

Charles University in Prague

Faculty of Social Sciences
Institute of Economic Studies



MASTER THESIS

**Parliamentary Elections and the Stock
Markets: Evidence from CEE Countries**

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Declaration of Authorship

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Prague, July 11, 2012

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Abstract

The thesis deals with electoral and partisan cycles in stock returns of nine CEE countries and checks consistency of observed cycles with efficient market hypothesis. The evidence mostly supports possibility of political influence on stock markets, but the effects often have opposite sign than hypothesized. Electoral cycle has been found in Estonia and Hungary, while returns in four other countries are significantly lower before elections. Markets more often exhibit left-wing premium, it is significant in the Czech Republic, Lithuania and Romania. The results are similar between nominal and real returns. Both cycles are also considered significant for the panel of countries. Moreover, cycles are hardly explainable by macroeconomic conditions, which indicates market inefficiency. This is confirmed by analysis of volatility, which reveals that risk does not correspond to changes in returns induced by the cycles.

JEL Classification E32, E44, G14, G18

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Abstrakt

Tato diplomová práce se zabývá přítomností volebního a stranického cyklu ve výnosech devíti akciových trhů střední a východní Evropy a zároveň posuzuje konzistenci zjištěných cyklů s hypotézou efektivních trhů. Empirické výsledky podporují domněnku o politickém vlivu na akciové trhy, nicméně zjištěné vlivy často neodpovídají hypotézám politického cyklu. Volební cyklus má očekávaný vliv na výnosy estonského a maďarského akciového trhu, ve čtyřech dalších státech je však vliv volebního cyklu opačný, tj. výnosy před volbami klesají. Stranický cyklus se překvapivě projevuje vyššími výnosy především za levicových vlád, což platí pro Českou republiku, Litvu a Rumunsko. Výsledky se obecně neliší pro nominální a reálné výnosy. Oba cykly jsou rovněž významné v kontextu panelu všech zemí. Pozorované cykly lze jen zřídka vysvětlit pomocí změn v makroekonomických podmínkách, což naznačuje možnou tržní neefektivitu. Efektivitu popírá i analýza volatility akciových výnosů, protože nebyl nalezen žádný vztah mezi pozorovanými cykly a rizikovostí akciových výnosů.

Klasifikace JEL

E32, E44, G14, G18

Klíčová slova

politika, volby, akciové trhy, výnosy,
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Acronyms

AIC	Akaike Information Criterion
AR	Autoregressive
ARMA	Autoregressive Moving Average
CEE	Central and Eastern Europe
EC	Electoral Cycle
EU	European Union
EGARCH	Exponential Generalized Autoregressive Conditional Heteroskedasticity
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
IFS	International Financial Statistics
MA	Moving Average
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PBC	Political Business Cycle
PC	Partisan Cycle
PT	Partisan Theory
RPBC	Rational Political Business Cycle
RWM	Reuters Wealth Manager
RPT	Rational Partisan Theory
S&P	Standard & Poor's
U.S.	United States
USD	United States Dollar

Master Thesis Proposal

Author	Bc. Tomáš Bláhovec
Supervisor	Mgr. Radka Štiková Ph.D.
Proposed topic	Parliamentary Elections and the Stock Markets: Evidence from CEE Countries

Topic characteristics This thesis will deal with political cycle in countries of Central and Eastern Europe. Traditional political cycle models try to describe the relationship between politics and key macroeconomic indicators or fiscal variables. Here, however, I would like to focus on a not-so-often analyzed relationship of politics and stock markets.

Firstly, I will empirically analyze how the stock returns are affected by the timing of elections and the ideology of the government. It is motivated by the fact that right-wing governments are expected to adopt such policies which are more in favor of stock markets. Secondly, a similar analysis will be done also for the volatility of stock market returns, mainly with the aim to find out if elections bring more uncertainty to the stock markets and if traders are prone to be surprised with the election results. Thirdly, I would like to assess the other direction of the relationship, that is, how the stock market situation influences popularity of the government.

The reason why I have chosen CEE countries is that the traditional political cycle is often found rather in these “new democracies” and thus it is appealing to test them also for the existence of another type of political cycle. It, however, brings some problems - especially with the short time series of data on stock market returns.

Hypotheses

1. Stock market returns are systematically higher under right-wing governments.
2. Stock market returns tend to be higher just before elections.
3. Return volatility is higher under left-wing governments.
4. Return volatility increases before elections due to higher uncertainty.
5. Better stock market situation improves government's popularity.

Methodology When testing stock returns hypotheses, the methodology will be close to that of Santa-Clara & Valkanov (2003) mainly in the sense of decomposing stock returns into expected (business cycle driven) and unexpected part where the latter is tested for political effects. However, to at least partially overcome the problem with short time series, I will use panel data methodology similarly to Bohl & Gottschalk (2006) who have used fixed-effects model allowing for country-specific effects. Such a model is reasonable also in the case of CEE countries.

When assessing volatility I will perform a GARCH type of analysis inspired by studies of Mukherjee & Leblang (2007) and Bialkowski *et al.* (2006b) for panel data. GARCH basically allows ascertaining time-varying volatility as a result of politically induced shocks which can be further analyzed relative to the political situation. Only a simple OLS model will then be used when testing the last hypothesis with a possibility to perform a more-detailed analysis using VAR model as in Döpke & Pierdzioch (2004).

Outline

- I. Introduction
- II. Literature review
- III. Data
- IV. Politics and the stock market returns
 - a. Methodology
 - b. Analysis of ideological effects
 - c. Analysis of election-timing effects
 - d. Discussion of the results
- V. Volatility Analysis
 - a. Methodology

- b. The model
 - c. Discussion of the results
- VI. Effects of stock market situation on government's popularity
- VII. Conclusions

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Supervisor

Chapter 1

Introduction

There certainly is little or no doubt that politicians, sometimes intentionally and sometimes not, affect stock markets. The ongoing financial crisis is a perfect example when politicians, through *ad-hoc* adopted policies, try to send reassuring signals to financial markets. Their ability to affect stock markets systematically is however far more questionable. After all, efficient market hypothesis, one of the cornerstones of modern finance implies that such a behavior, perhaps once repeated a few times, should be expected by investors and priced accordingly. This thesis tries to find answers to these two emerging questions: firstly, do incumbent policymakers have power to systematically affect stock markets and, secondly, does such a power, if exists, necessarily imply market inefficiency?

The interest in studying the relationship between stock markets and politics is among researchers for a long time. The theory of political cycles, although popularized rather in macroeconomics, traditionally distinguishes between two approaches which are followed also in this thesis. The electoral cycle, which is driven by opportunism of incumbent politicians who are keen to remain in the office and are willing to manipulate economy in order to achieve better results before elections. The partisan cycle, on the other hand, is based on difference in ideologies of policymakers whose policies then impact stock markets differently. The relationship between observed cycles and volatility of stock returns as a basic measure of risk must be analyzed to assess market efficiency. The analysis of political cycles in stock market returns should not be seen only as a proof of market (in)efficiency, it also may be beneficial for investors who want to be protected from political risks as well as for those who want to profit on them.

Majority of empirical studies dealing with political cycles and stock markets is focused on developed stock markets. Santa-Clara & Valkanov (2003) documents persistent partisan cycle in the United States and Booth & Booth (2003) found some evidence of electoral cycle there as well. Nevertheless the usual result for developed European stock markets is that—consistently with efficient market hypothesis—no cycles are found. There is however little evidence regarding less developed European stock markets such as those of CEE countries. They are only rarely included in international studies such as in Bohl & Gottschalk (2006). The aim of this thesis is to fill this gap. Existing evidence on political cycles in macroeconomic variables documents higher probability of political cycles in “new democracies”, where voters are not experienced enough to correctly extract political information. Likewise, given their short tradition of trading, CEE stock markets are good candidates for existence of political cycles.

The selection of CEE countries for analysis comes at a price of limited availability of data. Primarily, time series of stock returns and other variables are much shorter in comparison to those of developed markets. Thus one need to make a compromise between lower robustness stemming from shorter time series and lower probability of finding some political patterns as markets are becoming more efficient in time. Secondly, the beginnings of trading on CEE stock markets are usually influenced by economic transformation and ongoing institutional changes. Although we typically do not include the very beginnings of stock markets in the sample, it is not possible to eliminate these effects entirely.

The rest of the thesis is structured as follows. **Chapter 2** covers the theory of political cycles from its macroeconomic basics through its implications for stock markets and relationship with efficient market hypothesis. Hypotheses tested in the empirical part are also stated here. **Chapter 3** summarizes the empirical research on political cycle and stock markets, mainly contemporary empirical findings following influential studies of Booth & Booth (2003) and Santa-Clara & Valkanov (2003). The last section of the chapter then reviews what has been done concerning the politics and stock market volatility. Empirical part of the thesis starts in **Chapter 4**, where methodology used to test hypotheses stated in Chapter 2 is presented. **Chapter 5** describes the dataset and **Chapter 6** presents empirical findings about political cycles on CEE stock markets and market efficiency. The last **Chapter 7** shortly concludes.

Chapter 2

Theoretical Background

2.1 Theories of Political Cycles in Macroeconomic Policies

Here we describe the first generation models of political cycle in macroeconomic policy from the 1970s. Although these models are now rather obsolete, they—thanks to their simplicity—provide useful look at how politicians may influence the economy. We then continue with the second generation of models, which reflects the then ongoing rational expectations revolution, together with main empirical findings.¹

2.1.1 Basic Theories

The idea of politicians influencing the economy became of interest of many economists a long time ago. Indeed, already in late 1950s, Downs (1957) argued that incumbent political parties may try to deliberately manipulate the economy in their own interest, namely to secure re-election.² He points out *opportunistic* motives in the behavior of politicians:

“...parties formulate policies in order to win elections, rather than win elections in order to formulate policies.”

Downs (1957, pp.28)

¹We present rather intuitive description of these models. For a more thorough discussion and mathematical formalization of presented models the reader may refer to Alesina *et al.* (1997).

²Signs of political cycle theory can actually be found in even earlier literature, e.g., in Kalecki (1943).

This thought characterizes one area of political cycles theories, which try to answer whether it is actually possible for politicians to systematically affect the economy and, if so, how could this happen.

The theory of opportunistic behavior of political parties was formalized by Nordhaus (1975). His model of *Political Business Cycle* (PBC) describes how an opportunistically behaving government manipulates the economy in order to win (exogenously timed) elections. Under certain assumptions described below, it is reasonable for the government to stimulate the economy prior to an election and, if re-elected, pursue tightening policies afterward. Since political parties are assumed not to have any ideological intentions, in the Nordhaus' view all the governments should pursue *identical policy*. It has to be noted that—as author argues—such a policy is suboptimal in terms of social welfare if compared to that of a non-opportunistic government.

In this particular model, voters care about the state of the economy, namely about the inflation and unemployment rates.³ Clearly, they prefer both inflation and unemployment rates to be low. Voters, however, are not strictly rational: they assess the government performance only retrospectively and with a tendency to heavily discount observations earlier in the past so that they are influenced by the pre-election economic performance much more than by performance at the beginning of the government's term.

The economy itself is assumed to work within a framework of Phillips curve which describes the inverse relationship between inflation and unemployment (see Friedman 1968; Phelps 1968).

The simplest form of the Phillips curve have the following form:

$$u_t = \bar{u}_t - (\pi_t - \pi_t^e) \quad (2.1)$$

where u_t is unemployment, \bar{u}_t is a natural rate of unemployment,⁴ π_t is inflation and π_t^e is inflation expected for the period t .

The expectations about the future inflation rate have an *adaptive* form, i.e., agents adjust the current rate of inflation for the mistake of previous forecast. The government is assumed to control aggregate demand through a combination of fiscal and monetary policy, so that it can achieve any desirable point on the Phillips curve. Alternatively, we can say that the government controls the

³The model can easily be reformulated in terms of inflation and output growth rates on the Okun's law basis.

⁴It is the rate of unemployment which can be reached with stable inflation.

inflation directly (Alesina *et al.* 1997). Since the inflationary expectations are formed on a historical basis, they cannot be influenced by any possible future change in policy, which makes the Phillips curve relationship exploitable for the government in the short run. Simply said, the government may use expansionary (contractionary) policy and surprise agents by inflation higher (lower) than expected. Agents misinterpret the information and react by reducing (increasing) unemployment as Eq. (2.1) suggests. Lindbeck (1976) besides argues that there is a certain lag in inflation, so that if the expansionary policy is used before elections then the adverse growth in inflation occurs after the elections.

As a result, if the government boosts the economy before an election, it impresses voters with low unemployment rates and reasonable inflation. After the election inflation rises sharply and unemployment decrease towards its natural rate. No matter if the election is won by the incumbent or a challenger, the new government must consequently pursue contractionary policy in order to fight the high inflation. Such a policy, however, increases unemployment which would be unfavorable for re-election chances of the current incumbent. To increase them, he chooses to pursue expansionary policy in the second half of the electoral period just to lower unemployment before upcoming election and it actually starts a new period of PBC.

It is the assumed voters' decision-making process what motivates an opportunistic incumbent to ensure that economic conditions are as good as possible in the second half of the electoral period while the necessary recovery is timed to the first half. PBC model implies that even in case when this optimal behavior of the policymaker does not lead to his re-election, the cycle does not change over time (i.e., every government will pursue the same policy regardless of how long it is in the office). What may change over time is average inflation – Nordhaus (1975) demonstrates how, under some assumptions on voters' preferences, government's policy may lead to an upward shift of the short-run Phillips curve in each electoral period, effectively increasing inflation without any reduction in unemployment. Thus, in the long run, PBC leads to overly high inflation whereas unemployment is unaffected.⁵

The second basic political cycle theory, so-called *Partisan Theory* (PT) of political cycle was pioneered by Hibbs (1977; 1992). In contrast to Nordhaus (1975), in Hibbs' model politicians do not behave opportunistically but the em-

⁵The latter holds only in more usual case of vertical long-run Phillips curve. There would be somewhat lower level of unemployment if the curve is assumed to be negatively sloped though.

phasis is put on their *political ideology*. The argument behind is that constituents of individual political parties differ in what economic conditions they consider favorable for themselves. In this model, obviously, different governments may pursue different policies as long as they have different ideologies.

Hibbs argues that constituents of left-wing parties are typically from lower-income classes whose primary source of income is their labor. They naturally consider the low unemployment to be more important than low inflation. Constituents of right-wing parties, in contrast, are substantial holders of financial capital and hence are much more concerned with the inflation. Political parties are aware of the effects which unemployment and inflation have on the income distribution (and hence on their constituents) and are assumed to behave accordingly. Left-wing governments should thus be characteristic by lower unemployment rates (higher output growth) and higher inflation and right-wing ones the other way around. Individual voters—knowing what are the preferences of each political party—vote for the party whose program suits them best.

As Hibbs (1992) further specifies, PT does not postulate that, for example, left-wing governments should not react on increasing inflation at all. The parties are not assumed to be rigidly stuck with their ideologies. In fact, they use the similar policies but differ rather in extent in which they use them and, consequently, in the overall outcome representing their ideologies. Generally speaking, political parties are not supposed to behave strictly ideologically and may exhibit opportunistic behavior. Indeed, a party needs to get in the office if it wants to push its partisan policy through. The condition of PT is that partisan motives outweigh the opportunistic ones. In other words, the parties must not converge to one common policy.

Similarly to the PBC model, partisan cycle model is based on a two-party system with exogenously timed elections and Phillips curve (see Eq. (2.1)) exploitable because of adaptive inflationary expectations. As a result, a government can set its desirable combination of unemployment and inflation rates—a point on the Phillips curve—which it then keeps throughout its term in office. Hibbs (1977) is not explicit about the movements of the short-run Phillips curve as the expectations adjust.⁶ He rather argues that there may be a certain lag between policy adoption and its effect on the real economy. Clearly, the exact shape of the partisan cycle depends on how the two parties take turns in the office and how long is this lag. To briefly conclude, PT model suggests

⁶Hibbs' work is in fact rather empirical and the theoretical assumptions are inferred from his empirical models.

that left-wing parties should be able to set and keep lower unemployment and quite stable, yet comparatively higher, inflation when in the office while the opposite holds for right-wing parties.

2.1.2 Models with Rational Agents

The second generation of political cycles models, emerging from late 1980s onwards, reflects the influential research on rational formation of expectations. Agents who form rational expectations basically take into account not only historical information, but all available and relevant information which may affect future values of a predicted variable. It does not imply that an individual agent cannot be wrong in his expectations, but rather that the *aggregate expectation* is not systematically wrong and all errors are random. Agents also learn from their mistakes, correct them quickly as these are realized and do not repeat them.

Application of rational expectations has crucial implications for PBC and PT models. It, in fact, implies that a government is not able to affect the real economy (i.e., unemployment) as the Phillips curve trade-off is no more exploitable. In terms of PBC model, agents know that the government will try to induce pre-electoral boost through higher inflation and therefore higher inflation is expected. Their expectations then come true, which implies no effect on unemployment (equivalently $\pi_t^e \equiv \pi_t, \forall t$ in Eq. (2.1)). The situation in PT model is very similar. Nevertheless, it may happen that a government is able to “fool” agents once, but their rationality should prevent the government from doing it systematically. As is now apparent, under rational expectations neither political business cycle nor partisan cycle can exist in the form in which they were presented in the previous subsection.

Voters in the first generation of models are supposed to vote retrospectively. Although it seems rational to vote on the basis of future expected utility, it is well documented that voters indeed take pre-electoral economic conditions into account when casting their polls (see Kramer 1971; Lewis-Beck & Stegmaier 2000). Models of the second generation often rationalize retrospective voting to the extent that the information about current economic performance serves as the best available predictor of what can be expected from the incumbent in the future. In other words, forward-looking voting rationally shrinks to the retrospective voting. The process of rational retrospective voting within political cycle models is described below in a bit more detailed way.

Rogoff & Sibert (1988) and Rogoff (1990) were first to describe a model of opportunistically induced cycle with rational agents. This model is concerned with the effect elections may have on fiscal instruments, namely the government budget, and is discussed in the next subsection. Here, for the sake of clarity, we present the model of Persson & Tabellini (1990) whose *Rational Political Business Cycle* (RPBC) model is, just as Nordhaus' model of PBC, based on the Phillips curve. These models are so-called competence models where incumbents try to signal their competence through pre-electoral expansion.

The model assumes that there is a two-party political system, with an incumbent who directly controls inflation and a challenger, and elections which are held at the end of every second period. Both parties behave opportunistically, yet they, to some extent, care about social welfare. The economy is described by Phillip curve adjusted for incumbent's competence which is defined as an ability to lower the natural rate of unemployment (i.e. without an increase in inflation). A key feature of competence is that it is persistent over two periods.⁷ Say, that the competency shock in each period is positive for a competent government and negative for an incompetent government; expected competence of challenging party is normalized to zero. There is, however, information asymmetry – the government has complete information, whereas agents observe competence and actual inflation with one period lag. The fact that voters do not know competence immediately is crucial as it means that the government may change unemployment even if the inflation expectations are rational. There would be no cycle if the public has complete information.

Since competence distinguishes the incumbent and the challenger, voters *rationally* cast their ballots to the party which is expected to be more competent. Prior to an election, the best information about incumbent's future competence would be the current competence shock which is unknown at the moment. Clearly, a competent government is motivated to signal its competence to the public to raise its chances of re-election and does it by increasing inflation above expectations, effectively attaining lower unemployment which an incompetent government cannot achieve. Incompetent government, knowing that it is not able to signal itself as being a competent one, has no reason to “cheat” and would choose the optimal rate of inflation.⁸ Based on the signal, voters recognize

⁷Competence follows a first-order moving average process where the terms have expected value equal to zero.

⁸As we said, the public does not know whether the government's current competency shock is positive or negative, so the rationally expected rate of inflation is an average of high inflation set by competent government and optimal inflation of incompetent government.

incumbent's competence and vote accordingly. In other words, they vote on the basis of economic performance in the ending period, i.e., retrospectively.

What are empirical implications of RPBC model? There is only one type of policymaker, the competent one, who creates a pre-electoral boom. Consequently, in contrast with PBC model, the electoral effect on both pre-electoral and post-electoral policies should be weaker and of shorter term and hence the cycles in unemployment or growth should be weaker and less regular. The same should basically hold for inflation.

Partisan theory was adjusted for rational expectations and forward-looking voters in the *Rational Partisan Theory* (RPT) model of Alesina (1987). With inflation being the main policy instrument, both parties determine their publicly known target inflation level according to their preferences. As in the original PT model, left-wing governments are more concerned with unemployment and right-wing ones with inflation. Clearly, a left-wing government, caring more about unemployment, has higher target level of inflation than a right-wing one. Voters have different preferences over the two variables, but the distribution of voters is unknown and thus the election results are uncertain. They at least know what are the probabilities of each of the two parties' win. The timing of events within a period is crucial:

1. Voters realize probability of the two election results (e.g., in polls).
2. Expected inflation for the current period is fixed as the probability-weighted average of target inflation of both the parties. Inflation is hence expected to be somewhere between the target levels.
3. If it is an election period, the elections are held.
4. The incumbent party implements its policy for the current period, i.e., inflation is set to the target level of the incumbent.

In the election period, apparently, expectations will be *ex post* always wrong which will lead to a reduction in unemployment if the left-wing party has won the elections or an increase if the right-wing party has won. In the next period, with no electoral uncertainty, expectations adjust and unemployment returns to its natural rate. The effect on real economy is thus only short-lived. The size of the cycle then depends on voters' preferences—the more contested election, the more distinct cycle—and on the difference between the target inflation levels as this is what drives the expectations. Nevertheless, since the incumbent keeps inflation on his target level throughout the whole term in office, left-wing governments should be characteristic by somewhat higher inflation.

Let us have two comments on this model though. The first one is, as Alesina points out, if the two policymakers would cooperate and agree on a non-distorting policy, they both would be better-off in the long run. This might be a motivation to delegate the inflation-controlling policy on an independent institution (central bank). The second one is that the presented model is not compatible with the retrospective voting phenomenon. Current state of the economy in RPT model clearly provides no information on what to expect in future. Retrospective voting can be rationalized by adding a competence term, similarly as in the aforementioned RPBC model. For a full treatment, the reader may refer to Alesina & Rosenthal (1995, Chap. 8).

Macroeconomic variables have been intensively tested for presence of political cycles (for review see Drazen 2001, and citations therein). Generally, the empirical research has not been very supportive of significant political effects on real economy, that is on unemployment or output growth. The idea of PBC model implying regular pre-electoral expansion has often been rejected, likewise the milder cycles implied by the RPBC model. There has been some mixed evidence on inflation increasing after elections, consistently with opportunistic class of cycles. Support for the partisan theory has been somewhat better. Alesina & Roubini (1992); Alesina *et al.* (1997) conclude that the empirical implications of RPT—namely those for the economic activity—generally hold in two-party or otherwise polarized political systems. Yet again, the effects are not-persistent, effectively rejecting the traditional PT model.

2.2 From Macroeconomics to Stock Markets

Although the political cycle theory evolved in the field of macroeconomic variables such as unemployment and inflation, the interest of researchers has soon broaden. The reliance of the presented models on government ability to control inflation—highly disputable in presence of independent central banks—and unambiguous empirical evidence of political influence on real economy might be the main reasons. Given these reasons, researchers became interested rather in fiscal policy driving the political cycle. It also seemed more reasonable to study the opportunistic and partisan patterns in development of *policy instruments* like social transfers or taxes, which the government can easily change, rather than macroeconomic outcomes. This alternative approach has gained more popularity since the 1990's.

The aforementioned RPBC model of Rogoff & Sibert (1988) suggests that a re-election seeking incumbent is likely to create pre-electoral budget deficit (due to lower taxation) accompanied by higher inflation. In the following model, Rogoff (1990) describes how the opportunistic incumbent government may achieve its goals also through manipulating the composition of its spending. Prior to an election, obviously, the incumbent would prefer to spend on instruments with more instant effect (i.e., social transfers) than on long-term investments. The model of Drazen & Eslava (2005) proves that this may be done even without creating budgetary deficit.⁹

Concerning the empirical side, an early study on fiscal manipulation, due to Tufte (1978), documents pre-electoral increase in the U.S. transfer payments. A more recent study of Alesina *et al.* (1997) comes to a similar result also for a sample of industrial countries, although the cycles are not large and strictly regular. On the other hand, Andrikopoulos *et al.* (2004) generally find neither opportunistic nor partisan effects on fiscal variables in a sample of 14 developed EU countries. In the context of our thesis, however, an analysis of Brender & Drazen (2005) is of interest as it documents that budgetary cycles are more prone to exist in so-called new democracies¹⁰ where voters are not so experienced with fiscal manipulations and hence may be tricked more easily.

Nevertheless, the purpose of this thesis is to study the impacts that government may have on the stock market. At the beginning, let us have a word on notation: the term “political business cycle” itself indicates its connection to macroeconomic class of models; so, to avoid confusion, if we speak about impacts of opportunistically behaving politicians on stock markets, we use rather term *Electoral Cycle* (EC) instead of PBC. For the partisan (ideological) impacts on stock markets we simply use the term *Partisan Cycle* (PC). We use this terminology throughout the whole thesis.

There is not much doubt that both fiscal and monetary policy may affect stock market significantly. On the fiscal side, government spending programs are likely to raise profits and hence stock returns of some companies and lower it for the others, taxation and regulation are likely to have an adverse effect on stock returns, *etc.* (see Tavares & Valkanov 2001; Afonso & Sousa 2011). Fiscal policy may matter also in a sense of implying future monetary actions (see Jansen *et al.*

⁹It is worth mentioning that pre-electoral budget deficits (as a sign of pre-electoral expansion) need not influence incumbent’s re-election chances. In fact, in case of developed economies, voters even punish the deficits (Brender & Drazen 2008).

¹⁰These are countries with a short history of democracy, e.g., transition countries of the CEE.

2008). The impacts of monetary policy are less intuitive yet there are several studies documenting possible *ex post* increasing effect of expansionary monetary policy on stock returns (see Thorbecke 1997; Bernanke & Kuttner 2005). One should not underestimate also the indirect effect mediated by macroeconomic consequences of government policies. The transmission mechanism between political decisions and financial markets is in any case very complex and it is beyond the scope of this thesis to analyze it in a more detailed way.

Given this complexity, there is, unfortunately, not much of a theory on how exactly political outcomes may influence stock market. For the purpose of this thesis, we rather provide an extensive review of empirical literature in the Chapter 3. Here we present findings of several papers, which we think try to at least partially reveal the nature of the politics – stock markets relationship.

A rare attempt to explain stock returns patterns in terms of Alesina's RPT model is due to Cooley (2009) who associates post-electoral temporary increase in employment under left-wing governments with an increase in capital income growth and hence stock returns.¹¹ In the empirical part of his paper, he indeed finds capital income growth to be higher in the first years of Democratic presidency in the U.S. with the appropriate impact on the returns.

Mukherjee & Leblang (2007) investigate the relationship between government partisanship and stock market through changes in interest rates. They argue that investors expect interest rates to be higher under left-wing governments and in election years if they anticipate left-wing party to win. Consequently, this should translate into lower average returns and lower volatility and *vice versa* for the right-wing governments. Further, should the outcome of an election be highly uncertain, the volatility should be higher. Authors look for support of their hypothesis in long-term data on stock markets of the United States and the United Kingdom. Although they have not found any impact of political cycle on stock returns mean, they argue that it has significant effect on nominal interest rates. Differences in expected interest rates than indeed have the hypothesized effect on volatility. Based on their theory Mukherjee & Leblang argue against the frequent claim that left-wing governments are not good for stock markets and conclude that they may bring more of price stability.

Sturm (2011) suspects several tools of fiscal and monetary policies to be affecting stock returns. Basically, he tests the indicators of fiscal and monetary

¹¹Although one would probably expect the returns to be higher under right-wing governments, the opposite often holds (see Chapter 3).

policy on presence of the electoral cycle. At first, the U.S. data support his argumentation that there is no cycle in monetary indicators because monetary policy is not directly controlled by the government. At second, using measures on government budget and its changes, he finds some electoral patterns in fiscal policy. Nevertheless, the test of mutual causality reveals that the electoral cycle in stock returns and in the fiscal policy are two separate phenomena.

Finally, Pastor & Veronesi (2010; 2011) develop a theoretical model of policy changes influencing stock markets. The basic idea is that the effect on stock markets has two sources - *political uncertainty* about adoption of a policy and *policy uncertainty* about its future impact. The political uncertainty stems from the fact that changing policy incurs political costs which are not known to investors. It is further assumed that investors anticipate beneficial policy changes more than harmful ones. As a consequence, the effect of positive announcements is somewhat lower because it is already partially priced.

Beneficial policy change is supposed to have two basic effects; it should increase future profitability of a firm and, more importantly, it should increase investors' discounts rates because of policy uncertainty. The latter effect is considerably lower for positive changes in policy as these are more anticipated and hence bring less uncertainty. In general, stock returns should be lower after a policy change announcement unless the replaced policy was highly harmful. A change in discount factors through policy uncertainty should also lead to higher stock market volatility.

The proposed model necessarily needs to be tested empirically. It is, however, probably one of the most promising theoretical model to explain what is a role of a government in stock pricing and should provide theory how, if at all, policy changes following political cycles may affect the stock markets.

2.3 Market Efficiency

Financial markets are often believed to be “informationally efficient”, which means that the prices reflect all available information and a reaction on new information is very quick and precise in aggregate. Efficient market hypothesis in fact applies the concept of rationality to financial markets. If agents form rational expectations about future returns on their investments, they take all relevant and available information into account. As a consequence, no one should—on a risk-adjusted basis—*systematically* outperform the market. The reason why

we deal with the market efficiency is that it is likely to have a crucial impact on possibility of patterns of political cycles in stock returns. Similarly as in macroeconomic political cycle models, where rational expectations considerably weaken political effects, the cycles should be less evident also in the stock market returns.

Fama (1970) recognizes three forms of market efficiency, depending on what information is assumed to be incorporated in prices.

- *Weak form* means that only historical asset prices are reflected in stock market expectations. Under this assumption technical analysis might not lead to abnormal profits, whereas fundamental analysis still might be profitable.
- *Semi-strong form* is what is usually meant under the efficiency term. It assumes that prices reflect all publicly available information (historical prices, earnings announcements, business conditions, *etc.*). It is often said that the price reflects fundamentals, suggesting that fundamental analysis should be ineffective in case of semi-strong efficiency.
- *Strong form* on top of that allow for insider or private information to enter price and is the highest level of efficiency.

The information about timing of elections is costless and publicly available and hence there should be no electoral cycle in realized returns on at least semi-strongly efficient market. Likewise the result of an election is publicly known immediately after it (if not earlier), so there should be no partisan cycle either. In other words, investors should just expect pre-electoral booms and/or partisan differences and rapidly adjust their expectations so that elections would have no effect on returns after all.

Does presence of political cycle of either type thus imply market inefficiency? To answer this question, we must differentiate between *ex ante* expected and unexpected returns. Clearly, if there is a pattern of electoral or partisan cycle in unexpected returns, it would mean that investors are systematically surprised by the political outcomes; a result rather inconsistent with the efficient market hypothesis. A pattern in expected returns would, in contrast, suggest that the political outcomes are reflected in investors' expectations and priced accordingly – there is certain political risk which investors want to have compensated (they expect *political risk premium*).

The complication obviously arise from how to measure expected returns. To test a market for efficiency one needs an equilibrium model of (expected) asset

returns. Since there are many models of expected returns, a difference between realized returns and those implied by the model can be due to either market inefficiency or wrong equilibrium model. Unfortunately, it is not possible to say which one is the cause. This is known as “bad-model problem” or “joint-hypothesis problem”. There is lot of literature on the joint hypothesis problem, the reader may refer for example to Fama (1991). Without knowing the right equilibrium model of asset returns, it is only possible to assess whether existence of political cycle contradicts market efficiency by using other measures.

Santa-Clara & Valkanov (2003) suggest three methods how to explain partisan cycle on an efficient market. These methods, however, basically apply also to electoral cycle. The first and maybe the most intuitive approach is that the political risk premium is just a proxy for variations in expected returns caused by the business cycle. Some examples of variables reflecting macroeconomic conditions are dividend-to-price ratio and various measures of term and default spreads, which are known to predict stock market returns and hence may explain time-varying risk premium. The idea behind is that politics affect macroeconomic situation, which consequently affect stock markets. The partisan differences or those within the election period should then disappear once the returns are conditioned on business cycle variables.

The second approach postulates that if partisan cycle is rationally expected, there should be significant change in returns around elections, while returns in the rest of the election period should not differ much. It means that in the moment the election results become known, returns quickly adjust according to which party wins the election. This is basically an event study approach to market efficiency along the lines of Fama (1991). The problem of this method is that it is difficult to ascertain when exactly is the electoral uncertainty resolved. It could be before or just after the election, but for example in case of complicated coalition bargaining it may be fairly long time after the election.

The third approach relies simply on measuring risk across individual electoral periods. If a market is efficient, the difference in returns caused by either partisan or electoral cycle, should be due to different compensation for risk taken by investors. Since we can measure the risk by volatility of the returns, it is possible to find out whether the stock market risk differs under individual parties or before and after an election. If so, it would be reasonable for investors to demand adequate risk premium (expected return). We devote quite an attention to the analysis of volatility in the empirical part of this thesis.

To conclude this section, it has been shown that the existence of political cycle is possible even on efficient stock markets. In the context of less developed CEE stock markets the efficiency of even weak form is sometimes questioned (Kasman *et al.* 2009). There is, however, a possibility that it has improved in time as documented by Bechev (2003) or Guidi *et al.* (2010). Such an evidence somewhat increases probability of political cycle existing as an anomaly on CEE stock markets. This is inviting for us to include the question of market efficiency into our analysis.

2.4 Hypotheses

Based on the theory provided in the previous sections, we formulate four central hypotheses of the presented thesis. The first two are related to stock returns themselves, the other two are related to volatility of stock returns.

Hypothesis #1 (H1) The returns grow abnormally K months before every election in comparison to the rest of the election period.

The *electoral cycle* is driven by opportunistic behavior of the politicians who, in order to achieve re-election, influence the stock market in the following way: prior to an election they pursue expansionary policies which have a positive impact on the stock market so the returns are higher. After the election, on the other hand, the returns are lower as a consequence of post-electoral tightening policies.

Hypothesis #2 (H2) Stock market returns are in average higher under right-governments than under left-governments.

The *partisan cycle* is due to ideological preferences of the governing party. We formulate the hypothesis from the more traditional view that the constituents of right-wing parties are more concerned with capital returns and hence policies of right-wing parties should be more favorable to higher stock market returns than those of left-wing parties. The existing empirical evidence (see Chapter 3) as well as the aforementioned approach of Cooley (2009) however suggest that rather the opposite holds.

The hypotheses related to volatility are closely connected to the issue of market efficiency. An analysis of these hypotheses can however be useful to assess the actual relationship between politics and stock market.

Hypothesis #3 (H3) If there is an electoral cycle, stock market volatility is higher in the same K months before elections.

On an effective market, abnormal pre-electoral volatility of returns may simply be due to uncertainty about post-electoral course of policy and it may be also a consequence of the electoral cycle. In the latter case, pre-electoral expansionary policies represent shocks to stock markets further increasing their volatility. Violating hypothesis **H3** is thus at the same time violating of efficient market hypothesis.

Hypothesis #4 (H4) If hypothesis **H2** is true, stock market is more volatile (i.e., risky) in periods with right-wing governments.

Consistently with the second hypothesis, to justify higher returns under right-wing governments on an efficient market, they have to be a compensation for risk taken. In other words, the volatility should reflect the higher risk induced by right-wing policies oriented on higher stock returns. Hypothesis **H4** is again a test of market efficiency.

Chapter 3

Empirical Research Review

3.1 Early Findings

The first studies on relationship between stock markets and politics are dated back to early 1980's. They usually make use of the United States stock market data for an apparent reason. The U.S. market is traditionally one of the most developed stock markets in the world with long history of trading. The other common characteristic of these studies is that they are usually based on a comparison of average returns in different periods of political cycle or under different regimes.

Allvine & O'Neill (1980) were among the first who studied presence of the electoral cycle in the U.S. stock market. Using monthly returns on S&P 400 index¹² in period between 1948 and 1978, they found striking differences between the first two years and the second two years of the political cycle. The returns are found to be highest in the third year, 22.1%, followed by the fourth year with 9.2%. The returns in the first and second year after elections are 0.6% and 0.7% respectively. The authors also develop several trading rules which exploit this pattern to earn abnormal returns and argue against the market efficiency.

Herbst & Slinkman (1984) look for presence of sinusoidal patterns of two-year and four-year periods in the U.S. stock returns which, if peaking around election dates, could be considered as politically induced. They observed that cycles of both periods are present in the returns of the 1926–1977 period. The two-year cycle peaks in average nine months after elections and the four-year cycle reaches its amplitude shortly after them. Authors conclude that the four-year cycle is

¹²S&P 400 index covers stocks of 400 middle-capitalized companies traded on U.S. equity market.

associated with political process, whereas the shorter one is due to some other reasons.

Huang (1985) confirms results of Allvine & O'Neill (1980) in various sub-periods between the years 1832 and 1980. If the two political parties are taken separately, electoral cycle is found to be present under both (left) Democratic and (right) Republican administrations with higher significance in later sub-periods. Moreover, in his search for partisan patterns in stock returns, the author finds average returns to be significantly higher under Democratic presidencies by 9.2% in the more recent period 1929–1980. A possibility of earning abnormal profits on both electoral and partisan patterns is then proved by a few trading rules similarly to Allvine & O'Neill (1980).

Johnson *et al.* (1999) further extended partisan cycle studies by differentiating between returns on small and large stocks¹³ and analyzed both nominal and real annual returns between the years 1929 and 1996. Large stocks exhibit 5.8% higher nominal returns under Democrats; the difference is not statistically significant though. Small stocks, in contrast, yielded significantly 20.6% more under Democratic administrations. The differences are somewhat lower for real returns. Authors also found that nominal returns are economically significantly higher under both regimes in the second half of the political cycle however with low statistical significance.

Concerning the electoral cycle again, the study of Gartner & Wellershoff (1995) focuses on this type of cycle with a particular emphasis on its robustness. Using the U.S. quarterly data from 1951 through 1992 they realize the implied presence of the cycle is stable over model specification (capturing October 1987 market crash or various ARMA specifications of disturbances), over different stock indices (S&P 500, NASDAQ Composite and others),¹⁴ over time as well as over the ruling party. They found strong support for the electoral cycle which can be exploited to gain above-average returns.

Finally, Foerster & Schmitz (1997) document significant spillovers of the U.S. political cycle to stock markets of other developed countries. Indeed, the international stock returns in the second year of American president's term are documented to be significantly lower than in the other years and often are even negative. The authors also offer a possible explanation, namely that the U.S.

¹³Small stocks or small-caps are called stocks of a firm with small market capitalization. The terms large stocks and large-caps are used for stocks of large-capitalized firms.

¹⁴S&P 500 index consists of 500 large stocks traded in the U.S. NASDAQ Composite is an index of securities listed on NASDAQ Stock Market (both U.S. and non-U.S.).

election variables might capture somewhat irrational “sentiment” of investors worldwide. Such an irrationality might be seen as a challenge to the efficient market hypothesis.

3.2 Empirical Research on Stock Returns and Political Cycles

The empirical literature on political cycles in stock returns has lately grown substantially. In comparison with the studies presented in the previous section, the papers presented here employ more realistic stock returns models mainly in a sense of using linear regression or more sophisticated econometric techniques often controlling for the business cycle influences.

The evidence is further extended to other countries than the United States and although it is limited, the results are not very supportive of political cycles affecting international equity market returns. The research has been slightly dominated by partisan cycles studies, yet we present studies on both types of cycles.

3.2.1 Electoral Cycle

Booth & Booth (2003) investigate the U.S. equity market in period between 1926 and 1996 and were the first to rigorously take business conditions into account when looking for the electoral cycle. At first, by simple averaging returns on both small and large stocks over individual years of political cycle they confirm results of previous studies, i.e. that the electoral cycle is present. The differences between returns in excess of T-Bill rate in the first and the second half of the presidential term are found to be higher in case of small stocks as for example in Johnson *et al.* (1999).

At the second model, the authors control for business cycle effects in the excess returns. Dividend yields, term spread and default spread are hence used to proxy the business cycle influence.¹⁵ The hypothesis of electoral cycle just proxying the business cycle is, however, rejected on annual, quarterly and also monthly data. Although all the business cycle proxies have some power in

¹⁵Term spread is a difference between the yields on 10-year T-Bonds and 3-month T-Bills. The default spread is the difference between the yields on a portfolio of high-rated corporate bonds and the yields on long-term T-bonds.

explaining the returns, these are still significantly higher in the second two years of political cycle. This holds for both small and large-capitalized stocks.

Bohl & Gottschalk (2006) enriched the existing literature by providing international evidence on the electoral cycle in stock returns. Their dataset contains of monthly excess returns (over short-term interest rate) from stock markets of fifteen developed countries. The beginning of the time series for individual countries varied from 1957 to 1973 and the series ended in 2004. The authors study not only individual countries but also the panel comprising all fifteen countries. They also tested the data for the presence of partisan cycles (see Subsection 3.2.2 for the results).

The authors use methodology very similar to Booth & Booth (2003). Besides the dividend yield, term and default spreads, they also included relative interest rate, expected inflation and a lagged value of U.S. stock returns in the regression.¹⁶ The hypothesis of electoral cycle presence is rejected for eleven countries and the panel. There are, however, weak signs of the cycle in Austria, Canada and the Netherlands and somewhat stronger ones in Sweden. The results concerning the United States are in contradiction with findings of preceding studies though.

An analysis of Döpke & Pierdzioch (2006) is focused on the mutual relationship between German government and local stock market. In contrast to the previous studies, the regression used to test for the presence of electoral cycle does not take business cycle effects into account. On the other hand, the ability of business cycle variables to explain out political cycles has proven uncertain. The model, however, accounts for “crashes”, i.e. periods with returns below -20% . Generally, the quarterly data support the electoral cycle hypothesis only very weakly. In fact, the authors conclude that it is rather stock market situation which affects the government, namely its popularity.

Wong & McAleer (2009) use completely different methodology than the previous studies. They employ *spectral analysis* to find out that there is a strong cycle with period around 200 weeks (i.e. approximately four years) in the S&P 500 returns between since 1965 until 2003. An EGARCH model with political dummy variables and variables capturing a trend observed in the data is then used to assess electoral cycle presence. The observed cycle is rather strongly consistent with the U.S. presidential elections. It is further found that the cycle

¹⁶Relative interest rate is defined as the difference between actual interest rate and its one-year moving average. The U.S. lagged returns were not used in the regression for the United States.

is much stronger when the Republican presidents are ruling and especially when it is their second term in office.

3.2.2 Partisan Cycle

A seminal paper of Santa-Clara & Valkanov (2003) presents a systematic and robust approach to studying partisan cycles or political cycles in general. The authors work with monthly data on the U.S. stock returns from 1927 to 1998. The whole sample is divided into two sub-samples, where the first, from 1927 to 1962, covers the Great Depression and the second world war, the second covers the later period from 1963 to 1998.

At the first stage, Santa-Clara & Valkanov confirm that the excess returns (over 3-month T-Bill rate or over inflation) on an equally-weighted and value-weighted portfolios are significantly higher under Democratic administrations. The difference is generally higher for equally-weighted portfolio, for returns in excess of the T-Bill rate and in the latter sub-sample. For the entire sample, the annual returns over T-Bill rate are about 9% and 16.5% higher under Democrats for value-weighted and equally-weighted portfolio respectively. The results are statistically and economically significant and robust.

The authors also used cross-sectional returns on ten size-deciles portfolios to capture the effect of market capitalization. It is found that the “Democratic premium” is highest for stock of the smallest companies and declines monotonically with growing capitalization. It is consistent with results on equally and value-weighted portfolios where, apparently, the value-weighted portfolio is more affected by large-capitalized stocks. All the results are checked for robustness using bootstrapping experiment and quantile regressions. This effect had earlier been documented by Johnson *et al.* (1999), see Section 3.1.

Further, after controlling for business cycle fluctuations the Democratic premium even increases and gains more significance suggesting that the political effects cannot be explained by the business cycle variations. It is concluded that the difference in returns associated with the ruling party is rather unexpected which would imply that investors are being systematically surprised by the ruling party’s policy. Authors also did not find any kind of an “election shock” in returns. Such a shock would imply that investors expect different returns under different administrations and are just waiting for election results to resolve the uncertainty.

Santa-Clara & Valkanov also conduct a volatility analysis in order to find whether the Democratic premium can be explained by the difference in riskiness. They regress monthly volatility (computed from daily data) on political variables and variables controlling for the state of economy. Surprisingly, they find that the volatility tends to be higher under Republicans further indicating that the Democratic premium is not a compensation for risk and is unexpected.

Given the results presented above, the authors conclude that the difference in stock returns under Democrats and Republicans is puzzling because in an efficient market such a profit opportunity, as the Democratic premium proved to be, should quickly evaporate. Instead, the investors react on the election results weakly like they did not know what to expect from a new administration.

Aforementioned study of Bohl & Gottschalk (2006) also examines the existence of partisan cycles in stock markets of fifteen countries. The basic methodology the authors use is similar to Santa-Clara & Valkanov (2003) or Booth & Booth (2003). After controlling for the macroeconomic variables their findings does not support the hypothesis of partisan cycle in excess stock returns with exception of Denmark, Germany and the United States where there is apparent left-wing premium. On the panel of all fifteen countries, however, the partisan cycle is not found.

Bialkowski *et al.* (2006) further broaden international evidence on partisan cycles by analyzing 24 OECD countries from 1980 through 2005. For their analysis, they use dividend-adjusted value-weighted indices denominated in USD. They do not found any jumps in the returns immediately after the elections, when the uncertainty about future government is resolved, implying that investor do not expect any higher or lower returns. Likewise, they find ten countries with left-wing premium (of which only in the Czech Republic, France and Hungary it was significant). In contrast, the rest of the countries exhibit right-wing premium (including Poland); it is however significant only in Austria and Germany.

Study of Worthington (2009) investigates partisan cycle on the Australian stock market between the years 1901 and 2005. The approach used differs substantially from the previous studies. Author uses GARCH-in-mean methodology as it is found to suit well the Australian stock market.¹⁷ There are two

¹⁷This method not only assumes heteroskedasticity but also the conditional variance itself is added directly to the regression.

hypotheses tested in the paper – whether there is partisan cycle present and whether the returns are affected by the elections.

As for the first hypothesis, the nominal returns are higher under right-wing governments but it is not the case of returns in excess of inflation or T-Bills rate. Author concludes that it is more likely the inflation or T-Bills rate what changes under different government ideologies. As for the second hypothesis, the returns are found to be higher in the election month. The possible reasons may be opportunism of the ruling party or a positive effect of reduction in uncertainty.

Finally, a recent study due to Belo *et al.* (2011) claims that variables conventionally used to explain stock returns, e.g., business cycle variables or firm characteristics, have limited explanatory power.¹⁸ Instead, they find exposure to government spending to be significant in predicting *cross-sectional* stock returns in the United States. They find out that firms with a high exposure yield more than low-exposed ones under the Democrats and vice versa for the Republicans. Firm with high exposure to government spending should, however, have future profit more uncertain no matter what is the party in office.

3.3 Empirical Research on Politics and Volatility

Literature concerned with the relationship between political events (elections) and stock market volatility is fairly scarce. The reason might be that it may be seen primarily as a supportive tool to assess market efficiency. The analysis *per se*, however, may provide useful insights on how the investors react on political changes.

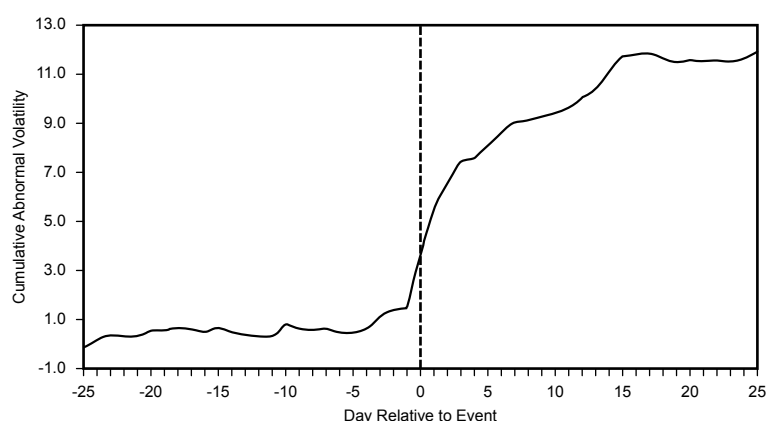
We have already presented the results of volatility analysis of Santa-Clara & Valkanov (2003) who argue that returns higher under Democrats in the U.S. are not associated with higher volatility. In contrast, Worthington (2009) finds the volatility to be significantly higher under left-wing government whereas the returns in most cases do not differ significantly and if so they are higher under right-wing government.

A comprehensive study of Bialkowski *et al.* (2008) investigates the direct effect of elections on stock market volatility. Their dataset comprises 134

¹⁸Many studies we have cited indeed confirm this (see e.g. Booth & Booth 2003; Santa-Clara & Valkanov 2003).

elections from 27 OECD countries in between 1980 and 2004. They use *event-study* methodology to quantify the impact that elections may have on the volatility. Stock returns 500 days prior to an event window (the studied period around elections) are fitted to a GARCH process based on which forecasts for the event window are consequently made. Cumulative Abnormal Volatility (CAV) function then captures the differences between the forecasted and actually realized variation in the event window.

Figure 3.1: Cumulative Abnormal Volatility function



Note: Event = Election day. The value of Cumulative Abnormal Volatility function corresponds to volatility being 23.42% higher over the 51 days due to the elections.

Source: Bialkowski *et al.* (2008, Fig. 1).

Under the null hypothesis of no effect of elections on volatility the CAV function should be equal to zero. The CAV function values for a 51-day symmetric event window are depicted in Fig. 3.1. There is apparent increase in volatility just prior the elections which stops around 15 days after them. The authors have found that volatility may more than double in the week after the elections in particular. The results suggest investors are being surprised by elections and need some time to adjust.

In the consequent part of their study, Bialkowski *et al.* show the magnitude of volatility shock is driven by increasing uncertainty caused mainly by tight political competition, change in government orientation and minority of the new government. Using simple measure for abnormal returns¹⁹ authors further argue that reward for risks taken during election periods is rather insufficient and a risk-averse investor should diversify her portfolio internationally.

¹⁹They are measured as the difference between country stock market index and global stock index. See Pantzalis *et al.* (2000) for a more detailed study on abnormal returns around elections.

Siokis & Kapopoulos (2007), in contrast, study stock market volatility in the framework of a small open economy. On an example of daily data of Greek stock market between the years 1987 and 2004 they show that volatility may differ as the government orientation changes. With use of exponential GARCH-in-mean methodology they found both partisan and electoral patterns in (conditional) variance – the variance is higher before elections and under right-wing governments. The data also suggest that an increase in the volatility should lead to higher returns.

Chapter 4

Methodology

4.1 Stock Market Returns

We have daily data on closing prices of main stock indices of selected CEE countries from Reuters Wealth Manager (RWM). From these data we extract prices of the last trading day of each month to get monthly series, which will be subject of the analysis. Prior to the actual analysis, however, it is convenient to test the series for seasonal patterns. Although market efficiency should prevent any seasonal pattern in the data, this necessarily need not to be the case of CEE stock markets. Indeed, even in more efficient stock markets of developed countries there are calendar-related anomalies like the well-known January effect, when the returns are abnormally high.²⁰ In the context of CEE countries the possibility of seasonal effects is certainly high enough so that it should not be disregarded if we want robust results of subsequent analysis.

We use X-12-ARIMA methodology of the U.S. Census Bureau to test and possibly correct for seasonality. It allows us to decompose the original series into four main multiplicative components: long-term trend, seasonal and trading effects and irregular component. The aim is to separate seasonal effects (repeating from year to year) and trading days effects (related to calendar, e.g., different number of trading days in each month). The methodology relies on fitting an autoregressive integrated moving average (ARIMA) model for trend and seasonal components with regressors capturing trading days effects.

²⁰The usual explanation is that many investor sell their stocks by the end of year in order to claim capital loss (to avoid taxation) and buy them back January next year causing high returns in this month.

The X-12-ARIMA computational package allows for automatic selection of appropriate number of Autoregressive (AR) and Moving Average (MA) terms for both trend and seasonal components as well as the necessary order of integration to obtain stationary series. We use this feature, setting maximal order for both AR and MA terms to two and maximal order of differencing (integration) to one. The setting is identical for both trend and seasonal components. Regarding the composition of calendar, we control for length of month and number of trading days within each month (not corrected for leap years), but only in case these regressors appear to be significant for respective time series. On top of that, X-12-ARIMA package is able to detect outliers of three types: additive (one period) outliers, temporary changes (diminish exponentially) and level shifts (do not disappear over time). We adjusted the series for presence of the first two types of outliers.

Four statistics are computed to assess presence of seasonal effect in a time series. There are two (parametric and non-parametric) tests for *stable* seasonality, that is effects which are repeated in the same months each year. The next test, on the other hand, test for seasonal effects which are moving in time. Because the “true” seasonal effect may be somewhat shadowed by moving seasonality, we decide on seasonality on the basis of the fourth test, which combines the results of the latter three ones and thus reflect negative impact of moving seasonality.²¹ We proceed with seasonally adjusted data for all the countries (i.e., trend and irregular component) should the original return series of most countries be significantly seasonal. In general, however, we do not expect the seasonality to be prevailing issue in stock market indices.

In the second step, we use the series to compute monthly returns. To better capture the point of view of an international investor and to be consistent with similar studies, the returns are converted from local currency to USD according to the following formula (expressed in percentage):²²

$$r_t = \frac{E_{t-1}}{E_t} \log \left(\frac{P_t}{P_{t-1}} \right) \cdot 100\% \quad (4.1)$$

²¹The exact procedure how the seasonality is identified can be found in SAS documentation here: http://support.sas.com/documentation/cdl/en/etsug/63348/HTML/default/viewer.htm#etsug_x12_sect028.htm

²²Throughout this thesis, $\log()$ is always natural logarithm.

where r_t is return over period t , E_{t-1} and E_t are end-of-period exchange rates of local currency vs. USD and P_{t-1} and P_t are stock index values at the end of period $t - 1$ and t , respectively.

In order to increase robustness of our results, we apply certain models also on *real returns*, which are computed as in Eq. (4.2):

$$\tilde{r}_t = r_t - \Delta CPI_t \quad (4.2)$$

where \tilde{r}_t is monthly real stock index return and ΔCPI_t is percentage change of consumer price index over period t approximating the rate of inflation.

The series of monthly nominal and real returns of respective countries are then tested on stationarity. A series is non-stationary or—in other words—has a *unit root* in case its properties like mean or variance change over time. Estimating Ordinary Least Squares (OLS) on non-stationary series leads to understating standard errors of coefficient estimates, hence overstating their significance and consequently it may result in spurious regression. Thus we use Augmented Dickey-Fuller test to find out whether a series has unit root, which is the null hypothesis of this test. The test basically evaluates power of lagged values and lagged differences of the series in explaining changes of the series. Our specification allows for five lagged differences of dependent variable (stock returns).²³ We expect the series of returns to be stationary, yet it was obtained from most likely non-stationary data (stock index values), but by applying logarithmic transformation and subsequent first differencing, which are typical adjustments to achieve stationarity.

4.2 Analysis of Stock Returns

4.2.1 The Basic Model

The analysis of political influence on stock markets can be done—in its most simplistic form— with a model using only appropriately specified dummy variables. The construction of these dummy variables reflects the effect we want study – either partisan or electoral. The model appropriate for testing of *electoral cycle* should distinguish time periods prior to the election and at the

²³The specification was generally selected using standard techniques. The results of test were, however, robust to various specification including exclusion of intercept and/or allowing for trend in the regression.

same time does not distinguish left-wing and right-wing governments. Hence a model of electoral cycle may be written as in Eq. (4.3):

$$r_{t+1} = \alpha + \beta_1 (1 - CT_t) PREED_K_t + \epsilon_{t+1} \quad (4.3)$$

where r_{t+1} denotes returns on stock market index in time $t + 1$ and $PREED_K$ and CT are political dummy variables constructed as follows:

$$PREED_K_t = \begin{cases} 1 & \text{if } t \text{ is in } K \text{ months prior to each elections (election} \\ & \text{month included),} \\ 0 & \text{otherwise} \end{cases}$$

and

$$CT_t = \begin{cases} 1 & \text{if there is non-partisan government in the office in month } t, \\ 0 & \text{otherwise.} \end{cases}$$

Inclusion of CT variable captures the idea that care-taking, i.e., apolitical, cabinets should not have any opportunistic motives and hence are not likely to try to induce pre-electoral expansion. Timing is such that investors are assumed to know past realization of political variables at the start of returns period. The interpretation of coefficients in model in Eq. (4.3) is that α is average return over the periods not affected by electoral cycle and $\alpha + \beta$ is average return over pre-electoral periods of length K months each. Hence β is the effect of the electoral cycle. Under the hypothesis of electoral cycle **H1** it should be that $\beta > 0$, whereas market efficiency would suggest $\beta = 0$.

Length of the cycle is a crucial setting of the electoral cycle model. Since we do not know how long the cycle should be in respective countries, we test model (4.3) with $K \in \{6, 7, 8 \dots 24\}$ for each country. The minimal length of six months is set because shorter cycle could merely be a coincidence rather than result of systematical political influence. On the other hand, maximal length of 24 months typically corresponds to half of the election period and there is no reason to expect longer cycles. From the set of 19 models, the final one is chosen based on Akaike Information Criterion (AIC), which is a commonly used measure of relative goodness of fit. Subsequently, we also test real returns for presence of electoral cycle of the selected length.

The model itself is estimated via OLS. Nature of our data however raises the possibility of heteroskedasticity and serial correlation of error terms ϵ_t . As

a consequence, although the estimates themselves would still be unbiased, their variance might be biased, which would lead us to false conclusions about their statistical significance. For testing on heteroskedasticity we employ standard White's test with null hypothesis of residuals being homoskedastic. Autocorrelation in residuals is assessed by Godfrey's test, which has null hypothesis of autocorrelation of up to a selected order; in our case it is set to four. OLS also relies on disturbances to be normally distributed, however tests based on residuals are likely to reject normality for financial time series data. The issue of non-normality makes statistical inference more difficult because test statistics need not to follow expected distribution. In other words, it decreases efficiency of OLS estimator, which in that case is no longer *best* unbiased linear estimator. The length of our time series, however, should sufficiently allow us to rely on central limit theorem, which implies that OLS estimates are asymptotically normally distributed, i.e., in large enough sample their distribution may be approximated by the normal one, making standard errors Student distributed and hence *t*-tests are reasonably valid.

In order to avoid imprecise standard errors, we use robust estimator of covariance matrix as proposed by Newey & West (1987). This estimator is robust both to heteroskedasticity and serial correlation and its use is conventional in financial time series econometrics. Newey-West estimator nevertheless requires the number of lags needed to adjust for autocorrelation to be set in advance. We proceed with the rule from Greene (2003), who suggests the number of lags to be approximately equal to $T^{1/4}$, where T is series length. In our case this value is between 3.40 and 3.90 and the number of lags for the Newey-West estimator is thus set to four.²⁴ Should it happen that disturbances are neither heteroskedastic nor autocorrelated the Newey-West estimator is less efficient than standard OLS errors, nevertheless the loss of efficiency is reasonably small (Davidson & MacKinnon 1993).

Finally, the model as stated in Eq. (4.3) assumes that politicians know at least K months in advance when the next elections will be held. This is not a problem until the elections are always held in the normal law-determined term. The elections are however sometimes called prematurely, typically due to some

²⁴Another rule used for detection of number of lags is to use integer part of $4(T/100)^{2/9}$ (Newey & West 1994). In our case this rule leads to the value of four, too.

governmental crisis. Since it is not very often in our data sample, we decide not to carry out any special treatment for prematurely called elections.²⁵

For the purpose of testing *partisan cycle* effects we define another three political dummy variables:

$$RD_t = \begin{cases} 1 & \text{if there is a right-wing cabinet at the beginning of month } t \\ 0 & \text{otherwise,} \end{cases}$$

$$LD_t = \begin{cases} 1 & \text{if there is a left-wing cabinet at the beginning of month } t \\ 0 & \text{otherwise,} \end{cases}$$

$$MAJ_t = \begin{cases} 1 & \text{if the government in month } t \text{ has majority in parliament} \\ 0 & \text{otherwise.} \end{cases}$$

The motivation for the third variable is that cabinets which have majority in the parliament can pursue their desired policies more easily than those without majority. It might be objected that the same should hold for the electoral cycle as well. The reason why this kind of information is not used in Eq. (4.3) is that it would probably raise the problem of multicollinearity.²⁶ Indeed, there usually is not much of variation in *MAJ* variable in the shorter pre-election periods.

A general model of partisan cycle is described in Eq. (4.4):

$$r_{t+1} = \alpha + \beta_1 RD_t + \beta_2 CT_t + \beta_3 RD_MAJ_t + \beta_4 LD_MAJ_t + \epsilon_{t+1} \quad (4.4)$$

where variables $RD_MAJ_t = RD_t MAJ_t$ and $LD_MAJ_t = LD_t MAJ_t$ capture periods with majority right-wing and left-wing cabinets, respectively. The *LD* variable itself is not directly present in the model as it is effectively substituted by the intercept term and inclusion of this variable would thus lead to perfect multicollinearity; it is defined mainly for purposes of defining variable *LD_MAJ*. From the construction of *RD* (*LD*) variable is also apparent that the election month is treated as under government of the ending cabinet. This reflects the fact that new cabinets usually effectively start their mandate not earlier than in next month after elections.

²⁵In fact, to partially overcome this issue we tested another model, where each election period was divided into two parts of the same length, and the electoral effects were tested in the latter one. In other words, the pre-electoral period was allowed to differ in length across election periods. Such a model, however, has not lead to any significant results and hence is not regarded in further analysis.

²⁶Multicollinearity is a problem of highly correlated regressors.

The partisan model is tested only for countries where there has been at least one change in ideology of the government. Because we use political data on cabinet level and not only on elections level we allow also for change of ideology within one election period. The intercept term in Eq. (4.4) reflects returns under all left-wing governments, coefficient β_1 additional returns under all right-wing governments. The care-taker variable CT is included only for countries, which experienced the care-taking type of government. Similarly, the two variables reflecting effect of majority governments are included in the regression for individual countries only if they provide enough additional information. To avoid excessive multicollinearity, the variables are used

$$RD_MAJ_t \text{ if } \text{corr}(RD_t, RD_MAJ_t) \leq 2/3,$$

$$LD_MAJ_t \text{ if } \text{corr}(LD_t, LD_MAJ_t) \leq 2/3.$$

We estimate the model in Eq. (4.4) with as many political variables as possible. Should the variables RD_MAJ_t or LD_MAJ_t appear not to be significant they are dropped in the final model. Clearly, nor RD neither CT variable can be dropped from the model since they differentiate between ideological “regimes”. Under hypothesis of partisan cycle **H2** it should be that $\beta_1 > 0$ or at least $\beta_1 + \beta_3 > 0$ (in case only majority right-wing government is able to achieve significantly higher returns). The market efficiency would suggest all coefficients (except α) to be equal to zero. Models are estimated similarly to those of electoral cycle, i.e., by OLS with Newey-West standard errors. The final model is again tested also on real stock returns to verify robustness of obtained results.

4.2.2 Expected and Unexpected Returns

We extend our analysis by testing political effects found by basic models in terms of their consistency with efficient market hypothesis. Models in the previous section were concerned with just realized returns; here, however, the analysis is extended to differentiate between expected and unexpected part of realized returns. Should the political effect be reflected in expected part of returns, it would suggest that investors are aware of political influence on stock market and, consistently with efficient market hypothesis, demand appropriate political risk premium. If, on the other hand, the effects are in the unexpected part of returns, it would suggest that investors are not able to interpret the political information

correctly or the information has no predictive power, perhaps because investors could be systematically surprised by political development. Since the ability of political representation to systematically surprise investors for a longer period of time is questionable, partisan or electoral patterns in the unexpected part of realized returns indicate market inefficiency.

It has already been mentioned in Section 2.3 that it is not possible to *exactly* separate expected and unexpected part of realized returns. The methodology we use is similar to that of Santa-Clara & Valkanov (2003) and Booth & Booth (2003) and lies in conditioning realized returns on macroeconomic variables known to be able to predict stock market returns. These variables should thus be able to explain variation in expected returns. The idea is that the political effects may in fact be proxying for business cycle fluctuations reflected in expected returns.²⁷ If this should be the case, the political dummy variables should become insignificant once the returns are conditioned on macroeconomic variables. For this purpose we estimate models

$$r_{t+1} = \alpha + \beta_1 (1 - CT_t) PREED_K_t + \gamma X_t + \epsilon_{t+1} \quad (4.5)$$

and

$$r_{t+1} = \alpha + \beta_1 RD_t + \beta_2 CT_t + \beta_3 RD_MAJ_t + \beta_4 LD_MAJ_t + \gamma X_t + \epsilon_{t+1} \quad (4.6)$$

which are respectively basic electoral (Eq. (4.3)) and partisan (Eq. (4.4)) models, with a vector of lagged macroeconomic variables X_t included.

The important question is what should be composition of the X vector. The studies dealing with developed markets typically include dividend yields, term and defaults spreads and various interest rates. Unfortunately, some of these variables are not available at all or for sufficiently long period for CEE countries. E.g., dividend yields are not usually available as well as commercial bond yields needed to compute the default spread. As it would be destructive to reduce length of already short time series, we have to resort to other variables which might proxy business cycle. Our choice of these controlling variables is mainly based on Pajuste *et al.* (2000) and Mateus (2004).

We divide the variables into two group, where the *local*, or *country-specific*, *factors* include the following:

²⁷Santa-Clara & Valkanov (2003) also advert to a possibility of indirect political effects where politicians influence macroeconomic variables as in the traditional PBC or PT models (and their rational counterparts) which, in turn, affect stock markets.

- $dCPI$ is monthly change of consumer price index to approximate for inflation. Sign of this variable's coefficient is expected to be negative.
- IP is monthly change of industrial production. The expected sign is positive.
- dER is monthly change of exchange rate of local currency against USDs. The sign of the coefficient may be both negative or positive depending on import-export orientation. It is likely to be negative for export-oriented countries and vice versa for import-oriented countries.
- MMR is short-term local money market rate, expressed as monthly average. It is expected to have negative impact on stock returns.

The *global factors* are common for all the countries and include:

- $MSCI$ are returns on MSCI All Country Europe Price Index (without dividend payments). The index covers 21 European countries including the Czech Republic, Hungary and Poland. The expected sign of this factor is positive.
- DY is dividend yield of MSCI All Country Europe Index. It is computed as the difference between returns on MSCI All Country Europe Gross Index (reflecting gross dividend payments) and Price Index ($MSCI$). The coefficient sign should be positive.
- $BOND$ is yield on 10-year German government bond which should partially proxy the term structure. The sign of this variable's coefficient is expected to be rather negative.
- SPR is spread between German and U.S. three-month money market rate. The effect on stock returns should be rather negative.
- $TBILL$ are returns on U.S. three-month Treasury Bill which approximates risk-free rate. The sign is expected to be negative.

We try to include as many relevant control variables as possible because it is likely that their predictive power will differ substantially across the countries. On the other hand, to avoid excessive loss of degrees of freedom in the final estimation for individual countries, we drop control variables one by one (from the least significant one), should they be insignificant on 10% level. The extended analysis, described in this section, is done for all electoral or partisan effects found by simple EC and PC models for both nominal and real returns.

4.2.3 Panel Study

An analysis similar to that of individual countries, as presented in the two previous subsections, is conducted also for panel of all countries. The aim is to increase sample size and improve robustness of our previous results. A natural way how to proceed is to estimate fixed-effects panel model based on Eq. (4.3) and Eq. (4.4). Fixed country-specific effects are appropriate here as they are likely to be correlated with other regressors.²⁸ Let us denote cross-sectional dimension of data as $i \in \{1, 2, 3 \dots N\}$ and time dimension as $t \in \{1, 2, 3 \dots T\}$. Because we do not have the same set of observations for each country we are dealing with an unbalanced panel, i.e., total number of observation is lower than NT . The electoral cycle panel model have form

$$r_{it+1} = (\alpha + \mu) + \beta_1 (1 - CT_{it}) PREED_K_{it} + \epsilon_{it+1} \quad (4.7)$$

where μ is vector of country-specific effects $\mu = (\mu_1, \mu_2, \mu_3 \dots \mu_N)$. These effects can be easily estimated by including $N - 1$ dummy variables in Eq. (4.7), each taking value of one for one selected country i and zero otherwise. There is only $N - 1$ dummy variables, not N , to avoid so-called “dummy variable trap” causing perfect multicollinearity. In other words, μ_N is normalized to zero in any case. Such an estimator is often called Least Squares Dummy Variable (LSDV) estimator. The panel model of partisan cycle is now evident:

$$r_{it+1} = (\alpha + \mu) + \beta_1 RD_{it} + \beta_2 CT_{it} + \beta_3 RD_MAJ_{it} + \beta_4 LD_MAJ_{it} + \epsilon_{it+1} \quad (4.8)$$

Before proceeding to actual analysis, the models in Eq. (4.7) and Eq. (4.8) are tested for presence of fixed effects, i.e. we perform F-test with null hypothesis that $\mu_1 = \mu_2 \dots = \mu_{N-1} = 0$. If the null hypothesis of no fixed effect cannot be rejected, there is no reason to lower degrees of freedom of the model by adding dummy variables for fixed-effects. Should this be the case, we treat the model as pooled OLS one. It means that the models estimated do not basically differ from Eq. (4.3) and Eq. (4.4), only the data have not only time-series dimension but also the cross-sectional one.

Essentially the same methodology as in Subsection 4.2.1 is then applied to these models. In the first step, the aim is to select correct models of electoral and partisan cycles in nominal returns. For EC we are choosing model with

²⁸Estimating random-effect models would lead to biased estimates in this case.

$K \in \{6, 7, 8 \dots 24\}$ months long cycle, which suits best the data (based on AIC). For PC the aim is to find out whether government majority plays some role or not. The chosen models for both types of political cycle are than tested on real returns as well. In the second step, vector of control variables X_t , described in the previous subsection, is included into the regression (Eq. (4.7), Eq. (4.8)) in order to differentiate whether the political effects are expected or not.

It is necessary, in any case, to carefully check OLS assumptions for panel data. Beyond heteroskedasticity and autocorrelation, which could be again taken care of by Newey-West robust standard errors, the panel or pooled OLS specification introduces problem of cross-sectional dependence. Petersen (2009) describes that standard OLS as well as Newey-West standard errors are biased in presence of cross-sectional dependence. It is only naturally to expect cross-sectional dependence in our data – there are several studies confirming that CEE are indeed often co-integrated. For this reason, we use Driscoll-Kraay estimator of variance covariance matrix (see Hoechle 2007), which is consistent with heteroskedasticity, autocorrelation and also cross-sectional dependence. Because the loss of efficiency in case of no cross dependence due to Driscoll-Kraay estimator may be—unlike the loss only under homoskedasticity and no serial correlation—severe, a test for cross-sectional dependence is called for.

To test for cross-sectional dependence we use a variant of Breusch-Pagan Lagrange multiplier test as implemented in STATA (`xttest2` routine) with null hypothesis of no cross-sectional dependence in residuals. If the null hypothesis is rejected, we use Driscoll-Kraay variance covariance estimator implemented to Stata by Hoechle (2007) (`xtscc` routine). Both routines are adjusted for use with unbalanced panels. If the test fails to reject the null hypothesis, we proceed with Newey-West estimator. For completeness, we also test for presence of heteroskedasticity (Likelihood Ratio test) with null hypothesis of homoskedasticity; and autocorrelation (Wooldridge test) with null hypothesis of first-order autocorrelation (`xtserial` routine in STATA).

4.3 Analysis of Volatility

The analysis starts with extracting volatility time series from stock market returns. Volatility in our case is measured by variance of nominal stock returns. The analysis is however conducted only for indices whose returns are heteroskedastic, i.e. variance is not constant in time. For testing heteroskedastic-

ity, we use mainly Portmanteau Q Test and additionally also Engle's Lagrange Multiplier Test for ARCH Disturbances and Lee and King's test as implemented in SAS. Null hypotheses of these tests are that there are no nonlinear (autoregressive of order up to 12) patterns in squared disturbances. In case the null hypothesis cannot be rejected, it would mean that volatility does not change over time. Such a finding is not consistent with political cycle on an efficient market and requires no further analysis.

We estimate (time-varying) *conditional volatility*, assuming that volatility in each period is conditional on the information available in that period. We choose a model from GARCH family of models as they are generally consistent with stylized facts about financial series, namely volatility clustering and fat tails.²⁹ The selected model is AR(1)-EGARCH(p, q) (see Nelson 1991), characterized by the set of equations (4.9) and (4.10). This model has performed best in comparison with standard GARCH(p, q) and threshold GARCH(p, q) models. The model is described as follows:

$$\begin{aligned} r_t &= \alpha + \beta r_{t-1} + \epsilon_t, \\ \epsilon_t &= h_t z_t, \quad z_t \sim i.i.d.(0, 1) \end{aligned} \tag{4.9}$$

where r_{t-1} is the AR(1) term included in order to account for autocorrelation in returns. Disturbances ϵ_t are assumed to have expected value of zero and conditional variance h_t . The distribution of z_t innovations is assumed to be normal in our case.³⁰ Finally, volatility (or conditional variance), as measured by h_t , follows EGARCH(p, q) process:

$$\begin{aligned} \log(h_t) &= \omega + \sum_{i=1}^p \delta_i \log(h_{t-i}) + \sum_{j=1}^q \alpha_j g(z_{t-j}) \\ g(z_t) &= \theta z_t + \gamma [|z_t| - E|z_t|] \end{aligned} \tag{4.10}$$

where p is number of lagged autoregressive terms and q is number of lagged returns innovations used to model volatility, $g(\cdot)$ is impact function of lagged innovations (described below) and E is expectations operator. Parameters ω ,

²⁹Volatility clustering means that once volatility rises it is likely to remain high for some time and vice versa; fat tails is a common characteristic of returns distribution, meaning that there is abnormally high fraction of extreme returns (both negative and positive) compared to normal distribution.

³⁰In fact, normality is not always confirmed. Therefore, we assumed also other distributions, namely Student's t-distribution and generalized error distribution, which could possibly better account for leptokurtosis in stock returns. None of these led to substantial improvement in results though.

δ 's and α 's are to be estimated. The equations in (4.9) and (4.10) are estimated simultaneously using maximum likelihood method. We estimate all the models with $p \in \{1, 2\}$ and $q \in \{0, 1, 2\}$ and choose the one with lowest AIC as the best.

As apparent from Eq. (4.10), volatility is computed as weighted average of three components: long-term variance ω , past volatility h_{t-i} and past return innovations z_{t-i} . This generally applies to all the GARCH types of models. EGARCH methodology is then particularly suitable for analyzing stock returns as it also allows for “leverage effects”, i.e., asymmetric reaction of volatility on good and bad news. It is because (linear) function $g(z_t)$ has different slope depending on the sign of z_t . If there is a good news ($z_t > 0$), $g(z_t)$ has slope $\theta + \gamma$ whereas in case of bad news ($z_t < 0$), it has slope $\theta - \gamma$. The difference in slopes then implies different impact of good and bad news on volatility. Besides this, EGARCH is advantageous in that it does not impose any restrictions on signs of the parameters ω , δ_i and α_j . The standard GARCH requires these parameters to be positive to ensure positive volatility h_t . This, however, is not necessary in EGARCH framework due to log function on the left-hand side of the first equation in (4.10).

In the subsequent step, we use the derived time series of volatility h_t as the dependent variable in model equivalent to Eq. (4.3) (see Eq. (4.11)). Hypothesis **H3** implies that β_1 should be positive, either as a symptom electoral cycle or due to pre-electoral uncertainty. On an efficient market, however, the patterns in both returns and volatility should be of the same length. Therefore, we mainly test volatility on the electoral effects recognized in analysis of returns, i.e., for each country where an electoral effect is found, we set K to number of months according to the best electoral cycle model described in Subsection 4.2.1.

$$h_t = \alpha + \beta_1 (1 - CT_t) PREED_K_t + \epsilon_t \quad (4.11)$$

Because market efficiency cannot be taken as granted, we also look for patterns of different lengths. The observed patterns in volatility, if any, should then be conditioned on the same set of macroeconomic variables X_t as we did in Subsection 4.2.2 in order to find out whether they can be politically induced. We also assess the change in volatility around elections by taking average volatility for months in 25-months symmetric window around elections. Under condition of risk connected with elections, it is naturally to expect a significant drop in volatility shortly after elections as a consequence of political uncertainty resolution.

To test hypothesis **H4**, we estimate Eq. (4.4) with h_t as the dependent variable Eq. (4.12) and the rules that apply for including CT , RD_{MAJ} and LD_{MAJ} variables do not change.

$$h_t = \alpha + \beta_1 RD_t + \beta_2 CT_t + \beta_3 RD_MAJ_t + \beta_4 LD_MAJ_t + \epsilon_{t+1} \quad (4.12)$$

Hypothesis **H4**, implicitly assuming right-wing premium and market efficiency, implies positive sign of the β_1 coefficient. Market efficiency itself implies insignificance of coefficient β_1 in case a country stock index does not exhibit any partisan patterns in returns. Generally, taking into account also the possibility of left-wing premiums, β_1 should have the same sign as it had for stock returns. Should the volatility differ significantly between the two ideologies, we may again use the set of macroeconomic variables X_t to trace the origin of the difference.

Chapter 5

Data

The general problem of studies concerned with CEE stock markets is short history of these markets. At best, one can use data from the post-communism period, which, however, are not always available for the whole period. Another problem is that the very beginnings of modern trading history are often distorted by low volumes of trade and/or low number of traders.³¹ Due to this problem, we cannot always rely on the whole sample available. On the other hand, shortening the time period reduces—already rather low—number of political events (elections and changes of cabinet) and decreases robustness of our findings. Therefore, one has to be cautious when finding the right balance between the two problems. Unfortunately, there often is not much of space to maneuver and we have to incline to keep more political events in the sample at the expense of including periods of higher market inefficiency.

Our aim, with regard also to the panel study we perform, hence is to cover as many CEE countries—with reasonable length of available data—as possible. Initially, we wanted to include all CEE members of the European Union. There was problem only with Slovenia, which had to be excluded from the study because its main stock index SBI TOP was introduced as late as of 2006 and no general index prior to this date has been available. In case of Estonia and Slovakia we restrain ourselves only on the period prior to the accession of these countries to the Eurozone. Further attempts to increase our dataset by including Russia and Ukraine failed because of substantial difference in political system of these countries and ambiguity connected with its qualifying. Finally, Croatia could not be included due to insufficient availability of several macroeconomic control variables.

³¹These effects are, to some extent, eliminated by using data of monthly frequency.

Given that, the dataset comprises nine CEE countries, all of which are EU members. The countries are presented in Table 5.1 together with time period over which they are analyzed.

Table 5.1: Analyzed countries and time periods

Country	ISO Code	Sample start	Sample end
Bulgaria	BGR	11/2000	01/2012
Czech Republic	CZE	03/1994	01/2012
Estonia	EST	02/1998	12/2010
Hungary	HUN	01/1993	01/2012
Latvia	LVA	02/2000	01/2012
Lithuania	LTU	02/2000	01/2012
Poland	POL	08/1994	01/2012
Romania	ROM	10/1997	01/2012
Slovakia	SVK	06/1994	12/2008

5.1 Stock Returns Data

Daily data on stock indices representative of the selected countries are collected from RWM. The indices we use are *SOFIX* for Bulgaria, *PX* (formerly *PX50*) for the Czech Republic, *OMXTGI* for Estonia, *BUX* for Hungary, *OMXRGI* for Latvia, *OMXVGI* for Lithuania, *WIG* for Poland, *BETI* for Romania and *SAX* for Slovakia. These indices are all weighted by market capitalization and computed in local currencies. Yet they still differ in some other characteristics:

- *Capitalization weights*: some of the indices are weighted based only on capitalization of free-floating shares, i.e., shares instantly available on the market. These indices are *SOFIX*, *BUX* and *BETI*.
- *Number of issues*: *SOFIX*, *PX*, *BUX*, *BETI* and *SAX* are based only on shares of selected companies (typically most liquid ones), whereas others are based on all shares traded on the market.
- *Dividends*: *SOFIX*, *PX* and *BETI* are price indices, which means they are not adjusted for dividends and hence reflect only price movements of underlying shares. The rest are total returns indices which are adjusted by assuming reinvestment of dividend payments (on the gross basis).

The differences in construction of indices are nevertheless not likely to affect our results significantly as we are not primarily interested in comparing returns among the countries.

We show the development of respective stock indices over time in Fig. 5.1.

5.2 Political Variables

Political systems of most European countries are—in comparison to e.g. U.S.—typically more complicated, which makes the data requirements more intensive and difficult. The political process in the CEE countries is characteristic by untimely called elections, relatively often changes of government within one election period, coalition cabinets and other phenomenons. Our aim is to reasonably capture these characteristics since they may have significant impact on either the length or depth of the political cycle.

We are concerned only with results of elections to the lower house (should there be two chambers) of national parliament and corresponding cabinets.³² The data on political variables are collected mainly from ParlGov database by Döring & Manow (2012). The database contains comprehensive information on political parties, elections and cabinets for all EU members as well as some other countries. To be able to construct political dummy variables, we need information about all the governments which were in the office in at least one month of the studied period. Further we collect (expected) dates of the closest upcoming elections because some of the countries could be in the pre-electoral phase of political cycle by the end of the studied period (if the elections were close enough). These data are obtained from International Foundation for Electoral Systems (2012).

We particularly gathered the following information:

- *Election date* as a month when the elections which determined the government were held.
- *Start date* as a month when the cabinet was inaugurated. For the sake of simplicity we assume that cabinets which were inaugurated in the election month or within two months after it start in the month just after the elections.

³²Namely we are concerned with elections to *Narodno Sabranie* in Bulgaria, *Riigikogu* in Estonia, *Országgyűlés* in Hungary, *Saeima* in Latvia and *Seimas* in Lithuania. In countries with bicameral parliament we proceed with *Poslanecká sněmovna* in the Czech Republic, *Sejm* in Poland, *Camera Deputatilor* in Romania and *Národná rada* in Slovakia.

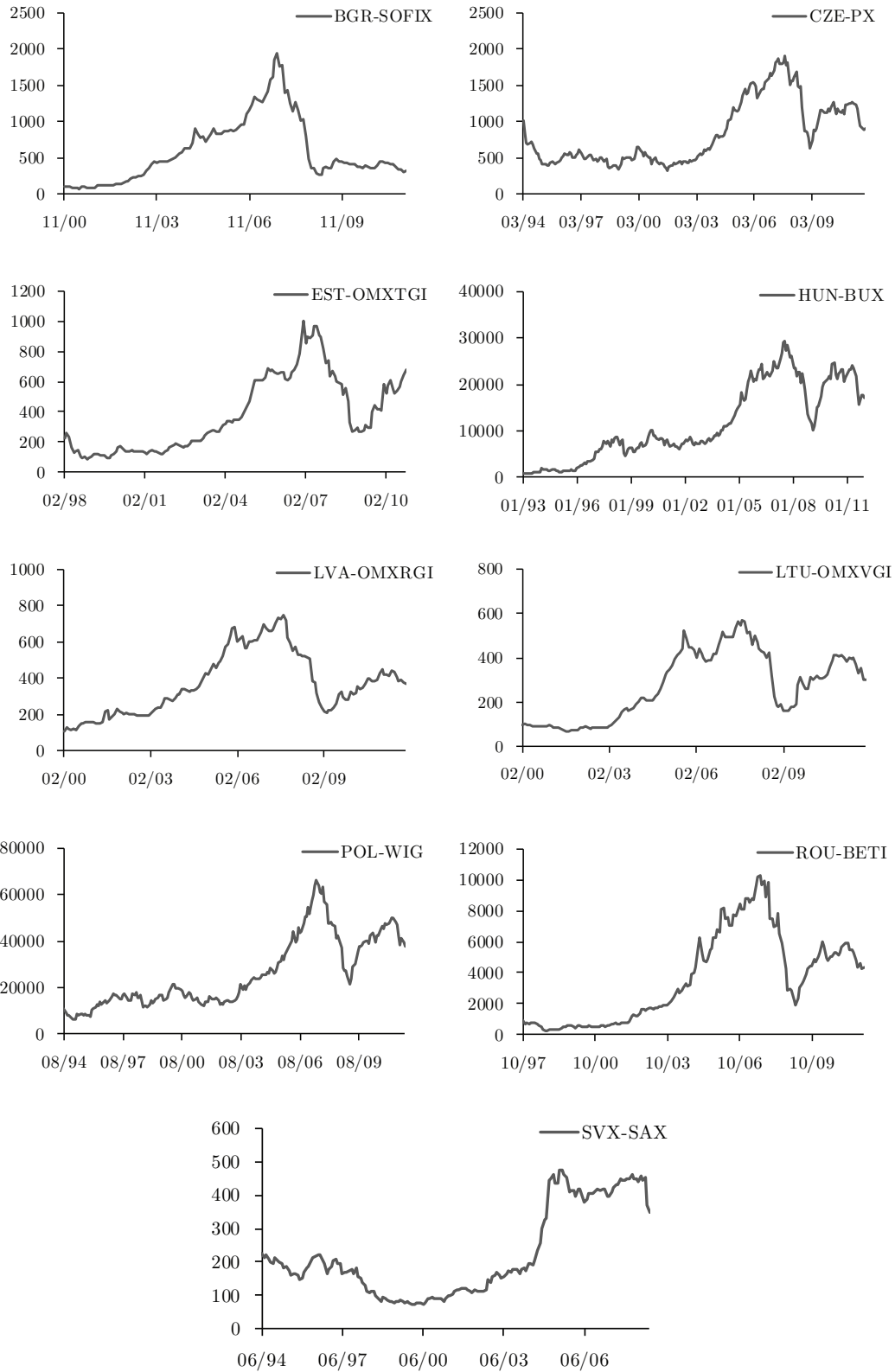


Figure 5.1: Stock market price indices (in local currency)

Source: Reuters Wealth Manager

- *End date* is the last month of the cabinet in the office. These dates are not directly provided by Döring & Manow (2012) so we calculate them as the month before the next cabinet starts. It implies that election months are considered to be under government of the ending cabinet.
- *Ideology* is computed as a weighted average of ideologies of individual cabinet parties. From this point of view, a government may be either right-wing or left-wing or non-partisan (technical). How the ideology is determined is described below.
- *Majority* is counted based on share of seats of cabinet parties on total seats available (provided by Döring & Manow (2012)). We store this information in *MAJ* dummy variable which equals one when the government has majority in the parliament and zero otherwise.

The basic information about collected political data can be found in Table 5.2.

The question of parties' ideologies may appear controversial in the context of CEE countries. Is it possible to reasonably quantify anything like political ideology? Döring & Manow (2012) draw from several questionnaire surveys of local experts, typically political scientists, who were asked to assess respective political parties on certain ideology-related issues. For our purpose the main relevant sources are Benoit & Laver (2006) and Hooghe *et al.* (2010). Döring & Manow (2012) use these data to assign each party a value between zero and ten on linear left-right scale. We compute the ideology of the whole cabinet by taking average weighted by number of seats in the parliament of each cabinet party. Hence we call the parties with the average less than five as left-wing and those with the average greater or equal to five we call right-wing.³³ It allows us to construct *RD* dummy variable taking value of one when the cabinet is considered right-wing and zero otherwise; and *LD* dummy variable for which the opposite holds.

The source data unfortunately do not contain ideology assessment for all parties, namely the very new ones. For this reason, we decide to use also other sources should we have ideology information on less than 70% of cabinet members. There had been two cases where we proceeded with data from Norwegian Social Science Data Services (2012) and three cases where we had to refer to other credible sources and general perception.³⁴ Since our dividing

³³The results are generally consistent with ideology of the prime ministers' party.

³⁴The latter three cases include TOP09 in the Czech Republic and Unity Party and Zatlers Reform Party in Latvia which are all perceived as right-wing parties. It should be noted,

Table 5.2: Summary of political data

Country	Period start	Election periods	# of cabinets (total)	Right-wing cabinets		Left-wing cabinets	
				#	Months in office	#	Months in office
Bulgaria	11/2000	4	4	3	85	1	49
Czech Republic	03/1994	6	11	5	98	4	96
Estonia	02/1998	5	8	8	154	0	0
Hungary	01/1993	6	10	4	84	6	144
Latvia	02/2000	5	12	12	143	0	0
Lithuania	02/2000	4	8	5	83	3	60
Poland	08/1994	6	13	7	123	6	86
Romania	10/1997	4	11	9	111	2	60
Slovakia	06/1994	6	6	4	140	2	34

Note: The studied period ends in January 2012 for all the countries, except from Slovakia (December 2008) and Estonia (Dec 2010). The total number of cabinets reflects also the non-partisan or technical cabinets which there were two in the Czech Republic, for 20 months in total.

Source: Döring & Manow (2012) and author's computations.

criterion is very simple (left-wing or right-wing), the method described above is sufficient.

An issue related to ideology is the existence of non-partisan and technical governments (care-takers). These are typically a consequence of lost of majority in the parliament or inability to find coalition partners. Since these governments can hardly pursue any ideological policy, we distinct them from standard cabinets. During the studied period, care-taking cabinets happened to be in the Czech Republic and Romania. The situation in the Czech Republic is covered by *CT* dummy variable, which takes value of one when the care-taking cabinet is in the office and zero otherwise. The care-taking cabinets in Romania were only short-lived (less than three weeks) and thus have been neglected without any informational loss.

5.3 Control variables

The control variables we use are gathered mainly from two sources: Eurostat and International Financial Statistics (IFS) by International Monetary Fund. All the control variables are collected for the whole period as mentioned in Table 5.1.

Inflation Monthly changes of national consumer price indices taken from IFS are used to approximate inflation rate. They are used not only as a control variable (*dCPI*), but also to compute real returns.

Industrial production Monthly changes in industrial production (variable *IP*) are computed from industrial production index from IFS for all the countries with exception of Estonian index, which is taken from Eurostat.

Exchange rates End-of-month exchange rates of national currencies against USD are from IFS. They are used to convert stock indices from national currencies and monthly changes are used as a control variable (*dER*).

Stock Returns MSCI All Country Europe index, used as a proxy of European stock returns, is obtained directly from MSCI website. The returns are used as

however, that this additional information has never changed the ideology of the whole cabinet as given by data from Döring & Manow (2012).

a control variable (*MSCI*, not adjusted for dividends) and to compute dividend yields (variable *DY*), which are the difference between returns of the index with gross dividends included and returns of not adjusted index. MSCI provides both types of the index.

Interest rates Availability of data on interest rates differs across the countries, hence there are some differences in the rates used. As a measure of domestic interest rate (variable *MMR*), we use day-to-day money market rate obtained from Eurostat (IFS in case of Poland), which is usually available for the longest period of time. The exception are Estonia and Romania, for which we use three-month and one-month money market rates, respectively; both taken from Eurostat. The inclusion of domestic interest rate is the reason why we exclude the period of Estonian and Slovak membership in the Eurozone from the sample. Further, from Eurostat data, we compute the spread between three-month German and U.S. money market rate (variable *SPR*).

Bond yields Since the data on domestic long-term bond yields are almost unavailable at sufficient length for most of CEE countries, yield of German ten-year government bond from IFS is used as a proxy (variable *BOND*).

T-Bills yields Yields on three-month U.S. T-Bills from IFS are also used as a control variable proxying the risk-free rate (*TBILL*).

Chapter 6

Empirical Analysis

In this section we present main findings on electoral and partisan patterns in stock returns. Subsequently, we accompany these findings by results of volatility analysis. First of all, however, we shortly discuss issues regarding the source data, namely the seasonality of stock indices.

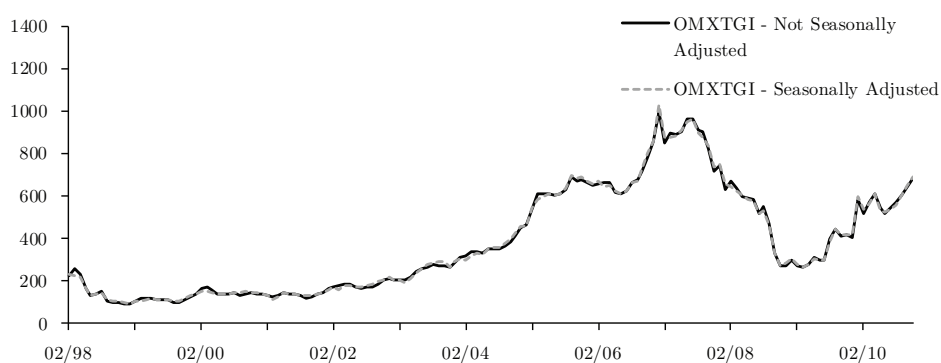
Figure 5.1 on page 44 shows development of each stock index over monitored period. The charts themselves do not suggest seasonal patterns for any of the indices, yet the X-12-ARIMA methodology detects some kind of significant seasonality for most of the countries. Indeed, only for three indices—Bulgarian, Hungarian and Romanian—we detect no stable seasonality, merely the moving one. For other three indices—Lithuanian, Latvian and Polish—at least one of the test for stable seasonality could not reject it, but the effects are not strong enough to be still acceptable given the presence of significant moving seasonality. Non-parametric Kruskal-Wallis test confirms seasonality at the one percent level for Slovakian index SAX, while moving seasonality is not confirmed at the five percent level, the combined test rejects the seasonality though.

The Czech PX index and Estonian OMXTGI are thus the only indices passing combined test of seasonality. The results are particularly strong for the Czech Republic, where both tests for stable seasonality cannot be rejected while moving seasonality can. In the case of Estonia, there is moving seasonality present at the one percent level, which is not strong enough to shadow the real seasonal effect. Despite the analysis proves seasonality to be significant for these two countries, Fig. 6.1 shows that there is little difference between the original and seasonally adjusted series.

The results of seasonality analysis generally quite vary across the countries; not only in terms of their significance, but also in nature of considered seasonal



(a) Czech Republic



(b) Estonia

Figure 6.1: Seasonality in stock market indices

Source: RWM and author's computations.

effects. The differences in underlying ARIMA models, significance of trading day effects and presence of outliers make presence of some “common” seasonal pattern rather unlikely. It should also be noted that all the models, except for Bulgarian one, pass X-12-ARIMA internal assessment of quality of seasonal adjustment which means low risk of model misspecification. Based on this and the results of seasonality tests, we decide to proceed with *not adjusted* series of returns for *all countries*. Figure 6.2 then depicts stock returns calculated from these series according to Eq. (4.1) on page 28.

Finally, Table 6.1 presents basic descriptive statistics and results of selected statistical tests. Mean stock return is typically positive over the monitored period, with exception of the Czech Republic with slightly negative monthly return.³⁵ Regarding the distribution, returns of CEE stock markets generally fit stylized facts about stock returns as they have negative or low skewness (with exception of Slovakia) and excess kurtosis (leptokurtosis). Shapiro-Wilk test

³⁵All returns are computed and stated in this chapter on *per mensem* (p.m.) basis unless noted otherwise.

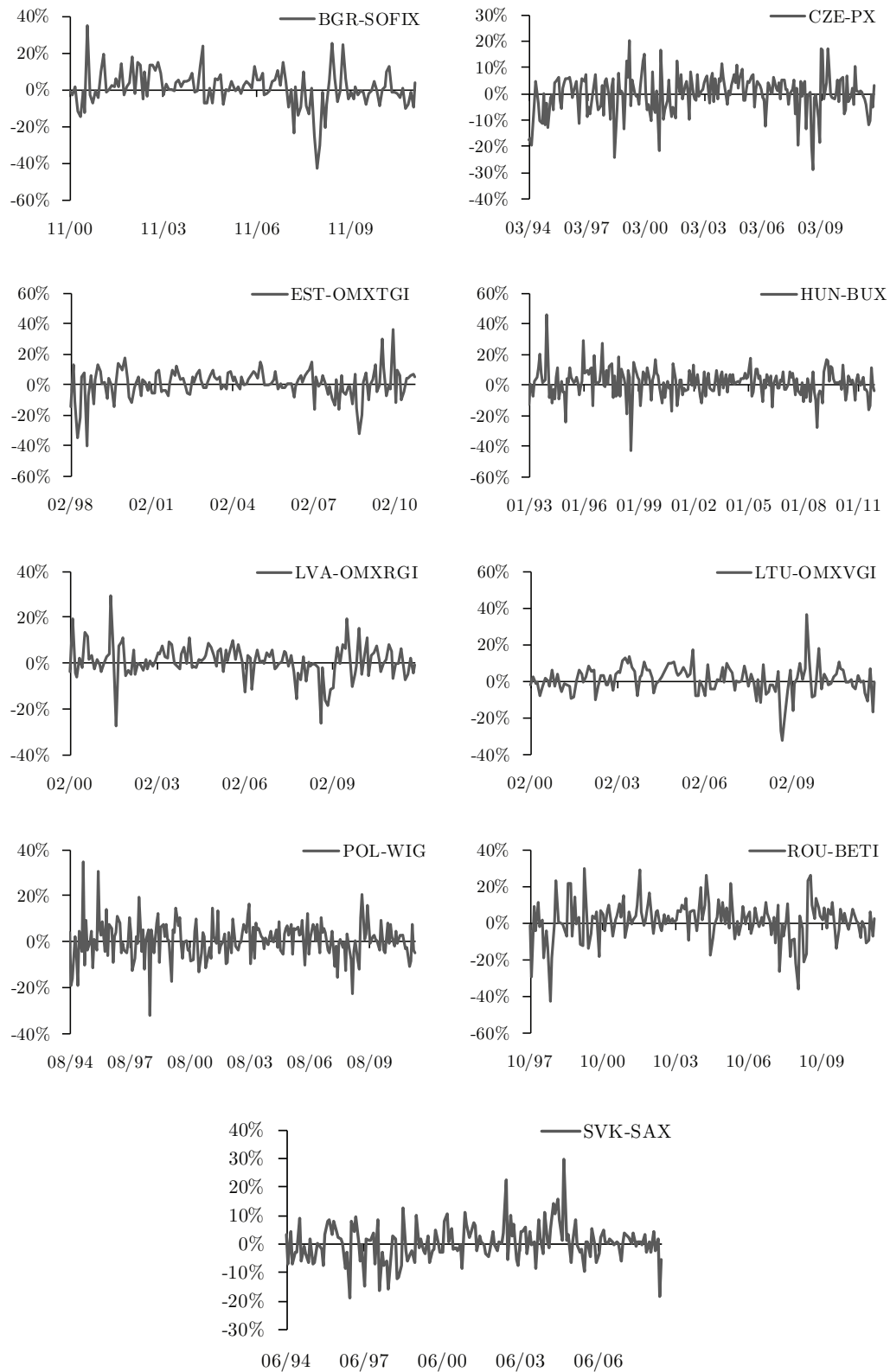


Figure 6.2: Stock market returns (in USD)

Source: Author's computations.

Table 6.1: Descriptive statistics of monthly stock returns

Country	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis	S-W W	S-W W	S-W p-val	ADF	ADF p-val	Obs.
BGR	0.889%	0.100	-42.651%	35.039%	-0.443	3.567	0.939	0.939	0.000***	-3.918	0.002***	134
CZE	-0.089%	0.075	-28.746%	20.189%	-0.692	1.590	0.960	0.960	0.000***	-5.468	0.000***	214
EST	0.614%	0.096	-39.911%	35.910%	-0.748	3.980	0.925	0.925	0.000***	-5.033	0.000***	154
HUN	1.354%	0.092	-43.197%	45.555%	-0.114	4.445	0.949	0.949	0.000***	-5.912	0.000***	228
LTU	0.798%	0.079	-32.268%	36.676%	-0.235	4.695	0.935	0.935	0.000***	-3.812	0.003***	143
LVA	0.854%	0.073	-27.077%	29.236%	-0.356	3.595	0.939	0.939	0.000***	-3.903	0.002***	143
POL	0.719%	0.082	-32.222%	34.975%	0.038	2.689	0.968	0.968	0.000***	-5.887	0.000***	209
ROU	1.008%	0.108	-43.060%	29.630%	-0.563	2.353	0.953	0.953	0.000***	-4.878	0.000***	171
SVK	0.291%	0.065	-18.683%	29.828%	0.409	2.868	0.960	0.960	0.000***	-4.104	0.001***	174

Note: ADF stands for Augmented Dickey-Fuller test with null hypothesis of unit root. S-W W stands for Shapiro-Wilk W statistics. This test has null hypothesis of normally distributed data.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

also rejects normality of returns for all the countries. Importantly, Augmented Dickey-Fuller test rejects the null hypothesis of unit root on the one percent significance level and hence no additional transformation is required.

6.1 Political Cycle in Stock Returns

6.1.1 Electoral Cycle

Regarding the electoral cycle, i.e. hypothesis **H1**, model specified in Eq. (4.3) has been estimated 19 times for each index, with K rising from 6 to 24. From the set of 19 models for each index we have chosen the best one in terms of AIC. Results of the selected models are summarized in Table 6.2, where one can easily see that the length of cycle covers almost whole spectrum of possible values: there are short-term electoral cycles (say less than one year) in Estonia, Romania, Poland or Slovakia as well as long-term cycles such as those in Latvia or Bulgaria.

Sign and significance of *PREED* variable coefficient is crucial when assessing presence of electoral cycle. As can be seen in Table 6.2, the data does not support **H1** strongly. In fact, nominal returns are higher before elections only in the Czech Republic, Estonia, Hungary and Latvia. While the increase of returns in pre-electoral period may be economically significant for all the countries, ranging from 1.4% to 3% *p.m.*, it is statistically significant on at least 10% level only for Estonia and Hungary. Estonia also exhibits the shortest EC, only seven months, which is more in conformity with rationality of stock investors. Hungary has the second shortest cycle from the four countries with length of 14 months. For the two remaining countries, the coefficient of *PREED* variable is not significant for any of the considered cycle lengths.

Many of the other stock markets exhibit rather unexpected behavior as their nominal returns are both economically and statistically significantly *negative* prior to elections. This holds namely for Bulgaria, Lithuania, Poland and Slovakia. Romania, on the other hand, has in average returns lower by 3.80% in seven months before elections, yet statistically insignificant. This phenomenon of decreasing returns is particularly strong in Slovakia, where it is the second highest (-4.16%) and most significant, followed by Lithuania with -3.81%. The decrease is highest in Bulgaria (-4.22%), yet less significant as well as in Poland (-1.87%). The evidence suggests that politicians are either not opportunistic

Table 6.2: Basic model of electoral cycle in nominal returns

Country	Length (K)	Intercept	$PREED$	R^2	White Test	Godfrey Test
BGR	22	2.628*** (0.945)	-4.219* (2.538)	0.043	10.293	8.669 0.003(1)
CZE	16	-0.381 (0.748)	1.449 (1.148)	0.008	2.697	5.247 0.022(1)
EST	7	0.253 (1.025)	3.020** (1.438)	0.013	0.882	6.417 0.011(1)
HUN	14	0.789 (0.789)	2.184* (1.324)	0.012	0.101	1.797 0.180(1)
LTU	16	2.093*** (0.870)	-3.814** (1.813)	0.051	1.199	13.721 0.000(1)
LVA	20	0.036 (1.231)	1.737 (1.430)	0.014	0.143	4.651 0.031(1)
POL	8	1.099 (0.912)	-1.866* (3.829)	0.008	1.812	0.663 0.718(2)
ROU	7	1.555* (0.954)	-3.800 (3.703)	0.013	0.738	5.548 0.019(1)
SVK	10	1.126* (0.637)	-4.163*** (1.167)	0.065	0.651	5.005 0.082(2)

Note: Newey-West standard errors in parentheses. White test has the null hypothesis that residuals are homoskedastic. Godfrey test has the null hypothesis of residuals being autocorrelated, the number in parenthesis represents order of detected autocorrelation. For these tests p-values are reported in the second row.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

in our sense³⁶ or they use wrong policies to affect stock market (or use the right policies wrongly), which consequently has an adverse effect on the market. The higher the significance of the cycle the higher the probability of the latter explanation.

The prevailing evidence thus so far implies that politicians are sometimes indeed trying to influence stock market before elections, but the effect is often the opposite than they want. Alternative explanation may be that investors worry because of expected pre-electoral uncertainty and leave the market. Three of the nine countries however do not exhibit statistically significant electoral cycle of any kind. Table 6.2 also reports results of White and Godfrey Test showing that residuals of most models are autocorrelated and sometimes heteroskedastic, so the Newey-West correction of standard errors has proven suitable. One also should not be confused by low values of R^2 ; the model with one dummy variable is very simple and it should not have high explanatory power as the opposite would mean predictability of stock returns and thus low efficiency.

In the next step, presence of electoral cycle of length selected for each country is also tested on real returns. As Table 6.3 shows, presence of electoral cycle in both Estonia and Hungary is robust to return specification. The decreasing returns phenomenon is stable in Slovakia and Lithuania, while in Bulgaria or Poland it is not significant anymore. Cautious reader may also notice that it is mostly intercept, not *PREED* coefficient, what differs in models with nominal and real returns. This indicates inflation being rather stable across the election period and not deviating from long-term value prior to elections, i.e., inflation appears to be rather immune to electoral cycle. It can be said that results for real returns confirm our findings from nominal returns models and that electoral cycle is relatively stable in this sense.

The last part is to determine whether observed political effects are expected or unexpected, i.e., we estimate model in Eq. (4.5). At the same time we analyze the source of these effects: whether pre-electoral difference in returns may really be a consequence of change in government policy or it can be explained by changes of macroeconomic conditions. In this part we thus restrict ourselves to countries where significant cycle, either positive or negative, has been found for nominal returns - Bulgaria, Estonia, Hungary, Lithuania, Poland and Slovakia.³⁷

³⁶It means that politicians may be opportunistic, but they do not care about stock market. Perhaps policies they consider to be popular for the public are detrimental to the stock market.

³⁷Cycles are still insignificant in the remaining countries, even if returns are adjusted for macroeconomic conditions.

Table 6.3: Basic model of electoral cycle in real returns

Country	Length (K)	Intercept	$PREED$	R^2	White Test	Godfrey Test
BGR	22	2.156** (0.927)	-4.136 (2.568)	0.041	10.500	8.336 0.004(1)
CZE	16	-0.663 (0.762)	1.209 (1.179)	0.005	2.401	5.288 0.021(1)
EST	7	-0.078 (1.034)	2.966** (1.440)	0.013	0.927	6.563 0.010(1)
HUN	14	-0.026 (0.757)	2.245* (1.291)	0.013	0.101	1.230 0.267(1)
LTU	16	1.898** (0.892)	-3.960** (1.846)	0.053	1.400	14.989 0.000(1)
LVA	20	-0.547 (1.281)	2.091 (1.490)	0.020	0.097	5.363 0.021(1)
POL	8	0.481 (0.696)	-1.594 (1.131)	0.006	2.004	0.619 0.734(2)
ROU	7	0.212 (0.954)	-3.805 (3.703)	0.013	0.517	6.936 0.008(1)
SVK	10	0.595 (0.656)	-4.169*** (1.220)	0.062	0.583	4.762 0.092(2)

Note: Newey-West standard errors in parentheses. White test has the null hypothesis that residuals are homoskedastic. Godfrey test has the null hypothesis of residuals being autocorrelated, the number in parenthesis represents order of detected autocorrelation. For these tests p-values are reported in the second row.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

Table 6.4: Extended model of electoral cycle in nominal returns

Country	Length (K)	Intercept	$PREED$	$dCPI$	IP	dER	$MSCI$	DY	MMR	$BOND$	SPR	$TBILL$	R^2
BGR	22	-9.916** (3.903)	-3.531** (1.652)	-1.051 (0.772)	0.016 (0.113)	0.422 (0.375)	0.525*** (0.199)	-0.597 (3.317)	-0.446 (0.965)	5.023*** (1.399)	-2.749* (1.582)	-2.156 (1.462)	0.187
BGR	22	-9.852** (4.047)	-3.734** (1.808)	-	-	-	0.387* (0.199)	-	-	5.008*** (1.549)	-3.564** (1.402)	-2.916*** (1.116)	0.166
EST	7	-0.013 (4.274)	5.127*** (1.759)	1.122 (1.487)	-0.157** (0.074)	0.512* (0.281)	0.731*** (0.173)	-1.821 (2.424)	-0.594*** (0.219)	2.028 (1.463)	-1.522 (1.217)	-2.033** (1.028)	0.274
EST	7	3.702*** (1.070)	4.503*** (1.684)	-	-0.167** (0.072)	0.537** (0.267)	0.756*** (0.169)	-	-0.711*** (0.226)	-	-	-	0.251
HUN	14	1.865 (3.320)	1.795 (1.145)	0.259 (0.742)	0.036 (0.062)	0.120 (0.168)	0.364*** (0.123)	-0.620 (2.352)	0.274* (0.140)	-0.771 (1.266)	-0.044 (0.627)	-0.404 (0.650)	0.076
HUN	14	2.091 (2.275)	1.962 (1.196)	-	-	-	0.307*** (0.097)	-	0.292** (0.120)	-1.116* (0.672)	-	-	0.069
LTU	16	0.553 (3.121)	-2.287** (1.119)	-2.865** (1.407)	-0.003 (0.047)	0.003 (0.321)	0.365** (0.153)	0.793 (2.094)	-0.233 (0.947)	1.449 (1.181)	-1.718 (1.211)	-1.471 (1.135)	0.227
LTU	16	2.527*** (0.764)	-2.647** (1.257)	-3.264*** (1.184)	-	-	0.413*** (0.154)	-	-	-	-	-	0.205
POL	8	4.835 (2.931)	-2.394** (1.201)	0.062 (1.063)	0.146 (0.108)	-0.072 (0.160)	0.119 (0.125)	-0.164 (2.350)	0.105 (0.165)	-0.896 (1.218)	-0.792 (1.075)	-0.367 (0.899)	0.054
POL	8	1.023 (0.643)	-1.764* (1.062)	-	-	-	0.169* (0.097)	-	-	-	-	-	0.020
SVK	10	5.426** (2.635)	-3.889*** (0.964)	-0.076 (0.402)	-0.151* (0.081)	0.169 (0.174)	0.149 (0.122)	-4.067 (2.622)	-0.250*** (0.094)	0.495 (0.768)	-0.498 (0.756)	-1.052 (0.739)	0.172
SVK	10	3.156*** (1.063)	-3.989*** (0.965)	-	-0.171** (0.087)	-	-	-	-0.249*** (0.086)	-	-	-	0.133

Note: Newey-West standard errors in parentheses.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

Table 6.5: Extended model of electoral cycle in real returns

Country	Length (K)	Intercept	$PREED$	$dCPI$	IP	dER	$MSCI$	DY	MMR	$BOND$	SPR	$TBILL$	R^2
EST	7	-0.419 (4.297)	5.107*** (1.770)	0.890 (1.496)	-0.156** (0.075)	0.499* (0.279)	0.722*** (0.173)	-1.861 (2.442)	-0.581*** (0.218)	2.140 (1.470)	-1.638 (1.228)	-2.178** (1.039)	0.273
EST	7	4.353*** (1.179)	4.365*** (1.603)	-	-0.161** (0.071)	0.547** (0.262)	0.763*** (0.170)	-	-0.581*** (0.215)	-	-	-0.576* (0.322)	0.259
HUN	14	1.667 (3.331)	1.822 (1.138)	0.028 (0.729)	0.044 (0.062)	0.112 (0.167)	0.349*** (0.121)	-0.349 (2.350)	0.222* (0.134)	-0.689 (1.252)	-0.090 (0.615)	-0.461 (0.643)	0.065
HUN	14	2.273 (2.251)	2.002* (1.189)	-	-	-	0.292*** (0.095)	-	0.232** (0.115)	-1.160* (0.657)	-	-	0.058
LTU	16	-0.442 (3.020)	-2.405** (1.092)	-3.081** (1.395)	-0.013 (0.046)	0.028 (0.317)	0.364** (0.153)	0.971 (2.081)	-0.302 (0.970)	1.786 (1.151)	-1.855 (1.218)	-1.607 (1.157)	0.237
LTU	16	2.391*** (0.780)	-2.768** (1.260)	-3.543*** (1.172)	-	-	0.409*** (0.153)	-	-	-	-	-	0.211
SVK	10	5.206* (2.690)	-3.873*** (1.009)	-0.166 (0.433)	-0.128 (0.083)	0.198 (0.172)	0.144 (0.124)	-3.252 (2.675)	-0.261*** (0.095)	0.356 (0.832)	-0.407 (0.821)	-0.962 (0.798)	0.159
SVK	10	2.702** (1.080)	-4.012*** (1.007)	-	-	-	-	-	-0.271*** (0.086)	-	-	-	0.106

Note: Newey-West standard errors in parentheses.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

Table 6.4 contains estimations of two models for each of the countries. The upper model comprises all available conditioning macroeconomic variables, whereas the bottom model comprise only those significant on at least 10% level. Our success in predicting stock returns by macroeconomic variables is however only limited. Out of nine of these variables only European stock returns are able to predict returns in most of the countries. Other variables with some predictive power are local money market rate or European bond yield proxy, significant for three and two countries respectively. On the other hand, European dividend yields are surprisingly not able to predict returns of any of the six stock markets. One can however still see relative increase in R^2 coefficient in most cases documenting predictive power of additional regressors. Signs of the coefficients are nevertheless not always as expected, e.g., in the case of change of exchange rate dER or bond yields $BOND$.

The extended EC model indicates existence of electoral cycle as unexpected and hence not priced anomaly in Estonia. The evidence is not so clear for Hungary, where the cycle is not significant anymore. It still can be a consequence of political opportunism if we would be willing to concede rather unlikely hypothesis that Hungarian government is able to manipulate interest rates. Generally both types of electoral patterns are surprisingly persistent once conditioned on macroeconomic variables. Such an evidence is strongly suggesting the possibility of market efficiency. Results of the extended model for real returns (see Table 6.5) confirm this idea and in this case EC is statistically significant on 10% level even for Hungary.

To conclude this subsection, we have found mixed evidence of electoral cycle. Whereas there is significant cycle in Estonia and partly also in Hungary, in four countries the cycle has the opposite sign and for three countries there are no significant cycles at all. Both type electoral patterns, positive (implied by **H1**) as well as negative ones, have been found also in real returns. Further, they have been considered unexplainable by business cycle fluctuations, which suggests that governments systematically surprise investors and thus denies efficient market hypothesis. The claim is however to be examined by analysis of volatility (see Section 6.3 on page 71).

6.1.2 Partisan Cycle

The study on partisan cycle in CEE countries could be done only for seven of them. As apparent from Table 5.2 on page 46, Estonia and Latvia had no left-wing

governments in the relevant period. The rest of the countries experienced both ideologies, in Slovakia, however, the history of left-wing cabinets is relatively short compared to that of right-wing ones. The results for this country should thus be interpreted with caution. The Czech Republic, as the only country, was governed by non-partisan cabinets for certain periods, which must be taken into account (variable CT must be included in the model). Returns under non-partisan cabinets are positive (0.46%) and statistically insignificant though.

For the analysis of PC, as defined by model in Eq. (4.4), it is necessary to determine for which countries to consider effects of cabinet majority. Given correlation between variables RD and RD_MAJ or LD and LD_MAJ , we decide to estimate these effect (i.e., include RD_MAJ or LD_MAJ into the model) in the following way: influence of right-wing majority only for Bulgaria and Lithuania, influence of left-wing majority only for Romania and both effects for the Czech Republic. Based on their significance, these effects can be excluded in the final model. In the remaining countries—Hungary, Poland and Slovakia—cabinets either had majority too often or almost never. Estimation results of the selected final model for each of the seven countries are presented in Table 6.6.

The hypothesis **H2** suggests that coefficient of right-wing dummy variable should be positive and significant, or at least sum of coefficients of RD and RD_MAJ variables should be positive and significant. The intercept then represents returns when left-wing cabinets are in office. Table 6.6 shows that in Bulgaria only majority right-wing governments bring higher returns by 4.65%. This however cannot be seen as a proof of existence of partisan cycle. The difference between returns achieved under majority right-wing cabinets and left-wing cabinets is actually equal to sum of coefficients of RD and RD_MAJ variable, which is positive but not significant on 10% level.³⁸ Hence, the majority right-wing cabinets are linked with higher return than minority ones are, but when compared to leftist ideology the difference is not statistically significant; yet with the value of $-0.93\% + 4.65\% = 3.72\%$ *p.m.* it is significant economically.

From the results of the rest of the countries one may see that—contrary to **H2**—right-wing governments are usually characteristic by *lower* returns than left-wing ones. In many cases, returns are even negative under right-wing cabinets (as indicated by sum of intercept and RD variable coefficient) and positive under left-wing cabinets. An exception is Slovakia, where however the

³⁸Test of the hypothesis $\beta_1 + \beta_3 = 0$ has p-value equal to 0.116.

Table 6.6: Basic model of partisan cycle in nominal returns

Country	Intercept	RD	RD_MAJ	LD_MAJ	R ²	White Test	Godfrey Test
BGR	-0.925 (2.589)	-0.190 (2.787)	4.648*** (1.560)	<i>n.a.</i>	0.049	6.321	8.361 0.004(1)
CZE	1.132 (0.710)	-2.509** (1.155)	-	-	0.031	0.740	3.342 0.068(1)
HUN	1.911** (0.795)	-1.226 (1.344)	<i>n.a.</i>	<i>n.a.</i>	0.004	1.601	2.185 0.139(1)
LTU	2.755*** (1.038)	-3.300** (1.620)	-	<i>n.a.</i>	0.042	2.308	13.745 0.000(1)
POL	1.353 (0.870)	-1.037 (1.172)	<i>n.a.</i>	<i>n.a.</i>	0.004	0.300	0.710 0.701(2)
ROU	4.376*** (1.009)	-5.065*** (1.475)	<i>n.a.</i>	-	0.050	2.292	3.042 0.081(1)
SVK	-0.206 (0.689)	0.615 (1.002)	<i>n.a.</i>	<i>n.a.</i>	0.001	2.886	6.632 0.036(2)

Note: *CT* variable is omitted from the output (it is used only in model for the Czech Republic, coefficient is positive and insignificant). *n.a.* means not applicable, '-' indicates exclusion due to insignificance. Newey-West standard errors in parentheses. White test has the null hypothesis that residuals are homoskedastic. Godfrey test has the null hypothesis of residuals being autocorrelated, the number in parenthesis represents order of detected autocorrelation. For these tests p-values are reported in the second row.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

Table 6.7: Basic model of partisan cycle in real returns

Country	Intercept	RD	RD_MAJ	LD_MAJ	R ²	White Test	Godfrey Test
BGR	-1.551 (2.590)	0.159 (2.758)	4.570*** (1.507)	<i>n.a.</i>	0.052	6.461	7.768 0.005(1)
CZE	0.934 (0.712)	-2.833** (1.159)	-	-	0.038	0.890	3.044 0.081(1)
HUN	1.076 (0.778)	-1.119 (1.291)	<i>n.a.</i>	<i>n.a.</i>	0.004	1.418	1.626 0.202(1)
LTU	2.636** (1.059)	-3.514** (1.660)	-	<i>n.a.</i>	0.046	2.158	14.818 0.000(1)
POL	0.575 (0.932)	-0.679 (1.209)	<i>n.a.</i>	<i>n.a.</i>	0.002	0.557	0.666 0.717(2)
ROU	3.204*** (1.084)	-5.329*** (1.536)	<i>n.a.</i>	-	0.055	2.094	3.878 0.049(1)
SVK	-0.474 (0.689)	0.287 (1.019)	<i>n.a.</i>	<i>n.a.</i>	0.000	3.145	6.166 0.046(2)

Note: *CT* variable is omitted from the output (it is used only in model for the Czech Republic, coefficient is positive and insignificant). *n.a.* means not applicable, '-' indicates exclusion due to insignificance. Newey-West standard errors in parentheses. White test has the null hypothesis that residuals are homoskedastic. Godfrey test has the null hypothesis of residuals being autocorrelated, the number in parenthesis represents order of detected autocorrelation. For these tests p-values are reported in the second row.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

history of left-wing cabinets is short so the difference may be due to chance and not determined by government policy. Nominal returns are thus significantly lower under right-wing cabinets in the Czech Republic (by 2.51%), Lithuania (3.30%) and Romania (5.07%). The stated differences have high economical significance, especially since they are on monthly basis. Hungary and Poland do not exhibit any sign of partisan cycle.

The presence of left-wing premium is also apparent in real returns as shown in Table 6.7. Czech Republic, Lithuania and Romania exhibit left-wing premium in real returns, which is in absolute value even higher than in nominal returns. This surprising fact may be considered a sign of higher inflation under right-wing governments. The right-wing premium is again confirmed for Slovakia and Bulgaria. In the latter case, however, real returns under majority right-wing cabinets are higher than under left-wing cabinets $0.16\% + 4.57\% = 4.73\%$ (significant at 10% level). Partisan cycles in Hungary and Poland remain insignificant. Therefore, as well as for electoral cycle, the results of partisan cycle analysis are fairly robust to both specifications of returns.

The analysis continues with determining whether the political premium could be expected or not. Tables 6.8 and 6.9 report the results of the selected models extended by inclusion of macroeconomic conditioning variables (see Eq. (4.6)) for nominal and real returns, respectively. Hungary, Poland and Slovakia are not further studied as there was no political pattern found in either nominal or real returns. As well as for the electoral cycle, the upper model for each country includes every conditioning variable we use, while the bottom one includes only those significant. Since the results of models of nominal and real returns are again not different in any fundamental way, we comment on both of them together.

The extended PC models generally fit better than EC ones. Conditioning variables most successful in predicting stock returns are in this case again European stock returns *MSCI*, now accompanied by the spread between European and U.S. interest rates *SPR* and yields of U.S. T-Bills (*TBILL*). The coefficients of these variables also have the expected signs. The other variables are generally insignificant. More importantly the political effects—right-wing and left-wing premiums—are rather persistent implying their unexpectedness. The exception is Lithuania, where the left-wing premium in both nominal and real returns can be explained by variation in macroeconomic conditions and the same holds for PC in nominal returns on the Czech stock market. A closer

Table 6.8: Extended model of partisan cycle in nominal returns

Country	Intercept	RD	RD_MAJ	dCPI	IP	dER	MSCI	DY	MMR	BOND	SPR	TBILL	R ²
BGR	-0.555 (6.365)	-3.456 (3.662)	6.873** (3.167)	-0.924 (0.894)	0.008 (0.115)	0.319 (0.373)	0.473** (0.203)	-0.288 (3.775)	-0.807 (1.075)	1.917 (1.699)	-2.524* (1.430)	-1.682 (1.355)	0.189
BGR	2.926 (3.388)	-1.894 (3.361)	7.747*** (2.403)	-	-	-	0.381* (0.197)	-	-	-	-2.789** (1.117)	-1.681* (0.995)	0.170
CZE	1.890 (2.653)	-1.215 (1.088)	<i>n.a.</i>	0.525 (1.068)	0.051 (0.057)	-0.129 (0.186)	0.166 (0.101)	-1.945 (1.770)	0.004 (0.059)	0.874 (0.980)	-1.922* (1.011)	-1.692** (0.844)	0.102
CZE	3.304*** (1.102)	-1.422 (0.951)	<i>n.a.</i>	-	-	-	0.205** (0.084)	-	-	-	-1.194** (0.532)	-0.892** (0.366)	0.087
LTU	3.662 (4.391)	-2.167 (1.475)	<i>n.a.</i>	-2.928** (1.436)	-0.013 (0.047)	-0.031 (0.320)	0.362** (0.157)	1.674 (2.133)	0.002 (0.976)	0.525 (1.378)	-1.814 (1.269)	-1.395 (1.202)	0.224
LTU	5.523*** (1.544)	-2.281 (1.467)	<i>n.a.</i>	-2.901** (1.350)	-	-	0.375** (0.148)	-	-	-	-1.490* (0.831)	-1.110** (0.410)	0.221
ROU	13.657** (5.988)	-7.672*** (1.941)	<i>n.a.</i>	-1.372 (1.448)	-0.032 (0.122)	-0.152 (0.324)	0.152 (0.177)	-0.931 (2.624)	0.096 (0.071)	-1.239 (1.779)	-2.830** (1.224)	-1.386 (0.886)	0.145
ROU	10.055*** (1.955)	-7.358*** (1.584)	<i>n.a.</i>	-	-	-	0.196* (0.116)	-	-	-	-3.382*** (1.116)	-1.897*** (0.634)	0.126

Note: *CT* variable is omitted from the output (it is used only in model for the Czech Republic, coefficient is positive and insignificant). *n.a.* means not applicable, ' ' indicates exclusion due to insignificance. Newey-West standard errors in parentheses.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

Table 6.9: Extended model of partisan cycle in real returns

Country	Intercept	RD	RD_MAJ	dCPI	IP	dER	MSCI	DY	MMR	BOND	SPR	TBILL	R ²
BGR	-1.660 (6.347)	-3.299 (3.605)	6.955** (3.111)	-1.059 (0.894)	0.004 (0.115)	0.300 (0.377)	0.451** (0.202)	1.413 (3.810)	-0.846 (1.031)	2.051 (1.701)	-2.657* (1.423)	-1.801 (1.346)	0.195
BGR	2.695 (3.438)	-1.840 (3.383)	7.956*** (2.403)	-	-	-	0.367* (0.196)	-	-	-	-2.911** (1.123)	-1.830* (0.994)	0.171
CZE	2.017 (2.660)	-1.472 (1.110)	<i>n.a.</i>	0.481 (1.061)	0.062 (0.057)	-0.132 (0.182)	0.149 (0.101)	-1.690 (1.802)	-0.011 (0.058)	0.804 (0.983)	-1.905* (1.015)	-1.692** (0.849)	0.109
CZE	3.375*** (1.099)	-1.701* (0.967)	<i>n.a.</i>	-	-	-	0.185** (0.082)	-	-	-	-1.237** (0.538)	-0.981*** (0.368)	0.095
LTU	2.744 (4.325)	-2.217 (1.499)	<i>n.a.</i>	-3.151** (1.427)	-0.023 (0.046)	-0.008 (0.315)	0.361** (0.157)	1.890 (2.128)	-0.068 (0.998)	0.834 (1.358)	-1.951 (1.277)	-1.523 (1.224)	0.233
LTU	5.522*** (1.575)	-2.443 (1.501)	<i>n.a.</i>	-3.151** (1.341)	-	-	0.370** (0.146)	-	-	-	-1.530* (0.842)	-1.148*** (0.415)	0.228
ROU	13.867** (5.952)	-7.696*** (1.901)	<i>n.a.</i>	-1.564 (1.470)	-0.034 (0.123)	-0.201 (0.323)	0.138 (0.182)	-0.364 (2.642)	0.070 (0.071)	-1.387 (1.782)	-2.819** (1.234)	-1.398 (0.907)	0.156
ROU	9.425*** (1.963)	-6.907*** (1.570)	<i>n.a.</i>	-	-	-	0.198* (0.117)	-	-	-	-3.328*** (1.107)	-2.268*** (0.640)	0.134

Note: *CT* variable is omitted from the output (it is used only in model for the Czech Republic, coefficient is positive and insignificant). *n.a.* means not applicable, ' ' indicates exclusion due to insignificance. Newey-West standard errors in parentheses.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

look reveals that for Bulgaria and Romania the conditioning of stock returns on business cycle fluctuations leads to even higher difference between ideologies, which can be as high as 7.36% *p.m* for Romanian nominal returns.

To conclude, we have found quite strong signs of ideologically motivated political cycle in several countries, namely the Czech Republic, Lithuania and Romania and some weaker signs of cycle in Bulgaria. The results are generally the same for nominal and real returns. The data show rather presence of left-wing premium along the lines of Cooley (2009) than right-wing premium as hypothesized in **H2**. What changes against electoral cycle is that it is possible to partially explain partisan cycle by macroeconomic variables and that is in the case of the Czech Republic and Lithuania. It would mean that investors can expect returns to be lower under right-wing cabinets and it hence should not be possible to make an extra profit on this information. Despite this, the results intensify our thought of inefficiency of CEE stock markets, especially since there is now some kind of inefficiency on eight out of nine examined stock markets,³⁹ But again, it needs to be confirmed by volatility analysis first. The fact that we had little success in explaining political premiums also strengthens the idea that the difference in returns might really be a consequence of political behavior.

6.2 Panel Study of Political Cycles

The purpose of the panel study is, as outlined above, to improve data basis of the model and to get more general and perhaps more reliable picture of political cycles in CEE countries. Mixed results of models for individual countries, presented in Subsections 6.1.1 and 6.1.2, indicate that multinational panel study need not to give clear answer. Regarding the econometric part of the analysis, we should note that all the model were estimated as pooled OLS regression since fixed country effect were not jointly significant in any case.

First we present results of panel model of electoral cycle reflecting cycles in all nine countries. Based on results from Subsections 6.1.1 one would expect to see, if any, pre-electoral cycle with average length (around one year) and rather with negative sign. The results of model stated in Eq. (4.7) on page 36 are presented in Table 6.10 and confirm the initial thought. For nominal returns

³⁹The only country with no political cycle is Latvia, where however partisan cycle cannot be present by definition since there were none leftist cabinets.

Table 6.10: Panel model of electoral cycle in nominal

	Length (K)	Intercept	$PREED$	R^2	Breusch-Pagan
<i>Nominal returns</i>					
Panel	10	0.988 (0.589)	-1.026* (0.475)	0.002	1145.283 0.000
<i>Real returns</i>					
Panel	10	0.400 (0.600)	-0.960* (0.481)	0.002	1149.881 0.000

Note: Driscoll-Kraay standard errors in parentheses. Breusch-Pagan test (with its p-value reported in the second row) has the null hypothesis of no cross-sectional dependence. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

the model implies returns in period not affected by elections to be 0.99%, but in the last ten months before elections they drop by 1.03% which means they are actually slightly negative (-0.04%). The results for real returns are similar and suggest that returns drop by 0.56% *p.m.* ten months before elections. Coefficient of $PREED$ variable is significant at the 10% significance level in both cases. Breusch-Pagan test rejects hypothesis of no cross-sectional dependence, which together with positive results on heteroskedasticity and autocorrelation (not reported here) justifies use of Driscoll-Kraay estimator of standard errors.⁴⁰

Pre-electoral decrease of nominal and real returns remains significant also after controlling for macroeconomic conditions, see Table 6.11. The decrease is however smaller in absolute value, 0.89% for nominal returns and 0.90% for real returns. Not too surprisingly MSCI index is the major predictor of CEE stock returns; it has already been documented for individual countries. Success of inflation in predicting real returns shows that there could be some autocorrelation in inflation rates. When comparing results for nominal and real returns one can also notice that coefficients of variable $PREED$ are somewhat stable and it is mostly the intercept what changes. This holds for basic as well as extended models and it can be explained by inflation being relatively stable, i.e., it is not influenced by approaching elections. The results are in accordance with those of individual countries, i.e., an electoral pattern is present on the stock market and appears to be unexpected by investors and thus suggesting possible market inefficiency. The negative sign of pre-electoral change in returns rejects

⁴⁰This holds for every model presented in this section.

Table 6.11: Extended panel model of electoral cycle

Length (K)	Intercept	$PREED$	$dCPI$	IP	dER	$MSCI$	DY	MMR	$BOND$	SPR	$TBILL$	R^2	Adj R^2
<i>Nominal returns</i>													
Panel	0.623	-0.788	-0.226	0.024	0.121	0.362***	-1.137	0.018	0.855	-0.988	-1.154*	0.067	0.061
	2.148	(0.432)	(0.435)	(0.046)	(0.144)	(0.105)	(1.651)	(0.038)	(0.702)	(0.671)	(0.541)		
Panel	0.894	-0.894*	-	-	-	0.340**	-	-	-	-	-	0.051	0.050
	(0.495)	(0.441)				(0.110)							
<i>Real returns</i>													
Panel	0.338	-0.756	-0.499	0.025	0.109	0.348***	-0.762	-0.011	0.911	-1.064	-1.225*	0.070	0.064
	(2.202)	(0.438)	(0.438)	(0.046)	(0.141)	(0.104)	(1.682)	(0.038)	(0.719)	(0.675)	(0.549)		
Panel	0.782	-0.897*	-0.791**	-	-	0.330**	-	-	-	-	-	0.052	0.050
	(0.569)	(0.446)	(0.317)			(0.108)							

Note: Driscoll-Kraay standard errors in parentheses.

Source: Author's computations.

the possibility of successful opportunistic government policies as hypothesized in **H1**, however does not reject political influence on stock markets.

Regarding partisan cycle the results of relevant model (see Eq. (4.8)) are presented in Table 6.12.⁴¹ They again correspond to what could be expected from the analysis of the individual countries. The main findings concerning nominal returns are that under left-wing cabinets they are significantly positive (1.66%), but under minority right-wing cabinets they are (significantly) lower by 2.79%, i.e., around -1.13%. On the individual basis, the only country where government majority plays a role is Bulgaria. On the global basis, the fact that right-wing cabinet has majority has good impact on stock markets as the return are by 1.89% higher compared to right-wing minority cabinets. The overall returns are however still lower than under leftist cabinets. At the same time, there is no significant difference between returns under minority and majority left-wing cabinets and variable *LD_MAJ* is hence excluded from the model. Returns under care-taking cabinets (case of the Czech Republic only) do not significantly differ from those under left-wing cabinets.

Table 6.12: Panel model of partisan cycle

	Intercept	<i>RD</i>	<i>RD_MAJ</i>	<i>CT</i>	R ²	Breusch-Pagan
<i>Nominal returns</i>						
Panel	1.656** (0.649)	-2.794*** (0.750)	1.890* (0.873)	-0.070 (1.247)	0.014	655.314 0.000
<i>Real returns</i>						
Panel	1.044 (0.660)	-3.067*** (0.774)	2.270** (0.879)	0.317 (1.296)	0.017	641.533 0.000

Note: Driscoll-Kraay standard errors in parentheses. *LD_MAJ* excluded from output and the model due to insignificance. Breusch-Pagan test (with its p-value reported in the second row) has the null hypothesis of no cross-sectional dependence.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

Partisan cycle in real returns is similar to the one in nominal returns in terms of signs and significance. There is however more distinct difference between the left-wing and minority right-wing cabinets (-3.07%) as well as between minority and majority right-wing governments (2.27%). It may suggest that minority right-wing governments allow comparatively higher inflation, whereas majority

⁴¹Estonia and Latvia are excluded from the panel due to reasons mentioned above.

Table 6.13: Extended panel model of partisan cycle

	Intercept	<i>RD</i>	<i>RD_MAJ</i>	<i>dCPI</i>	<i>IP</i>	<i>dER</i>	<i>MSCI</i>	<i>DY</i>	<i>MMR</i>	<i>BOND</i>	<i>SPR</i>	<i>TBILL</i>	<i>R</i> ²	Adj <i>R</i> ²
<i>Nominal returns</i>														
Panel	2.456 (2.111)	-2.695*** (0.614)	1.968** (0.787)	-0.242 (0.432)	0.026 (0.053)	0.059 (0.138)	0.307** (0.101)	-1.050 (1.765)	0.044 (0.038)	0.345 (0.667)	-0.766 (0.639)	-0.879 (0.523)	0.066	0.057
Panel	1.516** (0.569)	-2.519*** (0.644)	1.682* (0.724)	-	-	-	0.299** (0.108)	-	-	-	-	-	0.051	0.048
<i>Real returns</i>														
Panel	2.255 (2.173)	-2.733*** (0.624)	2.014** (0.787)	-0.499 (0.435)	0.027 (0.052)	0.046 (0.136)	0.292** (0.101)	-0.573 (1.800)	0.015 (0.038)	0.358 (0.687)	-0.819 (0.641)	-0.921 (0.528)	0.069	0.060
Panel	0.912 (0.585)	-2.806*** (0.682)	2.072** (0.742)	-	-	-	0.284** (0.106)	-	-	-	-	-	0.050	0.047

Note: Driscoll-Kraay standard errors in parentheses. Variable *CT* (negative and insignificant in all the cases) omitted to save space.

Source: Author's computations.

right-wing governments keep inflation around or slightly lower than is the level kept by leftist governments. Thus the claim that right-wing cabinets are linked to higher inflation stated in Subsections 6.1.2 should be softened to that it holds rather only for minority cabinets. For completeness, non-partisan cabinets achieve the highest real returns, but the difference from left-wing cabinets is not significant and the finding would not be anyway considered robust given the small number of non-partisan cabinets in the sample.

Extending the model by including macroeconomic variables makes the differences caused by partisan cycle even more significant as apparent from Table 6.13. In other words, as in majority of previous cases, business cycle fluctuations cannot explain the differences in nominal and real returns arising from political cycle. It still holds numerically that returns are the highest under left-wing cabinets, followed by majority right-wing cabinets and finally lowest for minority right-wing government. Such an evidence is a bit surprising since on the individual countries level macroeconomic variables are able to explain the left-wing premium for two out of four countries which have exhibited it. The reason behind may be distinction between minority and majority right-wing governments. The results of extended panel models are however still consistent with our previous thought that inflation is higher under minority right-wing cabinets and lower under left-wing and majority right-wing cabinets.

6.3 Volatility Analysis

A necessary condition to explain political cycle consistently with efficient market hypothesis is that volatility varies in time. Results of relevant tests for autoregressive patterns in squared disturbances ϵ_t^2 from Eq. (4.9) are reported in Table A.1 in Appendix A. Based on these results, we have to exclude Hungarian index BUX from further analysis because none of the applied tests has detected any autoregressive pattern in Hungarian stock returns. It means that volatility of Hungarian stock market can be considered constant and consequently electoral cycle found in its nominal returns cannot be consistent with efficient market hypothesis. At least one of the tests detected effects of time-varying volatility for the remaining eight countries.

Based on AIC, we proceed with the following model specifications (see Eqs. (4.9) and (4.10)) for these countries: EGARCH(0,2) for Latvia and Slovakia, EGARCH(1,1) for Poland and Romania, EGARCH(2,1) for Estonia and

Lithuania and finally for Bulgaria and the Czech Republic we use EGARCH(2,2). The resulting time series of conditional volatility h_t are plotted in Fig. 6.3.

In the first step we use our knowledge about electoral cycles in nominal returns and test volatility on cycles of the same length according to Eq. (4.11). Consistently with efficient market hypothesis and hypothesis **H3**, coefficient β_1 of variable *PREED* should be significant and positive for countries which exhibit electoral cycle. On the other hand, for countries where returns *decrease* before elections, efficient market would be less risky in that time and hence β_1 would be significantly negative. Hence in order stock market to be efficient, we expect positive coefficient for Estonia and negative for Bulgaria, Lithuania, Poland and Slovakia. The results are reported in Table 6.14.

Table 6.14: Electoral cycle in returns volatility

Country	Length (K)	Intercept	<i>PREED</i>	R^2
BGR	22	69.441*** (3.997)	30.163 (19.765)	0.052
EST	7	85.434*** (11.391)	89.495 (91.630)	0.040
LTU	16	63.040*** (7.188)	-10.055 (8.838)	0.005
POL	8	66.286*** (4.540)	-11.845 (7.948)	0.026
SVK	10	42.038*** (0.647)	-0.396 (2.052)	0.000

Note: Newey-West standard errors in parentheses.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

The evidence clearly shows that although signs of coefficients are, with exception of Bulgaria, as expected, the cycle in volatility is never statistically significant. This not only rejects efficient market hypothesis for each of the countries. An interested reader may also ask if there are any cycles in volatility linked to elections with different length, perhaps caused by electoral uncertainty. By releasing length of the relevant pre-election period (K) and testing all the countries, we can answer this question. There is however only one country, Bulgaria, which exhibits significant increase in volatility ten months before elections.⁴² We also check movements in volatility around elections in order to

⁴²Results of these models are reported in Table A.2 in Appendix A.

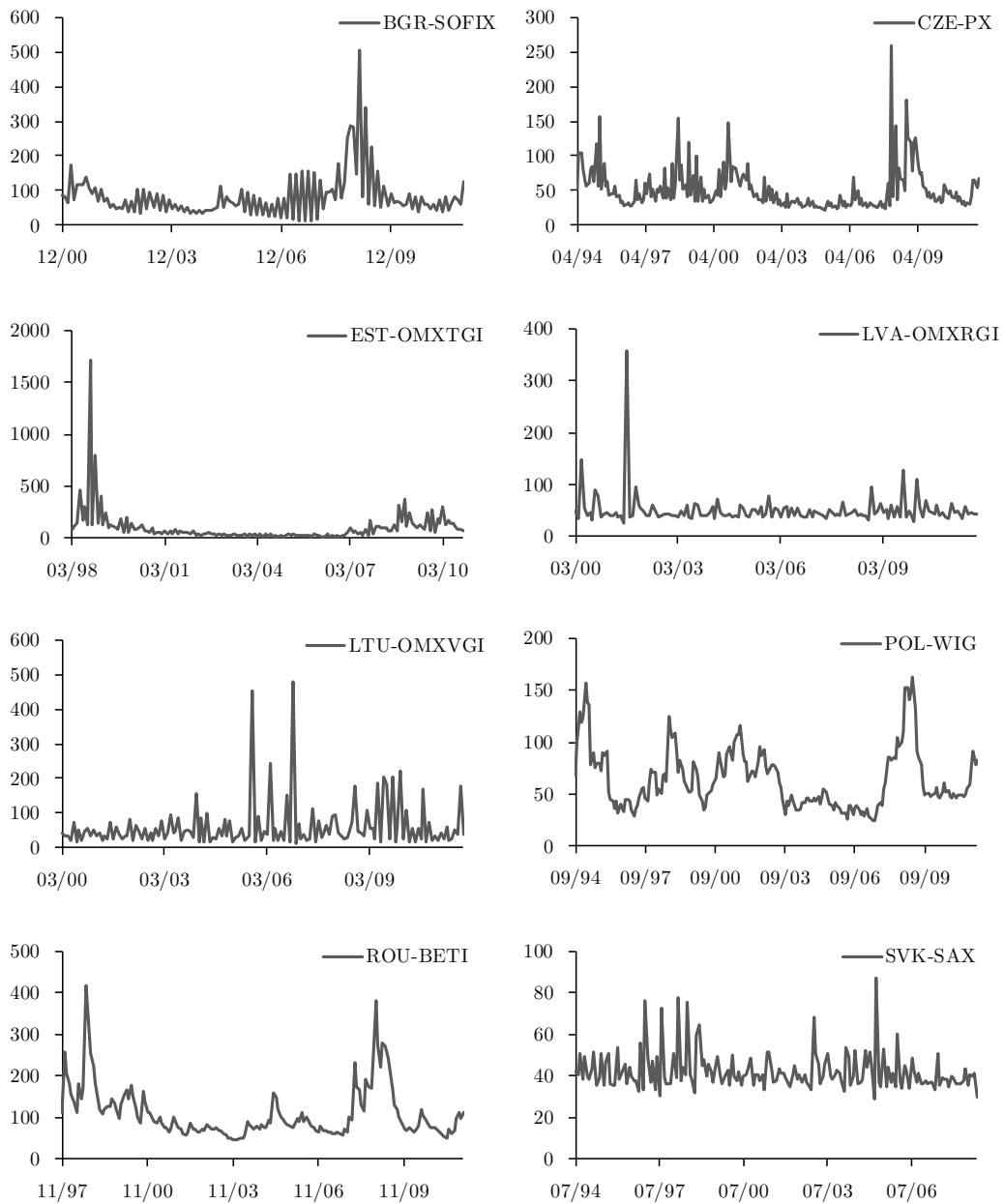


Figure 6.3: Stock returns volatility

Source: Author's computations.

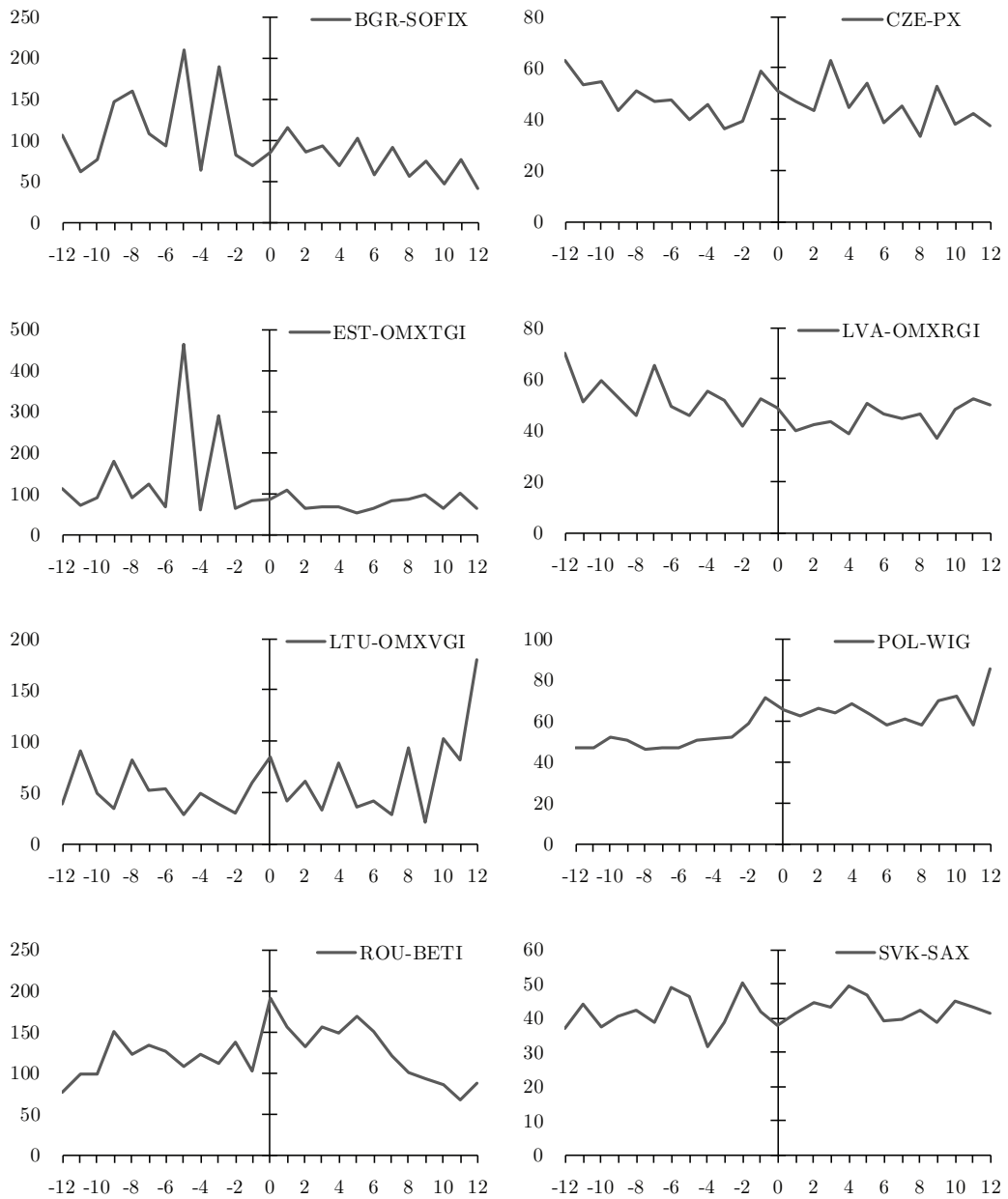


Figure 6.4: Stock returns volatility around elections
Note: Months relative to election month are denoted on x axis.

Source: Author's computations.

see if volatility peaks in time of elections (see Fig. 6.4). The evidence however does not suggest any apparent influence of elections on volatility, supporting previous results. Latvian stock market, which we have not found affected by any political cycle, is thus the only market so far, where we cannot reject efficient market hypothesis.

We now proceed with a similar study related to partisan cycle and hypothesis **H4**. We use findings from Subsections 6.1.2 and test these patterns in volatility according to model in Eq. (4.12). Main results, presented in Table 6.15, show that no coefficient except the intercept is significant. This again rejects hypothesis **H4** as there are no patterns in returns volatility corresponding to those found in stock returns. In other words, right-wing premium is not accompanied by higher risk under right-wing cabinets as well as left-wing premium is not accompanied by higher risk under left-wing cabinet. Therefore PC also cannot be explained consistently with market efficiency. Although for the Czech Republic and Lithuania we are able to explain the difference between returns under cabinets of left-wing and right-wing ideologies by macroeconomic conditions, not even these are correctly reflected in stock riskiness.

Table 6.15: Partisan cycle in returns volatility

Country	Intercept	RD	RD_MAJ	CT	R^2
BGR	104.166*** (20.998)	-33.873 (21.422)	-2.053 (8.483)	—	0.069
CZE	47.43*** (4.16)	8.855 (6.973)	—	4.532 (6.882)	0.019
LTU	56.027*** (6.806)	6.388 (10.024)	—	—	0.002
ROU	94.386*** (14.71)	24.335 (17.267)	—	—	0.034

Note: Newey-West standard errors in parentheses.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

To conclude this part, our suspicion from Section 6.1 that observed political cycles are symptoms of market inefficiency has been confirmed as we have not found any support for hypotheses **H3** and **H4**. Both electoral and partisan patterns, which we have found in stock returns, are not due to changing risk and hence there should exist an investing strategy yielding abnormal returns for given level of risk. Our findings thus suggest that government policies are

systematically surprising investors. There however is no satisfactory explanation of how governments can do this.

Chapter 7

Conclusion

The aim of the presented thesis is to analyze systematic impacts of political process, namely electoral and partisan cycles, on the stock market. Empirical evidence shows that stock returns indeed are often affected by political process, nevertheless the effect frequently has the opposite direction than hypothesized. It holds mainly for electoral cycle, where we have found two countries with returns significantly higher before elections, but four countries with returns significantly lower. The prevailing evidence of pre-electoral stock market downturn is confirmed by results of panel analysis which have showed that nominal returns are in average by more than 1% *p.m.* lower ten months before elections. Regarding partisan cycle, stock markets more often exhibit left-wing premium (for a possible explanation see Cooley 2009). Significant left-wing premium has been found in three out of seven stock markets, while being as high as more than 5% *p.m.* in Romania. Only one stock market, the Slovak one, exhibits right-wing premium, but it is insignificant. The panel analysis confirms general tendency to show left-wing premium – on the panel level it is around 2.80% *p.m.*. The observed cycles are generally robust to specification of returns (nominal and real).

Deeper analysis of political patterns in returns shows that with only rare exceptions they cannot be explained by business cycle fluctuations. Such an evidence indicates that changes in returns due to political process could be unexpected. Given the periodicity of cycles it is a sign of market inefficiency. At the same time, we use EGARCH methodology to derive stock returns volatility, which we further test if it corresponds to observed cycles in returns. The evidence is unfavorable for market efficiency since we have not found that differences in returns are due to differences in risk as efficient market hypothesis

implies. Stock riskiness generally seems to be largely unaffected by timing of elections or incumbent policymakers' ideologies. We have only found a weak connection between elections and stock market risk in Bulgaria.

The presented evidence is not so surprising given the lower degree of maturity of CEE stock markets. Many other studies show little support for existence of political cycle on developed stock markets. It is thus inviting to study CEE markets again after several years in order to see whether they become more developed or whether they are still susceptible to political manipulation. Future research could also possibly benefit from better availability of data – it has not been possible now, for example, to distinguish between returns on small and large caps and we know from current literature that the results may differ. Another issue that should be targeted in future research is possible endogeneity of political cycle. It may well hold that economic conditions or stock markets in particular is not affected by political process but political process is affected by economic conditions on the contrary.

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Appendix A

Supplementary Results

Table A.1 shows three most significant AR patterns in squared residuals based on Portmanteau Q test. Results for Slovakia are based on Lee and King's test, because neither Portmanteau Q nor Lagrange Multiplier test have found any significant patterns. None of the tests have found significant pattern for Hungary.

Table A.1: Tests on ARCH effects

Country	AR Order	Q	Pr > Q	LM	Pr > LM	LK	Pr > LK
BGR	1	8.142	0.004***	8.054	0.004***	4.318	< 0.001***
	2	8.343	0.015**	8.107	0.017**	3.201	0.001***
	4	12.109	0.017**	10.399	0.034**	3.782	< 0.001***
CZE	9	38.228	< 0.001***	30.139	< 0.001***	4.261	< 0.001***
	10	41.049	< 0.001***	30.399	0.001***	4.247	< 0.001***
	11	41.073	< 0.001***	30.440	0.001***	3.949	< 0.001***
EST	5	12.954	0.024**	8.483	0.132	3.688	< 0.001***
	4	10.211	0.037**	7.501	0.112	3.068	0.002***
	6	13.163	0.04**	8.487	0.205	3.493	< 0.001***
HUN	12	9.035	0.700	7.653	0.812	1.279	0.201
	3	0.846	0.838	0.866	0.834	0.952	0.341
	6	2.512	0.867	2.506	0.868	1.443	0.149
LTU	11	35.687	< 0.001***	25.759	0.007***	5.335	< 0.001***
	12	35.689	< 0.001***	27.525	0.006***	4.981	< 0.001***
LVA	1	4.146	0.042**	4.109	0.043**	3.527	< 0.001***
	2	16.919	< 0.001***	15.684	< 0.001***	4.570	< 0.001***
	3	18.190	< 0.001***	16.983	0.001***	4.315	< 0.001***
	4	18.255	0.001***	19.864	< 0.001***	3.364	0.001***
POL	9	26.943	0.001***	17.617	0.04**	0.040	0.968
	10	26.948	0.003***	18.090	0.054*	-0.188	0.851
	11	28.185	0.003***	18.869	0.064*	-0.648	0.517
ROU	9	26.223	0.002***	19.943	0.018**	3.459	< 0.001***
	10	26.527	0.003***	20.215	0.027**	1.565	0.118
	12	29.330	0.004***	22.582	0.032**	1.358	0.175
SVK	9	5.530	0.786	5.636	0.776	1.814	0.070*
	5	2.506	0.776	2.572	0.766	1.726	0.084*
	7	2.870	0.897	2.837	0.900	1.574	0.115

Note: Columns Q and Pr > Q are Portmanteau Q test statistics and corresponding p-values. Columns LM and Pr > LM are for Lagrange Multiplier test for ARCH effects; LK and Pr > |LK| then denote Lee and King's test.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.

Table A.2 shows results of models of electoral cycle patterns in volatility of stock returns. The best model for each country in terms of length of cycle (K) is chosen on basis of AIC. With exception of Bulgaria, the evidence does not indicate higher pre-electoral uncertainty. In fact, in three cases, volatility of stock returns even decreases before elections.

Table A.2: Electoral cycles in volatility of stock returns

Country	Length (K)	Intercept	$PREED$	R^2	White Test	Godfrey Test
BGR	10	70.341*** (3.868)	54.938* (32.783)	0.119	16.914 0.000	74.793 0.000(2)
CZE	6	53.268*** (3.541)	-16.162*** (4.164)	0.021	1.247 0.264	66.880 0.000(2)
EST	6	84.950*** (11.223)	111.118 (108.097)	0.053	10.669 0.001	51.291 0.000(2)
LTU	22	68.339*** (8.830)	-18.928* (9.975)	0.020	3.029 0.082	8.809 0.012(2)
LVA	14	46.958*** (1.410)	9.117 (6.398)	0.021	1.859 0.173	2.078 0.149(1)
POL	24	82.642*** (5.659)	-32.436*** (6.445)	0.304	14.716 0.000	123.881 0.000(1)
ROU	10	104.826*** (9.788)	30.530 (20.869)	0.033	0.165 0.684	115.730 0.000(1)
SVK	21	41.388*** (0.648)	1.417 (1.418)	0.005	7.048 0.008	3.465 0.063(1)

Note: Newey-West standard errors in parentheses. White test has the null hypothesis that residuals are homoskedastic. Godfrey test has the null hypothesis of residuals being autocorrelated, the number in parenthesis represents order of detected autocorrelation. For these tests p-values are reported in the second row.

***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Source: Author's computations.