of a longer event window a summation is included to sum the sigmas of all the days in the window (Leeds & Leeds, 2012).

While they are popular in the literature, the use of autoregressive techniques in stock return modeling has been questioned since the interpretation of the regression is more difficult. It is also suggested that the use of the model does not adequately capture trends or cyclic changes in returns that may lead to erroneous interpretations (Harvey, 1997). Past returns are also considered noisy measures of expected returns and once an event occurs, there is a tendency to observe an increase in the variability of stock returns as a result (Fama, 1991). One adjustment that has been made is to include not just a lagged time for the event, but a lead, future date as well, to account for increase in variability (Edmans et al, 2007; Wang & Markellos, 2018).

Some studies use the market model to predict returns and then use the residuals in this model for a dependent variable to analyze the independent variables in question over time (Edmans, Garcia, & Norli, 2007). Since the returns of these time series models do not follow a normal distribution and demonstrate increased variability (Hamilton & Susmel, 1994), the use of a Generalized Autoregressive for Conditional Heteroskedasticity (GARCH) model is used to address the skewness of these returns through time (Floros, 2010). The utilization of this model has shown that variation of skewness in the distribution through time can be seen as heteroscedasticity and the utilization of a GARCH model is a better predictor of returns in a time-series analysis

(Harvey & Siddique, 1999). An advantage of the GARCH procedure with modeling time series returns is that the use of dummy variables creates a parsimonious model, the variability of event clustering is accounted for, as is heteroskedasticity of the returns (Filis & Spais, 2012). The general model for evaluation is:

$$y_{it} = \mu + \beta_1 y_{i.t-1} + \beta_2 D_i + \beta_3 D_{ii} + \varepsilon_{it}$$

$$\sigma_{it}^2 = \omega + \beta_4 \varepsilon^2_{i,t-1} + \beta_5 \sigma^2_{i,t-1} + \beta_6 D_i + \beta_7 D_{ii} + u_{it}$$

Where y_{it} corresponds to stock$_i$'s daily returns and σ^2_{it} corresponds to stock$_i$'s conditional variance. The first equation is the mean (μ) return of stock$_i$ for the study period of the dummy variables (D_i and D_{ii}) and an error term ($\varepsilon_{i,t}$). The second equation models the variance (σ^2) with a constant (ω), the lag of the squared residual from the first equation, the dummy variables (D_i and D_{ii}), and the error term u_{it}. The first dummy variable D_i takes value zero for the pre-event period and one for the post-event period. The second dummy variable D_{ii} takes one for the event window and zero elsewhere. The use of dummy variables allows for the assessment of a change in response to the event window specified. If the coefficient of the effect of the dummy variable is positive, it signifies that there is a positive effect in response to the specified event window.

While an ordinary least squares (OLS) model fit is acceptable method in event studies, and will have similar results as other methods, there are times when allowing for correlation of the error term improves the interpretability in the model. One such time is when events occur in multiple firms at the same time, in which case there will be correlation in the error in the predicted return that is similar across all the firms (Binder, 1998). In this case, a seemingly unrelated regression (SUR) model can improve the

accuracy of the estimation (Tanuwidjaja, 2007). SUR's main contribution is to allow for assessment of events that affect several firms, and each firm's reaction to that event (Binder, 1985).

When events are contemporaneous (occur in the same time), the utilization of dummy variables provides the same numerical estimates as a two-step event study method (Karafiath, 1988). It also allows for the utilization of the dummy variables to assess the average returns of a number of firms that are subject to the same event window that result in smaller standard errors (Salinger, 1992). While initially used to test the effect of regulatory changes on companies within a specific sector, a multivariate model is useful for examining the returns of several companies who have the same event timeline (Binder, 1998). The usefulness of a single model is that it adjusts for contemporaneous correlation and heteroscedasticity involving the firms. The model is the same as the OLS market model, but exists in a stacked form for each company in the event window, as follows:

$$R_{1,t} = \beta_1 0 + \beta_1 1\ Rmt + \sum \delta_1 sDs + \varepsilon_{1,t}$$

$$R_{2,t} = \beta_2 0 + \beta_2 1\ Rmt + \sum \delta_2 sDs + \varepsilon_{2,t}$$

...

$$R_{n,t} = \beta_n 0 + \beta_n 1\ Rmt + \sum \delta_n sDs + \varepsilon_{n,t}$$

Where each firm contains the same, or similar, independent variables, but the coefficients adjust based on the firm (Binder, 1998). In addition to handling contemporaneous correlation, the series of equations also allows the error across the sample to have different variances. This increase in efficiency is especially useful if the

independent variables differ for the equations (Zellner, 1962). Not only is this stacked equation more efficient than performing single assessments for each company in the sample, but the variances are much smaller than those found in single equation estimates (Zellner, 1962). An additional feature of the SUR is that the test statistics are not as sensitive to violations of the assumption of normality, and when combined with bootstrapping can provide more accurate confidence intervals (Rilstone & Veall, 1996). Despite these advantages and the prevalence of event clustering, especially in the sport context, this method has seen limited utilization.

If companies indeed exist for the creation of wealth for their shareholders, then understanding how decisions impact the performance of their stock is important. Event studies have been conducted for the last 50 years in a variety of corporate settings to better understand stock performance. For all versions of an event study, a baseline is necessary in order to evaluate expected compared to unexpected performance (Brown & Warner, 1985). Commonly, this baseline is created by using a market model where the rate of return for the firm is regressed against the appropriate benchmark (S&P 500 for large cap U.S. stocks). Once this baseline is established, the actual returns are then compared to the expected returns for assessment of abnormal response. A simpler approach is to use dummy variables to identify the event window in question and assess the coefficients directly. For companies that share the same event window, a multivariate model can be conducted that allows for the correlation of the error terms, but for individual examination of the event in question. As sport has established event days and competition amongst firms for consumers, this method is an appropriate, but underutilized, means of assessment.

2.7 RATIONALE FOR HOSTING MEGA-EVENTS

Bidding to host a mega-event is an expensive undertaking and the subsequent decision by the organizing body to choose a host city is often a highly anticipated event. Host cities bid, in part, due to the belief that hosting a mega-event will spur investment and economic growth resulting from the event (Liu, 2011). Many countries view mega-event hosting as an opportunity to demonstrate their political and economic advancement to the world (Tomlinson, Bass, & Bassett, 2011). Their successful hosting of an event on the scale of the Olympic Games or World Cup serves as a signal of their increased stature. The addition of the international broadcast viewership provides further opportunity for the country to demonstrate their ascension among the world's leaders (Maharaj, 2015). In order to fulfill the desire to host an event on the world stage, some countries move ahead with a bid without input from the taxpayers or their approval for the allocation of taxpayer funds for construction costs and other expenses (Zimbalist, 2015).

The rationale for the construction is that the mega-event provides the host community with the opportunity to invest in their infrastructure. This trend for infrastructure development as a part of mega-event hosting started with the 1960 Summer Olympic Games in Rome, Italy, and has continued to increase the cost of development (Liao & Pitts, 2006). For many host communities, the influx of visitors to the Games creates demand for adequate housing, transportation and venues during the event, but after the event, supply far exceeds the future demand, as there are rarely permanent residents for venues and Olympic housing is usually not successfully converted to

residential housing (Newman, 2007). The benefits occur to the construction companies, who capitalize on the cost of development (Zimbalist, 2015).

In a culmination of the infrastructure development of the 1960's and 1970's, Denver became the first host city chosen to cancel its hosting after taxpayers refused to authorize additional spending in 1972. Then, after the 1976 Summer Olympic Games, Montreal's Olympic Stadium ended up costing taxpayers over $1 billion and was not completely paid off until 30 years after the hosting of the Games (McBride, 2018). The concern over the cost of hosting the Olympics and the public debt that resulted initially led taxpayers to be wary of hosting in the lead up to the 1984 Summer Olympic Games in Los Angeles, California. However, due to the savvy business decisions of the organizers in response to this limited taxpayer funding, those Olympics were widely considered profitable and a model for future host cities (Wharton, 2016), which provided future host-communities with the rationale necessary for bidding.

The financial burden of hosting a mega-event has seen continued growth over time (Baade & Matheson, 2016) as well as a consistent pattern of cost-overruns that places additional burden on the taxpayers (Flyvbjerg, Budzier, & Stewart, 2016). Despite the escalating costs that have dramatically outpaced inflation, host countries continue to bid, in part, for the potential they see for investment in infrastructure and tourism with the perception it will lead to future economic growth (Baade & Matheson, 2016; Tomlinson, Bass, & Bassett, 2011). In addition to the pre-event costs associated with hosting a mega-event, additional challenges are presented to many host countries because of large sport complexes built specifically for a mega-event that are dormant after the conclusion of the event (Robinson & Torvik, 2005). These "white elephants" can drain financial resources

for maintenance after the event has concluded and can also become dilapidated. Additional costs for a successful bid to host a mega event can involve staffing concerns for security (Tomlinson, Bass, & Bassett, 2011) and dealing with protesters who may view hosting as supporting large financially stable institutions rather than providing economic benefit that positively benefits all demographic groups within the host country (Maharaj, 2015). As an example, in order to pay for police during the 2016 Summer Olympic Games, Rio de Janeiro received $900 million from the federal government (McBride, 2018).

Once the hosting of a mega-event has occurred, it is possible to ascertain the impact that hosting had on the economy both during and after the event. While touted as a mechanism to create jobs, mega-events often result in a short-term increase of part-time jobs, rather than sustained employment. Anticipated tourism increases also sometimes fail to materialize, as concerns of crime, crowding and prices can dissuade would-be travelers from visiting (McBride, 2018). Then, there is the debt that taxpayers incur as a direct result of the infrastructure and stadium developments and their ongoing maintenance (Mitrofanova, Russkova, Batmanova, & Shkarupa, 2015). Prior to hosting, however, the allure of hosting a mega-event may be viewed by the marketplace as being a positive event. If investors view the potential hosting as a signal of future economic growth, they may invest in the businesses and industries that they think are likely to benefit. Collectively, these investment decisions may indicate an expectation of future returns for the countries and businesses that are involved with the mega-event.

Event studies have been extensively utilized in sport to examine, amongst other things, a country's stock market index in response to hosting a mega-event such as the

Olympic Games or FIFA World Cup (Floros, 2010; Leeds, Mirikitani, & Tang, 2009), investor response to initial sponsorship announcements (Hundt & Horsch, 2019; Lee & Groves, 2012), athlete endorsements (Ding, Molchanov, & Stork, 2011; Hood, 2012), naming rights announcements (Leeds, Leeds, & Pistolet, 2007), jersey sponsorship reaction during events (Hanke & Kirchler, 2013) and investor sentiment for on-field performance (Edmans, Garcia, & Norli, 2007; Ehrmann & Jansen, 2015). Its utilization to investigate non-sponsors has seen limited use (Hino & Takeda, 2019) and the examination of company stock performance in response to a sponsored event has not been compared to a non-sponsor's performance. The following three sections detail the negative effects of sporting events, highlight research that has been done in the areas of stock returns, sponsorship, hosting mega events and overall stock market volatility.

2.8 NEGATIVE EXTERNALITIES OF SPORT MEGA-EVENTS

Part of the rationale for cities and countries to bid on hosting a mega-event is the belief that hosting will exert a net-positive effect on the economy of the city or country in question (Barclay, 2009). However, in actuality, this has not been achieved (Siegfried & Zimbalist, 2006). Another common rationale is the increase in tourism that occurs as the result of the mega-event, however this may come at the expense of other visitors (Siegfried & Zimbalist, 2006). The announcement of a mega-event hosting announcement can have an anticipatory effect on the location that can increase investment within that community (Preuss, 2006). There has been some support that the announcement of a world cup increases the stock return of the tourism sector (Nicolau, 2012), however this is temporary, as in the long term there is a trend for hotels

constructed for mega-events to go out of business from the lack of tourism (Baade & Matheson, 2016).

There is also ongoing concern that the hosting of mega-events entails large opportunity costs and enhances gentrification. Moreover, in the case of Rio de Janeiro, there were two conflicting branding messages that afflicted the hosting of mega-event; on the one hand were the entrepreneurs and governing officials who were portraying the events as a way to regenerate the city, and on the other hand were social actors discussing human rights and fulfillment of social needs (Maiello & Pasquinelli, 2015). While the hosting of an event can serve as a vehicle to communicate to a target audience to highlight a location, it is also difficult to control all the messaging surrounding the event (Preuss, 2009).

In order to determine the efficiency of hosting an event it is necessary to ascertain the collective benefit of hosting the events on each stakeholder and the costs necessary of hosting. This assessment also varies as the more investment made for events make future events more efficient as the initial infrastructure has been developed (Preuss, 2009). Unfortunately, many hosts fail to adequately plan for the impact of an event on a longer term strategy. Many times, financial resources are allocated to the short term development and operations of the event, at the expense of a longer term outcome (Jago, et al., 2010). Therefore, any increase in anticipated future growth fails to materialize and the initial money spent is not recouped.

For fans to attend sporting events they have to travel to the event in question. Driving to an event increases the vehicle miles driven for the population, which increases emissions and road wear and decreases traffic flow (Humphreys & Pyun, 2017). When

analyzing the air quality surrounding Major League Baseball games, Locke (2018) found that baseball game decreased the air quality by 0.65%. Air quality concerns are not just present in the attendance of the event, but also the construction of the facilities, when particulate matter in the air is increased (Humphreys & Ruseski, 2018). Despite the presence of pollution during matches in the Chinese Soccer League, fans did not alter their consumption habits, although there exists long term health effects from exposure (Watanabe, Yan, Soebbing, & Fu, 2019). For mega-events is the added impact of athletes and fans traveling to competition destination, where the largest environmental impact is event-related travel (Collins, Jones & Munday, 2009). As a result, it has been argued that sporting events cause negative externalities within the local area, including traffic, pollution, crime and poor health outcomes that would be taxed in other contexts (Humphreys, 2019).

2.9 SPONSORSHIP AND COMPANY STOCK RETURN

As sponsorship agreements have become more lucrative and complex, the need to properly evaluate their impact has increased. However, estimating the performance of an event sponsorship is made difficult by the fact that companies do not typically disclose the contractual details of the partnership agreement, including the internal decision making and financial management process (Miyazaki & Morgan, 2001). This lack of disclosure has led researchers to adopt alternative methods for evaluating sponsorship effect which include the company stock return as a result of the sponsorship announcement. Such investigations have spanned a variety of sport teams, events and venues. For example, in their analysis of the value of naming rights for stadiums, Leeds, Leeds and Pistolet (2007) found little evidence that the purchase of naming rights had an

impact on sponsor stock returns. In some cases, there was a small increase the day or two after the announcement that subsequently decreased, leading to a neutral overall stock response (Leeds, et al, 2007).

Following their examination of stock price response to international sport sponsorship, Mazodier and Rezaee (2013) concluded that such sponsorship had a negative impact on share value, which was especially true for United States' based companies indicating that the perceptions of the shareholders was that the sponsorship would not positively reflect back to the brand. While studying international soccer matches on the stock return of athlete jersey sponsors, game losses indicated a negative stock return for the sponsors which was more pronounced if the defeat was a knockout (elimination game) or was unexpected (Hanke & Kirchler, 2013). This seemingly created an association between a company and the emotionality of the fans.

Conversely, other researchers have found that positive stock returns were realized resulting from their sponsorship (Clark, Cornwell & Pruitt, 2002; Cornwell, Pruitt & Clark, 2005; Mishra, Bobinski & Bhabra, 1997). In an analysis of sponsorship for the Super Bowl, it was found that there were no unusual stock returns for individual days, however, longer holding periods including an event window two days prior to two days post [-2,2], three days prior to three days post [-3,3] and four days prior to four days post [-4,4] were found to be positive (Eastman, Bradley & Wiggenhorn, 2010). Clark et al. (2009) demonstrated a decrease in market value for sponsorship of NCAA bowl games and a professional tennis tournament; however, mixed outcomes were observed for PGA sponsorship (Kim, 2010). There appears to be consistency in findings that NASCAR achieves a positive stock price outcome for sponsorship announcement (Clark, et al,

2009; Pruitt, Cornwell & Clark, 2004). To determine sport sponsorship outcomes on firms in Japan between 1991 and 2014, Hino and Takeda (2019) utilized a three-factor model to identify abnormal stock returns, which were then used to build a multiple regression model. The results indicate that sponsors in Japan had a positive market reaction while their competitors had a negative market reaction that could be the result of a signal regarding the expected success of the sponsoring company in attracting new customers. The positive market results decreased over the years, potentially the result of the rising cost of sport sponsorship, which may indicate the public views sponsorship as a poor investment. This finding was echoed by another evaluation of 98 official sport sponsorship announcements over 10 years that found that while the announcement demonstrated a positive response for the Summer Olympic Games, FIFA World Cup, and UEFA European Soccer Championship, it decreased over time (Abril, Sanchez & Recio, 2018).

In further examination of stock price adjustments to sponsorship announcements, researchers concluded that returns are dependent on the firm, the event being sponsored and the congruence of the firm with the event (Clark, Cornwell & Pruitt, 2009). Companies that have greater return on assets, and thus a demonstrated history of driving returns to the firm, achieve greater returns than those with lower selected financial ratios (Clark et al., 2002; Mishra, Bobinski & Bhabra, 1997). In addition to return on assets, being identified as a technology company and firm size play a role, with larger companies, as measured by market capitalization, expected to generate greater returns (Clark et al., 2002). Returns also vary by region, as well as by sport with soccer not showing much impact, but NASCAR demonstrating positive responses. However, the

positive stock responses identified appear to be more pronounced for smaller firms with a brand transfer on a national rather than international level with Asia/Pacific companies demonstrating greater positive responses (Reiser, Breuer, & Wicker, 2012). The lack of uniformity regarding positive sponsorship response to announcements continues to contribute to ongoing academic interest in this area.

Some companies have additional sponsorship opportunities open to them on a global scale. Olympic sponsorship is unique in the sport realm due to its size, commercial success, seasonal rotation and ability to generate substantial revenues through sponsorship (Miyazaki & Morgan, 2001). Indeed, a recent report issued by the IOC lists revenue from sponsorship as the second highest contributor to the organization at 45%. This is slightly behind broadcasting rights contributions of 47% (IOC, 2018). Since Olympic sponsorship is an expensive investment for the sponsoring firms, it has garnered academic interest to identify whether such investment produces positive results. Following the 1996 Olympic Games in Atlanta, Miyazaki and Morgan (2001) examined the change in stock price resulting from sponsorship announcement and did not identify any significant negative abnormal stock returns. There was one significant positive return which led the authors to conclude that Olympic sponsorship may have positive value to the sponsoring firms, or at least, be seen to sell at market price with a zero expected future return. These findings are supported by those of Samitas, Kenourgios and Zounis (2008) who reviewed the sponsorship announcement regarding the 2004 Athens Games and concluded that sponsoring firms did achieve positive abnormal stock returns, which were more pronounced for smaller, national companies compared to larger, international sponsors. The announcement of sponsorships for the London 2012 Olympic Games

demonstrated greater returns for TOP sponsors over official sponsors and for national British brands over non-British brands, as well as increased trading activity (Baim, Goukasian, & Misch, 2015).

Contrary to these findings, researchers using a regression model with dummy variables and bootstrapping failed to identify any abnormal returns in response to the announcement of the national team sponsors for the 2004 Olympics (Tsiotsou & Lalountas, 2005). A similar finding was discovered by Deitz, Evans and Hansen's (2012) results indicating a significant negative return for firms that sponsor the Olympics. This finding was based on the change in market price at the time the announcement was made, with TOP sponsors showing more of a negative return than other sponsorship levels. This conclusion supports a previous finding that Olympic sponsorship announcements have a negative effect on the share price of the firm (Farrell & Frame, 1997). The evidence regarding investor reaction to sponsorship announcements for the Olympics has thus far proven inconclusive.

TOP sponsors invest the greatest amount of money on Olympic sponsorships, so it is likely those companies would demand a higher return on that investment during and after the Games. Researchers confirmed that the Beijing 2008 Olympic sponsors slightly outperformed the S&P 500 over the course of the Games (Kim, Jung & Lee, 2013), with some days during the event window being abnormal, but the absence of a cross sectional evaluation does not illuminate the reasons why this was observed. It could be that abnormal returns were seen during the Olympics that may relate to activation strategies, broadcasting viewership or other unidentified variables. In an assessment of the announcement of 21 sponsoring companies of different levels (TOP, Grand National,

Official sponsor, exclusive supplier) for the Beijing 2008 Olympic Games, no effect on firm value was noticed. Moreover, reaction to firm value surrounding the opening ceremony differed between international and domestic firms, with domestic companies demonstrating a negative reaction while international companies showed a positive reaction. Conjecture exists regarding different motives, marketing and activation strategies between firms being the potential cause of the difference (Molchanov, Stork, & Zeng, 2010).

There were 117 advertisers identified for the Summer Olympic Games in 2000, 2004 and 2008. Overall, they achieved an increase in share price from the Monday before the Games to the Friday after the Games compared to the S&P 500 over the same period (Tomkovick & Yelkur, 2010). Subsequently, the researchers compared the performance of sponsorship companies versus advertising (but not sponsoring) companies and concluded that sponsoring companies who augment their sponsorship with advertising achieve greater-than-expected changes to their stock price (Yelkur, Tomkovich & Pennington, 2012). However, their use of mean stock price rather than stock returns may skew the results if larger corporate outliers exist. When looking specifically at four of the TOP sponsors for Beijing, Lee and Groves (2012) undertook a trend analysis for impact of the Games on stock price and showed mixed results as well as demonstrated that if a small stock bump was realized it was short lived before returning to baseline following the Olympics.

In addition to the Olympic Games, the FIFA World Cup is another heavily sponsored mega-event that draws international attention. An investigation into the market response of 30 FIFA commercial affiliates and two of their competitors at initial

announcement was conducted during the time FIFA was experiencing significant image difficulties which contributed to the subsequent election of a new president. This investigation utilized multiple models (CAPM market model, 3-factor model, 4-factor model) and inferential measures (t-test, Generalized Rank Test, Wilcoxon Sign, bootstrapping) (Hundt & Horsch, 2019). Results indicated that there was a neutral response to initial announcements, but there were negative stock responses to the image difficulties facing FIFA and the election of a new president that did not affect the sponsor's competition (Hundt & Horsch, 2019). In an assessment of 11 World Cup effects on the sectors in the US market utilizing an econometric model, only the financial sector displayed any appreciable difference, possibly related to liquidity of trading for foreign investors acting on sporting performance (Curatola, Donadelli, Kizys, & Riedel, 2016).

Since the cost of sponsorship for mega-events is expensive, the perceived success of the sponsoring companies continues to be of interest. The evaluation of sponsor stock returns using GARCH methods and log returns for 28 mega-event sponsoring companies from 2000 through 2009 demonstrates that while volatility increases during the event, not all companies and events are equal (Filis & Spais, 2012). Out of the 28 companies, 15 did not show any change in stock price during the event timeline (Filis & Spais, 2012). The 13 remaining companies did see a change in their stock price as a result of the sponsored event, most notably for companies that are recurrent companies with a strong global brand. Interestingly, the mega-events being studied were not consistent; McDonald's demonstrated a positive stock return during the 2000 and 2004 Olympic Games, but a negative stock return during the 2008 Olympic Games and 2002 World Cup.

To better understand the relationship between sponsors and their commercial success, researchers have also studied the impact of performance of athletic teams and their sponsor stock response. In an examination of the effect of sponsoring an international match where one of the three highest exposure football clubs was competing demonstrated a positive effect on the stock returns of the sponsoring enterprise, with authors noting that the "most significant takeaway from our analysis is that sponsoring firms do see abnormal stock returns of up to 2.24% 10 days after the international match, and abnormal returns of up to 5.03% 20 days beyond the sponsored competition" (Bouchet, Doellman, Trolio, & Walkup, 2015, p. 200).

In response to performance in the Turkish Soccer League, a positive relationship between performance and the stock returns for the sponsoring company was identified (Sarac & Zeren, 2013). It was found that stock returns react in a direct relationship to their favorite team's performance; there is a positive reaction with wins and a negative reaction with losses (Demir & Rigoni, 2017). Using a Brown and Warner market model combined with an econometric model of stock returns for the jersey sponsors of 114 matches in European soccer demonstrated a positive return when both teams had the same sponsor, negative returns when there was a loss and magnified effects for both during important, knockout games (Hanke & Kirchler, 2013). However, other researchers have disputed this finding, suggesting that wins and losses do not materially affect stock returns (Vieira, 2012). In a comprehensive review on the relationship between soccer performance and stock returns using meta-regression analysis, it was found that performance is not related to stock returns (Geyer-Klingeberg, Hang, Walter, &

Rathgeber, 2017). Thus, the idea that stock returns may react to performance may be unfounded.

Sponsoring companies working to utilize mega-events for financial success have demonstrated mixed results regarding their stock returns. It would appear that the Olympics demonstrates a slightly positive or neutral stock response to the sponsors overall, while the World Cup is perceived as less successful for sponsoring companies. Additionally, team performance has been used to evaluate sponsor success with similarly mixed results. The stock response to sponsors of different levels or ambush marketing companies has been largely absent. Mega-events are of interest to not only their sponsors, but to the host countries as well, for similar reasons. If the hosting of a mega-event is viewed positively by investors, then the overall stock market of the country in question will react based on the perceived outcome.

2.10 MEGA-EVENTS AND COUNTRY STOCK RETURNS

Mega-events have the potential to cause market reactions in a host country in addition to individual companies. If hosting is viewed as a positive economic outcome, then the host country market index should increase due to the likely investment and economic activity necessary to execute the event after the bid is awarded, but that is not generally the case (Liu, 2011; Martins & Serra, 2011). Using a market model and t-statistic in an assessment of the impact of 30 international sporting events (Summer Olympics, Winter Olympics, FIFA World Cup, European Football Championships, Commonwealth Games) on a host country's market, a short-term positive effect was found (Fah & Hai, 2014). Subsequent analysis for the impact of the event in question did not demonstrate a positive response from the start of competition (Fah & Hai, 2014).

Five World Cup announcements between 1994 and 2010 were assessed on the impact to the host country's exchange with findings indicating that all countries with the exception of South Africa showed a slight negative trend or no trend in daily CARs from between 40 days prior up until 26 days after the announcement. It can be concluded that in general, the announcement of the FIFA World Cup to the host country has had minimal impact on driving positive CARs over longer and shorter time event windows (Ramdas, van Gaalen, & Bolton, 2015).

In an examination of the effect of World Cup announcements on host countries' stock markets for the 1994 through 2010 World Cups on winning and losing countries host city bids, it appeared that market reactions for the winning bidders were neutral or negative for countries considered "developed" and positive in countries considered to be "developing," especially for Qatar. For losing bidders, the results showed a negative abnormal stock return at the announcement dates for two developing African countries classified as lower-middle income countries (Morocco and Egypt), with other losing countries demonstrating negative returns, on average (Charles & Darne, 2016). Eissa and Refai (2018) also found that investors in the Doha Stock Exchange viewed the decision to host the World Cup in a positive light, although this could be related to the corruption in the voting process. The Brazil FIFA World Cup announcement in 2010 demonstrated negative response for the event window studied [-1, 2] (Charles & Darne, 2016).

Announcements for the World Cup and Olympics were also assessed on the host country index from 1974-2013 with results indicating that there was an increase in the index in response to the announcement, but that the event itself did not demonstrate an appreciable market response. Additionally, when comparing economic size via GDP, the

countries with smaller GDP had greater returns (Mohamed, Oettle, & Stewart, 2015) suggesting that smaller countries expect to achieve greater economic growth as a result of hosting. Utilizing a single model with stock returns regressed against the lagged country index for five Summer Olympic Games announcements between 1988 and 2004 demonstrated that Seoul and Athens had a positive reaction to the announcement, but the other markets did not. For the losing cities, only one of the five announcements, Athens, demonstrated a market reaction, with a negative response in 1996 (Nishio, Lim, & Downward, 2009).

Mirman and Sharma (2010) analyzed the announcement effects of winning and losing bids for both the Summer and Winter Olympic Games, beginning with the 1996 Summer Olympic Games announced in 1990, up until the announcement of the 2012 Summer Olympic Games awarded in 2006. They found a negative stock market reaction for winners of the bid to host Winter Olympic Games and insignificant positive reaction for winners of the Summer Olympic Games. The announcement of 15 Olympic Games host cities was found to have a positive 2% impact of hosting the Summer Games, but no effect was identified for Winter Games hosts or cities who were not chosen (Dick & Wang, 2010). Moreover, returns varied based on economy size, with smaller economies demonstrating larger increases, although only for short durations.

In an examination of the 2000 Sydney Olympics on Australia's stock index, no impact was found. In an analysis of the market segments, four of the 20 (building materials, developers and contractors, engineering and miscellaneous services) demonstrated positive returns. Additionally, the companies that had a positive return post

announcement were those located in New South Wales, where Sydney is the capital (Berman, Brooks, & Davidson, 2000).

When comparing the effect of the announcement that Athens would host the 2004 Olympic Games instead of Milan, the Athens Stock Exchange had a positive reaction, with the industrials sector gaining the most in anticipation of the future infrastructure work, while the stock market in Milan showed no discernable change as a result of the announcement (Veraros, Kasimati & Dawson, 2004). A comparison of the Shanghai, Paris and Toronto stock exchanges in response to the 2008 Olympic announcement showed a positive but short duration response on Shanghai's index while those of losing cities Paris and Toronto had no such reaction (Leeds, Mirikitani, & Tang, 2009). The utilities and property sectors of the Shanghai index were also positive, while the industrials were negative, which was different than those discovered by Veraros, et al.

Using a GARCH method to assess the impact of the London 2012 announcement, results indicated that both the winning bid of London and losing bid of Paris stock exchanges had positive returns. Additionally, both produced negative returns following the terrorist attacks in London the following day (Kavetsos & Szymanski, 2008). By utilizing different estimation methods Asteriou, Samitas and Kenourgios (2013) evaluated the effect of the London Olympic Games announcement on the London stock exchange sectors. Under an OLS estimation, 5 of 28 sectors had a positive response, whereas only 3 sectors showed a positive response with a GARCH estimation.

The impact of the 2020 Olympic Games announcements on the indexes of the winning country Japan, and the losing country Spain, showed no effect; however, Turkey, another losing finalist, had both positive and negative returns in the event window. These

conflicting results were most likely the result of confounding political events (Sullivan & Leeds, 2016). It was believed that Tokyo would win its 2020 bid, so perhaps the announcement was not seen as new information. As is the case with firm level evidence, the announcement of hosting a mega-event does not demonstrate a clear signal regarding expected future returns as a result of hosting.

Mega-event hosting has been suggested to be positive for the host country economy through metrics besides just the performance of its major stock market index. However, many researchers find neutral or a negative response to hosting announcements, calling into question the ability for a mega-event to positively impact its stock market, let alone spur country wide economic growth. As many mega-events are isolated to certain cities or regions, this may help to understand the non-positive responses. Mega-event hosting and international sport competition may lead to positive civic pride even if discernable positive changes in economic conditions are not present. Some researchers have, therefore, examined the effect of National Team performance on the stock market of the host country.

Using mean returns post-match for the English National soccer team between 1984 and 2002, researchers identified that the London Stock Exchange increased after a win and decreased after a loss lending support for a sentimental reaction (Ashton, Gerrard, & Hudson, 2003). However, a replication of their study did not achieve the same results; instead, it suggested that team performance does not impact stock return (Klein, Zwergel, & Fock, 2009). In an assessment of national team performance in soccer and other sports using an econometric GARCH model, a national team win was found to have

a neutral response on the national index, but a loss did cause a decrease in the index in question (Edmans et al, 2007).

Further analysis using the stock price of one firm that is listed on two exchanges made it possible to ascertain differences between the countries based on sentiment. The games under investigation occurred when France and Italy were eliminated from World Cup competition in 2010 and the assessment was the difference in price of a single company that was cross-listed on the two exchanges. Results indicated that during the match, the price decreased on the exchange for the losing team leading authors to conclude that there exists an undervaluation by investors (Ehrmann & Jansen, 2015).

If investors are distracted by the loss of the team they support, that sentiment may not impact the stock market, but a decrease in market activity may be observed. Studying medal results of four summer Olympic Games on eight international markets (U.S., U.K., France, Australia, Netherlands, Germany, South Korea and Japan) and five multi-national sponsoring firms (Coca-Cola, McDonald's, Panasonic, Visa and Samsung) indicated that there was no significant association between medal performance and abnormal returns over the next trading day (Yang & Markellos, 2018). Additionally, trading volumes and volatility were lower during the Olympic Games and are further reduced by the number of the gold medals won over the previous day (Yang & Markellos, 2018).

Kaplansky ant Levy (2010) found that there was a negative response on the New York Stock Exchange unrelated to seasonality for the 15 World Cups studied. There was also found to be no relationship between country performance and stock returns in those countries during the 2010 World Cup in South Africa (Vieira, 2012). In an extension of the work of Kaplansky and Levy, it was found that sport sentiment mainly affects the

financial sector but no others (Curatola, Donadelli, Kizys, & Riedel, 2016). In a critique of using the Morgan Stanley Capital International (MSCI) World Index as a market control, Gerlach (2011) matched counties to their neighbor to eliminate bias. These matched countries allowed for regional differences to be identified between a team that played and a team that did not. Results indicated that the countries had similar market movements regardless of team participation which is not in line with investor sentiment following World Cup matches. It is more likely that the changes in the market were due to other news (Gerlach, 2011).

A paper presenting evidence that soccer match scores affect stock market returns in different ways based on the success of four country's studied showed that countries viewed as having relatively more successful soccer teams, Spain and the UK, indicate stock market returns decrease and agents become more risk averse after a loss. The results from countries with relatively less successful soccer teams, Chile and Turkey, reveal that stock market returns increase and agents become more risk accepting after a win (Berument & Ceylan, 2012). By comparing pre and post-match stock returns for three teams in the Italian League (Rome, Lazio, Juventus) it was found that winning is associated with higher returns than losing or ties (Boido & Fasano, 2007). In an assessment of Italian stock market responses to the Italian National team in FIFA competition, there was a positive increase in returns in response to international competition (Vicentini & Graziano, 2016).

Through viewing sentiment with a different lens by assessing returns during the course of the Olympics based on winning medals, Floros (2010) found that Greek athletes winning medals showed a positive return for the Athens Stock Exchange and national

sponsors. Another sentimental stock market reaction tested the hypothesis that tourism increases following mega-event hosting. Utilizing publicly traded tourism companies (hotels and airlines) to assess the effect of FIFA World Cup performance on tourism found that no generalizable effect exists, with the exception of Spain winning in 2010 using an event window of [-2, 2] for the final game (Nicolau & Sharma, 2018). Further analysis of Spain elucidates a positive response to the National Team winning the 2010 World Cup on the market value of the leading Spanish airline company (Iberia) and hotel company (Sol Melia) resulting from a hypothesized increase in brand knowledge in response to the World Cup (Nicolau, 2012).

If mega-events increase economic growth in the host country, then it would be expected that announcements of the host would result in a demonstrated market increase, but that has not been the case; however, the planning process can lead to short-term economic growth (Bruckner & Pappa, 2011) that is not sustained over time. This lack of a response may indicate either pessimism or skepticism on the part of investors who do not necessarily believe that hosting will result in appreciable growth. It has been suggested that perhaps investors react to National Team performance, but that has also not necessarily been the case. This might be attributable to the lack of a financial relationship between a country and performance, which is different from that of a team sponsor or a publicly owned team. For teams like Manchester United, who are publicly traded, their on-field performance may impact their stock returns.

2.11 STOCK RETURNS AND TEAM PERFORMANCE

Sport leagues in the U.S. do not currently have any publicly traded franchises, although there have been publicly traded franchises in the past. However, many

international clubs are publicly traded. Since some investors act on sentiment and emotion, sport outcome has been hypothesized to have an impact on trading. By studying Boston Celtics stock (which was publically traded from 1986 to 2002) activity from January 1, 1987 through May 31, 1998 it was discovered that trading volatility was greater during the season compared to the off season. Moreover, team losses were related to a negative stock response, while wins were not, but playoff wins or losses were related to a positive response (Brown & Hartzell, 2001). Since there have been few publically traded US sport franchises, there is a dearth of research on team performance and stock market returns. However, there have been a few studies of European clubs and stock performance

In a study of German club Borussia Dortmund stock returns for the 2003/2004 soccer season, a close relationship to team performance was noted (Stadtmann, 2006). Using betting odds and team performance for 16 British soccer clubs from 1999-2002, a positive abnormal return was found for wins and a negative return was discovered for losses, while betting odds were neutral (Palomino, Renneboog, & Zhang, 2005). Following the premise that what should affect stocks is new information, 19 English soccer clubs' change in stock price was found for important games, points achieved compared to expected outcome, and goal differential demonstrating that expected performance did not cause a change while unexpected performance did (Bell, Brooks, Mathews, & Sutcliffe, 2012).

If the stock returns of a company are related to financial performance rather than sport performance, then it would not be expected to see a stock market reaction to on-field performance. This area of academic inquiry has not been fully established and more

can be done to understand the relationship between on-field performance and stock returns of publicly traded sports teams.

2.12 SUMMARY

Event study methods have been employed extensively to investigate stock market performance in response to sporting events, both from an investor level (Edmans, Norli, & Garcia, 2007; Kaplansky & Levy, 2010), county level (Ashton, Gerrard, & Hudson, 2003; Berman, Brooks, & Davidson, 2000; Leeds, Mirikitani, & Tang, 2009) and sponsorship level (Abril, Sanchez, & Recio, 2018; Farrelly & Frame, 1997; Hino & Takeda, 2019). To date, a consensus on the relationship between mega-events and company/country stock returns is absent. It would appear, that in general, the announcement of sponsoring a mega-event is neutral to slightly positive, while the awarding of the host country appears to be neutral-to-positive for the Summer Olympic Games, but neutral-to-negative for the Winter Olympic Games and FIFA World Cup. Despite this body of work, the research regarding the impact of multiple mega-events on a single country is limited. Moreover, little inquiry has focused on the success of ambush marketing from a market standpoint. This dissertation looks to examine those research areas.

CHAPTER 3

METHODOLOGY

This is a proposed three-part investigation where the first portion compares the reaction of the Brazilian stock market to other host city bids for the 2016 Rio de Janeiro Summer Olympic Games and the second studies the Brazilian stock market as it reacted to the dual announcements of being a World Cup host and subsequently an Olympic host. The third study is an assessment of the returns for companies of varying sponsorship levels over the duration of the 2016 Rio de Janeiro Olympics and 11 days beyond the closing ceremony. Rather than focus on a number of Olympic Games, this study will heed the advice of Hundt and Horsch (2019) and focus on one event to isolated effect and avoid contamination over time.

3.1 BRAZIL MARKET RESPONSE TO 2016 SUMMER OLYMPIC GAMES HOSTING ANNOUNCEMENT

FIFA made the decision for Brazil to host the 2014 World Cup on October 30, 2007 in an uncontested bidding process (FIFA, n.d.), while the IOC announced their decision on October 2, 2009 awarding the 2016 Summer Olympic Games to Rio de Janeiro over finalists Madrid, Spain; Tokyo, Japan; and Chicago, United States (IOC, 2009). Later, Sergio Cabral, former Governor of Rio de Janeiro, testified to paying over $2 million in total to bribe nine IOC committee members in order to sway the Olympic

vote to Brazil (Panja, 2019). The Olympic announcement was seen as a surprise and carried potential significant international economic consequences if the Brazilian market responded favorably, especially if the markets for losing countries were depressed following the announcement. Subsequently, the World Cup was held from June 12, 2014 through July 13, 2014 and Brazil's national team competed in the quarterfinals on July 4, the semi-finals July 8 and the consolation game on July 12. The 2016 Olympics were hosted from August 5 through August 21.

While an OLS model fit has been found to be an accepted method in event studies, with similar results as other methods, there are times when allowing for correlation of the error term improves the interpretability in the model (Binder, 1998). One such time is when events occur in multiple firms at the same time, in which case there may be correlation in the error in the predicted return that is similar across all the firms (Binder, 1998). In this case, a seemingly unrelated regression (SUR) model can improve the accuracy of the estimation (Tanuwidjaja, 2007). SUR's main contribution is to allow for assessment of events that affect several firms, and each firm's reaction to that event (Binder, 1985).

When events are contemporaneous (occur at the same time), the utilization of dummy variables provides the same numerical estimates as a two-step event study method (Karafiath, 1988). It also allows for the utilization of the dummy variables to assess the average returns of a number of firms that are subject to the same event window that result in smaller standard errors (Salinger, 1992). While initially used to test the effect of regulatory changes on companies within a specific sector, a multivariate model is useful for examining the returns of several events that have the same timeline (Binder,

1998). The usefulness of a single model is that it adjusts for contemporaneous correlation and heteroscedasticity involving the firms. In the context of this dissertation, the announcement of mega-events could potentially affect stock market indices of several countries. Additionally, the event window for the Olympic Games will be shared by all countries looking to align themselves with that event. In these instances, a SUR model is an effective method of evaluation. The general OLS model for evaluation is:

$$R_{i,t} = \beta_{0,i} + \beta_1,Rm_t + \delta_{i,s}\, D_s + \varepsilon_{i,t}$$

Where R is the rate of return (adjusted close at day t – adjusted close at day t-1/ adjusted close at day t-1), for country i at day t. The parameters are the intercept, β_0, for country i and β_1 for the global index, MSCI, rate of return at day t. The variables of interest are the abnormal return, δ for country i for event day, s (-20, 20), that takes a dummy, D, value of 1 for the day s in question and 0 otherwise and ε is the residual for country i at day t.

The SUR model is the same as the OLS market model, but exists in a stacked form for each country in the event window, specifically, as follows:

$$R_1,t = \beta_{0,1} + \beta_{1,1}Rm_t + \delta_{1,s}D_s + \varepsilon_{1,t}$$

$$R_2,t = \beta_{0,2} + \beta_{1,2}Rm_t + \delta_{2,s}D_s + \varepsilon_{2,t}$$

$$R_3,t = \beta_{0,3} + \beta_{1,3}Rm_t + \delta_{3,s}D_s + \varepsilon_{3,t}$$

$$R_4,t = \beta_{0,4} + \beta_{1,4}Rm_t + \delta_{4,s}D_s + \varepsilon_{4,t}$$

$$R_5,t = \beta_{0,5} + \beta_{1,5}Rm_t + \delta_{5,s}D_s + \varepsilon_{5,t}$$

$$R_6,t = \beta_{0,6} + \beta_{1,6}Rm_t + \delta_{6,s}D_s + \varepsilon_{6,t}$$

Where R_1 is the rate of return of Brazil's index at day t, $\beta_{0,1}$ is the intercept of the model for Brazil, $\beta_{1,1}$ is the coefficient for the market return Rm (MSCI) at day t, δ as the coefficient for event day, s (-20, 20), D is the dummy variable for the event day equal to 1 for that day, s, and 0 otherwise or excess return, and ε is the residual error in the model for Brazil at day t. The other models relate to the stock exchanges of 2=Spain (Bolsa de Madrid, BOLYY, Madrid Stock Market General Index IGBM), 3=Japan (Tokyo Stock Exchange TYO, Nikkei 225 index) and 4=the United States (S & P 500) to examine their market reaction in response to the announcements. Two additional markets are also be included that would be considered "neutral" as it was not in the final decision for hosting. Germany (Frankfurt Stock Exchange, DAX) = 5 and Australia (Australian Securities Exchange, ASX) = 6 can serve as a comparison for the impact of the event on the countries involved, as well as for countries uninvolved in the final outcome. Additionally, a summation was added for the assessment for a longer event period, one extended from twenty days prior to the announcement to 20 days post announcement (-20, 20) and the second extended from the date of the announcement to five days post announcement (0, 5).

Brazil's stock market (BOVESPA) is one of the largest in the world and is usually considered to be an emerging market, composed of 50 stocks traded on the Sao Paulo exchange in a weighted average (Trading Economics, 2019). There are two proposed benchmark indexes for Brazil, with the first being the MSCI World Index and the second being the Argentinean index. Some concerns have been raised over benchmarking to the world index as it may not be appropriate for some index comparisons (Gerlach, 2011).

For the examination of the IOC's announcement of Rio de Janeiro being awarded the 2016 Summer Olympic Games, the data will be collected from Yahoo Finance! for the 250 days prior to the announcement with an event window starting 20 days prior to the announcement date and continuing for 20 days post announcement for a 41-day window as recommended by Leeds and Leeds (2012).

3.2 BRAZIL STOCK MARKET RESPONSE TO MEGA-EVENTS

For the examination of the Brazil's stock market index, BOVESPA, the rate of return for the index (closing day t-closing day t-1/closing day t-1) will be collected from Yahoo Finance! for the 250 days prior to the FIFA World Cup host city announcement October 30, 2007 and extend 21 days post the closing ceremonies of the 2016 Summer Olympic Games on August 21, 2016. Assessment will be conducted with an OLS regression model of the BOVESPA rate of return to that of the MSCI market and nearby country, Argentina (MERVAL).

Since there is significant time between the four mega-events (FIFA World Cup announcement, IOC announcement, FIFA World Cup, Summer Olympics) they can be isolated and each mega-event will be assessed independently to determine the market response of Brazil to each of the events. Additionally, the timeframe for the actual events are as long as, or shorter, than the typical 20 days post event date, which allows for evaluation of the daily and cumulative returns for the 2014 World Cup and 2016 Olympics. If hosting creates an economic stimulus there should be an increase in the market response during these time frames. In the 2014 World Cup, Brazil's national team made it through qualifying to the semi-finals, where they lost. They then lost the third place consolation game a couple of days later. Since team performance has the potential

to impact the market, the use of daily returns of the entire World Cup will indicate whether there is a change following the team performance.

The general model for assessment of each of the four independent models is:

$$R_{i,t} = \beta_{0,i} + \beta_1 Rm_t + \delta_s D_s + \varepsilon_{i,t}$$

Where R is the rate of return of Brazil's stock index, i, (BOVESPA) at day t, β0 is the intercept, Rm is the rate of return of the MSCI or Argentina's index (MERVAL) at day t, δ is the abnormal return at day s (-20, 20) with dummy code, D, of 1 signifying the day and 0 otherwise, and ε signifying the residual.

A follow up evaluation assesses whether there is a longer term abnormal response of different holding periods resulting from the dual announcements on the BOVESPA stock index given as:

$$R_{i,t} = \beta_{0,i} + \beta_1 Rm_t + \sum \delta_s D_s + \varepsilon_{i,t}$$

Where R is the rate of return of the BOVESPA on day t, β0 is the intercept, Rm is the market return of the MSCI or MERVAL at day t, ∑ is the summation for the event days, s, for different holding periods signified by dummy variable D and ε is the residual. The event windows utilized for assessment are [-20, 20] and [0, 5] to ascertain if a response exists.

Results of this second study may help to elucidate the effect of the different mega-events on the stock market of a single host country. The magnitude of the coefficients also highlights the market response to each of the events identified. Additionally, 95% confidence intervals will be constructed for the coefficient for the event and event

window for the five countries. While not typically done with event studies, the inclusion of confidence intervals allows for a broader assessment for the magnitude of the market reaction and whether they are economically large or small (MacKinnon, 2002).

3.3.1 STOCK MARKET RESPONSE FOR COMPANIES OF DIFFERING SPONSORSHIP LEVELS DURING THE 2016 SUMMER OLYMPIC GAMES

A third study will be conducted to evaluate the rate of return for companies over the duration of the 2016 Rio Olympic Games. The statistical method proposed for use in the assessment of stock rate of return for IOC TOP sponsors, United States Olympic Committee (USOC) sponsors and non-official, but competing, or ambushing, companies during the Olympics is an SUR model. Typical event study methods look for the reaction of a firm's stock response to a specified event (Brown & Warner, 1985). In the case of the Olympics, the event is the duration of the Games themselves. The general model for each company in the assessment for both the Olympic period and Post-Olympic period is:

$$R_{i,t} = \beta_{0,i} + \beta_1 Rm_t + \delta_s D_s + \varepsilon_{i,t}$$

Where R is the rate of return for company i at day t, β0 is the intercept for company i, Rm is the market return (S and P 500 for U.S. companies), δ is the abnormal return at day s signified with dummy, D, and ε is the residual in the model. A dummy code is also included for Mondays as a Monday effect has been discussed in the literature (Coates & Humphries, 2008) where some firms show an abnormal Monday return.

In the case of the Olympics, all the companies in the sample share the same event window, which may have errors that are similar across all the organizations (Baltazar & Santos, 2003; Taunuwidajaja, 2007). The use of an SUR model accommodates this by

allowing for this correlation in the model, which in this case is the 2016 Summer Olympic Games held in Rio de Janeiro from August 5 through August 21. If deemed appropriate, the specific model is constructed for each company as follows:

$$R_{1,t} = \beta_{0,1} + \beta_{1,1} Rm_t + \delta_{1,s}D_s + \varepsilon_{1,t}$$

$$R_{2,t} = \beta_{0,2} + \beta_{1,2} Rm_t + \delta_{2,s}D_s + \varepsilon_{2,t}$$

…

$$R_{n,t} = \beta_{0,n} + \beta_{1,n} Rm_t + \delta_{n,s}D_s + \varepsilon_{n,t}$$

Where R represents the rate of return or firm 1 on day t, Rm is the return of the benchmark index for the company being studied (S & P 500 for companies traded in the US), δ is the abnormal return for the specified event day s, D is a dummy code that takes the value of 1 for the specified day s and 0 otherwise, and ε is the residual error in the model. For the cumulative abnormal returns for each company, a summation term is added for all the dates in the window, which allows for assessment of returns over the duration of the Olympics Games as follows:

$$CAR_{1,t} = \beta_{0,1} + \beta_{1,1} Rm_t + \sum \delta_{1,s}D_s + \varepsilon_{1,t}$$

$$CAR_{2,t} = \beta_{0,2} + \beta_{1,2} Rm_t + \sum \delta_{2,s}D_s + \varepsilon_{2,t}$$

…

$$CAR_{n,t} = \beta_{0,n} + \beta_{1,n} Rm_t + \sum \delta_{n,s}D_s + \varepsilon_{n,t}$$

Following the event window pre-event specification, the returns for the companies and specified benchmark will be collected for 250 days prior to the Games. The pre-event window will end 20 days prior to the start of the Olympics to prevent an

increase in the variance from influencing the event window (Leeds & Leeds, 2012). The first event window will be the day of the Opening Ceremony and extend to the Closing Ceremony (August 21). A second event window will be conducted to ascertain if there are any longer-term gains from sponsorship after the conclusion of the Games. This will have the same pre-event window, but an event window extending from the first trading day following the closing ceremony (August 22) to 11 trading days afterwards. These dual event windows allow for the assessment of abnormal returns both during the Games and after their conclusion to assess for longer duration returns as a result of Olympic sponsorship. The company's daily rate of return data and the appropriate benchmark returns (S & P 500 for companies in the USA) will be collected from *Yahoo Finance!* for the 250 days prior to the opening ceremony.

While the OLS and SUR model will show estimates for the returns of the individual companies and how their stock performed during the Olympics, it will not offer a comparison between the companies or for different levels of sponsorship. For the assessment of differences in these cumulative abnormal returns for the companies at varying levels of sponsorship, these CARs will be a dependent variable for a cross-sectional regression model for independent variable's effect on these returns. Since TOP sponsors incur significant costs as a result of their sponsorship, they have a motivation to ensure that they realize a positive return on their investment and should have higher cumulative returns than other sponsorship levels (Baim, Goukasian, & Misch, 2015).

Since the coefficients are calculated for each company in the sample, they can be saved and used for additional firm-specific variables that may help explain abnormal returns through a cross-sectional regression analysis. This secondary analysis can be

conducted utilizing an OLS regression model and include the factors BAI score (higher scores more affiliated), sponsorship (TOP, USOC, Ambush), company size (measured as market cap in $ Billions USD), industry sector (tech, sport), and profitability, as measured as return on assets (Clark, Cornwell, & Pruitt, 2002) that have been examined in the literature. The models for assessment of the Olympic period and the post-Olympic period would be:

$$CAR_{i,t} = \beta_{0,i} + \beta_{1,i}BAI + \beta_{2,i}Sponsor + \beta_{3,i}Size + \beta_{4,i}Sector + \beta_{5,i}ROA + \varepsilon_{i,t}$$

Where CAR is the cumulative return for company i at event period t, β_0 is the intercept of the model and the independent firm variables are BAI score, Sponsor level (TOP, USOC, Ambush), size, sector, ROA and the residual error, ε.

3.3.2 SAMPLE FOR STUDY 3

The proposed sample will be constructed by collecting the names of the companies that were listed as worldwide Olympic partners (TOP) or USOC sponsors for the Rio Games from IEG's Rio Report (2016). Additionally, companies identified as ambushers by the Global Language Monitor (GLM) index as being ambushers were included for analysis. The GLM evaluates the brand affiliation between the organization and Olympics; a higher score on the index corresponds to a greater brand affiliation and, therefore, association (Pavitt, 2016). Companies were listed as ambushers who were not identified as either TOP or USOC sponsors, but were on the index as being identified with the Olympics. If a company was not a publicly listed organization (i.e., private), it was eliminated from the data set since returns cannot be assessed for private

organizations. The final sample size for the companies affiliated with the Olympics (Table 3.1) included 10 TOP sponsors, 11 USOC sponsors and 8 ambush companies.

Table 3.1. *Sample of Companies*

Company	Sponsorship	BAI
Coca Cola	Top	89.59
GE	Top	129.98
Bridgestone	Top	15.51
Panasonic	Top	45.84
Visa	Top	4.98
P and G	Top	19.85
Atos	Top	0.16
Omega Swatch	Top	84
Samsung	Top	363.39
McDonalds	Top	136.13
Att	USOC	0
BMW	USOC	0
BP	USOC	0
Budweiser	USOC	0
Dicks	USOC	0
Hershey	USOC	0
Kellog	USOC	0
Nike	USOC	237.62
TDAmeritrade	USOC	0
Citi	USOC	0
United	USOC	0
IBM	Ambush	89.17
Siemens	Ambush	124.2
Pepsi	Ambush	130.4
Starbucks	Ambush	107.28
UnderArmour	Ambush	79.62
Phillips	Ambush	107.57
Unilever	Ambush	115.84
Michelin	Ambush	66.28

For the evaluation of the Olympics event window, a check for confounding events will be conducted to assess if any of the companies in the sample had other relevant, economic information that was released during the event window in question. This will involve doing a search on Google and business websites (*CNBC*, *Wall Street Journal*, *Bloomberg*) to make sure no additional information may impact stock results (Deitz, Evans, & Hansen, 2012; McWilliams & Siegel, 1997). If a company had a confounding event, they may be eliminated from further evaluation. A sensitivity analysis can be performed for the models both with, and without, the company in question to identify what impact it has on the results (Klein, Zwergel, & Fock, 2009). However, if the event in question was related to their sponsorship of the Olympics, then that could be a leveraging strategy for their sponsorship and those companies would continue to be included since this may positively influence their returns and could be directly related to their sponsorship activities.

Understanding the common concerns regarding event studies, this investigation will initially conduct analysis on the raw returns of each company in the sample and create a market model against the appropriate benchmark (Brown & Warner, 1985). If, however, the returns are found to be non-normal in their distribution then the log returns will be used for the dependent variable (Hudson & Gregoriou, 2015). Although this makes the interpretation slightly more difficult given that the coefficients explain the log return rather than the actual return, the accuracy of the estimates should be improved.

3.4 LIMITATIONS

One the main concerns with the use of an event study is the estimation period for the pre-event model (Leeds & Leeds, 2012). There have been many time frames used in

the model, with a minimum of 170 days being identified (Leeds & Leeds, 2012) extending up to 240 days (MacKinlay, 1997). The use of the window allows for regression results to be accurate. Additionally, both MacKinlay (1997) and Leeds & Leeds (2012) recommend the use of a 20-day pre and 20-day post event window for a 41-day total event window. Despite this recommendation, very few studies extend to a post-event window of 20 days. The purpose of the pre-event window is to identify if there are any leakages of information that occur around the identified event, while the post-event identifies if there are lags in the market's incorporation of the event into the returns, as well as a longer duration holding period (Leeds & Leeds, 2012). Many of the studies in the literature have very short event windows extending from one-to-five days post-event at most, with many just looking for a short term one day post-event window.

Furthermore, the event window for pre and post-event is used to calculate abnormal returns on a symmetrical basis (same number of days prior to and post event), with the result being that there are very few abnormal cumulative holding periods. The use of asymmetric holding periods is rarely used, but is more fitting given the null hypothesis that the event causes a change, not that there is an expected abnormal return prior to an event. The incorporation of a pre-event window in the CAR may change the results as it is not expected that there is a return before an event, just that one exists post-event, yet many studies do not account for that. Subsequently, the event window should be shifted to the date of the event and the time frame after the event for identification of an abnormal response.

A second concern regarding the use of event studies is the non-normality of the data (Binder, 1998; Brown & Warner, 1985). The result of this has been to use the natural

log of returns, rather than returns themselves, and to incorporate non-parametric statistical methods (Cowan, 1992). Log returns have demonstrated a more normal distribution (Hudson & Gregoriou, 2015), however, the comparison of the conclusions drawn from using log returns has not been compared to the use of the regular returns. In their review of both simple mean and logarithmic mean returns, Hudson and Gregoriou (2015) do demonstrate that the coefficients differ in magnitude with simple means being higher than logarithmic means, which can change in significance over a short duration. Due to this, the inclusion of confidence intervals is added thus limiting reliance on p values to determine the significance of an effect (Kmetz, 2019). The calculation of log returns is given as:

$$R_t = \ln(P_t/P_{t-1})$$

Where the return on day t is the natural log of the closing Price on day t/Price on day t-1 (Berman et al, 2000). The log returns can also be calculated by subtracting the log of the price on day t from the log price on day t-1 (Hanke & Kirchler, 2013):

$$R_t = \ln(P_t) - \ln(P_{t-1})$$

While the use of the log returns allows for the assessment of whether the event is related to a positive, negative or neutral response, the interpretation of the effect is not as straightforward. However, if returns are non-normal then log returns can be used to correct to a more normal distribution for parametric examination.

A third concern is the impact that confounding events have on the outcome, which can change the interpretation of the results (Deitz, et al, 2012). Confounding events cloud the event study by including information that can affect stock price, but are unrelated to

the event in question. If included, it can cause a positive or negative reaction depending on the information that makes the impact of the event in question invalid. The recommendation for handling a confounding event is to delete that company from the sample (Klein, Zwergel, & Fock, 2009). In spite of these limitations, the use of an event study is prevalent across many industries, including sport, in examining the reaction of a company to an event.

Additionally, there exist three main concerns regarding the validity of the statistical impact of event studies with the first being that markets are indeed efficient, the second is that event day is accurately identified and third is that there are no confounding events during the assessment period (McWilliams & Siegel, 1997). Moreover, the small sample sizes encountered in the event study literature is problematic with assumptions of normality, and checks for outliers and bootstrapping methods are recommended (Hein & Westfall, 2004). Bootstrapping for confidence intervals has also been shown to provide more accurate estimates in a SUR model if there are concerns regarding normality or accuracy of the estimation (Rilstone & Veall, 1996).

For this proposed study on sponsorship returns, there is an identified event window (duration of the Olympic Games), but not an individual date. Rather than utilize a single date, the event will be the date of the Opening Ceremony through the closing ceremony and the CAR of each company during this timeframe. This can be accomplished either by using the daily CAR for the event window, or the weekly return for each company in the sample. The daily CAR will be expected to have variation over the course of the Olympics, but will allow for the assessment of the aggregate stock response during the timeframe. Adopting this method also allows for the possibility for

inclusion of firm level variables that may help to explain returns over this timeframe such as company size, industry sector, sponsorship level, congruence and profitability (Clark, Cornwell, & Pruitt, 2002; Fama & French, 1993). Unfortunately, it is not possible to acquire all the company information for the Olympics such as activation costs, daily sponsorship activity and sponsored athlete activity that may impact company returns. While the use of the CAR will address whether there are differences in returns based on level of sponsorship, care is required regarding the number of independent variables that can be considered, as a minimum of two subjects per variable is recommended, however, more is preferred (Austin & Steyerberg, 2015).

A possible concern for assessing several events on one index may be autocorrelation in the model that can generate misleading conclusions (Veraros, Kasimiti, & Hudson, 2004). Since the events are both independent and do not cluster in a short period of time (being more than 250 days between any of the events), four independent models can be identified for the Brazil index, rather than a single model. If several models are used, and it is determined that correlation does exist in the equations, then a GARCH model may be a more appropriate model. Additionally, given the length of the World Cup, weekly returns may be a better choice than daily returns, which may increase the potential for increased variability and spurious results, but the use of a CAR for the event time frame can help to decrease this.

CHAPTER 4

RESULTS

4.1 BRAZIL MARKET RESPONSE TO 2016 SUMMER OLYMPIC GAMES HOSTING ANNOUNCEMENT

The first study was an examination of the effect of the IOC's announcement awarding Rio de Janeiro as the host Olympic city upon the stock market index of Brazil, Spain, Japan, The United States of America, Germany and Australia. Using an ordinary least squares (OLS) dummy coded regression model, there was no abnormal effect identified for any of the countries on the day prior to the announcement, the announcement date or the day following the announcement. Interestingly, the only positive return for the announcement was Brazil's stock market index with a return of 1.1% (p=0.669); however, this was not abnormal. For event window ranging from day 0 to day 5 post event, the returns ranged in magnitude across the countries with Japan demonstrating a gain of 0.7% (p=0.345) and Brazil showing a positive return of 5.5% (p=0.011). For the complete event window of 20 days prior to the announcement to 20 days post announcement, the USA had the largest cumulative return of 4.4% (p=<0.001), while Japan had a loss of 3% (p=0.008) (Table 4.1).

Results using the natural log of the returns demonstrated a similar response as using rate of return. Again, Brazil's index is the only one to demonstrate a positive return

with a 1.1% (p=0.666) increase on the date of the announcement. The five-day CAR window post announcement ranges from Japan's increase of 1% (p=0.285) to Brazil's increase of 6.4% (p=0.006). For the full 41-day CAR of 20 days before to 20 days post announcement, Spain showed a loss of 2% (p=0.064) while the USA showed a gain of 4.8% (p<0.001) (Table 4.2). It appears that the estimation between log returns and rate of return for daily returns provide similar estimates.

A model using a SUR was conducted using rate of return and log returns, however, some adjustments had to be made to the data as the analysis required that observations be of equal length and there were asynchronous trading dates within the daily returns. To account for this, the data was imputed in the estimation window with the average return between the date preceding and following a missing return minimize estimation error. In the event window, any missing data was treated as a zero so that averaging the return would not result in inaccurate CAR calculations. Brazil had 12 missing returns in the estimation window and two in the event window, Spain had seven missing returns in the estimation window and zero in the event window, Japan had 18 missing returns in the estimation window and five in the event window, USA had seven missing returns in the estimation window and one in the event window, Germany had seven in the estimation window and zero in the event window, and Australia had six in the estimation window and zero in the event window. The results using rate of return demonstrate Brazil's index increasing 1.2% (p=0.645) on the announcement date with a five day CAR of 6% (p=0.002) (Table 4.3). Furthermore, Brazil had a 41-day CAR of 7.1% (p<0.001), while Japan had a decrease of 5% (p<0.001) over the same window. The use of log returns in the SUR demonstrated a similar 1.2% (p=0.647) increase for Brazil

on Day 0 with a five-day CAR of 6.1% (p=0.008). Brazil's 41-day CAR was 6.7% (p<0.001) and Spain showed a loss of 0.5% (p=0.351) over the 41-day event window (Table 4.4).

Overall, the results from these analyses indicate that there is no abnormal response to the IOC's host city announcement on any of the contending countries surrounding the immediate announcement date. While Brazil did demonstrate a positive coefficient, the magnitude was small and not abnormal. The other five countries (including two control countries) did not demonstrate an abnormal return, however, each displayed a negative coefficient in response to the announcement date. This analysis included rate of return, log returns and SUR and all estimations demonstrated similar results. It does not appear that the use of log returns for daily change improves the estimation. Additionally, the 5-day CAR and 41-day CAR differed between the countries, however, the BOVESPA was positive for both cases, which may suggest that the announcement had a longer term positive impact on Brazil's market.

4.2 BRAZIL STOCK MARKET RESPONSE TO MEGA-EVENTS

The second analysis was an examination of the impact of mega-events on the stock index of a single host country, in this case Brazil. The total time frame for examination extends from July 3, 2006 through the completion of the Summer Olympic Games in August 2016 for the four events. Since there existed more than 250 days before each event, four separate event analyses were conducted, each with their own 250-day estimation window that ended 20 trading days prior to each study (two announcements and two mega-events). The MSCI World Index as a benchmark was not utilized as a benchmark index in this analysis due to a limitation in the availability of returns on

Yahoo! Finance for the dates in question. Therefore, the use of the neighboring country, Argentina's index (MERVAL) was used. This is in accordance with prior research indicating that the utilization of a neighboring country may be a more appropriate use than a broader index (Gerlach, 2011).

Using daily rate of return, no effect for either of the mega-event announcements was identified (Table 4.5). Neither of the event announcements demonstrate a daily return distinguishable from zero. The CAR period day 0 to day 5 for the FIFA announcement was a loss of 1.4% ($p=0.088$) while the IOC announcement was a gain of 0.4% ($p=0.347$). For the 41 day CAR surrounding the FIFA announcement, there was a loss of 6.2% ($p<0.001$) while a loss of 1.8% ($p=0.035$) existed for the Olympic announcement. It would appear that a mega-event announcement does not have an appreciable effect on the stock market of Brazil at the date of announcement. There does exist a larger cumulative negative effect for the 41-day event window surrounding the announcements.

A second OLS model was performed for the World Cup hosted by Brazil from June 12, 2004 through July 13, 2014 utilizing the daily rate of return which demonstrated a World Cup CAR of 0.9% ($p=0.218$), however, only one event day had an abnormal return differing from zero (day 6 with a loss of 2.5%) (Table 4.6). The 41-day CAR surrounding the World Cup demonstrated a 0.5% ($p=0.335$) return. Moreover, results do not indicate that there is a national team performance effect on the index in question. This is in contrast to Edmans, Garcia, & Norli (2007) and Ashton Gerrard, & Hudson (2003) who did find that there was an effect on index for the host country performance.

Another OLS regression was performed for the Olympics held from August 5 through August 21, 2016. The Olympic period demonstrated a CAR of 3.7% ($p=0.002$),

while the 41-day CAR showed a 6.3% ($p<0.001$) increase, however, none of the dates in the event window demonstrated an abnormal return differing from zero (Table 4.7). The hosting of the Olympics did not appear to exert an impact on a given event day, however, the longer period did demonstrate a positive return. It may be that the business activity surrounding the Olympics accumulates over time.

Overall, the results of this study indicate that there was no abnormal response in the index of Brazil to the announcements, or hosting, of international sporting mega-events on a single day. While some other studies do demonstrate that the announcement of a mega-event can positively impact the stock market for the host country (Leeds, Mirkitani, & Tang, 2009; Mirman & Sharma, 2010; Veraros, Kasimati, & Dawson, 2004), this study does not identify such an effect on Brazil. It would appear that the market of Brazil acts indifferently to the announcement of the mega-events and their hosting. For both event announcements there was a negative CAR which may indicate pessimism regarding the event announcements over time. There was also a longer term gain for the Olympic period which may indicate that there is a cumulative effect for hosting a mega-event, even if each date does not differ from zero. No such effect existed for the World Cup event.

4.3 STOCK MARKET RESPONSE FOR COMPANIES OF DIFFERING SPONSORSHIP LEVELS DURING THE 2016 SUMMER OLYMPIC GAMES

The examination of the Olympic Games had two 11-day event windows, the first included the trading days during the Olympic Games and the second involved the 11 trading days after the conclusion of the closing ceremonies. Dow and DuPont merged together in 2017 and historic returns were not available on *Yahoo! Finance* so they were

dropped from the analysis. The results of the daily returns using an OLS regression model during the Olympic Games demonstrated very few abnormal returns on any given day (Table 4.8). TD Ameritrade had a 2.6% (p=0.049) increase on the trading day for the opening ceremony, while Citi Bank demonstrated a 3% (p=0.016) increase and United Airlines demonstrated a 4.6% (p=0.0265) increase. On the third day Omega had a 4.1% (p=0.002) increase and Philips showed a 2.5% (p=0.0213) increase while Bridgestone exhibited a 6.6% (p <0.001) decrease. Nike showed a 2.4% (p=0.070) increase on day four while Unilever showed a 2.1% (p 0.091) increase. Dicks Sporting Goods showed a 7.4% (p <0.001) increase on day seven while ATT showed a 2.2% (p 0.001) decrease. ATT had another decrease on day nine of 1.2% (p=0.0616) while McDonald's demonstrated a 1.7% (p=0.041) decrease on day 10 and Nike increased 3.0% (p=0.0238). Only three companies demonstrated a Monday effect, BP decreased 0.4% (p=0.069) and ATT increased 0.2% (p=0.0248) and Panasonic increased 0.05% (p=0.0819).

Following the Olympic Games, Starbucks showed a positive return of 1.7% (p=0.096) on day three (Table 4.9). On day seven, Hershey saw a 10.7% (p<0.001) decrease that was likely a result of an acquisition offer that collapsed (Kane, 2016). Meanwhile, United Airlines demonstrated a 9% (p <0.001) increase following the news that they hired a new president (Shen, 2016). Unilever had a 3.5% (p=0.004) increase on day 10 and only ATT demonstrated a Monday effect of 0.2% (p=0.0251) in the Post-Olympic period.

Summing the abnormal returns for the Olympic period CAR range between an 11.7% decrease (Samsung) and an 11.9% increase (Dick's Sporting Goods). On average, the CAR for the Olympic period was an increase of 1.3%. Overall, 20 of the companies

(66%) demonstrated a cumulative abnormal return differing from zero during the Olympic period. During the Post-Olympic period, Samsung had a 22.5% decrease in CAR and United Airlines had a 9.8% increase. The average CAR for the Post-Olympic period was a decrease of 0.7%. Overall, 16 companies (53%) demonstrated a cumulative abnormal return differing from zero during the Post-Olympic period. This would suggest that while an individual date may not display an abnormal return, the potential exists for an abnormal response over time.

Subsequent to the analysis of the sponsor stock performance during, and after, the Rio 2016 Summer Olympic Games, a multiple regression of the CAR's from the two periods was conducted. The independent variables for assessment included the BAI of the company in response to the Olympics, the level of sponsorship (TOP, USOC, Ambush), whether or not the company was in the technology sector, whether the company was in the sport sector, the market cap of the company measured in billions of U.S. dollars and their profitability as measured by ROA.

The cross sectional results of the Olympic period indicate that size, profitability and being in the tech sector do not seem to matter, which is different than Clark et al.'s 2002 finding that those variables influence returns (Table 4.10). The results also indicate that being a TOP sponsor or an ambush company do not materially differ in returns from being a USOC sponsor. It would appear that the level of sponsorship does not impact the returns of a company in this study. Of interesting note is that having a higher BAI score is related to a decrease in returns. This may be an additional area of interest as this would seem to suggest that being more identified with the Olympics can lead to a decrease in

returns. Finally, being in the sport sector was identified as increasing returns by approximately 10 percentage points during the Olympic period.

The post-Olympic period results again indicate that a higher BAI corresponds to a lower return (Table 4.11). It would not appear that any other variables have an influence on the returns of companies at different sponsorship levels. The advantage of being in the sport sector during the Olympics also appears to have dissipated following the conclusion of the Games.

In order to test the robustness of the findings, two additional models were conducted with the same variables but excluding the companies that had confounding events within the event window (Dick's Sporting Goods in Olympic period and Hershey and United in post-Olympic period) based on the recommendations of Dietz et al. (2012).

The exclusion of the companies with confounding events does not appear to exert an impact on the interpretation of the results. Even with the exclusion of Dick's Sporting Goods, the BAI is negatively related to the returns of a company and being a sport company positively impacts the returns. The adjusted R-square increased from 0.2755 to 0.329 with the exclusion of Dick's Sporting Goods (Table 4.12). While the variables in consideration appear to predict approximately 30% of the returns for the companies in the sample, that still leaves a large percentage of the cross section of returns unexplained.

The exclusion of Hershey and United Airlines in the post-Olympic window appears to enhance the effect of BAI on the cross section of returns in the sample. The adjusted R-square also increased from 0.1362 to 0.3173 with the exclusion of those companies (4.13). This model suggests that a higher BAI score negatively impacts returns

in the post-Olympic period, although it has a small overall effect. The other variables in the model do not appear to have an effect on the returns.

4.4 SUMMARY

The results of the studies generally indicate that the Olympic Games did not have an effect on the host country of Brazil. It also appears that the decision for Brazil to host the 2016 Summer Olympic Games did not have an effect on other markets. Moreover, the companies who have a relationship with the Olympics do not seem to benefit from their relationship, from a market response perspective. The results of the CAR cross sectional study would indicate that the companies that are aligned with the sport sector would gain a market advantage over companies in other sectors. Additionally, those companies rated higher on affiliation demonstrate a lower return both during, and after, the Olympic Games that may be worthy of future academic inquiry.

Table 4.1. *Country Results using OLS Rate of Return*

Country	Intercept	MSCI	Day -1	Day 0	Day 1	Days 0-5	Days -20-20
Brazil	0.000(0.001)	0.472(0.041)***	0.021(0.027)	0.011(0.027)	0.017(0.027)	0.055*	0.032*
Spain	0.000(0.001)	0.315(0.033)***	0.006(0.021)	-0.016(0.021)	0.019(0.021)	0.022	-0.006
Japan	-0.000(0.002)	0.121(0.048)*	-0.004(0.030)	-0.024(0.030)	-0.005(0.030)	0.007	-0.03***
USA	-0.001(0.001)	0.438(0.032)***	0.012(0.021)	-0.002(0.021)	0.014(0.021)	0.05*	0.044***
Germany	-0.000(0.001)	0.305(0.003)***	0.004(0.023)	-0.014(0.023)	0.006(0.023)	0.033	0.002
Australia	-0.000(0.001)	0.086(0.030)**	-0.001(0.020)	-0.021(0.020)	-0.001(0.020)	0.018	0.041***

Table 4.2. *Country Results using SUR Rate of Return*

Country	Intercept	MSCI	Day -1	Day 0	Day 1	Days 0-5	Days -20-20
Brazil	-0.000(0.001)***	0.455(0.040)	0.021(0.026)	0.012(0.026)	0.018(0.026)	0.06**	0.071***
Spain	0.000(0.001)***	0.312(0.003)	0.006(0.021)	-0.016(0.021)	0.019(0.021)	0.023	0.011
Japan	0.000(0.001)**	0.127(0.043)	-0.004(0.029)	-0.024(0.029)	-0.006(0.029)	0.004	-0.05***
USA	-0.001(0.001)***	0.439(0.031)	0.012(0.021)	-0.002(0.021)	0.012(0.021)	0.05*	0.051***
Germany	-0.000(0.001)***	0.306(0.034)	0.004(0.023)	-0.015(0.023)	0.006(0.023)	0.031	0.011
Australia	0.000(0.001)**	0.088(0.029)	-0.001(0.020)	-0.021(0.020)	-0.006(0.020)	0.012	0.039***

Table 4.3. *Country Results using OLS Log Returns*

Country	Intercept	MSCI	Day -1	Day 0	Day 1	Days 0-5	Days -20-20
Brazil	0.000(0.001)	0.468(0.040)***	0.023(0.027)	0.011(0.026)	0.017(0.026)	0.064**	0.036*
Spain	-0.000(0.001)	0.300(0.003)***	0.006(0.022)	-0.016(0.022)	0.019(0.022)	0.022	-0.02
Japan	-0.001(0.002)	0.109(0.047)*	-0.00490.030)	-0.024(0.030)	-0.005(0.030)	0.01	-0.015
USA	-0.001(0.001)	0.437(0.031)***	0.013(0.021)	-0.002(0.0210	0.014(0.021)	0.054*	0.048***
Germany	-0.000(0.001)	0.293(0.035)***	0.004(0.023)	-0.015(0.023)	0.007(0.023)	0.033	0.008
Australia	0.000(0.001)	0.078(0.030)**	-0.001(0.020)	-0.021(0.020)	-0.006(0.020)	0.013	0.055***

Table 4.4. *Country Results using SUR Log Returns*

Country	Intercept	MSCI	Day -1	Day 0	Day 1	Days 0-5	Days -20-20
Brazil	0.000(0.001)	0.452(0.039)***	0.022(0.026)	0.012(0.022)	0.017(0.026)	0.061**	0.067***
Spain	-0.000(0.001)	0.296(0.003)***	0.005(0.021)	-0.016(0.021)	0.019(0.021)	0.022	-0.005
Japan	-0.000(0.001)	0.116(0.043)**	-0.005(0.029)	-0.024(0.029)	-0.006(0.029)	0.005	-0.036**
USA	-0.001(0.001)	0.440(0.031)***	0.013(0.021)	-0.002(0.021)	0.014(0.021)	0.05*	0.06***
Germany	-0.000(0.001)	0.293(0.034)***	0.004(0.023)	-0.015(0.023)	0.006(0.023)	0.032	0.015
Australia	-0.000(0.001)	0.076(0.029)*	-0.002(0.020)	-0.021(0.020)	-0.006(0.020)	0.013	0.048***

Table 4.5. *Brazil Mega Event Announcements Rate of Return Results*

Announcement	Intercept	Merval	Day -1	Day 0	Day 1	Days 0-5	Days -20-20
FIFA WC	0.000(0.000)	0.849(0.046)***	0.007(0.009)	-0.011(0.009)	0.009(0.009)	-0.014	-0.062***
IOC Olympics	-0.000(0.001)	0.814(0.040)***	0.003(0.019)	0.011(0.019)	0.008(0.0019)	0.004	-0.018*

Table 4.6. *Brazil 2014 World Cup Rate of Return Results*

	Estimate	SE	T	P
Intercept	-0.000	0	-1.077	0.287
MERVAL	0.214	0.043	4.907	<0.001
Day -1	0.012	0.013	0.954	0.341
Day 0	NA	NA	NA	NA
Day 1	-0.004	0.013	-0.31	0.756
Day 2	0.019	0.013	1.429	0.154
Day 3	-0.013	0.013	-1.03	0.304
Day 4	0.011	0.013	0.882	0.378
Day 5	0.001	0.013	0.092	0.926
Day 6	-0.025	0.013	-1.927	0.055
Day 7	0.004	0.013	0.327	0.743
Day 8	-0.016	0.013	-1.318	0.189
Day 9	0.006	0.013	0.53	0.597
Day 10	-0.007	0.013	-0.624	0.533
Day 11	0.001	0.013	0.125	0.9
Day 12	-0.003	0.013	-0.292	0.771
Day 13	-0.004	0.013	-0.338	0.736
Day 14	0.017	0.013	1.346	0.179
Day 15	0.004	0.013	0.343	0.731
Day 16	-0.004	0.013	-0.318	0.75
Day 17	-0.006	0.013	-0.521	0.603
Day 18	0.009	0.013	0.704	0.482
Day 19	0.001	0.013	0.113	0.91
Day 20	0.018	0.013	1.413	0.159
WC CAR	-0.009			0.218
Days -20-20	0.005			0.335

Table 4.7. *Rio de Janeiro 2016 Olympics Rate of Return Results*

	Estimate	SE	T	P
Intercept	-0.000	0.000	0.454	0.996
MERVAL	0.456	0.038	11.837	<0.001
Day -1	0.005	0.014	0.366	0.714
Day 0	0.006	0.014	0.421	0.674
Day 1	>0.000	0.014	0.013	0.989
Day 2	-0.001	0.014	-0.105	0.916
Day 3	-0.010	0.014	-0.710	0.478
Day 4	0.025	0.014	1.768	0.078
Day 5	0.004	0.014	0.307	0.759
Day 6	NA	NA	NA	NA
Day 7	-0.006	0.014	-0.483	0.629
Day 8	0.002	0.014	0.199	0.842
Day 9	-0.007	0.014	-0.524	0.601
Day 10	-0.002	0.014	-0.148	0.882
Day 11	-0.019	0.014	-1.357	0.176
Day 12	-0.005	0.014	-0.401	0.688
Day 13	-0.004	0.014	-0.330	0.741
Day 14	-0.002	0.014	-0.168	0.866
Day 15	0.003	0.014	0.268	0.789
Day 16	0.008	0.014	0.54	0.590
Day 17	0.004	0.014	0.28	0.780
Day 18	-0.005	0.014	-0.358	0.720
Day 19	0.003	0.014	0.219	0.827
Day 20	0.017	0.014	1.205	0.229
Olympic CAR	0.037			0.002
Days -20-20	0.063			<0.001

Table 4.8. *Olympic Period Daily and CAR Results*

Company	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	CAR
AMTD	0.026*	-0.001	-0.003	0.008	0.002	-0.004	0.009	0.009	-0.003	-0.001	0.009	0.051***
Atos	0.008	0	-0.006	0.006	0	-0.011	0.005	-0.006	-0.004	0.003	0	-0.005
BMW	0.011	-0.011	0.004	0.003	-0.007	-0.005	0.007	-0.005	0.004	-0.003	-0.012	-0.014
BP	-0.008	0.005	0.004	-0.008	0.011	0.003	0.003	0.016	-0.003	0.009	-0.008	0.024*
Bridgestone	-0.012	0.015	-0.01	-0.066***	na	-0.015	0.004	0.006	0.001	0.004	0	-0.073**
Bud	-0.008	-0.007	0	0.006	0.003	0.013	-0.007	0.007	0.002	0	-0.002	0.007
Citi	0.03*	0.008	0	-0.003	0	0	0.015	0.015	-0.001	-0.005	0.004	0.063***
Dicks	0.023	0.008	-0.003	0.003	0.011	0.002	0.004	0.074***	-0.021	0.01	0.008	0.119***
GE	-0.006	0	0	0	-0.005	-0.001	-0.003	0.003	0	0.001	-0.005	-0.016***
Hershey	0.001	-0.009	-0.005	0.014	0.016	-0.005	0	0	0.015	-0.005	0.004	0.026*
IBM	0.004	0	-0.001	0.004	0.004	-0.008	-0.003	-0.002	-0.003	0.003	-0.006	-0.008
Kellogg	-0.002	0.003	-0.001	0	0.002	0	-0.002	-0.01	-0.001	0.002	0	-0.009*
Coke	-0.005	-0.001	0	0.004	0	0.006	0.002	-0.006	0.003	0	-0.003	0
McDonalds	0	-0.009	0	0.005	0	0.001	-0.013	-0.001	-0.009	-0.002	-0.017*	-0.045***

Company	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	CAR
Michelin	0.01	0.004	0	0.002	0.004	-0.007	0.002	-0.007	0.005	0.004	0.005	0.022**
Nike	0.011	0.003	-0.004	-0.008	0.024.	-0.004	0.003	0.006	-0.002	0.004	0.03*	0.063***
Omega	0.003	-0.004	0.005	0.041**	-0.002	0.006	0.001	0.004	0.01	0.011	0.002	0.077***
Panasonic	0.013	-0.016	0.014	0	na	-0.011	-0.008	0.021	0.021	0.013	0.005	0.052**
Pepsi	-0.003	-0.004	0	0.006	-0.006	0	0	-0.003	0.002	-0.003	0	-0.011**
PandG	-0.008	0	0.002	0.005	0.001	0.003	-0.002	-0.001	0.003	0.003	0	0.006
Phillips	-0.002	0.013	0.017	0.025*	0	-0.001	0.009	0.007	0.004	0.011	0.004	0.087***
Samsung	-0.002	-0.001	-0.029	-0.038	-0.011	-0.031	na	-0.004	-0.02	0.019	0	-0.117***
Starbucks	0	-0.01	-0.003	0.01	-0.007	0	-0.008	0.007	0.005	-0.007	-0.009	-0.022**
Siemens	0	0.007	-0.001	-0.004	0.009	0.001	-0.004	-0.007	0.006	0.001	0.011	0.019**
ATT	-0.003	-0.008	0.002	0.003	0.001	-0.002	-0.01	-0.022**	-0.004	-0.012.	-0.009	-0.064***
UA	0.019	0	-0.009	0.001	0.039	0.004	0.027	0.025	-0.012	0	0.024	0.118***
United	0.046*	0.001	-0.012	-0.009	0	0	0.014	0.007	0.003	-0.012	-0.007	0.031
Unilever	0.005	-0.007	0.009	-0.008	0.021.	-0.004	0.001	-0.01	0.007	-0.012	0	0.002
Visa	-0.002	0	0	-0.002	0	-0.001	0.009	0.004	0	-0.01	0.003	0.001

Table 4.9. *Post-Olympic Period Daily and CAR Results*

Company	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	CAR
AMTD	-0.007	0.006	0.011	0.015	0.02	-0.005	0.02	0.004	-0.01	0.01	na	0.064***
Atos	0.005	0.01	-0.01	-0.009	0.003	0	0.001	-0.008	0.008	-0.008	-0.002	-0.01
BMW	0	-0.004	-0.002	-0.005	0.006	0	0.007	0.002	0.006	-0.008	-0.003	-0.001
BP	-0.006	0.001	0.01	0	0	-0.001	-0.002	-0.005	-0.007	0.018	na	0.008
Bridgestone	0.013	0.003	0	0.01	0.003	0.001	0.009	0.002	0.005	0	0	0.046***
Bud	-0.007	0.006	0	0	0	0	-0.006	-0.008	0.006	0.011	na	0.002
Citi	0.005	-0.003	0.011	0.004	0.012	-0.003	0.018	0.001	-0.006	0	na	0.039***
Dicks	0.004	-0.003	0	0.002	0	0.007	-0.004	-0.002	0.002	0	na	0.006
GE	0.002	-0.005	0.004	0	0.001	-0.001	0.001	-0.002	-0.002	-0.002	na	-0.004
Hershey	0.001	-0.004	-0.016	0	0	0.002	-0.107***	0.003	-0.004	-0.006	na	-0.131**
IBM	0	0	-0.002	-0.001	0	0.003	0	0	0.004	-0.003	na	0.001
Kellogg	0	-0.006	-0.003	0.004	-0.006	0.006	-0.01	0.005	-0.007	0.005	na	-0.012*
Coke	-0.005	0.001	0.002	-0.003	-0.007	0	-0.006	0.005	-0.002	0.004	na	-0.011*
McDonalds	0.001	-0.004	0.003	0.005	-0.008	0.002	0.008	0.003	-0.003	0	na	0.007

Company	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	CAR
Michelin	-0.004	0.003	0.002	-0.006	-0.001	0.002	-0.004	0.002	-0.005	-0.006	-0.002	-0.019***
Nike	-0.003	0.014	0.014	-0.015	-0.002	-0.011	-0.009	-0.004	0.018	-0.01	na	-0.008
Omega	-0.001	-0.008	-0.021	-0.01	-0.007	-0.009	-0.002	-0.003	0.013	-0.003	0.009	-0.042***
Panasonic	0.003	-0.002	-0.001	-0.007	0.013	-0.017	0.007	0.014	0.007	-0.003	-0.01	0.004
Pepsi	-0.002	-0.002	0.004	-0.001	-0.003	0.001	-0.006	0.003	0.004	0.002	na	0
PandG	-0.005	0.004	0.002	0.007	-0.002	0.004	-0.007	0.001	0.011	-0.004	na	0.011*
Phillips	-0.006	0	0.014	0	0	-0.003	0.004	-0.003	0.013	0.005	na	0.024**
Samsung	0.002	-0.012	-0.038	-0.029	-0.034	0.02	-0.022	-0.033	-0.04	-0.018	-0.021	-0.225***
Starbucks	0.015	0.007	0.017.	0.005	0.001	-0.015	-0.004	0	0.001	-0.006	na	0.021*
Siemens	-0.004	0	0.006	0	0.002	0	-0.002	-0.009	0	0.003	-0.003	-0.007
ATT	-0.005	-0.003	0.002	0.005	-0.009	0.001	-0.002	0	0.001	-0.003	na	-0.013**
UA	0.007	0.011	-0.001	-0.012	-0.003	0.003	-0.01	-0.041	0.002	-0.035	na	-0.079**
United	-0.003	0.011	0.01	0.001	-0.01	-0.006	0.09***	-0.006	0.011	0	na	0.098**
Unilever	-0.013	-0.001	-0.006	0.009	0.003	na	-0.002	-0.008	-0.001	0.035**	-0.003	0.013
Visa	0.009	-0.006	-0.001	0.001	0.004	0	0.005	-0.001	0.004	0.003	na	0.018**

Table 4.10. *Olympic Period CAR Results*

	Estimate	LB	UB	SE	T	P
Intercept	0.0210	-0.0113	0.0534	0.0013	1.348	0.1918
BAI	-0.0003	-0.0006	0.0000	0.0001	-2.763	0.0116
Ambush	0.0249	-0.0277	0.0775	0.0253	0.984	0.3364
TOP	-0.0165	-0.0658	0.0329	0.0237	-0.694	0.4952
Tech	0.0131	-0.0492	0.0755	0.0300	0.437	0.6666
Sport	0.1058	0.0289	0.1826	0.0369	2.864	0.0092
Size(B$)	-2.7e-15	-1.4e-14	8.6e-15	5.5E-15	-0.501	0.6212
ROA	0.272	-0.7610	1.305	0.496	0.548	0.5893
R-square	0.2755					

Table 4.11. *Post-Olympic Period CAR Results*

	Estimate	LB	UB	SE	T	P
Intercept	0.01834	-0.0203	0.0570	0.0185	0.987	0.3350
BAI	-0.003	-0.0006	-0.00001	0.0001	-2.180	0.0407
Ambush	0.0173	-0.0454	0.0801	0.0302	0.573	0.5725
TOP	0.0150	-0.0438	0.0740	0.0283	0.532	0.600
Tech	-0.0422	-0.1166	0.0322	0.0357	-1.18	0.2513
Sport	-0.0108	-0.1024	0.0808	0.0440	-0.246	0.8084
Size(B$)	4.9e-15	-8.7e-15	1.8e-14	6.5e-16	0.746	0.4639
ROA	-0.0407	-1.6405	0.8247	0.5927	-0.688	0.4989
R-square	0.1362					

Table 4.12. *Olympic Period CAR results excluding Dicks Sporting Goods*

	Estimate	LB	UB	SE	T	P
Intercept	0.0126	-0.0176	0.0430	0.0145	0.870	0.3945
BAI	-0.0003	-0.0005	-0.00009	0.0001	-2.939	0.0081
Ambush	0.0344	-0.0141	0.0829	0.0232	1.478	0.1550
TOP	-0.0054	-0.0513	0.0404	0.0220	-0.249	0.8057
Tech	0.0113	-0.0453	0.0680	0.0271	0.418	0.6804
Sport	0.1099	0.0400	0.1798	0.0335	3.281	0.0037
Size(B$)	-1.9e-15	-1.2e-14	8.4e-15	4.9e-15	-0.397	0.6958
ROA	0.1552	-0.789	1.099	0.4527	0.343	0.7352
R-square	0.329					

Table 4.13. *Post-Olympic Period CAR Results excluding Hershey and United Airlines*

	Estimate	LB	UB	SE	T	P
Intercept	0.0221	-0.0106	0.0549	0.0156	1.414	0.1736
BAI	-0.0003	-0.0005	-0.00009	0.0001	-2.885	0.0095
Ambush	0.0094	-0.0415	0.0605	0.0244	0.389	0.7019
TOP	0.0057	-0.0428	0.0544	0.0232	0.249	0.8060
Tech	-0.0396	-0.0983	0.0190	0.0280	-1.415	0.1733
Sport	-0.0132	-0.0856	0.0592	0.0346	-0.382	0.7065
Size(B$)	3.50e-15	-7.2e-15	1.1e-14	5.1e-15	0.682	0.5036
ROA	-0.1904	-1.1731	0.7922	0.4695	-0.406	0.6895
R-square	0.3173					

CHAPTER 5

GENERAL DISCUSSION AND LIMITATIONS

The results of the analysis provide additional insight to the body of literature surrounding mega-events from both a country, and company, perspective. Specifically, the results of this study evaluate mega-events on the market of a single host country, Brazil, and the market performance of sponsoring companies during and after the Olympics.

5.1 GENERAL DISCUSSION OF RESULTS

The announcement by the IOC of the host city for an upcoming Summer Olympic Games is met with mixed enthusiasm by the stock market participants in that country, with some demonstrating a positive return (Leeds, Mirikitani & Tang, 2009; Veraros, Kasimati & Dawson, 2004) and others demonstrating a neutral response (Berman, Brooks & Davidson, 2000; Mirman & Sharma, 2010). The results of this study do not indicate that any market response occurred for Brazil, following the pattern of Mirman and Sharma. The present study examined the impact of the IOC announcement that Rio de Janeiro was awarded the 2016 Summer Games on the stock market of Brazil and those of losing countries, Japan, Spain and the U.S., as well as control countries, Germany and Australia. The event day in question did not impact the markets, either positively or negatively, for any of the countries identified. This was the case for both an OLS

estimation of rate of return as well as log returns and SUR for both. While Brazil was the only country to demonstrate a slightly positive response (1.1%), none of the returns were abnormal. It would appear, at least in this instance, that the IOC decision for hosting was met with a neutral response in 2009. This finding is especially interesting considering some Brazilian officials were engaging in a bribery scheme in an effort to influence the decision (Panja, 2019). Ostensibly, at least some element of the bribery activity was to spur business activity in Brazil. There was a longer-term gain for Brazil, both in the five days surrounding the announcement and during the 41-day event window. This may suggest that while an individual day is neutral, that the Brazil market takes time to absorb and process mega-event information.

This finding was extended for an examination of the market response of Brazil to multiple mega-events in close succession. The results do not suggest that any reaction to the event announcements elicits a daily response. However, for both mega-event announcements there existed a cumulative abnormal loss that differs from zero. If part of the rationale for mega-event hosting is for economic gain and an announcement serves as a signal for that gain (Martins & Serra, 2011), then a response would be expected. Since their existed a negative return over time, it may be that investors are pessimistic about the long-term outlook of the mega-event and its ability to generate a positive economic return.

The lack of abnormal daily response was observed for both the event announcements, event time frames and performance of the Brazilian soccer team. This distinct lack of identified abnormal effect suggests that international sport hosting and competition does not impact the Brazilian stock market on a daily basis. This is contrary

to findings of Edmans et. al (2007) that international competition affects the market of the home country. Even though Brazil was the host country of the 2014 FIFA World Cup and the Brazilian National Team was eliminated in the semi-finals and consolation match, no impact was observed on the Brazilian stock market.

A holding period over the duration of a mega-event demonstrated a loss of 0.9% during the World Cup and a gain of 3.7% for the Olympics. This would suggest that while there may not an abnormal return on a single day, there may be a gain or loss over time. It would also appear that the mega-events do not illicit the same response; the FIFA World Cup did not demonstrate any abnormal activity during, or around the World Cup, while the Olympic Games generated a positive cumulative return both during, and surrounding, the Games. There was also a differing conclusion using MSCI and MERVAL to the IOC announcement; BOVESPA displayed a positive CAR benchmarked to the MSCI but a negative CAR using the MERVAL.

The analysis of the event timeline in question relied on using the neighboring Argentina stock market index (MERVAL) rather than the international index due to availability. While the use of the neighbor country has been recommended (Gerlach, 2011), it could, nevertheless, impact the results, which is a limitation of the present study.

The analysis of the sponsoring companies for the 2016 Summer Olympic Games demonstrated a largely benign daily response of the Olympic Games on the market return of the sponsoring companies. Very few individual days during, or after, the Olympics elicited an abnormal response, and the abnormal response of three companies (Dick's Sporting Goods, Hershey and United Airlines) were unrelated to their Olympics involvement. An SUR was not conducted because this would require equal observations

for all individual models, and with non-synchronous trading, the observations would need to be adjusted which may impact the results. However, there were several companies who displayed a cumulative abnormal response both during (66%) and following the Olympics (53%) which would suggest that returns can accumulate over time. The magnitude of the cumulative returns differs greatly with an average return of 1.3% during the Olympic Games and a loss of 0.7% following the Games.

A cross-sectional regression was performed to examine the impact of the level of sponsorship, affiliation index score, company size, company sector and profitability on the returns of the companies and no effect was identified for the level of sponsorship. The results of this study indicate that there is no immediate market advantage gained from being a TOP sponsor or USOC sponsor above an ambushing company. However, the benefits of sponsorship may not be reflected in the market returns of the event window studied, or might also occur to the sponsoring company in a different way. It may also be that there are other non-market, intangible benefits that occur to an official sponsor, such as hospitality for potential and existing clients and top-performing employees, that official sponsors are able to leverage (Stotlar & Nagel, 2017).

Sponsoring firms may utilize the sponsorship as a mechanism to engage with an international consumer base in order to demonstrate a product, understand their needs and develop a contact list (Noori, 2012). Firms may also be using the international nature of the mega-event to build a brand image and connect that image with the event to grow their business (Meenaghan, 2001). In addition, firms may use their official relationship as a way to communicate with consumers and use their status as a mechanism to support the organizations they align with. Olympic sponsors may contribute a portion of their sales to

a foundation that supports athletes, so supporting the sponsor would be seen as supporting the athletes (Polonsky & Speed, 2001).

It is also possible that a sponsor is utilizing the sponsorship as a means to maintain market share and a competitive advantage over a competing company. If this is the case, then looking at the rate of return for a sponsor and a non-identified, non-sponsor, control company for differences during a mega-event timeframe may indicate to what level a firm is achieving a market advantage. Since there are many objectives that managers pursue when evaluating marketing potential, without knowing the motivation for each firm, it is speculation. While a market perspective examines an event for a financial return, it is narrow in focus and does not fully capture the range of business objectives.

The results of the present study indicate that the BAI score is negatively related to returns, both during, and after, the Olympic event period. This finding may be worthy of future consideration as it measures how closely related a brand is with the Olympics and a negative relationship would suggest that more closely aligned brands have negative returns, regardless of their sponsorship status, size or industry sector. The current results differ from the findings of Clark, et al (2002) who identified that technology companies have superior performance. The analysis yields no positive impact for technology companies, but a positive impact for sporting companies that may be the result of a natural congruence these companies have with an international athletic competition such as the Olympics. There is also no effect for either the size of a company or their profitability in terms of performance during or after the Olympics.

Overall, this study did not find a market advantage to official sponsorship of the 2016 Summer Olympic Games, however it was identified that companies in the sport sector substantially benefit during the Olympics. Companies in the sport sector saw a 10% rate of return during the Games that dissipated post Games suggesting that sport companies can achieve a positive market return during a sport mega-event. Since this is likely the first study that examined the market response during the Olympics, it is not known if other Olympic Games or mega-events demonstrate a similar finding, which is an area for future academic inquiry.

5.2 CONTRIBUTIONS OF STUDY

The results of the present study help to further the inquiry of sporting mega-events and the market response of host countries and sponsoring companies. Specifically, this study focused on mega-events as they related to a single country (Brazil). This helps to isolate any effects to a single country rather than in aggregate (Hundt & Horsch, 2019). While other studies have identified a positive, although short lived, abnormal return in response to a host country announcement (Fah & Hai, 2014; Leeds, Mirikitani & Tang, 2009; Veraros, Kasimati & Dawson, 2004), the current study did not identify such a result. There is also no finding of a negative response for "losing" countries of a host country announcement, which support other such findings (Dick & Wang, 2010; Sullivan & Leeds, 2016). This would suggest that mega-events do not exert an equal effect on all participants and that each mega-event is unique in its market potential. It could also be that market participants are increasingly aware that hosting may not lead to increased economic benefits, and even display negative effects, that are not viewed as an attractive investment opportunity.

This study also contributes to the body of literature regarding company stock returns in response to their sponsorship. This study utilized the 2016 Summer Olympic Games and the post-Olympic period to ascertain their impact on the market returns of the sponsoring companies. There was no significant change identified for companies based on sponsorship level, however, there was an effect noticed for those companies in the sport sector and their BAI score. Additionally, three companies achieved abnormal returns during one of the two event windows unrelated to the Olympics. It does not appear, at least in the present sample, that being a TOP sponsor leads to greater-than-expected market returns. Since it is expected that new information moves stock prices, perhaps the expected returns are already reflected in the stock price, as suggested by the EMH, or Olympic sponsorship is not expected to lead to greater future returns.

This study also utilized an OLS regression model for rate of return as well as log returns and a SUR model for the assessment of returns given the contemporaneous event timeline for the IOC Rio de Janeiro Summer Olympic Games announcement. The analysis indicates that the OLS and SUR models achieve a similar output with our samples. It does not appear that a SUR model improves the estimations and the only potential advantage gained is one of efficiency. There was not a meaningful difference in rate of return or log returns in the sample. While it has been suggested that log returns follow a more normal distribution and their use improves estimation (Hudson & Gregoriou, 2015), this study does not note a meaningful difference. It may be that the log returns may depend on the use of weekly or monthly returns, rather than daily returns to improve estimations.

5.3 IMPLICATIONS FOR FUTURE RESEARCH

If mega-events are to be an economic driver that countries hope them to be (Tomlinson, Bass & Bassett, 2011), then continued inquiry is recommended to ascertain whether that is the case or not. When countries engage in mega-event hosting for economic reasons, they may also be taking a longer term view of increased tourism visits and expenditures, as well as infrastructure improvements that may take years to develop beyond the host dates, which is beyond the scope of this project to identify. Moreover, there are billions of dollars being spent on sponsorships worldwide (IEG, 2018) and it does not appear that there is a clear market advantage to such sponsorship outlays. If the companies are utilizing the sponsorship for intangible benefits, this should be communicated to the shareholders who may be questioning the legitimacy of such spending. Researchers are encouraged to continue to examine the effect that sponsorship has on the returns of the host community.

There has been robust inquiry into the impact of mega-event hosting on the returns of the host country and each country, and event, appears to be different. There has also been many researchers examining the market returns of sponsorship, but those are generally focused on announcements, rather than the actual event. Events provide unique opportunities for official sponsors, and ambushers, to both leverage and activate their brand for commercial success. This study provides an examination of such event and post-event windows without any such advantage identified. Other researchers should continue to examine the returns during actual sporting events to determine whether a market response is present, perhaps utilizing additional methodologies.

One potential additional method is to evaluate the performance of an official sponsor with a non-sponsor, non-advertising, non-affiliated control company. A difference in differences for the rate of return for the companies prior to, during and after an event may help to better isolate the specific effect that sponsorship has. If a sponsor is able to achieve a greater post-event return compared to their pre-event return in relation to a competitor, then more information regarding the impact of mega-event sponsorship can be identified.

Another area of inquiry is in the statistical utilization of a Type I sum of squares that examines the impact of each variable on the rate of return of the company in isolation. This is in contrast to the typical Type III sum of squares usually employed in multiple regression that examines the effect of each variable after accounting for the other variables in the model. The Type I will allow for the interpretation of each variable's direct effect on the rate of return of the companies in the sample, thereby demonstrating the contribution of each individual variable and identification of variables that exert the largest impact.

5.4 CONCLUSION

This study examined the impact of the 2016 Summer Olympic Games in Rio de Janeiro on the host country and sponsorship companies. Unlike other studies, no effect was identified for the IOC decision for Rio de Janeiro to host over cities in other countries. Additionally, specific to Brazil, this study failed to identify any effect on the market of Brazil in response to mega-event hosting. Lastly, the results of the present study indicate that there is no clear advantage gained from USOC, TOP sponsorship or ambush marketing using a market perspective. The decisions to sponsor is individual for

the companies, but does not appear to impact returns. The study did identify a positive effect for companies in the sport sector, which may further provide support for the importance of congruence in sponsorship. We also find evidence that the BAI score is related to a decrease in returns that is worthy of more academic inquiry.

Mega-events continue to dominate fan interest and attract billions of dollars in broadcasting and sponsorship dollars that may, ultimately, fail to provide a positive return for those companies involved. If part of a company's purpose is to increase market value to shareholders, then mega-events may not be an appropriate vehicle for that objective particularly since the financial and time investment is considerable. Future studies should continue to investigate the relationship between sponsors and mega-events for mutually beneficial relationships.

REFERENCES

A futile search? (2008, January 14). *Street & Smith's Sport Business Journal*. Retrieved from https://www.sportsbusinessdaily.com/Journal/Issues/2008/01/14/SBJ-In-Depth/Afutile-Search.aspx

Aaker, D. A., & Jacobson, R. (1994, May). The financial information content of perceived quality. *Journal of Marketing Research, 31*(2), 191-201.

Abril, C., Sanchez, J. & Recio, T. (2018, September). How does Wall Street react to global sports sponsorship announcements? An analysis on the effect of sponsoring companies' stock market prices. *Journal of Advertising Research*, 297-310.

Amezquita, D.P. (2016). Ambush marketing vs. official sponsorship: Is the international I. P. an unfair competition regime a good referee? *Revista La Propiedad Inmaterial, 21*(5), 5-24.

Andersson, T., Rustad, A., & Solberg, H. A. (2004). Local residents' monetary evaluation of sports events. *Managing Leisure, 9*(3), 145-158.

Andranovich, G., Burbank, M., & Heying, C. H. (2010). Political economy of the Olympic Games. In C. A. Santo & Gerard C. S. Mildner (Eds.), *Sport and public policy* (pp. 185-200). Champaign, IL: Human Kinetics.

Andrews, J. (2012, August 3). Time to end ambush marketing. *IEG*. Retrieved from https://www.sponsorship.com/About/Sponsorship-Blog/Jim-Andrews/August-2012/Time-to-End-Ambush-Marketing.aspx

Ashton, J. K., Gerrard, B. & Hudson, R. (2003). Economic impact of national sporting success: evidence from the London stock exchange. *Applied Economic Letters, 10*(12), 783-785.

Asteriou, D., Samitas, A. & Kenourgios, D. (2013). The London 2012 Olympic Games announcement and its effect on the London stock exchange. *Journal of Economic Studies, 40*(2), 203-221.

Austin, P. C., & Steyerberg, E. W. (2015). The number of subjects per variable required in linear regression analyses. *Journal of Clinical Epidemiology, 68*, 627-636.

Baade, R. A., & Matheson, V. A. (2016). Going for the gold: The economics of the Olympics. *The Journal of Economic Perspectives, 30*(2), 201–218.

Baim, D. V., Goukasian, L. & Misch, M. B. (2015). Olympic sponsorships, stock prices and trading activity. *International Journal of Sport Finance, 10,* 176-195.

Baltazar, R., & Santos, M. (2003). The benefits of banking mega-mergers: Event study evidence from the 1998 failed mega-merger attempts in Canada. *Canadian Journal of Administrative Sciences, 20*(3), 196-208.

Barclay, J. (2009). Predicting the costs and benefits of mega-sporting events: Misjudgment of Olympic proportions? *Institute of Economic Affairs*, 62-66.

Bell, A. R., Brooks, C., Matthews, D., & Sutcliffe, C. (2012). Over the moon or sick as a parrot? The effects of football results on a club's share price. *Applied Economics, 44*(26), 3435-3452.

Berman, G., Brooks, R. & Davidson, S. (2000). The Sydney Olympic Games announcement and Australian stock market reaction. *Applied Economics Letters, 7*(12), 781-784.

Berument, M. H. & Ceylan, M. B. (2012). Effects of soccer on stock markets: The return-volatility relationship. *The Social Science Journal, 49*, 368-374.

Binder, J. J. (1985). On the use of the multivariate regression model in event studies. *Journal of Accounting Research, 23*(1), 370-383.

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

Blackshaw, I. (2011, March). Combating "ambush marketing": The 2010 South Africa FIFA World Cup experience. *Global Sports Law and Taxation Reports, 2*(1), 5-8.

Blakey, J. (2018, June 25). Ambush marketing and the 2018 FIFA World Cup. *Sports Shorts*. Retrieved from https://www.sports.legal/2018/06/ambush-marketing-and-the-2018-fifa-world-cup/

Boido, C. & Fasano, A. (2007). Football and mood in Italian Stock Exchange. *Review of Financial Studies*, *14*, 1-27.

Bouchet, A., Doellman, T. W., Trolio, M. & Walkup, B. R. (2015). The impact of international football matches on primary sponsors and shareholder wealth. *Journal of Sport Management, 29,* 200-210

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

Brown, G. W. & Hartzell, J. C. (2001). Market reaction to public information: The atypical case of the Boston Celtics. *Journal of Financial Economics, 60*, 333-370.

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

Bruckner, M. & Pappa, E. (2011, August). For an olive wreath? Olympic Games and anticipation effects in microeconomics. *Centre for Economic Policy Research*, Discussion paper 8516.

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance, 52*(1), 57-82.

Chadwick, S. & Burton, N. (2011). The evolving sophistication of ambush marketing: A typology of strategies. *Thunderbird International Business Review, 53*(6), 709-720.

Chalip, L. B., Green, C., Taks, M., & Misener, L. (2017). Creating sport participation from sport events: making it happen. *International Journal of Sport Policy and Politics, 9*(2), 257–276.

Chan, W. S. (2003). Stock price reaction to news and no-news: Drift and reversal after headlines. *Journal of Financial Economics, 70*, 223-260.

Charles, A. & Darne, O. (2016). Stock market reactions to FIFA World Cup announcements: An event study. *Economics Bulletin, 36*(4), 2028-2036.

Clark, J.M., Cornwell, T. B. & Pruitt, S. W. (2002, November/December). Corporate stadium sponsorships, signaling theory, agency conflicts and shareholder wealth. *Journal of Advertising Research*, 16-33.

Clark, J.M., Cornwell, T.B. & Pruitt, S.W. (2009). The impact of title event sponsorship announcements on shareholder wealth. *Marketing Letters, 20*(2), 169-182.

Coates, D. & Humphreys, B. R. (2008). The effect of on-field success on stock prices: Evidence from Nippon professional baseball. *North American Association of Sports Economists. Working Paper Series,* 08-05.

Collins, A., Jones, C., & Munday, M. (2009). Assessing the environmental impacts of mega sporting events: Two options?. *Tourism management*, *30*(6), 828-837.

Cornwell, T. B., & Maignan, I. (1998) An International Review of Sponsorship Research. *Journal of Advertising, 27*(1), 1-21.

Cornwell, T. B., Roy, D. P. & Steinard, E. A. (2001). Exploring managers' perception of the impact of sponsorship on brand equity. *Journal of Advertising, 30*(2), 41-51.

Cornwell, T. B., Pruitt, S. W. & Clark, J. M. (2005, Fall). The relationship between major-league sports' official sponsorship announcements and the stock price of sponsoring firms. *Journal of the Academy of Marketing Science*, *33*(4) 401-412.

Cornwell, T. B. (2008). State of art and science in sponsorship-linked marketing. *Journal of Advertising, 37*(3), 41-55.

Corrado, C. J. (1989). A nonparametric test for the abnormal security-price performance in event studies. *Journal of Financial Economics, 23*, 385-395.

Cousens, L., Babiak, K., & Bradish, C. L. (2006). Beyond sponsorship: Re-framing corporate-sport sponsorships. *Sport Management Review, 9*, 1-23.

Cowan, A. R. (1992). Nonparametric event study tests. *Review of Quantitative Finance and Accounting, 2*, 343-358.

Crompton, J. L. (2004). Conceptualization and alternate operationalizations of the measurement of sponsorship effectiveness in sport. *Leisure Studies, 23*(3), 267-281.

Crompton, J. L. (2015, April). Potential negative outcomes from sport sponsorship. *International Journal of Sports Marketing and Sponsorship*, 179-193.

Curatola, G., Donadelli, M., Kizys, R., & Riedel, M. (2017). Investor sentiment and sectoral stock returns: Evidence from World Cup games. *Finance Research Letters, 17*, 267-274.

Danielson, M. G., Heck, J. L., & Schaffer, D. R. (2008, Fall/Winter). Shareholder theory-How opponents and proponents both get it wrong. *Journal of Applied Finance*, 1-5.

Deitsch, R. (2015, February 12). FIFA grants Fox, Telemundo U.S. TV rights for World Cup through 2026. *Sport Illustrated*. Retrieved from

https://www.si.com/soccer/2015/02/12/fifa-fox-usa-tv-rights-world-cup-2026-telemundo

Deitz, G. D., Evans, R. D. & Hansen, J. D. (2012). Sponsorship and shareholder value: A re-examination and extension. *Journal of Business Research*, 1-9.

Demir, E. & Rigoni, U. (2017). You lose, I feel better: Rivalry between soccer teams and the impact of Schadenfreude on stock market. *Journal of Sports Economics, 18*(1), 58-76.

Dick, C. D. & Wang, Q. (2010). The economic impact of the Olympic Games: evidence from stock markets. *Applied Economic Letters, 17*(9), 861-864.

Ding, H., Molchanov, A. E. & Stork, P. A. (2011). The value of celebrity endorsements: A stock market perspective. *Marketing Letters, 22,* 147-163.

Dunbar, G. (2018, June 9). World Cup spending, profits set to fall short of record sums. *Associated Press*. Retrieved from https://apnews.com/2f31259342a14a43bc722f792b646185/World-Cup-spending,-profits-set-to-fall-short-of-record-sums

Eastman, J. K., Bradley, R. I. & Wiggenhorn, J. M. (2010). The short-term impact of Super Bowl advertising on stock prices: An exploratory event study. *The Journal of Applied Business Research, 26*(6), 69-84.

Edmans, A., Garcia, A. & Norli, O. (2007). Sports sentiment and stock returns. *The Journal of Finance, 57*(4), 1967-1998.

Ehrmann, M. & Jansen, D. J. (2015). It hurts (stock prices) when your team is about to lose a soccer match. *Review of Finance, 20*(3), 1215-1233.

Eissa, M. A. & Refai, H. A. (2018). Mega-sports events and stock market returns: The case of the 2022 World Cup. *Event Management, 22,* 379-388.

Epstein, A. (2014). The Olympics, ambush marketing and Sochi Media. *Sports and Entertainment Law Journal*, 109-129.

Fah, C. F. & Hai, H. T. (2014). Impact of mega event hosting on the hosting countries' stock market. *Proceeding of the Social Sciences Research*, June 9-10, Kota Kinabalu, Sabah, Malaysia.

Fahy, J. Farrelly, F. & Quester, P. (2004). Competitive advantage through sponsorship: A conceptual model and research propositions. *European Journal of Marketing, 38*(8), 1013-1030.

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

Fama, E. F. (1991). Efficient capital markets: II. *The Journal of Finance, 46*(5), 1575-1617.

Fama, E. F. (1998). Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics, 49*. 283-306.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns of stocks and bonds. *Journal of Financial Economics, 33*, 3-56.

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.

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics, 116*, 1-22.

Farrell, K. A. & Frame, W. S. (1997). The value of Olympic sponsorship: Who is capturing the gold? *Journal of Market Focused Management, 2* (2), 171 – 182.

Farrelly, F., Quester, P. & Greyser, S. A. (2005, September). Defending the co-branding benefits of sponsorship B2B partnerships: The case of ambush marketing. *Journal of Advertising Research*, 339-348.

FIFA. (ND). FIFA World Cup host announcement decision. Retrieved from https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=24&ved=2ahUKEwj1u8vS0rLlAhXEVt8KHWHLATcQFjAXegQIBRAC&url=https%3A%2F%2Fwww.fifa.com%2Fmm%2Fdocument%2Ffifafacts%2Fmencompwc%2F51%2F97%2F81%2Fip-201_13a_fwc-host.pdf&usg=AOvVaw28h4VksSx-WEcoRZbhbb-c

Filis, G. N. & Spais, G. S. (2012). The effect of sport sponsorship programs of various sport events on stock price behavior during a sport event. *Journal of Promotion Management, 18*, 3-41.

Floros, C. (2010). The impact of the Athens Olympic Games on the Athens stock market. *Journal of Economic Studies, 37*(6), 647-657.

Flyvbjerg, B., Budzier, A., & Stewart, A. (2016). The Oxford Olympics study 2016: Cost and cost overrun at the games. Retrieved from http://ssrn.com/abstract¼2804554.

Friedman, M. (1970, September 13). *The social responsibility of business is to increase its profits*. New York Times.

Gerlach, J. R. (2011). International sports and investor sentiment: Do national team matches really affect stock market returns? *Applied Financial Economics, 21*(12), 863-880.

Geyer-Klingberg, J., Hang, M., Walter, M., Rathgeber, A. (2018). Do stock markets react to soccer games? A meta-regression analysis. *Applied Economics, 50*(19), 2171-2189.

Grady, J., McKelvey, S. & Bernthal, M. J. (2009). From Beijing 2008 to London 2012: Examining the event-specific Olympic legislation vis-a-vis the rights and interests of stakeholders. *Journal of Sponsorship, 3*(2), 144-156.

GumGum Sports doubles number of clients and employees in 2018: Finds nearly $1 billion in total unrealized social media value for sponsors. (2019, January 23). Business Wire. Retrieved from https://www.businesswire.com/news/home/20190123005836/en/GumGum-Sports-Doubles-Number-Clients-Employees-2018

Hanke, M. & Kirchler, M. (2013). Football championships and jersey sponsor's stock prices: An empirical investigation. *The European Journal of Finance, 19*(3), 228-241.

Hamilton, J. D., & Susmel, F. (1994). Autoregressive conditional heterskedasticity and changes in regime. *Journal of Econometrics, 64*, 307-333.

Harvey, A. (1997). Trends, cycles, and autoregressions. *The Economic Journal, 107*, 192-201.

Harvey, C. R., & Siddique, A. (1999). Autoregressive conditional skewness. *Journal of Financial and Quantitative Analysis, 34*(4), 465-487.

Hein, S. E., & Westfall, P. (2004). Improving tests of abnormal returns by bootstrapping the multivariate regression model with event parameters. *Journal of Financial Econometrics, 2*(3), 451-471.

Hill, K. (2016). Ambush marketing: Is it deceitful or a probable strategic tactic in the Olympic Games. *Marquette Sports Law Review, 27*(1), 197-215.

Hino, Y., & Takeda, F. (2019 in press). Market reactions to sport sponsorship announcements: Comparison between sponsors and their rivals. *Sport Management Review*.

Hood, M. (2012). The Tiger Woods scandal: A cautionary tale for event studies. *Managerial Finance, 38*(5), 543-558.

Hudson, R. S., & Gregoriou, A. (2015). Calculating and comparing security returns is harder than you think: A comparison between logarithmic and simple returns. *International Review of Financial Analysis, 38*, 151-162.

Humphreys, B. R. & Pyun, H. (2017). Professional sporting events and traffic: Evidence from U. S. cities. *Journal of Regional Science, 58*(5), 869-886.

Humphreys, B. R. (2019). Should the construction of new professional sports facilities be subsidized. *Journal of Policy Analysis and Management*, *38*(1), 264-270.

Hundt, S., & Horsch, A. (2019) Sponsorship of the FIFA World Cup, shareholder wealth, and the impact of corruption. *Applied Economics, 51*(23), 2468-2491.

IEG. (2016). Rio 2016 Key Sponsorship Stats. Retrieved February 11, 2018 from http://www.sponsorship.com/Latest-Thinking/Rio-2016-Olympic-Sponsorship-Insights.aspx

IEG. (2018). What sponsors want and where dollars will go in 2018. Retrieved from www.sponsorship.com/IEG/files/f3/f3cfac41-2983-49be-8df6-3546345e27de.pdf

International Olympic Committee. (2009, October 2). Rio de Janeiro elected as the 2016 host city. Retrieved from https://www.olympic.org/news/rio-de-janeiro-elected-as-the-2016-host-city

International Olympic Committee. (2014, May 7). IOC awards Olympic Games broadcast rights to NBCUniversal through 2032. Retrieved from https://www.olympic.org/news/ioc-awards-olympic-games-broadcast-rights-to-nbcuniversal-through-to-2032

International Olympic Committee. (2018). Revenue sources and distribution. Retrieved February 9, 2018 from https://www.olympic.org/ioc-financing-revenue-sources-distribution

Jacobs, J., Jain, P., & Surana, K. (2014, June). *Is sport sponsorship worth it?* McKinsey & Company.

Jago, L., Dwyer, L., Lipman, G., van Lill, D., & Vorster, S. (2010). Optimising the potential of mega-events: An overview. *International Journal of Event and Festival Management, 1*(3), 220-237.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*, 305-260.

Jensen, J. A. & Turner, B. A. (2018). Event history analysis of longitudinal data: A methodological application to sport sponsorship. *Sport in Society, 21*(2), 376-393.

Joshi, A., & Hanssens, D. M. (2009). Movie advertising and the stock market valuation of studios: A case of 'Great Expectations'?" *Marketing Science*, *28* (2), 239–50.

Kane, G. (2016, August 31). Why did Hershey fall by 10.8% on August 30? *Market Realist.* Retrieved from https://marketrealist.com/2016/08/hershey-fall-10-8-august-30/

Kaplansky, G. & Levy, H. (2010, April). Exploitable predictable irrationality: The FIFA World Cup effect on the US stock market. *The Journal of Financial and Quantitative Analysis, 45*(2), 535-555.

Kapsi, N. and Beneki, E. (2004) *The Business of Olympic Games Sponsorship: Incentives and Rewards*, KERKYRA Publications, Athens.

Karafiath, I. (1988). Using dummy variables in the event methodology. *The Financial Review, 23*(3), 351-357.

Kavetsos, G. & Szymanski, S. (2008). Olympic Games, terrorism and their impact on the London and Paris stock exchanges. *Revue d'Economie Politique, 118*(2), 189-206.

Keller, K. L. (1993). Conceptualizing, measuring and managing customer-based brand equity. *Journal of Marketing, 57*, 1-22.

Kim, J. W. (2010). The worth of sport event sponsorship: An event study. *Journal of Management and Marketing Research*, 1-15.

Kim, H.D., Jung, C. & Lee, J. H. (2013). An analysis of stock market response to the IOC's commercial partnership: The case of the TOP partnership program. *Journal of Promotional Management, 19*, 331-352.

Klein, C., Zwergel, B., & Fock, J. H. (2009). Reconsidering the impact of national soccer results on the FTSE 100. *Applied Economics, 41*(25), 3287-3294.

Kmetz, J. L. (2019). Correcting corrupt research: Recommendations for the profession to stop misuse of p values. *The American Statistician, 73*(1), 36-45.

Knittel, C. R. & Stango, V. (2018). Celebrity endorsements, firm value, and reputation risk: Evidence from the Tiger Woods scandal. *Management Science, 60*(1), 21-37.

Kolari, J. & Pynnonen, S. (2011). Nonparametric rank tests for event studies. *Journal of Empirical Finance, 18*(5), 953-971.

Kruger, T. S. & Goldman, M. M. (2014). The impact of new, renewal and termination sponsorship announcements on share price returns. *International Journal of Sport Marketing & Sponsorship, 15*(4), 223-238.

Lee, B. & Groves, D. (2012). China Olympics and sponsor stock. *International Journal of Leisure and Tourism Marketing, 3*(2), 125-145.

Leeds, E. M., Leeds, M. A. & Pistolet, I. (2007). A stadium by any other name: The value of naming rights. *Journal of Sports Economics, 8,* 581-595.

Leeds, M. A. (2010). Is bad news always bad? The impact of Floyd Landis's rise and fall on Phonak. *Applied Economic Letters, 17*(8), 805-808.

Leeds, M. A., Mirikitani, J. M. & Tang, D. (2009). Rational exuberance? An event analysis of the 2008 Olympics announcement. *International Journal of Sport Finance, 4,* 5-15.

Leeds, E. M. & Leeds, M. A. (2012). Event Analysis. In W Andreff & S. Szymanski (Eds.), *The Oxford Handbook of Sports Economics (2nd Ed)* (285-301). New York, NY: Oxford University Press.

Liao, H., & Pitts, A. (2006). A brief historical review of Olympic urbanization. *The International Journal of the History of Sport, 23*(7), 1232–1252.

Liu, Y. (2011). The 2000 and 2008 Olympic host announcement and Chinese stock market responses. *International Journal of Applied Economics, 8*(2), 43-62.

Locke, S. L. (2019). Estimating the impact of Major League Baseball games on local air pollution. *Contemporary Economic Policy*, *37*(2), 236-244.

MacIntosh, E., Nadeau, J., Seguin, B., O'Reilly, N., Bradish, C. L. & Legg, D. (2012). The role of mega-sports event interest in sponsorship and ambush marketing attitudes. *Sport Marketing Quarterly, 21*, 43-52.

MacKinlay, C. (1997). Event studies in economics and finance. *Journal of Economic Literature, 45,* 13-39.

MacKinnon, J. G. (2002). Bootstrap inference in econometrics. *Canadian Journal of Economics/Revue canadienne d'économique*, *35*(4), 615-645.

Maharaj, B. (2015). The turn of the South? Social and economic impacts of mega-events in India, Brazil and South Africa. *Local Economy, 30*(8), 983-999.

Maheu, J. M. & McCurdy, T. H. (2004). News arrivals, jump dynamics, and volatility components for individual stock returns. *The Journal of Finance, 59*(2), 755-793.

Maiello, A. & Pasquinelli, C. (2015) Destruction or construction? A (counter) branding analysis of sport mega-events in Rio de Janeiro. *Cities, 48*, 116-124.

Martins, A. M. & Serra, A. P. (2011). Market impact of international sporting and cultural events. *Journal of Economics and Finance, 35*(4), 382-416.

Maxwell, H. & Lough, N. (2009). Signage vs. no signage: An analysis of sponsorship recognition in women's college basketball. *Sport Marketing Quarterly, 18*, 188-198.

Mazodier, M. & Rezaee, A. (2013). Are sponsorships announcements good news for the shareholders? Evidence from international stock exchanges. *Journal of the Academy Marketing Science, 41*, 586-600.

McBride, J. (2018, January 19). The economics of hosting the Olympic Games. *Council on Foreign Relations*. Retrieved from https://www.cfr.org/backgrounder/economics-hostingolympic-Games.

McEnally, R. T., & Kim, K. (2012). Corporate governance. In M. R. Clayman, M. S. Fridson, & G. H. Troughton (Eds.), *Corporate finance: A practical approach* (pp. 1-42). Hoboken, NJ: John Wiley & Sons, Inc.

McWilliams, A., & Siegel, D. (1997). Event studies in management research: Theoretical and empirical issues. *The Academy of Management Journal, 40*(3), 626-657.

Meenaghan, T. (2001). Understanding sponsorship effects. *Psychology & Marketing, 18*(2), 95-122.

Mishra, D. P., Bobinski, G. S. & Bhabra, H. S. (1997). Assessing the economic worth of corporate event sponsorships: A stock market perspective. *Journal of Market Focused Management, 2*, 149-169.

Mirman, M. & Sharma, R. (2010). Stock market reaction to Olympic Games announcement. *Applied Economic Letters, 17(*5), 463-466.

Mitrofanova, I. V., Russkova, E. G., Batmanova, B. V., & Shkarupa, E. A. (2015). Drivers of the regional economic growth and the problem of "White Elephants" of the Russian Olympic Megaproject "Sochi 2014". *Mediterranean Journal of Social Sciences, 6*(4), 267–276.

Miyazaki, A. D. & Morgan, A. G. (2001, January/February). Assessing market value of event sponsoring: Corporate Olympic sponsorships. *Journal of Advertising Research*, 9-16.

Mohamed, S., Oettle, T. & Stewart, S. (2015, Winter). Mega-sporting events: The impact on host stock markets and investment prospects. *Corporate Ownership and Control, 12*(2), 222-231.

Molchanov, A., Stork, P. A., & Zeng, V. (2010). The 2008 Beijing Olympic Sponsorships: Value for Money? Available at SSRN 1649132.

Moyer, R. C., McGuigan, J. R. & Rao, R. P. (2015). *Contemporary Financial Management* (13th ed.). Stamford, CT: Cengage Learning.

Muller, M. (2015). What makes an event a mega-event? Definitions and sizes. *Leisure Studies, 34*(6), 627-642.

Nakamura, B. M. (2018). Is Olympic ambush marketing here to stay: Examining the issues surrounding ambush marketing as they relate to Olympic sponsors, athletes, and other stakeholders. *Arizona Journal of International & Comparative Law, 35*(3), 499-530.

Newman, P. (2007). "Back the bid": The 2012 summer Olympics and the governance of London. *Journal of Urban Affairs, 29*(3), 255–267.

Nicolau, J. L. (2012). The effect of winning the 2010 FIFA World Cup on tourism market value: The Spanish case. *Omega, 40*, 503-510.

Nicolau, J. L. & Sharma, A. (2018). A generalization of the FIFA World Cup effect. *Tourism Management, 66*, 315-217.

Nishio, T., Lim, C. & Downward, P. (2009). Analyzing the economic impact of the Olympics using stock market indices of host countries. Paper presented at the 18th World IMACS/MODSIM Congress, Cairns, Australia, July 13-17.

Nocera, J. (2012, August, 10). Down with shareholder value. *New York Times*. Retrieved from https://www.nytimes.com/2012/08/11/opinion/nocera-down-with-shareholder-value.html

Noori, B. (2012). Marketing DSS architecture for sport sponsorship management. *Journal of Database Marketing & Customer Strategy Management, 19(*4), 294-299.

Olson, E. L., & Thjomoe, H. M. (2011). Explaining and articulating the fit construct in sponsorship. *Journal of Advertising, 40*(1), 57-70.

O'Reilly, N., & Horning, D. L. (2013). Leveraging sponsorship: The activation ratio. *Sport Management Review, 16*, 424-437.

Palmer, D. (2019, July 23). Australian Olympic Committee confirm relaxation of Rule 40 guidelines. *Inside the Games*. Retrieved from https://www.insidethegames.biz/articles/1082489/australia-rule-40-guidelines

Palomino, F., Renneboog, L., & Zhang, C. (2005). Stock price reactions to short-lived public information: The case of betting odds. *ECGI-Finance Working Paper*, (81).

Panja, T. (2019, July 5). Former Rio Governor describes extensive bribery in bid for 2016 Olympics. *New York Times.* Retrieved from https://www.nytimes.com/2019/07/05/sports/2016-olympics-rio-bribery.html

Pavitt, M. (2016, August, 28). Exclusive: Study claims Nike achieved best ambush marketing campaign at Rio 2016. *Inside the Games*, retrieved February 9, 2018 from https://www.insidethegames.biz/articles/1041052/exclusive-study-claims-nike-achieved-best-ambush-marketing-campaign-at-rio-2016

Perlman, E. (2016, August, 5). Rio 2016: Olympics sponsors under fire from public health campaigns. *Newsweek*. Retrieved February 9, 2018 from http://www.newsweek.com/rio-2016-sponsors-coca-cola-and-kelloggs-under-fire-public-health-campaigners-487708

Pitt, L., Parent, M., Berthon, P. & Steyn, P. G. (2010). Event sponsorship and ambush marketing: Lessons from the Beijing Olympics. *Business Horizons, 53*, 281-290.

Polonsky, M. J., & Speed, R. (2001). Linking sponsorship and cause related marketing: Complementarities and conflicts. *European Journal of Marketing, 35*(11/12), 1361-1385.

Preuss, H. (2006). Lasting effects of major sporting events. *Institute of Sport Science*, 1-11.

Preuss, H. (2009). Opportunity costs and efficiency of investments in mega sport events. *Journal of Policy Research in Tourism, Leisure and Events, 1*(2), 131-140.

Pruitt, S. W., Cornwell, T. B. & Clark, J. M. (2004). The NASCAR phenomenon: Auto racing sponsorships and shareholder wealth. *Journal of Advertising Research, 44*(3), 281-296.

Ramdas, B., van Gaalen, R. & Bolton, J. (2015). The announcement impact of hosting the FIFA World Cup on host country stock markets. *Procedia Economics and Finance, 30,* 226-238.

Reiser, M., Breuer, C., & Wicker, P. (2012). The sponsorship effect: Do sport sponsorship announcements impact the firm value of sponsoring firms? *International Journal of Sport Finance, 7*, 232-248.

Robinson, J. A., & Torvik, R. (2005). White elephants. *Journal of Public Economics, 89*(2-3), 197–210.

Roxborough, S. (2016, August 18). Rio Olympics worldwide to top 3.5 billion, IOC estimates. *The Hollywood Reporter*. Retrieved from https://www.hollywoodreporter.com/news/rio-olympics-worldwide-audience-top-920526

Russell, M., Mahar, J. & Drewniak, B. (2005). Examination of stock market response to publicity surrounding athletic endorsers. *The Marketing Management Journal, 15*(2), 67-79.

Rilstone, P., & Veall, M. (1996). Using bootstrapped confidence intervals for improved inferences with seemingly unrelated regression equations. *Econometric Theory*, *12*(3), 569-580.

Salinger, M. (1992). Standard errors in event studies. *The Journal of Financial and Quantitative Analysis, 27*(1), 39-53.

Samitas, A., Kenourgios, D. & Zounis, P. (2008). Athens' Olympic Games 2004 impact on sponsor's stock returns. *Applied Financial Economics, 18*(19), 1569-1580.

Sandler, D., & Shani, D. (1989). Olympic sponsorship vs. "ambush" marketing: Who gets the gold? *Journal of Advertising Research.*

Sarac, M. & Zeren, F. (2013). The effect of soccer performance on stock return: Empirical evidence from "the big three clubs" of Turkish Soccer League. *Journal of Applied Finance and Banking, 3*(5), 299-314.

Schwabe, J. (2018). The pledge to brand loyalty: A gold medal approach to Rule 40. *Harvard Journal of Sports and Entertainment Law, 9,* 55-81.

Schweitzer, R. (1989, July/August). How do stock returns react to special events? *Business Review,* 17-29.

Seguin, B., Lyberger, M., O'Reilly, N. & McCarthy, L. (2005, July). Internationalising sport sponsorship: A comparative study. *International Journal of Sport Marketing and Sponsorship*, 216-230.

Seguin, B, & O'Reilly, N. J. (2008). The Olympic brand, ambush marketing and clutter. *International Journal of Sport Management and Marketing, 4*(1), 62-84.

Shani, D. & Sandler, D. M. (1998). Ambush marketing: Is confusion to blame for the flickering of the flame? *Psychology & Marketing, 15*(4), 367-383.

Shen, L. (2016, August 30). How a new hire added $1.5 billion to United Airline's market cap. Fortune. Retrieved from https://fortune.com/2016/08/30/scott-kirby-billion-hire/

Sherman, R. (2012, July 30). USA track athletes stage tweet-protest against Rule 40. *SBnation*. Retrieved from https://www.sbnation.com/london-olympics-2012/2012/7/30/3201119/2012-olympics-rule-40-twitter-sanya-richards-ross

Siegfried, J. & Zimbalist, A. (2006). The economic impact of sports facilities, teams and mega-events. *The Australian Economic Review, 39*(4), 420-427.

Smith, M., & Kohn, R. (2000). Nonparametric seemingly unrelated regression. *Journal of Econometrics, 98*(4), 257-281.

Spanberg, E. (2008, January 14). Sponsors ask hard questions about spending. *Street and Smith's Sport Business Journal*.

Stadtmann, G. (2006). Frequent news and pure signals: The case of a publicly traded football club. *Scottish Journal of Political Economy, 53*(4), 485-504.

Stotlar, D. K. (2004). Sponsorship evaluation: Moving from theory to practice. *Sport Marketing Quarterly, 13*, 61-64.

Stotlar, D. K. & Nagel, M. S. (2017). D*eveloping successful sport sponsorship plans (5th ed.).* Morgantown, WV: Fit Publishing.

Stout, L. A. (2003). The mechanisms of market inefficiency: An introduction to the new finance. *Journal of Corporate Law, 28*, 635-669.

Strycharz, J., Strauss, N. & Trilling, D. (2018). The role of media coverage in explaining stock price fluctuations: Insights for strategic financial communication. *International Journal of Strategic Communication, 12*(1), 67-85.

Sullivan, C. & Leeds, M. A. (2016). Will the Games pay? An event analysis of the 2020 summer Olympics announcement on stock markets in Japan, Spain and Turkey. *Applied Economic Letters, 23*(12), 880-883.

Tan, K. (2019, July 24). NBCUniversal projecting over $1.2 bn in ad sales from Tokyo 2020. *Sport Business*. Retrieved from https://media.sportbusiness.com/news/nbcuniversal-projecting-over-1-2bn-in-ad-sales-from-tokyo-2020/

Tanuwidjaja, E. (2007). Multi-factor SUR in event study analysis: Evidence from M&A in Singapore's financial industry. *Applied Financial Economics Letters, 3*(1), 55-62.

Taylor, C. R. (2016, August 4). Sponsorship and advertising trends in the 2016 Rio Olympic Games: Three things to watch for. *Forbes*. Retrieved April 11, 2019 from https://www.forbes.com/sites/onmarketing/2016/08/04/sponsorship-and-advertising-trends-in-the-2016-rio-olympic-games-three-things-to-watch-for/#1a3b5e4e18c7

Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. *The Journal of Finance, 57*(3), 1139-1168.

Thaler, R. H. (2016). Behavioral economics: Past, present, and future. *American Economic Review, 106*(7), 1577-1600.

Tien, C., Lo, H.C. & Lin, H. W. (2011). The economic benefits of mega events: A myth or a reality? A longitudinal study of the Olympic Games. *Journal of Sport Management, 25*, 11-23.

Tomkovick, C. & Yelkur, R. (2010). Olympic advertisers win gold, experience stock price gains during and after the Games. *Journal of Global Academy of Marketing Science, 20*(1), 80-88.

Tomlinson, R., Bass, O., & Bassett, T. (2011). Before and after vuvuzela: Identity, image and mega-events in South Africa, China and Brazil. *South African Geographical Journal, 93*(1), 38-48.

Trading Economics. (2019). Brazil Stock Market. Retrieved from https://tradingeconomics.com/brazil/stock-market

Tsiotsou, R. (2011). A stakeholder approach to international and national sport sponsorship. *Journal of Business & Industrial Marketing, 26*(8), 557-565.

Tsioutsou, R., & Lalountas, D. (2005). Applying event study analysis to assess the impact of marketing communication strategies: The case of sponsorship. *Applied Financial Economics Letters, 1*(4), 259-262.

Veraros, N., Kasimati, E. & Dawson, P. (2004). The 2004 Olympic Games announcement and its effect on the Athens and Milan stock exchanges. *Applied Economic Letters, 11*(12), 749-753.

Vicentini, F. & Graziano, E. A. (2016). Football cultural events and stock market returns: The case of FIFA World Cup. *International Journal of Environmental Policy and Decision Making, 2*(2), 1-11.

Vieira, E. F. (2012). Investor sentiment and market reaction: Evidence on 2010 FiFA World Cup. *International Journal of Economics and Accounting, 3(*1), 51-76.

Walker, A. (2014, February 6). How L.A.'s 1984 Summer Olympics became the most successful game ever. *Gizmodo.* Retrieved from https://gizmodo.com/how-l-a-s-1984-summer-olympics-became-the-most-success-1516228102

Watanabe, N. M., Yan, G., Soebbing, B. P., & Fu, W. (2019). Air pollution and attendance in the Chinese Super League: Environmental economics and the demand for sport. *Journal of Sport Management*, *33*(4), 289-302.

Weeks, C. S., Cornwell, T. B., & Drennan, J. C. (2008). Leveraging sponsorships on the Internet: Activation, congruence, and articulation. *Psychology & Marketing*, *25*(7), 637-654.

Weeks, C. S., Humphreys, M. S., & Cornwell, T. B. (2018). Why consumers misattribute sponsorships to non-sponsor brands: Differential roles of item and relational communications. *Journal of Experimental Psychology, 24*(2), 125-144.

Wharton, D. (2016, December 2). LA 2024 releases revised budget for Olympics, revenue to equal $5.3 billion in costs. *Los Angeles Times*. Retrieved from http://www.latimes.com/sports/olympics/la-sp-olympics-la-2024-story.html

Yang, J. Y. & Markellos, R. N. (2018). Is there an Olympic gold medal rush in the stock market? *The European Journal of Finance, 24*(17), 1631-1648.

Yelkur, R., Tomkovick, C. & Pennington, J. (2012). The alchemy of Olympics advertising & sponsorship: Turning the games into gold. *Journal of Management Policy and Practice, 13*(2), 34-45.

Zellner, A. (1962). An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of the American Statistical Association, 57*(298), 348-368.

Zimbalist, A. (2015). *Circus maximus* (2nd ed.). Washington, DC: Brookings Institution Press.