A Work Project, presented as part of the requirements for the Award of a Masters Degree in Finance from the NOVA – School of Business and Economics and a Professional Master in Finance from the São Paulo School of Economics.

BRAZIL'S 2014 PRESIDENTIAL ELECTIONS: THE INTERCONNECTION BETWEEN ELECTION NEWS AND STOCK MARKET BEHAVIOUR

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08-01-2016

Abstract

This study researches whether there has been abnormal stock market behaviour in Brazil as a consequence of election news (observed via opinion polls), regarding the last Brazilian presidential election, held in October 2014. Via applying event study methodology, the research on the Ibovespa and Petrobras suggests that events in which Rousseff was gaining in share have been subject to negative abnormal returns, and events where Rousseff was loosing in share have led to positive abnormal returns. Moreover, volatility has been significantly elevated during the election period and volume has been found to have slightly increased.

Political News in Finance, Event Study, 2014 Brazilian Elections, Abnormal Returns

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1 Introduction

"The Brazilian unit of *Banco Santander* has fired an analyst and other employees involved in the publication of a client note critical of President Dilma Rousseff's economic policies" (Jelmayer & Magalhaes, 2014).

This statement clearly highlights that there is a controversial point of intersection between the so-called political world and the financial sector. Within a newspaper article of the Wall Street Journal Jelmayer and Magalhaes (2014) state that the report in question, responsible for the expulsion of several employees, was concerned with a warning of wealthy clients to prepare for the outcome of the (back then) 'upcoming' Brazilian elections. It was stated that when the incumbent president Rousseff was re-elected the overall stock market might suffer. This notion is based on the fact that "Brazil's stock market has rallied repeatedly in recent weeks upon the release of a respected public-opinion poll showing Ms. Rousseff's lead slipping" (Jelmayer & Magalhaes, 2014: 1). The incident received public and political attention, cumulating in former President Lula da Silva's rather harsh statement: "This girl doesn't understand squat about Brazil […] they should fire her and give me her Bonus. There's no place in the world where Santander earns more money than in Brazil" (Margolis, 2014: 1)[1]. Santander apologised publicly to Rousseff and laid of the analysts in question; roughly one year later one of the fired analysts, Sinara Polycarpo, judicially obtained 450 R$[2] as an indemnity for moral damages (Globo G1, 2015). These events clearly highlight that the interplay between political and financial systems is

[1] The statement above is a translation of Lula's words, which published within a *Bloomberg View* article. The Brazilian news network Globo cited Lula's comment as follows: *"manter uma mulher dessa num cargo de chefia, sinceramente ...Pode mandar embora. E dá o bônus dela pra mim"* (G1 Globo, 2014: 1). However, the Brazilian financial news website *InfoMoney* differently quoted Lula's statement: *"essa moça não entende p***a nenhuma de Brasil e de governo Dilma"* (Salomão, 2014: 1).

[2] Equating 11,297 US$ or 10,395 € (as of December 19, 2015)

contentious, and to gain an academic perspective on the politically charged and opinionated issue, this paper aims for researching whether pre-election trends are impacting overall stock market behaviour. In this sense, the paper is concerned with answering the subsequent research question:

Have election trends, as observed via opinion polls, been impacting Brazilian market behaviour, in regard to IBovespa's returns, volatility and volume, and the returns of governmentally related stocks?

Within the following, it is investigated whether there is an impact existent, the null hypotheses of no impact (zero abnormal returns, abnormal volume and abnormal volatility) are tested. Furthermore, the two governmentally related stocks of *Petrobras* and *Vale* are tested for abnormal returns in relation to election news.

In hindsight it is observable that since the final presidential election (October 26, 2014) the Ibovespa has been following a downward trend. *See Figure 1 below*[3]*:*

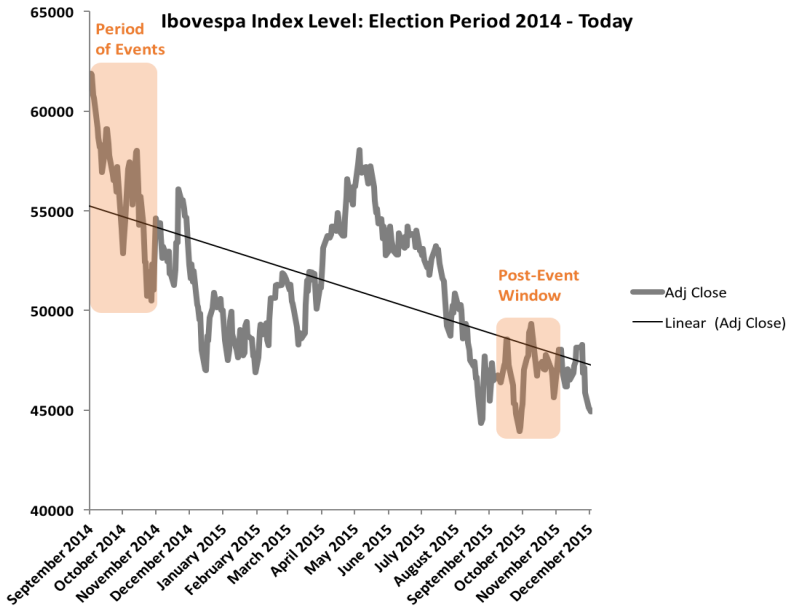

Figure 1: Index Level Ibovespa – September 2014 until December 2015

[3] The Post-Event Window in the graph above highlights the period of September-October 2015, exactly one year after the election period in 2014, to compare the overall Index decay that has been happening within the passage of the year.

In order to additionally validate the significance, the study introduces a robustness test of running the very same methodology that has been used for testing contingent abnormal returns within the Brazilian pre-election period on the Argentinian stock index *MERVAL*.

The following section is concerned with providing relevant background information regarding the theoretical frameworks of the subject; further it resumes pertinent background information and outlines the analytical framework and methodology of the study. Second, the analysis section deals with researching the actual impacts of market returns, volatility, volume, and governmentally related stocks in regard to election trends in Brazil. Finally, a concluding part is concerned with making sense of the findings and placing them in the wider context of political environment as well as running the 'placebo' study of Argentina's stock index.

2 Analytical Framework

2.1 Theoretical Notions and Literature Review

There are several theoretical notions and concepts to be found within academic literature, drawing upon different kinds of interplays between politics and financial concerns:

From a general perspective, there has been a mutual agreement within academia, that pre-election periods may result in abnormal, mostly positive returns. This is basically following the same logic of a company's stock price going up when the firm is facing major changes, such as a take-over or a merger, since this action is ideally promising change for the better; restructuring an entity that is obviously not working at

highest possible productivity, otherwise a merger/ acquisition was not necessary or possible. Based on this idea, upcoming elections in a democratic setting bring along the spirit of change, that is hopefully for the better as well, or at least for matching the people's ideas with governmental composition.

In this regard, the results of Allvine and O'Neill (1980) show that there is a positive correlation between presidential election cycles and stock market behaviour. Their study is concerned with the United State's election cycle; they found an upward trend over a two-year period prior to presidential elections. This was confirmed by studies of Johnson et al. (1999), who found that within the second part of the presidency stock returns were significantly higher, implying that that stock market trends are somehow following election cycles. Panzalis et al. (2000) confirmed these results on an international level. They also found positive abnormal returns when election week has been approaching.

There are several differing theories that are dealing with explaining the relationship of a country's stock market behaviour and its correlation to political news in general, as well as to elections: In that sense, the model of the political business cycle was developed by Nordhaus in 1975; which is explaining the manipulating influence of political parties in order to attempt wining re-elections. Further, Hibbs (1977) proposed the so-called partisan theory which draws on the differing stresses of labour versus business oriented parties.

Within the framework of behavioural finance the notion of voters' sentiments plays a crucial role, since it may influence market behaviour in terms of investors' dealing with uncertainty (*see* Statmann, 1999). Here it becomes, necessary to briefly draw upon the market's absorption of news in general: What is known in academia as

the *Efficient Market Hypothesis* (EMH), may simplified be described as a market environment in which (stock-) prices fully reflect all available information. Fama (1965) was the first to mention the concept and in 1970 Fama classified three distinct forms of market efficiency, a weak, a semi-strong, and a strong form of market efficiency, dependent on the market's level of information accessibility and spread. In that sense, the possibility of abnormal returns may be misleadingly interpreted as a violation of the efficient market hypothesis: However, since election periods are greatly defined by uncertainty, which is reflected in possibly huge price movements. 'Abnormal' returns that might be observed after the release of election related news, such as opinion polls, are rather a confirmation of the EMH's concept of prices (and price-movements) reflecting the overall market sentiment, as fostered by the available information. The velocity of the market's intake of the news then defines the level of market efficiency[4].

Also related to the subject of political and financial interaction, Goldman, Rocholl and So (2009), show political connection, as in companies with politically linked boards have a compelling impact on the value of these companies[5].

Medeiros & Roriz (2014) have been looking into the equity risk premium by means of the 2004 US Presidential Election: They found that stocks which are highly exposed to the market tend to suffer in periods of political uncertainty and that equity prices possibly reflect uncertainty linked to elections.

Moreover, Bialkowski, Gottschalk and Wisniewski (2008) have been looking at stock market volatility during periods of elections, studying 27 countries: They found

[4] Additionally, it should be mentioned that defining the actual level of Market Efficiency in the real world is not an easy task, since markets are opaque entities. Nevertheless, there is overall agreement that emerging markets such as the Brazilian market are rather defined by a week or semi-strong form of efficiency.

[5] Goldman, Rocholl and So's 2009 study focuses on firms within the US.

that stock market volatility is indeed substantially increased during periods of national elections. Using a volatility event study within the framework of a GARCH (1,1) volatility model, they examined 134 elections, and found that "a strong abnormal rise starts on Election Day" (Bialkowski et al, 2008: 1947), whereas the market starts to settle down "after around 15 trading days following the event" (ibid). Additionally, the research drew on the determinants of excess volatility, the authors found, the margin of victory, as in the closeness of the opponents, to be a significant determining factor. Further, "a change in political orientation of the executive also adds to volatility of stock prices" (ibid)[6]. Drawing upon the compensation of investors taking political risk while holding stock during election periods, they did not find positive abnormal returns: "down and upwards moves occur with almost equal probability" (Bialkowski et al, 2008: 1949).

Bringing the gathered information together leads to somewhat confusing results: on a macro level, financial election cycles with market uplifts around election periods occur (Allvine and O'Neill (1980); Johnson et al. (1999); Panzalis et al. (2000)); however, on a micro level, when looking specifically into small event windows around election day Bialkowski, Gottschalk and Wisniewski (2008) did not find potential for positive abnormal returns on an international level.

Building upon the knowledge studies such as Bialkowski, Gottschalk and Wisniewski's provided, this study researches the possible impact of the 2014 Brazilian Presidential Elections on overall market behaviour, in depth. Due to the vigorous empirical nature of the research, the data has been analysed by utilising the widely used concept of abnormal returns in an event study context. The following section is

[6] Further significant determinants: minority governments and short history of trading (age of stock exchange), (*see* Bialkowski, Gottschalk & Wisniewski, 2008).

concerned with providing theoretical insights into the event study methodology as an underlying concept.

2.2 Analytical Framework: Event Studies

Event studies have been widely used within financial research, to investigate investors' responses to specific events. Mostly, Event study methodology is used to examine the impact of firm specific events such as the issuance of new debt or the announcements of earnings. However, it has also been utilised to investigate the impact of events concerning overall economic condition[7]. During periods of events new information is processed by the markets which conceivably leads to abnormal returns, (*see* Liu, 2007).

MacKinlay (1997) suggests key steps to follow, to successfully conduct an event study: First, the Event has to be defined:

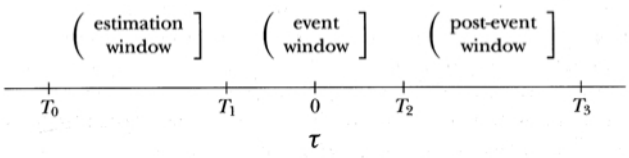

Figure 2: Timeline of an Event Study (*see* MacKinlay, 1997: 20)

Here, the estimation window is the basis of the calculation of a series' expected values. The event window is the actual period of concern where the possibly abnormal returns may have occurred. The post-event window is considered when it is of interested what happened to the prices after the actual event[8].

[7] For instance, change in legislation or the impact of elections.
[8] Mostly, from a longer term perspective.

Next, the expected or *normal* values (i.e. returns) of a series are calculated based on data from the estimation window. Here, differing approaches are available, dependent on which type of series is under observation. The most common approach to estimate a series of expected returns is based on the Market Model: Which is an ordinary least square approach of regressing a series of expected returns, by means of an intercept estimation (α_i); a market-based beta estimate (β_i), which describes the firm's relationship to overall market-movements; the actual returns of the market $(R_{m,t})$; as well as an error term $(\varepsilon_{i,t})$[9].

$$E(R_{i,t}) = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}, \qquad \varepsilon_{i,t} \sim N(0, \sigma_{i,t})$$

After defining the expected returns for a specific period, the abnormal returns have to be calculated: Following logical reasoning, abnormal returns within a certain period can be defined as the difference between actual (observed) returns minus the expected returns (Serra, 2002)[10].

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

Further, the measure of cumulative abnormal returns (CAR) provides the cumulative sum of observed abnormal returns over the event period. The fact that during the period under consideration in this study, right before the election, polls have been release on an almost daily basis, which makes it difficult to calculate CARs. Most of the event periods in use have a length of only one day, to avoid interference of differing events

[9] This can be classified as a regression based approach according to Cable and Holland's study in 1999.
[10] By definition, this is equal to the residual in the specific time period – the difference between the actual and the fitted value.

with one-another[11]. The average abnormal return (AvAR) provides the mean amount of all the abnormal returns within the event period[12].

The next step is defining whether the observed abnormal returns as well as their cumulative sum are sufficiently abnormal to be statistically significant. This can be observed via hypothesis testing of the abnormal returns: The null hypothesis of no abnormal returns (AR=0) can be tested against various alternatives of either negative abnormal returns (AR<0), positive abnormal returns (AR>0), or abnormal returns that are different from zero (AR≠0), depending on expectations about the possible impact of the event. Then, a test statistic is computed which has to be compared to a critical value[13]. The test statistic is computed as follows, whereas SE is the standarderror retrieved from the regression[14]. (*see* Brooks 2008, Liu, 2007; Bialkowski, Gottschalk & Wisniewski, 2008).

$$t_{i,t}^{AR} = \frac{AR_{i,t}}{SE_i}$$

$$t^{CAR} = \frac{CAR_{event\ window(n_1,n_2)}}{\sqrt{n_2 - n_1 + 1} * SE_i}$$

Since this study attempts to not only investigate abnormal returns but also abnormal volatility and abnormal volume, further modelling assumptions have to be clarified.

[11] However, the study computes a five-day CAR after the final Election, when no further interference due to other poll releases can be happening.
[12] Within this study, the AvAR is the average of all day-one abnormal returns among the different events of poll releases or actual election rounds, this will be further described in the following section.
[13] For reasons of simplicity, normality is assumed, (*see* Appendix 3 for the kurtosis, and skewness results of the data set).
[14] Since the null hypothesis can be defined as AR of zero the numerator of the AR minus its expectation under the null hypothesis (zero), can be simply stated as AR: In stead of: $t^{AR} = \frac{AR_t - 0}{\sqrt{Var(AR_t)}}$, (the same holds for t^{CAR}).

In regard to modelling volatility this paper takes a GARCH(1,1) approach:

$$E(R_{i,t}) = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}, \qquad \varepsilon_{i,t} \sim N(0, \sigma_{i,t})$$

$$\sigma_{i,t} = \omega + \gamma_1 \varepsilon_{i,t-1}^2 + \gamma_2 \sigma_{i,t-1}$$

$\sigma_{i,t}$ can be described as the conditional volatility, at time t. The GARCH(1,1) process is a weighted function of a long term average value (dependent on ω), volatility information on the previous day ($\gamma_1 \varepsilon_{i,t-1}^2$) and the model's fitted variance from the previous day ($\gamma_2 \sigma_{i,t-1}$), (*see* Brooks, 2008, Chapter 8). The unconditional volatility is describing the normal volatility and will be discussed in the next section.

Moreover, the study models volume by using a mere mean approach, in that sense, the estimation period's mean volume is defined as the expected value of volume.

2.3 Application and Data Selection

2.3.1 Expected Values and Modelling

This study is concerned with investigating two differing types of data; data on the Brazilian stock market index Ibovespa, as well as data on stocks that are related to the Brazilian government. Within the data on the index, three differing series are considered: first, the Ibovespa's returns; second the Ibovespa's volatility; third, Ibovespa's volume. Further, the two governmentally related stocks of Petrobras and Vale are analysed, since they are both highly related to the Brazilian government and hence, might especially reflect the impact of political news within financial markets.

The data is retrieved from *www.finance.yahoo.com*[15]. Within this study, the estimation window, which is used to model the expected values of normal returns, has the length of 600 observations starting on October 10, 2011. Since the Ibovespa is an index itself, the market model has to be applied using another broader market index that has a relation to the index in question: Within this study two models have been used: First, the *S&P500* was used as a market proxy for modelling the Ibovespa's expected returns as well as for Vale's and Petrobras' expected returns, since this is a less biased proxy than the Ibovespa index itself[16]. As a second model the study uses the exchange traded fund EEM (iShares MSCI Emerging Markets ETF)[17] as a market proxy to model expected returns – *see Appendix 1 for information on the ETF's composition.*

Using OLS regression, expected returns of IBovespa based on the 600 Observations, stating on October 10, 2011, can be described as follows:

$$Model_{S\&P}: \quad E[R_{\hat{}bvsp}] = -0.001 + 0.92R_{S\&P} \qquad Adj.R^2: 35.2\%$$

$$Model_{EEM}: \quad E[R_{\hat{}bvsp}] = -0.0002 + 0.70R_{EEM} \qquad Adj.R^2: 50.3\%$$

Regarding volatility, within the framework of this paper, the conditional volatility $\sigma_{i,t}$ has been used as the 'actual' volatility value at time t, whereas the normal/ expected volatility value is defined by the unconditional volatility σ. Here, σ is defined by the squared variance of $\varepsilon_{i,\ estimation\ period}$ using 599 residuals stemming from the regressions.

[15] Index data on the IBovespa: *^bvsp*; on the S&P500: ^gspc; on Vale: *vale*; on Petrobras: *petr3.sa* and *petr4.sa*; on iShares MSCI Emerging Markets ETF: *EEM*

[16] The Ibovespa is subject of a great deal of affection by movements of the two stocks, because they make up a large part of the index's composition.

[17] The EEM has been chosen due to its really small exposure to Brazil, as an emerging market itself (only 6%), whereas China, South Korea and Taiwan constitute the largest share (in sum 51%).

$$Model_{S\&P}: \quad \sigma_{\hat{}bvsp} = 1.10\%$$

$$Model_{EEM}: \quad \sigma_{\hat{}bvsp} = 0.96\%$$

Furthermore, the GARCH(1,1) parameters for conditional volatility have been estimated using a Maximum Likelihood approach[18]:

$$Model_{S\&P}: \quad \sigma_{\hat{}bvsp,t} = 0.00001 + 0.03\varepsilon^2_{\hat{}bvsp,t-1} + 0.89\sigma_{\hat{}bvsp,t-1}$$

$$Model_{EEM}: \quad \sigma_{\hat{}bvsp,t} = 0.00002 + 0.09\varepsilon^2_{\hat{}bvsp,t-1} + 0.73\sigma_{\hat{}bvsp,t-1}$$

In regards to modelling expected volume, academia does not provide a clear-cut way to obtain very accurate results. Hence, this research simply models expected volume by taking the mean of Ibovespa's trading volume over the estimation period. First, a 600 observations model has been used, starting at October, 10, 2011 and ending at April 11, 2014. In mid 2013 Brazil lived through a period of riots and public unrest, which supposedly especially impacted the trading volume, leading to a phase of highly volatile volumes. Since this may bias the expected mean value of the index's volume, additionally a 400-obeservaion average model has been applied.

$$Model_{\text{øVlm, 600 Observations}}: \quad E[Vlm_t] = 3{,}796{,}067$$

$$Model_{\text{øVlm, 400 Observations}}: \quad E[Vlm_t] = 3{,}416{,}666$$

Following a similar approach than the one of modelling Ibovespa's expected returns, Vale's returns can be described as follows:

$$Model_{S\&P}: \quad E[R_{vale}] = -0.002 + 1.49R_{S\&P} \qquad Adj.R^2: 36.3\%$$

$$Model_{EEM}: \quad E[R_{vale}] = -0.0009 + 1.16R_{EEM} \qquad Adj.R^2: 55.0\%$$

[18] $MLE = -\frac{1}{2}\ln(2\pi) - \frac{1}{2}\ln(\sigma_{\hat{}bvsp,t}) - \frac{1}{2}\frac{\varepsilon^2_{\hat{}bvsp,t}}{\sigma_{\hat{}bvsp,t}}$

When considering the returns of Petrobras the study compares two different types of stocks available on Petrobras, the 'usual' (Petr3) stock, which comes with all the features of regular common stock, as well as the preferred stock (Petr4), which comes along with the features of preferred stock, that can very simply be described as privileged remuneration, on the costs of no voting rights. Both stocks can respectively be described as follows:

$$Model_{S\&P}: \quad E(R_{petr3}) = -0.002 + 1.13R_{S\&P} \qquad Adj.R^2: 18.2\%$$

$$Model_{EEM}: \quad E(R_{petr3}) = -0.001 + 0.86R_{EEM} \qquad Adj.R^2: 26.7\%$$

$$Model_{S\&P}: \quad E(R_{petr4}) = -0.0007 + 1.02R_{S\&P} \qquad Adj.R^2: 16.0\%$$

$$Model_{EEM}: \quad E(R_{petr4}) = -0.0001 + 0.86R_{EEM} \qquad Adj.R^2: 28.4\%$$

The next section is concerned with describing the approach towards the actual testing of abnormality during the election period via applying event study methodology and graphical data analysis.

2.3.2 Application of Event Studies

On the basis of the above-mentioned expected values several event studies were conducted, to test whether there was indeed abnormal stock market behaviour related to news about the upcoming election. In this regard, eight events have been selected to be tested; two of these eight events are the actual election results (round one, October 5,

2014; and round two, October 26, 2014)[19]. Further, the eight events stem from a period which is referred to in this study as 'period of events', starting on October 03, 2014 and ending on October 31, 2014. Hence, all eight events are part of this 'period of events' of 21 observations.

Since opinion polls were published quite frequently, and by several institutions, a system of event selection has been employed that attempts to ensure that the single events are not overly biasing one-another[20]. Further, the events were categorised into two groups dependent on whether the then-incumbent (and now re-elected) President Dilma Rousseff (PT)[21] was relatively gaining or loosing in share. In that sense, the type I events are defined as events when Rousseff was relatively gaining in share. Type II Events, are defined as events when Dilma was relatively loosing in share. Both event types have four observations each, whereas type II events, can be described as events when challenger Aécio Neves (PSDB)[22] was relatively gaining in share, apart from the first event, which was still prior the first round of election and more challengers were still in the race. However, only the first two candidates (Rousseff and Neves) were allowed to enter the second round.

Table 1 below summarises the events that have been selected for the event study tests, whereas Type I events can be observed in red, and Type II Events in blue. The bolded dates refer to the actual first and second election round. New results have been published very frequently, and since it was a close race, the lead has been reversed quite often; therefore, the window length has been set to one day, except for the last event,

[19] Since, the elections took place on a Sunday the event study as such was conducted on the following Monday, when the new information was processed by the markets.
[20] However in reality, it is extremely challenging to concretely measure the impact of the different poll events upon each other.
[21] The PT (*Partido dos Trabalhadores*), 'Workers' Party' is the Brazilian Labour party, which stresses labour and social political issues.
[22] The PSDP (*Partido da Social Democracia*), 'Social Democracy Party' has a centrist alignment.

where the event window has a length of two to five trading days[23]; here, CARs can properly calculated.

The percentage values of the candidates are based on data from *www.eleicoes2014.com.br/pesquisa-eleitoral-para-presidente*, as well as other news websites, whereas the mean was taken when more than one poll was published on a given day. Appendix 2 provides a detailed list on which date, at which time and by whom the polls were released, clarifying how the poll release date has been made fit to trading days. When a poll was released during the Bovespa's opening hours it enters into market information on the same day, when the release was after market close, the study considers the information to be valid for the next day.

Finally, the abnormal values for each event have been computed and their significance has been tested. For the last event abnormal values have been computed for day one to day five, and on their cumulative sums (CAR/ CAVlm)[24].

Trading Days	Market	Aécio	Dilma	*Δ Dilma*	Info Date	Event Type	#Event
Monday, 27 October 14	**Election round 2 on Sunday – market closed**	**48.35%**	**51.65%**	***6.25%***	**Info from Sunday**	**Type I**	**8**
Friday, 24 October 14	Market open	54.60%	45.40%	*-8.10%*		Type II	7
Thursday, 23 October 14	Info from 23th after market close –> -1 day	48.00%	52.00%	*5.20%*	Info from Wednesday	Type I	6
Thursday, 16 October 14	Info from 16th after market close –> -1 day	51.00%	49.00%	*3.80%*	Info from Wednesday	Type I	5
Monday, 13 October 14	Info from 13th after market close –> -1 day	58.80%	41.20%	*-6.53%*	Info from Saturday	Type II	4
Friday, 10 October 14	No new Info on the 10th –> -1 day	52.27%	47.73%	*1.73%*	Info from Thursday	Type I	3
Monday, 6 October 14	**Election round 1 on Sunday – market closed**	**33.53%**	**41.61%**	***-4.06%***	**Info from Sunday**	**Type II**	**2**
Friday, 3 October 14	Market still open but late: Release 16:51	20.60%	37.30%	*-8.20%*		Type II	1

Table 1: Poll Events (based on Eleições 2014 (2014, a&b); see Appendix 2 for a detailed list of poll releases)

[23] Since the last event is already after the final election, there cannot be any interference.
[24] Whereas 'CAR/ CAVlm' stands for cumulative abnormal returns, and –volume.

3 Analysis

During the election period graphs plotting the results of opinion polls, such as the ones below, were everywhere. Politicians, newspapers, as well as to a certain deal academia and many other actors were battling via headlines over headlines. The Brazilian election was receiving a great deal of media attention, not just in Brazil itself but also in the rest of the world. One could argue that the huge level of international media attention was mainly due to the fact that the election results might have an effect on Brazil's market conditions, which is arguably of great interest to many international investors, who view it as a promising emerging market; this would be inline with the Wall Street Journal's newspaper article, cited in the introduction[25].

When looking at Figure 3 it becomes obvious that this electoral race was an extremely close head-to-head race, with many game changing events and an unusual frequency of changes in the lead.

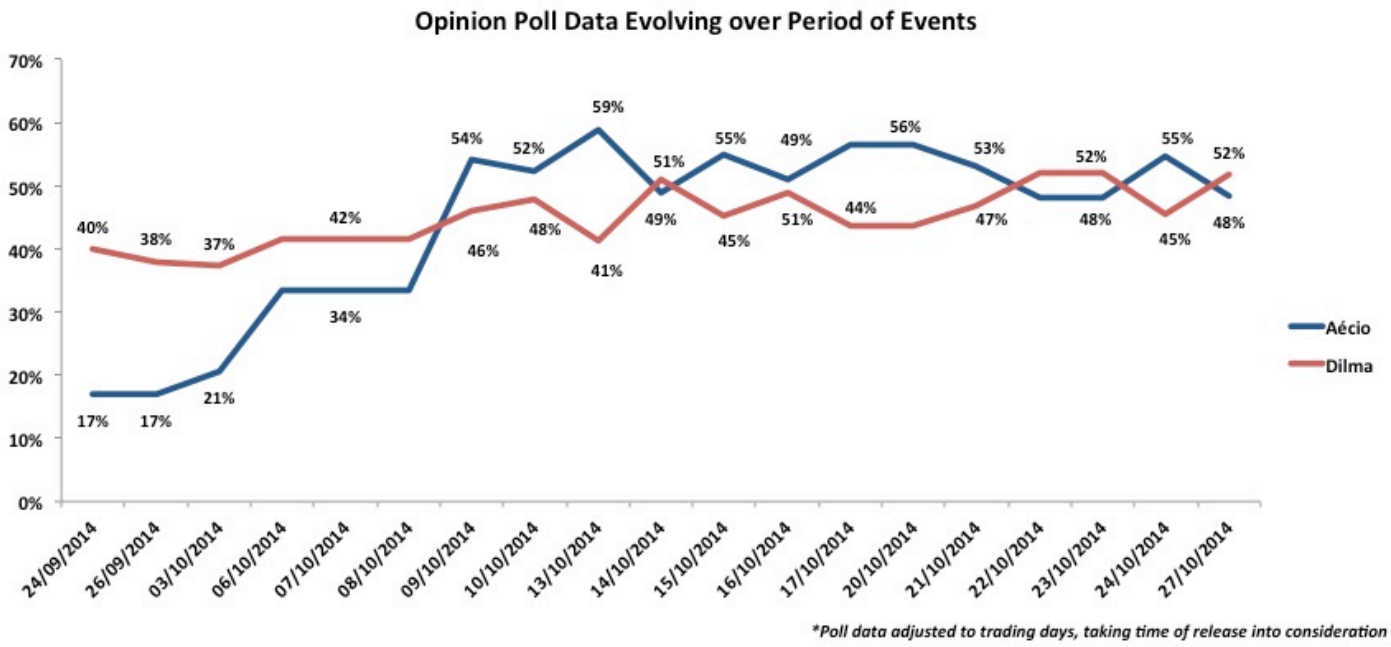

Figure 3: Opinion poll and first and second election round results (based on Eleições 2014. (2014,a&b))

[25] Jelmayer & Magalhaes, 2014

This vacillation of the Brazilian voters (*see* Figure 3), led to great percussions within the Brazilian markets. However, it has to be academically clarified in how far this period of volatile market behaviour has been significantly related to the publication of election news. The following sections are devoted to researching this relationship.

3.1 Market Returns

Figure 4 below, shows that the fitted vales of both models fit the actual values quite well within the first twenty observations of the estimation window, *see right panels of Figure 4 below.*

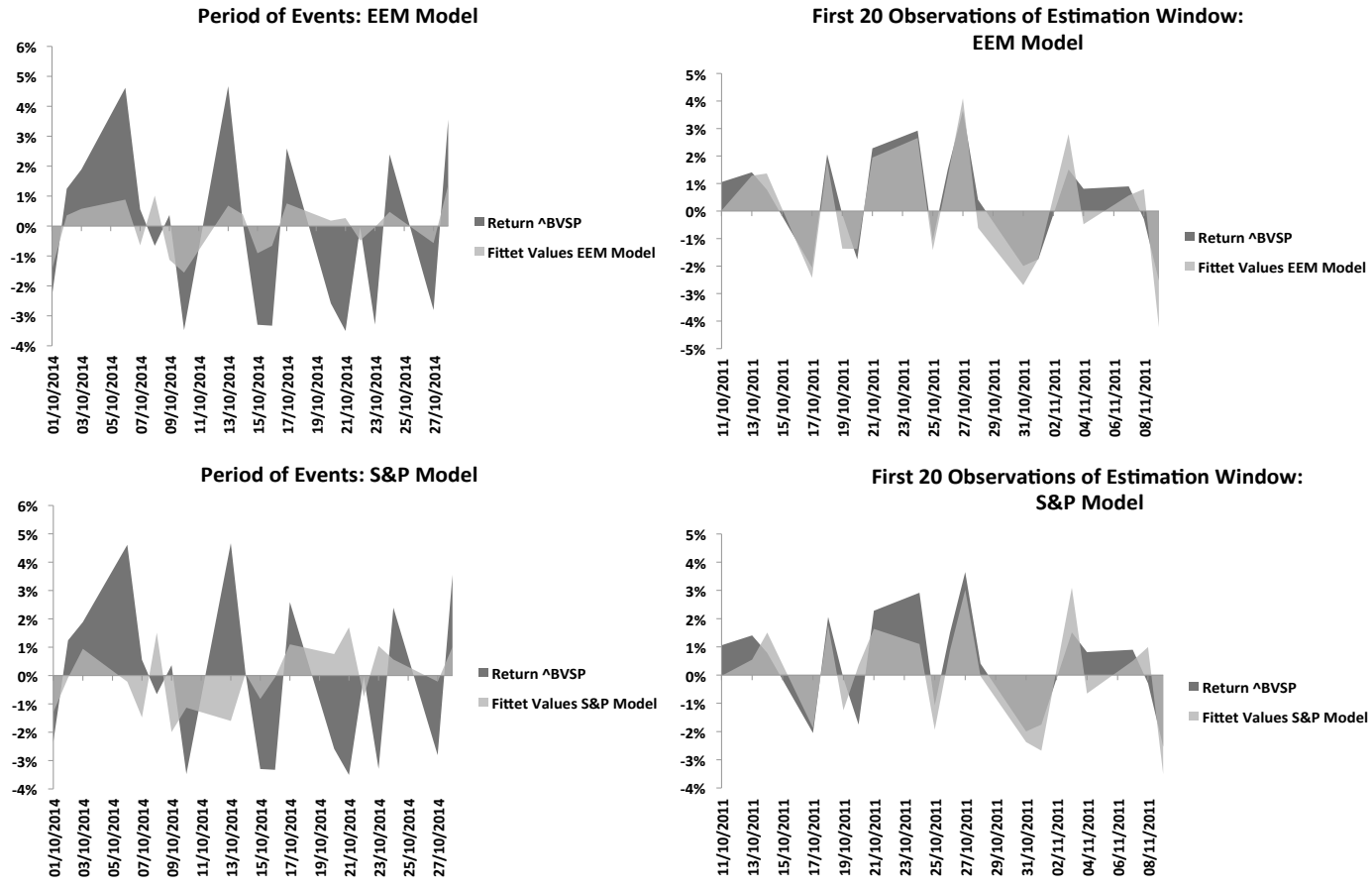

Figure 4: Actual and fitted values: first 20 observation of Estimation Window; Period of Events[26]

[26] It might be confusing that only 16 events are shown on the axis, this is however only due to reasons of style (size), there are indeed 20 observations represented in the graph.

When the period of events is considered, the fitted values do not fit the actual values of the Ibovespa at all, suggesting that there are in deed abnormal returns. When analysing the abnormality of returns for type I events, all four events have negative returns, and two of the four events show show significant abnormal returns. On average it has been confirmed, that the returns of the four events within the category of 'Dilma gaining in share', have been significantly abnormal. More precisely, for both models, the null hypothesis of zero abnormal returns can be rejected with a 99% level of significance (*see* Table 2)[27].

				S&P Model					**EEM Model**				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig *1%***	**Sig *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig *1%***	**Sig *5%***
10/10	-3.48%	-55.2%	-	-2.34%	-37.2%	-2.13	no	yes	-1.92%	-30.5%	-1.99	no	yes
16/10	-3.33%	-52.8%	-	-3.26%	-51.8%	-2.97	yes	yes	-2.67%	-42.3%	-2.77	yes	yes
23/10	-3.29%	-52.3%	-	-4.34%	-68.9%	-3.95	yes	yes	-3.25%	-51.7%	-3.38	yes	yes
27/10	-2.81%	-44.5%	-	-2.59%	-41.1%	-2.36	no	yes	-2.24%	-35.5%	-2.32	no	yes
Ø	**-3.23%**	**-51.2%**		**-3.13%**	**-49.8%**	**-2.85**	**yes**	**yes**	**-2.52%**	**-40.0%**	**-2.62**	**yes**	**yes**

Table 2: Abnormal Returns Ibovespa – Type I Events

For the last event, the final election round CARs have been calculated, *see Table 3 and 4*. However, none of those CARs from either model, (although having different length: from 2 days to 5 days, *see second column of Table 3 and 4 for the length*), can be seen as significantly abnormal.

		S&P Model						
Date	**CAR**	**AR *d***	**AR *y***	**CAR *d***	**CAR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
31/10	5d	+3.3%	+52.2%	2.96%	47.0%	1.20	no	no
30/10	4d	+2.0%	+31.7%	-0.33%	-5.3%	-0.15	no	no
29/10	3d	-2.3%	-36.1%	-2.33%	-37.0%	-1.22	no	no
28/10	2d	+2.5%	+40.3%	-0.05%	-0.9%	-0.03	no	no
27/10	1d	-2.6%	-41.1%	-2.59%	-41.1%	-2.36	no	yes

Table 3: CARs Ibovespa Type I Events S&P Model

[27] Within Table 2 and the following tables, R *d* shows the daily ln-returns (logarithmic returns), whereas R *y* depicts the annualised version, same holds for AR (abnormal returns), and CAR (cumulative abnormal returns).

		EEM Model						
Date	**CAR**	**AR *d***	**AR *y***	**CAR *d***	**CAR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
31/10	5d	+4.0%	+63.6%	3.26%	51.7%	1.51	no	no
30/10	4d	+1.9%	+29.6%	-0.75%	-12.0%	-0.39	no	no
29/10	3d	-2.6%	-40.6%	-2.61%	-41.5%	-1.57	no	no
28/10	2d	+2.2%	+34.6%	-0.06%	-0.9%	-0.04	no	no
27/10	1d	-2.2%	-35.5%	-2.24%	-35.5%	-2.32	no	yes

Table 4: CARs Ibovespa Type I Events EEM Model

Due to the change of sign over consecutive trading days, the cumulative sum approaches zero at the 2-day CAR and the 4-day CAR. (*Appendix 5 graphically shows the post election CARs for Ibovespa's returns*).

When looking at type II events, when Dilma is relatively loosing in share, all events show positive returns. There are significant abnormal returns to be found, more precisely, for two of four events, as well as for the average of all four events, the null hypothesis of zero abnormal returns can be rejected at a significance level of 99%, *see Table 5 for details.*

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	1.89%	30.0%	+	+0.95%	+15.0%	0.86	no	no	+1.32%	+20.9%	1.37	no	no
06/10	4.61%	73.3%	+	+4.84%	+76.8%	4.40	yes	yes	+3.73%	+59.2%	3.87	yes	yes
13/10	4.67%	74.2%	+	+6.27%	+99.6%	5.71	yes	yes	+3.99%	+63.3%	4.14	yes	yes
24/10	2.39%	38.0%	+	+1.82%	+28.9%	1.66	no	no	+1.92%	+30.5%	1.99	no	yes
Ø	**3.39%**	**53.8%**		**+3.47%**	**+55.1%**	**3.16**	**yes**	**yes**	**+2.74%**	**+43.5%**	**2.84**	**yes**	**yes**

Table 5: Abnormal Returns Ibovespa – Type II Events

3.2 Volatility

For analysing Ibovespa's volatility a slightly different, graphical approach has been applied, since the assumptions regarding volatility during the election period are different from the assumptions regarding returns. First, when looking at volatility this

study is looking at the entire period of events, rather than single Type I and Type II events, to research whether volatility is increased over the election period as a whole. Within the last section it became obvious that during the election period returns have been switching signs very frequently, almost on a daily basis, which already implies that there should be increased volatility, when seen as the second moment of return. Due to an election period being subject to general market uncertainty, it is assumed that independent of which candidate takes the lead, at any point in time during the election period, volatility is probably increased. Ibovespa's volatility has been proxied by the above described GARCH(1,1) model using the S&P regression's residuals as well as the EEM regression's residuals, *see Figures 5 & 6.*

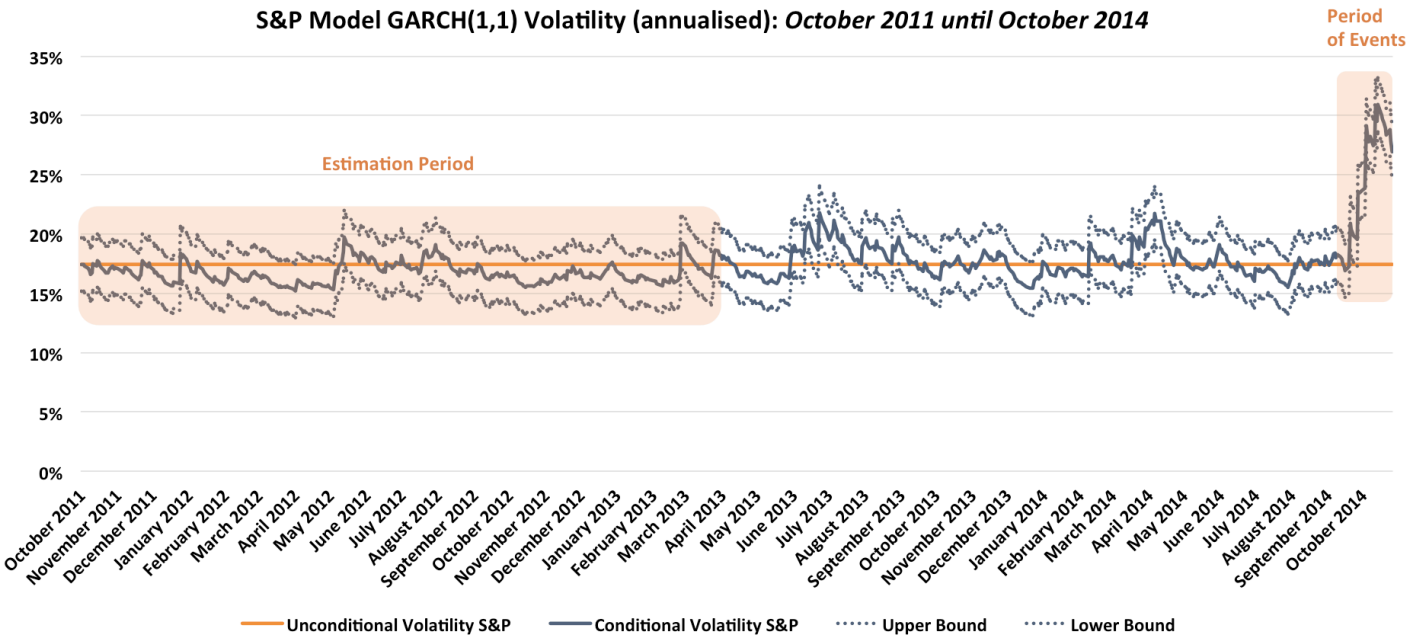

Figure 5: GARCH(1,1) S&P Model annualised Volatility: Estimation Period - Period of Events

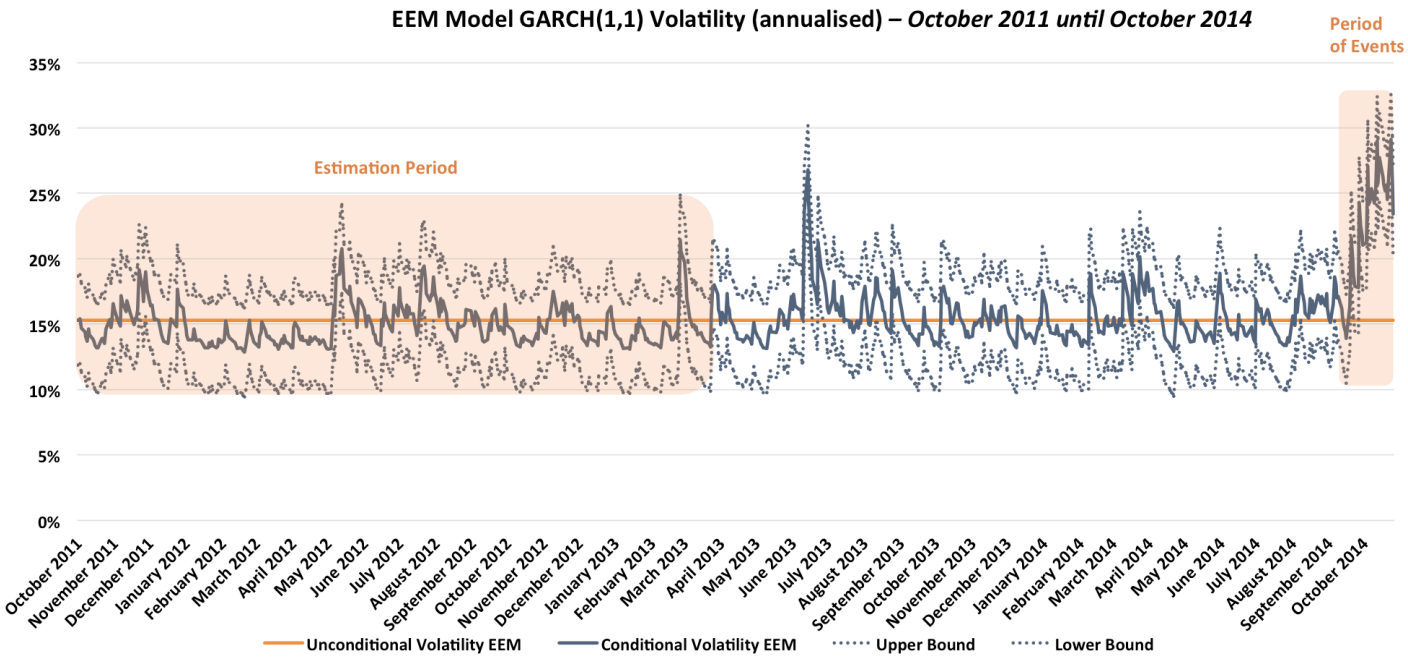

Figure 6: GARCH(1,1) EEM Model annualised Volatility: Estimation Period - Period of Events

Both models show, that when the election period is approaching, volatility is clearly rising. Even when considering a band of ±2 standard deviations, during the period of events, volatility is clearly rising far above the natural level of volatility.

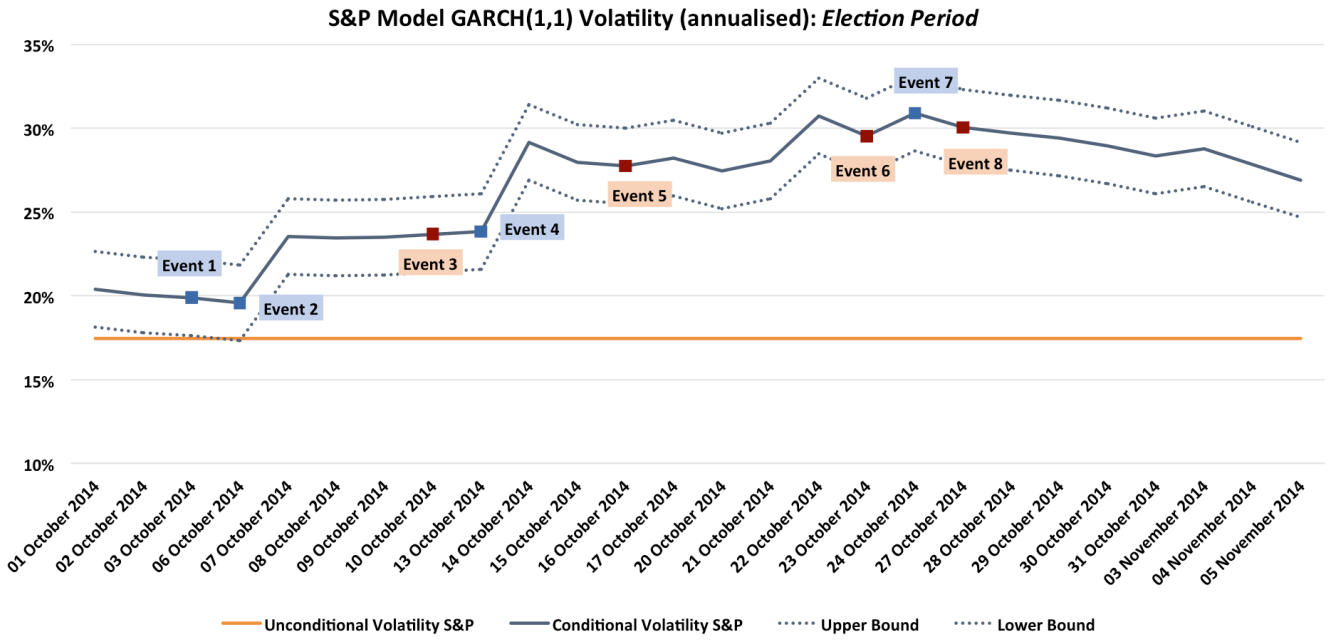

Figure 7: GARCH(1,1) S&P Model annualised Volatility – Period of Events

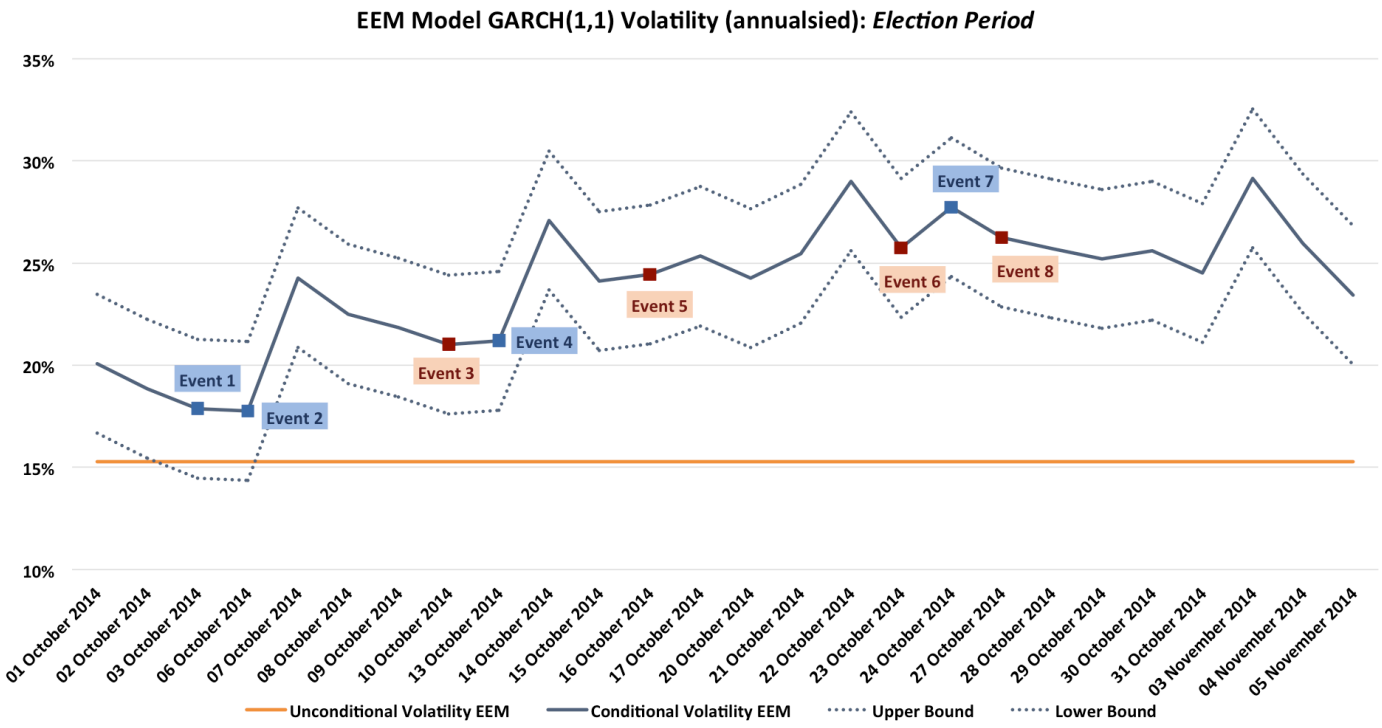

Figure 8: GARCH(1,1) EEM Model annualised Volatility – Period of Events

Figure 7 and 8 display the two models' precise evolvement of volatility during the period of events. Both models show, that after October 7, Ibovespa's volatility proxy exceeds its natural level, by far, leading to a maximum annualised volatility level of 29.13% (1.84% in daily terms) within the period of events, considering data from the EEM Model[28].

When conducting an event study, the graphical results can be approved. For the first two events an abnormal volatility of zero cannot be rejected, however for the other six events an abnormal volatility of zero can be rejected at a 99% significance level, *see Appendix 4 for details.*

It can be concluded that volatility reaches extremely high levels during the period of events, but slowly comes back to a normal level over time (*see Figures 9 &*

[28] Maximum annualised volatility S&P Model: 30.89% (1.95% in daily terms)

10, which show volatility in 2014 and 2015). The S&P model and the EEM model show reversion, whereas within the EEM model, the unconditional volatility level is reached faster (after 10 trading days, precisely). Within the S&P Model approximately two month passed until abnormal volatility of zero cannot be rejected any more.

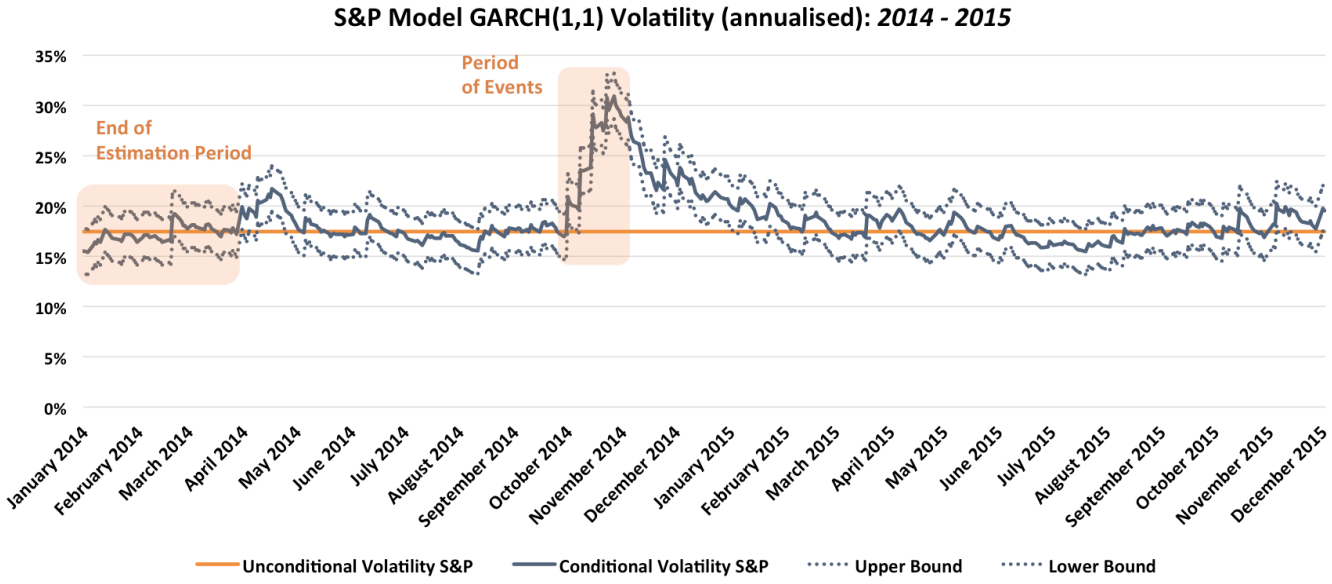

Figure 9: GARCH(1,1) S&P Model: 2014 - 2015

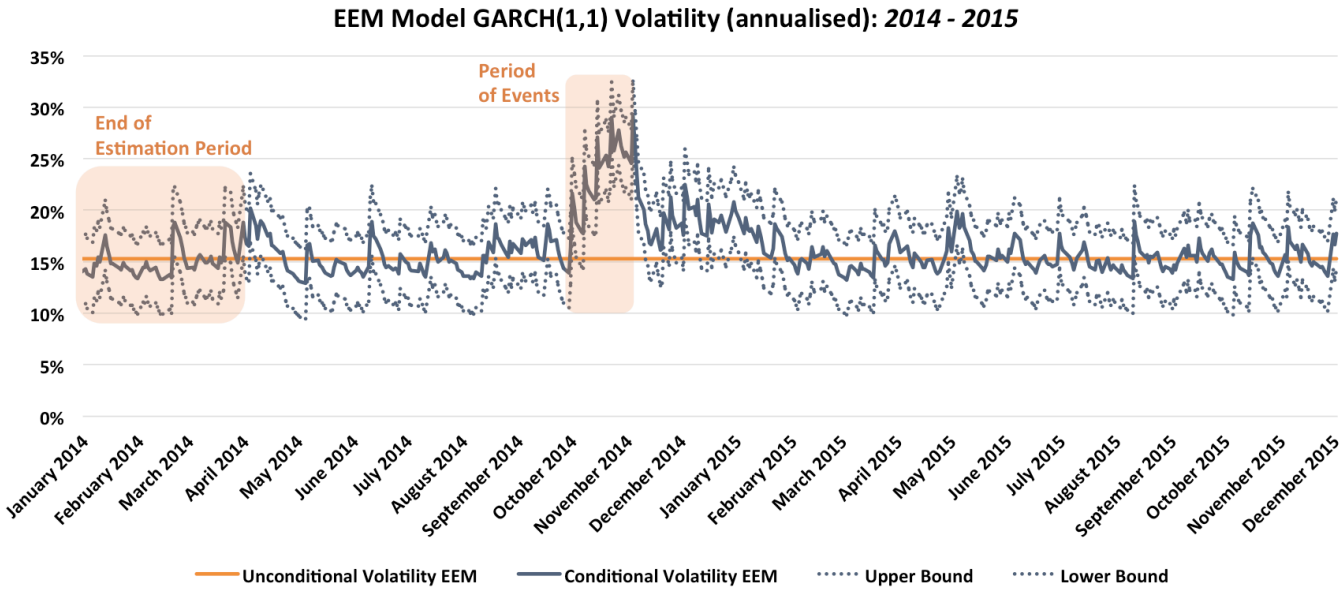

Figure 10: GARCH(1,1) EEM Model: 2014 - 2015

3.3 Volume

As already described in the modelling section, it is difficult to accurately model and forecast trading volume, therefore, a mean approach has been applied within this study. Hence, the normal level of volume, based on the mean of a 600-observation-long estimation window, is set to be approximately 3,800,000. Whereas the normal level, based on an estimation window length of 400 observations, is set to be approximately 3,400,000, (*see Section 2.3.1 for the exact values*).

Figure 11 and 12 below summarise the period of events, of the two models. It becomes clear that trading volume in general has rather risen than decreased, since for both models the period of event average lies slightly above the estimation window averages.

Generally, the 600-observation estimation window average is higher than the 400-observation average, due to times of very high volume levels, as well as variation in volume in the second half of 2013. Therefore, it follows, that the slightly increased level of volume during the election period, can be considered to be more abnormal when looking at the 400-obsevation average, with a lower natural level of volume.

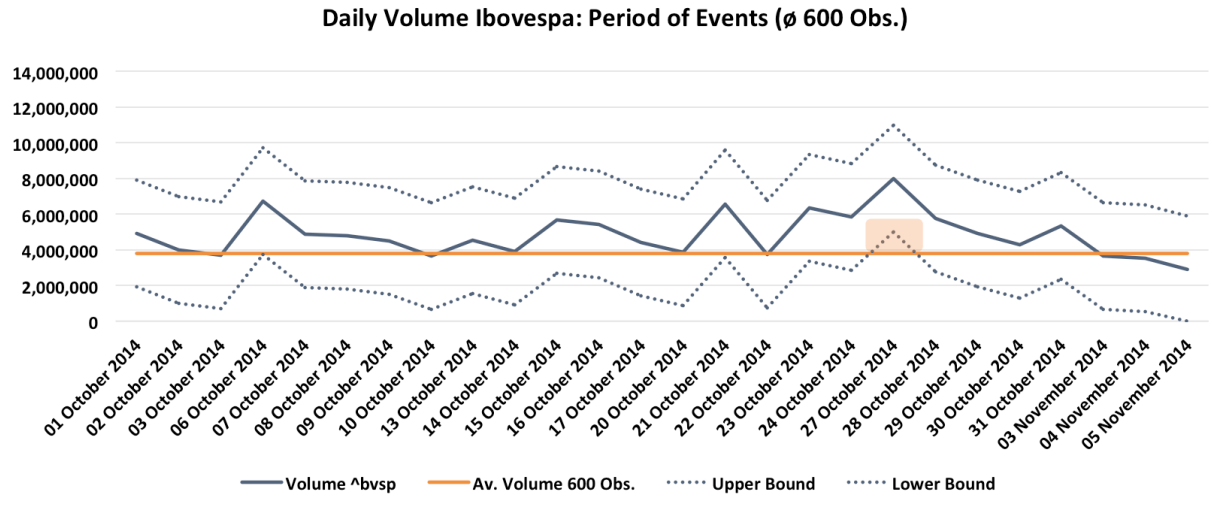

Figure 11: Volume Ibovespa (ø 600 Obs.) – Period of Events

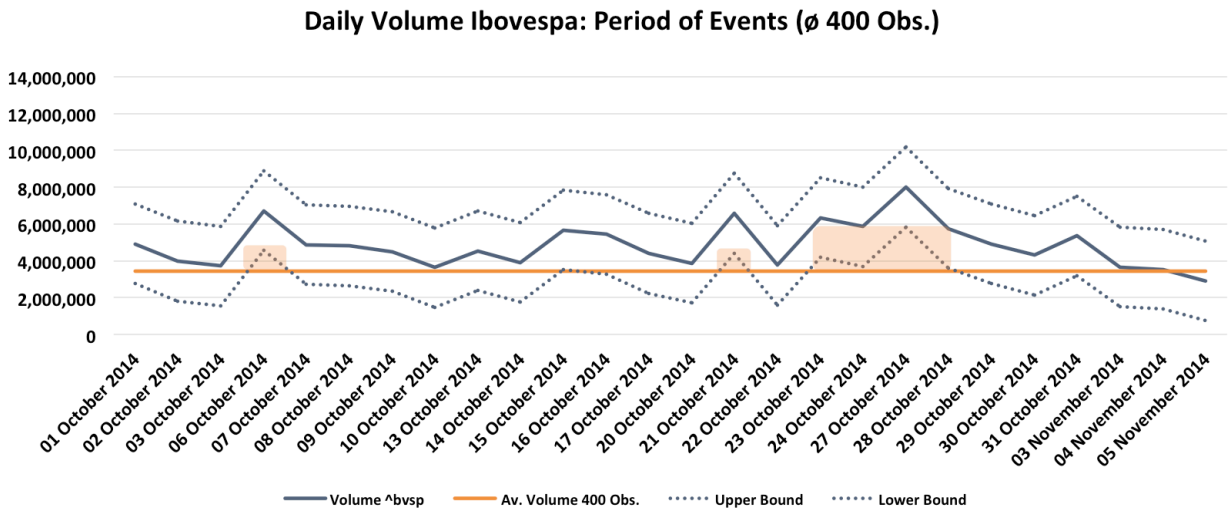

Figure 12: Volume Ibovespa (ø 400 Obs.) – Period of Events

Based on the statistical tests below (*see Table 6 and 7*), it becomes obvious that, on average there is no increased volume for Type I events, nor for Type II events.

		ø 600 Obs.				**ø 400 Obs.**			
Date	**Vlm *d***	**AVlm *d***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AVlm *d***	**t-stat**	**Sig. *1%***	**Sig. *5%***
10/10	3,635,700	-160,367	-0.11	no	no	219,034	0.20	no	no
16/10	5,427,800	1,631,733	1.09	no	no	2,011,134	1.86	no	no
23/10	6,346,100	2,550,033	1.70	no	no	2,929,434	2.71	yes	yes
27/10	7,999,300	4,203,233	2.81	yes	yes	4,582,634	4.23	yes	yes
øAVlm	**5,852,225**	**2,056,158**	**1.37**	**no**	**no**	**2,435,559**	**2.25**	**no**	**yes**

Table 6: Abnormal Volume Ibovespa – Type I Events

		ø 600 Obs.				**ø 400 Obs.**			
Date	**Vlm *d***	**AVlm *d***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AVlm *d***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	3,708,600	-87,467	-0.06	no	no	291,934	0.27	no	no
06/10	6,714,000	2,917,933	1.95	no	no	3,297,334	3.05	yes	yes
13/10	4,544,400	748,333	0.50	no	no	1,127,734	1.04	no	no
24/10	5,852,100	2,056,033	1.37	no	no	2,435,434	2.25	no	yes
øAVlm	**5,204,775**	**1,408,708**	**0.94**	**no**	**no**	**1,788,109**	**1.65**	**no**	**no**

Table 7: Abnormal Volume Ibovespa – Type II Events

However, when looking at the CAVlms after the final election day, the cumulative sum of the volume becomes significant for the 600-observation model for CAVlm(1,1) until

CAVlm(1,5), and stops being significantly different from zero after the 5th day. For the 400-observation model, the cumulative sum stays significantly abnormal until CAVlm(1,12); from the 13th day onwards, an hypothesis of zero abnormal returns of the cumulative sum cannot be rejected anymore. Figure 13 plots the 5-day CAVlm in its upper panel, which shows a clear upward trend; the 15-day CAVlm in the lower panel, shows that the 600-Observation Model starts to revert its cumulative sum after the 5th day; *see Appendix 9 for details on the CAVlms.*

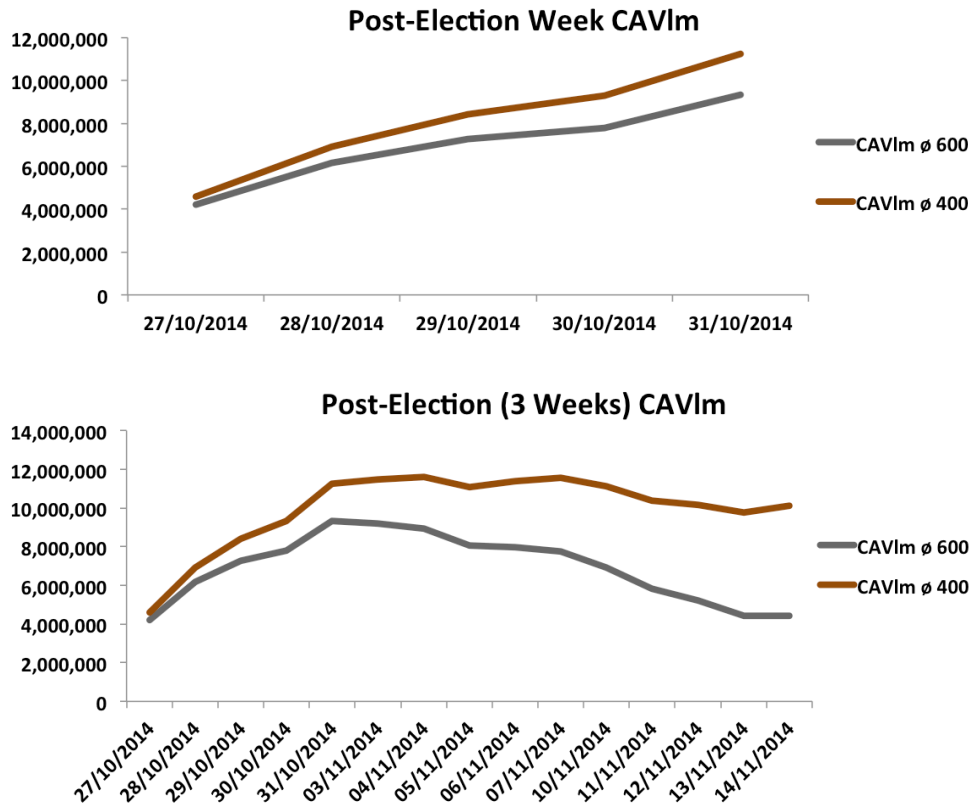

Figure 13: CAVlm Ibovespa, upper panel 5 day CAVlm; lower panel 15 day CAVlm

3.4 Governmentally Related Stocks

3.4.1 Petrobras

The same abnormal return event study methodology that has been applied on the Ibovespa, has also been deployed on Pertrobras' common stock (Petr3.sa) as well as on its preferred version (Petr4.sa). The results are very much in line with the previous findings and even more extreme: Type I events for both stocks exhibit only negative returns. For three out of four single type I events abnormal returns of zero can be rejected on a 99% confidence level as well as their average, for both models.

Similarly, all type II events show positive returns, with a significant abnormal average (*see Appendix 6 for details on Petr3.sa and Petr4.sa's performance)*. Hence, it can be concluded that Petrobras does react strongly on political news, more precisely, news regarding governmental composition.

3.4.2 Vale

Since, neither type I nor type II events yield any significant results on average, when conducting and analysing the event studies of Vale's abnormal returns, it can be concluded that Vale's stock did not lead to any abnormal returns during the election period. This suggests that it is not as dependent or related to governmental/ and political news as for instance Petrobras, *see Appendix 7 for statistical data*[29].

[29] Vale, listed on the NYSE, as well as Vale5.sa, listed on the Bovespa. Both have been considered, however, neither yielded any significant results.

4 Robustness, Further Research and Concluding Remarks

The above stated research question of whether there has been abnormal stock market behaviour as a consequence of election news regarding the last Brazilian presidential election, has been confirmatively answered. The study found that there have been abnormal returns; that volatility has been significantly increased during the election period, which is in line with Bialkowski et al.'s findings (2008); and that volume was slightly elevated during the election period.

The Brazilian stock index Ibovespa as well as the governmentally related company Petrobras reacted with negative abnormal returns to poll releases in favour of Rousseff. When Rousseff was relatively loosing in share, there have been positive abnormal returns on the day of the release itself, or on the subsequent trading day, when the poll results have been released after market close.

In order to preclude that these abnormal values are subject to an overall South American trend, the same event study methodology was conducted on Argentina's stock index MERVAL: As one might have expected, the results were not significant[30] (*see Appendix 8 for statistical data).*

In order to additionally validate the study, further research on the subject may be conducted: Option strategies are one way of dealing with (electoral-) uncertainty. I.e. a straddle[31], which basically bets on market movement, would be a wise strategy when considering that this research, as well as Bialkowski et al., conclude that there is an

[30] On average, type I and type II events have not yielded any significant results, whereas none of the single type I events have been significantly abnormal. However, within the type II events, two single events show abnormality, whereas one of them shows a significant negative abnormal return and the second one a significant positive abnormal return. Due to differentiation in signs, other causes of abnormality are assumed.

[31] The combination of a put and a call option with the same strike price and expiration date

overall increased level of volatility during election phases. Hence, one could look at the evolvement of option prices and underlying option strategies to further conclude about the market participants' expectations in relation to elections.

Moreover, improvements could be made especially in regard to more accurately modelling volume. Additional governmentally related stocks, such as utilities, may also be considered to strengthen the results. Furthermore, it would be interesting to research whether there has been any abnormal behaviour in relation to foreign investment within Brazil during the election period and consequently in a post event window.

Another interesting evolvement can be observed when looking at the number of IPOs launched in Brazil: As Levin (2015) puts it, "these days, Brazilian companies are more likely to de-list than go public as … a crippling recession and political turmoil wipe out $290 billion in market vale this year alone". In fact, the number of companies going public within Brazil has heavily decreased over the last two years (*see Figure 14 below)*, a development, that may also suggest, that the political environment does not inspire companies to go public. Within a framework of further research it would be interesting to study the relationship of political environment and election phases and IPOs.

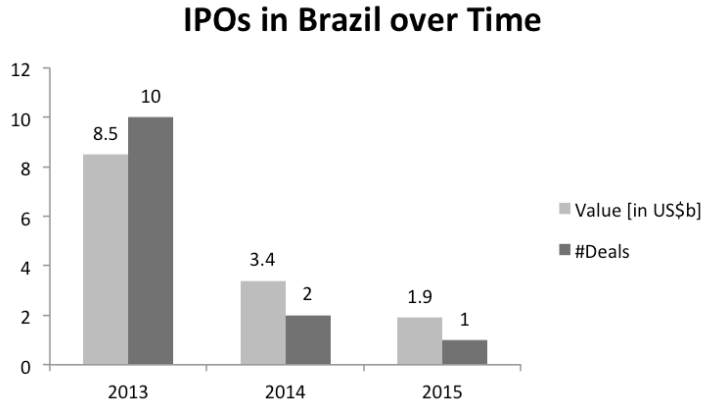

Figure 14: IPO's in Brazil, based on Elliott, 2015 and EY, 2013

All in all this study concludes that in this particular setting abnormal returns (positive as well as negative) have been possible – in this setting depending on who takes the lead. This could also be researched in an international cross-sectional setting, using for instance, Bialkowski et al.'s determinant of closeness of the electoral race. Hence, looking into elections considered to be close, and whether they reveal opposite direction of abnormal returns, more precisely, one candidate's lead in polls is answered with positive abnormal returns while another is connected to negative abnormal returns.

To finally conclude, this study is the mere beginning of what still needs to be researched elaborately, to approach full comprehension of the interaction between politics and financial markets.

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Appendices

Appendix 1 – *Additional Data on the EEM*

EEM iShares MSCI Emerging Markets ETF

Fact Sheet as of 09/30/2015

iShares by BLACKROCK®

The iShares MSCI Emerging Markets ETF seeks to track the investment results of an index composed of large- and mid-capitalization emerging market equities.

WHY EEM?

1. Exposure to large and mid-sized companies in emerging markets
2. Easy access to 800+ emerging market stocks
3. Use to diversify internationally and seek long-term growth

GROWTH OF 10,000 USD SINCE INCEPTION

The Hypothetical Growth of $10,000 chart reflects a hypothetical $10,000 investment and assumes reinvestment of dividends and capital gains. Fund expenses, including management fees and other expenses were deducted.

PERFORMANCE

	1 Year	3 Year	5 Year	10 Year	Since Inception
NAV	-19.78%	-5.81%	-4.17%	3.40%	10.71%
Market Price	-19.39%	-5.62%	-4.18%	3.36%	10.71%
Benchmark	-19.28%	-5.27%	-3.58%	4.27%	11.15%

The performance quoted represents past performance and does not guarantee future results. Investment return and principal value of an investment will fluctuate so that an investor's shares, when sold or redeemed, may be worth more or less than the original cost. Current performance may be lower or higher than the performance quoted. Performance data current to the most recent month end may be obtained by visiting www.iShares.com or www.blackrock.com.

Market returns are based upon the midpoint of the bid/ask spread at 4:00 p.m. eastern time (when NAV is normally determined for most ETFs), and do not represent the returns you would receive if you traded shares at other times.

RISK PROFILE

Lower Risk/ Reward — Higher Risk/ Reward

Based on the 1 year standard deviation of the fund. Standard deviation measures how dispersed returns are around the average. A higher standard deviation indicates that returns are spread out over a larger range of values and thus, more volatile or risky. Each increment on the scale above represents a 5% range of standard deviation except for the last segment which is > 20%.

KEY FACTS

Inception Date	04/07/2003
Expense Ratio	0.68%
Benchmark	MSCI Emerging Markets Index(SM)
30 Day SEC Yield	2.07%
Number of Holdings	849
Net Assets	$21,307,382,425
Ticker	EEM
CUSIP	464287234
Exchange	NYSE Arca

TOP HOLDINGS (%)

SAMSUNG ELECTRONICS LTD	3.20
TAIWAN SEMICONDUCTOR MANUFACTURING	2.94
TENCENT HOLDINGS LTD	2.60
CHINA MOBILE LTD	2.20
CHINA CONSTRUCTION BANK CORP H	1.68
NASPERS LIMITED N LTD	1.51
INDUSTRIAL & COMMERCIAL BANK OF CH	1.28
HON HAI PRECISION INDUSTRY LTD	1.09
BANK OF CHINA LTD.	1.03
INFOSYS LTD	0.99
	18.52

Holdings are subject to change.

FEES AND EXPENSES BREAKDOWN

Expense Ratio		**0.68%**
Management Fee	0.68%	
Acquired Fund Fees and Expenses	0.00%	
Foreign Taxes and Other Expenses	0.00%	
- Fee Waivers		0.00%
= Expense Ratio		**0.68%**

FUND CHARACTERISTICS

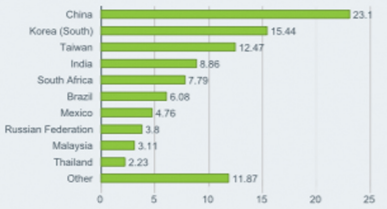
Beta vs. S&P 500	0.67
Standard Deviation (3yrs)	13.77%
P/E Ratio	18.71
P/B Ratio	3.13

Beta is a measure of the tendency of securities to move with the market as a whole. A beta of 1 indicates that the security's price will move with the market. A beta less than 1 indicates the security tends to be less volatile than the market, while a beta greater than 1 indicates the security is more volatile than the market.

The price to earnings ratio (P/E) is a fundamental measure used to determine if an investment is valued appropriately. Each holdings' P/E is the latest closing price divided by the latest 12 months' earnings per share. Negative earnings are excluded, extraordinary items are excluded, and P/E ratios over 60 are set to 60.

The **price to book (P/B) value ratio** is a fundamental measure used to determine if an investment is valued appropriately. The book value of a company is a measure of how much a company's assets are worth assuming the company's debts are paid off. Negative book values are excluded from this calculation and holding price to book ratios over 25 are set to 25.

COUNTRY BREAKDOWN (%)



TOP SECTORS (%)

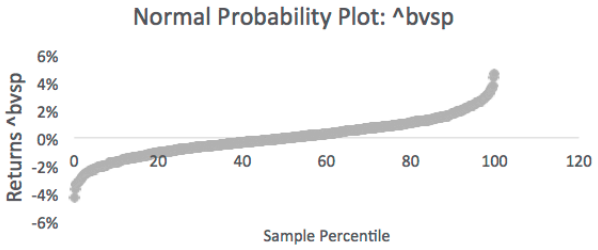
Appendix 2 – *Additional Data on Poll Releases*

# Event	Date	Time	Aecio	Dilma	Δ Dilma	Event Type	Poll by	Link
	Tuesday, 28 October 14							
8	**Monday, 27 October 14**	-	-	-				
8	Sunday, 26 October 14	Round 2	**48.35%**	**51.65%**	**+6.25%**	Type I	**Election**	**http://www.eleicoes2014.com.br/candidatos-presidente/**
	Saturday, 25 October 14	-	-	-				
7	**Friday, 24 October 14**	**08:30**	**54.60%**	**45.40%**	**-8.10%**		**ISTOÉ/Sensus**	**http://www.istoe.com.br/reportagens/389091_AECIO+LIDERA+COM+NOVE+PONTOS+DE+VANTAGEM+SOBRE+DILMA?pathImagens=&path=&actualArea=internalPage**
6 (ø)	**Thursday, 23 October 14**	17:01	46.50%	53.50%	+1.50%		ø Datafolha & Ibope	
	Thursday, 23 October 14	*17:02*	*47.00%*	*53.00%*			*Datafolha*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/dilma-tem-53-e-aecio-47-dos-votos-validos-diz-pesquisa-datafolha.html*
	Thursday, 23 October 14	*17:01*	*46.00%*	*54.00%*			*Ibope*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/dilma-tem-54-e-aecio-46-dos-votos-validos-diz-pesquisa-ibope.html*
6	Wednesday, 22 October 14	**15:00**	**48.00%**	**52.00%**	**+5.20%**	Type I	**Datafolha**	**http://www1.folha.uol.com.br/poder/2014/10/1536237-otimismo-com-economia-aumenta-e-ajuda-dilma-na-disputa-eleitoral.shtml**
	Tuesday, 21 October 14	**12:09**	53.20%	46.80%	-4.70%		Veritá	http://www.hojeemdia.com.br/elei%C3%A7%C3%B5es-2014/aecio-tem-53-2-contra-46-8-de-dilma-mostra-pesquisa-do-instituto-verita-1.276725
(ø)	Monday, 20 October 14	**n/a**	48.50%	51.50%	+7.90%		ø Datafolha, Vox Populi & MDA	
	Monday, 20 October 14	*20:01*	*48.00%*	*52.00%*			*Data Folha*	*http://noticias.r7.com/eleicoes-2014/vox-populi-indica-dilma-a-frente-de-aecio-mas-empate-tecnico-persiste-21102014*
	Monday, 20 October 14	*20:25*	*48.00%*	*52.00%*			*Vox Populi*	*http://www1.folha.uol.com.br/poder/2014/10/1535524-dilma-tem-52-dos-votos-validos-e-aecio-tem-48-diz-datafolha.shtml*
	Monday, 20 October 14	*n/a*	*49.50%*	*50.50%*			*MDA*	*http://www.cnt.org.br/Paginas/Agencia_Noticia.aspx?noticia=125-pesquisa-cnt-mda-20102014*
	Sunday, 19 October 14							
	Saturday, 18 October 14							
	Friday, 17 October 14	**16:12**	56.40%	43.60%	-5.40%		Sensus	http://www.istoe.com.br/reportagens/388139_AECIO+ESTA+13+PONTOS+A+FRENTE+DE+DILMA?pathImagens=&path=&actualArea=internalPage
5	**Thursday, 16 October 14**		-	-		Type I		
5 (ø)	Wednesday, 15 October 14	18:12	**51.00%**	**49.00%**	**+3.80%**	Type I	**ø Datafolha & Ibope**	
	Wednesday, 15 October 14	*20:25*	*51.00%*	*49.00%*			*Ibope*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/aecio-tem-51-e-dilma-49-dos-votos-validos-aponta-ibope.html*
	Wednesday, 15 October 14	*18:12*	*51.00%*	*49.00%*			*Datafolha*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/aecio-tem-51-e-dilma-49-dos-votos-validos-aponta-datafolha.html*
	Tuesday, 14 October 14	19:25	54.80%	45.20%	-5.80%		Veritá	http://www.em.com.br/app/noticia/politica/2014/10/14/interna_politica,579701/pesquisa-mostra-que-aecio-tem-57-e-dilma-43-das-intencoes-de-voto-em-minas.shtml
4	**Monday, 13 October 14**	20:23	49.00%	51.00%	+9.80%		Vox Populi	http://noticias.r7.com/eleicoes-2014/vox-populi-mostra-empate-entre-dilma-rousseff-e-aecio-neves-14102014
	Sunday, 12 October 14							
4	Saturday, 11 October 14		**58.80%**	**41.20%**	**-6.53%**	Type II	**ISTOÉ**	**http://www.istoe.com.br/reportagens/387301_AECIO+DISPARA+E+ABRE+17+PONTOS+DE+VANTAGEM+SOBRE+DILMA+MOSTRA+PESQUISA+ISTOE+SENSUS?pathImagens=&path=&actualArea=inter**
3	**Friday, 10 October 14**	-	-	-				
3	Thursday, 9 October 14	17:51	**52.27%**	**47.73%**	**+1.73%**	Type I	**ø Datafolha, Ibope & Veritá**	
	Thursday, 9 October 14	*20:04*	*51.00%*	*49.00%*			*Datafolha*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/aecio-tem-46-e-dilma-44-diz-1-pesquisa-datafolha-do-2-turno.html*
	Thursday, 9 October 14	*20:02*	*51.00%*	*49.00%*			*Ibope*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/aecio-tem-46-e-dilma-44-diz-1-pesquisa-ibope-do-segundo-turno.html*
	Thursday, 9 October 14	*17:51*	*54.80%*	*45.20%*			*Veritá*	*https://www.brasil247.com/pt/247/poder/156383/Pesquisa-Verit%C3%A1-A%C3%A9cio-abre-dez-pontos-no-2%C2%BA-turno.htm*
	Wednesday, 8 October 14	17:01	54.00%	46.00%	+4.39%		Paraná Pesquisas	http://epoca.globo.com/tempo/eleicoes/noticia/2014/10/baecio-54-x-dilma-46b-primeira-pesquisa-sobre-o-segundo-turno.html
	Tuesday, 7 October 14	-	-	-				
2	**Monday, 6 October 14**	-	-	-				
	Sunday, 5 October 14	**Round 1**	**33.53%**	**41.61%**	**-4.06%**	Type II		**http://www.eleicoes2014.com.br/candidatos-presidente/**
	Saturday, 4 October 14	16:15	26.33%	45.67%				
	Saturday, 4 October 14	*20:07*	*26.00%*	*47.00%*			*Vox Populi*	*http://noticias.r7.com/eleicoes-2014/vox-populi-mostra-dilma-na-lideranca-e-aecio-a-frente-de-marina-04102014*
	Saturday, 4 October 14	*18:56*	*27.00%*	*46.00%*			*Ibope*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/ibope-votos-validos-dilma-tem-46-aecio-27-e-marina-24.html*
	Saturday, 4 October 14	*16:15*	*26.00%*	*44.00%*			*Datafolha*	*http://g1.globo.com/politica/eleicoes/2014/noticia/2014/10/datafolha-votos-validos-dilma-tem-44-aecio-26-e-marina-24.html*
1	**Friday, 3 October 14**	**16:51**	**20.60%**	**37.30%**	**-8.20%**	Type II	**Sensus**	**http://www.istoedinheiro.com.br/noticias/economia/20141003/pesquisa-istoe-sensus-mostra-empate-tecnico-entre-aecio-marina/195713.shtml**
	Thursday, 2 October 14	n/a	23.00%	45.50%	+7.50%		ø Datafolha & Ibope	
	Thursday, 2 October 14	*n/a*	*22%*	*47%*			*Ibope*	*http://www.eleicoes2014.com.br/pesquisa-eleitoral-para-presidente/*
	Thursday, 2 October 14	*n/a*	*24%*	*44%*			*Datafolha*	*http://www.eleicoes2014.com.br/pesquisa-eleitoral-para-presidente/*

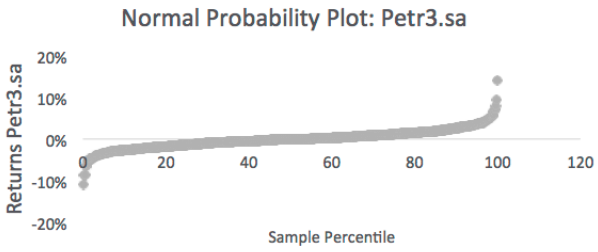
**Bovespa openinghours (9:30-16:55 - after market: 16:55 - 18:00)*
***Release within trading hours*
****Release after market close*

Appendix 3 – *Descriptive Statistics on the Data Sets*

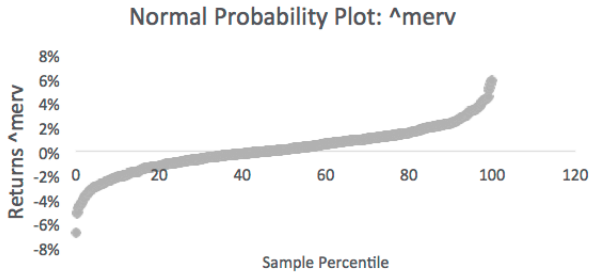
Returns Estimation Period ^bvsp	
Mean	-0.01%
Median	-0.04%
Standard Deviation	1.37%
Sample Variance	0.02%
Kurtosis	3.26
Skewness	0.13
Range	8.94%
Minimum	-4.33%
Maximum	4.61%
Count	599



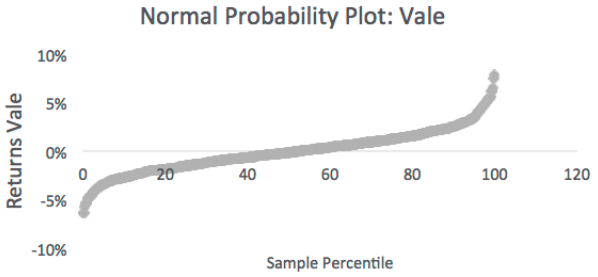
Returns Estimation Period Petr3.sa	
Mean	-0.09%
Median	0.00%
Standard Deviation	2.31%
Sample Variance	0.05%
Kurtosis	7.17
Skewness	0.28
Range	25.06%
Minimum	-10.95%
Maximum	14.11%
Count	599



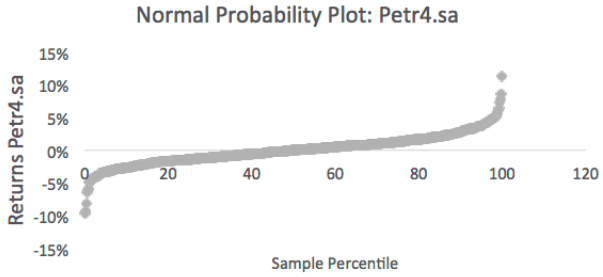
Returns Estimation Period ^merv	
Mean	0.17%
Median	0.12%
Standard Deviation	1.83%
Sample Variance	0.03%
Kurtosis	3.62
Skewness	-0.06
Range	12.65%
Minimum	-6.78%
Maximum	5.87%
Count	599



Returns Estimation Period Vale	
Mean	-0.07%
Median	-0.15%
Standard Deviation	2.16%
Sample Variance	0.05%
Kurtosis	3.63
Skewness	0.27
Range	14.22%
Minimum	-6.38%
Maximum	7.84%
Count	599



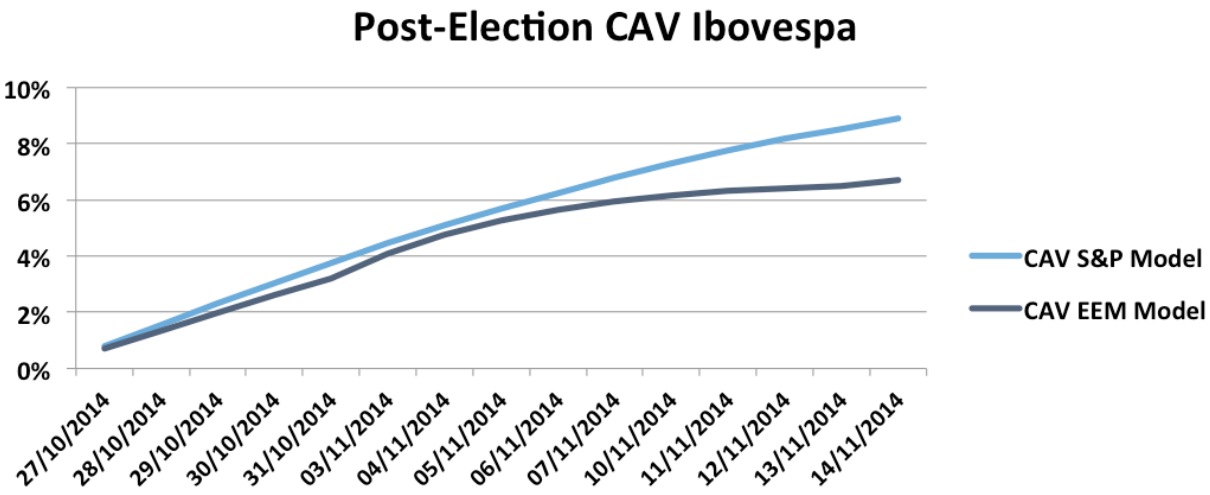
Returns Estimation Period Petr4.sa	
Mean	0.01%
Median	0.00%
Standard Deviation	2.28%
Sample Variance	0.05%
Kurtosis	5.23
Skewness	0.20
Range	20.98%
Minimum	-9.66%
Maximum	11.32%
Count	599



Appendix 4 – *Volatility Event study*

S&P Model								EEM Model						
Date	σ_t ***d***	σ_t ***y***	**AV *d***	**AV *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	σ_t ***d***	σ_t ***y***	**AV *d***	**AV *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	1.25%	19.9%	+0.15%	+2.5%	2.18	no	yes	1.13%	17.9%	+0.16%	+2.6%	1.53	no	no
06/10	1.23%	19.6%	+0.13%	+2.1%	1.89	no	no	1.12%	17.8%	+0.16%	+2.5%	1.46	no	no
13/10	1.50%	23.8%	+0.40%	+6.4%	5.67	yes	yes	1.34%	21.2%	+0.37%	+5.9%	3.49	yes	yes
10/10	1.49%	23.7%	+0.39%	+6.2%	5.54	yes	yes	1.32%	21.0%	+0.36%	+5.7%	3.38	yes	yes
16/10	1.75%	27.8%	+0.65%	+10.3%	9.15	yes	yes	1.54%	24.4%	+0.58%	+9.2%	5.39	yes	yes
24/10	1.95%	30.9%	+0.85%	+13.5%	11.94	yes	yes	1.62%	25.7%	+0.66%	+10.5%	6.16	yes	yes
23/10	1.86%	29.5%	+0.76%	+12.1%	10.72	yes	yes	1.75%	27.7%	+0.78%	+12.4%	7.33	yes	yes
27/10	1.89%	30.0%	+0.79%	+12.6%	11.18	yes	yes	1.65%	26.3%	+0.69%	+11.0%	6.46	yes	yes
Ø	**1.62%**	**25.6%**	**+0.52%**	**+8.2%**	**7.28**	**yes**	**yes**	**1.43%**	**22.8%**	**+0.47%**	**+7.5%**	**4.40**	**yes**	**yes**

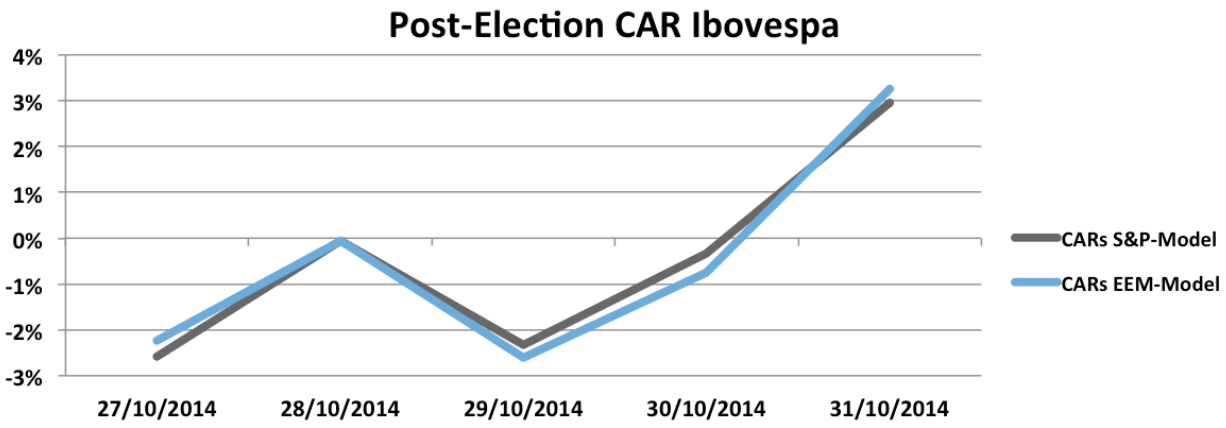
Appendix Table 1: Abnormal Volatility Ibovespa – Period of Events



Appendix Graph 1: Post-Election (15 trading days) CAV Ibovespa – after day 10 (November 11, 2014)

EEM AV is not significantly abnormal anymore; CAV curve for EEM Model flattens.

Appendix 5 – ***Plots of Ibovespa's post election CAR***



Appendix Graph 2: Post-Election (5 trading days) CAR Ibovespa

Appendix 6 – *Event study: Petrobras*

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
10/10	-5.99%	-95.0%	-	-4.52%	-71.7%	-2.16	no	yes	-3.99%	-63.4%	-2.02	no	yes
16/10	-7.53%	-119.6%	-	-7.38%	-117.1%	-3.53	yes	yes	-6.64%	-105.5%	-3.36	yes	yes
23/10	-6.43%	-102.1%	-	-7.64%	-121.3%	-3.66	yes	yes	-6.31%	-100.2%	-3.20	yes	yes
27/10	-10.96%	-174.0%	-	-10.62%	-168.6%	-5.09	yes	yes	-10.19%	-161.7%	-5.15	yes	yes
øAR	**-7.73%**	**-122.7%**		**-7.54%**	**-119.7%**	**-3.61**	**yes**	**yes**	**-6.78%**	**-107.7%**	**-3.43**	**yes**	**yes**

Appendix Table 2: Abnormal Returns Petr3.sa – Type I Events

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	5.34%	84.8%	+	+4.26%	+67.6%	2.04	no	yes	+4.70%	+74.6%	2.38	no	yes
06/10	9.27%	147.2%	+	+9.62%	+152.7%	4.61	yes	yes	+8.24%	+130.9%	4.17	yes	yes
13/10	9.87%	156.7%	+	+11.91%	+189.1%	5.70	yes	yes	+9.10%	+144.4%	4.60	yes	yes
24/10	4.23%	67.1%	+	+3.61%	+57.2%	1.73	no	no	+3.71%	+58.9%	1.88	no	no
øAR	**7.18%**	**113.9%**		**+7.35%**	**+116.6%**	**3.52**	**yes**	**yes**	**+6.44%**	**+102.2%**	**3.26**	**yes**	**yes**

Appendix Table 3: Abnormal Returns Petr3.sa – Type II Events

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
10/10	-5.58%	-88.5%	-	-4.33%	-68.8%	-2.07	no	yes	-3.67%	-58.2%	-1.90	no	no
16/10	-7.74%	-122.8%	-	-7.68%	-122.0%	-3.68	yes	yes	-6.93%	-110.1%	-3.59	yes	yes
23/10	-7.50%	-119.0%	-	-8.68%	-137.8%	-4.15	yes	yes	-7.47%	-118.5%	-3.87	yes	yes
27/10	-11.56%	-183.6%	-	-11.34%	-180.1%	-5.43	yes	yes	-10.88%	-172.6%	-5.64	yes	yes
øAR	**-8.09%**	**-128.5%**		**-8.01%**	**-127.1%**	**-3.83**	**yes**	**yes**	**-7.24%**	**-114.9%**	**-3.75**	**yes**	**yes**

Appendix Table 4: Abnormal Returns Petr4.sa – Type I Events

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	5.89%	93.5%	+	+4.83%	+76.6%	2.31	no	yes	+5.17%	+82.0%	2.68	yes	yes
06/10	10.54%	167.3%	+	+10.77%	+171.0%	5.15	yes	yes	+9.43%	+149.7%	4.89	yes	yes
13/10	9.87%	156.7%	+	+11.64%	+184.7%	5.57	yes	yes	+9.01%	+143.1%	4.67	yes	yes
24/10	5.61%	89.1%	+	+4.96%	+78.8%	2.38	no	yes	+5.01%	+79.6%	2.60	yes	yes
øAR	**7.98%**	**126.7%**		**+8.05%**	**+127.8%**	**3.85**	**yes**	**yes**	**+7.16%**	**+113.6%**	**3.71**	**yes**	**yes**

Appendix Table 5: Abnormal Returns Petr4.sa – Type II Events

Appendix 7 – *Event Study: Vale*

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
10/10	-3.16%	-50.2%	-	-1.26%	-20.0%	-0.73	no	no	-0.52%	-8.3%	-0.36	no	no
16/10	-3.70%	-58.7%	-	-3.54%	-56.2%	-2.06	no	yes	-2.55%	-40.5%	-1.76	no	no
23/10	0.09%	1.5%	+	-1.55%	-24.6%	-0.90	no	no	+0.21%	+3.3%	0.14	no	no
27/10	-5.34%	-84.7%	-	-4.93%	-78.3%	-2.86	yes	yes	-4.34%	-68.9%	-3.00	yes	yes
øAR	**-3.03%**	**-48.0%**		**-2.82%**	**-44.8%**	**-1.64**	**no**	**no**	**-1.80%**	**-28.6%**	**-1.25**	**no**	**no**

Appendix Table 6: Abnormal Returns Vale – Type I Events

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	-0.63%	-10.1%	-	-2.11%	-33.5%	-1.23	no	no	-1.54%	-24.4%	-1.06	no	no
06/10	2.60%	41.2%	+	+3.01%	+47.8%	1.75	no	no	+1.17%	+18.6%	0.81	no	no
13/10	5.10%	80.9%	+	+7.76%	+123.1%	4.51	yes	yes	+4.01%	+63.7%	2.77	yes	yes
24/10	3.00%	47.6%	+	+2.13%	+33.9%	1.24	no	no	+2.26%	+35.9%	1.56	no	no
øAR	**2.52%**	**39.9%**		**+2.70%**	**+42.8%**	**1.57**	**no**	**no**	**+1.48%**	**+23.5%**	**1.02**	**no**	**no**

Appendix Table 7: Abnormal Returns Vale – Type II Events

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
10/10	-1.80%	-28.6%	-	-0.99%	-15.7%	-0.40	no	no	-0.53%	-8.4%	-0.22	no	no
16/10	-2.93%	-46.4%	-	-2.92%	-46.4%	-1.16	no	no	-2.41%	-38.3%	-0.99	no	no
23/10	1.88%	29.8%	+	+1.05%	+16.7%	0.42	no	no	+1.87%	+29.7%	0.77	no	no
27/10	-4.09%	-64.9%	-	-3.97%	-63.0%	-1.58	no	no	-3.65%	-58.0%	-1.49	no	no
øAR	**-1.73%**	**-27.5%**		**-1.71%**	**-27.1%**	**-0.68**	**no**	**no**	**-1.18%**	**-18.7%**	**-0.48**	**no**	**no**

Appendix Table 8: Abnormal Returns Vale5.sa – Type I Events

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	-1.70%	-27.0%	-	-2.46%	-39.0%	-0.98	no	no	-2.23%	-35.4%	-0.91	no	no
06/10	-0.13%	-2.0%	-	-0.00%	-0.1%	0.00	no	no	-0.92%	-14.6%	-0.38	no	no
13/10	4.24%	67.3%	+	+5.40%	+85.7%	2.15	no	yes	+3.62%	+57.4%	1.48	no	no
24/10	0.38%	6.0%	+	-0.09%	-1.4%	-0.04	no	no	-0.06%	-1.0%	-0.03	no	no
øAR	**0.70%**	**11.1%**		**+0.71%**	**+11.3%**	**0.28**	**no**	**no**	**+0.10%**	**+1.6%**	**0.04**	**no**	**no**

Appendix Table 9: Abnormal Returns Vale5.sa – Type II Events

Appendix 8 – Event Study Abnormal Returns: *Merval (Placebo Study)*

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
10/10	-1.62%	-25.7%	-	-0.66%	-10.5%	-0.40	no	no	-0.35%	-5.6%	-0.22	no	no
16/10	3.32%	52.7%	+	+3.20%	+50.8%	1.95	no	no	+3.75%	+59.6%	2.35	no	yes
23/10	-2.69%	-42.7%	-	-3.92%	-62.2%	-2.38	no	yes	-2.83%	-45.0%	-1.77	no	no
27/10	-2.50%	-39.6%	-	-2.46%	-39.1%	-1.50	no	no	-2.15%	-34.1%	-1.34	no	no
øAR	**-0.87%**	**-13.8%**		**-0.96%**	**-15.2%**	**-0.58**	**no**	**no**	**-0.39%**	**-6.3%**	**-0.25**	**no**	**no**

Appendix Table 10: Abnormal Returns Merval – Type I Events

				S&P Model					EEM Model				
Date	**R *d***	**R *y***	**Sign**	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**AR *d***	**AR *y***	**t-stat**	**Sig. *1%***	**Sig. *5%***
03/10	6.48%	102.8%	+	+5.36%	+85.0%	3.26	yes	yes	+5.77%	+91.6%	3.61	yes	yes
06/10	-4.42%	-70.2%	-	-4.38%	-69.5%	-2.67	yes	yes	-5.42%	-86.0%	-3.39	yes	yes
13/10	0.00%	0.0%	+	-0.19%	-3.0%	-0.11	no	no	-0.16%	-2.5%	-0.10	no	no
24/10	2.76%	43.9%	+	+2.02%	+32.0%	1.23	no	no	+2.15%	+34.1%	1.34	no	no
øAR	**1.20%**	**19.1%**		**+0.70%**	**+11.1%**	**0.43**	**no**	**no**	**+0.58%**	**+9.3%**	**0.37**	**no**	**no**

Appendix Table 11: Abnormal Returns Merval – Type II Events

Appendix 9 – *CAVlm Event Study*

		ø 600 Obs.					ø 400 Obs.				
Date	**CAVlm**	**Avlm *d***	**CAVlm *d***	**t-stat**	**Sig. *1%***	**Sig. *5%***	**Avlm *d***	**CAVlm *d***	**t-stat**	**Sig. *1%***	**Sig. *5%***
14/11	15d	-6,767	4,437,497	0.77	no	no	372,634	10,128,510	2.42	no	yes
13/11	14d	-763,167	4,444,264	0.79	no	no	-383,766	9,755,876	2.41	no	yes
12/11	13d	-597,467	5,207,431	0.97	no	no	-218,066	10,139,642	2.60	yes	yes
11/11	12d	-1,117,567	5,804,898	1.12	no	no	-738,166	10,357,708	2.76	yes	yes
10/11	11d	-822,367	6,922,465	1.40	no	no	-442,966	11,095,874	3.09	yes	yes
07/11	10d	-203,467	7,744,832	1.64	no	no	175,934	11,538,840	3.37	yes	yes
06/11	9d	-103,567	7,948,298	1.77	no	no	275,834	11,362,906	3.50	yes	yes
05/11	8d	-894,467	8,051,865	1.90	no	no	-515,066	11,087,072	3.62	yes	yes
04/11	7d	-266,267	8,946,332	2.26	no	yes	113,134	11,602,138	4.05	yes	yes
03/11	6d	-130,867	9,212,599	2.51	no	yes	248,534	11,489,004	4.33	yes	yes
31/10	5d	1,552,133	9,343,466	2.79	yes	yes	1,931,534	11,240,470	4.64	yes	yes
30/10	4d	503,633	7,791,333	2.60	yes	yes	883,034	9,308,936	4.30	yes	yes
29/10	3d	1,119,233	7,287,700	2.81	yes	yes	1,498,634	8,425,902	4.49	yes	yes
28/10	2d	1,965,233	6,168,466	2.92	yes	yes	2,344,634	6,927,268	4.53	yes	yes
27/10	1d	4,203,233	4,203,233	2.81	yes	yes	4,582,634	4,582,634	4.23	yes	yes

Appendix Table 12: Cumulative Abnormal Volume Ibovespa