CHARLES UNIVERSITY
FACULTY OF SOCIAL SCIENCES
Institute of Economic Studies

Political Cycles and Their Impact on Macroeconomic Indicators in Central Europe

Bachelor's thesis

Author: Jan Botka
Study program: Economics and Finance
Supervisor: PhDr. Michal Hlaváček, Ph.D.
Year of defense: 2023

Declaration of Authorship

The author hereby declares that he or she compiled this thesis independently, using only the listed resources and literature, and the thesis has not been used to obtain any other academic title.

The author grants to Charles University permission to reproduce and to distribute copies of this thesis in whole or in part and agrees with the thesis being used for study and scientific purposes.

Prague, August 1, 2023

Jan Botka

Abstract

This study examines the impact of the political cycle on macroeconomic indicators in Central Europe, with a special focus on the Czech Republic. Thirty-nine Vector Autoregressive (VAR) models were constructed using data from 1998 to 2022 aiming to apply the Political Business Cycle (PBC) theory. It is the first time the VAR model has been used in this context for most of the selected countries. As the main variables in the model, subject to potential influence by political cycles, were chosen real GDP, inflation and unemployment. The results showed that no consistent significant relationship exists across all countries, with each nation displaying varying connections and occasional contradictions to the presupposed theory. Nevertheless, certain associations between the political cycle and macroeconomic indicators were observed in individual countries, supporting the presence of the PBC to some extent in the Czech Republic, Hungary, and Austria. Conversely, no evidence or even contradictory results were found for the PBC in Slovakia, Poland, and Germany. Additionally, the presence of the "partisan" political cycle was identified in Hungary but not in the Czech Republic, Germany, or Austria. Poland's significant results exhibited signs opposite to those expected. This research opens new avenues for further in-depth analyses of the political cycles in this region.

Keywords	Vector Autoregression, Political Cycle, Real GDP, ,Unemployment, Inflation
Title	Political Cycles and Their Impact on Macroeconomic Indicators in Central Europe

Author's e-mail	janbotka06@gmail.com
Supervisor's e-mail	michal.hlavacek@unrr.cz

Abstrakt

Tato studie zkoumá vliv politického cyklu na makroekonomické ukazatele ve střední Evropě, s hlavním zaměřením na Českou republiku. Bylo vytvořeno celkem třicet devět modelů vektorové autoregrese (VAR) s použitím dat z let 1998 až 2022 za účelem aplikace teorie politického hospodářského cyklu (PBC). Ve většině vybraných zemích se jedná se o první použití modelu VAR v tomto kontextu. Jako hlavní proměnné v modelu, které mohou být ovlivněny politickými cykly, byly vybrány reálné HDP, inflace a nezaměstnanost. Výsledky ukázaly, že neexistuje konzistentní signifikantní vztah mezi politickým cyklem a makroekonomickými ukazateli napříč všemi zeměmi. Naopak každá země ukazuje různé vazby a občas i protichůdné výsledky ve srovnání s předpokládanou teorií. Nicméně, určité vztahy mezi politickým cyklem a makroekonomickými ukazateli v jednotlivých zemích zpozorovány byly. Ty naznačují existenci PBC alespoň částečně v České republice, Maďarsku a Rakousku. Naopak, v případě Polska, Slovenska a Německa nebyly nalezeny žádné důkazy pro PBC nebo výsledky byly opačné oproti očekávání. Kromě toho byla identifikována existence "ideologického" politického cyklu v Maďarsku, ale ne v České republice, Německu nebo Rakousku. Signifikantní výsledky pro Polsko ukázaly náznaky opačného vztahu, než bylo očekáváno. Tato studie otevírá nové možnosti pro další výzkum politických cyklů v tomto regionu.

Klíčová slova	Vektorová autoregrese, politický cyklus, reálné HDP, nezaměstnanost, inflace
Název práce	Politické cykly a jejich vliv na makroekonomické ukazatele ve střední Evropě

E-mail autora	`janbotka06@gmail.com`
E-mail vedoucího prace	`michal.hlavacek@unrr.cz`

Acknowledgments

The author thanks his supervisor, PhDr. Michal Hlaváček, Ph.D., for his support and helpful advice while writing the thesis.

Typeset in FSV LaTeX template with great thanks to prof. Zuzana Havrankova and prof. Tomas Havranek of Institute of Economic Studies, Faculty of Social Sciences, Charles University.

AI language models were used in this thesis as a support tool to improve the language expressions of the author.

Bibliographic Record

Botka, Jan: *Political Cycles and Their Impact on Macroeconomic Indicators in Central Europe.* Bachelor's thesis. Charles University, Faculty of Social Sciences, Institute of Economic Studies, Prague. 2023, pages 98. Advisor: PhDr. Michal Hlaváček, Ph.D.

Contents

List of Tables

List of Figures

Acronyms

AIC Ainake's Information Criterion

ADF Augmented Dickey-Fuller

ARCH LM Autoregressive Conditional Heteroskedasticity Lagrange Multiplier

BLUE Best Linear Unbiased Estimator

CUSUM Cumulative Sum of Squares

el0 quarter during election

el1a one quarter after election

el1b one quarter before election

el2b two quarters before election

el3b three quarters before election

el4b four quarters before election

FPE Final Prediction Error

HHI Herfindahl-Hirschman Index

HICP Harmonised Index of Consumer Prices

HQ Hannan-Quinn

IRF Impulse Response Function

PBC Political Business Cycle

PP Phillips-Perron

SC Schwarz Criterion

UK United Kingdom

VAR Vector Autoregressive

Chapter 1

Introduction

In the field of political science, one of the most intensely discussed phenomena is the rise of populism in recent decades and, in contrast, the seemingly corresponding decline of traditional parties. (Kukovič & Just 2022) The populist surge is characterized by an increasing number of politicians with appealing promises to the masses without a consistent agenda or ideological framework. While political scientists have meticulously examined this development, economists have not been focusing that much on the effects of the same issue on the real economy, especially in Central Europe. This thesis aims to bridge this gap through an economic theory that might offer the key to understanding the populist trend and its macroeconomic implications - the Political Business Cycle (PBC) theory, introduced by Nordhaus (1975). The PBC theory holds the potential for shedding light on the economic manipulations enacted by populist leaders for electoral gains. Even though some research regarding political cycles has already been done in Central Europe (Štiková (2008), Lami & Imami (2013) etc.), it predominantly concentrates on the municipal level, scrutinizing the political budget cycle. (for example, Maličká (2019), Plaček *et al.* (2016) or Filipiak & Kluza (2022)). Less attention has been directed towards understanding how politicians influence the macroeconomic landscape. In general, previous investigations into this relationship have rendered ambiguous results, causing some economists to sideline the PBC theory. However, given the prevailing political climate characterized by populism and the pursuit of re-election at any cost, it seems prudent to revisit this theoretical framework. In the quest for re-election, populist leaders often resort to expansionary fiscal policy manoeuvres such as increased government spending and tax cuts, aiming to create a temporary economic boom that bolsters their popularity. These tactics align

closely with the core assumptions of the PBC theory, indicating a potential resurgence of the political business cycle in contemporary politics.

In order to conduct an in-depth examination of this relationship between the political business cycle and macroeconomic indicators, we constructed thirty-nine Vector Autoregressive (VAR) models in each examined country differing in structure and used variables. These models integrate macroeconomic indicators such as inflation, real GDP growth, unemployment, and interest rates. Additionally, most of them, in order to find the political business cycle as stated by Nordhaus (1975), incorporate a dummy variable indicating the occurrence of an election period. Some of our models also examine whether the ideology of the governing party still plays a role, thus, incorporating an iterated variable of the before-election and right-wing/left-wing dummy variables. It should be noted that previous analyses of this topic have yielded quite ambiguous results. Therefore, it is not anticipated that every country examined in this study will demonstrate significant findings. However, in countries deeply affected by populist politics, a clearer manifestation of the political business cycle is expected. Ultimately, this thesis endeavours to provide an analysis that will help understand the broader macroeconomic implications of the rising tide of populism through the PBC in Central Europe. By doing so, it aspires to contribute to the literature in both economics and political science, potentially offering novel insights that can guide future research and policy-making.

The thesis is structured as follows: Chapter 2 provides an overview of the evolution of the PBC theory and summarises the empirical research that has been conducted in the countries under examination. Chapter 3 shortly defines the concept of Vector Autoregression, a statistical technique utilized in our analysis. Chapter 4 focuses on data description, elaborating on how the data was acquired and which variables have been employed in our models. Chapter 5 presents a detailed exposition of the analysis, laying out the results and findings specifically in the context of the Czech Republic. In contrast, Chapter 6 extends this analysis, presenting the outcomes of applying the same analytical approach to data gathered from Slovakia, Poland, Hungary, Germany, and Austria. Finally, Chapter 7 consolidates our findings, providing a summary of the key points discovered in our exploration of the relationship between the political business cycle and macroeconomic indicators.

Chapter 2

Political Business Cycle

2.1 Literature Overview

2.1.1 Development of the PBC theory

The literature around this topic saw a significant increase in attention during the 1970s, which resulted in the development of two main approaches. The first approach, developed firstly by Nordhaus (1975) and Lindbeck (1976), is based on the principle that politicians have one sole objective: to remain in office. This opportunistic business cycle theory is based on the idea that politicians propose unpopular policies after elections and before elections popular ones to get re-elected. This cyclical movement is expected to result in an increase in unemployment and a decrease in inflation after elections and vice versa before elections. This contradictory movement of inflation and unemployment is an application of the famous Phillips curve within one election term[1]. However, one of the limitations of this model is its assumption of a nonrational voter. This assumption stems from the median voter theory established by Hotelling (1929), where political parties converge on the median voter's viewpoint.

The second approach is focused more on the assumption that "different parties have different preferences concerning the intrinsic properties of their economic policies".[2] This approach was initiated by Hibbs (1977), who demonstrated differences between Democratic and Republican policy impacts on US unemployment and inflation. According to this model, left-wing governments tend to decrease unemployment and are less reluctant to inflation and right-wing governments vice versa. This "partisan" or "ideological" approach is fur-

[1] Phillips (1958)
[2] Alesina (1987)

ther developed by Alesina (1987). In subsequent research conducted across 18 OECD countries, he bolstered his theory by uncovering additional evidence to support it. He also found that inflation tends to increase after elections, probably due to the occurrence of pre-electoral opportunistic budget policies. In fact, Alesina (1988) and Alesina & Roubini (1992) indicate that election years in multiple OECD democracies are associated with increased budget deficits and money growth. However, empirical evidence typically does not support the hypothesis regarding output and unemployment formulated in Nordhaus (1975), known as the PBC hypothesis.

The opportunistic and ideological approaches were combined in Nordhaus *et al.* (1989). One of the conclusions of this work is that, even if a party is purely ideological, it may behave opportunistically if compromising on its policies is more beneficial than the opposing party's policies. However, Nordhaus still employs the non-rational voter approach, supporting it by rejecting the ultrarational voter assumption. In response, Alesina acknowledges rejecting the ultrarational voter theory but argues that it is incorrect to assume that voters are entirely irrational. He advocates for the application of models with rational voters with imperfect information.

Another compelling work by Drazen (2000) concludes the work done in the 20th century and constructs his model, which is the first to incorporate monetary and fiscal policy in a rational opportunistic framework, but with separate fiscal and monetary authority. He comes with his AFPM (active-fiscal, passive-monetary) model, an extension of the model from Rogoff (1990).

2.1.2 Research conducted in specific countries

This section summarizes the literature in the countries that will be analysed in the thesis. The oldest empirical analyses among our chosen countries were conducted in Germany and Austria, as they have been democratic regimes since WWII and were analysed alongside other OECD countries. The remaining countries are often referred to as "new democracies", where empirical research was conducted for the first time in the 1990s.

Hallerberg *et al.* (2002) research revealed that the behaviour of EU accession countries, also classified as "new democracies", was comparable to that of other OECD nations. Their findings indicate that the fiscal or monetary cycles occur and influence macroeconomic indicators based on whether the country has a fixed or floating exchange rate and an independent or dependent central bank.

According to this study, when the central bank operates independently and the exchange rate is floating, fiscal or monetary cycles should not be able to occur.

According to Štiková (2008), the strength of the cycle is influenced by the strength of democracy. In weaker democracies, the cycle tends to be stronger. She argues that in these newly established democracies, voters may not have the same ability as voters in more developed and established democracies to identify fiscal manipulation. Consequently, politicians in weaker democracies are rewarded through re-election instead of being punished for their behaviour.

Pulatov & Ahmad (2021) were searching for political business cycles in all post-communist European countries. They found a significant effect of the elections on inflation which is 21.43% higher during them than in non-election periods. They also found higher government expenditures having downward pressure on unemployment during the election period.

The following sections will provide a summary of the literature examining the PBC in the countries under our study. In every country, at least some paper suggests the existence of the political budget cycle on a municipal level. However, the relationship between macroeconomic indicators and the political cycle has been examined only in Germany and the Czech Republic, so far.[3]

Germany

Germany provides a useful example for investigating the occurrence of political business cycles, particularly when compared to the United States. Despite sharing similarities such as a strong democracy and an independent central bank, the two countries differ significantly in their political systems. Alesina & Roubini (1992) argue that the evidence on rational partisan theory is more conclusive in countries with clear two-party systems or distinct left-right coalitions, which is characteristic of the United States' political landscape, where the two dominant parties are the Democratic and Republican parties. On the other hand, Germany has not had a single-party government since WWII, and coalitions are often formed between parties that fall on opposite ends of the left-right spectrum. In addition, Germany is also known for its fiscal conservative policies.

Despite previous arguments suggesting that Germany could be less affected by political business cycles, empirical evidence of their occurrence has been found by Alesina & Roubini (1992). However, their findings were later chal-

[3]excluding panel regressions

lenged by Berger & Woitek (1997), who found no support for the predictions of the partisan school, neither in its non-rational (Hibbs[4]) nor rational expectations (Alesina[5]) versions. Moreover, they observed no significant impact of federal elections on net production and prices, which contradicts the Nordhaus hypothesis on opportunistic cycles[6].

The primary relevance of the Berger & Woitek (1997)'s paper for this thesis lies in the methodology used. This paper used VAR models to analyze the interplay between political cycles and the German economy. They estimate the model:

$$A_t = A_1 X_{t-1} + \ldots + A_p X_{t-p} + D_t + u_t$$

where:

X_t is a 6x1 vector containing selected variables at time t

$A_1, \ldots, A_p$ are the parameter matrices of the VAR model

u_t is a 6x1 vector of errors following the usual assumptions

D_t is the dummy for exogenous changes in government behavior

The authors run two different regressions for social democratic and conservative governments using VAR models. The dummy variable equals one if a certain party controls economic policy and equals zero otherwise. The paper concludes that there could be opportunistic cycles in some policy instruments. In our thesis, we will apply a similar methodology, which differs only in detail.

Austria

Neck & Getzner (2001) discovered information about the relationship between public debt and the form of government. They found that when a single party holds power, the primary surplus is significantly lower compared to coalition governments. Although this result might have been interesting then, it is no longer relevant in Austria today. While the Austrian People's Party (ÖVP) and the Social Democratic Party of Austria (SPÖ) remain the two most powerful parties in Austria, their relative significance has decreased since the end of World War II. The rise of the Freedom Party of Austria (FPÖ) has disrupted the traditional dominance of the ÖVP and SPÖ, and the FPÖ has held significant

[4]Hibbs (1977)
[5]Alesina (1987)
[6]Nordhaus (1975)

political power. Since Neck and Getzner's work was published in 2001, there has never been a time when a single party held more than 50% votes, making coalition-building a constant necessity.

The authors did not find conclusive evidence of ideology's significant impact on the primary surplus-to-GDP ratio. On the other hand, they observed some evidence of an opportunistic political business cycle, with fiscal policymakers being partially willing to run lower primary surpluses during election years than in other periods. This effect was more pronounced in the period from 1975 to 1999 than in the period from 1961 to 1974.

Evidence suggesting that Austrian governments tend to manipulate fiscal policy before elections was also found by Doležalová (2011).

Czech Republic

Štiková (2008) applying the approach from Alesina & Roubini (1992) found evidence that partly supports opportunistic motives for the behaviour of Czech politicians. Her test revealed a tendency towards higher GDP growth than in the EU-15 and a fall in the unemployment rate before the parliamentary elections. On the other hand, inflation contradicted the theory of the political business cycle models, probably because inflation fell continuously since 1993 after the economic transformation to relatively low values. Our paper takes the paper of Štiková (2008) as an inspiration mainly due to the variables used in the model. Štiková uses the difference between real GDP growth in the Czech Republic and the EU15 in her model.

More recent work was done by Brechler & Geršl (2014), who found that incumbents propose more laws in the period before the election. This indicates that some form of political legislation cycle exists in the Czech Republic. The evidence of the existence of the political cycle on a municipality level in the Czech Republic was provided by Plaček *et al.* (2016) and Sedmihradská *et al.* (2011). However, neither of these papers investigates if it impacts macroeconomic indicators.

Slovakia

Malička (2019) found a positive impact of the election year variable on per capita municipal expenditure. However, this paper does not investigate the impact on macroeconomic indicators.

Hungary

Lami & Imami (2013) provides evidence of fiscal expansion before elections and contractions afterwards in Hungary. They also found that the contraction after elections do not fully balance out the expansion before elections. Therefore, this paper suggests an overall increase in public debt in Hungary due to the political cycle.

Poland

The evidence of the existence of some form of political cycle in Poland was found in several papers. Malkowska *et al.* (2020) shows that politicians tend to set lower tax rates in years when elections take place. Filipiak & Kluza (2022) found higher expenditure on investment by local governments during election years. On the contrary, Doležalová (2011) found that structural balance tends to increase in the year before elections in Poland.

More findings related to the election cycle are also provided by Gałązka (2021), Swianiewicz & Kurniewicz (2018), Wyszkowski & Łukasz Zegarowicz (2018) or Redžepagić & Llorca (2007). However, in all cases, they do not search for the relationship between the cycle and macroeconomic indicators.

Chapter 3

Vector Autoregression (VAR)

For the analysis of the relationship between our political and macroeconomic variables, we decided to use the VAR model. This section describes the general definition of the model. For more information, see the textbook from Lütkepohl & Krätzig (2004) which was used as main source for this section.

3.1 Definition of the VAR Model

The VAR(p) model is given by:

$$
\begin{aligned}
y_{1,t} &= c_1 + \phi_{11} y_{1,t-1} + \phi_{12} y_{2,t-1} + \ldots + \phi_{1p} y_{1,t-p} + u_{1,t} \\
y_{2,t} &= c_2 + \phi_{21} y_{1,t-1} + \phi_{22} y_{2,t-1} + \ldots + \phi_{2p} y_{2,t-p} + u_{2,t} \\
&\vdots \\
y_{n,t} &= c_n + \phi_{n1} y_{1,t-1} + \phi_{n2} y_{2,t-1} + \ldots + \phi_{np} y_{n,t-p} + u_{n,t}
\end{aligned}
$$

where:

$y_{i,t}$ is the ith variable at time t

c_i is the intercept for the ith equation

ϕ_{ij} represents the coefficient of the lagged variable $y_{j,t-1}$ in the ith equation

$u_{i,t}$ is the unobservable error term for the ith equation

In its matrix form, it can be written as:

$$\mathbf{y}_t = \mathbf{A}_1\mathbf{y}_{t-1} + \ldots + \mathbf{A}_p\mathbf{y}_{t-p} + \mathbf{u}_t \tag{3.1}$$

where:

$\mathbf{y}_t$ is a vector of K time series variables

$\mathbf{A}_i$'s are $K \times K$coefficient matrices

$\mathbf{u}_t$ is an unobservable error term

The error term $\mathbf{u}_t$ is commonly assumed to be a zero-mean independent white noise process with time-invariant, positive definite covariance matrix $E(\mathbf{u}_t\mathbf{u}_t') = \Sigma_u$. In simpler terms, the $\mathbf{u}_t$'s are independent stochastic vectors with $\mathbf{u}_t \sim (0, \Sigma_u)$ (Lütkepohl & Krätzig 2004).

A process is considered stable if the determinant of the autoregressive operator does not have any roots on the complex unit circle. When assuming that the process has been initiated in the infinite past, it produces stationary time series characterized by time-invariant means, variances, and covariances (Lütkepohl & Krätzig 2004).

Chapter 4

Data Description

This thesis uses several variables that had to be obtained and collected in usable form. Therefore, data collection was an essential part of the work. This chapter describes the data used in the thesis's final form.

All variables were formed into time series, with the first observation from the first quarter of 1998 and the last from the last quarter of 2022. Six countries are included in our data set. Variables were divided into two separate groups according to their nature.

4.1 Macroeconomic Data

The first group of variables was collected from the Eurostat database (except the Interest Rate variable). This approach was chosen to avoid differences in data collection methods in individual countries. Four data sets from Eurostat were used - real GDP growth, unemployment rate, HICP and population.

4.1.1 Real GDP growth

Raw data obtaining information from each country in our data set regarding their GDP growth were obtained in Eurostat (2023b). The original data set was filtered in R to fulfil the requirements described below.

Data are seasonally and calendar-adjusted. This deals with two effects that could bias our model - seasonality and the calendar effect. While seasonally adjusted data overcome the problem with every-year recurring, predictable fluctuations and changes in the data, calendar-adjusted data remove changes that result from a different proportion of weekdays and holidays in each quarter.

Data were chosen for all our countries from the first quarter of 1998 to the end of 2022. As most of the countries of our interest were going through a transmission period from socialist regimes to democratic ones with a free market environment, interpreting the results from earlier periods would be more difficult. The availability of other variables was also an essential factor in choosing this time interval.

Each observation is derived as a percentage change on the previous quarter, is based on chain-linked volumes, and uses GDP at market prices. This approach of deriving real GDP growth is possible as we work with seasonally and calendar-adjusted data.

EU15 variable

The method described above was used for all countries in our interest (the Czech Republic, Slovakia, Poland, Hungary, Austria, and Germany) and for all countries from the EU15 except for the United Kingdom (UK). EU15 is a set of 15 countries that were part of the European Union before the 2004 EU enlargement. Those countries are Belgium, France, Germany, Italy, Luxembourg, Netherlands, Denmark, Ireland, Greece, Portugal, Spain, Austria, Finland and Sweden, and the UK. The UK was excluded from the list because it left the EU in 2020.

Out of these data sets, a weighted average was derived and named EU15 in the data set used for our model. As a weight, the average population in 2022 was chosen.[1] However, the EU15 variable cannot be used in models for Germany and Austria as they would be included in both sides of the model. Therefore, two other variables, EU15_AT and EU15_DE, were created for the Austria and Germany model, where this weighted average contains only 13 countries instead of 14 (EU15_AT excludes Austria, and EU15_DE excludes Germany).

Population data were obtained as the total population national concept in Eurostat (2023a). They are unadjusted (i.e. neither seasonally adjusted nor calendar-adjusted data) and measured in thousands.

[1] At first, we used the average population in a given quarter as a weight. Same as in the case of GDP data, we had data for the time interval from the first quarter of 1998 to the end of 2022. However, a disadvantage of this approach is that sometimes there can be sudden fluctuations in population, which can affect the overall weighted average. These sudden changes can arise after a census in a country or after some migration wave. Therefore, we decided to abandon this approach as it is not essential in our context to reflect changes in population.

4.1.2 Unemployment

The unemployment data were obtained from Eurostat (2023d). It is measured as the percentage of the population in the labour force. Data were filtered in R.

Data are only seasonally adjusted. They are not calendar-adjusted. Unemployed people are unemployed during weekdays in the same way as during holidays. Therefore, the calendar effect is more critical in the GDP data.

In the case of unemployment, we do not use the EU15 variable. The reason for this is the assumed absence of strong links between the labour markets in the Czech Republic and the EU15, owing to the low international mobility of workers. The same reasoning was used in Štiková (2008).

4.1.3 Inflation

The inflation data were obtained from Eurostat (2023c). They are measured as Harmonised Index of Consumer Prices (HICP). The main advantage of HICP is that it has the same methodology in all countries in the European Union.

As in the case of GDP EU15, EU15_AT and EU15_DE were created similarly as described in 4.1.1.

4.1.4 Interest Rate

The variable reflects the base rate set by a country's central bank. In the case of countries which accepted the euro as their currency (Austria and Germany in 1999, and Slovakia in 2008), the interest rate is set by the ECB.

It is common for the central bank to change the interest rate multiple times in the same quarter. Therefore, the interest rate used in our models is a weighted average where its weight is a proportion of the quarter where a given weighted value of interest rate is in effect.[2]

The data were collected from the official sites of the central banks.[3]

[2]Number of days in a given quarter when the interest rate is in effect/Number of days in a given quarter

[3]the Czech Republic - Czech National Bank, Slovakia until 2008 - National Bank of Slovakia, Poland - Narodowy Bank Polski, Hungary - Hungarian National Bank, Germany until 1999 - Deutsche Bundesbank, Austria until 1999 - Oesterreichische Nationalbank, ECB - European Central Bank

4.2 Political Data

The second group of our variables were collected manually from different sources that are publicly available on the Internet. Data were collected monthly and quarterly at the same time. In the end, only quarterly data were used in our models.

4.2.1 Dummy Variables

Most of our variables focusing on the political situations in given countries are dummy variables, meaning they can have only two values - one if it meets the requirement or zero if it does not.

- **Election Period**
  This variable shows if, in a given period[4], a parliamentary election was held in a country. Other elections (presidential, regional etc.) were not taken into account as those do not directly affect the government. We assume that incumbent parties try to affect the real economy before elections to get reelected. As all countries of our interest have parliamentary systems, this incentive is present only in the parliamentary elections.

- **Caretaker / no Confidence**
  This variable returns one if the government is without confidence or if it is only a temporary government (in other words, caretaker government) which is in power till (in most cases premature) election. These governments usually have very limiting power; therefore, we expect this type of government should not affect macroeconomic indicators as much as incumbents with full power.

  It should be noted that the situation with a caretaker government can be seen only in some of the countries in our interest in the examined period. The only country where it happened multiple times is the Czech Republic, with three different caretaker governments.[5] In the case of Austria, there is only one example of a caretaker government.[6] In other countries (Hungary, Germany and Poland), there was no caretaker government in

[4]The meaning of a given period changes from model to model as described in 5.3.2

[5]the Cabinets of Josef Tošovský (1998), Jan Fischer (2009-2010) and Jiří Rusnok (2013-2014)

[6]the Cabinet of Brigitte Bierlein (2019 - 2020)

power in our examined period.[7] Therefore, it makes sense to include this variable in our model only in some cases.

- **Left-Wing Party in Power**
  This variable indicates if the incumbent party is more on the right side of the political spectre than its competitors that ruled in the country in different periods. The theory of political cycles assumes that a left-wing party cares more about decreasing unemployment and increasing GDP than desires stable inflation around its inflation goal. Therefore it is assumed that there should be higher inflation (also higher real GDP growth and lower unemployment) on average when a left-wing party is in power.

- **Right-Wing Party in Power**
  This variable is the opposite case of the Left-Wing Party in Power variable. The reasoning behind using this variable is that in situations where exists a third option, for example, a government which is neither right-wing nor left-wing or a caretaker government, zero in the Left Party in Power variable does not necessarily mean that the government is on the right side of the political spectrum.

- **Change to the Left**
  This variable is similar to the Left-wing Party in Power variable, but it equals one only for the first year (four quarters) of a left-wing government and only if it can be considered as a shift of ideology. That means that a right-wing party has to be in power before this shift.[8] The idea behind this variable is that the shift in ideology represented by a new government can cause a change in the economy. We assume this shock is only temporary. Therefore this variable should be more significant than the Left-Wing Party in Power variable.

- **Change to the Right**
  This variable works the same way as the Change to the Left variable.

[7] The Cabinet of Ľudovít Ódor in Slovakia came to power in 2023 after our last observation.

[8] if a caretaker government is in power between right-wing and left-wing government, then the accession of a left-wing government is considered as the change to the left as well

4.2.2 Problems with Left / Right Dummy Variables

There are some important problems with using these variables that should be mentioned. The decision of which party should be on the right and which should be on the left is quite ambiguous. In countries with a two-party system (USA, for example), there is no need for such interpretations. However, in a multi-party system, which is the case for all our examined countries, there are many different political parties with different agenda, which in most cases, have to form a coalition to have a majority of legislative seats. In some cases, political parties form left-wing and right-wing blocks, which, through time, change in power. However, in some cases, there are coalitions formed by left-wing and right-wing parties, where the decision about the direction of their ideology is much more difficult. In the most ambiguous cases, we applied the same approach as Berger & Woitek (1997), which in cases of "Grand" coalition in Germany labelled the government as left-wing if the left-wing SPD held the post of Federal Minister of Finance.

4.2.3 Other Political Variables

- **Government Power**
  This variable measures how powerful the government is in parliament. The logic behind this variable is that when a government has only a close majority, it cannot act as freely as with a large majority in parliament because it needs a larger part of its majority to adopt every law. Moreover, it cannot propose laws, for example, those that would change the constitution, which need a 3/5 or 2/3 majority (also super-majority or qualified majority).

  There are six values that the Government variable can acquire:

  - 3: the qualified majority (or super-majority)
  - 2: not enough for a qualified majority, but the government can still propose laws without worrying about "turncoats".
  - 1: a very close majority
  - -1: minority government which needs a very small amount of deputies outside of incumbent political parties to propose every law

- -2: minority government which needs some deputies outside of incumbent political parties equal to small political party to propose every law
- -3: minority government which needs a large number of deputies outside of incumbent political parties equal to significant political party to propose every law

- **HHI of Coalition**
  This variable shows the proportion of power within the coalition itself. It is computed similarly to a measure of market concentration called Herfindahl-Hirschman Index (HHI). HHI is usually computed by the equation 4.1.

$$\text{HHI} = s_1^2 + s_2^2 + ... + s_n^2 \tag{4.1}$$

  where s_i is a market share of a firm i and n is the number of firms.

  In our case, s_i is a coalition share of a political party i and n is the number of political parties in a government. Coalition share is computed in the equation 4.2.

$$CS_i = d_i/m \tag{4.2}$$

  where CS_i is the coalition share of a political party i, d_i is the number of deputies of political party i and m is the number of deputies in a coalition.

  This paper is not the first to use HHI as a political variable. It can be seen, for example, in Maux *et al.* (2011). HHI, as a measure of government fragmentation, is also used in Lees (2012). However, this paper is the first to use it in the context of the political cycle.

Chapter 5

Empirical Part I - the Czech Republic

In this chapter, we present the results of our analysis, which was conducted in the following way: twenty-five different VAR models were conducted on the data set of the Czech Republic to find and confirm the relationship between the election cycle and chosen macroeconomic indicators. These models were tested and examined. After the examination, we reported the results and conducted several tests measuring the quality of our models. At last, all models were replicated in other countries and results were compared with the Czech Republic. The results of other countries will be presented in chapter 6.

Besides the models focused on the election cycle, we also conducted several models using other political variables. As the results of these models were merely significant, only a small section will be dedicated to these variables.

The following sections will present the most important models and their results.

5.1 Stationarity of the Data

Before moving on to the VAR model itself, we had to do a couple of tests that would satisfy one of the main assumptions of the model - the stationarity of variables. Two tests were used to check this assumption. The first one is the Augmented Dickey-Fuller (ADF) test. This test is the most popular test for stationarity testing. However, as the test has some limitations, the Phillips-Perron (PP) test was also conducted. Both of them have the same null hypothesis:

$$H_0 : x \text{ has a unit root} \tag{5.1}$$

In our case, x describes a time series. If the null hypothesis is rejected, we can say that x has no unit root. In that case, we can proceed with x as it is stationary.

- **Real GDP Growth**
  There are three variables measuring real GDP growth. The variable measuring the growth in the Czech Republic passed both ADF and PP tests. The variable measuring the weighted average of the EU15 described in section 4.1.1 also passed both tests.

  However, as explained in section 5.3, most of our models used the third variable, which was derived as the difference between the growth in the Czech Republic and the growth in the EU15. Štiková (2008) already used this method, and we decided to replicate this in our model as well. This variable also passed the PP test but did not pass the ADF test as the p-value equals 0.06566.

  This result should indicate that using the first two variables is better. Nevertheless, as it is highly desirable for the reasons described in the following sections, we will still use this variable for our most important models. Even though the p-value is not that far from the usually used significance level of 0.05, we should consider this while interpreting the results.

- **Unemployment**
  The unemployment variable did not pass both tests. Therefore, we tried to make the data stationary through differencing. The previous quarter's value was subtracted from each observation, and tests were replicated. Our new unemployment values passed both tests. Therefore, we can use them in our VAR model.

- **Inflation (HICP)**
  As in the case of the real GDP growth variable, more variables measure inflation in our data set. The variables measuring the HICP in the Czech Republic and the EU15 failed both tests. The difference between these two variables could not rule out non-stationarity in the data.

Therefore, we had to obtain new values of the HICP in the Czech Republic and EU15 through differencing. The new time series for the Czech Republic is stationary according to both tests. However, the EU15 HICP variable did not pass the ADF test, only the PP test. For this reason, we created a new time series as a difference of the HICP in the Czech Republic and the EU15. This time series passed both stationarity tests.

- **Interest Rate**
  The interest rate variable was originally also non-stationary. Therefore differencing method, as in the previous examples, was conducted, and differenced time series passed both tests.

- **HHI and Power variables**
  These variables measuring the fragmentation of the incumbent coalition and the incumbent's power in the parliament barely passed the PP test. Moreover, they were very far from passing the ADF test. Therefore, new time series with differenced values was conducted, and it passed both tests.

  Apart from the variables mentioned before, the HHI and Power variables are constant when the government is stable, and no elections are held. Therefore, new differenced variables are, for most of the time[1], zero. For this reason, we will mainly use the non-differenced versions of the variables. Nonetheless, we must remember the non-stationarity of the time series in interpretations.

One disadvantage of differencing our time series was that we lost one observation[2]. Nevertheless, we still have 99 observations which should be enough for our test.

5.2 Problematic Periods

In recent years the European economy was hit by several shocks that created outliers in our data. As can be seen in the data from the Czech Republic in figure 5.1, there was an unprecedented drop in real GDP growth during the Covid crisis in 2020 and then again a huge rise when recovering from the initial drop. We can also see a significant spike in the inflation data in recent years,

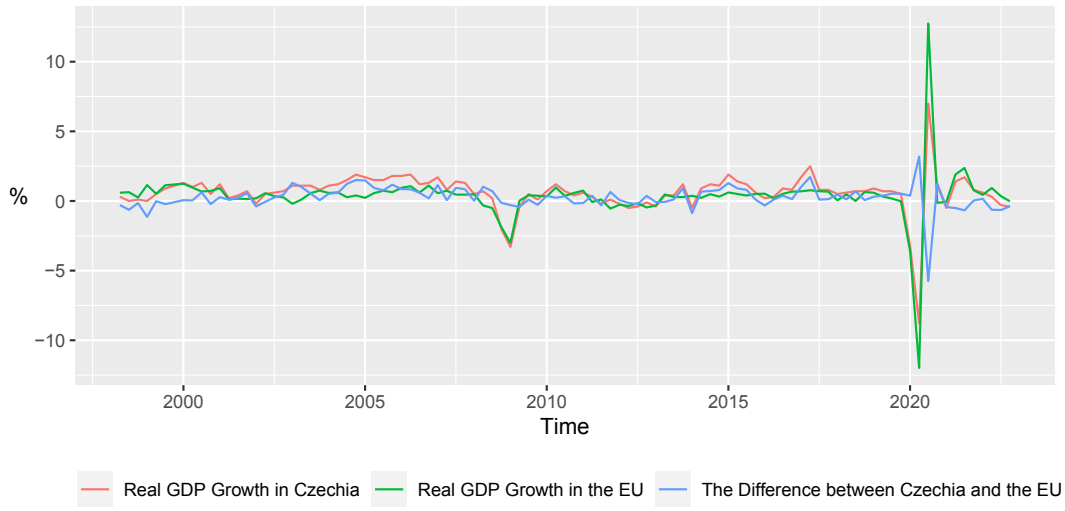
[1] more precisely, in 89 out of 99 observations
[2] First quarter of 1998

thanks to the energy crisis, the war in Ukraine and other unimportant reasons for our thesis. This is another reason for using the difference between real GDP growth and inflation values in the countries of our interest and the EU.

Figure 5.1: Fluctuations of the Real Economy in the Czech Republic

Source: Plotting our time series in R

Figure 5.2: Fluctuations of Real GDP Growth



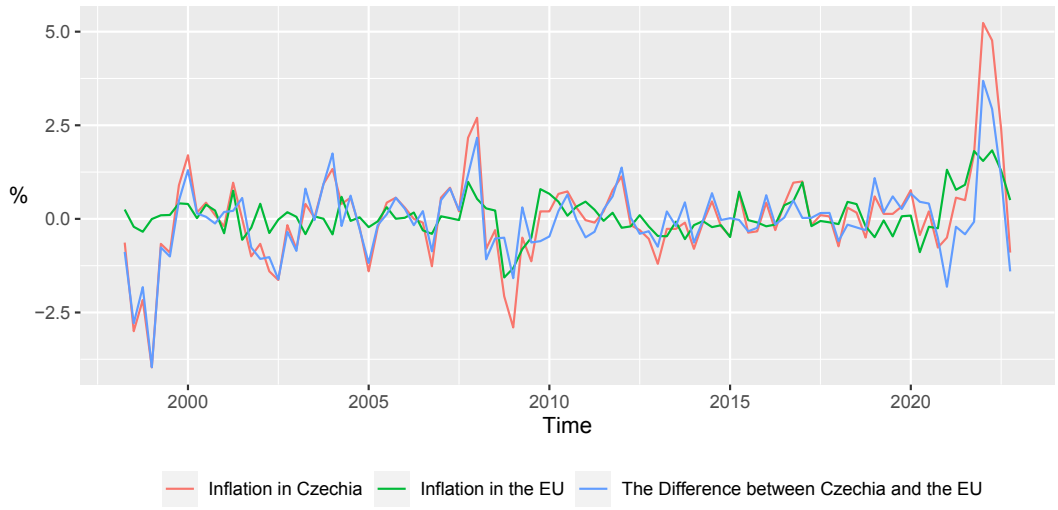
Source: Plotting our time series in R

Using the difference should mitigate these fluctuations in the data. However,

countries in the EU were hit by these shocks in different magnitudes. In the case of the 2020 shock in real GDP growth, the Czech Republic was not hit as much as the countries from the EU15 variable. Therefore, the variable measuring the difference between these two shows the effect of the shock reversed. (visualised in figure 5.2)

In the case of the rise of inflation, mainly in 2022, we can see a reverse situation where the shock was more significant in the Czech Republic than in the countries forming the EU15 variable. Therefore, the difference between these two variables alleviated the shock's magnitude, though the shock remained significant. (visualised in figure 5.3)

Figure 5.3: Fluctuations of Inflation



Source: Plotting our time series in R

Nonetheless, as we did not have enough observations to spare, we decided to continue our analysis with the whole data set. For clarity, we also conducted a test without these complicated periods to check whether the results were similar to the model including these periods. The results of the reduced model spanning the period from 1998 to 2019 can be found in Appendix A.4. As it shows the same results as our original model, we can continue with our analysis.

5.3 Specifications of VAR Models Emphasizing the Impact of the Election Cycle

In this section, we describe several models. We explain their differences and how they change the results. At first, we started with the model using differenced variables of real GDP growth and inflation as described in previous sections. Then, we moved on to models using the same variables as difference between the Czech Republic and the EU.

5.3.1 VAR model with EU15 as exogenous variable

This model is the only model using the variables EU15gdp and EU15inf [3] as exogenous variables. As seen in the table 5.1, the relationship between real GDP growth in the Czech Republic and the EU15 is very significant. The same is true for inflation. (table 5.2) Unfortunately, the significance of these relationships overshadows the connections that we seek. The evidence for this statement can be found in the R-squared. The R-squared of the GDP equation in this model equals 0.9. If we run the same model but the EU15gdp variable excluded, we would end up with an R-squared equal to 0.18. For this reason, we decided to continue only with the models using the difference between the Czech Republic's and the EU15's real GDP growth and inflation.

[3] weighted average of real GDP growth in the countries of the EU15 and weighted average of the HICP in the countries of the EU15

Table 5.1: Summary of the GDP equation in the model with exogenous EU15 variable

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.24	0.04	5.86	0.00	***
Unemployment.l1	-0.21	0.23	-0.92	0.36	
Inflation.l1	-0.02	0.07	-0.28	0.78	
iRates.l1	0.17	0.16	1.07	0.29	
GDP.l2	0.05	0.04	1.24	0.22	
Unemployment.l2	-0.15	0.22	-0.69	0.49	
Inflation.l2	0.03	0.06	0.50	0.62	
iRates.l2	-0.25	0.15	-1.66	0.10	
const	0.15	0.07	2.02	0.05	*
EU15gdp	0.74	0.03	24.74	0.00	***
EU15inf	-0.19	0.12	-1.65	0.10	
bElection	0.09	0.13	0.66	0.51	

Note: bElection variable represents the four quarters before the elections

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.9082, Adjusted R-squared: 0.891

Table 5.2: Summary of the Inflation equation in the model with exogenous EU15 variable

	Estimate	Std..Error	t.value	Pr(>|t|)	Significance
GDP.l1	-0.06	0.07	-0.89	0.37	
Unemployment.l1	0.12	0.38	0.33	0.74	
Inflation.l1	0.27	0.11	2.51	0.01	*
iRates.l1	0.53	0.27	1.95	0.05	
GDP.l2	-0.07	0.07	-0.94	0.35	
Unemployment.l2	-0.17	0.41	-0.42	0.67	
Inflation.l2	-0.10	0.11	-0.87	0.39	
iRates.l2	0.19	0.32	0.59	0.56	
GDP.l3	0.11	0.06	1.72	0.09	
Unemployment.l3	-0.38	0.35	-1.09	0.28	
Inflation.l3	-0.12	0.11	-1.04	0.30	
iRates.l3	-0.47	0.26	-1.81	0.07	
const	0.01	0.13	0.08	0.94	
EU15gdp	0.01	0.05	0.21	0.83	
EU15inf	1.05	0.19	5.59	0.00	***
bElection	-0.10	0.21	-0.47	0.64	

Note: bElection variable represents the four quarters before the elections

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.63, Adjusted R-squared: 0.5606

5.3.2 Structural Variations in VAR Models without exogenous EU15 variables

This section describes the differences in VAR models conducted without exogenous EU15 variables. As mentioned in the section above, from this point, the GDP variable depicts a difference between real GDP growth in the Czech Republic and the EU15, and the same applies to the Inflation variable.

Exogeneity / Endogeneity of the Election variable

The first difference between the models is if the election variable is taken as exogenous or endogenous. Theoretically, this decision should depend on whether we believe that the timing of elections is endogenous in the model, meaning that GDP and other selected variables affect this timing. That is quite a controversial statement.[4] Nevertheless, in the practice of the VAR modelling, the difference is that when we take a variable as exogenous, the model will be looking for the contemporaneous effect. On the other hand, when we take the variable as endogenous, it will contain the lagged version of election variables in equations. The number of lagged election variables depends on the number of lags in the model. The endogenous version of the model is described in the equation 5.2 [5]. Clearly, the equation is the same as described in chapter 3. The exogenous version is shown in the equation 5.3.

We consider a VAR model with p lags and n endogenous variables Y_t.
The model can be written as follows:

$$Y_t = A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + u_t \tag{5.2}$$

where:

- $Y_t = (Y_{1t}, \ldots, Y_{nt})'$ is the vector of endogenous variables, including the endogenous election variable E_t.

[4] In very special occasions, where the government might resign prematurely because of some problems in the economy, it could be the case (for example, Heckelman & Berument (1998) explores this theory), but we will not go that far in this thesis.

[5] Upon examination of the equation, it becomes evident that the endogeneity, as traditionally defined, is included in the model. This can be seen in the matrix segment, where the election variable serves as a dependent variable. However, for the purposes of our analysis, we will not utilize this portion of the matrix. Instead, we will focus solely on the equations where our chosen macro-variables function as dependent variables.

- $A_1, \ldots, A_p$ are $n \times n$ coefficient matrices for the lags of the endogenous variables.
- $u_t = (u_{1t}, \ldots, u_{nt})'$ is a vector of error terms.

We consider a VAR model with p lags, n endogenous variables Y_t, and an exogenous election variable E_t.

The model can be written as follows:

$$Y_t = A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + BE_t + u_t \tag{5.3}$$

where:

- $Y_t = (Y_{1t}, \ldots, Y_{nt})'$ is the vector of endogenous variables.
- E_t is the exogenous election variable.
- $A_1, \ldots, A_p$ are $n \times n$ coefficient matrices for the lags of the endogenous variables.
- B is an $n \times 1$ coefficient matrix for the exogenous election variable.
- $u_t = (u_{1t}, \ldots, u_{nt})'$ is a vector of error terms.

The advantage of using the exogenous version of the variable is that we can include a wider period within the election variable. That is not possible in the endogenous version of the model as the lagged versions of the variable would be overlapped.[6] The disadvantage of the exogenous version is that the model shows only the contemporaneous effect of the election variable. However, we can overcome this problem by including lagged election variable as an exogenous variable. Lastly, when including the election variable as endogenous, we can construct Impulse Response functions, which can help us interpret the results, which can sometimes be confusing in VAR. We decided to try both versions to see if the results would stay the same and to embrace the advantages of both possibilities.

[6] In the exogenous version of the model, it is possible to incorporate a variable representing three quarters surrounding the elections. However, in the endogenous version of the model, which includes at least two lags, including two lagged election variables would result in duplicating two identical quarters within both variables.

Different Forms of the Election Variable

The second difference between tried VAR models is the form of the election variable. As described in the section above, exogenous and endogenous types of election variables cannot have the same form on every occasion. While searching for the election cycle in the Czech Republic, we tried several forms that will be described in this section. They were divided according to their usage in the model as exogenous or endogenous.

- **Exogenous Election Variable**
  The exogenous election variable was employed in two instances: firstly, in the initial models, and secondly, in a group of models designed to confirm the findings derived from the models incorporating the endogenous election variable. The possibility of a wider time period was the reason for incorporating this variable in our first models. Three variables alternated in the first group of our models - the variable depicting three quarters around elections and the variables depicting three quarters before and after this three-quarter period. Given that only the variable representing the period around elections demonstrated a significant effect, subsequent sections will exclusively focus on models incorporating this particular variable.

- **Endogenous Election Variable**
  The endogenous election variable was included in our most important models. As we cannot use a wider time period, this variable always depicts only one quarter.[7]

Number of lags

The last difference between conducted VAR models is the number of lags. Multiple techniques evaluate how many lags should be used in a particular model.[8] We should be careful with the choice, as too few lags lead to misspecification

[7] In most cases two quarters before election (el2b) variable was used but in some models other quarters were used instead - four quarters before election (el4b), three quarters before election (el3b), one quarter before election (el1b), quarter during election (el0) or one quarter after election (el1a).

[8] Lag selection tests were performed before evaluating each model. Four different tests were considered, each minimizing its definition of information criterion - Ainake's Information Criterion (AIC), Hannan-Quinn (HQ), Schwarz Criterion (SC) and Final Prediction Error (FPE). However, the results of these tests differed significantly in most models. Therefore, we decided to construct more models with different numbers of lags to see how the relationship between our variables changes.

and biased parameter estimators, and too many lags lead to overfitting. As the VAR model includes different types of variables, the best option is to try more VAR models with different numbers of lags. For example, we found that equations incorporating unemployment as a dependent variable show better results when including fewer lags. However, models with more lags hold better results in the inflation case.

5.3.3 Results of VAR models without Exogenous EU15 variable

In this section, we will summarise the results of our analysis focusing on the effect of the election cycle on macro-variables in the Czech Republic. We conducted twenty-two VAR models differencing in specifications from the previous section. Numbers from 2 to 23[9] were assigned to these models, and detailed results for each can be provided upon request.

Models CZ5, CZ8 and CZ13 were chosen for a detailed description in the following sections. These three tests were selected as their combination can provide us with all the advantages described above. Model CZ5 is the representative of the group using the exogenous version of the election variable. On the other hand, models CZ8 and CZ13 incorporate the endogenous version. We used them both as their disparity in the number of lags brings complement results. We found out that models with fewer lags are better at finding the relationship between the election cycle and unemployment. On the contrary, models with more lags beat other models in finding connections between the election cycle and inflation. This might be due to the natural behaviour of these variables, as unemployment can react to economic shocks more quickly than inflation. For this reason, we decided to show detailed results of both models.

Model CZ5

Model CZ5 belongs to the group of models incorporating an exogenous election variable. Models CZ2, CZ3 and CZ4 incorporated election variables depicting periods before and after elections. No significant effect was found. Models CZ5, CZ6 and CZ7 incorporated election variable depicting a three-quarters period around elections. The difference between them lies in the number of

[9]Model CZ1 was already mentioned in tables 5.1 and 5.2

lags. Tests for the lag selection in VAR models were conducted. Model CZ5 uses three lags.[10]

The test results, as depicted in the table 5.3, indicate lower real GDP growth in the Czech Republic around the election period. This contradicts a traditional political cycle theory assuming incumbents with an incentive to increase the product around elections. The relationship between the election cycle and inflation or unemployment is not significant. Tables depicting this insignificant relationship can be found in the appendix (Table A.1 and Table A.2).

Table 5.3: Summary of the GDP equation in the model CZ5

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.07	0.11	-0.59	0.56	
Unemployment.l1	-0.97	0.34	-2.82	0.01	**
Inflation.l1	-0.25	0.12	-2.17	0.03	*
iRates.l1	0.90	0.25	3.62	0.00	***
GDP.l2	0.29	0.10	2.79	0.01	**
Unemployment.l2	0.36	0.37	0.98	0.33	
Inflation.l2	0.04	0.11	0.38	0.70	
iRates.l2	-0.66	0.31	-2.12	0.04	*
GDP.l3	0.23	0.10	2.22	0.03	*
Unemployment.l3	0.27	0.34	0.80	0.43	
Inflation.l3	-0.12	0.12	-1.01	0.31	
iRates.l3	0.17	0.26	0.66	0.51	
const	0.24	0.10	2.28	0.02	*
Election	-0.48	0.22	-2.16	0.03	*

Note: Election represents the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.3565, Adjusted R-squared: 0.2545

Multiple tests had to be done to conclude if the parameter estimators were Best Linear Unbiased Estimator (BLUE) or at least unbiased. The first test looks for residuals' serial correlation (i.e. autocorrelation). This test is called Portmanteau Test. The null hypothesis of this test is:

$$H_0 : \textit{Residuals are not serially correlated.} \tag{5.4}$$

We can reject a null hypothesis if the p-value is smaller than 0.05, meaning that residuals are serially correlated, and the estimator is not BLUE.

In model CZ5, the null hypothesis is rejected up to eight lags. Therefore, the residuals are serially correlated as we used three lags in the model. Even though this is not the best result, we will continue with this model as all models

[10]Model CZ6 uses only two lags. Model CZ7 uses four lags.

we tried had similar problems. Our estimators are still unbiased. However, they are not BLUE, and we must consider this in the interpretation.

The second test checks the stationarity of residuals. This test is the already mentioned ADF test. The p-value of this test is almost zero; therefore, we can reject the nonstationarity of residuals.

The third test checks the homoskedasticity of residuals. This test is called Autoregressive Conditional Heteroskedasticity Lagrange Multiplier (ARCH LM) test. The null hypothesis for this test is:

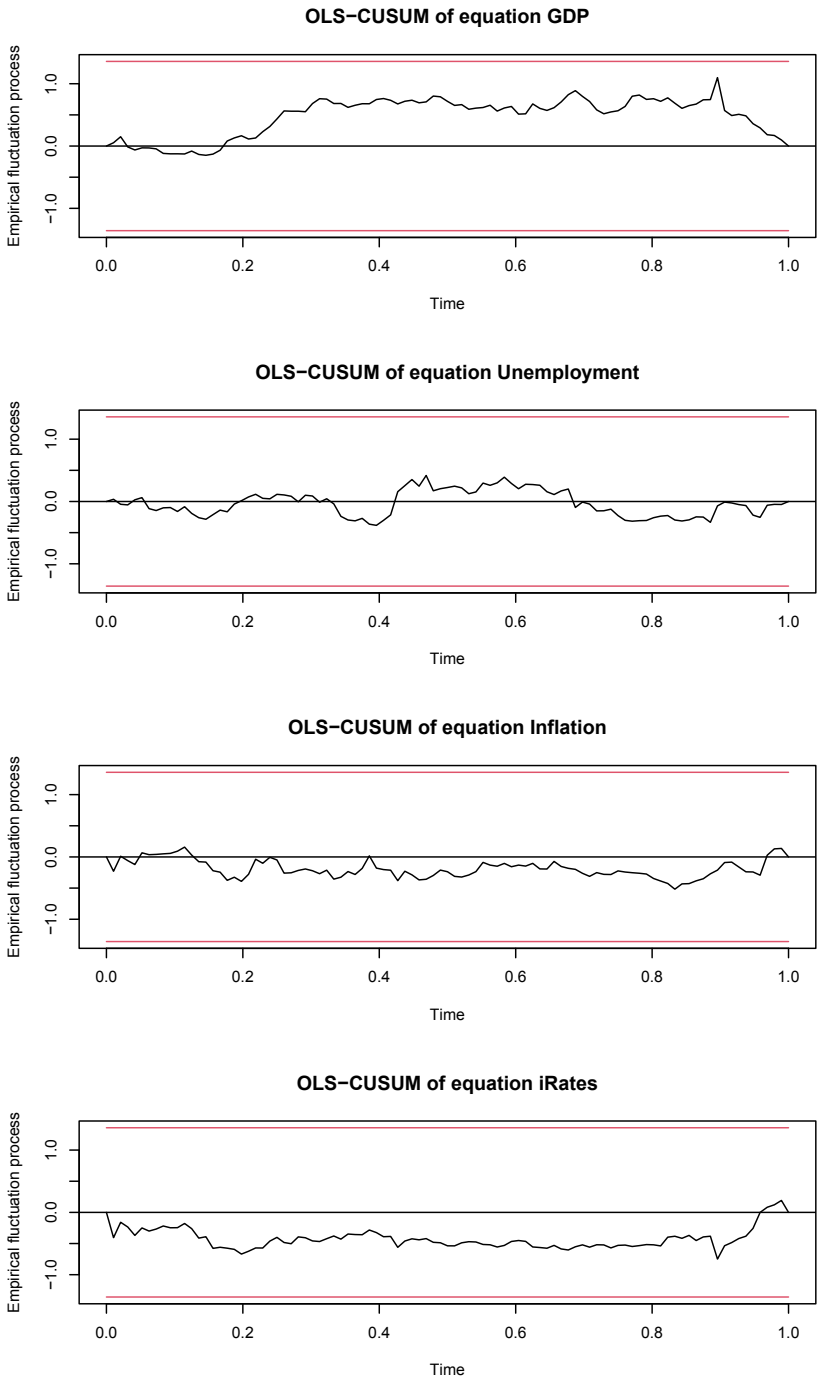
$$H_0 : \textit{Residuals are homoskedastic.} \tag{5.5}$$

Unlike in models CZ6 and CZ7, model CZ5 passed the test, as we cannot reject the null hypothesis. However, the p-value equals 0.06812, so it is not that far from rejection. Therefore, we must be cautious with the assumption of residuals' homoskedasticity.

The last test checks the stability of the model. The test is called CUSUM test. The product of this test is a plot called CUSUM line and confidence bands. The model is unstable if the CUSUM line crosses confidence bands. The CUSUM test of the model CZ5 is depicted in the graph 5.4. As no line crosses confidence bands, we can say that the model is stable.

In conclusion, model CZ5 indicates lower real GDP growth in the Czech Republic around the election period. However, we must bear in mind the autocorrelation and possible heteroskedasticity of residuals.

Figure 5.4: Model CZ5: the CUSUM test



Note: CUSUM Test for parameter stability in the VAR Model CZ5. This figure plots the cumulative sum of residuals from the VAR model over time, with the red lines representing the 5% significance level for the parameter stability test. The graph was generated using the 'stability' function from the 'vars' package in R.

Model CZ8

Model CZ8 belongs to the group of models incorporating an endogenous election variable el2b. The reason for using the el2b was that the exogenous form of the model found a significant relationship only around elections. As the endogenous version of the model will include only lags of the el2b variable, it will start with the period depicting one quarter before elections.[11] Incorporating more lags in the model will depict the whole period around elections. However, unlike in model CZ5, in model CZ8, we have estimates for each quarter.[12]

The only difference between models CZ8-CZ13 lies in the number of lags. Model CZ8 uses three lags.[13]

The test results, as depicted in the table 5.4, indicate lower real GDP growth in the Czech Republic one quarter after the elections. This result confirms the result from model CZ5 (this quarter was part of the around-elections variable). Moreover, it specifies the result as the relationship between real GDP growth and the other two periods (one quarter before elections and the quarter during elections) is insignificant. Interpreting the result might be more intuitive now as it no longer contradicts the political cycle theory. We could interpret this effect as a form of the consolidation of public spending after elections. On the other hand, it is a period where the new government usually switches with the old one, and it needs some time before launching big projects. That could be the reason for lower economic performance as well.

Model CZ8, like model CZ5, did not find any connection between inflation and the election cycle. Results are part of the appendix A.3.

Unlike model CZ5, model CZ8 also finds a connection between the election cycle and unemployment. As shown in the table 5.5, unemployment is significantly lower in the election quarter. This result is in line with the political cycle theory, where the incumbent party seeking reelection wants to influence the economy to have the lowest unemployment rate during elections.

[11] In tables 5.4, A.3, 5.5 referred to as Elections.l1.

[12] The around-elections period in model CZ5 is identical to the period in model CZ8 depicted by Elections.l1, Elections.l2 and Elections.l3.

[13] Model CZ9 uses two lags, and models CZ10-CZ13 use from four to seven lags.

Table 5.4: Summary of the GDP equation in the model CZ8

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.05	0.11	-0.47	0.64	
Unemployment.l1	-1.01	0.35	-2.90	0.00	**
Inflation.l1	-0.25	0.12	-2.12	0.04	*
iRates.l1	0.91	0.25	3.66	0.00	***
Elections.l1	-0.49	0.34	-1.44	0.16	
GDP.l2	0.28	0.10	2.63	0.01	*
Unemployment.l2	0.41	0.38	1.09	0.28	
Inflation.l2	0.04	0.11	0.36	0.72	
iRates.l2	-0.70	0.32	-2.19	0.03	*
Elections.l2	-0.24	0.35	-0.70	0.48	
GDP.l3	0.22	0.10	2.15	0.03	*
Unemployment.l3	0.22	0.35	0.64	0.52	
Inflation.l3	-0.12	0.12	-0.98	0.33	
iRates.l3	0.18	0.26	0.71	0.48	
Elections.l3	-0.71	0.35	-2.02	0.05	*
const	0.24	0.10	2.27	0.03	*

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.3647, Adjusted R-squared: 0.2456

Table 5.5: Summary of the Unemployment equation in the model CZ8

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.03	0.04	-0.93	0.36	
Unemployment.l1	0.49	0.12	4.27	0.00	***
Inflation.l1	0.03	0.04	0.80	0.43	
iRates.l1	-0.12	0.08	-1.42	0.16	
Elections.l1	-0.10	0.11	-0.84	0.41	
GDP.l2	-0.03	0.03	-0.81	0.42	
Unemployment.l2	0.04	0.13	0.35	0.73	
Inflation.l2	-0.08	0.04	-2.00	0.05	*
iRates.l2	0.08	0.11	0.74	0.46	
Elections.l2	-0.29	0.11	-2.50	0.01	*
GDP.l3	0.03	0.03	0.86	0.39	
Unemployment.l3	0.03	0.11	0.29	0.77	
Inflation.l3	0.01	0.04	0.19	0.85	
iRates.l3	0.06	0.09	0.67	0.50	
Elections.l3	0.08	0.12	0.69	0.49	
const	0.00	0.03	0.14	0.89	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.4845, Adjusted R-squared: 0.3879

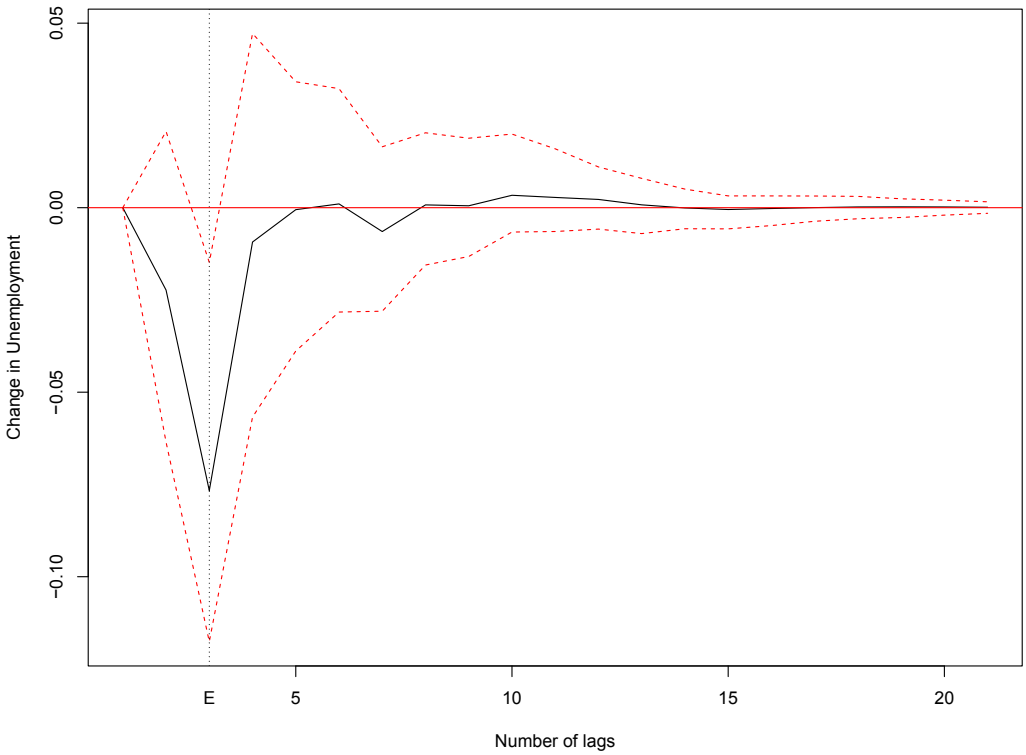
As in the case of the previous model, multiple tests were done. The model,

as model CZ5, failed the Portmanteau test looking for residuals' autocorrelation. The p-value exceeds 0.05 only when we include eight or more lags. Therefore, the residuals in the model are serially correlated. On the other hand, the model's residuals are stationary according to the ADF test. ARCH LM test shows better results than in the case of the model CZ5. We cannot reject the homoskedasticity of residuals, and the p-value equals 0.3233.[14] The model passed the CUSUM test as well. Therefore, the model is stable.[15]

As we use the el2b variable as endogenous, we can construct the IRF. The IRF depicts a reaction of a variable to a one-time shock in another variable, ceteris paribus. This visualization can help us to understand the relationship and interpret the results. As shown in figure 5.5, we must consider whether zero is within the red dotted lines representing the confidence interval. We can only conclude the result as significant in the part of the graph where zero is outside of the confidence interval. As this situation appeared only in the IRF of Unemployment, confirming the findings about a decrease around elections, the IRF of GDP and Inflation is included only in the appendix (Figure A.2 and Figure A.3).

[14]Three lags were used in the test, which is the same amount as included in the model.
[15]The figure showing the CUSUM test can be found in the appendix A.2.

Figure 5.5: IRF of Unemployment to Elections



Note: The graph presents the (IRF) of unemployment to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model CZ8. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of unemployment over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

In conclusion, model CZ8 indicates lower real GDP growth in the Czech Republic one period after the elections and lower unemployment in the election quarter. The IRF function confirms the result in the unemployment case. Nevertheless, we have to bear in mind the autocorrelation of residuals.

Model CZ13

Model CZ13 belongs to the same group of models incorporating the endogenous election variable el2b as model CZ5. Therefore, the description from the previous section (5.3.3) also applies here. The only difference lies in the number of lags. In model CZ13, seven lags were used.

The idea behind using more lags is the probability that we miss some long-

term dependencies between inflation and the election cycle. This is supported by the PBC theory, which assumes increasing inflation after elections due to increased public spending before elections. Therefore, it assumes that the shock in inflation is more delayed than the shocks in unemployment and real GDP growth.

However, we have to consider that the information criteria tests that were run with this model advised using models with 3 lags at maximum. [16] Hence, using seven lags in a model can lead to overfitting, and we should keep that in mind while interpreting the results.

The test results, as depicted in the table 5.6, indicate lower real GDP growth in the Czech Republic one quarter after the elections. This result confirms the result from models CZ5 and CZ8. The estimated parameter is even stronger (-0.48 in model CZ5, -0.71 in model CZ8 and -0.94 in model CZ13).

Model CZ13, unlike models CZ5 and CZ8, found a connection between inflation and the election cycle (Table 5.7). In general, models incorporating more lags showed a significant decrease in inflation in the quarter before elections. Model CZ13 is an example of this. While settling to the 90% confidence interval, model CZ13 also indicates a decrease in inflation in three quarters after elections. This result contradicts the political cycles theory assuming that the public spending from incumbents before elections will increase the inflation after elections.

The interpretation of both results is quite tricky. The political cycle theory might suggest that due to public spending before elections, the central government can raise interest rates to avoid inflation. This can cause a decrease in inflation. However, interest rates are part of our model, and we found no evidence supporting this theory.

Unlike model CZ8, model CZ13 found no significant connection between the election cycle and unemployment. This result is in line with results from other models, where estimated parameters for this relationship start to be insignificant with the increasing number of lags. The summary of this result can be found in Table A.4.

[16] AIC and FPE indicate that a lag length of 3 is appropriate. On the other hand, the HQ criterion and the SC recommend a lag length of one.

Table 5.6: Summary of the GDP equation in the model CZ13

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.10	0.15	0.65	0.52	
Unemployment.l1	-0.87	0.42	-2.10	0.04	*
Inflation.l1	-0.11	0.16	-0.66	0.51	
iRates.l1	1.73	0.42	4.13	0.00	***
Elections.l1	-0.41	0.43	-0.96	0.34	
GDP.l2	0.35	0.15	2.35	0.02	*
Unemployment.l2	0.31	0.46	0.69	0.49	
Inflation.l2	-0.16	0.16	-0.98	0.33	
iRates.l2	-1.41	0.63	-2.23	0.03	*
Elections.l2	0.17	0.43	0.40	0.69	
GDP.l3	0.08	0.14	0.55	0.58	
Unemployment.l3	0.23	0.43	0.53	0.60	
Inflation.l3	-0.07	0.16	-0.44	0.66	
iRates.l3	-0.51	0.67	-0.75	0.45	
Elections.l3	-0.94	0.42	-2.22	0.03	*
GDP.l4	0.04	0.15	0.29	0.77	
Unemployment.l4	-0.16	0.45	-0.36	0.72	
Inflation.l4	-0.06	0.16	-0.39	0.70	
iRates.l4	0.57	0.51	1.11	0.27	
Elections.l4	-0.25	0.46	-0.54	0.59	
GDP.l5	-0.07	0.14	-0.51	0.61	
Unemployment.l5	-0.32	0.45	-0.71	0.48	
Inflation.l5	0.24	0.18	1.35	0.18	
iRates.l5	-0.44	0.51	-0.85	0.40	
Elections.l5	0.08	0.42	0.18	0.86	
GDP.l6	0.10	0.13	0.81	0.42	
Unemployment.l6	0.10	0.45	0.23	0.82	
Inflation.l6	-0.42	0.19	-2.19	0.03	*
iRates.l6	0.81	0.45	1.81	0.08	
Elections.l6	-0.43	0.42	-1.04	0.30	
GDP.l7	0.08	0.13	0.68	0.50	
Unemployment.l7	0.36	0.39	0.91	0.37	
Inflation.l7	-0.18	0.20	-0.92	0.36	
iRates.l7	0.04	0.36	0.12	0.90	
Elections.l7	-0.28	0.43	-0.66	0.51	
const	0.24	0.19	1.23	0.22	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.5474, Adjusted R-squared: 0.2646

Table 5.7: Summary of the Inflation equation in the model CZ13

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.02	0.14	0.16	0.87	
Unemployment.l1	0.05	0.38	0.13	0.90	
Inflation.l1	0.08	0.15	0.56	0.58	
iRates.l1	0.35	0.38	0.94	0.35	
Elections.l1	-0.81	0.39	-2.10	0.04	*
GDP.l2	0.19	0.13	1.40	0.17	
Unemployment.l2	-0.22	0.41	-0.54	0.59	
Inflation.l2	-0.23	0.15	-1.57	0.12	
iRates.l2	0.98	0.57	1.71	0.09	
Elections.l2	-0.48	0.39	-1.24	0.22	
GDP.l3	-0.09	0.12	-0.76	0.45	
Unemployment.l3	-0.43	0.38	-1.11	0.27	
Inflation.l3	-0.21	0.14	-1.48	0.14	
iRates.l3	-0.56	0.61	-0.92	0.36	
Elections.l3	-0.68	0.38	-1.78	0.08	
GDP.l4	0.10	0.13	0.73	0.47	
Unemployment.l4	0.11	0.41	0.26	0.80	
Inflation.l4	-0.58	0.14	-4.05	0.00	***
iRates.l4	0.52	0.46	1.11	0.27	
Elections.l4	-0.72	0.41	-1.74	0.09	
GDP.l5	-0.01	0.12	-0.09	0.93	
Unemployment.l5	0.51	0.41	1.24	0.22	
Inflation.l5	-0.04	0.16	-0.26	0.80	
iRates.l5	-0.22	0.46	-0.48	0.63	
Elections.l5	-0.72	0.38	-1.90	0.06	
GDP.l6	-0.09	0.11	-0.75	0.45	
Unemployment.l6	0.33	0.40	0.82	0.42	
Inflation.l6	-0.13	0.17	-0.77	0.44	
iRates.l6	0.66	0.40	1.62	0.11	
Elections.l6	-0.60	0.38	-1.59	0.12	
GDP.l7	0.07	0.11	0.66	0.51	
Unemployment.l7	-0.30	0.36	-0.85	0.40	
Inflation.l7	-0.04	0.18	-0.21	0.83	
iRates.l7	-0.38	0.33	-1.15	0.25	
Elections.l7	-0.40	0.39	-1.02	0.31	
const	0.30	0.17	1.77	0.08	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.5982, Adjusted R-squared: 0.3471

Multiple tests were done again. As with the previous models, the model failed the Portmanteau test looking for residuals' autocorrelation. The p-value

exceeds 0.05 only when we include seventeen or more lags.[17] Therefore, the residuals in the model are serially correlated. On the other hand, the model's residuals are stationary according to the ADF test. ARCH LM test shows better results than in the case of the model CZ8. We cannot reject the homoskedasticity of residuals, and the p-value equals one.[18] The model passed the CUSUM test as well. Therefore, the model is stable.[19]

The IRF were constructed. We found that including more lags in a model leads to more uncertain results as zero is included in confidence intervals in each IRF graph except figure 5.6, which shows the narrow significant period with decreased inflation before election. The rest can be found in Section A.3.

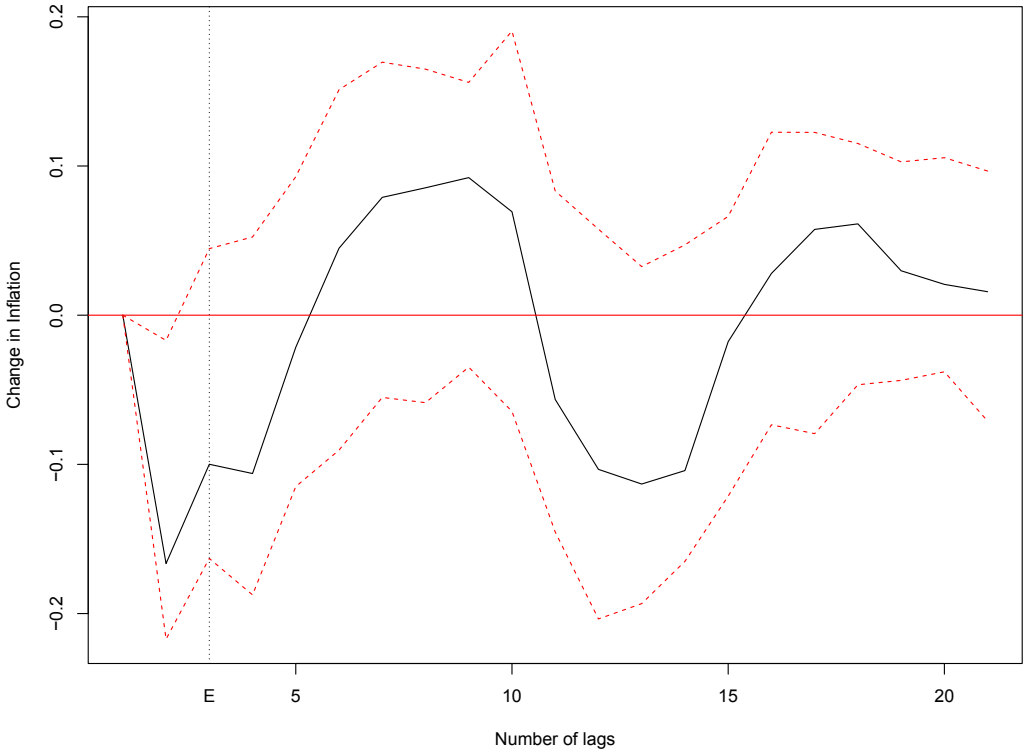
In conclusion, model CZ13 confirms the results indicating lower real GDP growth in the Czech Republic one period after the elections. The model also indicates a decrease in inflation the quarter before the elections. However, we must bear in mind the autocorrelation of residuals and the possibility of overfitting the model when using 7 lags.

[17]This sounds much worse than in previous models, but we have to consider the usage of seven lags instead of the three used in models CZ5 and CZ8

[18]Seven lags were used in the test, which is the same amount as included in the model. When including only three lags, as was included in the test of model CZ8, the p-value is 0.6115, which is still better than the result of model CZ5.

[19]The figure showing the CUSUM test can be found in the appendix A.3.

Figure 5.6: Impulse Response Function (IRF) of Inflation to Elections in ModelCZ13



Note: The graph presents the (IRF) of inflation (the difference between inflation in the Czech Republic and the EU15) to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model CZ13. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of inflation over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

Models Confirming the Previous Results

After this analysis, we decided to construct a final group of VAR models focusing on the election cycle in the Czech Republic. This group's function is to confirm the results through the exogenous form of the model. In this section, we will briefly describe the results.

Models CZ15 - CZ18 used the el1a variable to confirm a decrease in real GDP growth in this quarter. Models differ in the number of lags used.[20] Each

[20] 7, 6, 5 and 4

confirmed a significant negative relationship between real GDP growth and the first quarter after the elections.

Models CZ19 - CZ21 used the el0 variable to confirm a decrease in unemployment during this quarter. Models differ in the number of lags used.[21]. Each confirmed a significant negative relationship between unemployment and the quarter during elections.

Model CZ22 used the el1b variable to confirm a decrease in inflation in this quarter. Four lags were used. It confirmed a significant negative relationship between inflation and the one quarter before elections only while settling with 90% confidence interval. This indicates that we should be careful with interpreting the inflation effect on the election cycle.

5.4 Other Models

Even though this thesis mainly focuses on the election cycle, we collected data for other political variables. Our motivation was the theory of partisan political cycles, where left-wing governments should affect macroeconomic variables differently than right-wing governments. Moreover, we were interested if there is some role in the government's power or fragmentation. The ideas behind selecting variables were described in Chapter 4. However, as we did not find any significant results, this section will only briefly state which models were conducted. Results can be delivered upon request.

- **HHI and Fragmentation of Governments**
  The HHI was used in this context as a variable depicting the fragmentation of the government. We decided to use this variable alongside the election variable as an iterated variable (i.e. a product of these two was taken). The idea behind this was that the government might be more able to affect the real economy while being formed by fewer political parties. Multiple tests were done, but no results favoured this theory.

- **Power of the Government** The idea behind the power variable is similar to the previous one. Stronger governments, described by the proportion of legislative seats, should be more efficient in affecting the real economy. No significant results were found.

[21] 2, 3 and 1

- **Searching for the Partisan Political Cycle** As described in the previous chapters, a significant part of the thesis was dedicated to creating a data set with information about the ideology shifts in the government. We constructed several models, including an exogenous ideology variable intending to find a partisan political cycle in the Czech Republic. The ideology variable took several forms - left-wing party in power, right-wing party in power, shift to the left, shift to the right and an iterated variable of an ideology and a period before elections. Unfortunately, none of the models proved the existence of the partisan cycle in the Czech Republic.

5.5 Summary of the Results in the Czech Republic

After considering all the models, three main significant results were found: lower real GDP growth one quarter after elections, lower unemployment in a quarter during elections and lower inflation one quarter before elections. Therefore, the assumptions about the opportunistic political cycle in the Czech Republic were only partially confirmed. Even though Štiková (2008) found an unemployment decrease before the election period instead of during it, in both examples, unemployment confirms the opportunistic political cycle theory. However, we did not find significant results of the relationship between real GDP growth and periods before elections, which would confirm the cycle as in Štiková (2008).

Chapter 6

Empirical Part II- Other Countries

In this chapter, we will present the results in other countries and compare them with those we already obtained in the Czech Republic.

6.1 Time Series Stationarity and Problematic Periods

Before moving on to the modelling, we had to analyze the data in the same way as described in Chapter 5. In this section, we will summarise similarities and differences found in the data compared to the analysis done with the data from the Czech Republic.

Firstly, we had to transform our data into stationary time series. We used the same procedure as before. However, some discrepancies should be pointed out. As in the Czech Republic, the variable depicting the difference between real GDP growth in a given country and the EU15 passed only the PP test and failed the ADF test in Hungary and Germany. Slovakia, Poland and Austria passed both stationarity tests.

Another problem regarding stationarity was found in the differenced time series of unemployment in Hungary, Poland and Germany. In both cases, it failed the ADF test. However, as the PP test was passed in nearly every case[1], we decided to continue with the form of data as in the Czech Republic.

Secondly, we took a look at the fluctuations of the time series. In the case of Poland and Germany, we observed similar patterns to those in the Czech Republic during the Covid crisis. The real GDP growth experienced more minor shocks than the EU15 countries, causing an inverse shock in the

[1] In the case of Germany, the p-value of the PP test was 0.05447.

variable depicting the difference between them. The fluctuations in Hungary and Austria more copied those in the EU15, leading to the balance in the variable depicting their difference.

A similar increase in inflation in 2022, as in the Czech Republic, can be seen in Hungary and Poland. On the contrary, Austria and Germany stayed relatively close to the EU15 average inflation in 2022.

Slovakia experienced the most significant shocks in our group of countries in the examined period. As shown in Figure 6.1, fluctuations in real GDP growth during the Covid crisis could be compared to those in Poland or the Czech Republic. However, we can see only slightly less significant fluctuations around the period of the financial crisis in 2008 and in the years 1998 and 1999. The latter is probably a late result of the transformation experienced by Slovakia in the 1990s. More detailed reasons for these fluctuations can be found in the annual reports of the National Bank of Slovakia (1998). In the case of inflation, the situation is even worse. As can be seen in figure 6.2, before 2005, Slovakia experienced two shocks in inflation with a magnitude higher than the rise of 2022. We decided to continue with the original data as there would be too few observations in the reduced model that would consider only data from 2005 to 2020. Nonetheless, we have to keep this in mind while interpreting the results.

6.2 Results

The analysis from Chapter 5 was replicated. This section contains a summary of all significant results that were found across models. The details behind this summary, including the results of each model in each country, can be provided upon request.

As in the case of the Czech Republic, it should be noted that in most models, we could reject the nonexistence of autocorrelation in residuals. In the models with a low number of lags, we even faced heteroskedasticity. As already mentioned, this does not make the VAR estimates biased. However, the model is no longer BLUE, and the variance estimation is biased. For this reason, we mostly report results that were confirmed as significant in several cases. Otherwise, we always point to imperfections in the results obtained.

Figure 6.1: Fluctuations of the Real Economy in Slovakia

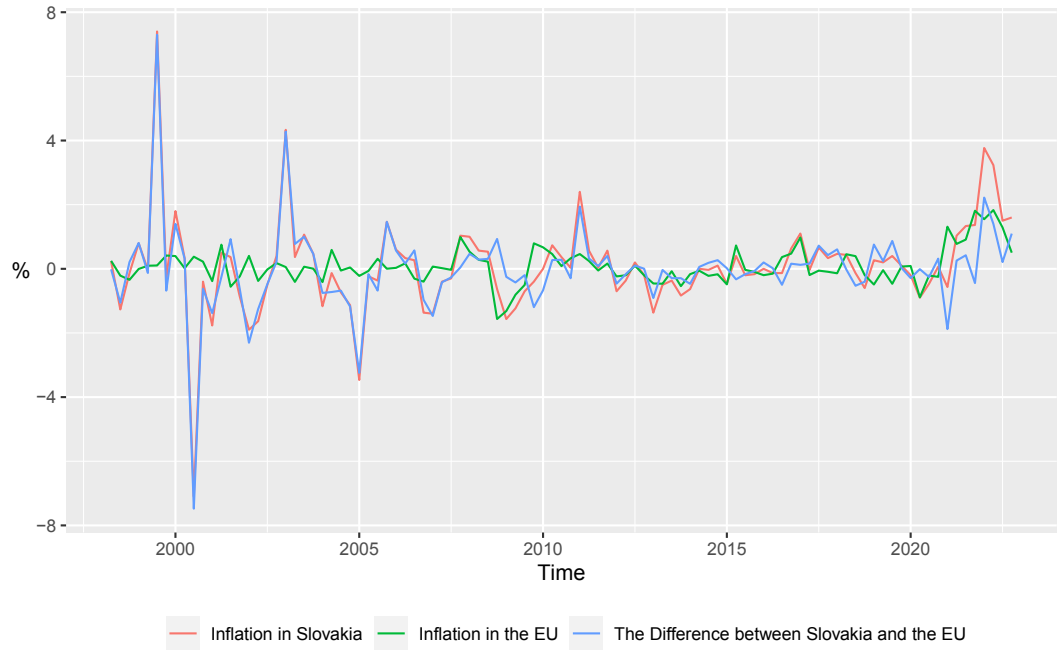
Source: Plotting our time series in R

6.2.1 Slovakia

In Slovakia, results profoundly depend on the number of lags chosen in the model. For example, in most models, nothing indicates a connection between the election cycle and unemployment. However, models incorporating seven lags show higher unemployment one quarter after elections (Table A.7). This result is somewhat surprising, as in the case of the Czech Republic, unemployment preferred fewer lags in the model to show significant results. It might be the case that this finding is only a result of overfitting in a model because all information criterion tests, except the AIC, advised using only one lag in the model.

The relationship between the election cycle and real GDP growth is similarly ambiguous. Several models indicate more significant growth one quarter after elections. However, supposing that a 90% confidence interval is not significant enough, we have to use precisely five lags in a model because only models with five lags show this result with a p-value under 0.05. Moreover, as shown in table 6.1, this particular model's adjusted R-squared equals only 0.09431. This potential increase in real GDP growth might be connected to more significant

Figure 6.2: Fluctuations of Inflation in Slovakia



Source: Plotting our time series in R

municipal expenditure found by Maličká (2019), which was, however, found during elections, not after them.

The interpretation of these results is not simple, as they are unstable across models. This could result from including problematic periods in the model mentioned in previous sections. On the other hand, unlike real GDP growth or inflation, the unemployment rate did not experience any abnormal fluctuations, and the reason for the need for seven lags in the model has to lie somewhere else. Moreover, information criterion tests were not much helpful either, as different tests simultaneously advised using a lags length of one or ten in a model.[2]

The last unmentioned significant relationship was found between inflation and the Change to the Right variable. The model indicates that inflation will rise more for one year when the government's ideology shifts to the right (Table A.8). However, we must consider that there were only two periods when the government shifted to the right in Slovakia - the governments of Mikuláš Dzurinda (1998) and Iveta Radičová (2010) and the former went to power

[2]The AIC usually advocated for more lags, and the rest implied fewer lags.

Table 6.1: Summary of the GDP equation in model SK11

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.09	0.12	-0.77	0.44	
Unemployment.l1	-0.33	0.49	-0.67	0.50	
Inflation.l1	-0.20	0.14	-1.42	0.16	
iRates.l1	1.41	0.58	2.41	0.02	*
Elections.l1	0.83	0.63	1.33	0.19	
GDP.l2	0.12	0.12	0.98	0.33	
Unemployment.l2	1.08	0.61	1.77	0.08	
Inflation.l2	-0.06	0.12	-0.53	0.60	
iRates.l2	-2.54	0.73	-3.47	0.00	***
Elections.l2	-0.61	0.66	-0.93	0.36	
GDP.l3	-0.07	0.11	-0.62	0.53	
Unemployment.l3	-1.46	0.63	-2.33	0.02	*
Inflation.l3	-0.01	0.11	-0.08	0.94	
iRates.l3	2.07	0.79	2.62	0.01	*
Elections.l3	1.38	0.65	2.14	0.04	*
GDP.l4	0.19	0.11	1.81	0.08	
Unemployment.l4	0.83	0.62	1.34	0.18	
Inflation.l4	0.05	0.11	0.42	0.68	
iRates.l4	-1.83	0.76	-2.42	0.02	*
Elections.l4	-0.15	0.63	-0.23	0.82	
GDP.l5	-0.04	0.10	-0.40	0.69	
Unemployment.l5	-0.62	0.44	-1.42	0.16	
Inflation.l5	-0.16	0.13	-1.18	0.24	
iRates.l5	0.79	0.63	1.27	0.21	
Elections.l5	0.00	0.63	0.00	1.00	
const	0.31	0.21	1.50	0.14	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.3378, Adjusted R-squared: 0.09431

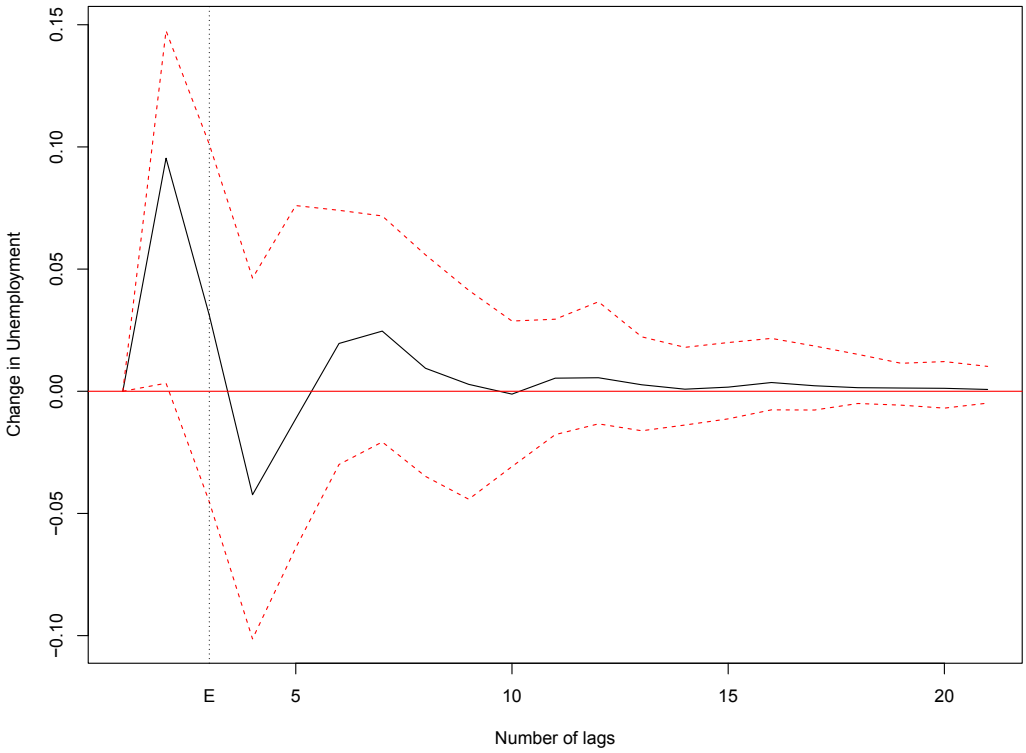
during the period of enormous fluctuations in inflation. Therefore, it would not be very wise to rely on this correlation.

6.2.2 Poland

In the case of Poland, we could not find any connections between the political cycle and real GDP growth or inflation. On the other hand, we found some significant results regarding unemployment. Across models, there is a significant increase in unemployment one quarter before elections (Table A.9). However, this result is contrary to the theory of political cycles, as the incumbents should be trying to decrease unemployment before elections. Moreover, a connection

between unemployment and the first quarter after elections was discovered. Even though it was not significant in any model[3], all constructed models indicated a decrease in unemployment after the elections (Table A.10). Therefore, we can see the quarter of the election as some sort of turning point, which is something we would expect from the political cycle. Nevertheless, we expected a turning point in the other direction where unemployment will decrease before elections and rise after them. These dynamics can be seen in the IRF depicted in figure 6.3.

Figure 6.3: Impulse Response Function (IRF) of Unemployment to Elections in Model PL10



Note: The graph presents the (IRF) of unemployment to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model PL10. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of unemployment over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

[3]Estimates in most of the models held p-value around 0.2. Only one of them could be declared as significant while settling with a 90% confidence interval.

Lastly, one significant result regarding the partisan political cycle in Poland was encountered. It implies a decrease in unemployment in the first year of the government's ideology shift to the right (Table A.11). The partisan political theory does not assume this result, as this is expected from the shift to the left. Parties on the right side of the political spectrum should be focused on lowering inflation, which according to the Phillips curve, should increase unemployment. The major problem with this expectation is probably the assumption of the Phillips curve, as our data imply only an ambiguous relationship between unemployment and inflation. The effect of unemployment on inflation was found, but we can see opposite signs in the estimates for unemployment variables with different lags. Moreover, the opposite effect of inflation on unemployment was not found.

As in the case of Slovakia, we have to consider that we have a very limited number of observations for this variable. Three different periods are depicted as a shift to the right in Poland.[4] However, despite the low number of observations, none of them were facing significant fluctuations in unemployment. Therefore, the result might be more reliable than in Slovakia but still questionable and hard to interpret.

In conclusion, out of the three examined economic indicators, only unemployment was found to be connected with the political cycle. The analysis indicates that unemployment rises before the elections and might decrease afterwards. We also found a decrease in unemployment when the government's ideology shifts to the right.

6.2.3 Hungary

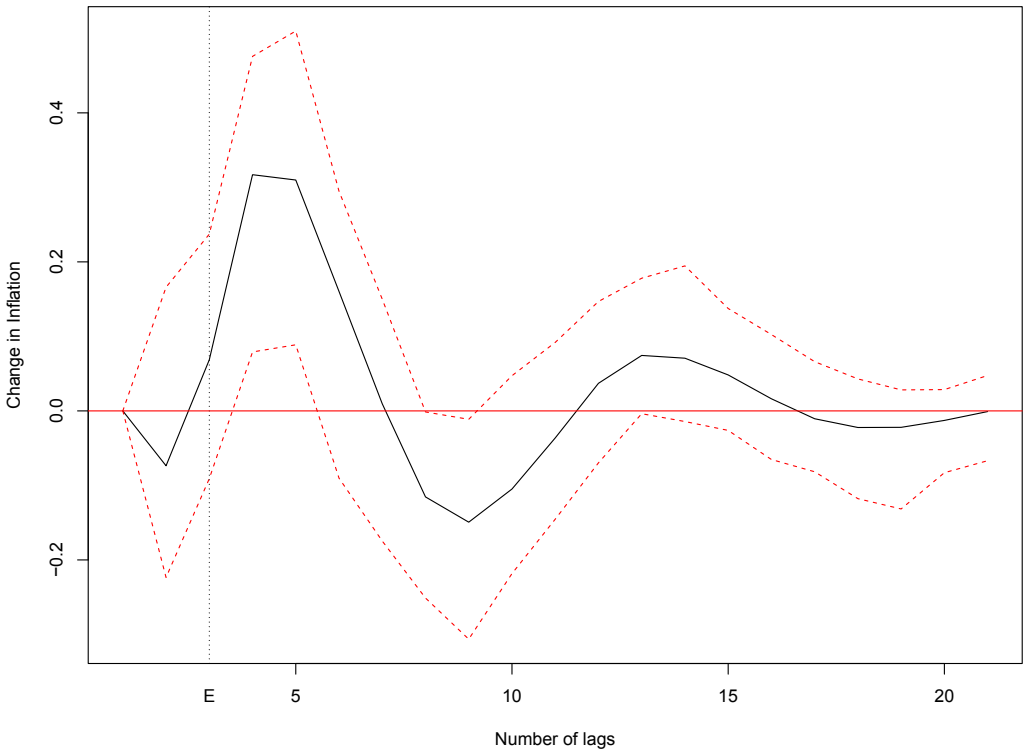
We did not find any evidence suggesting a connection between the election cycle and real GDP growth or unemployment in Hungary. On the other hand, we found a connection between the election cycle and inflation. Several models indicate that inflation tends to be higher in the quarter during elections or the quarter afterwards. However, the significance of these two periods is mutually excludable. While using models with more lags, the quarter during the elections is significant (Table A.13). While using models with fewer lags, the first quarter after elections is significant, at least at 90% significance (Table A.12). In both cases, inflation is higher during this period.

[4]The first year of governments of Jerzy Buzek (1997), Kazimierz Marcinkiewicz (2005) and Beata Szydło (2015)

There could be at least two explanations for this behaviour with opposite conclusions. The first is that including more lags revealed some long-term dynamics within our data that were missed before. Therefore, the models with fewer lags had biased estimates. On the other hand, the second explanation could be entirely opposite, that adding more lags led only to overfitting the model, which can also lead to a non-significant variable pretending to be significant. To decide which interpretation is more likely, we ran some information criterion tests. In this particular situation, all of them advised using only one lag. For this reason, we decided to stick with the result from models using fewer lags, which is higher inflation in the first quarter after the elections. This result is in line with the political business cycle theory.

A more useful representation of the dynamics between inflation and the election cycle can be described by the IRF. As can be seen from figure 6.4, the increase in inflation mentioned above is followed by a significant decrease.

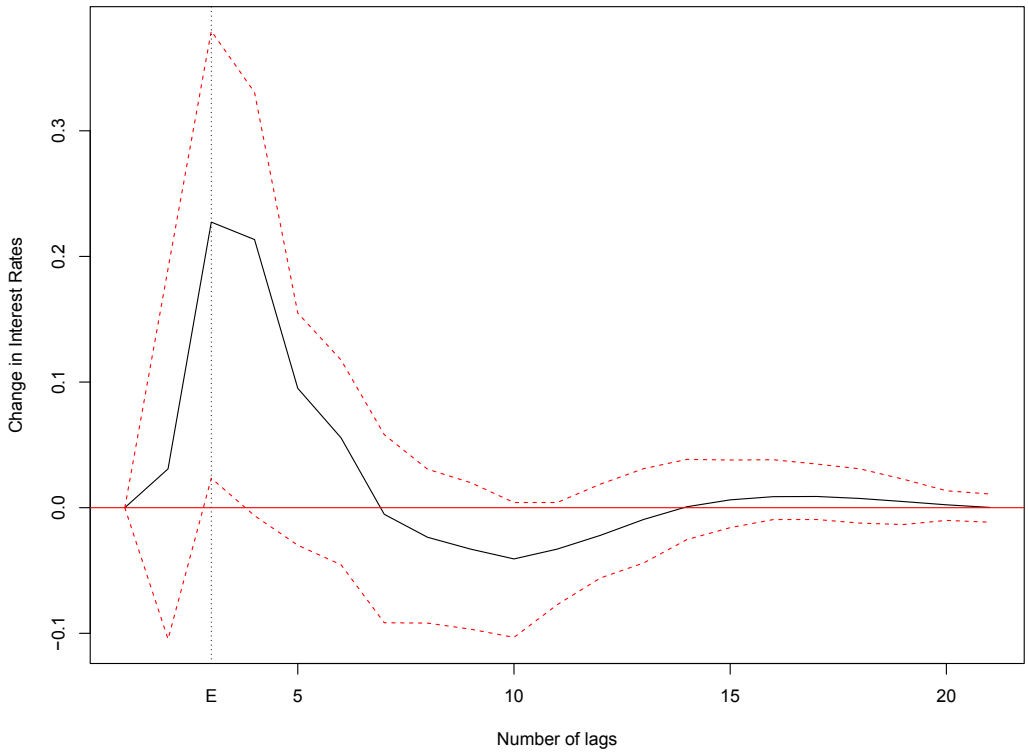
Figure 6.4: Impulse Response Function (IRF) of Inflation to Elections in Model HU10



Note: The graph presents the (IRF) of inflation (the difference between inflation in Hungary and the EU15) to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model HU10. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of inflation over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

Even though we were not searching for this relationship, as a by-product, we found that interest rates tend to be higher in the quarter of elections (Table A.14). The dynamic of this relationship is depicted in Figure 6.5. This could be interpreted as the central bank predicting the rise of inflation after elections increase interest rates.

Figure 6.5: Impulse Response Function (IRF) of Interest Rates to Elections in Model HU8



Note: The graph presents the (IRF) of interest rates to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model HU8. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of interest rates over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

While searching for the partisan political cycle, we found two results that support this theory in Hungary. Firstly, inflation tends to be higher before elections when a left-wing party is in power (Table A.15).[5] This is in line with the theory which assumes that left-wing parties find more important to lower unemployment than inflation. Secondly, we found lower real GDP growth during the first year of the ideology shift in government to the right (Table A.16). This might be due to the consolidation of public spending, which is important

[5]In the case of Hungary, those are governments of Gyula Horn (1994), Péter Medgyessy (2002), Ferenc Gyurcsány (2004, 2006) and Gordon Bajnai (2009)

for decreasing inflation - the assumed primary goal of right-wing parties.[6]

On the other hand, the analysis also implies an increase in unemployment rate while a left-wing party is in power (Table A.17). This result contradicts the interpretation from above. However, the most likely reason for this is that unemployment continuously decreased from 2013 to 2020, with a right-wing party in power for the whole period.[7] Therefore, this result does not necessarily reject the partisan political cycle in Hungary.

A similar interpretation can be applied to the last significant result found in Hungary. The analysis indicates that unemployment tends to be lower when the government has a substantial majority in the National Assembly of Hungary (Table A.18). Victor Orbán and his governments have had a substantial majority in all cases. Therefore, we can apply the same reasoning as in the previous paragraph and conclude that this result is probably a spurious regression.

In conclusion, we found an increase in inflation in the quarter following the elections, which is in line with the opportunistic political cycles theory. We also found an increase in interest rates during the quarter of elections. This might be due to the anticipated increase in inflation by the central bank. Our analysis also indicates the existence of the partisan political cycle in Hungary as we found that inflation tends to be higher before elections when a left-wing government is in power, and real GDP growth tends to be lower in the first year after the government's ideology shifts to the right. The former implies that left-wing governments do not focus much on decreasing inflation. The latter indicates a stronger consolidation of public spending when a right-wing party is in power. It should be noted that these statements are only interpretations which can be confirmed by subsequent research.

6.2.4 Germany

Firstly, a decrease in real GDP growth, an increase in unemployment and a decrease in interest rates were found in the quarters before the elections (shown in figures 6.6, 6.7 and tables A.19, A.20 and A.21). The first two results contradict the opportunistic political cycle theory, which assumes the opposite result as incumbents try to increase the real GDP growth and decrease unemploy-

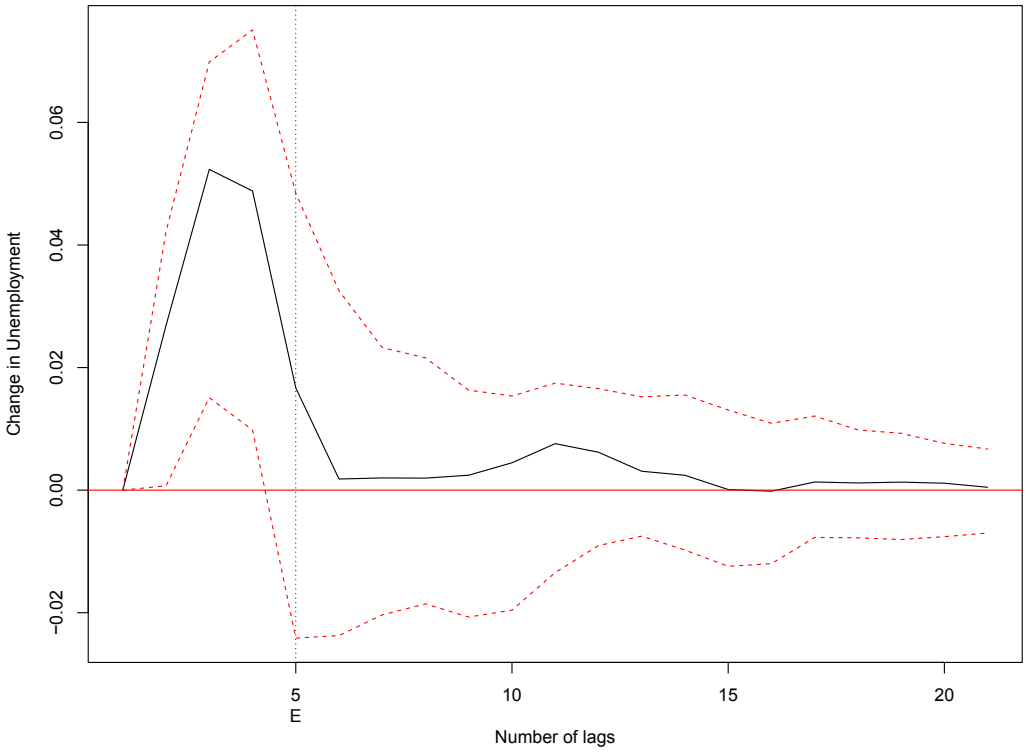
[6]However, it should be noted that the Adjusted R-squared was very low, indicating that the model does not explain a significant amount of the variability in real GDP growth.

[7]We should also consider an ambiguous division of Hungarian political parties on a left-right scale basis. In our examined period, right-wing governments in Hungary are primarily represented by one man - Viktor Orbán, who is hardly a representative of a traditional right-wing party and has been continuously in power since 2010.

ment before the elections. The third result of decreased interest rates before elections could be interpreted as a supporting argument for a political cycle. However, we assume that the ECB is entirely independent of the government of Germany and could not be directly affected by its election cycle.

Secondly, we found that inflation tends to decrease two quarters after elections are held (Table A.22).[8] This could be interpreted through the theory of opportunistic political cycles by consolidating public spending after elections.

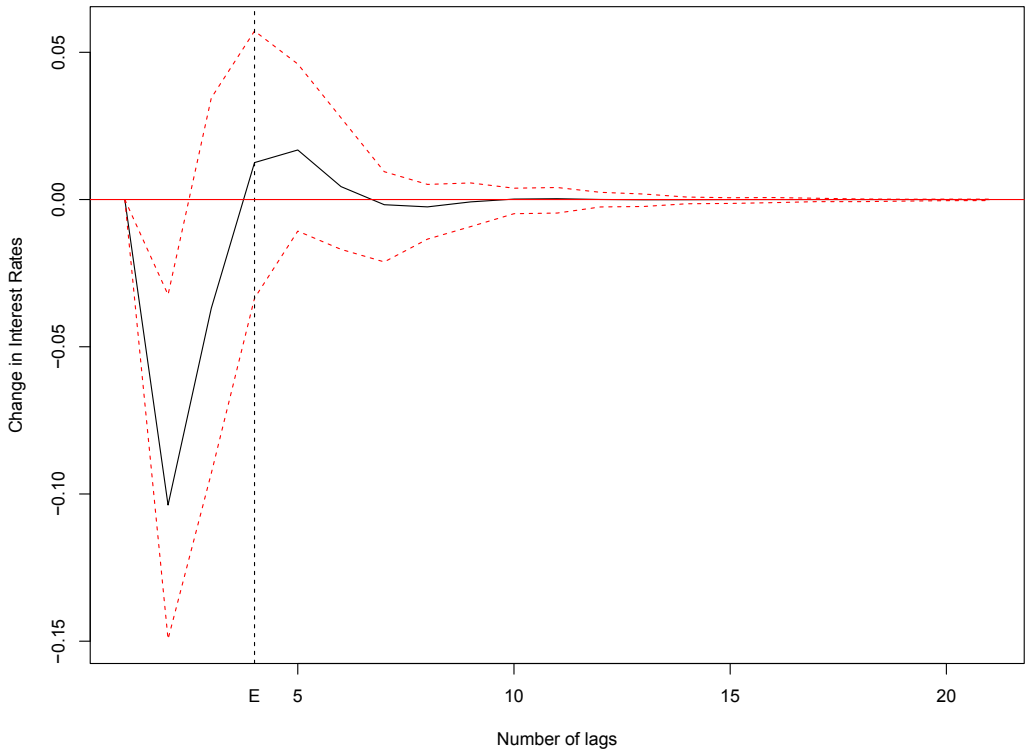
Figure 6.6: Impulse Response Function (IRF) of Unemployment to Elections in Model DE14b



Note: The graph presents the (IRF) of unemployment to a one-unit shock in the variable el4b (i.e. four quarters before the election), as estimated from the VAR model DE14b. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 5 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of unemployment over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

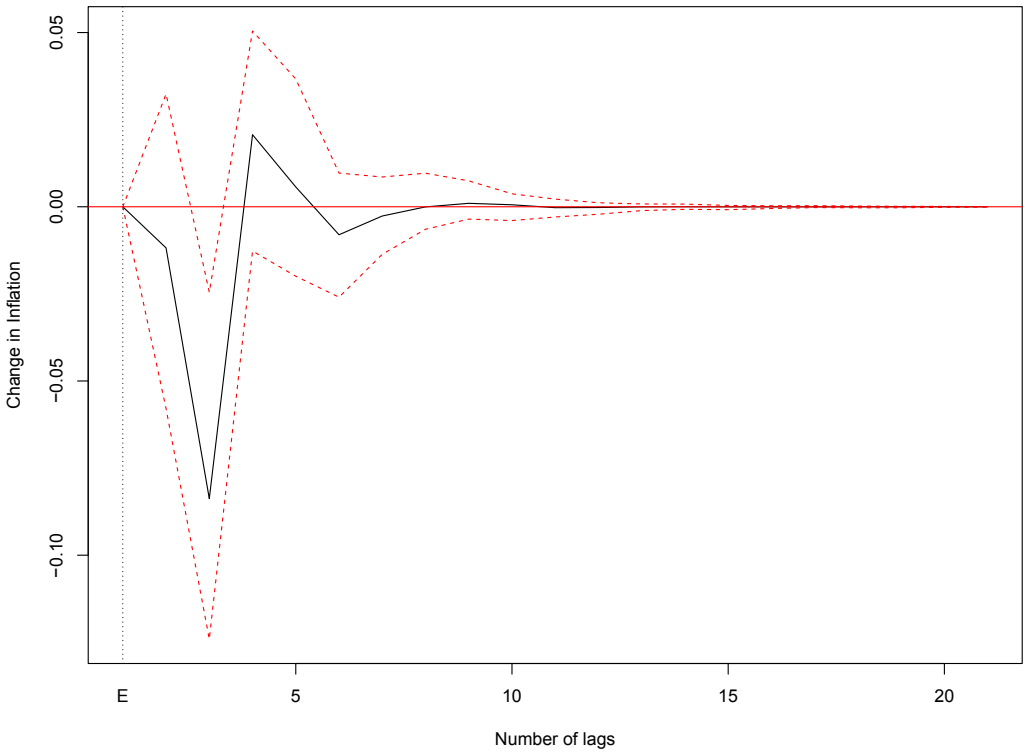
[8]However, the Adjusted R-squared was very low, indicating that the model does not explain a significant amount of the variability in inflation.

Figure 6.7: Impulse Response Function (IRF) of Interest Rates to Elections in Model DE14c



Note: The graph presents the (IRF) of interest rates to a one-unit shock in the variable el3b (i.e. three quarters before the election), as estimated from the VAR model DE14c. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 4 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of interest rates over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

Figure 6.8: Impulse Response Function (IRF) of Inflation to Elections in Model DE14a



Note: The graph presents the (IRF) of inflation (the difference between inflation in Germany and the EU15 without Germany) to a one-unit shock in the variable el0 (i.e. the quarter of election), as estimated from the VAR model DE14a. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 1 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of inflation over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

While searching for the partisan political cycle in Germany, we found out that real GDP growth tends to be lower when the left-wing party is in power (Table A.23) This contrasts with the theory which expects left-wing governments to increase real GDP growth more than right-wing governments. However, we did not find any evidence that a change in the ideology of a government could have any impact on real GDP growth. Moreover, most of the major crises, including the Dotcom Bubble, the Global Financial Crisis and the COVID-19 Pandemic, were experienced by the EU at times when left-wing parties were in power.[9] Therefore, it might only be due to the luck of the right-wing parties

[9]from 1998 to 2009, the coalition of SPD and Grünen, from 2018 to 2021, the "Grand" coalition of CDU/CSU and SPD with Olaf Sholz from SPD as Federal Minister of Finance

which ruled in better times.

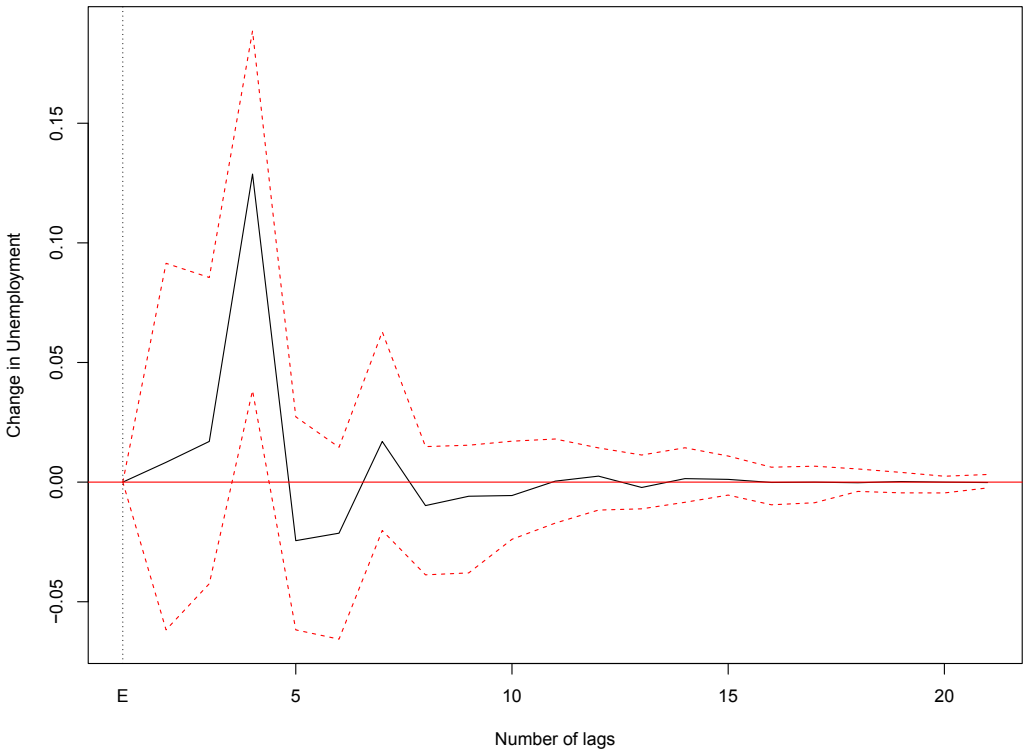
In conclusion, our findings contradict the opportunistic political cycle theory as the behaviour of real GDP growth and unemployment before elections is significant but in the opposite direction than expected. Only post-election observations, implying a decline in inflation, align with the political cycle. Likewise, no significant evidence was found to support the existence of the partisan political cycle.

6.2.5 Austria

The same analysis was undertaken in Austria as well. However, we can report only one finding. Otherwise, nothing could be declared as a significant result.

We found that unemployment tends to increase after elections, as shown in Figure 6.9 and Table A.24. This aligns with the opportunistic political cycle, as after the elections, there may be a consolidation of public finance, leading to the closure of redundant jobs and a potential increase in unemployment.

Figure 6.9: Impulse Response Function (IRF) of Unemployment to Elections in Model AT14



Note: The graph presents the (IRF) of unemployment to a one-unit shock in the variable el0 (i.e. the quarter of election), as estimated from the VAR model AT14. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 1 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of unemployment over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

Chapter 7

Conclusion

In this thesis, we developed and assessed thirty-nine VAR models to uncover any potential connection between macroeconomic indicators (real GDP growth, unemployment and inflation) and the political cycle within the Czech Republic. We subsequently applied this analysis to data from Slovakia, Poland, Hungary, Germany and Austria, spanning the period from 1998 to 2022. By evaluating these models, we are able to conclude whether patterns of the Political Business Cycle (PBC) are observable in Central Europe, and if so, which of the two dominant streams of the PBC theory prevail - the "opportunistic" political cycle as introduced by Nordhaus (1975), or the "partisan" political cycle as pioneered by Hibbs (1977).

The first important conclusion we can draw is that no particular finding of this thesis is uniformly applicable across all countries investigated. A singular significant result, ironically at odds with the PBC theory, which was found to be shared between two countries, was an increase in unemployment before elections in Poland and Germany. On the contrary, we obtained two significant findings contradicting each other in different countries. Firstly, a decrease in real GDP growth in the quarter after elections was found in the Czech Republic, whereas in Slovakia, real GDP growth tends to increase in the same period. Secondly, inflation tends to be higher after elections in Hungary, whereas in Germany, it tends to be lower. These results imply that there does not exist any consistent significant relationship between the political cycle and macroeconomic indicators across countries in Central Europe.

Nevertheless, this does not imply a complete lack of association between the political cycle and macroeconomic indicators. Although this relationship varies between countries and occasionally contradicts the presupposed theory, certain

connections were observed. In the Czech Republic, we came across three significant findings. Firstly, although we did not find a significant increase in real GDP growth as Štiková (2008), lower real GDP growth can be seen in the quarter after the elections. This implies some consolidation in public finance after elections. Secondly, lower unemployment during elections was observed. Even though Štiková (2008) observed this before elections, instead of during them, it results in a similar conclusion suggesting the existence of the PBC in the Czech Republic. Thirdly, we found a significant decrease in inflation one quarter before the elections. As an increase in inflation is expected after elections, this result neither supports nor contradicts the PBC theory. It can, however, be interpreted as Czech politicians might propose policies decreasing inflation before elections knowing that Czech citizens are more reluctant towards it.

We observed that models with fewer lags are better at identifying the relationship between the election cycle and unemployment, whereas models with more lags excel in finding connections between the election cycle and inflation, likely due to the different response times of these variables to economic shocks.

In Slovakia, we found only one reliable result. Unlike in the Czech Republic, an increase in real GDP growth was found after the elections contradicting the assumption of consolidation after elections. Models with more lags also observed an increase in unemployment one quarter after the elections. Even though the finding is in line with the theory, it is not consistent across most of our models. We also found some unreliable evidence about the existence of the reversed "partisan" political cycle, with the right-wing party increasing inflation in the first year in office.

In Poland, we found no evidence of the "opportunistic" political cycle as described by Nordhaus (1975). Moreover, we found that unemployment tends to increase one quarter before the elections. This result might be connected to the findings of Doležalová (2011) about the increase of the structural balance in the year before elections in Poland. In addition, although it was insignificant, the results suggested a decrease in unemployment after the election. These results form a political cycle which is, however, reversed. This result might be subjected to future research. The results also infer the existence of the "reversed partisan" cycle, as a decrease in unemployment was observed during the first year of the government's ideology shift to the right.

In Hungary, our analysis indicates increasing inflation during the quarter following the elections. This result aligns with the political cycle theory and could be associated with the fiscal expansions found by Lami & Imami (2013).

In the election quarter, the results suggest an increase in interest rates, which could issue from the central bank anticipating the increase in inflation. In addition, the results suggest increased inflation before elections when a left-wing government is in power and a decreased real GDP growth in the first year after the government's ideology shift to the right. Both results align with the "partisan" political cycle theory.

In Germany, the changes in real GDP growth and unemployment before elections are significant but in the opposite direction than expected by the PBC theory. Only post-election observations, implying a decline in inflation two quarters after the elections, align with the political cycle. In addition, no evidence supported the existence of the partisan political cycle in Germany, which corresponds to Berger & Woitek (1997), who challenged the findings of Alesina (1987).

In Austria, only one founding can be taken as significant, which is an increase in unemployment after elections. This aligns with the opportunistic political cycle. On the other hand, nothing indicates that an ideology impacts macroeconomic indicators in Austria. That corresponds to the findings of Neck & Getzner (2001).

In conclusion, the analysis in some form supports the existence of the PBC, as stated by Nordhaus (1975), in the Czech Republic, Hungary, and Austria, while no evidence can be found for the "opportunistic" political cycle (or the results are even entirely opposite) in Slovakia, Poland, and Germany. Additionally, some form of the "partisan" political cycle, as stated by Hibbs (1977), is evident in Hungary, whereas no evidence of it was found in the Czech Republic, Germany, or Austria. Notably, in Poland, we found significant results with opposite signs than expected. Moreover, in all examined countries, there is no evidence of the relationship between macroeconomic indicators and the magnitude of the government's majority in the parliament or a connection between indicators and the level of fragmentation of the governing coalition. By providing insights into the complexities of the PBC theory's applicability in this region, this research may serve as a baseline for future investigations into the interplay between political actions and economic outcomes. The thesis contributes significantly to the field of political economy by highlighting the importance of considering political forces when studying macroeconomic fluctuations and offering valuable guidance for policymakers and researchers seeking a deeper understanding of the factors influencing economic trends in Central Europe.

Bibliography

Alesina, A. (1987): "Macroeconomic Policy in a Two-Party System as a Repeated Game." *The Quarterly Journal of Economics* **102**.

Alesina, A. (1988): "Macroeconomics and Politics." *NBER Macroeconomics Annual* **3**.

Alesina, A. & N. Roubini (1992): "Political Cycles in OECD Economies." *Review of Economic Studies* **59**.

Berger, H. & U. Woitek (1997): "Searching for Political Business Cycles in Germany." *Public Choice* **91**.

Brechler, J. & A. Geršl (2014): "Political Legislation Cycle in the Czech Republic." *Constitutional Political Economy* **25**.

Czech National Bank (2023): "Jak se vyvíjela dvoutýdenní repo sazba ČNB?"

Deutsche Bundesbank (2023): "Central Bank interest rates."

Doležalová, J. (2011): "The Political-Budget Cycle in Countries of the European Union." *Review of Economic Perspectives* **11(1)**: pp. 12–36.

Drazen, A. (2000): "The Political Business Cycle After 25 Years." *NBER Macroeconomics Annual* **15**.

European Central Bank (2023): "Key ECB interest rates."

Eurostat (2023a): "Employment and population - international data cooperation quarterly data."

Eurostat (2023b): "GDP and main components (output, expenditure and income)."

Eurostat (2023c): "HICP - monthly data (index)."

Eurostat (2023d): "Unemployment by sex and age - monthly data."

Filipiak, B. Z. & K. Kluza (2022): "Political Business Cycle in Local Governments in Transition and Developing Economies. Literature Review and Empirical Study for Poland." *Lex Localis* **20**: pp. 1057–1582.

Gałązka, M. (2021): "The political business cycle in municipalities in Poland."

Hallerberg, M., L. V. de Souza, & W. R. Clark (2002): "Political Business Cycles in EU Accession Countries." *European Union Politics* **3**.

Heckelman, J. C. & H. Berument (1998): "Political Business Cycles and Endogenous Elections." *Southern Economic Journal* **64**: pp. 987–1000.

Hibbs, D. A. (1977): "Political Parties and Macroeconomic Policy." **71**: pp. 1467–1487.

Hotelling, H. (1929): "Stability in Competition." *The Economic Journal* **Vol. 39, No. 153**: pp. 41–57.

Hungarian National Bank (2023): "Base rate history."

Kukovič, S. & P. Just (2022): *The Rise of Populism in Central and Eastern Europe*. Edward Elgar Publishing.

Lami, E. & D. Imami (2013): "Searching for political fiscal cycles in Hungary." *Contemporary Economics* **7**.

Lees, C. (2012): "The paradoxical effects of decline: Assessing party system change and the role of the catch-all parties in Germany following the 2009 federal election." *Party Politics* **18**: pp. 545–562.

Lindbeck, A. (1976): "Stabilization Policy in Open Economies with Endogenous Politicians." *The American Economic Review* **66**: pp. 1–19.

Lütkepohl, H. & M. Krätzig (2004): *Applied Time Series Econometrics*. Cambridge University Press.

Maličká, L. (2019): "Political Expenditure Cycle at the Municipal Government Level in Slovakia." *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis* **67**.

Malkowska, A., M. Głuszak, B. Marona, & A. Telega (2020): "The impact of the electoral cycle on area-based property tax in poland." *Eastern European Economics* **58**: pp. 517–535.

Maux, B. L., Y. Rocaboy, & T. Goodspeed (2011): "Political fragmentation, party ideology and public expenditures." *Public Choice* **147**: pp. 43–67.

Narodowy Bank Polski (2023): "Interest rates."

National Bank of Slovakia (1998): "Annual report 1998." .

National Bank of Slovakia (2023): "Basic interest rate of the NBS."

Neck, R. & M. Getzner (2001): "Politico-Economic Determinants of Public Debt Growth: A Case Study for Austria." *Public Choice* **109**.

Nordhaus, W. D. (1975): "The Political Business Cycle." **42**: pp. 169–190.

Nordhaus, W. D., A. Alesina, & C. L. Schultze (1989): "Alternative Approaches to the Political Business Cycle." *Brookings Papers on Economic Activity* **1989**.

Oesterreichische Nationalbank (2023): "Base and reference rates of the Oesterreichische Nationalbank."

Phillips, A. W. (1958): "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957." *Economica* **25**.

Plaček, M., M. Půček, F. Ochrana, M. Křápek, & L. Matějová (2016): "Political business cycle in the Czech Republic: Case of municipalities." *Prague Economic Papers* **25**.

Pulatov, A. & A. H. Ahmad (2021): "Political Business Cycles in Post-Communist European Countries." *Politics and Policy* .

Redžepagić, S. & M. Llorca (2007): "Does Politics Matter in the Conduct of Fiscal Policy? Political Determinants of the Fiscal Sustainability: Evidence from Seven Individual Central and Eastern European Countries (CEEC)."

Rogoff, K. (1990): "Equilibrium Political Budget." *American Economic Review* **80**: pp. 21–36.

Sedmihradská, L., R. Kubík, & J. Haas (2011): "Political Business Cycle in Czech Municipalities." *Prague Economic Papers* .

Swianiewicz, P. & A. Kurniewicz (2018): "The Political Cycle in Tariffs on Local Public Services in Poland." *Studia Regionalne i Lokalne* **72**.

Wyszkowski, A. & Łukasz Zegarowicz (2018): "Assesment of the Political Budget Cycle in Poland." *PRACE NAUKOWE UNIWERSYTETU EKONOMICZNEGO WE WROCŁAWIU* .

Štiková, R. (2008): "Models of Political Cycles: The Czech Experience." *Prague Economic Papers* .

Appendix A

Models

A.1 Model CZ5

Table A.1: Summary of the Inflation equation in the model CZ5

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.13	0.12	1.09	0.28	
Unemployment.l1	0.11	0.36	0.29	0.77	
Inflation.l1	0.15	0.12	1.21	0.23	
iRates.l1	0.73	0.26	2.80	0.01	**
GDP.l2	0.18	0.11	1.63	0.11	
Unemployment.l2	-0.14	0.40	-0.36	0.72	
Inflation.l2	0.01	0.12	0.05	0.96	
iRates.l2	0.01	0.33	0.02	0.98	
GDP.l3	-0.11	0.11	-1.01	0.32	
Unemployment.l3	-0.18	0.36	-0.51	0.61	
Inflation.l3	-0.23	0.12	-1.86	0.07	
iRates.l3	-0.25	0.27	-0.92	0.36	
const	-0.02	0.11	-0.14	0.89	
Election	-0.11	0.23	-0.47	0.64	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.3626, Adjusted R-squared: 0.2615

Table A.2: Summary of the Unemployment equation in the model CZ5

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.03	0.04	-0.67	0.51	
Unemployment.l1	0.46	0.12	3.92	0.00	***
Inflation.l1	0.03	0.04	0.86	0.39	
iRates.l1	-0.10	0.08	-1.22	0.22	
GDP.l2	-0.04	0.04	-1.08	0.28	
Unemployment.l2	0.08	0.13	0.65	0.52	
Inflation.l2	-0.08	0.04	-2.01	0.05	*
iRates.l2	0.05	0.11	0.46	0.65	
GDP.l3	0.03	0.03	0.72	0.47	
Unemployment.l3	-0.01	0.12	-0.06	0.95	
Inflation.l3	0.01	0.04	0.21	0.83	
iRates.l3	0.07	0.09	0.79	0.43	
const	0.00	0.04	0.13	0.90	
Election	-0.10	0.08	-1.36	0.18	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.4474, Adjusted R-squared: 0.3598

A.2 Model CZ8

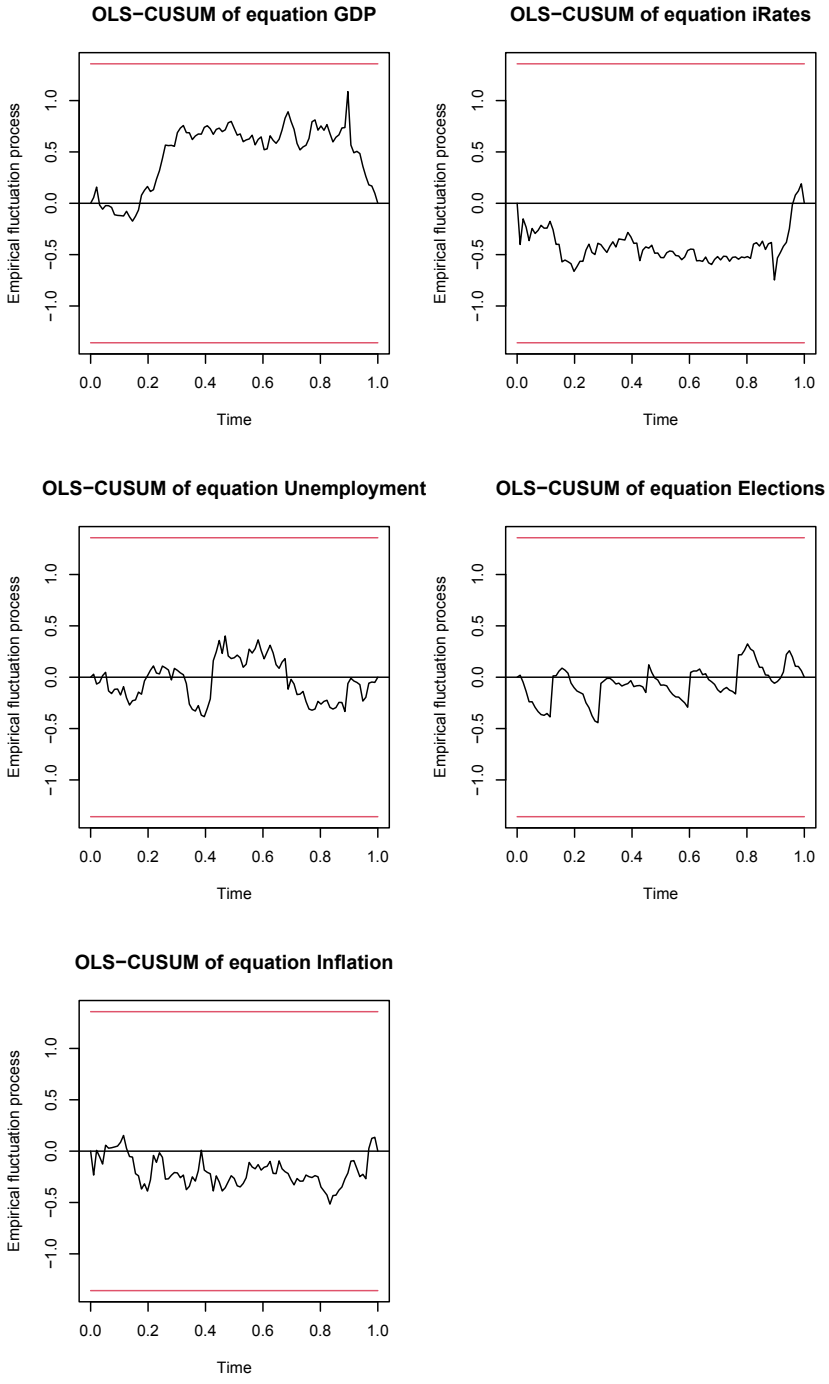
Table A.3: Summary of the Inflation equation in the model CZ8

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.12	0.12	1.04	0.30	
Unemployment.l1	0.14	0.37	0.37	0.71	
Inflation.l1	0.15	0.12	1.21	0.23	
iRates.l1	0.71	0.26	2.68	0.01	**
Elections.l1	-0.32	0.36	-0.88	0.38	
GDP.l2	0.19	0.11	1.73	0.09	
Unemployment.l2	-0.13	0.40	-0.33	0.74	
Inflation.l2	-0.00	0.12	-0.01	0.99	
iRates.l2	0.06	0.34	0.19	0.85	
Elections.l2	-0.13	0.37	-0.35	0.73	
GDP.l3	-0.10	0.11	-0.94	0.35	
Unemployment.l3	-0.16	0.37	-0.42	0.67	
Inflation.l3	-0.22	0.12	-1.73	0.09	
iRates.l3	-0.29	0.28	-1.04	0.30	
Elections.l3	0.13	0.37	0.36	0.72	
const	-0.02	0.11	-0.17	0.87	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

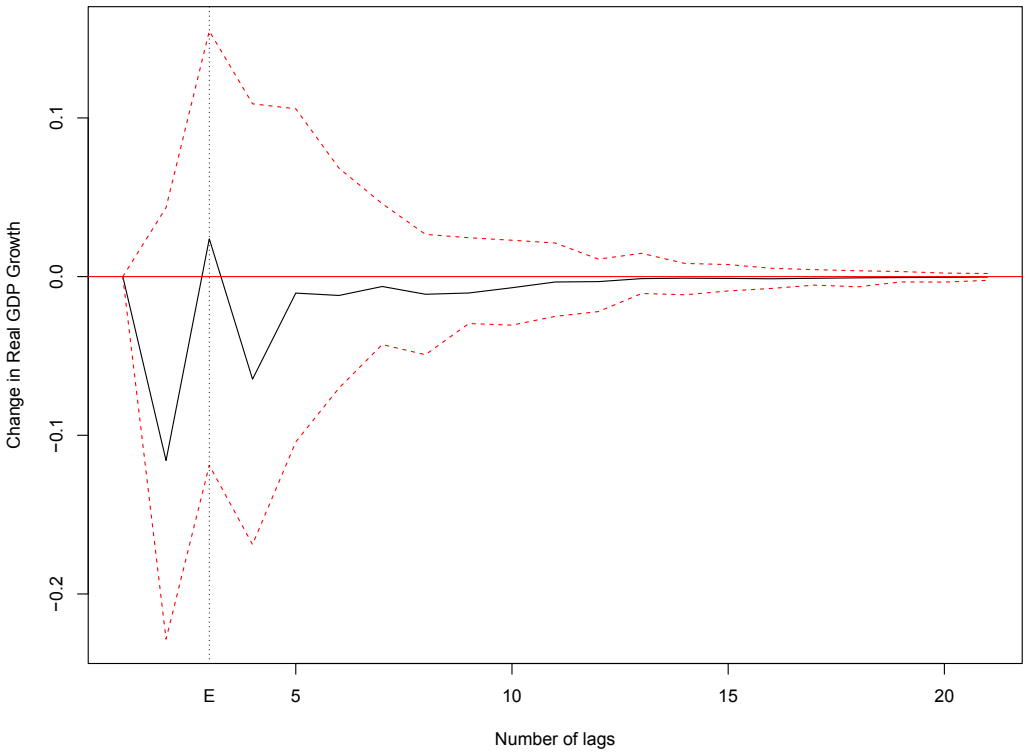
R-Squared: 0.3694, Adjusted R-squared: 0.2512

Figure A.1: Model CZ8: the CUSUM test



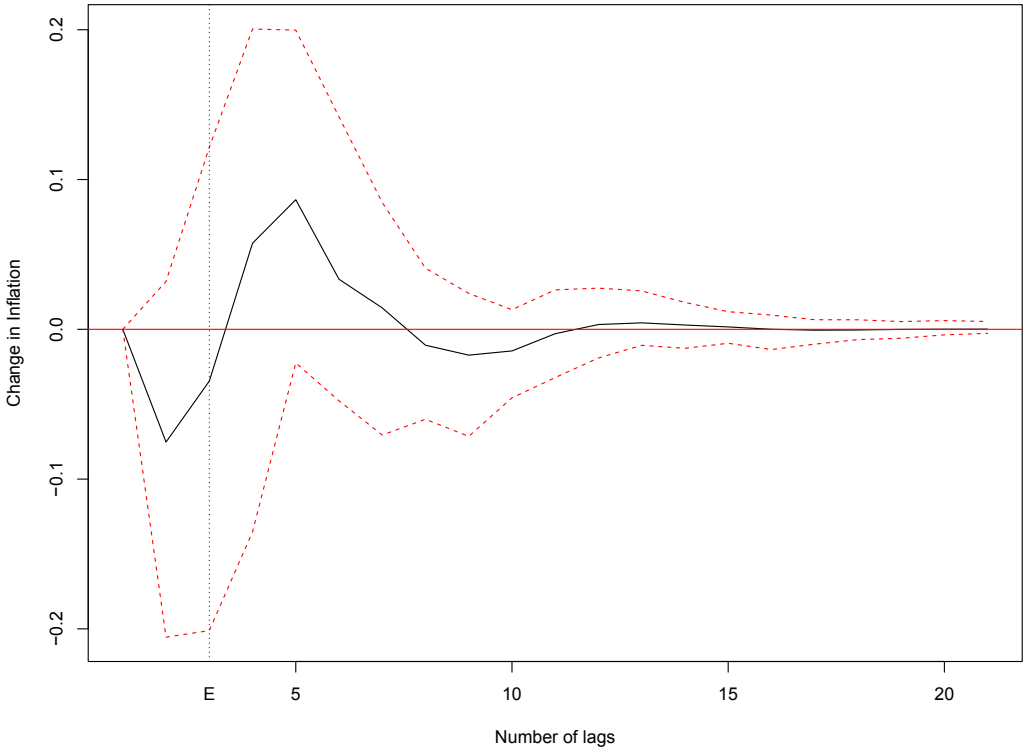
Note: CUSUM Test for parameter stability in the VAR Model CZ8. This figure plots the cumulative sum of residuals from the VAR model over time, with the red lines representing the 5% significance level for the parameter stability test. The graph was generated using the 'stability' function from the 'vars' package in R.

Figure A.2: Impulse Response Function (IRF) of Real GDP Growth to Elections in Model CZ8



Note: The graph presents the (IRF) of real GDP growth (the difference between real GDP growth in the Czech Republic and the EU15) to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model CZ8. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of real GDP growth over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

Figure A.3: Impulse Response Function (IRF) of Inflation to Elections in Model CZ8



Note: The graph presents the (IRF) of inflation (the difference between inflation in the Czech Republic and the EU15) to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model CZ8. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of inflation over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

A.3 Model CZ13

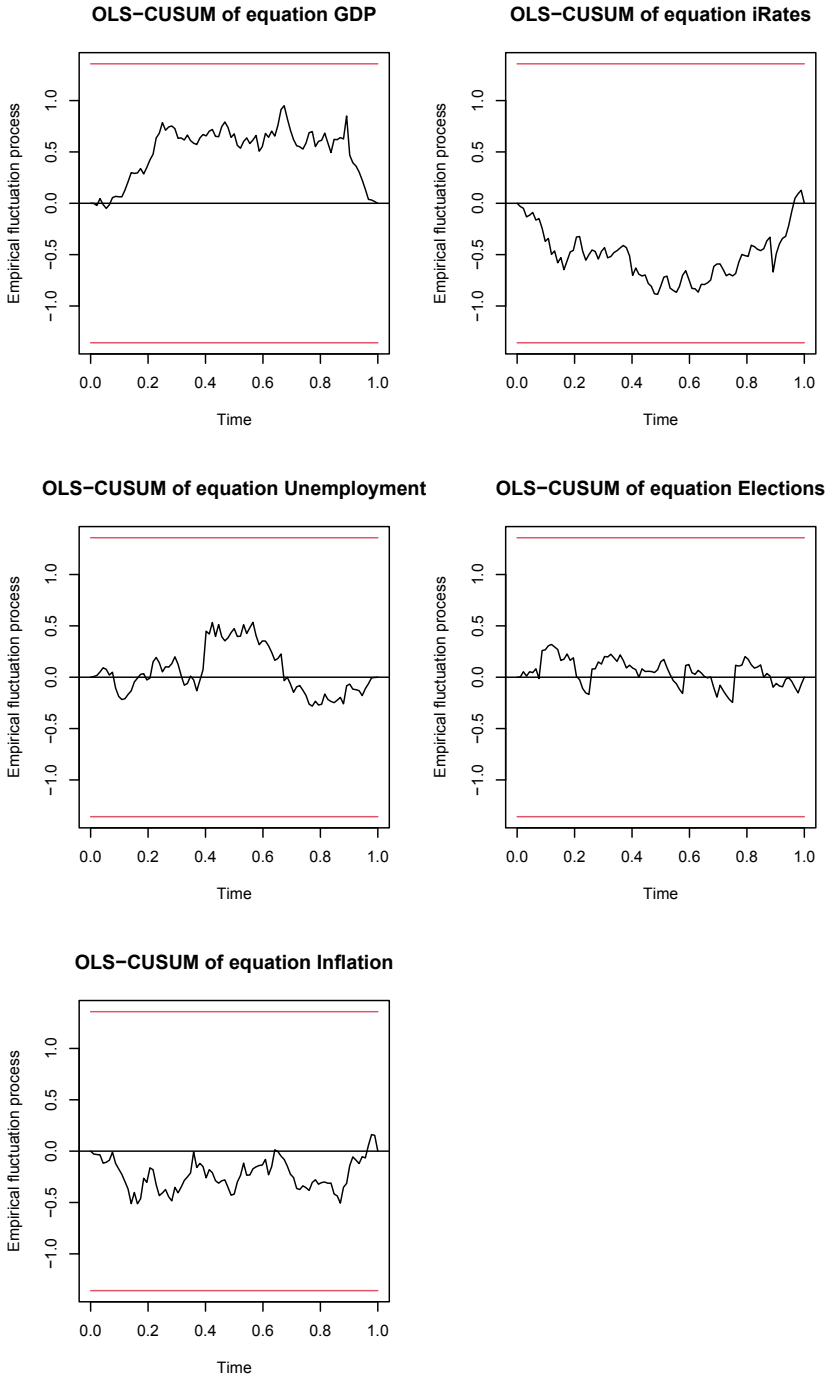
Table A.4: Summary of the Unemployment equation in the model CZ13

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.03	0.05	-0.65	0.52	
Unemployment.l1	0.44	0.14	3.13	0.00	**
Inflation.l1	0.10	0.06	1.75	0.09	
iRates.l1	-0.26	0.14	-1.83	0.07	
Elections.l1	-0.05	0.14	-0.38	0.71	
GDP.l2	-0.04	0.05	-0.82	0.42	
Unemployment.l2	0.10	0.15	0.64	0.53	
Inflation.l2	-0.08	0.05	-1.44	0.16	
iRates.l2	0.10	0.21	0.46	0.64	
Elections.l2	-0.18	0.15	-1.24	0.22	
GDP.l3	0.04	0.05	0.86	0.39	
Unemployment.l3	0.05	0.14	0.35	0.73	
Inflation.l3	0.00	0.05	0.02	0.98	
iRates.l3	0.05	0.23	0.21	0.83	
Elections.l3	0.03	0.14	0.18	0.86	
GDP.l4	0.04	0.05	0.82	0.42	
Unemployment.l4	0.17	0.15	1.15	0.26	
Inflation.l4	-0.07	0.05	-1.23	0.23	
iRates.l4	0.08	0.17	0.44	0.66	
Elections.l4	0.08	0.15	0.54	0.59	
GDP.l5	-0.05	0.05	-1.04	0.30	
Unemployment.l5	-0.23	0.15	-1.48	0.15	
Inflation.l5	0.10	0.06	1.70	0.09	
iRates.l5	-0.08	0.17	-0.45	0.65	
Elections.l5	-0.08	0.14	-0.60	0.55	
GDP.l6	-0.08	0.04	-1.92	0.06	
Unemployment.l6	-0.01	0.15	-0.08	0.94	
Inflation.l6	-0.03	0.06	-0.41	0.68	
iRates.l6	0.18	0.15	1.18	0.24	
Elections.l6	0.11	0.14	0.82	0.42	
GDP.l7	-0.02	0.04	-0.41	0.68	
Unemployment.l7	-0.05	0.13	-0.40	0.69	
Inflation.l7	0.03	0.07	0.39	0.70	
iRates.l7	-0.14	0.12	-1.13	0.26	
Elections.l7	-0.05	0.14	-0.35	0.73	
const	0.03	0.06	0.43	0.67	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

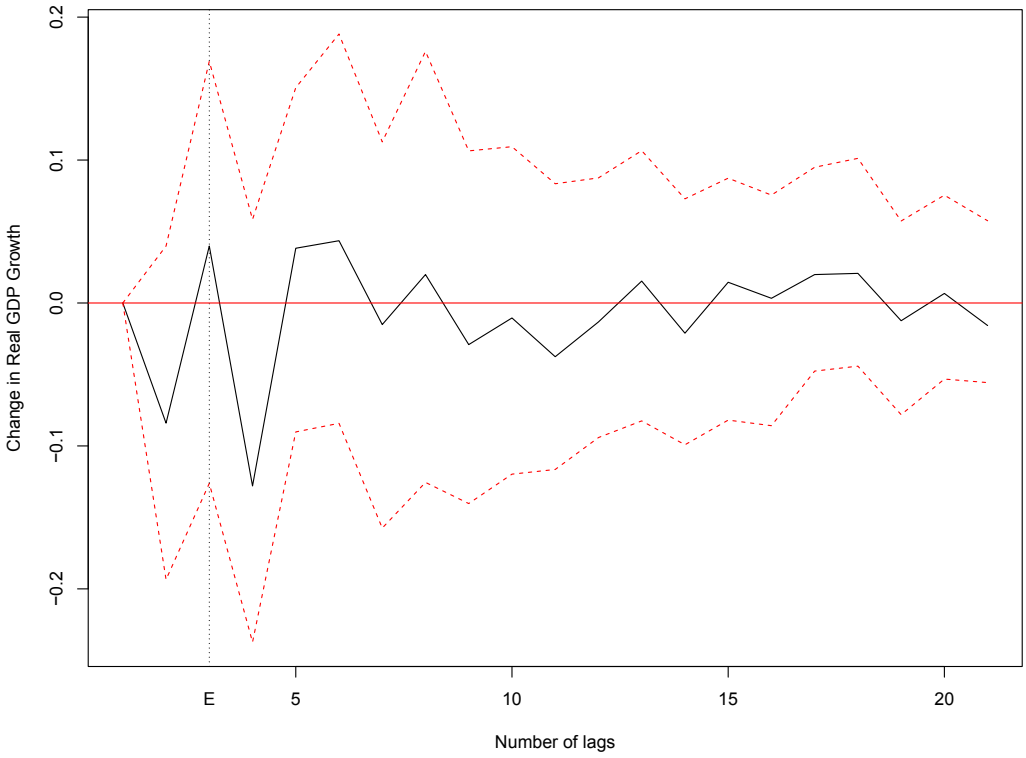
R-Squared: 0.5799, Adjusted R-squared: 0.3173

Figure A.4: Model CZ13: the CUSUM test



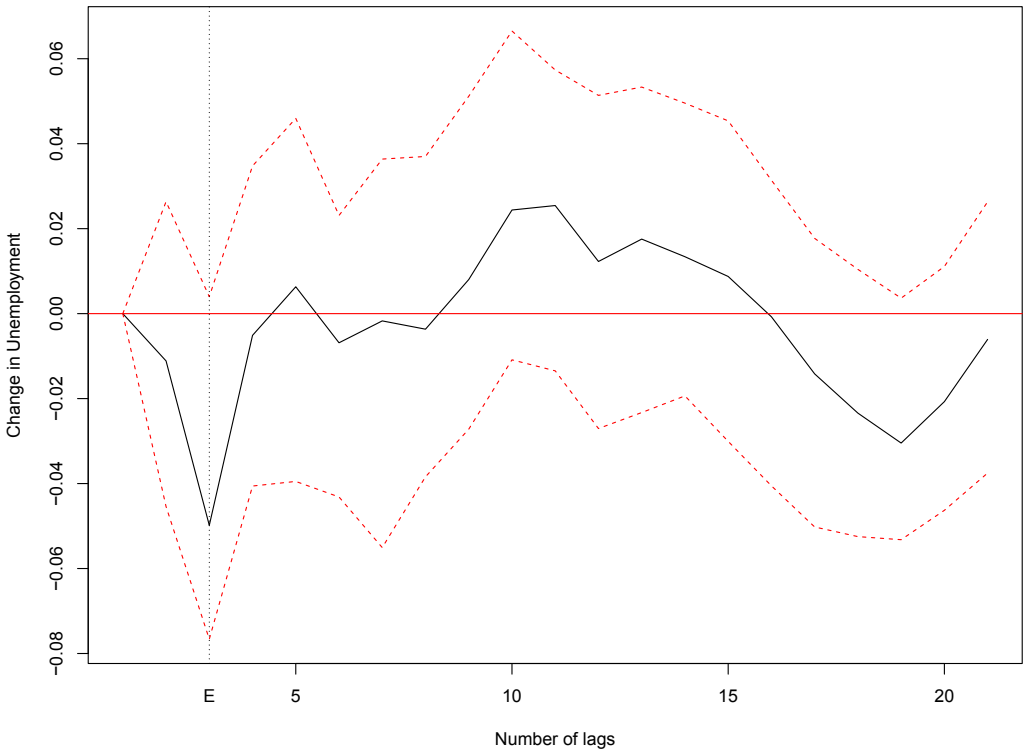
Note: CUSUM Test for parameter stability in the VAR Model CZ13. This figure plots the cumulative sum of residuals from the VAR model over time, with the red lines representing the 5% significance level for the parameter stability test. The graph was generated using the 'stability' function from the 'vars' package in R.

Figure A.5: Impulse Response Function (IRF) of Real GDP Growth to Elections in ModelCZ13



Note: The graph presents the (IRF) of real GDP growth (the difference between real GDP growth in the Czech Republic and the EU15) to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model CZ13. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of real GDP growth over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

Figure A.6: Impulse Response Function (IRF) of Unemployment to Elections in Model CZ13



Note: The graph presents the (IRF) of unemployment to a one-unit shock in the variable el2b (i.e. two quarters before the election), as estimated from the VAR model CZ13. Values on the x-axis represent a number of lags, including lag 0. Therefore, number 3 (marked as E) represents the election quarter in this graph. The solid line represents the estimated response of unemployment over 20 periods following the shock. The area between red lines represents the 95% confidence intervals for the IRF, computed using a bootstrap method with 1000 replications. The graph was generated using the 'irf' function from the 'vars' package in R.

A.4 Reduced Model

In section 5.2, we showed how real GDP growth and inflation have been facing heavy fluctuations since 2020. For this reason, we performed an analysis of the data ending in 2019. The results show very similar results to the original analysis. For example, results of the reduced version of the model CZ8 have been shown in the tables A.5 and A.6. Other results can be delivered upon request, but they are similar to those from section 5.3.3.

Table A.5: Summary of the GDP equation in the reduced model CZ8r

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.05	0.11	-0.47	0.64	
Unemployment.l1	-1.01	0.35	-2.90	0.00	**
Inflation.l1	-0.25	0.12	-2.12	0.04	*
iRates.l1	0.91	0.25	3.66	0.00	***
Elections.l1	-0.49	0.34	-1.44	0.16	
GDP.l2	0.28	0.10	2.63	0.01	*
Unemployment.l2	0.41	0.38	1.09	0.28	
Inflation.l2	0.04	0.11	0.36	0.72	
iRates.l2	-0.70	0.32	-2.19	0.03	*
Elections.l2	-0.24	0.35	-0.70	0.48	
GDP.l3	0.22	0.10	2.15	0.03	*
Unemployment.l3	0.22	0.35	0.64	0.52	
Inflation.l3	-0.12	0.12	-0.98	0.33	
iRates.l3	0.18	0.26	0.71	0.48	
Elections.l3	-0.71	0.35	-2.02	0.05	*
const	0.24	0.10	2.27	0.03	*

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.3647, Adjusted R-squared: 0.2456

Table A.6: Summary of the unemployment equation in the reduced model CZ8r

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.03	0.04	-0.93	0.36	
Unemployment.l1	0.49	0.12	4.27	0.00	***
Inflation.l1	0.03	0.04	0.80	0.43	
iRates.l1	-0.12	0.08	-1.42	0.16	
Elections.l1	-0.10	0.11	-0.84	0.41	
GDP.l2	-0.03	0.03	-0.81	0.42	
Unemployment.l2	0.04	0.13	0.35	0.73	
Inflation.l2	-0.08	0.04	-2.00	0.05	*
iRates.l2	0.08	0.11	0.74	0.46	
Elections.l2	-0.29	0.11	-2.50	0.01	*
GDP.l3	0.03	0.03	0.86	0.39	
Unemployment.l3	0.03	0.11	0.29	0.77	
Inflation.l3	0.01	0.04	0.19	0.85	
iRates.l3	0.06	0.09	0.67	0.50	
Elections.l3	0.08	0.12	0.69	0.49	
const	0.00	0.03	0.14	0.89	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.5373, Adjusted R-squared: 0.4353

A.5 Results from Chapter 6

Table A.7: Summary of the unemployment equation in model SK13

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.05	0.04	1.48	0.15	
Unemployment.l1	0.73	0.14	5.10	0.00	***
Inflation.l1	-0.03	0.05	-0.56	0.58	
iRates.l1	-0.23	0.16	-1.40	0.17	
Elections.l1	0.05	0.18	0.28	0.78	
GDP.l2	0.00	0.04	0.06	0.95	
Unemployment.l2	-0.24	0.17	-1.38	0.17	
Inflation.l2	0.02	0.04	0.47	0.64	
iRates.l2	-0.13	0.21	-0.65	0.52	
Elections.l2	0.02	0.18	0.08	0.93	
GDP.l3	-0.02	0.03	-0.74	0.46	
Unemployment.l3	0.09	0.17	0.50	0.62	
Inflation.l3	0.09	0.04	2.31	0.02	*
iRates.l3	0.01	0.23	0.05	0.96	
Elections.l3	0.37	0.18	2.04	0.05	*
GDP.l4	0.01	0.03	0.19	0.85	
Unemployment.l4	0.05	0.18	0.29	0.77	
Inflation.l4	0.04	0.03	1.08	0.28	
iRates.l4	-0.17	0.25	-0.71	0.48	
Elections.l4	-0.16	0.19	-0.81	0.42	
GDP.l5	0.02	0.03	0.64	0.53	
Unemployment.l5	-0.25	0.18	-1.40	0.17	
Inflation.l5	-0.02	0.04	-0.58	0.57	
iRates.l5	0.23	0.25	0.93	0.36	
Elections.l5	0.04	0.18	0.22	0.83	
GDP.l6	0.02	0.03	0.70	0.49	
Unemployment.l6	0.17	0.18	0.95	0.34	
Inflation.l6	0.03	0.04	0.89	0.37	
iRates.l6	0.09	0.22	0.39	0.70	
Elections.l6	0.22	0.17	1.29	0.20	
GDP.l7	-0.01	0.03	-0.44	0.66	
Unemployment.l7	0.15	0.13	1.17	0.25	
Inflation.l7	0.01	0.04	0.23	0.82	
iRates.l7	0.10	0.18	0.53	0.60	
Elections.l7	-0.05	0.17	-0.31	0.76	
const	-0.13	0.06	-1.98	0.05	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.6777, Adjusted R-squared: 0.4762

Table A.8: Summary of the inflation equation in model SK32

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.12	0.09	-1.30	0.20	
Unemployment.l1	-0.49	0.40	-1.21	0.23	
Inflation.l1	0.06	0.10	0.55	0.58	
iRates.l1	-0.33	0.52	-0.64	0.53	
GDP.l2	-0.15	0.09	-1.66	0.10	
Unemployment.l2	0.14	0.39	0.36	0.72	
Inflation.l2	0.11	0.10	1.06	0.29	
iRates.l2	0.31	0.53	0.59	0.55	
const	-0.01	0.17	-0.03	0.98	
sRight	1.48	0.52	2.82	0.01	**

Note: sRight represents the Shift to the Right variable

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.1492, Adjusted R-squared: 0.06115

Table A.9: Summary of the unemployment equation in model PL10

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.08	0.04	2.09	0.04	*
Unemployment.l1	0.58	0.11	5.13	0.00	***
Inflation.l1	-0.05	0.08	-0.68	0.50	
iRates.l1	0.08	0.07	1.11	0.27	
Elections.l1	0.39	0.18	2.24	0.03	*
GDP.l2	0.02	0.04	0.40	0.69	
Unemployment.l2	0.02	0.13	0.17	0.87	
Inflation.l2	0.04	0.08	0.57	0.57	
iRates.l2	-0.18	0.09	-1.88	0.06	
Elections.l2	-0.06	0.18	-0.33	0.74	
GDP.l3	0.07	0.04	1.50	0.14	
Unemployment.l3	0.11	0.13	0.90	0.37	
Inflation.l3	0.01	0.08	0.15	0.88	
iRates.l3	0.09	0.11	0.85	0.40	
Elections.l3	-0.23	0.18	-1.29	0.20	
GDP.l4	0.06	0.04	1.56	0.12	
Unemployment.l4	0.18	0.11	1.56	0.12	
Inflation.l4	-0.05	0.07	-0.71	0.48	
iRates.l4	0.05	0.08	0.53	0.60	
Elections.l4	0.01	0.17	0.07	0.94	
const	-0.16	0.08	-1.86	0.07	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.6245, Adjusted R-squared: 0.5231

Table A.10: Summary of the unemployment equation in model PL15

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.08	0.04	2.21	0.03	*
Unemployment.l1	0.48	0.12	4.06	0.00	***
Inflation.l1	-0.01	0.09	-0.07	0.94	
iRates.l1	0.12	0.09	1.40	0.17	
GDP.l2	0.00	0.04	0.10	0.92	
Unemployment.l2	0.01	0.14	0.05	0.96	
Inflation.l2	0.01	0.10	0.12	0.91	
iRates.l2	-0.21	0.12	-1.78	0.08	
GDP.l3	0.04	0.05	0.77	0.44	
Unemployment.l3	0.09	0.14	0.65	0.52	
Inflation.l3	0.12	0.11	1.10	0.27	
iRates.l3	0.20	0.14	1.46	0.15	
GDP.l4	0.08	0.05	1.62	0.11	
Unemployment.l4	0.24	0.13	1.80	0.08	
Inflation.l4	-0.12	0.10	-1.31	0.20	
iRates.l4	-0.07	0.12	-0.59	0.56	
GDP.l5	-0.05	0.05	-1.03	0.31	
Unemployment.l5	0.06	0.14	0.47	0.64	
Inflation.l5	0.07	0.09	0.77	0.45	
iRates.l5	0.15	0.12	1.22	0.23	
GDP.l6	0.03	0.04	0.79	0.43	
Unemployment.l6	0.03	0.13	0.24	0.81	
Inflation.l6	-0.01	0.08	-0.10	0.92	
iRates.l6	0.07	0.12	0.57	0.57	
GDP.l7	0.00	0.04	0.08	0.94	
Unemployment.l7	-0.04	0.12	-0.29	0.77	
Inflation.l7	-0.11	0.08	-1.40	0.17	
iRates.l7	0.05	0.09	0.53	0.60	
const	-0.07	0.13	-0.57	0.57	
aElection	-0.36	0.19	-1.89	0.06	

Note: aElection represents the el1a variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.6621, Adjusted R-squared: 0.504

Table A.11: Summary of the unemployment equation in model PL32

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.04	0.03	1.21	0.23	
Unemployment.l1	0.61	0.11	5.72	0.00	***
Inflation.l1	-0.05	0.06	-0.84	0.40	
iRates.l1	0.08	0.07	1.11	0.27	
GDP.l2	-0.02	0.03	-0.62	0.54	
Unemployment.l2	0.07	0.11	0.69	0.49	
Inflation.l2	0.06	0.06	0.98	0.33	
iRates.l2	-0.13	0.07	-2.00	0.05	*
const	-0.03	0.05	-0.49	0.63	
sRight	-0.27	0.16	-1.76	0.08	

Note: sRight represents the Shift to the Right variable

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.5554, Adjusted R-squared: 0.5094

Table A.12: Summary of the inflation equation in model HU10

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.09	0.13	-0.72	0.47	
Unemployment.l1	0.57	0.44	1.31	0.19	
Inflation.l1	0.26	0.12	2.26	0.03	*
iRates.l1	0.37	0.13	2.78	0.01	**
Elections.l1	-0.30	0.43	-0.70	0.49	
GDP.l2	-0.10	0.12	-0.82	0.42	
Unemployment.l2	-0.39	0.46	-0.86	0.39	
Inflation.l2	-0.14	0.13	-1.08	0.28	
iRates.l2	0.12	0.16	0.74	0.46	
Elections.l2	0.37	0.41	0.90	0.37	
GDP.l3	-0.02	0.12	-0.15	0.88	
Unemployment.l3	-0.38	0.46	-0.83	0.41	
Inflation.l3	-0.01	0.13	-0.08	0.94	
iRates.l3	0.19	0.17	1.13	0.26	
Elections.l3	0.82	0.42	1.94	0.06	
GDP.l4	0.06	0.12	0.48	0.64	
Unemployment.l4	0.44	0.43	1.02	0.31	
Inflation.l4	-0.31	0.13	-2.41	0.02	*
iRates.l4	-0.03	0.15	-0.21	0.83	
Elections.l4	0.54	0.43	1.25	0.21	
const	0.04	0.13	0.27	0.79	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-squared: 0.5076, Adjusted R-squared: 0.3745

Table A.13: Summary of the inflation equation in model HU12

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.28	0.14	-2.04	0.05	*
Unemployment.l1	0.14	0.43	0.32	0.75	
Inflation.l1	0.39	0.13	3.09	0.00	**
iRates.l1	0.31	0.14	2.22	0.03	*
Elections.l1	-0.15	0.42	-0.37	0.72	
GDP.l2	0.01	0.14	0.04	0.97	
Unemployment.l2	-0.47	0.48	-0.98	0.33	
Inflation.l2	-0.35	0.14	-2.48	0.02	*
iRates.l2	0.29	0.16	1.84	0.07	
Elections.l2	0.91	0.42	2.15	0.04	*
GDP.l3	0.01	0.12	0.07	0.94	
Unemployment.l3	0.35	0.49	0.71	0.48	
Inflation.l3	0.02	0.13	0.13	0.90	
iRates.l3	0.13	0.16	0.83	0.41	
Elections.l3	0.48	0.43	1.13	0.26	
GDP.l4	0.02	0.12	0.19	0.85	
Unemployment.l4	0.85	0.46	1.87	0.07	
Inflation.l4	-0.36	0.14	-2.58	0.01	*
iRates.l4	-0.18	0.16	-1.12	0.27	
Elections.l4	0.53	0.41	1.29	0.20	
GDP.l5	0.01	0.12	0.11	0.91	
Unemployment.l5	-0.79	0.47	-1.68	0.10	
Inflation.l5	0.40	0.16	2.55	0.01	*
iRates.l5	0.24	0.16	1.47	0.15	
Elections.l5	0.27	0.43	0.63	0.53	
GDP.l6	0.21	0.13	1.65	0.10	
Unemployment.l6	-0.23	0.44	-0.53	0.60	
Inflation.l6	-0.31	0.14	-2.18	0.03	*
iRates.l6	-0.06	0.14	-0.40	0.69	
Elections.l6	-0.03	0.43	-0.07	0.94	
const	-0.07	0.14	-0.48	0.63	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.6359, Adjusted R-squared: 0.4598

Table A.14: Summary of the interest rates equation in model HU8

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.07	0.11	0.69	0.49	
Unemployment.l1	-0.36	0.36	-0.99	0.32	
Inflation.l1	-0.01	0.10	-0.06	0.95	
iRates.l1	0.55	0.12	4.72	0.00	***
Elections.l1	0.13	0.36	0.35	0.73	
GDP.l2	0.06	0.11	0.55	0.58	
Unemployment.l2	0.23	0.39	0.58	0.56	
Inflation.l2	0.00	0.11	0.00	1.00	
iRates.l2	0.06	0.13	0.49	0.62	
Elections.l2	0.82	0.36	2.30	0.02	*
GDP.l3	-0.03	0.11	-0.28	0.78	
Unemployment.l3	-0.05	0.36	-0.13	0.90	
Inflation.l3	-0.17	0.11	-1.60	0.11	
iRates.l3	0.14	0.12	1.22	0.22	
Elections.l3	0.43	0.36	1.18	0.24	
const	-0.12	0.11	-1.09	0.28	

Note: Elections represent the el2b variable * p<0.05, ** p<0.01, *** p<0.001

R-squared: 0.42, Adjusted R-squared: 0.3113

Table A.15: Summary of the inflation equation in model HU27

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.01	0.12	-0.05	0.96	
Unemployment.l1	0.18	0.38	0.48	0.63	
Inflation.l1	0.25	0.10	2.53	0.01	*
iRates.l1	0.58	0.11	5.31	0.00	***
const	0.24	0.15	1.61	0.11	
LeftEl	1.27	0.52	2.46	0.02	*
bElection	-0.37	0.27	-1.36	0.18	
Left	-0.44	0.25	-1.74	0.09	

Note: Left is a dummy variable representing a left-wing government, bElection represents four quarters before elections, and LeftEl is their iterated variable

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.4428, Adjusted R-squared: 0.3995

Table A.16: Summary of the real GDP growth equation in model HU32

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.07	0.11	-0.66	0.51	
Unemployment.l1	-0.73	0.34	-2.14	0.04	*
Inflation.l1	-0.19	0.10	-1.92	0.06	
iRates.l1	-0.14	0.11	-1.23	0.22	
GDP.l2	-0.01	0.10	-0.07	0.94	
Unemployment.l2	0.14	0.34	0.42	0.68	
Inflation.l2	-0.09	0.10	-0.90	0.37	
iRates.l2	0.12	0.11	1.10	0.28	
const	0.35	0.10	3.43	0.00	***
sRight	-0.89	0.37	-2.43	0.02	*

Note: sRight represents the Shift to the Right variable

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.1632, Adjusted R-squared: 0.07661

Table A.17: Summary of the unemployment equation in model HU27

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.06	0.03	1.98	0.05	
Unemployment.l1	0.37	0.10	3.82	0.00	***
Inflation.l1	0.02	0.03	0.91	0.36	
iRates.l1	0.03	0.03	1.25	0.22	
const	-0.09	0.04	-2.30	0.02	*
LeftEl	0.21	0.13	1.61	0.11	
bElection	-0.11	0.07	-1.59	0.12	
Left	0.16	0.06	2.54	0.01	*

Note: Left is a dummy variable representing a left-wing government, bElection represents four quarters before elections, and LeftEl is their iterated variable

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.4343, Adjusted R-squared: 0.3902

Table A.18: Summary of the unemployment equation in model HU35

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.07	0.03	2.31	0.02	*
Unemployment.l1	0.34	0.10	3.27	0.00	**
Inflation.l1	0.01	0.03	0.40	0.69	
iRates.l1	0.02	0.03	0.72	0.48	
GDP.l2	-0.01	0.03	-0.43	0.67	
Unemployment.l2	0.18	0.10	1.78	0.08	
Inflation.l2	-0.00	0.03	-0.01	0.99	
iRates.l2	0.05	0.03	1.56	0.12	
const	0.08	0.04	2.00	0.05	*
Power	-0.06	0.02	-3.05	0.00	**

Note: Power represents the size of the government's majority (or potentially the minority) in the National Assembly

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.4547, Adjusted R-squared: 0.3983

Table A.19: Summary of the real GDP growth equation in model DE2

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.18	0.10	-1.68	0.10	
Unemployment.l1	-0.27	0.93	-0.29	0.77	
Inflation.l1	0.48	0.30	1.63	0.11	
iRates.l1	0.45	0.40	1.13	0.26	
GDP.l2	0.15	0.10	1.43	0.16	
Unemployment.l2	0.62	1.27	0.48	0.63	
Inflation.l2	-0.28	0.28	-1.00	0.32	
iRates.l2	-0.57	0.43	-1.32	0.19	
GDP.l3	0.15	0.11	1.45	0.15	
Unemployment.l3	-1.76	0.91	-1.94	0.06	
Inflation.l3	-0.32	0.30	-1.08	0.29	
iRates.l3	-0.63	0.42	-1.51	0.13	
const	-0.06	0.14	-0.46	0.65	
bElection	-0.54	0.24	-2.22	0.03	*

Note: bElection represents the four quarters before elections

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.224, Adjusted R-squared: 0.101

Table A.20: Summary of the unemployment equation in model DE14b

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.01	0.01	0.95	0.35	
Unemployment.l1	0.94	0.11	8.50	0.00	***
Inflation.l1	0.01	0.03	0.15	0.88	
iRates.l1	-0.12	0.05	-2.45	0.02	*
Elections.l1	0.11	0.05	2.25	0.03	*
GDP.l2	-0.00	0.01	-0.29	0.77	
Unemployment.l2	-0.25	0.15	-1.61	0.11	
Inflation.l2	-0.01	0.03	-0.18	0.86	
iRates.l2	0.07	0.05	1.39	0.17	
Elections.l2	0.08	0.05	1.62	0.11	
GDP.l3	-0.02	0.01	-1.47	0.15	
Unemployment.l3	0.10	0.11	0.96	0.34	
Inflation.l3	0.02	0.03	0.67	0.50	
iRates.l3	0.05	0.05	1.06	0.29	
Elections.l3	-0.04	0.05	-0.67	0.51	
const	-0.02	0.02	-1.37	0.17	

Note: Elections represent the el4b variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.7352, Adjusted R-squared: 0.6855

Table A.21: Summary of the interest rates equation in model DE14c

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	0.01	0.03	0.20	0.84	
Unemployment.l1	-0.34	0.27	-1.23	0.22	
Inflation.l1	-0.03	0.08	-0.38	0.70	
iRates.l1	0.63	0.12	5.48	0.00	***
Elections.l1	-0.44	0.12	-3.59	0.00	***
GDP.l2	-0.03	0.03	-0.91	0.37	
Unemployment.l2	0.13	0.26	0.48	0.63	
Inflation.l2	-0.06	0.08	-0.70	0.49	
iRates.l2	-0.28	0.12	-2.35	0.02	*
Elections.l2	0.15	0.13	1.13	0.26	
const	-0.04	0.04	-1.04	0.30	

Note: Elections represent the variable el3b

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.4132, Adjusted R-squared: 0.345

Table A.22: Summary of the inflation equation in model DE14a

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.02	0.04	-0.45	0.66	
Unemployment.l1	-0.19	0.35	-0.54	0.59	
Inflation.l1	-0.06	0.11	-0.52	0.60	
iRates.l1	-0.04	0.14	-0.30	0.77	
Elections.l1	-0.05	0.15	-0.36	0.72	
GDP.l2	-0.11	0.04	-2.99	0.00	**
Unemployment.l2	0.25	0.34	0.74	0.46	
Inflation.l2	-0.07	0.11	-0.66	0.51	
iRates.l2	0.14	0.15	0.93	0.36	
Elections.l2	-0.40	0.15	-2.77	0.01	**
const	0.07	0.05	1.40	0.16	

Note: Elections represent the el0 variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.1701, Adjusted R-squared: 0.07357

Table A.23: Summary of the real GDP growth equation in model DE28

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.16	0.11	-1.52	0.13	
Unemployment.l1	-0.28	0.91	-0.31	0.76	
Inflation.l1	0.41	0.28	1.44	0.15	
iRates.l1	0.60	0.38	1.58	0.12	
GDP.l2	0.06	0.10	0.62	0.53	
Unemployment.l2	-0.50	0.88	-0.57	0.57	
Inflation.l2	-0.22	0.29	-0.76	0.45	
iRates.l2	-0.73	0.40	-1.83	0.07	
const	0.16	0.18	0.88	0.38	
Left	-0.46	0.21	-2.15	0.03	*

Note: Left is a dummy variable representing a left-wing government

* p<0.05, ** p<0.01, *** p<0.001 R-Squared: 0.1583, Adjusted R-squared: 0.07119

Table A.24: Summary of the unemployment equation in model AT14

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
GDP.l1	-0.03	0.07	-0.39	0.70	
Unemployment.l1	-0.06	0.11	-0.55	0.59	
Inflation.l1	0.39	0.14	2.78	0.01	**
iRates.l1	-0.19	0.15	-1.23	0.22	
Elections.l1	0.03	0.17	0.19	0.85	
GDP.l2	-0.02	0.07	-0.26	0.79	
Unemployment.l2	-0.21	0.11	-1.91	0.06	
Inflation.l2	-0.09	0.15	-0.58	0.57	
iRates.l2	-0.19	0.15	-1.28	0.20	
Elections.l2	0.06	0.16	0.37	0.71	
GDP.l3	0.00	0.07	0.06	0.95	
Unemployment.l3	0.22	0.11	1.91	0.06	
Inflation.l3	0.16	0.15	1.11	0.27	
iRates.l3	0.17	0.15	1.09	0.28	
Elections.l3	0.43	0.16	2.63	0.01	*
const	-0.04	0.05	-0.84	0.41	

Note: Elections represent the el0 variable * p<0.05, ** p<0.01, *** p<0.001

R-Squared: 0.2489, Adjusted R-squared: 0.108