

HOW DO PARLIAMENTARY ELECTIONS AFFECT STOCK MARKET VOLATILITY? EXAMPLE FROM THE REPUBLIC OF MACEDONIA

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Abstract

The main aim of this research is to examine the effect that political elections have on stock prices on the Macedonian Stock Exchange Index MBI 10. Our paper strains to imply the existence of problems due to political uncertainties of the efficient market hypothesis. The methodology used for the research is a simple generalized autoregressive conditional heteroscedasticity GARCH (1, 1) model. Also, to control if political uncertainty before the elections influences the return of MBI 10, a dummy variable (D60) is added. In addition, Wald test is applied. When the dummy variable is included in the model, the level of significance is 5%, meaning that the 60-day period before the elections is important for the stock exchange market. Moreover, we find that that past innovations impact MBI 10 asymmetrically. On the basis of a political regime that has two main political parties, this paper finds that the conditional mean of the stock market index is affected by the political uncertainty. The results imply that the parliamentary elections are significant, thus they do impact the Macedonian Stock Exchange.

Key words: MBI 10, stock market volatility, GARCH, elections

JEL classification: C15, C22, E44, G14, G18

1. Introduction

The efficient market hypothesis (Fama, 1991) is an investment theory that states it is impossible to “beat the market”, because stock market efficiency causes existing share prices to always incorporate and reflect all relevant information. The theory says that stocks always trade at their fair value on stock exchanges, making it impossible for investors to either purchase undervalued stocks or sell stocks at inflated prices.

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This theory is accepted among most researchers, so they use it to prove that volatility on the stock markets is explained with new economic information.

Our paper is based on a research that tries to show the existence of problems in the efficient market hypothesis due to political uncertainties. We provide evidence that, during the period around the parliamentary elections, there is a connection between the movement of stock prices on the Macedonian Stock Exchange and political events. We analysed the MBI 10 to prove that volatility increases more in the period before the elections. One possible explication is that the stock prices increase because the political parties create high growth and low employment before the election. Actually, they try to create an expansion and - because of the expansion - the investors can make abnormal profit.

Macedonian Stock Exchange Index (MBI 10) is price index that includes the most liquid and the largest (with largest market capitalization) companies, allowing more realistic display of movements of prices on the official market of the Macedonian Stock Exchange. MBI 10 consists of a maximum of 10 shares listed on the official market on the Macedonian Stock Exchange. The calculation of MBI 10 was introduced in 2005. Since 2005, there have been 5 parliamentary elections that took place in the following years: 2006, 2008, 2011, 2014, and 2016. We studied the effect that all 5 parliamentary elections had on the movement of the prices of stocks included in the Macedonian Stock Exchange Index MBI 10.

The structure of the paper is as follows. Section 2 is the literature review. The methodology is discussed in Section 3. Section 4 presents the data, and Section 5 discloses the empirical results. Section 6 concludes.

2. Literature review

The impact of political elections and events over volatility of stock prices has been the main aim of many studies because of the changes in investors behaviour associated with election periods. An election period changes the investor's attitude towards the stock exchange and serves like a motivation to take on uncertainty in the stock market during political elections. The impact of elections on stock markets is well documented for developed countries. Such papers for developed countries are written by Leblang and Mukherjee (2005), who examine how the American and British stock returns react to government partisanship and elections. Their results reveal that stock markets in the United States and Britain have been historically quite sensitive to elections and partisan politics. There is also evidence from Belgium on the influence of political effects. Vuchelen (2003) depicted that news content of events, such as: elections, changes in formation and composition of governments, depends on the electoral system and that the ideological compositions of governments are important. Moreover, Füss and Bechtel (2006) have examined the systematic distributive effects of expected government partisanship on the stock market in the 2002 German federal elections and discovered that, while stocks of small businesses were still responsive to changes in expected government partisanship in the 2002 Federal election, the performance of medium-sized and large companies was not. Art Durnev (2011) discusses elections

and investment sensitivity to stock prices by altering how managers respond to stock prices when making investment decisions. The conclusion is that politics has real impact on corporate performance.

On the other hand, there is research on this topic, which looks into the influence of election regime in developing countries. Tabassam and Hashami (2016) examine the effect of political unrest on the Pakistani economy by using election regime and strikes as political instability proxies. They have showed that political instability has negative effect on economic growth. In their research, with evidence from the Turkish developing economy and the support of the Political Business Cycle theory, Koksal and Caliskan (2012) found that volatility of the ISE100 index increases in the pre-electoral period and that the cyclical behaviour might be due to uncertainties associated with elections. Political Business Cycle theory, in the matter of elections, is researched in the South East Europe region by. Siokis and Kapopoulos (2007), who were interested in finding a link between movements in the stock prices on the Athens Stock Exchange and the dynamics of political events. Their research proved that there are effects of politics and political uncertainty brought into the stock market. In the developing economies from the South East Europe, Vulic (2010) researched the efficiency of the Montenegrin capital market, in order to demean if the Efficient Market Hypothesis applies for the Montenegrin Stock Exchange. Her findings confirmed that the capital market in Montenegro is small, emerging and therefore inefficient. The conclusion would be that the Montenegrin capital market is inefficient, because the movement of stock prices can be predicted.

Malkiel (2003) examines the attacks on the efficient market hypothesis and the belief that stock prices are partially predictable, concluding that there are pricing irregularities and predictable patterns in stock returns. The partial predictability of the stock market can be confirmed with the research of Pantzalis et al. (2000), who found positive abnormal returns in the two-week period before the election week in a sample of 33 countries.

As far as we know, the topic about the influence of political elections on the stock exchange has not been documented in Macedonia.

3. Methodology

Based on the properties of the past behaviour, we can predict the behaviour of a variable in the future, using the autoregressive statistical model. One of the simplest models is the ARMA one, first introduced by Box, Jenkins and Reinsel (1994). With the ARMA model, we predict the value of the variable only by considering the sum of the weighted values that took in the previous period, plus the error term. The more complex model is the ARCH model, developed by Robert F. Engle (1982). The ARCH model assumes that follows a simple time series model, such as a stationary ARMA (p, q), with some explanatory variables. Although the ARCH models take care of clustered errors, as well as of nonlinearities, they also have some weaknesses. Consequently, the model

depends on the square of previous shocks, therefore assuming that positive and negative shocks have similar effects on volatility. Furthermore, one of the characteristic weaknesses of the ARCH model is that it requires many parameters to describe the volatility process of an asset return. Therefore, an alternative model was developed by Bollerslev (1986) who proposed a useful extension known as the generalized ARCH, (GARCH). GARCH models use only three parameters that allow for an infinite number of square roots to influence the current conditional variance. Simple GARCH (p, q) models are frequently used for modelling the volatility of financial returns, however, GARCH is not a "perfect model", and thus could be improved. The improvements are built on GARCH as a based model and are observed in the form of an alphabetic mix: TARARCH, OGARCH, M-GARCH, PC-GARCH etc. Although more complex models are existent, there are research papers that correspond to the superiority of GARCH against the more complex models: such as Hansen, P. R. and Lunde, A. (2001), which claim that the best models do not outperform GARCH (1, 1). GARCH models are used by financial professionals in several areas, such as trading, investing, hedging and dealing. Engle and Bollerslev (1986) model with GARCH (1, 1) to study risk premium on the foreign exchange market. Sadorsky (2012), with multivariate GARCH (1, 1) model, examines the volatility dynamics between the stock prices of clean energy and technology companies. Marius M. (2009), argues that GARCH is the most suitable model to use for an estimation of the volatility of the returns of groups of stocks. Papers in government elections, political science and economics have also applied GARCH (1, 1) models: for example, Leblang D. and Mukherjee B., (2005), investigate how government partisanship and traders' expectations of electoral victory affect American and British stock returns, based on GARCH (1, 1). However, we have to have in mind the weakness of GARCH models being that they require several years of daily data in order to be trustworthy.

This paper applies simple GARCH (1, 1), a statistical model that attempts to explain the asymmetric effect of shocks on volatility. The model is described as follows:

The conditional mean equation:
$$\mu_t = \alpha_1 r_t + \alpha_2 D60 + \varepsilon_t$$

Where μ_t is the conditional mean of the Macedonian stock exchange index returns (Rmbi), D60 is a 0-1 dummy variable taking a value 1 in the 60 days before the parliamentary election and 0 otherwise. In accordance with Article 92 of the Constitution of the Republic of Macedonia, the elections shall take place the earliest on the 70th day after they were announced, but shall not take place later than 90 days from the day of the announcement. The analysed period of 60 trading days corresponds to this time frame. ε_t is a sequence of IDD (identically and independently distributed) random variables with mean 0 and variance 1.

The variance equation:
$$\sigma_t^2 = \alpha_3 + \alpha_4 \varepsilon_{t-1}^2 + \alpha_5 \sigma_{t-1}^2 + \alpha_6 R_{dax}$$

Where σ_t^2 is the conditional variance of the Macedonian stock exchange index returns (Rmbi); ε_{t-1}^2 is the previous day's return information about volatility or ARCH term; σ_{t-1}^2 is the previous day's residual variance, or GARCH term. The R_{dax} represents the return of the Dax index which measures the performance of the 30 major German companies trading on the Frankfurt Stock Exchange. By including the Dax index, we control for the so-called " worldwide effects" or news generated by the increased globalization

of financial markets. Moreover, according to the efficient market hypothesis, rational traders and investors incorporate in their decisions all the important relevant information - not only information generated domestically, but information produced by other international stock markets.

The implication of the model is: if political uncertainty before the elections influences the return of MBI 10, then the D60 variable should be significantly different from 0. Therefore, the null hypothesis of the Wald test is the following:

$$H_0 : \alpha_i = 0$$

If the null hypothesis is rejected, then the parliamentary elections are significant, thus they impact the Macedonian stock exchange.

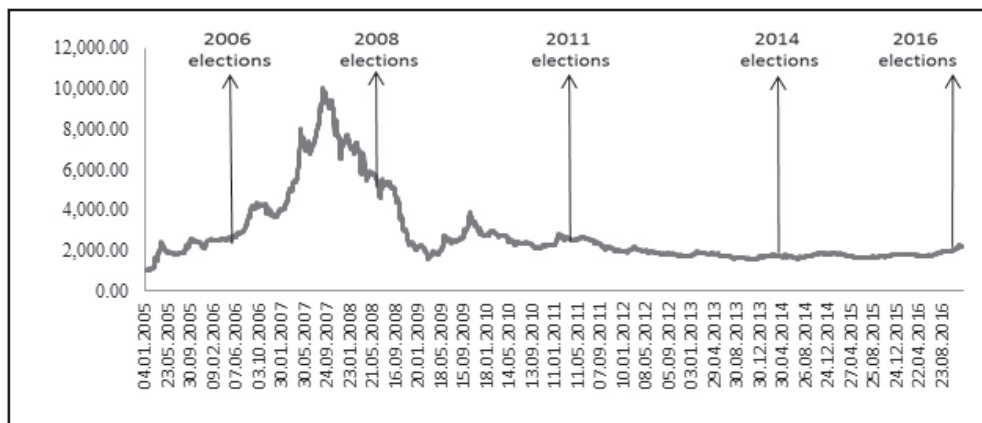
3. Data

Data for the (Macedonian stock exchange index) MBI 10 can be obtained daily from the Macedonian stock exchange data base. MBI 10 is a price index weighted with the market capitalization of the 10 most liquid shares. The daily returns are calculated as follows:

$$R_{mbi10} = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

Where P_t is the daily closing price and P_{t-1} is the previous day closing price. The stock index values and the occurrence of the elections are illustrated in Graph 1. In addition, Table 1 reports various statistics for the daily percentage return in the MBI 10. The Jarque-Bera statistic shows that the distribution differs from normal distribution. Higher kurtosis means that the distribution is leptokurtic compared to a normal distribution. Non-symmetrical or negatively skewed distribution occurs also (frequent small gains and a few extreme losses). The leptokurticity and the skewness can be partially attributed to the dismissal of normality.

Graph 1. Macedonian Stock Exchange index (MBI10)



Source: Macedonian Stock Exchange

Table 1. Summary Statistics on Changes in Stock Market Index

Mean	0.000272
Std.Dev.	0.013197
Skewness	-0.134034
Kurtosis	12.55649
Observations	2909
Jarque-Bera	11078.23
Probability	*0.000000

*if $p < \alpha$ (0.05), the distribution is not normal

Source: Macedonian Stock Exchange

Following the introduction of political pluralism, there were 4 (four) regular parliamentary elections held in Macedonia (in 1994, 1998, 2002, and 2006) and 4 (four) parliamentary elections held earlier than the regular time the ruling party was supposed to be in power (held in 2008, 2011, 2014 and 2016). The observed time period, from January 2004 to December 2016, includes 2909 observations. In this time frame, five parliamentary elections were held: in July 2006, June 2008, June 2011, April 2014, and December 2016. The elections before 2006 are excluded from our research because the analysed stock exchange index was introduced at the Macedonian stock exchange on 04.01.2005.

While Pluralism is a political theory in Macedonia, Members of Parliament are elected using the D'Hondt method (D'Hondt, 1878). Legislatures using this system for allocating seats favour small parties less. Consequently the majority consists of two political parties, the left sided Social Democratic Alliance of Macedonia (SDSM) and the right sided Internal Macedonian Revolutionary Organization – Democratic Party for Macedonian National Unity” (VMRO-DPMNE).

After the elections are completed, the President of the Republic of Macedonia hands the mandate for constituting the Government to the candidate of the party(ies) that won a majority of seats in Parliament. There has been an unwritten rule that the party who will compose the new Government coalitions with the one of the political parties representing the Albanian minority - usually the one that won the most votes from the Albanian minority. The right sided coalition led by VMRO has won all elections and a majority of the parliamentary seats in the analysed period. VMRO achieved the biggest win with 48.78% of the popular vote in 2008, and the smallest popularity vote was won in 2006. On the other hand, SDSM's biggest win is the 2016 election. The results of the recent parliamentary elections are depicted in the table below:

Table 2. Summary Statistics on Parliamentary elections in Macedonia from 2006 to 2016

Date	VMRO	SDSM	DUI	DPA	Voter turnout	Regular/ Early
5 July 2006	32.50%	23.30%	12.12%	7.50%	56.00%	Regular
1 June 2008	48.78%	23.64%	12.82%	8.26%	57.06%	*Early
5 June 2011	38.98%	32.78%	10.24%	5.90%	63.50%	Early
27 April 2014	42.97%	25.34%	13.71%	5.92%	62.96%	Early
11 December 2016	38.14%	36.66%	7.28%	2.60%	66.79%	Early

*The first early parliamentary elections in Macedonia; *DUI (Democratic Union for Integration); *DPA (Democratic Party of Albanians)

Source: State Election Commission of the Republic of Macedonia

4. Empirical results

In this segment, we present the findings about the influence of political events on the Macedonian stock exchange index in the pre-election period. The phenomenon of the importance of political events for the stock exchange market is well documented for the stock exchanges of developed economies; therefore, our goal is to prove that political events have significant influence in explaining the behaviour of MBI 10 on the Macedonian stock exchange, as well.

The GARCH (1,1) model is used for the estimation. Table 3 and Table 4 report the results of the model calculations.

Table 3. Estimation output on conditional mean

Conditional mean			
Equation: $\mu_t = \alpha_1 ar(1) + \alpha_2 D60 + \varepsilon_t$			
Variable	Coefficient	Std. Error	Prob.
(1)	0.346221	0.015028	*0.0000
D60	0.001236	0.000609	**0.0425

*significant at 1%, **significant at 5%

Source: Models' estimates

Conditional mean. The results of the conditional mean equation for the daily return of the MBI 10 index are shown in table 3.

In the equation, the Wald test F-statistics for the (1) coefficient is significant at 1% level, suggesting that past innovations impact the conditional mean of the Mbi10 index asymmetrically.

When we include the dummy variable in the equation, the level of significance is 5%. This suggests that the 60-day period before the elections impacts the mean of the daily return. The dummy variable, D60, is statistically different from zero; these results indicate that there is a marginally positive effect of the political elections on the stock returns in Macedonia. Furthermore, the D60 coefficient is positively close to zero, implying that high volatility is related to the increase in values of the daily change in stock prices. Because the value of the dummy variable coefficient is positive and statistically significant, it appears that the MBI 10 increase, close to an election, increases volatility, while a decrease would reduce the volatility. This positive sign before the election is not consistent with the efficient market hypothesis, since this information appears not to be reflected in the stock prices. Although both coefficients of (1) and the dummy variable are significant, further analysis based on the Wald test suggests that there is a difference. More specifically, the coefficient of (1) is statistically significantly larger in absolute value than the coefficient of the dummy variable suggesting that the influence of past innovations is stronger.

Table 4. Estimation output on conditional variance equation

Conditional variance			
Equation: $\sigma_t^2 = \alpha_3 + \alpha_4 \varepsilon_{t-1}^2 + \alpha_5 \sigma_{t-1} + \alpha_6 R_{dax}$			
Variable	Coefficient	Std. Error	Prob.
	3.10E-06	2.76E-07	*0.0000
	0.229454	0.011930	*0.0000
	0.767245	0.008700	*0.0000
	0.000119	3.63E-05	*0.0011

*significant at 1%

Source: Models' estimates

Conditional variance. Table 4 demonstrates the results of the conditional variance equation for the daily return of the MBI 10 index. The results reveal the presence of conditional heteroscedasticity. The variables in the conditional variance equation are significantly different from 0 at the level of 1%. The Wald test for and coefficients for past innovations and past conditional variances accordingly, lead to conclusion that past innovations impact Mbi10 asymmetrically. These findings suggest that future volatility of the Macedonian stock exchange could be predicted using past information.

Lastly, the coefficient controls for the news generated by the increased globalization on the financial markets. This coefficient is significant at the level of 1%, capturing the positive impact from the worldwide effects. The significance reveals that the Macedonian stock exchange is affected by the globalization accordingly the increases and decreases in the Mbi10 can be partly explained with changes in the index.

5. Conclusion

The aim of this paper is to prove that the political uncertainties are significant to the dynamics of the Macedonian stock exchange market. We based our research on the volatility of the main Macedonian stock exchange index MBI 10. Using the GARCH model, we examined the volatility of the MBI 10 around 5 (five) parliamentary elections from 2006 to 2016. Our motivation is derived from the efficient market hypothesis. With our research, we confirm the findings documented by other studies, which show how stock markets can be inefficient during political elections. Thus politicians tend to create expansion in the before elections period, in order to make better chances to be re-elected. There are studies that show that this behaviour is typical, because political parties are often engaging in so-called expansion before elections, in order to stimulate opportunistic behaviour to win. This, according to the efficient market hypothesis, means that not all relevant information is included in the stock prices. This can be used by investors to make abnormal profits.

By using the methods explained in this paper, we were able to find that parliamentary elections in Macedonia held between 2006 and 2016 had an impact on the conditional variances of the stock market index. Based on a Wald test, we concluded that the main

impediment in our research is that we used a rather short time period for observation. This is because Macedonia has been an independent state since 1991 and the stock exchange market introduced the calculation of MBI 10 in 2005.

Even though the topic of election influence on stock exchange market is most often studied in developed and studied a bit less in developing countries, the research on this topic in the SEE region is starting to expand. In Macedonia, this area is still rather unstudied, and it certainly leaves a lot of space for further studies and researches to be done in the field.

It is our recommendation that the analysis be extended to the period after the elections. Further, while we prove that there is a rise in volatility in the period before the elections, the research could be extended to whether higher yields are compensation for the greater risk.

To sum up, more research in the field would definitely be needed, and if in the upcoming elections we see a change in Government (the opposition comes into power), there will definitely be a possibility to examine whether different political regimes impact the stock prices differently.

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