Market Anomaly: 2014th World Cup Effect

José Maria Candido Alves

ESCP-Europe Paris (e133401); CLSBE (152413016)

ABSTRACT

Inspired by the World Cup effect discovered by Kaplanski and Levy (2010), we decided to investigate the 2014th edition. Our findings were conclusive. The average return on the U.S. stock market during the latest World Cup was +0.87%, compared to an average of -2.42% of all past World Cups; hence, the anomaly disappeared. We suggest its disappearance was driven by: (1) the growth popularity of Football in the U.S. and its influence on the local stock market, and by (2) the publication of Kaplanski and Levy (2010 and 2014) followed by an investment strategy, which allowed sophisticated investors to take advantage of the anomaly.

Keywords: *Behavioral finance, Stock market anomalies, Market efficiency, Investor sentiment, Flow of information, Abnormal returns, Football*

Professor Franck Bancel

Supervisor

"There is a lot of evidence that such overconfidence in intuition is a powerful force in the markets."

Robert J. Shiller

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Résumé

Inspiré par « l'effet Coupe du Monde » découvert par Kaplanski et Levi (2010), nous avons décidé d'enquêter sur la 2014e édition. Nos résultats ont été concluants. Le rendement moyen sur le marché boursier américain au cours de la dernière Coupe du Monde était de + 0,87%, quant à celle de l'ensemble des dernières Coupes du Monde était de -2,42% ; par conséquent, l'anomalie a disparu. Nous avons conclu que ce changement été lié à: (1) la croissance de popularité du football aux Etats-Unis et son influence sur le marché boursier local, et par (2) la publication de Kaplanski et Levi (2010 et 2014) qui a été suivie par une stratégie d'investissement qui a permis aux investisseurs qui étaient au courant de profiter de cette situation.

Mots-clés: *La finance comportementale, Anomalies de marché, L'efficacité du marché, Le sentiment des investisseurs, Flux d'informations, Les rendements anormaux, Le football*

Resumo

Inspirado pelo efeito Campeonato do Mundo descoberto por Kaplanski e Levy (2010), decidimos investigar a edição de 2014. Os nossos resultados foram conclusivos; os retornos do NYSE Composite Index durante o Campeonato do Mundo de 2014 foram de +0,87%, em comparação com uma média de -2,42% de todas as edições anteriores, o que faz com que a anomalia tenha desaparecido. Sugerimos como razões para o seu desaparecimento: (1) o crescimento da popularidade do futebol nos EUA e a sua influência nos mercados financeiros, e (2) a publicação de Kaplanski e Levy (2010 e 2014) acompanhado de uma estratégia de investimento o que permitiu aos investidores sofisticados tirar vantagem da anomalia.

Palavras-chave: *Finanças comportamentais, Anomalias financeiras, Eficiência do mercado financeiro, o Sentimento dos investidores, o Fluxo de informações, Retornos anormais, Futebol*

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Paris, 11th of May 2015

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I. INTRODUCTION

I always felt inspired by behavioral finance and its impact on the finance field. In such a pragmatic industry why would exogenous factors, such as weather or sporting events, influence behavior?

I pursued my interest in this subject matter during the Empirical Finance final project at Católica-Lisbon, which investigated the relation between temperature and stock market returns. Indeed, a statistically significant negative correlation was found. Although there are numerous financial market anomalies, for this investigation I chose to examine the FIFA World Cup effect because it combines two of my passions, football and finance.

When I first read the paper of Guy Kaplanski and Haim Levy (2010 and 2014), I was astonished by their results and posed the questions:

1. What happened during the 2014th FIFA World Cup?
2. If the effect persisted, why did it persist?
3. If not, why and what has changed?

To address these questions, we replicated Kaplanski and Levy (2010 and 2014) analyses for two time periods: (1) from 1950 to 2006, to cross check their results and (2) from 1950 to 2014, to include the latest FIFA World Cup. On top of these analyses, we also hypothesized two reasons for the disappearance of the effect.

The primary goal of this research was to find out if the effect persisted over the 2014th World Cup and what factors were driving this anomaly. Consequently we tested the following hypothesis:

1. The U.S. stock market is efficient and therefore there are no abnormal returns.
2. The potential number of disappointed fans affects the stock market returns.
3. The eliminated countries' direct investment in the U.S. equity market affects the stock market returns.

According to our research, the effect disappeared and therefore we complemented our analysis with the following hypothesis, in order to understand the popularity of football before and after the 2010th World Cup:

4. The U.S. national football team results affect the stock market returns.

Our work will be structured the following way: Section I introduces the topic; Section II presents the relevant literature review; Section III and IV report 2014th FIFA World Cup key figures and the impact of foreign direct investment in the U.S., respectively; Section V and VI analyze the data and explain the methodology used, respectively; Section VII presents the results and Section VIII concludes.

II. LITERATURE REVIEW

MARKET EFFICIENCY

DEFINITION

The Efficient Market Hypothesis (EMH) introduced by Fama (1965), which claims that in an efficient market, stock prices fully reflect all the available information. In efficient stock markets, returns are supposed to follow a random walk and investors should expect to obtain an equilibrium rate of return. The random walk hypothesis states that price changes are unpredictable, meaning future returns are not predictable on the basis of past ones. The information contained in the past prices is fully and instantly reflected in present prices in an efficient market as argued by Fama (1965). Following his study, many researchers examined the efficiency of capital markets. Since the introduction of EMH (Fama, 1965) researchers have documented several market anomalies in the stock returns.

TYPE OF EFFICIENCY FORMS

There are three forms of market efficiency: weak, semi-strong and strong. Weak form of market efficiency states that current market prices capture all information contained on past pric-

es and volume data. Semi-strong, goes further by capturing all publicly available information. Finally, strong form of efficiency states that current market prices reflect not only all publicly available information but also private one.

MARKET ANOMALIES

DEFINITION

Lo (1997) states that researchers have not yet reached a consensus about whether financial markets are efficient or not, in fact it is not the objective of the authors to test that hypothesis, but to show evidence of a specific market anomaly during a specific time period – the World Cup Effect.

Reputable scholars such as Richard Roll, Robert Haugen or Paul Samuelson commented the existence of market anomalies and their exploitation. Richard Roll (1994) made it public that *"Over the past decade, I have attempted to exploit many of the seemingly most promising 'inefficiencies' by actually trading significant amounts of money (…) Many of these effects are surprisingly strong in the reported empirical work, but I have never yet found one that worked in practice."*. Paul Samuelson (1989) recognized that taking advantage of market anomalies before they being exploited by other players is a challenge that only a few masterminds can have the pleasure to do. He adds that *"Out of the thousands of published and unpublished statistical testings of various forms of the [efficient market] hypothesis, a few dozen representing a minuscule percentage have isolated profitable exceptions to the theory."* Finally, Robert Haugen (1995) cites that *"In the course of the last 10 years, financial economists have been struggling to explain (…) the huge, predictable premiums in the cross-section of equity returns"*

According to Brennan and Xia (2001), a market anomaly is "*the statistically significant difference between the realized average return (…) and the returns that are predicted by a particular asset pricing model"*. Frankfurter and McGoun (2002) defined anomaly as "*an irregularity or a deviation from common or natural order or an exceptional condition*". In fact, anomalies may occur once, often or even endlessly, but they are a clear indicator of capital markets

inefficiency. Tversky & Kahneman (1986) defined market anomalies as "*an anomaly is a deviation from the presently accepted paradigms that is too widespread to be ignored, too systematic to be dismissed as random error and too fundamental to be accommodated by relaxing the normative system*". In a nutshell and according to financial literature, market anomalies are described as uncommon situations in which the movement of a share or a group of shares diverges from the conventions of EMH.

Abnormal returns – actual return minus expected return – are expected to be zero in efficient markets, thus persistence realization of those represents an anomaly and consequently translates into predictability of future returns. It is therefore a market distortion that investors have been taking advantage of. However, according to Chordia et al. (2014), the recent policies of liquidity stimulation and lower trading costs made the average returns from a portfolio strategy based on anomalies decreased considerably. Furthermore, Schwert (2003) points out that market anomalies tend to attenuate or even disappear after being reported and also that mispricing opportunities may not hold for different time periods.

Market anomalies have been identified many years ago and somehow they still persist, but as Hawawini and Keim (1995) argued, there are no "guarantees [of] their presence in the future". However, there may be numerous reasons for their existence. Firstly, the lack of understanding of such mispricing might move away investors from investing in such opportunity. Secondly, arbitrage might be too costly due to the bid-ask spread, complexity or transaction costs. Thirdly, the potential profit might be not enough to give it a try, even if the chance exists. Fourthly, the opportunity might be restricted due to trading limitations. Lastly, investors are not always rational and even with new information they might not change their behavior.

According to Latif et al. (2012) market anomalies can be divided into three categories: (1) fundamental, (2) technical and (3) calendar or seasonal anomalies. We created a fourth category named others for all those anomalies not fitting on the three categories described before.

- Value anomaly

Graham & Dodd (1934) proved in their research that value stocks outperformed growth stocks. According to their study, value shares perform better than growth ones given its actual growth rate and sales. As proven by Lakonishok et al. (1992), market tends to overestimate growth of the growth stocks and they do it for two reasons: (1) take the wrong conclusions with the existing data and (2) tend to focus too much on past performance, even though there are low probabilities it will occur in the future.

However, both authors agree that institutional investors do not take the wrong conclusions but rather have a preference for growth stocks over value, since they were more likely to be the past winners. Lakonishok et al. (1993) adds that this preference is related to the time horizon individuals want their return, which is considerably shorter than institutional investors. Finally, some authors claimed that riskiness was actually the cause for higher performance of value stocks over growth stocks. But, based on other studies (Lakonishok, 2002) value stocks are not riskier when looking at its volatility and beta.

- Low P/E

As identified by Ball and Brown (1968) and Goodman & Peavy (1983), companies with a lower Price to Earnings ratio (PER) were more likely to generate higher future returns and outperform the market while those with a high PER tend to underperform.

- Size effect

The widely known size effect, where small cap stocks tend to outperform larger cap stocks was firstly described by Banz (1981). The author found a higher risk adjusted return for smaller firms since 1941. Such anomaly was even recommended as an investment strategy by Haugen and Lakonishok (1988).

- Book to Market ratio

Chan, Hamao, and Lakonishok (1991) and Fama and French (1992) found that higher book-to-market ratios (the ratio of the book value of a common stock to its market value) tend to be asso-

ciated with higher expected returns. Value effect is well described by Fama and French (1992) and it consists in the creation of portfolios with a long position on stocks with the highest Book-to-Market ratio and a short one on stocks with the lowest Book-to-Market ratio.

- Net Payout Yield

In 1988, Fama and French introduced the dividend yield effect. Stocks with a higher dividend yield generated higher future returns than those with low dividend yields. However, more recently academic studies started to show weakened results and discovered a new effect – Net Payout Yield. Boudoukh et al. (2007) found Net Payout Yield - dividends plus repurchases minus issuances – a much stronger predictor of future equity performance than dividend yield. Gray and Vogel (2012) also explored the use of net-debt paydown, which added robustness to the stockholder metric. A strong argument for the weakening of the dividend yield effect is related with the recent SEC regulation changes.

- Low-volatility anomaly

Ali et al. (2003) study combined the Book-to-market effect with volatility and found that the value effect was greater for stocks with high idiosyncratic return volatility. Baker et al. (2011) also discovered that low volatility stocks consistently outperform high volatility stocks, which was also supported by Dutt et al. (2013). As a supporting argument for the low volatility anomaly, the latter study found a strong correlation between low volatility stocks and higher operating returns.

TECHNICAL

- Momentum

Momentum strategies are characterized by a short position on stocks that have declined its value in the past (losers) and long position on firms with recent positive returns (winners). This anomaly was firstly identified by Jegadeesh and Titman (1993) and later developed by Hons & Tonks (2001), which divided the strategy into two portfolio (loser's and winner's) and reported higher returns due to lower risk by the latter then by the former.

- Moving Averages

Although technical analyses were in use since the 1800s, Brock et al. (1992) was one of the first studies to show its potential. Moving averages are techniques in which past prices are used in order to predict future prices. They are characterized by mainly two price averages, one long and one short, typical 50 and 15 days respectively. Investors must sell a stock whenever the short average is lower than the longer one and must buy it whenever the short average is above the longer one.

- Trading Range Break

Trading Range Break is another technical analysis studied by Brock et al. (1992), where buy and sell signals are determined by the last 50,150 or 200 days maximum or minimum. An investor would sell a stock if its price falls below a minimum or if it goes above a maximum. Although difficult to implement, the study showed significant and positive returns.

CALENDAR

As Boudreaux (1995) concluded, calendar or seasonal anomalies contradict the weak form of efficiency because it assumes markets can be predicted based on past information. Hence, the existence of such variations contradicts EMH, meaning investors can earn substantial abnormal returns.

- January effect

In 1942, Watchel reported for the first time seasonal effects, in what he recommended a "*well worth watching when formulating an actual investment policy*". Rozeff and Kinney (1976) found that the average return for the month of January was higher than for any other month in NYSE from 1904 to 1974, which they called the January effect. Few years later, Keim (1983) and Reinganum (1983) claimed that returns for small firms were higher than for larger ones, however disagreed on the reason. Whereas the former argued that this pattern was due to the tax-loss-selling effect, the latter disagreed questioning the true reason for such difference in returns when controlling for size. Lakonishok and Haugen (1987) suggested that the January effect might be due to the window dressing effect, meaning that investors, especially fund managers, sell their

poor performers in December in order to hide their losses and buy them back again in January to hold their optimal portfolio structure again.

- Holiday effect

The holiday effect was firstly reported by Lakonishok and Smidt (1988) and showed that half of the positive returns of Dow Jones occurred during the 10 pre-holiday trading days. Cadsby and Ratner (1992) also observed this effect in the US but not in Europe. Ariel (1990) went further and stated that more than one-third of the positive returns in the U.S. occurred on the 8 days before a market closed holiday.

- Day of the week effect

Kelly (1930) found with three years of data that Monday was the worst day to buy stocks. Hirsch (1968) and Cross (1973) drew the same conclusions, but Franck Cross compared Friday average returns with those of Monday. Gibbons and Hess (1981) also compared the first and the last trading days of the week, concluding that Friday had higher returns. Another perspective had Jaffe and Westerfield (1989) and Brooks and Persand (2001) reporting Tuesday as the day with the lowest returns for Japan and Australia and for Malaysia and Thailand, respectively.

- Religious effects

Bialkowski et al. (2010) studied the stock market returns during the Muslim Holy Month and discovered that returns were significantly higher and less volatile during this period than the rest of the year. On the other hand, Lakonishok & Smidt (1988) studied stock markets around Christmas time and discovered that *"the price increase from the last trading day before Christmas to the end of the year is over 1.5%"*.

OTHERS

- Neglected Stocks

Neglected Stocks, or Reversals occur when either past top or worst performing stocks reverse and tend to out- or underperform the market in subsequent periods. This event is usually attributed to investors' expectations of poorly performing stocks to succeed and high flyers to fall. Another common explanation is related to investment fundamentals, i.e. if a stock is performing

well, it will become relatively expensive and therefore its valuation will decrease. The same logic applies to underperforming stocks. De Bondt & Thaler (1985) studied the event and found that portfolios of prior "losers" consistently outperformed prior "winners". The authors identified gains of 25% for the past "losers" portfolios compared to those of past "winners" for data ranges as long as 36 months after the creation of the portfolios, which was consistent with their hypothesis of markets overreaction. Furthermore, Tversky and Kahneman (1973) argued that a possible reason for such anomaly might be the "*excessive pessimism about the future prospects of companies that had done poorly"*.

- Dogs Of The Dow

The Dogs of the Dow anomaly was discovered by John Slatter and involves trading the stocks of the Dow Jones Industrial Average (DJIA). According to this anomaly, an investor who held an equally-weighted portfolio of the ten highest dividend-yielding stocks, for one year, would have an average return of 16.06% versus 10.91% of the overall index. This strategy was particularly successful after the crash of 1987, where the dogs were indeed the underperformers and actually recovered post-crisis. Domian et al. (1998) concluded that the strategy succeeded around the crisis period but weakened afterwards suggesting overreaction as a cause for the success. However, more recently Rinne and Vähämaa (2011) conducted an empirical study of this strategy in the Finnish market and reported average annual abnormal returns of 4.5%.

- Temperature Anomaly

People tend to rate their life satisfactions much higher on sunny days than on cloudy or raining days (Schwartz and Clore, 1983). Evidence suggests that low temperatures tend to cause aggression, and high temperatures tend to cause aggression, hysteria or apathy (Cao and Wei, 2005). According to Saunders (1993) research, less cloud cover is associated with higher returns, and the returns' difference between the cloudiest days and the least cloudy days is statistically significant. Investors' mood is upbeat or optimistic on sunny days, which uplifts the stock market returns. Conversely, their pessimistic mood on cloudy days depresses the stock returns. Hence, Saunders (1993) as well as Hirshleifer and Shumway (2003) argued that weather can indeed affect the behavior of market traders and consequently stock returns. Also, in an empirical study

incorporating many weather variables, Howarth and Hoffman (1984) found that humidity, temperature and sunshine exercise the greatest influence on mood.

Other studies have tested the impact of ambient temperature alone on mood, behavior and task performance. Allen and Fisher (1978) and Wyndham (1969) found that task-performing abilities are weakened when individuals are exposed to very high or low temperature.

- Daylight Saving Anomaly

Sleeping is crucial in everyone's life, and even if researchers have been showing its positive effects on productivity and wellness[1], stock market participants have been sleeping less. Kamstra's et al. (2000) analyzed the effect of daylight saving changes on financial markets. His study showed evidence that, weeks following daylight-saving weekends have large negative returns. Kamstra's argues the effect is related to sleep desynchronosis, which affects negatively sleep patterns.

INVESTOR SENTIMENT

Investor behavior is an important field to which has been devoted increasing attention on capital market studies. Two perspectives have been taking into account: traditional and behavioral finance. Most studies focused on the institutional investors behaviors, due to data availability and impact on the market.

Although, investment behavior has been investigated from the perspective of investment selection decisions, such as the risk-return paradigm, more recent research focused on internal and external behavioral factors. Investment behavior theories attempt to explain the rationality or irrationality behind investment decisions and how they differ among investors, assuming equal amount of information.

[1] Dababneh, A. J., Swanson, N., & Shell, R. L. (2001). Impact of added rest breaks on the productivity and well-being of workers. *Ergonomics, 44*(2), 164-174.

Under the EMH, traditional finance theory argues that stock prices fully reflect the information available and all players are rational. However, more recently researchers have been connecting the psychological state of the investors to the markets.

Barber and Odean (2000) disagree that all investors behave rationally, even though modern financial economics defend it. Moreover, investor's irrational behavior tends to occur more frequently than it was supposed. Behavioral finance includes these conducts into financial market models. There are mainly two common slip-ups investors make: trade excessively and tend to disproportionately hold on losing investments while selling winners. These authors argue that these deviations come from human psychology. Human beings are naturally over confident and that is the first reason for the bias, while the second is related with the necessity to avoid a regret sentiment.

Therefore, it is well established in the psychological literature that mood, feelings and emotions affect people's decisions according to Schwartz (1990) and Loewenstein et al. (2001), and that mood itself can be influenced by environmental factors such as weather conditions, confirmed by Watson (2000).

SPORTING EVENTS

Another equally important part of this study is related with sports and how they impact economies and investors behavior. In fact, the economic impact of sports events is a well-studied subject. Fourie and Santana-Gallego (2011) concluded that countries hosting sports events see an increase of 12.5% on tourist arrivals. Moreover, even those countries that were ready to host one, but lost the bid, still see an increase of 3.4%. Kavetsos and Szymanski (2010) studied the "feelgood" factor around sports events, concluding that *"hosting major sporting events raises reported happiness"*, especially for football events. However, they claim this "*fellgood*" factor is not systematic and appears to be a short term effect.

This finding is of extreme importance given the existing link reported by Edmans et al. (2007) between mood and stock returns. According to his study, which involved 39 countries and 32 years of data (1973 to 2004), football results are strongly correlated with stock market returns,

especially on football losses. Edmans et al (2007) reported *"a loss in the World Cup elimination stage leads to a next-day abnormal stock return of -49 basis points."* On the same topic, Ashton et al. (2003) measured the impact of the England football team on the FTSE 100 index. The study reported a *"statistically significant relationship between the performance of the English national football team and the exchange in the price of shares traded on the London stock exchange".* Whitfield (2003) reported that a good result in soccer games affects psychologically trader's investment decisions. As an example, when England team was knocked off the 1990 World Cup, the London Stock Exchange fell by 1%. Finally, in Turkey it was proven that football results affected stock market returns by Berument et al. (2006). Berument observed an increase on stock market returns after a victory of Besiktas against its rivals (Fenerbahçe and Galatasaray).

III. 2014TH FIFA WORLD CUP

Outside United States of America and Canada, the World Cup is the most important sporting event. Despite the already mentioned effects, the FIFA World Cup has a vast media attention, comparable only to the Olympic Games, with an extensive TV audience, massive merchandise sales and huge attention and involvement by the fans. The 2014th edition was special because it broke numerous records in what concerns television audience. In order to understand its impact, key figures[2] are presented below, split into digital exposure (U.S. and Worldwide) and financial impact:

Digital Exposure - US

- All-time record figures in online streaming of matches in the USA
- 2014th World Cup beat TV viewing figures for 2014 NBA Finals and 2013 World Series
- "*The audience reach in the USA saw a near 20% rise versus that achieved in 2006, with 94.5 million viewers watching some part of the tournament in-home. This is the largest increase in audience reach of any measured market analyzed*."

[2]http://www.fifa.com/mm/document/affederation/tv/01/47/32/73/2010fifaworldcupsouthafricatvaudiencereport.pdf

Digital Exposure - Worldwide

- 214 countries reached
- 1+ billion people have watched some coverage of the Final game
- All-time high TV viewing records in Germany, the Netherlands and Belgium
- The final between GER v ARG attracted the biggest audience in German TV history
- Most data ever streamed for an event as fans watch online
- Biggest audience for a TV show in France for 7 years
- Biggest audience for a TV show achieved in UK, Italy, Spain and Portugal for 2 years
- The official FIFA app recently became the biggest sports event app of all time with a record 28 million downloads.
- 451 million Facebook users were, while FIFA's Twitter followers surpassed the 16-million mark. The official FIFA World Cup Instagram app increased from 42,000 to 0.8 million followers
- 40+ billion impressions of official FIFA World Cup digital content

Finance

- The tournament will bring an additional R$112.79 billion to the Brazilian economy
- Tax revenue for shall amount to as much as USD 7.2 billion[3]
- According to the Getulio Vargas Foundation, 14 million jobs have been created in the last four years because of the FIFA World Cup, the equivalent of 180 Maracana stadiums filled to capacity
- FIFA invested more than US$ 850 million in the organization of the FIFA World Cup in Brazil
- FIFA staff spent more than 600,000 nights in hotels
- In hotel accommodation in Brazil alone, FIFA and the organizing committee spent more than 500 million reais

[3] Ernst & Young and Getulio Vargas Foundation 2014 World Cup report

IV. FOREIGN DIRECT INVESTMENT IN THE U.S.

Although soccer popularity has grown exponentially, it still remains as the 4th most popular sport in the U.S., therefore the results of the U.S. national team should not affect directly the stock market, or at least not in the same magnitude as other they do in other countries. Additionally, U.S. stock market is known to be very liquid, which would help in case an investment strategy is put in place. Finally, it is the market where more foreign investors invest.

Foreign direct investment in the United States accounted for 16.5%[4] of the GDP, which shows the importance of foreign capital in the American economy. On a historical cost basis, totaled $2.8 trillion in 2013, an increase of $0.5 trillion versus 2010, when the last World Cup occurred. United States is the world's most attractive country in what concerns foreign investment, ahead of China, Russia, Hong Kong and Brazil. However, its share among all foreign direct investment dropped from more than 33% in 2000 to less than 20% in 2013, which is a consequence of the multinationals expansion for faster growing economies and the competition for foreign investments. From the participating countries, seven of them account for 90% of all Equity held by World Cup countries. As it can be seen in Figure 1, the leading investor is the United Kingdom with $741b, followed by Japan ($361b) and Switzerland ($331b).

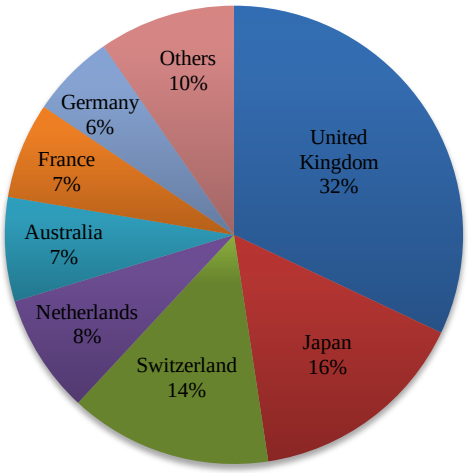
When looking at all countries holding US Equity, Canada is the leader with holdings of almost $770b, followed by United Kingdom and Japan. The seven countries in Panel B represent almost 70% of all US equity held by foreign investors. The "Others" slice aggregates 191 countries and represents $1.3 trillion.

[4] Foreign Direct Investment in the United States 2014 Report, Organization for International Investment

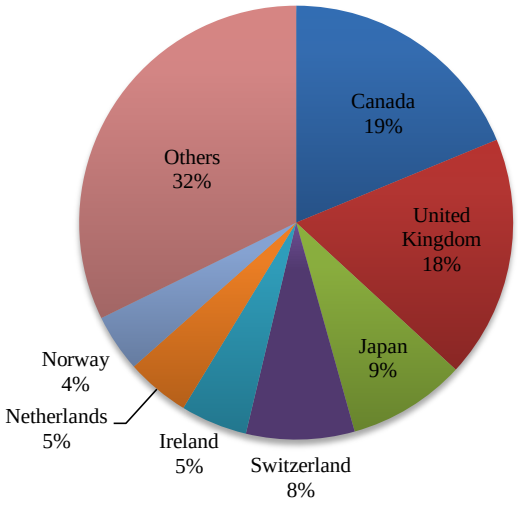
Figure 1 - % of U.S. Equity held by World Cup countries and by Foreign Investors in 2014

Figure 1 reports the percentage of U.S. equity held by World Cup countries (Panel A) and by all foreign countries (Panel B). On Panel A, 28 countries are reported, being Algeria, Iran and Nigeria the countries without U.S. equity. The other country missing is USA. The "Others" slice corresponds to 21 countries and $223b in investment. Panel B aggregates 198 countries and the "Others" slice corresponds to 191 countries and $1.3t in investment.

Panel A - World Cup countries



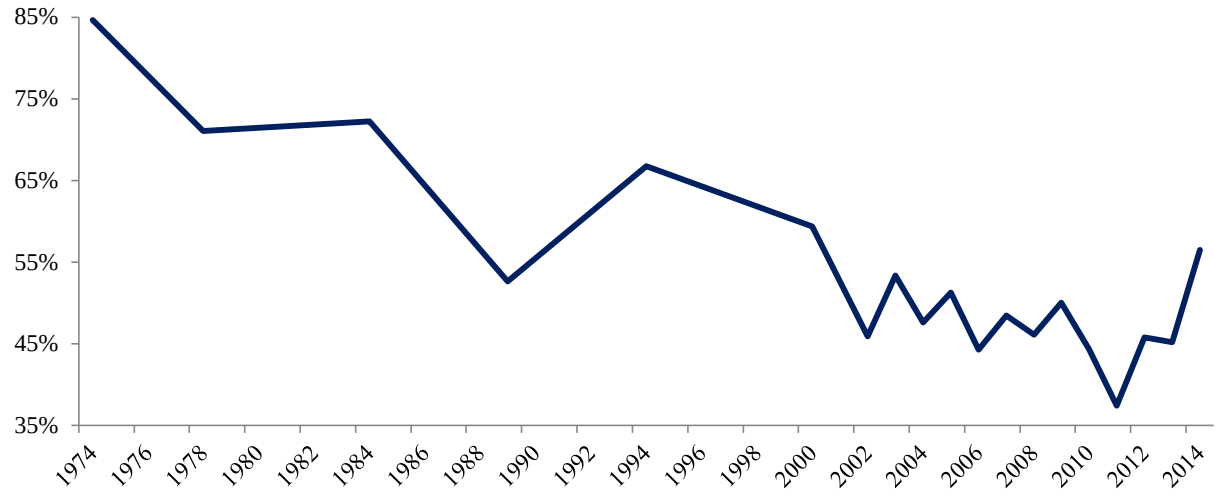
Panel B - All Foreign countries



Overall, the 28 teams present in the 2014th FIFA World Cup account for 56% of the all US Equity held by foreign investors in 2014, which represents an increase from 44% in 2010 (Figure 2). Although this percentage is relatively small compared to 1974, where it reached almost 85%, we need to take into consideration the evolution of the markets and the international investment in rapidly growing economies. The $4.1 trillion of Equity held by foreign investors in 2014 is the maximum since 2002, which by itself proves the importance of such investments for the U.S. economy.

Figure 2 - % of U.S. Equity held by World Cup countries

Figure 2 reports the evolution of the percentage of U.S. Equity held by World Cup Countries since 1974 until 2014.



In order to better understand the magnitude of those investments and the share each country allocates to U.S. Equity, Table 1 presents a comparison between the dollar value of U.S. equity held by World Cup countries and the percentage of their equity portfolio invested in the United States of America in 2010 and 2014. In 2014, the total amount invested by foreign investors in the U.S. equity market was about $4.1 trillion, which constitutes an increase of 55% versus 2010. When looking at the countries participating in this World Cup, the value decreases to $2.3 trillion, which constitutes an increase of 97%, when compared to 2010 ($1.1 trillion). About 85% of the participating countries increased their investments in U.S. stocks and more than half allocated a higher percentage of their equity portfolio to U.S. securities versus 2010. Thus, a large amount of money is invested in the U.S., and it is reasonable to assume that if part of the portfolio is sold, this market will be affected. Finally, about one-fifth[5] of the New York Stock Exchange (NYSE) listed companies are foreign. Hence, foreign investors are familiar with the U.S. stock market and it's reasonable to assume that a part of them hold a percentage of these companies. Furthermore, most of these companies are listed both in New York and in their country of origin; therefore, even if foreign investors sell their shares in the local market, the U.S. market will be affected otherwise arbitrage opportunities would exist.

[5] http://www.world-exchanges.org/statistics/

Table 1 - Foreign holdings of U.S. securities by Country

Table 1 reports the value of foreign holdings of U.S. equity and the percentage of their portfolios invested in the U.S. N/A indicates the data was not available for that country.

	U.S. Equity ($m)[6]		% of Equity Portfolio in U.S.[7]	
Country	**2010**	**2014**	**2010**	**2014**
United Kingdom	324.272	741.272	26%	32%
Japan	224.171	360.823	40%	28%
Switzerland	161.595	331.037	16%	19%
Netherlands	151.977	194.669	34%	33%
Australia	74.436	169.918	42%	N/A
France	114.876	156.986	10%	12%
Germany	57.153	137.457	8%	11%
South Korea	1.255	59.021	24%	41%
Mexico	1.682	41.999	45%	30%
Belgium	19.253	34.096	6%	7%
Chile	12.558	27.447	30%	N/A
Italy	12.808	27.026	4%	4%
Colombia	4.116	11.133	69%	74%
Spain	6.126	9.642	11%	5%
Argentina	362	4.616	90%	93%
Portugal	2.382	3.373	14%	12%
Uruguay	1.731	2.116	28%	N/A
Costa Rica	512	721	87%	69%
Greece	1.066	506	9%	5%
Russia	193	464	21%	10%
Ecuador	255	368	N/A	N/A
Croatia	169	248	N/A	N/A
Honduras	54	74	N/A	N/A
Brazil	1.767	73	23%	40%
Ghana	10	13	N/A	N/A
Cameroon	3	11	N/A	N/A
Ivory Coast	4	3	N/A	N/A
Bosnia And Herzegovina	1	1	N/A	N/A
Total World Cup Countries	1.174.787	2.315.113		
Total All Countries	2.650.010	4.099.529		

[6] U.S. Bureau of Economic Analysis, Survey of Current Business (April 2014) - http://www.treasury.gov/resource-center/data-chart-center/tic/Pages/fpis.aspx

[7] Coordinated Portfolio Investment Survey (CPIS) data of the International Monetary Fund (IMF) - http://data.imf.org/?sk=B981B4E3-4E58-467E-9B90-9DE0C3367363

V. DATA

The returns employed on this analysis will be those of NYSE Composite Index, downloaded from Center for Research in Security Prices (CRSP) and the dates will be from January 1st of 1950 to December 31st of 2014. In total there will be 16,443 trading days, from those 255 are EED (Event Effect Days) and 315 are EPED (Event Effect Period Days). The returns considered below are based on an equally weighted portfolio. In Table 2, we present the summary statistics for every World Cup year, divided between the Full Year statistics and the EPED of that year.

As we can see on Panel B, 13 out of 17 World Cups years had a negative return and an annualized rate of return on the World Cup EPED below the rate of return corresponding to the full year (Panel A). The average return for all World Cup periods is -2.23%, whereas the average yearly return is 11.3%, over the same time period (1950-2014).

Table 2 - Summary Statistics

Table 2 presents the summary statistics of the sample, which extends from January 1950 until December 2014. There are 17 World Cups represented. It is divided in two panels: Panel A - Full Year, which compromises all trading days of every World Cup year, and Panel B - World Cup, which refers just to the contest period. Panel A has on average 254 trading days, whereas Panel B has on average 19 trading days. In order to compute the annualized return, the following formula was used: $Anualized\ Return_n = (1 + Return_n)^{(\frac{365}{Trading\ days})}$. The market return is the equally-weighted index return from CRSP. Standard deviation = $\sqrt{E((X-\mu)^2)}$, Skewness = $\frac{1}{\sigma^3}E((X-\mu)^3$, Kurtosis = $\frac{1}{\sigma^4}E((X-\mu)^4$ and Excess Kurtosis = $\frac{1}{\sigma^4}E((X-\mu)^4 - 3$ are computed for both panels.

	Panel A: Full Year					Panel B: World Cup					
Year	Return	St. Dev	Skewness	Kurtosis	Excess Kurtosis	Return	Return (annualized)	St. Dev	Skewness	Kurtosis	Excess Kurtosis
1950	27,76%	0,85%	-1,73	7,89	4,89	-10,94%	-94,04%	1,96%	-0,83	0,78	-2,22
1954	41,87%	0,46%	-0,33	2,07	-0,93	1,93%	71,20%	0,27%	1,36	0,70	-2,30
1958	44,39%	0,50%	-0,11	3,36	0,36	1,95%	55,49%	0,42%	-0,88	0,53	-2,47
1962	-13,50%	0,99%	-0,65	8,04	5,04	-1,92%	-42,00%	2,24%	0,65	0,75	-2,25
1966	-8,75%	0,76%	-0,71	1,65	-1,35	-4,02%	-63,20%	0,63%	-1,41	3,70	0,70
1970	-2,22%	1,08%	0,61	4,17	1,17	-0,54%	-11,63%	1,21%	0,31	-0,60	-3,60
1974	-28,99%	1,22%	0,57	1,21	-1,79	-14,78%	-96,78%	0,85%	-0,89	2,70	-0,30
1978	10,76%	0,83%	-0,31	5,85	2,85	-1,55%	-27,21%	0,66%	-0,17	-0,31	-3,31
1982	23,95%	0,88%	0,44	1,32	-1,68	-0,13%	-2,40%	0,65%	0,71	-0,09	-3,09
1986	12,66%	0,70%	-1,06	3,94	0,94	-0,08%	-1,47%	0,59%	-0,75	2,55	-0,45
1990	-16,43%	0,73%	-0,61	2,72	-0,28	-1,05%	-16,76%	0,42%	-0,83	0,37	-2,63
1994	-4,63%	0,50%	-0,43	3,30	0,30	-1,53%	-23,51%	0,51%	-0,80	0,57	-2,43
1998	-3,11%	0,93%	-0,74	3,29	0,29	-0,67%	-10,15%	0,67%	-0,52	0,78	-2,22
2002	-7,25%	1,08%	0,15	1,16	-1,84	-5,72%	-62,38%	0,79%	0,74	0,35	-2,65
2006	17,60%	0,68%	0,14	1,19	-1,81	1,31%	25,35%	1,09%	0,67	0,65	-2,35
2010	21,46%	1,22%	-0,21	2,17	-0,83	-0,94%	-15,08%	1,34%	-0,10	1,19	-1,81
2014	1,09%	0,71%	-0,36	1,14	-1,86	0,87%	15,51%	0,43%	-0,79	-0,54	-3,54

VI. METHODOLOGY

As a matter of coherence the methodology used will be the same as Kaplanski and Levy (2010). The null hypothesis is that the US stock market is efficient and therefore there are no abnormal profits. The alternative hypothesis is that the event coefficient is statistical significant. Regarding the null hypothesis, the methodology used was based on Kamstra et al. (2003) and Edmans et al. (2007) and then ran the following regression:

$$R_t = \gamma_0 + \sum_{i=1}^{2} \gamma_{1i} R_{t-i} + \sum_{i=1}^{4} \gamma_{2i} D_{it} + \gamma_3 H_t + \gamma_4 T_t + \gamma_5 P_t + \gamma_6 E_t + \sum_{i=1}^{2} \gamma_{7i} J_{it} + \varepsilon_t,$$

where R_t is the daily stock return, $\gamma_0$is the regression intercept coefficient, $R_{t-1}$and $R_{t-2}$are the first and second previous day returns, respectively, D_{it} , i = 1..4, are dummy variables for the day of the week: Monday, Tuesday, Wednesday, and Thursday, respectively[8], H_t is a dummy variable for days after a non-weekend holiday[9], T_t is a dummy variable for the first five days of the fiscal year[10], P_t is a dummy variable for the annual event period (June–July), E_t stands for the event days, and J_{it}, i = 1,2, are dummy variables for the 10 days with the highest (i = 1) and lowest (i = 2) returns during the studied period. The variable P_t is introduced in order to make sure the world cup returns are driven by the event rather than by the specific time of the year (june-july). Likewise, the dummy J_{it} controls for the 10 days with extreme returns (positive and negative).

In terms of the event days, two variables were considered:

a. EED (event effect days) is a game day that is also a trading day and the following day. This definition is based on Edmans et al. (2007) findings that the local effect occurs on the day after the game. I have decided to include the same day of the game as the NYSE was still open after some of the world cup games.
b. EPED (event period effect days) includes all competition days plus break days and two additional trading days. The first EPED is the day of the first game and the last is the day after the final game.

[8] Chang, Pinegar, and Ravichandran (1993) and Abraham and Ikenberry (1994)
[9] Kim and Park (1994)
[10] Dyl and Maberly (1992)

The model will be regressed twice, firstly with an Equally Weighted index from CRSP and secondly with a Value Weighted Index. It is assumed that returns' volatility is constant. However, according to past literature[11] returns have time-varying volatility. To address this issue, Kaplanski and Levy (2010) and Edmans et al. (2007) modelled the stock returns using the generalized autoregressive conditional heteroskedasticity GARCH (1,1). The results of the GARCH (1, 1) model didn't affect their conclusions; therefore, we decided to not include this analysis.

Additionally, we reproduced the following analyses in order to verify the existence of the arbitrage opportunity found by Kaplanski and Levy (2010):

1. Computed returns for the 2014th World Cup and compared them with those of that year.
2. Computed returns for all past World Cup competitions (2014th edition included), starting in 1950, and compare it with the returns of that year. The objective is to understand if the effect is related with the World Cup or if the year was exceptionally worse than the others.
3. Compared returns for World Cup years with non-World Cup years, to understand if the effect was driven by a worse than normal World Cup year or if it was directly related with the event. Computed returns for both and conducted a t-test. The null hypothesis that both returns are equal cannot be rejected with a *t*-value of -1.56[12]. We also regressed the World Cup (Table 10) years only and compared the results.
4. Since the competition takes place every June or July, we introduced this dummy variable on our regression model to understand if the effect was driven by the months or by the competition itself. We also compared the returns of World Cup years with non-World Cup ones for the month of June and July. The null hypothesis that both returns are equal cannot be rejected with a *t*-value of 1.9.

[11] French, Schwert and Stambaugh (1987) and Bollerslev, Engle and Nelson (1994)

[12] $t = \frac{\mu_1 - \mu_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$; $\mu_1 = Return\ on\ World\ Cup\ year;\ \mu_2 = Return\ on\ non - World\ Cup\ year$

VII. RESULTS

In the following section, we will present the regression results for all 17 past World Cups, composed by 16,442 trading days, 255 Event Effect Days (EED) and 315 Event Effect Period Days (EPED). Table 3 reports our main regression results. Panel A and B resume the results for EED, whereas C and D resume for EPED. All Panels present regressions on Value-Weighted index (VW) and on Equally-weighted index (EW). The main variable analyzed will be the World Cup days, which assumes the value of EED or EPED.

The main conclusions from our analysis are:

1. The coefficient of the variable World Cup days is negative for all regressions and with high levels of significance, confirming the results of Kaplanski and Levy (2010 and 2014).
2. Our results are robust for all tested variables. This includes the length under analysis (EED and EPED), the model (with and without serial correlation, day of the week, tax year and holiday variables), the index (value- and equal-weighted index) and the most extreme positive- and negative-return days.
3. June-July variable is insignificant, meaning the fact that the event occurs during this two months is irrelevant for the World Cup effect.

Table 3 - Main Regression results (1950-2014)

Table 3 reports the results of the following regression: $R_t = \gamma_0 + \sum_{i=1}^{2}\gamma_{1i}R_{t-i} + \sum_{i=1}^{4}\gamma_{2i}D_{it} + \gamma_3 H_t + \gamma_4 T_t + \gamma_5 P_t + \gamma_6 E_t + \sum_{i=1}^{2}\gamma_{7i}J_{it} + \varepsilon_t$, where R_t is the daily stock return, $\gamma_0$is the regression intercept coefficient, $R_{t-1}$and $R_{t-2}$are the first and second previous day returns, respectively, D_{it} , i = 1..4, are dummy variables for the day of the week: Monday, Tuesday, Wednesday, and Thursday, respectively, H_t is a dummy variable for days after a non-weekend holiday, T_t is a dummy variable for the first five days of the fiscal year, P_t is a dummy variable for the annual event period (June–July), E_t stands for the event days, and J_{it}, i = 1,2, are dummy variables for the 10 days with the highest (i = 1) and lowest (i = 2) returns during the studied period. The first line of each test reports the coefficients of the regression and the second line reports the *t*-values. *, ** and *** indicate a significance level of 10%, 5% and 1%, respectively.

Case	Gamma	R_{t-1}	R_{t-2}	Non weekend holidays	Monday	Tuesday	Wednesday	Thursday	1st 5 days of Tax	Jun-Jul	World Cup days	10 best days	10 worst days	R^2 F
Panel A - Event Effect Days (EED) - All Game Days														
VW														
1a - Base model (BM)	0,0008			0,0004	-0,0016	-0,0005	0,0000	-0,0004	0,0007	0,0000	-0,0018			0,005
	(5,11***)			(0,76)	(-7,07***)	(-2,01**)	(-0,16)	(-1,72*)	(1,45)	(-0,23)	(-2,99***)			9,883
2a - BM with serial correlation	0,0008	0,0668	-0,0373	0,0003	-0,0016	-0,0004	-0,0001	-0,0004	0,0007	0,0000	-0,0018			0,010
	(5,11***)	(8,58***)	(-4,78***)	(0,49)	(-7,23***)	(-1,64*)	(-0,36)	(-1,87*)	(1,35)	(-0,21)	(-3,01***)			17,100
3a - BM without control dummy variables	0,0004										-0,0019			0,001
	(4,98***)										(-3,29***)			10,851
EW														
1a - Base model (BM)	0,0014			0,0009	-0,0025	-0,0013	-0,0004	-0,0007	0,0000	-0,0002	-0,0016			0,011
	(9,41***)			(1,92*)	(-11,55***)	(-5,96***)	(-2,1**)	(-3,08***)	(0,09)	(-1,01)	(-2,87***)			22,050
2a - BM with serial correlation	0,0013	0,1526	-0,0112	0,0005	-0,0026	-0,0010	-0,0004	-0,0007	-0,0001	-0,0002	-0,0015			0,033
	(8,78***)	(19,57***)	(-1,44)	(0,98)	(-12,13***)	(-4,67***)	(-1,77*)	(-3,24***)	(-0,14)	(-0,81)	(-2,73***)			56,568
3a - BM without control dummy variables	0,0005										-0,0019			0,001
	(6,97***)										(-3,43***)			11,770
Panel B - EED + Extreme Days Dummy Variables														
VW														
1b - Base model (BM)	0,0008			0,0004	-0,0015	-0,0005	0,0000	-0,0003	0,0007	-0,0001	-0,0018	0,0738	-0,0443	0,102
	(5,27***)			(0,88)	(-6,74***)	(-2,33**)	(-0,14)	(-1,55)	(1,52)	(-0,49)	(-3,11***)	(26,92***)	(-32,29***)	185,592
2b - BM with serial correlation	0,0008	0,0648	-0,0106	0,0003	-0,0015	-0,0004	0,0000	-0,0004	0,0007	-0,0001	-0,0017	0,0744	-0,0438	0,106
	(5,14***)	(8,74***)	(-1,42)	(0,64)	(-6,88***)	(-1,96**)	(-0,19)	(-1,66*)	(1,39)	(-0,45)	(-3,07***)	(26,92***)	(-31,99***)	161,795
3b - BM without control dummy variables	0,0004										-0,0019	0,0736	-0,0446	0,098
	(5,38***)										(-3,48***)	(26,8***)	(-32,49***)	595,610
EW														
1b - Base model (BM)	0,0014			0,0010	-0,0024	-0,0013	-0,0004	-0,0006	0,0000	-0,0002	-0,0016	0,0791	-0,0445	0,125
	(9,85***)			(2,11**)	(-11,69***)	(-6,46***)	(-2,21**)	(-3***)	(0,08)	(-1,11)	(-3,06***)	(30,83***)	(-34,71***)	235,733
2b - BM with serial correlation	0,0013	0,1409	0,0168	0,0005	-0,0025	-0,0010	-0,0003	-0,0006	-0,0001	-0,0002	-0,0015	0,0813	-0,0431	0,146
	(9,06***)	(19,18***)	(2,28**)	(1,21)	(-12,3***)	(-5,28***)	(-1,66*)	(-3,07***)	(-0,16)	(-0,86)	(-2,87***)	(31,85***)	(-33,9***)	234,055
3b - BM without control dummy variables	0,0005										-0,0019	0,0789	-0,0449	0,116
	(7,52***)										(-3,66***)	(30,6***)	(-34,82***)	721,174

(continued)

Case	Gamma	R_{t-1}	R_{t-2}	Non weekend holidays	Monday	Tuesday	Wednesday	Thursday	1st 5 days of Tax	Jun-Jul	World Cup days	10 best days	10 worst days	R^2 F
Panel C - Event Effect Period Days (EPED) - All Game Days + 2 Days														
VW														
1a - Base model (BM)	0,0008			0,0004	-0,0016	-0,0005	0,0000	-0,0004	0,0008	0,0000	-0,0015			0,005
	(5,15***)			(0,75)	(-7,11***)	(-2,03**)	(-0,21)	(-1,76*)	(1,49)	(-0,2)	(-2,77***)			9,725
2a - BM with serial correlation	0,0008	0,0667	-0,0373	0,0003	-0,0016	-0,0004	-0,0001	-0,0004	0,0007	0,0000	-0,0015			0,010
	(5,15***)	(8,56***)	(-4,79***)	(0,49)	(-7,27***)	(-1,66*)	(-0,41)	(-1,9*)	(1,4)	(-0,18)	(-2,75***)			16,950
3a - BM without control dummy variables	0,0004										-0,0016			0,001
	(4,98***)										(-3,02***)			9,137
EW														
1a - Base model (BM)	0,0014			0,0009	-0,0025	-0,0013	-0,0005	-0,0007	0,0001	-0,0002	-0,0015			0,011
	(9,45***)			(1,92*)	(-11,59***)	(-5,98***)	(-2,15**)	(-3,12***)	(0,12)	(-0,89)	(-2,9***)			22,075
2a - BM with serial correlation	0,0013	0,1525	-0,0113	0,0005	-0,0026	-0,0010	-0,0004	-0,0007	0,0000	-0,0001	-0,0013			0,033
	(8,82***)	(19,55***)	(-1,45)	(0,97)	(-12,17***)	(-4,69***)	(-1,82*)	(-3,27***)	(-0,1)	(-0,74)	(-2,63***)			56,512
3a - BM without control dummy variables	0,0005										-0,0017			0,001
	(7,01***)										(-3,41***)			11,597
Panel D - EPED + Extreme Days Dummy Variables														
VW														
1b - Base model (BM)	0,0008			0,0004	-0,0015	-0,0005	0,0000	-0,0003	0,0008	-0,0001	-0,0015	0,0738	-0,0443	0,101
	(5,32***)			(0,87)	(-6,78***)	(-2,35**)	(-0,19)	(-1,59)	(1,57)	(-0,45)	(-2,87***)	(26,92***)	(-32,28***)	185,429
2b - BM with serial correlation	0,0008	0,0647	-0,0107	0,0003	-0,0015	-0,0004	-0,0001	-0,0004	0,0007	-0,0001	-0,0014	0,0744	-0,0438	0,106
	(5,18***)	(8,72***)	(-1,43)	(0,63)	(-6,92***)	(-1,98**)	(-0,24)	(-1,7*)	(1,43)	(-0,43)	(-2,78***)	(26,92***)	(-31,98***)	161,632
3b - BM without control dummy variables	0,0004										-0,0016	0,0736	-0,0446	0,098
	(5,38***)										(-3,2***)	(26,8***)	(-32,48***)	594,910
EW														
1b - Base model (BM)	0,0014			0,0010	-0,0024	-0,0013	-0,0004	-0,0006	0,0001	-0,0002	-0,0015	0,0791	-0,0445	0,125
	(9,89***)			(2,11**)	(-11,74***)	(-6,48***)	(-2,26**)	(-3,04***)	(0,12)	(-0,99)	(-3,09***)	(30,83***)	(-34,71***)	235,754
2b - BM with serial correlation	0,0013	0,1408	0,0167	0,0005	-0,0025	-0,0010	-0,0003	-0,0006	-0,0001	-0,0001	-0,0013	0,0813	-0,0431	0,146
	(9,1***)	(19,16***)	(2,27**)	(1,2)	(-12,34***)	(-5,3***)	(-1,71*)	(-3,11***)	(-0,13)	(-0,8)	(-2,74***)	(31,85***)	(-33,9***)	233,988
3b - BM without control dummy variables	0,0005										-0,0017	0,0789	-0,0449	0,116
	(7,55***)										(-3,64***)	(30,59***)	(-34,83***)	721,104

The next step taken was to analyze how a portfolio of $100 performed from the very first day of the 2014 FIFA World Cup until the end of the competition. As it can be seen on Figure 3, and against our hypothesis, the portfolio increased its value throughout the event ending with a value of $100.86 taking into consideration the equally-weighted index. The total return on equity during 2014 was 0.45%, which means our portfolio had an even better performance during the competition than it would have if held for the whole year.

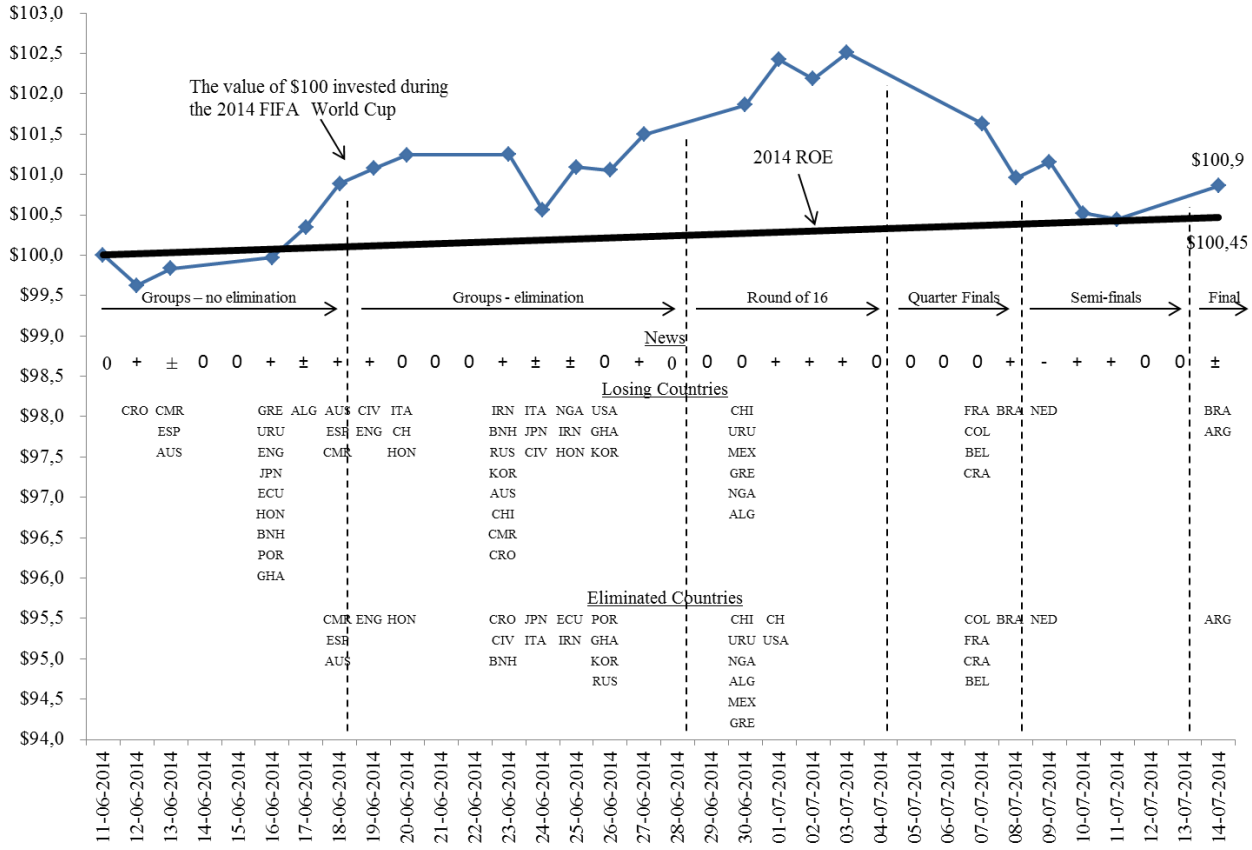
On Figure 3, we can also observe a scale of News, which aims to grade the economic news of that day. Classification is divided into: positive economic news (relative to consensus) represented by a "+" sign, negative economic news (relative to consensus) represented by a "–" sign, inconclusive economic news (if both positive and negative economic news come out) represented by a "±" sign and neutral economic news (if no relevant news are issued on that day) represented by 0. All news are described in detail on Table 7 and were retrieved from Bloomberg Economic Calendar, which reports the main economic and financial news of the day, as well as a consensus scale.

Moreover, two lines are presented: losing and eliminated countries. This information aims to understand how the stock market performed when certain teams lose or are eliminated. There are four interesting insights from this figure: (1) On June 16th, the U.S. national team defeated Ghana by 2-1, and from that same day stock market rallied until June 22nd; (2) On June 22nd, U.S. sealed a draw against Portugal and the value of our portfolio decreased; (3) On June 26th, U.S. loses against Germany, but advances to the next phase, which is seen as positive and the stock market increases until July 2nd; (4) U.S. is eliminated by Belgium on July 1st and from that time our portfolio depreciates. These findings are coherent with Edmans et al. (2007), where a strong link was found between football results and local equity market. Our hypothesis is that U.S. investors are starting to take a closer attention to football[13] and U.S. national team results are affecting the equity market, but this option will be explored further on this research.

[13] Commonly known as "soccer" in the U.S.

Figure 3 - Losing and Eliminated Countries

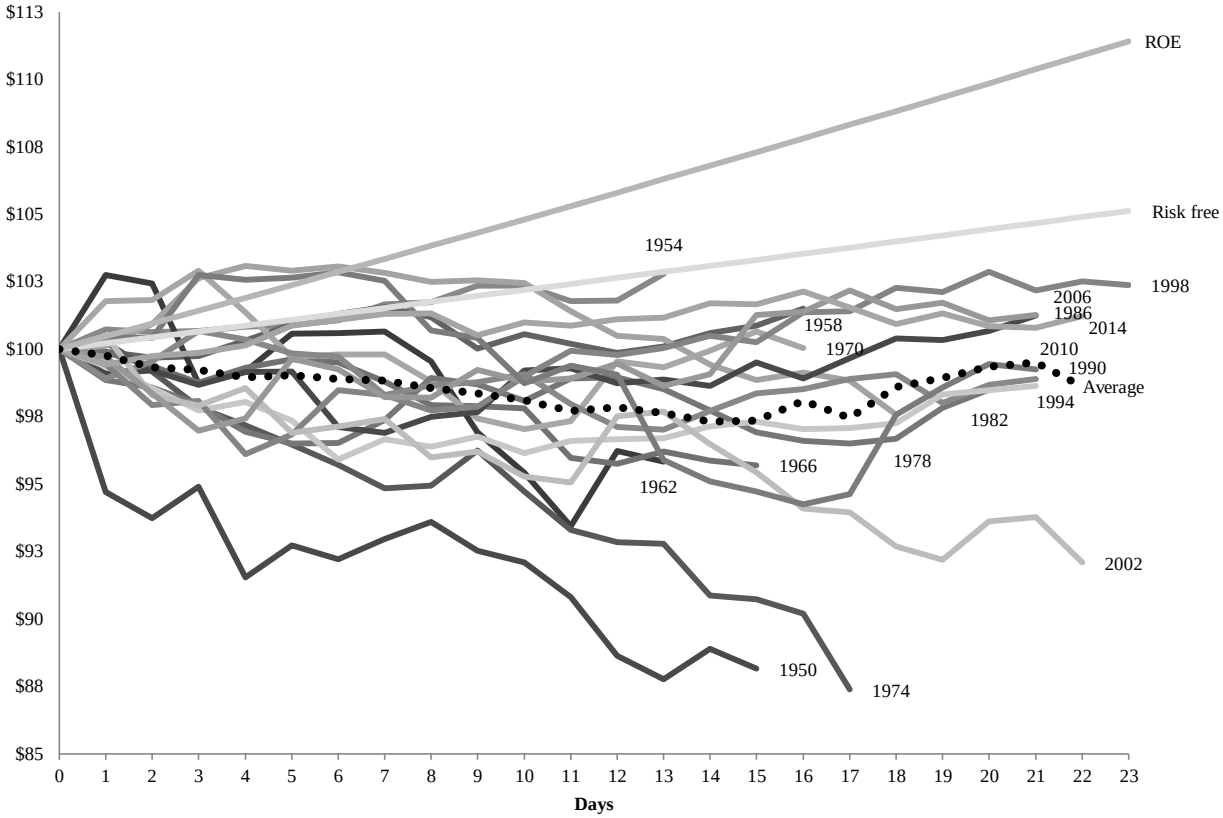
Figure 3 presents the value of $100 invested in the NYSE Index during the 2014 World Cup. The bold black line represents a hypothetical investment at the 2014 average return on equity of the whole year. The figure also presents the economic news divided by positive, negative, mixed and inconclusive (+, -, ± and 0, respectively). He second and third line represent the losing countries and the eliminated countries from one stage to the next one.



The next step of our analysis was to evaluate the performance of $100 invested in the NYSE Composite Index during the past World Cup Editions and see how they performed. There are 17 World Cup Editions represented and all of them have a performance below a hypothetical investment on a risk free asset or at the average rate of return on equity for the whole period (1950-2014). The 1974th FIFA World Cup Edition was the one where the value of $100 decreased the most. On the other side, the 1954th edition was the one where the market valued the most. On average, each World Cup has 19 days, being the longest the 1998th (23 days) and the shortest the 1954th and 1962nd edition (13 days).

Figure 4 - The value of $100 invested during all World Cups

Figure 4 presents the value of $100 invested in the NYSE Index during all past World Cups. The dotted line represents the average return. The two bold straight lines correspond to the hypothetical investment of $100 at the average rate of return on equity (1950-2014) and the risk free,[14] respectively.



In order to understand the possible effect of the disappointment of the fans during the World Cup and its influence on the stock market, we regressed on the returns of our portfolio two variables: (1) the accumulated percentage of population from the countries eliminated from the World Cup and (2) the accumulated percentage of investment in U.S. equity by countries eliminated from the World Cup.

Starting with the *NEWS* dummy variable, we concluded that they are insignificant, but we need to consider that only a small sample was tested. Surprisingly and contrarily to what Kaplanski and Levy (2014) found, the variable *DISAPPOINTMENT* is positively correlated with the returns of our portfolio with a high significance level. Our hypothesis is that this variable has lost strength compared to the last World Cup edition since it doesn't seem logical that the less popu-

[14] http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histretSP.html

lation and investment in the U.S. the better the performance, although it is highly significant. According to our results, the *FINALS* dummy variable had a negative correlation with our portfolio performance, which can be easily verified on Figure 5 This finding is according to our expectations, since neither the *NEWS* nor the *DISAPPOINTMENT* could explain this performance, and they were already included in the model. Taking into consideration the Durbin-Watson test, the series seems to be inconclusive regarding autocorrelation.

Table 4 - Stock Market Returns and Fans' disappointment

Table 4 reports the results of the following regression:

$$STOCK_T = \beta_0 + \beta_1 NEWS_T + \beta_2 DISAPPOINTMENT_T + \beta_3 FINALS_T + \beta_4 STOCK_{T-1} + \varepsilon_T,$$

where the variable $STOCK_t$ denotes the value in day t of $100 invested in the NYSE Composite Index during the 2014 World Cup; $NEWS_t$ is equal to −1, 0 or 1 depending on whether the economic news in day t was negative, inconclusive or positive, respectively; $DISAPPOINTMENT_t$ is one of the fans' disappointment variables: a) The accumulated percentage of the population corresponding to countries eliminated from the World Cup, which serves as a proxy for the potential number of disappointed fans; b) The accumulated percentage of investments in U.S. equities corresponding to countries eliminated from the World Cup, which serves as an indicator for the potential effect of the disappointed fans on the U.S. stock market; and $FINALS_t$ is a dummy variable corresponding to the Finals Period, which serves as a control variable to understand the decline during this period. The first line of each test reports the regression coefficients and the second line reports the corresponding standard errors' *t*-values (in brackets). * indicates a significance level of 5%. ** indicates a significance level of 1%.

Disappointment variable	Constant	News	Disappointment	Finals	Stock $_{-1}$	R^2	DW
Potential number of disappointed fans	41,60	-0,10	0,99	-0,73	0,59	0,74	2,81
	(2,49*)	(-0,67)	(2,25*)	(-2,39*)	(3,52**)		
Eliminated countries' foreign direct investment in the U.S.	58,47	0,03	1,27	-0,61	0,42	0,74	2,84
	(2,75**)	(0,16)	(2,34*)	(-2,31*)	(1,95)		

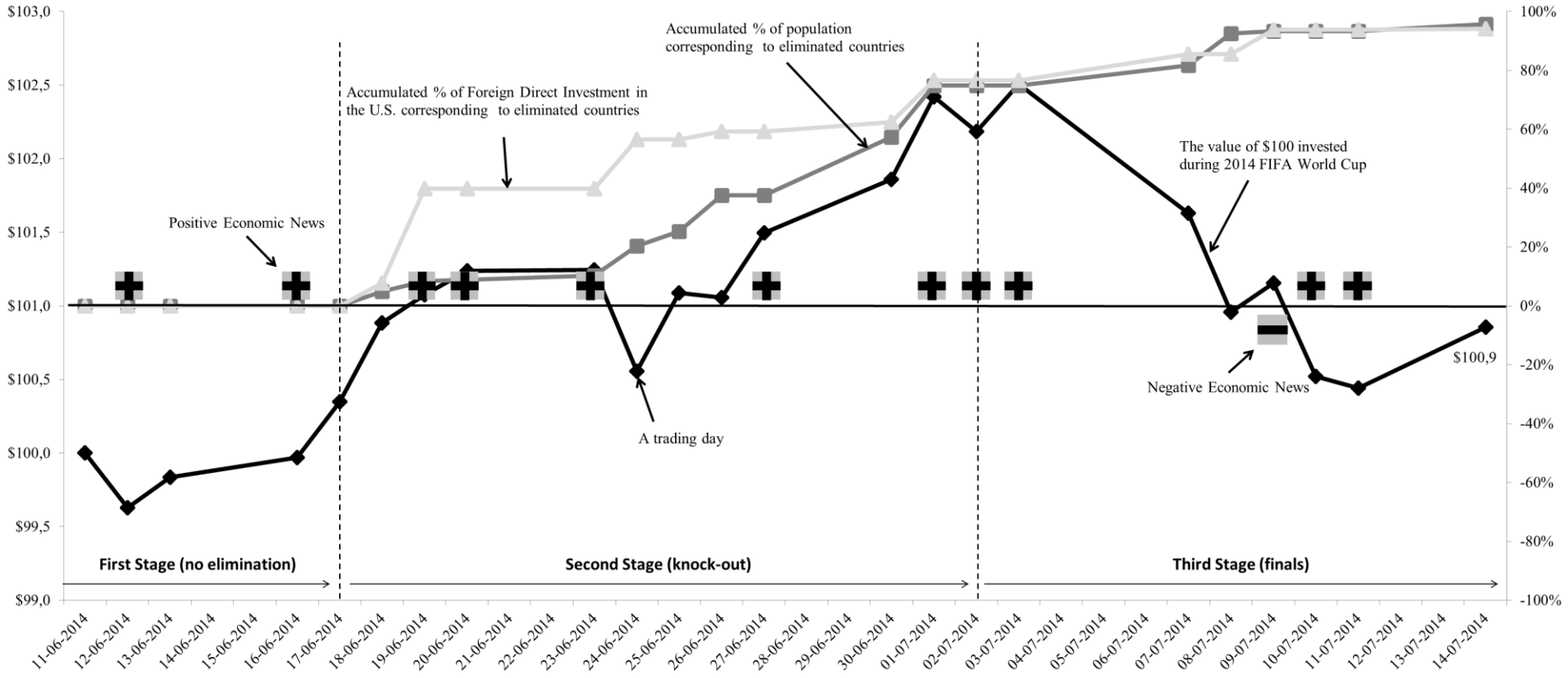
During the first stage, the negative sentiment was relatively small, since teams were not eliminated and even those who lost still had a chance to proceed to the next phase. Thus, the increase in price can be attributed to the positive economic news released on June 12th and on June 16th. On the first part of the second stage, market prices remained stable, which was not coherent with the positive economic news and with the increased percentage of foreign direct investment in U.S. corresponding to eliminated countries. However, on June 26th, the price dipped, which can only be explained by an abrupt increase on the accumulated percentage of population and foreign direct investment by eliminated countries. From then on the value of our portfolio increased steadily until the beginning of the third stage. An alternative explanation for the sharp increase at the beginning is the fact that sophisticated investors, who did not enjoy the full potential of the anomaly in 2010, bought stocks earlier which increased the market prices. During the final phase, a consistent depression on the value of our portfolio can be seen potentially motivat-

ed by the negative sentiment. However, the positive economic news released during this period contradicts this movement. Finally, the inflection observed on July 11th of 2014 was very similar to the one of 2010, which we argue was caused by investors' expectation in a market rebound driving prices up.

As we can observe on Figure 5, during the 2014th FIFA World Cup the disappointment variables were positively correlated with the performance of the stock market, which contradicts the negative sentiment effect defended by Edmans et al. (2007) and further confirmed by Kaplanski and Levy (2010 and 2014). During the first and second stages of the event, the portfolio appreciated, on average, whereas during the final stage it depressed.

Figure 5 - The U.S. Stock Market vs. Disappointed Fans

Figure 5 juxtaposes the value of $100 invested in the NYSE Composite Index on the accumulated percentage of foreign direct investment in the U.S. corresponding to eliminated countries and the accumulated percentage of population corresponding to eliminated countries. It also presents the positive and negative relevant economic news.



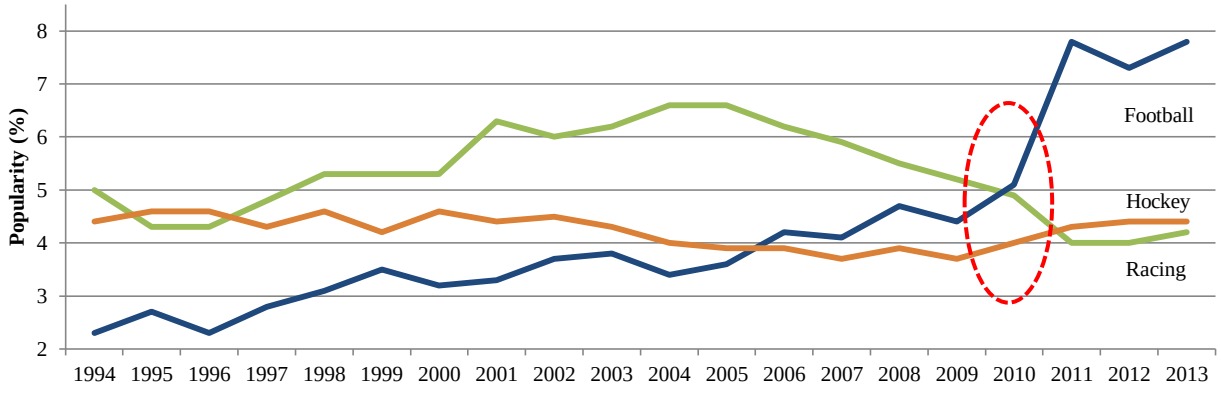
Contrarily to past World Cup editions, the return of an equally-weighted portfolio on the NYSE Composite Index during the 2014th edition was positive and above the stock market return of that year. Thus, the World Cup effect Kaplanski and Levy discovered in 2010 may have vanished. We propose two hypotheses for such disappearance:

1) Football popularity growth and US national team results

American football has been always the most popular sport in the U.S., seconded by basketball and baseball. These three sports account for 62% of all mentions and therefore take the lead. Historically, the "battle" between Racing, Hockey and Football has been tight, with Racing being the fourth, Football the fifth and Hockey the sixth. However, since the last World Cup in 2010 this trend has changed considerably and U.S. has now more "Soccer" fans than any time in the last 20 years, as it can be seen on Figure 6. Despite it only got about 8% of the choices, preference is worth as much as Hockey and Racing together and therefore its influence on financial markets might be much higher than it was during the last World Cups.

Figure 6 - Football Popularity in the US[15]

Figure 6 reports the evolution of popularity among Football, Hockey and Racing from 1994 until 2013. The red dotted circle indicates the moment when football surpassed Hockey in popularity.



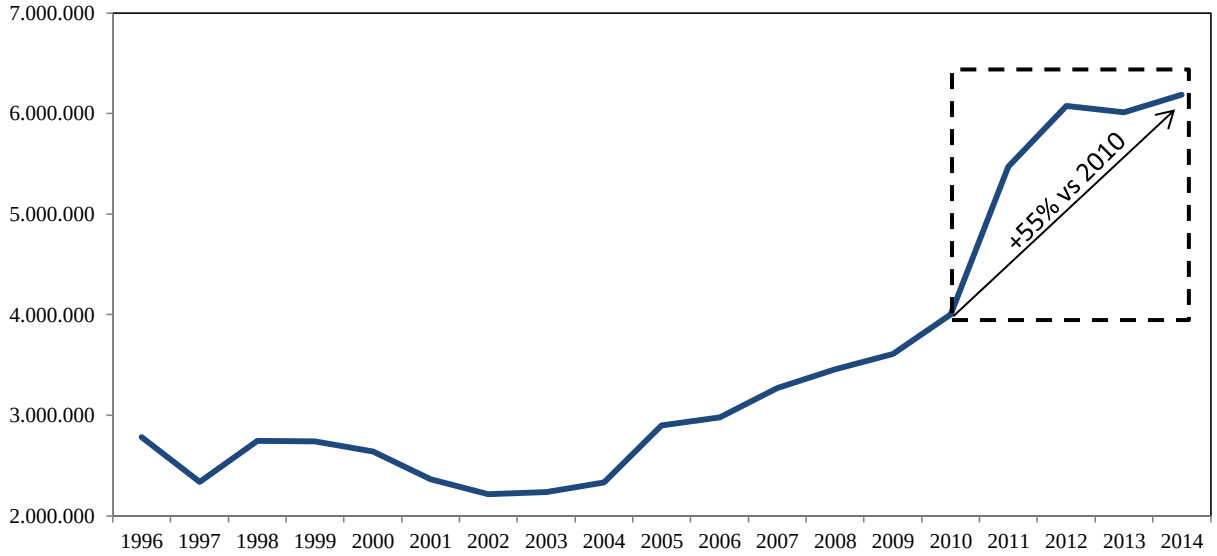
In order to prove this increasing popularity, we also investigated the Major League Soccer (MLS) attendance, as it is a decent proxy for the interest in Football. On Figure 7, we can observe that from 1996 until 2002, the number of football supporters remained relatively stable

[15] http://www.sportsbusinessdaily.com/Journal/Issues/2014/01/06/Research-and-Ratings/Up-Next.aspx - accessed on April 29th

at an average of 2.5m. However, since 2002 this number increased considerably reaching the 4m annually spectators. From 2010 onwards, the MLS attendance increased 55% to more than 6m annual spectators, which corresponds to an increase of 100% vs. 2002. An important contributor to this statistic was the arrival of many renowned players such as David Beckham (2007), Thierry Henry (2010) and Kaká (2014).

Figure 7 - Historical MLS Attendance

Figure 7 reports the evolution of the MLS attendance from 1996 until 2014.



According to our research, returns are positively correlated with football *Results* after the 2010th FIFA World Cup, which means there might exist a link between victories and positive market returns and therefore football results are starting to have an influence on the U.S. equity market. On the other side, before the 2010th World Cup, our results were mixed, hence no conclusion can be drawn. It is important to mention that the *Results* coefficients were not significant. We could also observe that the *GameDay* variable had a negative coefficient, which means every time the U.S. National team played the stock market returns were negative. This result was highly significant and would require further research.

[16] http://www.socceroverthere.com/?page_id=11524
[17] The reference point of a football fans is that their team will win (also known as fans' "allegiance bias") and therefore a draw would be a negative result.

Table 5 – Regression of Stock market returns on U.S. Results

Table 5 reports the regression results of the following regression:

$$STOCK_T = \beta_0 + \beta_1 GameDay_T + \beta_2 Results_T + \varepsilon_T,$$

where *GameDay* corresponds to a game trading day and the following day, *Results* corresponds to 1 if the U.S. national football team won, -1 if lost or drew and 0 otherwise. It aims to measure the influence of football on financial markets before and after the 2010th World Cup. There were taken into account 16,443 trading days, from January 1950 to December 2014. The period before the 2010th FIFA World Cup ranges from January 1950 to September 2010 and comprehends 15,379 trading days of which 584 are EED. The period after the 2010th FIFA World Cup ranges from October 2010 to December 2014 and comprehends 1,063 trading days of which 100 are EED. The total number of games analyzed was 597, divided into 5 competitions (World Cup, Gold Cup, Copa America, Confederations Cup and Olympics). The first line of each model reports the regression coefficients and the second line reports the corresponding *t*-values (in brackets).*** indicates a significance level of 1%.

Influence of football before and after World Cup 2010	Constant	GameDay	Results
Before the 2010th World Cup			
1a. Base Model	0,0005	-0,0011	-0,0001
	(6,98***)	(-2,86***)	(-0,17)
2a. Base model without EED	0,0005		0,0002
	(6,56***)		(0,54)
After the 2010th World Cup			
1b. Base Model	0,0003	0,0004	0,0001
	(1,06)	(0,36)	(0,14)
2b. Base model without EED	0,0004		0,0002
	(1,23)		(0,16)

On Table 6, we compare the average returns after an U.S. football team game before and after the 2010th World Cup. Before the 2010th World Cup, results were mixed, with negative average returns after a victory, positive after a draw and negative after a defeat. On the other hand, after the 2010th World Cup, the average returns are positive after a victory, mixed after a draw and negative after a defeat.

Although our sample is relatively small and the majority of our returns are not statistically different from zero, the results of the U.S. football team are starting to influence the American equity market. This conclusion proves the negative sentiment Edmans et al. (2007) defended, where losses have a negative effect on local markets.

Table 6 – Average Stock Market Returns and U.S. Results

Table 6 reports the average returns of the NYSE Composite Index equally-weighted on the day and one day after all games played by the U.S. national football team. There were taken into account 16,443 trading days, from January 1950 to December 2014. The period before the 2010th FIFA World Cup ranges from January 1950 to September. The period after the 2010th FIFA World Cup ranges from October 2010 to December. The total number of games analyzed was 597 (253 W, 125 D, 219 L), divided into 5 competitions (World Cup, Gold Cup, Copa America, Confederations Cup and Olympics). * indicates that the average return is significantly different from 0 with a confidence level of 90%.

	W	W_{t+1}	W_{agg}	D	D_{t+1}	D_{agg}	L	L_{t+1}	L_{agg}
Before the 2010th World Cup									
Return	-0,07%	-0,05%	-0,06%	0,03%	0,01%	0,02%	-0,11%	-0,07%	-0,09%
Standard deviation	1,19%	1,09%	1,13%	0,60%	0,47%	0,52%	1,19%	0,90%	1,03%
N	89	137	226	47	63	110	106	143	249
After the 2010th World Cup									
Return	0,24%*	0,02%	0,13%	-0,35%	0,28%	-0,03%	-0,10%	-0,06%	-0,08%
Standard deviation	0,66%	0,72%	0,69%	1,38%	1,55%	1,46%	1,08%	0,49%	0,88%
N	27	26	53	10	10	20	16	11	27

2) Published articles with arbitrage opportunities reduce considerably the returns of those free lunches

Our second hypothesis is the one defended on McLean and Pontiff (2014) research, where returns on market anomalies tend to decrease around 35% after they are published. The authors attribute this change to sophisticated investors who put in practice the researchers' work and to statistical biases. According to their results, the hypothesis that return-predictability does not change after the publication is rejected as well as that alpha post-publication does not exist.

It is reasonable to assume that sophisticated investors have taken advantage of this anomaly, making the free lunch disappear. Two facts support this argument:

1. Not only the discovery of the effect drew a lot of professional investors' attention, but also the publication of an investment strategy[18] just before the 2010th FIFA World Cup. Therefore even less sophisticated investors could exploit the effect:

"The obvious way of exploiting the tendency of the US stock market to perform poorly during the month-long FIFA World Cup is to short sell the S&P 500 index shortly before the tournament starts on Friday 11 June and close this position after the final game has been played on Sunday 11 July. The easiest

[18] Thomson, S. (2010). *Investors Chronicle* - http://www.investorschronicle.co.uk/2011/09/08/your-money/a-world-cup-winner-27YltDzO0mSTTuoNFjj0cI/article.html

way of executing this trade to try to profit from the average 2.58 per cent fall in the S&P 500 during the tournament is through spread betting, whereby investors place a down bet for every point movement in the S&P 500. Although the index is denominated in dollars, there is no foreign currency risk as the down bet can be placed in sterling for every point movement in the index. Profits from spread betting are currently tax-free in the UK. In the UK, spread betting firms include IG Index, City Index, Capital Spreads, Cantor Index and CMC Markets. Alternatively, both Société Générale and Royal Bank of Scotland have issued several covered put warrants on the index. The one that fits our trading time frame best is SB07 which has an expiry date of 17 December 2010, exercise price of 1300 and parity of1000:1. With the S&P 500 trading at 1158 and the sterling dollar exchange rate £1:$1.50 these put warrants are priced at 144p.This means that around 66 per cent of the warrant premium is 'in-the-money' and the rest is 'out-of-the-money'. Assuming that the implied volatility of the warrants remains constant then they are effectively geared 4 times to movements in the underlying index so a 2.58 per cent fall in the index over the course of the World Cup would generate a 10 per cent profit. By the same token, a 2.58 percent rise in the index would lead to a 10 per cent loss."

2. Kaplanski and Levy (2014) observed a rebound during the Finals period, which according to their hypothesis was driven by sophisticated professional investors that took advantage of the elimination period, where the negative sentiment effect was at its highest.

VIII. CONCLUSIONS

Motivated by the influence of sports results on stock market returns, firstly described by Edmans et al. (2007) and later explored by Kaplanski and Levy (2010 and 2014), this paper investigates the World Cup effect during the 2014th edition. A financial anomaly, where the average rate of return of all past World Cups is -2.23% compared to +11.30% of all years' average returns over the same period length.

We found that during the latest edition the returns were positive and therefore the anomaly disappeared. Kaplanski and Levy (2010) tested the anomaly on the U.S. equity market based on the international aggregate effect and not on the results. However, the influence of U.S. football team results on the local stock market has increased exponentially since 2010. Therefore, we attribute the disappearance of the effect to (1) the increased popularity of football in the United States and to (2) the publication of the articles exposing such anomaly.

These findings have important implications for all players involved in the behavioral finance field. For investors, they now know the World Cup effect disappeared and no further free lunches will be taken. Therefore, investors will focus their investments on other strategies. Nevertheless, it opened a potential arbitrage opportunity, where the U.S. national football team results might be positively related with market returns, however further research is needed to confirm this trend. For academics, it filled the gap left by Kaplanski and Levy (2010) by uncovering the disappearance of the anomaly. It also complemented current literature by discovering the potential factors which led to the arbitrage opportunity departure and launched further research on potential market anomalies.

We suggest further investigation on the influence of U.S. national football team results on the stock market returns. Our research presented a positive correlation between returns and victories as well as a positive and significantly different from zero return on a victory of the national team. However, due to limited data our results didn't show the statistically robustness needed to confirm our expectations.

IX. APPENDIX

Table 7 - News from Bloomberg Economic Calendar

Dates	Summary	Positive	Negative	Inconclusive	Overall Assessment
12-06-2014	Prior economic strength helped take the edge off both retail sales and jobless claims. Respectable growth underway in the jobs market.	Jobless claims, Retail Sales, Import and Export Prices			+
13-06-2014	Economic news includes a steady mid-month reading on consumer sentiment.	Decrease on PPI-FD monthly of 0,2%	CPI disappointed		±
16-06-2014	The factory sector is adding solidly to second-quarter growth. The status of the housing sector is uncertain, evidenced by today's housing market report which came in better-than-expected but still slightly in the contractionary zone.	Industrial Production rose, Housing Market Index			+
17-06-2014	Deep declines for housing starts & permits and a sudden lurch higher for consumer prices where year-on-year rates are now just above or near the key 2.0 percent zone.	CPI had a small increase	Disappointing Housing Starts		±
18-06-2014	Soft job growth is the chief concern at the FOMC which otherwise sees strength ahead for the economy, especially coming out of the weather-related dip in the first quarter.	Federal Open Market Committee (FOMC) News - taper remains			+
19-06-2014	Continuing declines for jobless claims and impressive strength throughout the Philly Fed manufacturing report. The index of leading economic indicators is also solid though held back by a key area of weakness in the economy -- housing permits.	Jobless claims decline, Strong Philadelphia Fed's Business Outlook Survey report			+
20-06-2014	Economic news is mostly positive and the Fed is described as dovish.				0
23-06-2014	The factory sector is as strong as ever, while housing appears to be showing some life of its own, at least based on today's very positive existing home sales report.	Very positive Home sales report and PMI Manufacturing index			+
24-06-2014	Surge in new home sales and a gain for consumer confidence. Demand for the safety of Treasuries rose with the 10-year yield down 4 basis points to 2.58 percent.	New Home sales positive, Consumer Confidence increased	Iraq airstrikes, S&P Case-Shiller HPI downward from trend		±
25-06-2014	GDP was revised sharply lower in the first quarter, to an ominous looking minus 2.9 percent. Durable goods orders also show contraction in data for May, And outside of this report, other data from the manufacturing sector have been strong.	Manufacturing sector keeps strong	Weaker durables orders than expected for May. Real GDP surprised on the downside		±
26-06-2014	Continuing favorable indications from jobless claims. Personal income showed solid gains but personal outlays were soft.	Jobless claims		Personal income and outlays	0
27-06-2014	The day's only economic news was a mostly upbeat consumer sentiment report that points to specific strength for June.	Consumer Sentiment			+

Dates	Summary	Positive	Negative	Inconclusive	Overall Assessment
30-06-2014	Home sales appear to be heating up fast. Last week's reports on new home sales and existing home sales were very encouraging, followed today by a very strong rise in pending home sales.	Pending Home Sales Index, Dallas Fed Mfg Survey	Chicago PMI		0
01-07-2014	Strong acceleration in new orders headlined solid manufacturing reports. Looking at construction, spending slowed in May but April was revised sharply higher. Auto sales are now back at the height of the last economic expansion back in 2006.	Strong Manufacturing reports (PMI Manufacturing Index). Auto Sales are up	Construction Spending	ISM Mfg Index	+
02-07-2014	Janet Yellen's speech was on the theoretically side, focusing on long-term risks to monetary policy, not short-term ones. Factory orders were on the weak side. Surge in ADP's employment count.	Positive ADP's employment count	Factory orders		+
03-07-2014	June's employment report easily beat expectations. Trade data showing a rise in exports, and the ISM non-manufacturing report showing impressive acceleration in new orders.	Employment report, low jobless claims, rise in exports, acceleration in new orders by the ISM non-manufacturing report			+
08-07-2014	Demand for labor is on the rise, confirmed by the JOLTS report.	Job openings, positive chain store reports and consumer credit			+
09-07-2014	FOMC minutes that confirm expectations for gradual tapering of asset purchases followed by the first rate hike sometime next year. Lack of alarm over the inflation outlook is another positive in the minutes.		Taper is on schedule and likely will end in October if the economy follows forecast		-
10-07-2014	Jobless claims data continue to signal solid strength for the labor market.	Jobless claims			+
11-07-2014	Treasury's deficit is coming down reflected in a $70.5 billion surplus for the month of June.	Treasury deficit is coming down			+
14-07-2014	Strong results from Citigroup. Money moved out of the safety of Treasuries where yields moved several basis points higher including a 3 basis point rise for the 10-year note to 2.55 percent.				±

Table 8 - Total Population of World Cup countries

Table 8 reports the World Cup participants and its respective population in 2013.

Countries	Population (m)
Algeria	39
Argentina	43
Australia	23
Belgium	11
Bosnia and Herzegovina	4
Brazil	200
Cameroon	22
Chile	18
Colombia	48
Costa Rica	5
Cote D`Ivoire	20
Croatia	4
Ecuador	16
France	66
Germany	81
Ghana	26
Greece	11
Honduras	8
Iran	77
Italy	60
Japan	127
South Korea	50
Mexico	122
Netherlands	17
Nigeria	174
Portugal	10
Russia	144
Spain	47
Switzerland	8
United Kingdom	64
Uruguay	3
USA	319
Total	**1.869**

Table 9 - Main regression results (1950-2006)

Table 9 reports the results of the following regression: $R_t = \gamma_0 + \sum_{i=1}^{2}\gamma_{1i}R_{t-i} + \sum_{i=1}^{4}\gamma_{2i}D_{it} + \gamma_3 H_t + \gamma_4 T_t + \gamma_5 P_t + \gamma_6 E_t + \sum_{i=1}^{2}\gamma_{7i}J_{it} + \varepsilon_t$, where R_t is the daily stock return, $\gamma_0$is the regression intercept coefficient, $R_{t-1}$and $R_{t-2}$are the first and second previous day returns, respectively, D_{it} , i = 1..4, are dummy variables for the day of the week: Monday, Tuesday, Wednesday, and Thursday, respectively, H_t is a dummy variable for days after a non-weekend holiday, T_t is a dummy variable for the first five days of the fiscal year, P_t is a dummy variable for the annual event period (June–July), E_t stands for the event days, and J_{it}, i = 1,2, are dummy variables for the 10 days with the highest (i = 1) and lowest (i = 2) returns during the studied period. The first line of each test reports the coefficients of the regression and the second line the *t*-value. *, ** and *** indicate a significance level of 10%, 5% and 1%, respectively.

Case	Gamma	R_{t-1}	R_{t-2}	Non week-end holidays	Monday	Tuesday	Wednesday	Thursday	1st 5 days of Tax	Jun-Jul	World Cup days	10 best days	10 worst days	R^2 F
Panel A - Event Effect Days (EED) - All Game Days														
VW														
1a - Base model (BM)	0,0009			0,0005	-0,0017	-0,0006	0,0000	-0,0004	0,0013	0,0000	-0,0021			0,007
	(5,58***)			(0,96)	(-7,74***)	(-2,85***)	(0,2)	(-1,88*)	(2,63***)	(-0,12)	(-3,66***)			13,164
2a - BM with serial correlation	0,0008	0,1346	-0,0447	0,0002	-0,0017	-0,0004	0,0000	-0,0005	0,0011	0,0000	-0,0021			0,026
	(5,45***)	(16,18***)	(-5,38***)	(0,42)	(-8,06***)	(-2,09**)	(0,04)	(-2,25**)	(2,35**)	(-0,05)	(-3,61***)			38,018
3a - BM without control dummy variables	0,0004										-0,0022			0,001
	(5,44***)										(-3,94***)			15,490
EW														
1a - Base model (BM)	0,0015			0,0011	-0,0026	-0,0015	-0,0004	-0,0006	0,0006	-0,0002	-0,0019			0,017
	(10,94***)			(2,4**)	(-13,43***)	(-7,84***)	(-2,01**)	(-3,42***)	(1,42)	(-1,02)	(-3,71***)			32,023
2a - BM with serial correlation	0,0013	0,2684	-0,0413	0,0002	-0,0027	-0,0010	-0,0002	-0,0007	0,0003	-0,0001	-0,0017			0,084
	(9,9***)	(32,26***)	(-4,97***)	(0,56)	(-14,77***)	(-5,25***)	(-1,26)	(-4,03***)	(0,83)	(-0,66)	(-3,45***)			132,734
3a - BM without control dummy variables	0,0005										-0,0021			0,001
	(8,11***)										(-4,29***)			18,435
Panel B - EED + Extreme Days Dummy Variables														
VW														
1b - Base model (BM)	0,0009			0,0005	-0,0015	-0,0006	0,0000	-0,0004	0,0013	-0,0001	-0,0021	0,0696	-0,0498	0,058
	(11,25***)			(2,48**)	(-13,34***)	(-8,06***)	(-2,35**)	(-3,51***)	(1,45)	(-1,09)	(-3,82***)	(15,72***)	(-23,75***)	89,132
2b - BM with serial correlation	0,0008	0,1264	-0,0364	0,0002	-0,0016	-0,0005	0,0000	-0,0005	0,0011	-0,0001	-0,0020	0,0658	-0,0490	0,074
	(10,11***)	(32,52***)	(-3,42***)	(0,64)	(-14,72***)	(-5,49***)	(-1,51)	(-4,06***)	(0,82)	(-0,7)	(-3,52***)	(17,25***)	(-23,16***)	96,283
3b - BM without control dummy variables	0,0004										-0,0022	0,0701	-0,0503	0,053
	(8,43***)										(-4,43***)	(15,71***)	(-23,88***)	269,686
EW														
1b - Base model (BM)	0,0015			0,0011	-0,0025	-0,0015	-0,0004	-0,0006	0,0006	-0,0002	-0,0019	0,0781	-0,0590	0,070
	(11,25***)			(2,48**)	(-13,34***)	(-8,06***)	(-2,35**)	(-3,51***)	(1,45)	(-1,09)	(-3,82***)	(15,72***)	(-23,75***)	108,190
2b - BM with serial correlation	0,0013	0,2632	-0,0279	0,0003	-0,0026	-0,0010	-0,0003	-0,0007	0,0003	-0,0001	-0,0017	0,0836	-0,0556	0,135
	(10,11***)	(32,52***)	(-3,42***)	(0,64)	(-14,72***)	(-5,49***)	(-1,51)	(-4,06***)	(0,82)	(-0,7)	(-3,52***)	(17,25***)	(-23,16***)	187,089
3b - BM without control dummy variables	0,0005										-0,0021	0,0786	-0,0597	0,055
	(8,43***)										(-4,43***)	(15,71***)	(-23,88***)	278,857

(continued)

Case	Gamma	R_{t-1}	R_{t-2}	Non week-end holi-days	Monday	Tuesday	Wednesday	Thursday	1st 5 days of Tax	Jun-Jul	World Cup days	10 best days	10 worst days	R^2 F
Panel C - Event Effect Period Days (EPED) - All Game Days + 2 Days														
VW														
1a - Base model (BM)	0,0009			0,0005	-0,0017	-0,0006	0,0000	-0,0004	0,0013	0,0000	-0,0018			0,007
	(5,63***)			(0,95)	(-7,79***)	(-2,87***)	(0,14)	(-1,93*)	(2,68***)	(-0,06)	(-3,4***)			12,940
2a - BM with serial correlation	0,0008	0,1344	-0,0448	0,0002	-0,0017	-0,0004	0,0000	-0,0005	0,0012	0,0000	-0,0017			0,026
	(5,5***)	(16,16***)	(-5,39***)	(0,41)	(-8,12***)	(-2,11**)	(-0,02)	(-2,3**)	(2,41**)	(-0,03)	(-3,24***)			37,762
3a - BM without control dummy variables	0,0004										-0,0018			0,001
	(5,44***)										(-3,6***)			12,975
EW														
1a - Base model (BM)	0,0015			0,0011	-0,0026	-0,0015	-0,0004	-0,0007	0,0006	-0,0001	-0,0017			0,017
	(10,99***)			(2,4**)	(-13,49***)	(-7,86***)	(-2,07**)	(-3,47***)	(1,47)	(-0,87)	(-3,75***)			32,055
2a - BM with serial correlation	0,0013	0,2682	-0,0414	0,0002	-0,0027	-0,0010	-0,0002	-0,0007	0,0004	-0,0001	-0,0014			0,084
	(9,95***)	(32,23***)	(-4,98***)	(0,56)	(-14,83***)	(-5,27***)	(-1,33)	(-4,08***)	(0,88)	(-0,61)	(-3,19***)			132,550
3a - BM without control dummy variables	0,0005										-0,0019			0,001
	(8,15***)										(-4,24***)			17,965
Panel D - EPED + Extreme Days Dummy Variables														
VW														
1b - Base model (BM)	0,0009			0,0005	-0,0015	-0,0006	0,0000	-0,0004	0,0013	-0,0001	-0,0018	0,0696	-0,0498	0,058
	(5,84***)			(0,98)	(-7,31***)	(-2,95***)	(-0,09)	(-1,98**)	(2,74***)	(-0,39)	(-3,44***)	(12,39***)	(-25,04***)	88,928
2b - BM with serial correlation	0,0008	0,1263	-0,0364	0,0002	-0,0016	-0,0005	0,0000	-0,0005	0,0012	-0,0001	-0,0017	0,0658	-0,0490	0,074
	(5,68***)	(15,56***)	(-4,44***)	(0,47)	(-7,62***)	(-2,21**)	(-0,19)	(-2,31**)	(2,46**)	(-0,35)	(-3,27***)	(11,65***)	(-24,83***)	96,045
3b - BM without control dummy variables	0,0004										-0,0018	0,0701	-0,0503	0,053
	(5,86***)										(-3,74***)	(12,44***)	(-25,25***)	268,756
EW														
1b - Base model (BM)	0,0015			0,0011	-0,0025	-0,0015	-0,0004	-0,0007	0,0006	-0,0002	-0,0017	0,0781	-0,0590	0,070
	(11,31***)			(2,47**)	(-13,4***)	(-8,08***)	(-2,42**)	(-3,57***)	(1,5)	(-0,93)	(-3,86***)	(15,72***)	(-23,75***)	108,218
2b - BM with serial correlation	0,0013	0,2630	-0,0280	0,0003	-0,0027	-0,0010	-0,0003	-0,0007	0,0004	-0,0001	-0,0014	0,0836	-0,0556	0,135
	(10,16***)	(32,49***)	(-3,43***)	(0,64)	(-14,78***)	(-5,51***)	(-1,57)	(-4,11***)	(0,88)	(-0,66)	(-3,26***)	(17,24***)	(-23,16***)	186,916
3b - BM without control dummy variables	0,0005										-0,0019	0,0786	-0,0597	0,055
	(8,48***)										(-4,37***)	(15,71***)	(-23,88***)	278,686

Table 10 - Robustness checks

Table 10 reports the results of the following regression: $R_t = \gamma_0 + \sum_{i=1}^{2}\gamma_{1i}R_{t-i} + \sum_{i=1}^{4}\gamma_{2i}D_{it} + \gamma_3 H_t + \gamma_4 T_t + \gamma_5 P_t + \gamma_6 E_t + \sum_{i=1}^{2}\gamma_{7i}J_{it} + \varepsilon_t$, where R_t is the daily stock return, $\gamma_0$is the regression intercept coefficient, $R_{t-1}$and $R_{t-2}$are the first and second previous day returns, respectively, D_{it} , i = 1..4, are dummy variables for the day of the week: Monday, Tuesday, Wednesday, and Thursday, respectively, H_t is a dummy variable for days after a non-weekend holiday, T_t is a dummy variable for the first five days of the fiscal year, P_t is a dummy variable for the annual event period (June–July), E_t stands for the event days, and J_{it}, i = 1,2, are dummy variables for the 10 days with the highest (i = 1) and lowest (i = 2) returns during the studied period. The regression period corresponding to the World Cup years only is composed by 17 World Cups (1950, 1954, 1958, 1962, 1966, 1970, 1974, 1978, 1982, 1986, 1990, 1994, 1998, 2002, 2006, 2010 and 2014), with 4,333 trading days and 315 EPED. The regression period corresponding to the June-July period includes 2,757 trading days and 313 EPED. The first line of each test reports the coefficients of the regression and the second line the *t*-value. *, ** and *** indicate a significance level of 10%, 5% and 1%, respectively.

Case	Gamma	R_{t-1}	R_{t-2}	Non weekend holidays	Monday	Tuesday	Wednesday	Thursday	1st 5 days	Jun-Jul	WC days	10 best days	10 worst days	R^2 F
Panel A - Outliers Sensivity														
Without the World Cup of 1950	0,0013	0,1419	0,0172	0,0005	-0,0024	-0,0010	-0,0003	-0,0006	-0,0001	-0,0001	-0,0011	0,0813	-0,0431	0,147
	(9,03***)	(19,3***)	(2,33**)	(1,19)	(-12,24***)	(-5,24***)	(-1,69*)	(-3,03***)	(-0,17)	(-0,79)	(-2,17**)	(31,94***)	(-33,98***)	234,809
Without the World Cup of 1974	0,0013	0,1403	0,0165	0,0006	-0,0025	-0,0010	-0,0003	-0,0006	0,0001	-0,0001	-0,0009	0,0813	-0,0431	0,146
	(9,09***)	(19,1***)	(2,24**)	(1,22)	(-12,32***)	(-5,32***)	(-1,72*)	(-3,11***)	(0,19)	(-0,82)	(-1,92*)	(31,86***)	(-33,92***)	233,319
Without the World Cup of 1950 and 1974	0,0013	0,1413	0,0169	0,0005	-0,0024	-0,0010	-0,0003	-0,0006	0,0001	-0,0001	-0,0007	0,0813	-0,0431	0,146
	(9,03***)	(19,23***)	(2,29**)	(1,21)	(-12,22***)	(-5,26***)	(-1,7*)	(-3,04***)	(0,18)	(-0,82)	(-1,31)	(31,94***)	(-34,00***)	234,227
Without the World Cup of 1974 and 2002	0,0013	0,1404	0,0169	0,0005	-0,0025	-0,0010	-0,0003	-0,0006	0,0001	-0,0001	-0,0008	0,0813	-0,0431	0,146
	(9,04***)	(19,1***)	(2,28**)	(1,21)	(-12,28***)	(-5,27***)	(-1,67*)	(-3,08***)	(0,19)	(-0,81)	(-1,62)	(31,86***)	(-33,92***)	233,144
Panel B - World Cup Years Only														
1b - Base model (BM)	0,0013			0,0005	-0,0025	-0,0015	0,0002	-0,0010	-0,0008	-0,0001	-0,0014			0,016
	(4,56***)			(0,47)	(-6,09***)	(-3,66***)	(0,4)	(-2,35**)	(-0,8)	(-0,29)	(-2,19**)			8,526
2b - BM with serial correlation	0,0004										-0,0016			0,002
	(2,81***)										(-3,14***)			9,831
3b - BM without control dummy variables	0,0013	0,2488	-0,0120	-0,0005	-0,0028	-0,0011	0,0002	-0,0013	-0,0007	-0,0001	-0,0012	0,0618		0,086
	(4,43***)	(16,4***)	(-0,79)	(-0,5)	(-6,86***)	(-2,83***)	(0,59)	(-3,15***)	(-0,76)	(-0,16)	(-1,89*)	(7,44***)		33,588
Panel C - June-July														
1c - Base model (BM)	0,0013			-0,0016	-0,0027	-0,0015	-0,0003	-0,0004			-0,0017			0,024
	(4,14***)			(-1,44)	(-6,07***)	(-3,27***)	(-0,58)	(-0,92)			(-3,76***)			11,166
2c - BM with serial correlation	0,0003										-0,0017			0,005
	(2,24**)										(-3,81***)			14,500
3c - BM without control dummy variables	0,0011	0,2209	-0,0039	-0,0019	-0,0028	-0,0009	0,0000	-0,0004			-0,0014			0,073
	(3,6***)	(11,7***)	(-0,21)	(-1,79*)	(-6,43***)	(-2,12**)	(-0,02)	(-1)			(-3,24***)			21,535

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