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EURO-MEDITERRANEAN FINANCIAL MARKETS REACTION TO POLITICAL ELECTIONS

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ABSTRACT

This paper studies a sample of Euro-Mediterranean countries to test the link of political-financial interdependencies. We focus specifically on the impact of the occurrence of national elections on the reaction of financial markets. We used the GARCH (1,1) model and the concept of the volatility multiplier to test our hypotheses. The results established that political elections have a significant impact on stock market performance and volatility for Euro-Mediterranean countries. We detected anomalous behavior in stock market returns. Stock market returns on election day and in the days following the election are inversely higher as uncertainty about the election outcome decreases. Investor uncertainty, combined with the consequences of the multiparty system in Euro-Mediterranean countries, leads to negative abnormal returns around elections. In terms of volatility, we found that the greater degree of uncertainty about the situation and the market disruption affected by the media and social networks increase volatility before election day.

Contribution/ Originality: This study contributes to the existing literature on the irregularities of stock market returns. It is one of the few studies to have examined the reaction of stock markets to political elections in Euro-Mediterranean countries. The paper contributes to the linkage analysis of political-financial interdependencies.

1. INTRODUCTION

Beyond the premises of the theory of market efficiency, a plethora of articles and increasingly sophisticated empirical works have been interested in studying the irregularities of stock market returns. Their results contradict the assumptions of this theory and have shown the failure of standard valuation models to explain the magnitude of stock market fluctuations. Several irregularities in stock returns were identified as anomalies, as they cannot be explained in the paradigm of efficient market assumptions. Unlike conventional dividends and earnings, volatility factors must be identified and evaluated (Bialkowski, Gottschalk, & Wisniewski, 2008). Thus, different studies have focused on finding possible stock market anomalies such as seasonal effects, the January effect, the vacation effect, the month change and weekend effect or economic phenomena.

Recently, the literature on stock market anomalies has been enriched by new empirical models linking stock market determinants to political variables (Baker, Nicholas, and Davis (2016) and Lehkonen and Heimonen (2015)).

These studies have largely demonstrated their relevance to political anomalies. Indeed, the previous literature had emphasized the interdependence between politics and economics by referring to important theories such as the partisan preference theory of Nordhaus (1975) or Hibbs (1977), which was modified to incorporate rational expectations by Alesina (1987). Recently, new empirical evidence has rekindled interest and curiosity in dissecting financial markets from a policy perspective. Research by Pantzalis, Stangeland, and Turtle (2000); Santa-Clara and Valkanov (2003); Booth and Booth (2003) and Honghai, Libing, Sunqi, and Donglei (2017), which examines the behavior of stock markets around election dates, argues that political events generally have a large influence on financial markets. Investors may adjust their expectations and revise their strategies based on new policies such as monetary policies, taxes or election results.

This article focuses on this link of political-financial interdependencies by specifically studying the reaction of financial markets to the occurrence of elections. A growing body of research has examined the effects of national elections on stock market performance (Floros, 2008; Knight, 2006; Li & Born, 2006) among others) and has shown a significant effect of national elections on stock market performance. Other studies have focused on jointly analyzing the effect of national elections on stock market volatility and performance, such as Bialkowski et al. (2008); Honghai et al. (2017); Goodell and Vähämaa (2013). On the other hand, the lack of election certainty and its effect have been interpreted in different additional theoretical and empirical frameworks as in Baker et al. (2016), Pastor and Veronesi (2012) and Kelly, Pastor, and Veronesi (2016).

Historically, national elections are one of the most important political events in any nation. This event is preceded by a year of debates between the candidates, extensive media coverage and various prognostications that have a strong impact on investor behavior and financial markets. Investors are often faced with uncertainty related to changes in government and economic policies. This uncertainty can alter their future actions and decisions and thus impact the financial market (Baker et al. (2016) and Lehkonen and Heimonen (2015)). In a theoretical and empirical framework, Kelly et al. (2016) show that political uncertainty is valued in the equity option market. In fact, in the financial market, investors always anticipate price movements, based on upcoming news. In a climate of uncertainty about the outcome of elections, these investors tend to freeze their trades or simply withdraw from the market. Their profitability prospects change accordingly (Cosset & Suret, 1995). Sometimes, investors' fears dissipate, and the market can be active even before the elections to the extent that election results can be predicted. Therefore, the level of uncertainty can be said to determine price movements. Generally speaking, investors, based on their anticipation, tend to rush into the market, looking for a bull market and mainly motivated by the positive atmosphere expected after the elections.

The analysis of political cycles in stock market returns has been conducted mainly in the United States and/or in developed markets. We use an analysis of the stock market reaction to political elections in the Euro-Mediterranean countries. Indeed, this area constitutes a very important geopolitical bloc of interest. This importance is reflected in various agreements (commercial, political, economic, etc.). Based on the assumption that the effects of political uncertainty propagate across countries (Kelly et al., 2016), we focused on the entire zone rather than on a single country. Overall political and financial stability is critical; hence, our choice of study is useful. The Euro-Mediterranean zone has long been invested with important strategic stakes: confrontation between Arabs and Europeans and rivalry between powers, colonization and the emergence of the terrorist threat. Since January 2011, it has been a region of political demands for governance that is more attentive to the aspirations of the people, as in Tunisia. These recent developments in the democratic process and the advent of governments resulting from free and transparent elections have revived interest in examining the relationship between electoral mandates and economic policies as reflected in stock prices. We have therefore chosen to work on a sample of seven countries, namely Tunisia, Morocco, Turkey, Spain, France, Greece and Italy. To the best of our knowledge, our research is the first to examine the reaction of the financial markets at the Euro-Mediterranean level to the occurrence of a political event, namely elections. Therefore, we answer the following main question:

What is the impact of the occurrence of a national election on the performance and volatility of stock markets in the Euro-Mediterranean countries. Our answer will be based, first, on a classical event study methodology and, second, it will be developed by analyzing the results of an event study based on a GARCH (1,1) model and the concept of the volatility multiplier. We rely on GARCH models because they are designed to deal with the non-stationarity assumption of financial data that generally have stylized characteristics. They exhibit volatility clustering, leptokurtosis (the distribution of returns is fat-tailed) and leverage. The GARCH (1,1) model allows us to deal with the heteroscedasticity of the time series and to provide a measure of volatility.

Our empirical results establish that political elections have a significant impact on the performance and volatility of Euro-Mediterranean stock markets. These results for the Euro-Mediterranean stock market are significantly different from the results reported in the literature for the US stock market. These results are at odds with the opportunistic political business cycle (OPBC), which is based on the idea that in order to maximize votes, ruling parties, relying on voters' short-sightedness, maneuver economic policy to create favorable economic conditions for election dates and generate pre-election boom cycles. For our sample, stock market returns decline before political elections and increase right after. This is consistent with the literature that reports that stock returns are lower if uncertainty is higher considering that risk averse investors do not like uncertainty. Political uncertainty is related to cabinet changes, government ideology or volatility in the distribution of seats in parliament. Stock market returns on election day and in the days following the election are inversely higher as uncertainty about the outcome of the election decreases. Euro-Mediterranean countries have a multi-party system that can explain the negative abnormal returns around elections. Thus, we can argue that investors uncertainty, combined with the consequences of the multiparty system, leads to negative abnormal returns before election day. In terms of volatility, we found that the greater degree of uncertainty about the situation and the market disruptions affected by the media and social networks increase volatility before election day. The month before the political elections is characterized by an increase in risk related to the outcome of the formation of the new government, the economic policy adopted during its term, as well as a decrease in performance. However, the month following the election date is characterized by a decrease in the level of volatility; this could be due to a clearer view of the country's new government, the economic policies adopted, as well as an increase in performance.

Our study will be organized as follows. The second section presents a review of the previous literature on the effects of national elections on market response. The third section describes the study sample, the elections to be studied, and the methodology. The main results of this methodology will be presented and discussed in the fourth section.

2. LITERATURE REVIEW

The literature on political cycles in stock market returns has been conducted for different country samples. Established political events, particularly national elections, are known to have a significant impact on financial markets. Our research is related to at least two strands of this literature: one on the effects of national elections on stock market performance and the other on the effect of national elections on stock market volatility.

2.1. Effects of National Elections on the Stock Market Performance

In order to measure the effect of political events on financial markets, several research studies have focused on the analysis of political instability to explain financial development in the world. They have shown that variation in political stability has had a significant, substantial and consistent impact on financial market development over several decades. The research attempted to show how political events impose structure on market returns. They report that they create policies that stimulate the economy and promote stock market returns (Hensel & Ziemba, 1995). According to Vuchelen (2003), it is policymakers who systematically seek to increase stock prices before elections. Nevertheless, stock prices are a function of the level of uncertainty in the market. According to Brown,

Harlow, and Tinic (1988), for example, in response to increased uncertainty, investors price below their fundamental values prior to an event. A corrective trend will ensue, involving an increase in stock prices when the level of uncertainty decreases and the outcome of the election becomes more certain.

Bilson, Brailsford, and Hooper (2002) and Roe and Siegel (2011) examined this relationship between political risk and stock market returns for different types of markets (emerging and developed) and found that political risk is important in explaining the change in stock market performance. The authors studied national elections as a political event that has a significant impact on the stock market. In this context, Lobo (1999) based his study on the U.S. market by analyzing the impact of U.S. elections on stock market returns for the period from January 1965 to December 1996 using a jump-diffusion model composed of a geometric Brownian motion and a Poisson process. He concluded that elections are an important source of uncertainty for the stock market and that the election period is characterized by lower returns compared to non-election years. His result is consistent with that of Allvine and O'Neill (1980) who found that the U.S. stock market, for the period between 1961 and 1987 had an upward trend in the two years preceding the presidential elections. Pantzalis et al. (2000) in turn analyzed the stock market reaction around elections for 33 countries using an event study methodology. The results showed that the stock market reaction is positive and significant for the two weeks preceding the political elections. They showed that when there is a higher degree of uncertainty before an election process, there is a corresponding increase in stock prices due to this uncertainty. Wang and Lin (2009) also examined the relationship between politics and Taiwan's financial market by focusing on the effects of legislative sessions between the pre- and post-power change period on returns. Methodologically, the authors used an AR (3) and EGARCH (1,1) model. They showed that returns are significantly negative at the 5% threshold after a change in power. With different modeling methods, other studies document a significant impact of general elections on the price of the Athens stock exchange and the New Zealand stock exchange (Floros, 2008).

Different results have been reported by research on general elections. From this point of view, Mandacı (2003) analyzed, for the Turkish market, the impact of general elections on the performance of the ISE100 stock index based on an event window (15, +15). He found that only certain elections are followed by abnormal returns. Returns are significantly higher during elections. Döpke and Pierdzioch (2006) studied the relationship between market movements and the political process in Germany and compared it with the results found in the literature on the US stock market. The results showed that stock market returns increase with the liberal government as well as under the conservative government. They also concluded that there is no relationship between stock market returns and elections, unlike the results found in the United States. These results suggest that the effect of elections on the stock market cannot be generalized to all elections and depends on the level of uncertainty in the political environment and macroeconomic conditions.

2.2. The Impact of National Elections on Volatility

Any type of event can cause variations in the stock market. Macroeconomic news, especially political events, have been documented to have a significant impact on stock market volatility (see among others (Engle. & Victor, 1993; Mehdian, Tevfik, & Perry, 2008)). Nikkinen and Sahlström (2004) report an increase in the volatility of financial asset prices in the run-up to a macroeconomic announcement that creates uncertainty, followed by a rapid drop when the data is released. Studies have particularly focused on political elections and their effect on stock market volatility, as well as on stock market performance. A large body of interesting research, such as Herbst and Slinkman (1984); Huang (1985); Lobo (1999); Li and Born (2006); Bialkowski et al. (2008); Goodell and Vähämaa (2013); Wang and Lin (2009); Johnson, Chittenden, and Jensen (1999); Lehkonen and Heimonen (2015); Li and Born (2006); Smales (2014); Smales (2015); Smales (2016) have analyzed how a political election can induce greater stock market volatility. Herbst and Slinkman (1984); Huang (1985) and Lobo (1999) found that volatility is high in an election year.

In particular, Bialkowski et al. (2008) conducted a study that examines the impact of political elections on the volatility of stock returns for indices from 27 OECD countries. They adapted an event study methodology that measures conditional abnormal volatility using a GARCH (1,1) model. They found that stock markets are extremely sensitive around elections in terms of volatility. The authors explain these results by the fact that investors are always surprised by the final distribution of votes despite many efforts to accurately predict election results. In response to this surprise, stock prices react strongly by temporarily exhibiting high levels of volatility. It is important to note that the margin of victory and the change in political orientation of the government are key factors in explaining the magnitude of election shocks. For the U.S. presidential election, Li and Born (2006) report that stock market volatility increases when the presidential election has no clear winner. Smales (2015) also argue that stock market uncertainty fades with the increase in the probability of the incumbent president winning.

Goodell and Vähämaa (2013); Smales (2014); Smales (2016) focus on the effect of presidential elections on implied volatility and show that implied volatility in financial markets increases with uncertainty around election outcomes. Indeed, stock market uncertainty increases with positive changes in the probability of success of the potential winner as investors revise their expectations about future macroeconomic policy. These results provide support for the political uncertainty hypothesis, which assumes that information about the probability of an election winner reflects in particular information about future macroeconomic policy.

3. EMPIRICAL METHODOLOGY

In our study, we used the event study methodology to adapt the approach described in the work of Bialkowski et al. (2008). The event study methodology adopted consists of three steps. The first step is to identify and date public events. The definition and calculation of abnormal volatilities is the subject of the second step. In the third step, we analyze the abnormal volatilities.

3.1. Description of the Sample of the Study

In this study, we analyze the stock market reaction to political elections in the Euro-Mediterranean countries. We chose to work on a sample of seven countries, namely Tunisia, Morocco, Turkey, Spain, France, Greece and Italy. To analyze the effect of political events on stock markets, we focused on the aggregate stock market indices of each country. This choice is justified by the nature of the events to be studied. These are political elections, and therefore events of a macroeconomic nature that have effects not only on one sector but on the entire market.

Table 1 below summarizes the set of indices for the countries in our sample as well as the different sources of collection of their historical price during the study period which runs from January 1, 2001 to March 31, 2018.

Table-1. Main indices of the countries of the Euro-Mediterranean area.

Pays	Indice	Source
Espagne	IBEX35	Bloomberg
France	CAC40	www.finance.yahoo.com
Grèce	Athen index compos (GD)	www.finance.yahoo.com
Italie	FTSE MIB	www.finance.yahoo.com
Maroc	MASI	www.cdgcapitalbourse.ma
Tunisie	Tunindex	www.bvmt.com.tn
Turquie	ISE100	www.finance.yahoo.com

The study period was set based on the relevance of the events. Indeed, according to Roe and Siegel (2011), linking the political and financial components requires that the country under study be considered democratic during the event period. Thus, only elections held in the period when the country is considered democratic are considered in our study sample. For example, Tunisia was only considered after the 2011 revolution. Furthermore, for the purpose of our study, we collected historical prices of MSCI world indices for all countries from the

Bloomberg website. Table 2 presents the descriptive statistics of the returns of the stock market indices used in the study.

Table-2. Descriptive Statistics for Index returns.

	Mean	Max	Min	Sd	Sekewness	Kurtosis
IBEX35	0.00007	0.1348	-0.0959	0.0152	0.0840	5.2152
CAC40	-0.00004	0.1059	-0.0947	0.0150	0.0341	5.1221
ATHEX	-0.00040	0.1343	-0.1367	0.0182	-0.0685	4.8172
FTSE MIB	-0.00017	0.1087	-0.0860	0.0155	-0.0737	4.4776
MASI	0.00007	0.1348	-0.0959	0.0152	0.0840	5.2152
TUNINDEX	0.00037	0.0411	-0.0500	0.0054	-0.4389	11.1856
ISE100	0.00060	0.1269	-0.1998	0.0213	-0.3140	6.7112

The average value for the majority of the indexes is close to zero, the standard deviation varies between 0.54% and 2.1% for the whole sample, which indicates that the returns are not very different from the average. The majority of the indexes have a non-zero skewness and more than half of the sample has a negative skewness which allows us to deduce that the distribution of the index returns is skewed. Moreover, the kurtosis values are all greater than three, so we are in a leptokurtic distribution. The data do not follow a normal distribution. It must be said that these results of the descriptive analysis are not a surprise for us, as they present the main properties found in financial series.

3.2. Model and Identification of Selected Events

At the level of this study we therefore considered all elections that took place during our study period concerning the selected countries of the Mediterranean area. The dates of the elections are collected from the database developed by Martin and Swank in 2012, available on the website of the American university "Marquette" (http://www.marquette.edu/) with a double check in newspapers and on the internet. For Tunisia and Morocco, the dates of the selected elections are obtained from newspapers as well as from news sites, as they are not available in Martin and Swank's database which covers only 27 countries belonging to the OECD. We distinguish between different types of political elections. These are national elections, such as presidential and parliamentary elections, and local elections, such as municipal elections. In this article, we have examined all three types of elections. However, the dates of parliamentary and presidential elections are usually very close in time. Indeed, these two dates usually coincide or are separated by less than 300 days (the period of study of the event). In both cases, we include in the sample one of the two events. This choice depends on the nature of the country's political system (parliamentary system vs. presidential system). Note that all the countries in our sample have a parliamentary regime with a prime minister as head of government, and a president or monarch as head of state (sometimes purely symbolic). Consequently, in the case of successive election dates, it is the parliamentary elections that are considered. We also chose to study the impact of municipal elections on the determinants of the stock market, because of the importance of the municipal council in the countries in our sample. Indeed, as in any democracy, elected officials represent the population and make the necessary decisions on the directions and priorities of the municipality and administer its affairs. Thus, we obtain a sample composed of 21 events divided into 9 municipal elections, 11 legislative elections and one presidential election. For the purposes of our research, we define the day of the event as the day of the election, except in cases where the elections took place on a weekend or a holiday. In these cases, the event day is defined as the first trading day after the election.

3.2.1. Event Window and the Estimation Period

For the event window we have chosen the interval [-1.51] that is 25 days (one month of quotation) before and after the day of the election. The estimation period is 250 days. According to Brown and Warner (1985) the number

of observations necessary to estimate the benchmark model is 250 daily observations of the yield. It should be noted that event windows and estimation periods were considered after cleaning up any other important event that could skew the results of our study.

3.2.2. Models and Tests Identification: Elections and Stock Market Performance

The presence of a market reaction following political elections must be detected by abnormal behavior around the event period. In order to verify these abnormal behaviors, reference was made to the most used model in event studies which is the market model. This methodology is proposed by Fama, Fisher, Jensen, and Roll (1969).

$$R_{i,t} = \alpha + \beta R_t^* + \varepsilon_{i,t} \qquad (1)$$

Where $R_{i,t}$ is the daily index return of country i at time t and R_t^* is the daily return of the World Index MSCI. The calculation of the return is as follows:

$$R_{i,t} = \ln\left(\frac{P_t}{P_{t-1}}\right) \qquad (2)$$

Where R_{it} is the index return of the country index i at the date t and P_t and P_{t-1} are the prices of the index respectively at the date t and t-1.

Equation 1 and 2 allow to calculate the country index return. This method takes into account the risk of each index. The theoretical profitability of the indices is linked to the market profitability by a proportionality coefficient, the β, specific to the index. Over the estimation period, the profitability of each index (i) is therefore compared to that of the MSCI index in order to estimate the parameters of the OLS model.

Using estimated parameters $\hat{\alpha}$ and $\hat{\beta}$, we can obtain theoretical/expected profitability Equation 3 over the event period.

$$Renta\ theo_{i,t} = \hat{\alpha} + \hat{\beta} R_t^* \qquad (3)$$

Abnormal returns are calculated in Equation 4 as the difference between the observed returns and the theoretical returns.

$$AR_{itd} = R_{it} - Renta\ theo_{it} \qquad (4)$$

d Is the number of elections (event) for each country. Once the abnormal returns are calculated, the overall impact of all events is measured by the accumulation of this abnormal profitability. An average of the abnormal returns for each index is then calculated.

$$\overline{AR}_{it} = \frac{1}{N} * \sum_{d=1}^{N} AR_{itd} \qquad (5)$$

With N is the number of events studied. Finally, the accumulation of the abnormal profitability "CAR" is given by the sum of the average of the abnormal returns during the event window based on the Equation 6.

$$CAR_{i,t} = \sum_{j=0}^{t} \overline{AR}_{it} \ , t = 1 \dots 51 \qquad (6)$$

In order to evaluate the significance of the CAR, we chose the parametric test Student.

3.2.3. Models and Tests Identification: Elections and Stock Market Volatility

We evaluate the impact of elections on the second moment of return distribution using the approach A volatility event-study. The discussion presented here is based on the approach taken by Bialkowski et al. (2008). Exploiting the issues of Engle (1982) and Bollerslev (1986) the authors proposed an event study methodology based on the work of Hilliard and Savickas (2002) on stochastic volatility. The methodology of this study, consist on an estimation of the GARCH parameters, a prediction of the volatility on the basis of estimated GARCH parameters, a calculation of the multiplicative coefficient of the volatility and finally a calculation of the CAV.

First, after identifying the event study parameters, we estimate the factors of a GARCH model (1.1) for each event during the estimation period and predict the conditional volatility during the days of the window of the event based on these estimated factors. The GARCH model (1,1) is the most used model of the ARCH family in the literature of research in the field of finance.

$$R_{i,t} = \alpha + \beta R_t^* + \varepsilon_{i,t}\,, \qquad \varepsilon_{i,t} \sim N(0, h_{i,t}) \qquad (7)$$

$$h_{i,t} = \gamma_0 + \gamma_1 h_{i,t-1} + \gamma_2 \varepsilon_{i,t-1}^2 \qquad (8)$$

With R_{it} it is the index return of country i at date t ; R_t^* is the daily return of the MSCI world index at time t ; $\varepsilon_{i,t}$ is the country-specific part of index returns, it is the residual of the model; $h_{i,t}$ represents its conditional variance.

Second we measure abnormal volatility. The GARCH model can serve as a reference because it can provide an indication of what the volatility would have been had if the election didn't take place. We will therefore have a forecast of the conditional volatility during the k days of the event window based on the information effective on the last day of the estimate period t^* which results in the following equation (Equation 9):

$$E(h_{i,t^*+k}/\Omega_{t^*}) = \hat{\gamma}_0 \sum_{j=0}^{k-1} (\hat{\gamma}_1 + \hat{\gamma}_2)^j + (\hat{\gamma}_1 + \hat{\gamma}_2)^{k-1}\, \hat{\gamma}_1 h_{i,t^*} + (\hat{\gamma}_1 + \hat{\gamma}_2)^{k-1}\, \hat{\gamma}_2 \hat{\varepsilon}_{i,t^*}^2 \qquad (9)$$

$\hat{\gamma}_1$ *and* $\hat{\gamma}_2$ are the GRACH parameters estimated from the Equations 7 and 8 ; $\hat{\varepsilon}_{i,t^*}^2$ is the residues squared of the last day of estimation period; h_{i,t^*} is the historical volatility of residues $\varepsilon_{i,t}$ during the last day of estimation calculated on 250 days of estimation.

Third we calculate the multiplicative coefficient of volatility. The previous forecast ignores the effect of the event; indeed, it does not take into account the impact of elections on volatility. Therefore, the distribution of residues during the event window can be described in Equation 10 as follows:

$$\varepsilon_{i,t} \sim N(AR_t, M_t E(h_{i,t}/\Omega_{t^*})) \quad (10)$$

Where AR_t is abnormal return induced by the event for t > t^* and M_t is the multiplicative coefficient that reflects the effect of the event on volatility

M_t>0 is a parameter that measures the multiple by which volatility increases from its non-event level during the event window (Hilliard & Savickas, 2002). If the event has no impact on volatility, M_t would be equal to 1. If the

event increases (decreases) volatility, M_t>1 (M_t<1). A particular event may have different values of M_t for each day of the event window (t >t^*).

The objective of our study is to quantify the effect of elections on stock market volatility, M_t is the primary parameter of interest of this study. The method of estimating the multiplier of the induced volatility of the event is based on the combination of standardized residuals with a transverse approach as explained by Boehmer, Musumeci, and Poulsen (1991) and Hilliard and Savickas (2002).

Indeed, if the residues were standardized using the cross-sectional average, they would normally be distributed with an average of zero. Their difference, under the hypothesis of residual orthogonality, would be given by Equation 11:

$$var\left(\varepsilon_{i,t}-\frac{1}{N}\sum_{i=1}^{N}\varepsilon_{i,t}\right)=M_t\left[E(h_{i,t}/\Omega_{t^*})\frac{N-2}{N}+\frac{1}{N^2}\sum_{j=1}^{N}E(h_{j,t}/\Omega_{t^*})\right]$$

$$=M_t\,EIDRV_{i,t} \qquad (11)$$

Where $EIDRV_{i,t}$ is the reduced variance of the non-event residuals. N is the number of events in the sample.

$$\varepsilon_{i,t}-\frac{1}{N}\sum_{i=1}^{N}\varepsilon_{i,t}\sim \boldsymbol{N}\left(0\,,M_tE(h_{i,t}/\Omega_{t^*})\frac{N-2}{N}+\frac{M_t}{N^2}\sum_{j=1}^{N}E(h_{j,t}/\Omega_{t^*})\right) \qquad (12)$$

Standardized residuals will follow a normal distribution of mean 0 and variance M_t (Equation 13).

$$\frac{\varepsilon_{i,t}-\frac{1}{N}\sum_{j=1}^{N}\varepsilon_{j,t}}{\sqrt{\frac{N-2}{N}.E(h_{i,t}/\Omega_{t^*})+\frac{1}{N^2}\sum_{j=1}^{N}E(h_{j,t}/\Omega_{t^*})}}\sim N(0,M_t) \qquad (13)$$

To estimate the multiplier coefficient M_t we calculate the variance of the standardized residues in Equation 14 as follow:

$$\widehat{M}_t=\frac{1}{N-1}\sum_{i=1}^{N}\frac{\left(\widehat{\varepsilon_{i,t}}-\frac{1}{N}\sum_{j=1}^{N}\widehat{\varepsilon_{i,t}}\right)^2}{\frac{N-2}{N}.E(h_{i,t}/\Omega_{t^*})+\frac{1}{N^2}\sum_{j=1}^{N}E(h_{j,t}/\Omega_{t^*})} \qquad (14)$$

With $\widehat{\varepsilon_{i,t}}=R_{i,t}-(\hat{\alpha}+\hat{\beta}R_t^*)$ et t > t^*

Under the null hypothesis, the standardized residuals follow a standard normal distribution centered since M_t would be equal to one. Consequently, the percentage of abnormal variation of the volatility each day t of the event window would be equal to $(\widehat{M}_t-1)$.

Finally, we calculate the « CAV » based on the Equation 15. So, for an event window (n_1,n_2), the cumulative abnormal volatility (CAV) can be calculated as follows:

$$CAV(n_1,n_2) = \sum_{t=n_1}^{n_2} \widehat{M}_t - (n_2 - n_1 + 1) \qquad (15)$$

The null hypothesis of no impact of the elections on volatility can be expressed as follows:

$$H_0 : CAV(n_1,n_2) = 0$$

4. RESULTS AND DISCUSSION

Before starting the study, we checked the stationarity of the time series of each event as well as the exitance of the ARCH effect to avoid our results being biased. Each estimation period includes two time series: the country index return and the MSCI World Index return series. For our sample, for each country, all the series of the event estimation period do not have a unit root; the p-value is less than 5%. In addition, the trends are insignificant (the p-value is greater than 5%). For each country and for each event. To be able to estimate a GARCH model we have also tested the presence of ARCH effect. This test allows us to choose the events to be processed and to exclude any event that does not have an ARCH effect during the period preceding the event window. As a result, we find that all events selected in our sample have an ARCH effect. The results indicate that all the p-values of the test are less than 5% or 10%.

The analysis of the results obtained will be done in two parts. The first will address the impact on stock market returns and the other will explain the impact on volatility.

4.1. Impact of Political Elections on Stock Market Returns in the Euro-Mediterranean Area

Table 3 shows the mean and cumulative abnormal returns as well as their associated T-Student.

The average abnormal return (AMR) varies between -0.691% and 0.7392% throughout the event window. The fluctuation of the RAM is relatively small.

The cumulative average abnormal returns are significant at the 10% threshold on the 13th day and during the period from the 16th to the 20th day. The last two days of the event window have significant CAR at the 10% threshold. Indeed, the absolute values of t-Student (1.56 and 1.417) are greater than the tabulated values. The results from the calculation of the average cumulative abnormal returns CAR, show us that they are negative before the political elections, and positive afterwards. The stock market returns decrease before the political elections and rise after political elections. This is consistent with literature findings which report that stock returns are lower if uncertainty is higher by considering that risk averse investors dislike uncertainty. The political uncertainty is related to cabinet change, government ideology or the volatility of the distribution of seats in parliament. The stock returns on the election day and days after the election are conversely higher since uncertainty about election outcome drops. These findings are inconsistent with the opportunistic political business cycle (OPBC) which is based on the idea that in the goal of maximizing votes, the parties in power, relying on the myopia of voters, maneuver economic policy to create favorable economic conditions for election dates and generate cycles of expansion before the elections. The Euro-Mediterranean countries have a multi-party system which may explain the negative abnormal returns around elections (Riley & Luksetich, 1980). Thus, we can argue that uncertainty by adverse investors joint with the consequences of the multi-party system lead to a negative abnormal return before election day.

4.2. Impact of Political Elections on the Volatility of Stock Markets in the Euro-Mediterranean Area

In order to study the impact of political elections on the volatility of stock markets in the Euro-Mediterranean area, we have estimated several parameters in order to calculate the cumulative abnormal volatility (CAV). The latter will allow us to measure the additional or subtractive change in volatility during the window of the event.

Table-3. Mean and Cumulative Abnormal returns and Associated T-Student.

Day	ARM	T-student	CAR	T-student
1	-0.00124	-0.42603	-0.00124	-0.09068
2	-0.00691	-2.381**	-0.00815	-0.59748
3	-9E-05	-0.03114	-0.00824	-0.60411
4	-0.00339	-1.1675	-0.01162	-0.85261
5	0.001194	0.411509	-0.01043	-0.76502
6	0.003812	1.313598*	-0.00662	-0.48542
7	0.001174	0.404698	-0.00544	-0.39928
8	-0.00323	-1.11318	-0.00867	-0.63622
9	-0.00456	-1.57209*	-0.01324	-0.97084
10	-0.00372	-1.28188	-0.01696	-1.24369
11	0.001054	0.363046	-0.0159	-1.16642
12	0.002856	0.984236	-0.01305	-0.95692
13	-0.0056	-1.93107**	-0.01865	-1.36795*
14	0.004443	1.530922*	-0.01421	-1.04209
15	-0.00329	-1.13415	-0.0175	-1.2835
16	-0.00335	-1.15424	-0.02085	-1.52918*
17	0.00027	0.093132	-0.02058	-1.50935*
18	0.000553	0.190402	-0.02003	-1.46883*
19	0.000418	0.144107	-0.01961	-1.43815*
20	0.001517	0.52283	-0.01809	-1.32687*
21	0.001169	0.402967	-0.01692	-1.2411
22	0.001877	0.646667	-0.01504	-1.10345
23	0.002519	0.867968	-0.01253	-0.91871
24	0.004247	1.463525*	-0.00828	-0.60719
25	0.000932	0.321159	-0.00735	-0.53884
26	0.00342	1.178342	-0.00393	-0.28802
27	-0.00022	-0.07568	-0.00415	-0.30413
28	0.00204	0.703027	-0.00211	-0.15449
29	0.002391	0.823881	0.000285	0.020869
30	0.002101	0.724074	0.002386	0.174989
31	-0.00379	-1.30679*	-0.00141	-0.10316
32	0.004503	1.551835*	0.003097	0.227147
33	0.000863	0.297376	0.00396	0.290444
34	0.003672	1.265371	0.007632	0.559779
35	0.007392	2.547125***	0.015024	1.101936
36	-0.00162	-0.55911	0.013401	0.98293
37	-2.4E-05	-0.00844	0.013377	0.981134
38	-0.00183	-0.6313	0.011545	0.846761
39	0.00294	1.013043	0.014484	1.062388
40	0.001502	0.51743	0.015986	1.172523
41	-0.00149	-0.51431	0.014493	1.063051
42	-0.00018	-0.06265	0.014312	1.049716
43	0.00132	0.454913	0.015632	1.146544
44	-0.00158	-0.54531	0.014049	1.030476
45	0.002389	0.823204	0.016438	1.205695
46	-0.00043	-0.14814	0.016008	1.174163
47	-0.00246	-0.84743	0.013549	0.993787
48	0.003252	1.120736	0.016801	1.232337
49	0.001737	0.598629	0.018539	1.359755*
50	0.002733	0.941833	0.021272	1.560225*
51	-0.00195	-0.6711	0.019324	1.417381*

Note: ***, **,* : significant respectively, at the threshold 1%, 5% et 10%.

First we estimated GARCH model parameters and the residual. The results of this step give us the following actors: α and β the coefficients of the market model; γ_0 the minimum volatility (the constant of the GARCH model); γ_1 the coefficient of the delayed variance or the GARCH term; γ_2 The coefficient of the squared residual of the preceding period or the term ARCH.

We must check each time the significance of the parameters at the threshold of 5% or 10%. Indeed, for the first event, the estimation of the GARCH model provided us with a significant γ_0, in this case we consider that this parameter is equal to zero. However, the GARCH parameter γ_1 and the ARCH parameter γ_2 are significant at the 5% threshold and have a respective value of 0.8507 and 0.265. The coefficients of the α and β market model are -.00046 and 1.044 respectively. From these estimates of the parameters α and β we can estimate the model residual for all t> t^* according to this equation:

$$\widehat{\varepsilon_{i,t}} = R_{i,t} - (\hat{\alpha} + \hat{\beta} R_t^*)$$

Second we predict the conditional volatility during the event window. This step is based on the results of the first step and the variance and residual of the last day of the estimation period. The results allowed us to have the forecast conditional volatility independent of the realization of the event, that is to say in case of non-event.

Then we calculate the multiplier coefficients of volatility. M_t will allow us to measure the change-in-volatility of its non-event level. After all calculations, we obtained multiplier coefficients for each day of the event window presented in the following table (Table 4):

Table-4. Multiplicative coefficient M_t.

Day	M_t	Day	M_t	Day	M_t
1	1.2166	18	0.5213	35	0.4052
2	3.5790	19	0.9698	36	0.1603
3	0.8338	20	0.4085	37	0.1534
4	1.7859	21	0.8477	38	0.6277
5	1.9266	22	0.6893	39	0.1912
6	1.7493	23	2.4893	40	0.0817
7	1.4966	24	3.8171	41	0.1359
8	1.7153	25	1.4248	42	0.2477
9	1.2980	26	1.0149	43	0.1106
10	1.7940	27	2.2811	44	0.0865
11	3.2848	28	0.3045	45	0.0838
12	0.6705	29	0.6480	46	0.0566
13	0.6536	30	0.3731	47	0.0499
14	0.6694	31	1.4646	48	0.0943
15	0.7074	32	0.5982	49	0.0307
16	0.4523	33	0.6965	50	0.0567
17	1.7290	34	0.5910	51	0.1396

According to Table 4 the multiplier coefficients are positive, which is consistent with the definition and application conditions of this methodology. The results of the coefficient M_t for the day just before the elections (Day 25), indicates that the volatility has increased by 42.48%. Indeed, the multiplier coefficient M_t is equal to 1.424814. It is greater than 1, the reference value which indicates the no change in the level of volatility. These findings show an increase in volatility before election day which is consistent with the conclusion of Mehdian et al. (2008) who argued that the highest observed returns should be expected in the time period immediately preceding the election date as this is when media coverage and campaigning are at their peak. Therefor we conclude that the increase in volatility before election day, probably due to the greatest degree of uncertainty about the situation and the market disruption affected by the media and social networks. However, for two days after the election, the multiplier coefficient is equal to 0.3045, which means that there is a decrease in the volatility of its non-event level of 69.55% (1-0.3045 = 0.6955), this decrease can be explained by a probable publication of the result, or a clearer vision on the possible results (publication of the statistics by the media ...). The interpretation of the multiplier at

date t is not suggestive of the overall effect, so we will add up these multipliers which will reveal the impact of the election on volatility throughout the year. window of the study.

Finally we calculate the « CAV ». As previously reported, the calculation of the cumulative abnormal volatility is the sum of the multiplier coefficients during the event window minus the number of days of the window. We obtained « CAV »presented in Table 5. In our case, our event window equals (1, 51) from where:

$$CAV(1,51) = \sum_{t=1}^{51} \widehat{M}_t - (51 - 1 + 1) \ = -3.5863$$

At first glance, this value may have little intuitive content. However, when analyzing it, you can realize that the ratio of the CAV to the total number of days included in the event window is equal to the percentage decrease of the volatility compared to its reference index that is in relation to its level if the elections will not have taken place. This means that in the 51 days surrounding the elections, the country-specific variance was 7.03% less than it would have been if the elections did not occur. We can therefore conclude that elections do have an impact on volatility.

Table-5. Cumulative abnormal volatility.

Jour n	CAV(1.n)	Jour n	CAV(1.n)	Jour n	CAV(1.n)
1	0.2166	18	8.0834	35	10.1071
2	2.7956	19	8.0532	36	9.2674
3	2.6294	20	7.4618	37	8.4208
4	3.4153	21	7.3095	38	8.0484
5	4.3419	22	6.9988	39	7.2396
6	5.0912	23	8.4882	40	6.3214
7	5.5879	24	11.3053	41	5.4573
8	6.3031	25	11.7301	42	4.7050
9	6.6012	26	11.7450	43	3.8156
10	7.3951	27	13.0261	44	2.9021
11	9.6799	28	12.3306	45	1.9859
12	9.3504	29	11.9786	46	1.0425
13	9.0041	30	11.3517	47	0.0924
14	8.6735	31	11.8163	48	-0.8133
15	8.3808	32	11.4145	49	-1.7826
16	7.8331	33	11.1110	50	-2.7259
17	8.5621	34	10.7019	51	-3.5863

According to Table 5, the CAV (1.26) (one month before the elections), is equal to 11.7450, which explains a 45.17% increase in the volatility of its non-event level. However, the CAV (26.51) (one month after the elections), is equal to -13.8915, thus a decrease in the CAV of its non-event level of 53.43%. Findings show a strong abnormal rise that starts before the Election Day and continues for a pic at the day of election. The market settles down after election day following the event. This non prolonged reaction is most probably due to the fact that the official results are quickly released after the elections. We can therefore conclude that there is a positive impact on volatility one month before the elections and a negative impact during the month following the political elections. The statistical significance of the results is tested using the bootstrap methodology (Efron, 1979). This methodology consists of pulling, from all countries and dates available, at random with discount N country / date combinations to match the number of elections in the original sample. Calculate the cumulative abnormal volatility for the sample generated randomly on the respective event window. Repeat steps (1) and (2) 5000 times and sort the resulting CAV collection in increasing order to obtain the empirical distribution. The p-value can be defined as the number of bootstrap CAV that exceed the CAV calculated for the sample of the original election divided by the

number of repetitions (ie, 5000). All the p-values found are close to zero. This proves the significance of the results of the study.

5. CONCLUSION

This paper examined the reaction of stock markets in Euro-Mediterranean countries (Tunisia, Morocco, Turkey, Spain, France, Greece and Italy) following political elections. We studied their impact on market returns and volatility. We selected 21 political elections of different types (legislative, presidential and municipal). We opted for a classical event study methodology to analyze the impact on stock market performance, however, we adopted the methodology used in the work of Bialkowski et al. (2008) which is based on the GARCH (1,1) model and on the concept of volatility multiplier to measure the cumulative abnormal volatility (CAV). The results of our research show that political elections have a significant impact on returns as well as on volatility. Indeed, stock returns decrease before political elections and increase right after. Thus, stock returns do not follow the market efficiency hypothesis during political elections. Regarding volatility, we found that there is a positive impact one month before the political elections and a negative impact in the month after. In summary, the month before the political elections is characterized by an increase in volatility before the elections, due to the increase in risk related to the formation of the new government and the economic policy adopted during its term, and a decrease in performance. However, the month following the election date is characterized by a decrease in the level of volatility, probably due to a clearer view of the country's new government and therefore the economic policies adopted, and by an increase in returns. The main implication of this study is for investors. By recognizing the market's reaction to political elections, they can develop buying and selling strategies to generate momentary profits by exploiting the imbalance produced in the market.

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