Political Uncertainty and the Greek Stock Market over the Period 2011-2015

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Abstract: In this article, we examine the possible effects of the successive elections in Greece over the period 2011-2015 on the pricing behaviour of four basic stock indices of Athens Exchange. Our analysis reveals that, with the exception of the pre-election period before the elections of the 6th of May 2012, returns over the pre-election periods are positive. During the rest of the periods assessed returns are negative with the exception of the period 18th June 2012 to 31 December 2014 over which returns are positive. On the other hand, the variance in the Greek market is relatively low during the pre-election periods compared to the volatility during the periods before the announcement of an election process or after carrying out the elections. In addition, volatility surged during the interval which followed the announcement of the referendum of the 5th of July 2015 on 28 June 2015 till the announcement of the elections of the 20th of September 2015 on 28th August 2015.

Keywords: Political uncertainty, return, risk, Greek stock market.
JEL classification: G11, G15

1. Introduction
In the finance literature, it is widely accepted that economic news and events are not the only factors that can affect the course of capital markets. Among other elements, political factors and events can significantly affect the pricing and volatility of stocks, bonds and other assets traded on capital markets.

In this article, we perform a simple statistical analysis to examine the possible effects of the successive elections in Greece over the period 2011-2015 on the pricing behaviour of stocks in Athens Exchange. This period has been characterized by the dramatic hardships in the Greek economy and society as a result of the sovereign debt crisis, which was triggered by the end of 2009 and, eventually, led to the first bailout agreement between the Greek government and EU and IMF on the 23rd of April 2010.

The bailout programs and the relevant memorandums of understanding signed between Greece and its international creditors have required from Greek governments taking severe and unpopular austerity measures and implementing major reforms in labour market, social insurance, pension system and public sector so that the huge fiscal deficits be tackled and the international competitiveness of the country be boosted.

The results of these measures have been the soaring in unemployment rates and the consequent "brain-drain" in Greece as mainly well-educated young Greek scientists have been constantly immigrating to Northern Europe or outside the European continent during the period of the crisis, the unprecedented sinking in the Greek GDP by more than 25%, the substantial increase in the rate of the Greek people living below the poverty threshold, and the deterioration of education, health and other social services offered by the Greek state to its citizens.

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Along with the dramatic effects on essentially every economic and social aspect of life in Greece, the crisis resulted in the increased political risk and uncertainty manifested by the frequent political elections in Greece over the period under study. It is easy to understand that the unpopularity of the severe austerity measures resulted in the governing parties losing power in the parliament and Greek society, which, in its turn, contributed to the necessity of frequent elections and the consequent short-lived governments over the period of crisis.

In our study, we examine whether the increased political risk and uncertainty combined with the austerity measures imposed by the bailout programs have caused an impact on return and volatility in the Greek stock market. In this respect, we consider four major stock indices of Athens Exchange.

To the best of our knowledge, this is the first study in the literature to examine the impact of the soared political uncertainty in Greece over the last five years on the local stock market. However, there are a couple of studies which assess the relationship between political factors and the course of the Greek stock market using data from the pre-crisis period. In particular, Siokis and Kapopoulos (2007) use data of the Greek composite index for the period 1987-2004 and find that different political regimes affect the conditional variance of the stock market index and that the stock market index is asymmetrically affected by past innovations. Floros (2008) uses daily data of the General index of Athens Exchange during the period 1996-2002 to show that, on average, the performance of the index increases two months prior to the elections whereas the mean daily fluctuation decreases. One month before the elections, index performance decreases and the mean daily fluctuation increases. Furthermore, between three and six months after the elections, performance decreases while for a collective six months after the elections, there is a remarkably positive course.

Our study covers the period spanning from 1/1/2011 to 11/20/2015 and takes into consideration the parliamentary elections that took place over that interval as well as the referendum of the 5th of July 2015 on the acceptance or the rejection of the suggested bailout agreement by the international creditors of the country. Furthermore, our study considers ten sub-intervals relating to the announcement of elections, the relevant pre-election periods and the periods after the elections.

When it comes to performance, our analysis reveals that, with the exception of the pre-election period before the elections of the 6th of May 2012, the average returns of the stock indices into consideration over the several pre-election periods examined are positive. This finding applies both to daily and total returns of indices. During the rest of the periods assessed the basic indices of Athens Exchange present, on average, negative returns with the exception of the period 6/18/2012-12/31/2014 over which returns are basically positive.[1]

As far as volatility is concerned, the results of our analysis indicate that the return variance in the Greek stock market is relatively low during the pre-election periods compared to the volatility during the periods before the announcement of a new election process or after carrying out the elections. This pattern is traced both in the risk expressed as the standard deviation of returns and the risk calculated as the intraday volatility. Another significant finding with respect to risk is that volatility in the Greek stock market surged during the interval that followed the announcement of the referendum of the 5th of July 2015 and up to the announcement of the elections of the 20th of September 2015 on 8/28/2015. This period presents the highest volatility compared to all other periods examined in our study.

It should be noted that, over the recent years, Greece stands as a unique case among the countries of "West" given that it is the only country with so frequent and radical changes in

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[1] This was a relatively stable period from a political and economic perspective over which the government of New Democracy and PASOK managed to eliminate the fiscal deficits and put the Greek economy in the path of a weak growth by the end of 2014 while significant growth rates were anticipated by several international institutions for 2015.

the political environment characterized by extremely short-lived governments while it is the first country in the Eurozone which needed a bailout by EU and IMF. Consequently, we are not aware of literature records which address the issue of the increased political risk as a result of frequent elections within a dramatically deteriorating economic and social environment.

Given the uniqueness of the Greek case, we deem our study as major expansion to the finance literature which examines the interconnections between the stock markets and political environment. Our findings not only concern the Greek authorities and people but they also concern investors worldwide who are interested in Greece and may be examining whether they should invest in the Greek stock market and economy or not. In addition, by examining pre- and post-elections periods and revealing different trading trends among the several periods examined, our results may help stock investors build profitable or risk mitigating trading strategies. Finally, one can use our results to speculate about the capital markets of countries which present (or will present in the future) political characteristics such as those in Greece.

The remainder of this paper is structured as follows. Next section provides a brief literature review on political uncertainty and its impact on capital markets. Section 3 develops the methodology used in our empirical investigation. Section 4 describes the data used in this study and provides information about the political events considered in our study. The empirical findings of our research are presented in Section 5 and conclusions are discussed in Section 6.

2. Literature Review

A large body of the literature assesses the relationship between US presidential elections and stock markets. In this respect, Niederhoffer *et al*. (1970) examine the changes in the prices of the Dow Jones Industrial Average (DJI) before and after presidential elections reaching a conclusion that the stock market performances during Republican and Democratic administrations have no systematic difference. The same pattern is revealed by Gärtner and Wellershoff (1995, 1999). The latter studies also highlight that volatility in stock markets increases during the pre-election period. The increase in market volatility triggered by the election process is also supported by the findings of Goodell and Vähämaa (2013), who claim that the presidential election process induces market uncertainty as investors form their expectations with respect to the potential winners and the policies winners are going to implement. On the other hand, according to Goodell and Bodey (2012), market uncertainty smooths as the probable winner becomes clearer.

Santa-Clara and Valkanov (2003) find that the excess return in the stock market of the United Sates is higher under Democratic than Republican presidencies. They also document that volatility is slightly higher during Republican presidencies. In addition, Oehler *et al*. (2013) find that the victory of a Democratic candidate rather negatively affects overall stock returns while the impact of a Republican victory can be either positive or negative. A change in presidency from either a Democratic to a Republican candidate or vice versa causes stronger stock market effects than re-election or the election of a president from the same party.

Johnson *et al*. (1999) find that small-capitalization stocks perform significantly better during Democratic administrations. This finding is supported by Lobo (1999) too. In the same context, Booth and Booth (2003) find that, irrespective of their market capitalization, stocks in the US present a presidential cycle pattern, according to which returns are significantly higher in the last 2 years than in the first 2 years of the presidential term. Wong and McAleer (2009) show that the US stock prices closely follow the 4-year presidential election cycle by declining during the first half of a presidency, reaching a trough in the second year, rising during the second half of a presidency and reaching a peak in the third or fourth year.

Outside the United States, Foerster (1993) shows that the Canadian stocks also follow a four year cycle similarly to US stocks. Vuchelen (2003) reports that political events such as elections, the formation of new governments and changes in the composition of governments as well as the ideological composition of the government can be significant determinant factors of stock market performance in Belgium. In the Arab world, Chau *et al*. (2014) examine the impact of political uncertainty caused by the "Arab Spring" on the volatility of major stock markets in the MENA region and find that conventional and Islamic market indices react heterogeneously to the political turmoil, that is, the volatility of Islamic indices increases more than the volatility in conventional markets during the period of political unrests. Al Shugaa and Masih (2014), Mnif and Kammoun (2015) and Abumustafa (2016) confirm the increase in volatility of Islamic stock markets caused by the events during the Arab Spring.

At a more international level, Bialkowski *et al*. (2007) examine whether in 24 countries not including US the political orientation of the incumbents affect stock markets in a different way. Their analysis reveals that there are no statistically significant differences in returns between left-wing and right-wing executives. Finally, Bialkowski *et al*. (2008) use a sample of 27 OECD countries to test whether national elections induce higher stock market volatility and find that the country-specific component of index return variance can easily double during the week around an election.

3. Methodology
In our study, we seek to define how the performance and volatility of the Greek stocks have been affected by the increased political risk and uncertainty over the period under examination. Performance of indices is assessed in two ways via calculating their raw daily returns and by computing their overall (total) return over several sub-periods. The return of each index is computed with the daily closing prices, which have been found on the website of the Greek economic newspaper "NAFTEMPORIKI". Daily return is computed in percentage terms using the following formula:

$$R_{i,t} = \frac{CP_{i,t} - CP_{i,t-1}}{CP_{i,t-1}} \tag{1}$$

where $R_{i,t}$ refers to percentage return of the *ith* stock index on day *t* and $CP_{i,t}$ refers to the closing trading price of this index on day *t*. The same formula is applied in the calculation of total returns with the difference that the term "CP_{t-1}" is replaced with the term "CP_{t-n}", with *n* being different from 1 and covering the entire sub-period examined each time.

Volatility in the Greek stock market is assessed using two alternative measures of risk. The first one is a standard measure of risk and concerns the so-called "total risk" computed as the standard deviation of indices' daily returns. The second type of volatility examined is the so-called "intraday volatility", which is computed as the percentage fraction of the highest minus the lowest trading price of each index on day *t* by its closing price on the same day. Intraday volatility is formulated as follows:

$$IntVol_{i,t} = \frac{HP_{i,t} - LP_{i,t}}{CP_{i,t}} \tag{2}$$

where $IntVol_{i,t}$ refers to intraday volatility of the *ith* stock index on day *t*, $HP_{i,t}$ refers to the highest trading price of the index on day *t*, $LP_{i,t}$ refers to the lowest trading price of the index on day *t* and $CP_{i,t}$ is defined as above.

In order to enhance the statistical validity of our analysis, we also perform a conditional volatility analysis using a Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model, which has been proved to capture volatility in stock markets in a satisfactory way. We use a GARCH(1,1) model, which is specified as follows:

$$R_t = X_t^{'}\theta + \varepsilon_t \tag{3}$$

$$\sigma_t^2 = \omega + \alpha\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 \tag{4}$$

in which the mean equation given in (3) is written as a function of exogenous variables with an error term. σ_t^2 is the conditional variance and is a function of a constant term (ω), news about volatility from the previous period, measured as the lag of the squared residual from the mean equation (ε_{t-1}^2), and the last period's forecast variance (σ_{t-1}^2).

4. Study Period and Sample

Our study period spans from 1/1/2014 to 11/20/2015 and considers the parliamentary elections that took place over that interval as well as the referendum of the 5th of July 2015, which asked the Greek people to decide whether the country should accept or not the suggested third bailout agreement by its creditors. Table 1 describes the ten different sub-periods assessed in our study.

The first sub-period spans from 1/1/2011 to 4/11/2012 and covers the beginning of our analysis till the 11st of April 2012, when the elections of the 6th of May 2012 were announced. The second interval covers the pre-election period and spans from 4/12/2012 to 5/6/2012. The third interval covers the period 5/7/2012-5/19/2012, which concerns the post-election period till the declaration of the new elections that were to take place on June 17, 2012. This new election process was triggered by the failure of the political parties in Greece to form a government. The fourth interval spans from 5/20/2012 to 6/17/2012 and relates to the new pre-election period. The fifth interval ranges from 6/18/2012 to 12/31/2014 and covers the post-election period till the announcement of the elections of the 25th of January 2015. The next interval considered is the period 1/1/2015-1/25/2015, which covers the pre-election period. The seventh period examined spans from to 1/26/2015 to 6/28/2015 and covers the period after the elections of the 25th of January 2015 till the announcement by the Greek Prime Minister Mr. Tsipras of the referendum of the 5th of July 2015.[2] The eighth interval ranges from 8/3/2015 to 8/28/2015 and concerns the period between the re-opening of Athens Exchange after the enforcement of capital controls by the 29th of June and the declaration of the new elections that were to take place on the 20th of September 2015. The ninth interval examined concerns the pre-election period. The last interval considered relates to the post-election period which ranges from 9/21/2015 to 11/20/2015.[3]

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[2] It is noted that the actual announcement of the referendum took place during the first hours of Saturday the 27th of June 2015 and was followed by the enforcement of capital controls in the Greek banking and capital markets by Monday the 29th of June 2015. As a result of the capital controls' enforcement, Athens Exchange halted its operation during the period 6/29/2015-8/3/2015. The referendum along with the capital controls fired a great anxiety in Greece and worldwide about the future of the country and its relationship with its creditors as well as its membership with the Eurozone.

[3] In our analysis, we do not take into consideration the Municipal and Prefectural elections that took place in May 2014, because, generally speaking, these type of elections are considered to contribute less to political risk as they do not result in a possible immediate change in the general government. The same applies to the European Parliamentary Elections of the same period.

In our study, we take into consideration four basic indices of the Greek stock Exchange. The first index considered is the General Index of Athens Exchange. The second index examined is the FTSE/Athex Market Index, which depicts the performance of all the companies quoted in Athens Exchange. The third index assessed is the FTSE/Athex Large Cap Index, which represents the performance of the twenty biggest companies listed in Athens Exchange in terms of market capitalization. The last index included in the sample is the FTSE/Athex Mid Cap Index, which tracks the performance of the next forty biggest companies listed in Athens Exchange.

Table 1: Study period

No	Interval	Event Examined
1.	1/1/2011 - 4/11/2012	It covers the beginning of our analysis till the 11st of April 2012, when the elections of the 6th of May 2012 were announced.
2.	4/12/2012 - 5/6/2012	It covers the pre-election period of the elections of the 6th of May 2012.
3.	5/7/2012 - 5/19/2012	It concerns the post-election period till the declaration of the new elections that were to take place on the 17th of June 2012. That new election process was triggered by the failure of the political parties in Greece to form a government.
4.	5/20/2012 - 6/17/2012	It relates to the new pre-election period for the elections of the 17th of June 2012.
5.	6/18/2012 - 12/31/2014	It covers the post-election period till the announcement of the elections of the 25th of January 2015.
6.	1/1/2015 - 1/25/2015	It covers the pre-election period for the elections of the 25th of January 2015.
7.	1/26/2015 - 6/28/2015	It covers the period after the elections of the 25th of January 2015 till the announcement by the Greek Prime Minister Mr. Tsipras of the referendum of the 5th of July 2015.
8.	8/3/2015 - 8/28/2015	It concerns the period between the re-opening of Athens Exchange after the enforcement of capital controls by the 29th of June and the declaration of the new elections that were to take place on the 20th of September 2015.
9.	8/29/2015 - 9/20/2015	It covers the pre-election period of the elections of the 20th of September 2015.
10.	9/21/2015 - 11/20/2015	It relates to the post-election period till the end of our study period.

5. Empirical Results
5.1 Return Analysis
Table 2 presents the returns of the four key indices of the Greek stock market over the ten sub-periods considered in our analysis. The table has two panels; one for the average daily returns and one for the total returns of indices over the relevant intervals examined.

Over the period 1/1/2011-4/11/2011, which refers to the period before the declaration of the elections of the 6th of May 2012, all the indices present negative returns with the mean daily return of the four indices being equal to -0.206%. In total return terms, the indices lost more than 53% of their values over the period 1/1/2011-4/11/2011. We point out that during that period Greece had already signed the first bailout agreement with its international creditors by the spring of 2010, which resulted in the enforcement of the first package of austerity measures towards the elimination of fiscal deficits. This factor must have contributed to the negative course of the Greek stock market.

Table 2: Return analysis

	Interv1	Interv2	Interv3	Interv4	Interv5	Interv6	Interv7	Interv8	Interv9	Interv10
Panel A: Average Daily Return										
General Index	-0.181	-0.336	-2.186	0.167	0.084	0.158	0.008	-1.009	0.648	-0.118
FTSE/Athex Market Index	-0.218	-0.485	-2.430	0.334	0.066	0.095	-0.015	-1.096	0.630	-0.082
FTSE/Athex Large Cap Index	-0.221	-0.497	-2.427	0.326	0.061	0.093	-0.024	-1.105	0.629	-0.076
FTSE/Athex Mid Cap Index	-0.205	-0.401	-2.487	0.332	0.079	0.167	0.197	-0.867	0.690	-0.223
Mean	-0.206	-0.430	-2.383	0.290	0.073	0.128	0.042	-1.019	0.649	-0.125
T-test		7.705[a]	39.798[a]	-24.883[a]	4.842[a]	-3.750[a]	2.175[b]	70.138[a]	-40.706[a]	16.026[a]
Panel B: Total Return										
General Index	-48.823	-4.664	-20.255	1.841	-97.989	2.976	-5.107	-20.527	10.060	-5.594
FTSE/Athex Market Index	-56.476	-6.657	-22.395	4.822	13.544	1.854	-8.487	-22.388	9.742	-4.278
FTSE/Athex Large Cap Index	-57.341	-6.823	-22.419	4.543	-46.468	1.627	-9.554	-22.614	9.712	-4.035
FTSE/Athex Mid Cap Index	-52.050	-5.500	-22.582	5.669	261.62	7.296	17.172	-17.694	10.742	-9.473
Mean	-53.673	-5.911	-21.913	4.219	32.677	3.438	-1.494	-20.806	10.064	-5.845
T-test		-32.276[a]	44.241[a]	-19.022[a]	-0.360	0.373	0.991	3.708[a]	-34.314[a]	10.636[a]

Notes: T-test assesses the statistical significance of the difference in mean estimates between two successive intervals. [a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level.

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Returns are also negative during the pre-election period of the elections of the 6th of May 2012 with the average daily return of indices being equal to -0.430%. This average return is more negative than the corresponding average return of the period before the announcement of elections. After the elections of the 6th of May, returns become even more negative till the announcement of the new elections of the 17th of June 2012 as a result of the failure of the political parties in Greece to form a cooperative government.

Generally speaking, the negative returns of the total period ranging from the announcement of the elections of the 6th of May till the announcement of the new elections of the 17th of June, i.e., the period 4/11/2011-5/19/2012, are indicative of the withdrawal of investors from the Greek stock market as a result of the increased concern about an imminent exit of Greece from the Eurozone, the well-known GREXIT, due to the deteriorating fiscal position of the country and its huge sovereign debt.

This increased fear seems to fade away after the announcement of the elections of the 17th of June 2012, given that the majority of indices present positive average returns over the pre- and post-election periods and up to the announcement of the new elections that were to take place on the 25th of January, 2015. We remind that the new elections were announced on 31 December 2014. The positive average returns of that period are possibly the outcome of the quite successful policy on behalf of the Greek government towards the fiscal adjustment mandated by the memorandum of understanding accompanying the bailout agreements between Greece and its creditors.

In addition, the concern about a GREXIT was limited during that period and the confidence of international investors that the Greek economy would recover was partially restored. These facts might have contributed to the positive course of the Greek stock market. Moreover, the Greek stock indices also present positive returns during the pre-election period 1/1/2015-1/25/2015. This positive course of Athens Exchange might relate to the increased optimism and the positive expectations among the Greek people which were based on the imminent change in the Greek political scene that would bring SYRIZA in power.

When it comes to the period after the elections of the 25th of January 2015 and till the announcement of the referendum of the 5th of July 2015, that is, the period spanning from 1/26/2015-6/28/2015, the returns of three out of the four indices examined are basically negative. Only the FTSE/Athex Mid Cap Index presents materially positive returns. This index might have played a safe haven role for investors. The negative returns of the period must have been affected by the recovered fear about a GREXIT from the Eurozone as a result of the long-lasting negotiations between the new Greek government and the international creditors and the inability to reach a new agreement about the unhindered financing of Greece. The fear of a GREXIT was escalating up to the announcement of the referendum of the 5th of July.

The announcement of the referendum raised the fear of a GREXIT to its top. Even though an agreement was finally reached between Greece and creditors on the 13rd of July 2015, a possible GREXIT was the main topic on the media worldwide up to the 28th of August 2015, when the elections of the 20th of next September were announced. The events of that period combined with the capital controls imposed in the Greek banking system and the close of Athens Exchange till the 3rd of August 2015 must have contributed to the significant losses of about 21% accrued in the Greek stock market over the period 8/3/2015-8/28/2015.

Optimism seems to return in the Greek stock market by the announcement of the new elections of the 20th of next September and up to the date of elections as shown in the positive returns of the four indices under study. Both the average daily returns and the total returns of indices during the period 8/29/2015-9/20/2015 are significantly positive with the mean total return of the four indices being equal to about 10% during that interval. Unfortunately, after the elections of the 20th of September 2015 pessimism returns in the Greek market after the

specification of the severe austerity measures mandated by the new bailout agreement of the 13rd of July 2015. Pessimism is reflected to the negative returns of the four indices of Athens Exchange after the elections of the 20th of September 2015 and up to 11/20/2015.

When it comes to the statistical significance of the results presented above, Table 2 includes t-statistics on the difference in mean returns between two successive periods. In the case of average daily returns, the t-statistics indicate that the differences in returns are all highly significant at the 5% level or better. With just three exceptions, this is also the case for total (cumulative) returns too.

In order to enhance the clarity of our analysis, we provide in Figure 1 a graph of returns of the Greek stock indices during the ten sub-periods considered in our study. The figures includes ten individual graphs for the group of the four indices examined. The graphs verify the analysis made so far on raw average returns. For instance, returns move around zero over the period before the announcement of elections of the 6th of May 2012, they are more negative during the respective pre-elections period and they become even more negative during the period which covers the elections of the 6th of May 2012 up to the announcement of the new elections of the 17th of June 2012.
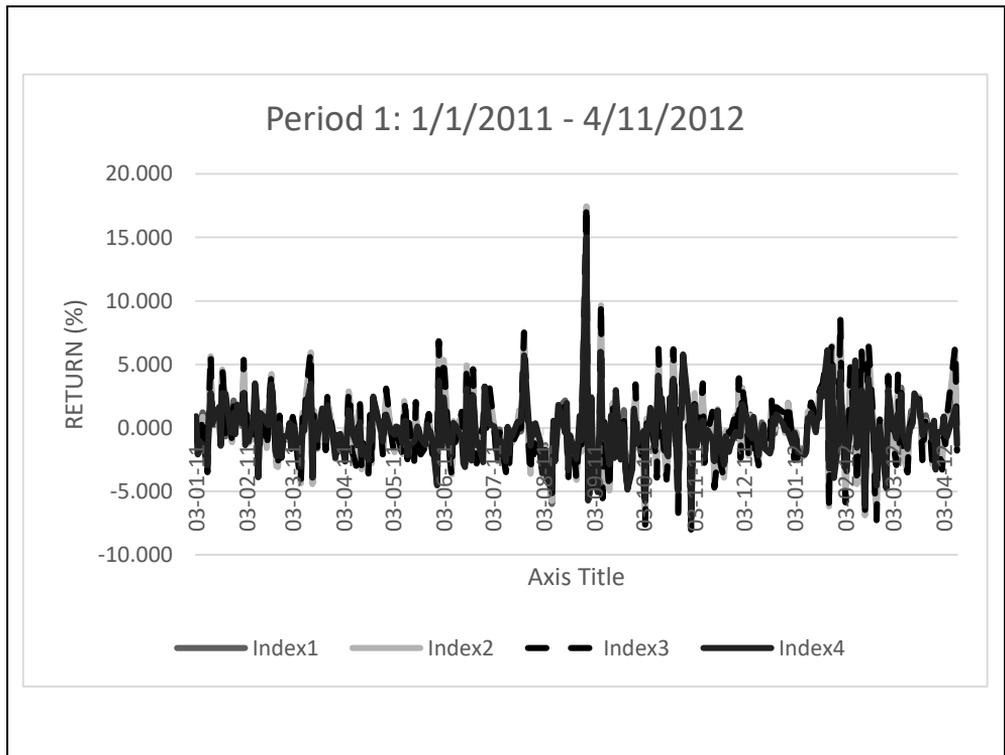
Notes: Index 1: General Index; Index 2: FTSE/Athex Market Index; Index 3: FTSE/Athex Large Cap Index; Index 4: FTSE/Athex Mid Cap Index

Figure 1: Returns of Greek Stock Indices over the period 1/1/2011 - 11/20/2015
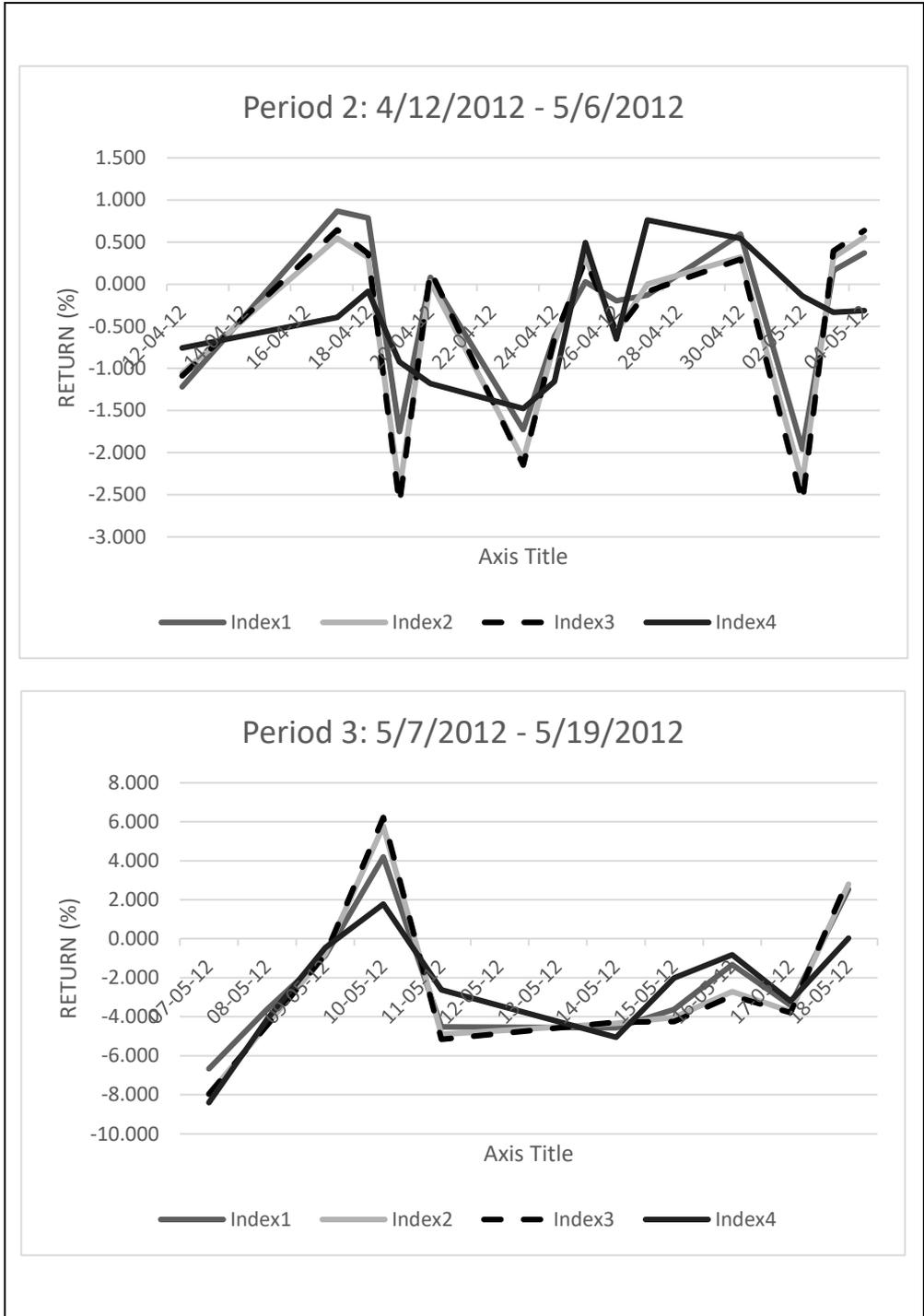
Period 2: 4/12/2012 - 5/6/2012

Period 3: 5/7/2012 - 5/19/2012
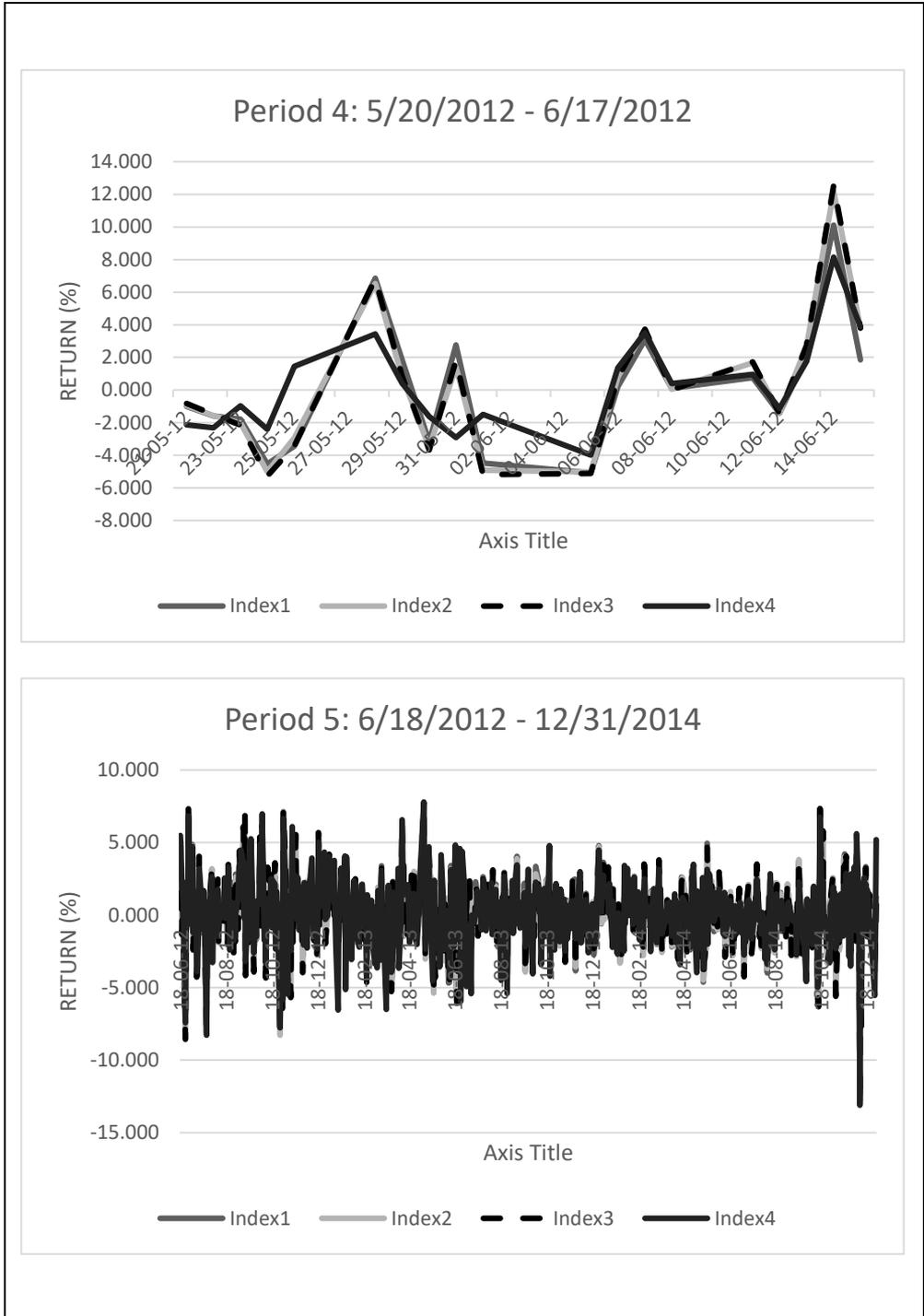
Notes: Index 1: General Index; Index 2: FTSE/Athex Market Index; Index 3: FTSE/Athex Large Cap Index; Index 4: FTSE/Athex Mid Cap Index

Figure 1 *(continued)*

Notes: Index 1: General Index; Index 2: FTSE/Athex Market Index; Index 3: FTSE/Athex Large Cap Index; Index 4: FTSE/Athex Mid Cap Index

Figure 1 *(continued)*

Period 6: 1/1/2015 - 1/25/2015
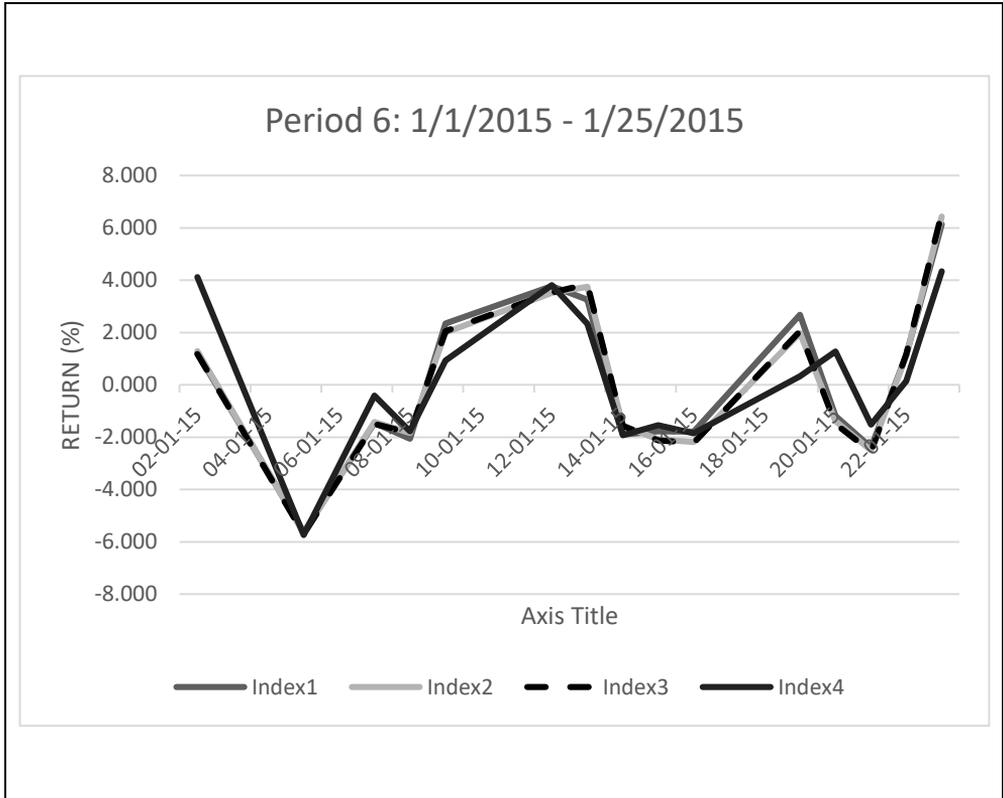
Notes: Index 1: General Index; Index 2: FTSE/Athex Market Index; Index 3: FTSE/Athex Large Cap Index; Index 4: FTSE/Athex Mid Cap Index

Figure 1 *(continued)*

Overall, the graphs show that, stock returns during the pre-election periods are positive. One exception to this finding concerns the pre-election period of the 6th of May 2012. Another period with positive average returns is the interval 6/18/2012 - 12/31/2014, which covers the post-election period of the 17th of June 2012 up to the announcement of the elections of the 25th of January 2015. During the rest of the periods examined, returns are, on average, negative. The main inference drawn from analysing the returns in the Greek stock market over the 2011-2015 period by taking into account the elections and the referendum conducted during that period is that, given the suffocative economic conditions in Greece, as a result of the three bailout programs signed between Greece and its creditors, the announcement of a new election process plays a somehow decompressing role and stimulates a sense of optimism, which is reflected to the positive returns of the Greek equity indices during the several pre-election periods examined. Unfortunately, this optimism is extremely short-lived as it tends to vanish after the date of elections with the exception of the period after the elections of the 17th of July 2012, which resulted in the formation of the government supported by New Democracy, PASOK and the Democratic Left Party[4] and till the 31st of December 2014, when the elections of the 25th of January 2015 were announced.

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[4] The Democratic Left Party withdrew from the government in June 2013.

5.2 Risk Analysis

Table 3 presents the risk estimates of the four indices of Athens Exchange examined over the ten sub-periods considered in this study. The table has two panels; the first panel concerns the risk expressed in return standard deviation terms. This is a standard measure of an equity investment's risk. The second panel includes the intraday volatility of indices. This is an alternative way to measure risk calculated as the percentage fraction of the highest minus the lowest trading price of each index on day *t* by its closing price on the same day.

The basic finding in Table 3 is that, during the pre-election periods, risk is, on average (but not in each individual pre-election period), lower than the risk during the periods before the announcement of elections or during the periods after the date of elections. This inference is verified by calculating the average risk estimate of the four indices for the four pre-election periods considered, namely the periods 4/12-5/6/2012, 5/20-6/17/2012, 1/1-1/25/2015 and 8/29-9/20/2015, and comparing it to the average risk of indices for the rest of the periods under examination. More specifically, the average standard deviation of indices during the pre-election periods is equal to 2.307% whereas the corresponding average standard deviation during the rest of the periods is equal to 3.147%. The respective average estimates in intraday volatility terms are equal to 3.047% and 3.844%.

As far as the statistical significance of the differences in mean risk estimates between the successive periods examined is concerned, the relevant t-statistics presented in table 3 indicate that, with the exception of the intervals before and after the elections of the 20th of September 2015, the differences in mean risks are all highly statistically significant, both when standard deviation of returns and intraday volatilities are taken into consideration.

Overall, the average risk estimates above verify our inference about the decreased volatility in the Greek market during the pre-election periods. This finding boosts the assertion in the section of return analysis about the decompressing role of elections' announcement and the optimism developed after the announcements, which both contribute to the positive returns presented by the equity indices of Athens Exchange over the pre-election periods.

Moreover, the high volatility in the Greek market before the announcement and after the conduction of elections is an indication of the return to pessimism mainly due to the failure of governments to meet the expectations of the people and fulfil the commitments undertaken during the pre-election periods. In addition, the harsh economic conditions over the study period, the severe austerity measures and the rapid fiscal adjustment required by the bailout agreements, and the frequent reappearance of scenarios about a GREXIT in the international press affect the course of the Greek market in a negative way. We remind that, in the previous section, with the exception of the pre-election periods, returns were found to be negative over the rest of the periods examined. These negative returns combined with high volatility translate into an extremely precarious environment for investors interested in the Greek stocks.

A last observation with respect to volatility is that after the announcement of the referendum of the 5th of July 2015 and up to the announcement of the elections of the 20th of September 2015, which is during the period 6/28/2015-8/28/2015, volatility is by far the greatest among all the periods considered. We remind that the announcement of the referendum triggered the enforcement of capital controls in the Greek banking and capital markets and fired the highest fear ever about the exit of Greece from the Eurozone. The second most volatile period of the Greek stock market covers the interval 5/7-6/17/2012, which is the time between the two successive election processes in 2012 when a GREXIT was highly probable.

Table 3: Risk analysis

	Interv1	Interv2	Interv3	Interv4	Interv5	Interv6	Interv7	Interv8	Interv9	Interv10
Panel A: Standard Deviation of Returns										
General Index	2.400	0.966	3.371	3.912	2.115	3.081	3.482	5.154	1.219	1.579
FTSE/Athex Market Index	2.901	1.091	4.033	4.318	2.288	3.115	3.823	5.729	1.358	1.813
FTSE/Athex Large Cap Index	3.008	1.175	4.200	4.481	2.326	3.162	3.899	5.813	1.387	1.867
FTSE/Athex Mid Cap Index	2.235	0.681	2.914	2.973	2.287	2.753	2.908	4.453	1.232	0.924
Mean	2.636	0.978	3.630	3.921	2.254	3.028	3.528	5.287	1.299	1.546
T-test		16.955[a]	-13.544[a]	-2.959[b]	4.972[a]	-7.205[a]	-3.627[a]	-19.369[a]	14.329[a]	-1.322
Panel B: Intraday Volatility										
General Index	3.034	1.871	5.080	4.387	2.668	3.490	4.067	4.784	1.966	2.056
FTSE/Athex Market Index	3.662	2.350	6.134	4.872	2.873	3.691	4.466	5.292	2.226	2.314
FTSE/Athex Large Cap Index	3.761	2.541	6.413	5.108	2.940	3.778	4.585	5.393	2.290	2.381
FTSE/Athex Mid Cap Index	2.648	1.540	4.673	3.417	2.838	3.190	3.674	4.732	2.033	1.797
Mean	3.276	2.076	5.575	4.446	2.830	3.537	4.198	5.050	2.129	2.137
T-test		27.562[a]	-18.309[a]	7.747[a]	4.516[a]	-5.966[a]	-8.489[a]	-11.737[a]	29.969[a]	-0.101

Notes: T-test assesses the statistical significance of the difference in mean estimates between two successive intervals. [a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level.

The analysis above is based on unconditional estimates of risk. The results of the GARCH (1,1) process used to measure the conditional risk in the Greek stock market over the period 2011-2015 are presented in Table 4. The table has two panels; one for the conditional variance obtained by equation (4) and one for the conditional volatility computed as the square root of conditional variance.

The results in Table 4 indicate that the conditional risk moves similarly to the unconditional risk in Table 3. The only exception to this observation concerns the periods 6 and 7. In particular, in the case of unconditional risk, volatility in period 7 increases relative to period 6 while the opposite trend is observed when conditional risk is taken into consideration. When it comes to the statistical significance of the differences in mean conditional risk estimates among the successive study sub-periods, the relevant t-statistics indicate that differences are highly significant, with the exception of periods 5 and 6 and 9 and 10.

5.3 Comparison to the Literature

In this section, we compare the results of our analysis to the findings of other relevant studies on international stock markets and Greece in order to highlight the contribution of our study and the policy implications drawn from our findings.

Before conducting such a comparison, we should point out first that our study is not absolutely comparable to the large body of the studies concerning the US market, given that these studies mainly seek to accentuate the impact on the stock market by a Democratic or a Republican administration. In addition, other international studies focus on the impact on stock markets by specific events, such as the Arab Spring, or different political regimes, i.e., left-wing or right-wing administrations. Moreover, the uniqueness of Greece among the countries of "West" as the only country with so frequent and radical changes in the political environment over the recent years characterized by extremely short-lived governments and as the first country in the Eurozone which needed an international bailout is another element which makes our study less comparable to other studies in the literature. On the other hand, these are the main factors which boost the originality of our paper, even though, from a methodological perspective, our study is not that innovative.

Given the limitations above, our observation that the variance in the Greek market is relatively low during the pre-election periods compared to the volatility during post-election periods contradicts the findings of Gärtner and Wellershoff (1995, 1999) and Goodell and Vähämaa (2013), which show that the volatility in the US stock market increases during the pre-election period compared to the post-election period.

On the other hand, if we consider the heated Greek political environment over the study period as a period of a relative political unrest, we may draw a comparison between Greece and Arab Markets during the "Arab Spring", during which volatility in Islamic stock markets increases, as evidenced by the studies of Chau *et al*. (2014), Al Shugaa and Masih (2014), Mnif and Kammoun (2015) and Abumustafa (2016). The overall volatility in the Greek stock market is also increased during the period under investigation.

Possibly the most comparable study to our own is that of Floros (2008), who, examining the Greek market during the pre-crisis period 1996-2002, finds that the average performance of the General Index increases two months prior to the elections while it starts to decrease one month before the elections. In our case, we find that returns during pre-election periods are mainly positive, however, the intervals used in our analysis are not absolutely comparable to those of Floros (2008). A relative similarity between our results and those of Floros (2008) concern volatility. In particular, in our case, volatility is low during the pre-election periods. This is also the case in Floros (2008) two months before the elections.

Table 4: Conditional risk analysis

	Interv1	Interv2	Interv3	Interv4	Interv5	Interv6	Interv7	Interv8	Interv9	Interv10
Panel A: Conditional Variance										
General Index	1.346	1.095	5.899	4.45	1.107	2.776	1.426	5.216	0.85	1.176
FTSE/Athex Market Index	1.662	1.337	7.725	2.36	1.075	2.466	1.538	6.059	0.818	1.208
FTSE/Athex Large Cap Index	1.758	1.506	8.416	2.755	1.081	2.919	1.567	7.044	0.775	1.247
FTSE/Athex Mid Cap Index	1.179	0.961	1.454	0.383	1.105	3.075	1.05	6.42	1.239	0.962
Mean	1.486	1.225	5.873	2.487	1.092	2.809	1.395	6.185	0.921	1.148
T-test		11.575[a]	-3.193[a]	2.750[b]	1.671	-13.746[a]	6.232[a]	-12.098[a]	13.503[a]	-1.333
Panel B: Conditional Volatility										
General Index	1.160	1.047	2.429	2.110	1.052	1.666	1.194	2.284	0.922	1.084
FTSE/Athex Market Index	1.289	1.156	2.779	1.536	1.037	1.570	1.240	2.461	0.904	1.099
FTSE/Athex Large Cap Index	1.326	1.227	2.901	1.660	1.040	1.709	1.252	2.654	0.880	1.117
FTSE/Athex Mid Cap Index	1.086	0.980	1.206	0.619	1.051	1.754	1.025	2.534	1.113	0.981
Mean	1.215	1.103	2.329	1.481	1.045	1.675	1.178	2.483	0.955	1.070
T-test		15.382[a]	-3.613[a]	3.618[a]	1.392	-16.976[a]	5.942[a]	-14.003[a]	16.714[a]	-1.376

Notes: T-test assesses the statistical significance of the difference in mean estimates between two successive intervals. [a] indicates statistical significance at 1% level; [b] indicates statistical significance at 5% level.

The subject of our study entails significant implications from a political and economic perspective. The key issue is that, in order for a country to thrive, political stability is of outmost importance. A turbulent political environment discourages investments by both domestic and international investors in capital markets and the "real" economy. Among others, less expenditure on investments entails less growth, less profitable opportunities, lower income, higher unemployment rates, lower social prosperity. In such an environment, societies and economies are caught in a vicious circle of misery and pauperization.

The analysis above highlights the necessity for the Greek political parties to set aside their ideological and other differences and work together in order for Greece to overcome the current severe economic hardship. In addition, the Greek experience may be used by other countries as a case study of what a country facing major financial and economic difficulties should and should not do in order to deal with its problems.

6. Conclusion

In this article we try to answer whether and how the multiple election processes that took place in Greece over the last five years affected the Greek stock market. In particular, we examine whether the high political risk deriving from the frequent elections influences the performance and volatility in the Greek market.

In our study, we use four key indices of the Greek stock market and consider the period 1/1/2011-11/20/2015 by taking into account the several parliamentary elections and the referendum that took place over that period. In addition, we consider ten sub-intervals relating to the announcement of elections, the relevant pre-election periods and the periods after the elections.

With respect to performance, the basic inference drawn from our analysis is that, given the suffocative economic conditions in Greece as a result of the three bailout programs signed between Greece and its creditors, the announcement of new elections exerts a positive influence on the Greek stock market and creates a sense of optimism, which is reflected to the positive returns of the Greek equity indices during the several pre-election periods examined. However, this optimism does not last for a long time and tends to vanish after the conduction of elections. The only exception to this finding relates to the period after the elections of the 17th of July 2012 which resulted in the formation of the government supported by New Democracy, PASOK and the Democratic Left Party and till the 31st of December 2014, when the elections of the 25th of January 2015 were announced.

The main inference in regard to volatility is that, on average, risk in Athens Exchange is lower over the pre-election periods (but not in each single pre-election period) than during the periods before the announcement or after the conduction of elections. This finding verifies the inference based on the results of return analysis that the announcement of elections plays a decompressing role and results in a short-term optimism, which is reflected to the positive returns presented by the equity indices of Athens Exchange over the pre-election periods. Another significant finding about volatility is that after the declaration of the referendum of the 5th of July 2015 on the 28th of June 2015 and till the announcement of the elections of the 20th of September 2015 on the 28th of August 2015, risk is by far the highest among the average risk estimates of all the sub-periods examined.

When it comes to the key question of the current study about whether the frequent election processes can cause a negative impact on the Greek stock market, the answer deriving from the analysis of performance and volatility in Athens Exchange over the period 2011-2015 is that the announcement of a new election contest can temporarily contribute to the Greek stock market in a positive way. However, the policy implemented by the Greek governments and the measures taken after the conduction of elections are the two factors, besides the institutional characteristics and financial figures of the companies listed in Athens Exchange,

which crucially affect the pricing behaviour of Greek equity shares. The role of these factors is dual given that they can influence the key financial figures of the companies themselves as well as the overall economic and investing environment, which can also affect the value of the companies listed in Athens Exchange.

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