INSTITUTO POLITÉCNICO DE LISBOA
INSTITUTO SUPERIOR DE CONTABILIDADE E ADMINISTRAÇÃO DE LISBOA

FROM BALLOT BOXES TO STOCK EXCHANGES: THE IMPACT OF ELECTIONS ON FINANCIAL MARKET MOVEMENTS

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Lisbon, march 2025

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Dissertação submetida ao Instituto Superior de Contabilidade e Administração de Lisboa para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Análise Financeira, realizada sob a orientação científica de Prof. Doutor José Nuno Sacadura, Professor Adjunto, da área de Economia/Finanças.

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RESUMO

Este estudo analisa a complexa e dinâmica inter-relação entre 6 estados-membros da União Europeia, Áustria, França, Espanha, Itália, Holanda e Portugal utilizando a inovadora abordagem do modelo DCC- GARCH, com o objetivo de analisar o contágio de volatilidade. Além disso, analisa em que medida as eleições influenciam a volatilidade dos índices financeiros, questionando se esses momentos cruciais amplificam a incerteza dos mercados e se o crescimento das forças de extrema-direita em diversas nações europeias desencadeiam instabilidade financeira. Os países estudados têm assistido nos últimos anos ao crescimento dos partidos de extrema-direita, resultado do falhanço das medidas políticas tomadas especialmente no que diz respeito à emigração, criando instabilidade política. O período em analise é de 14 de fevereiro de 2017 a 11 de março de 2024, permitindo analisar pelo menos dois atos eleitorais por país. Os resultados revelam-se surpreendentes: enquanto a instabilidade parece aumentar nas vésperas e após as eleições, o impacto - seja positivo ou negativo - varia de acordo com o índice analisado e o país em que as eleições decorreram. O comportamento dos índices durante o período em analise permite determinar, nalguns casos o pico máximo ou mínimo de volatilidade, coincidente com a data do evento.

Palavras-chave: Politic Risk, Elections, GARCH, Volatility, Event study.

ABSTRACT

To examine volatility contagion, this study employs the novel DCC-GARCH model technique to examine the intricate and dynamic relationships amongst the six European Union members—Austria, France, Spain, Italy, the Netherlands, and Portugal. Additionally, it examines the degree to which elections impact financial index volatility, raising questions about whether these pivotal events heighten market trepidation and whether the rise of far-right parties in several European countries initiates financial instability. Due to political measures, particularly those pertaining to emigration, failing and leading to political instability, far-right parties have grown in strength in the nations under study in recent years. With the analysis period spanning from February 14, 2017, to March 11, 2024, we can examine a minimum of two electoral actions in each nation. The findings are unexpected: although there seems to be a rise in instability before, during, and after the elections, the impact—whether favourable or unfavourable—varies depending on the index examined and the nation where the elections were held. It is sometimes possible to ascertain the greatest or minimum peak of volatility that corresponds with the date of the event based on the behaviour of the indices during the analysis period.

Key Words: Politic Risk, Elections, GARCH, Volatility, Event study.

INDICE

INDICE TABLES

INDICE GRAPHS

INDICE APPENDICES

INDICE ATTACHAMENTS

ABBREVIATIONS

ARCH – Autoregressive Conditional Heteroskedasticity

ARMA - AutoRegressive Moving Average

ARMA - AutoRegressive Moving Average

CAR Cumulative Abnormal Return

CAAR Cumulative Average Abnormal Return

CAV - Cumulative Abnormal Volatility

DCC-GARCH - Dynamic Conditional Correlation - Generalized Autoregressive Conditional Heteroskedasticity

EU – European Union

ICB - Industry Classification Benchmark

GARCH – Generalized Autoregressive Conditional Heteroskedasticity

LPF - List Pim Fortuyn

PHEIC Public Health Emergency of International Concern

RRP - Radical Right-wing Populism

US – United States

WHO - World Health Organization

1. INTRODUCTION

The recent developments in international politics have exposed economies and financial markets to a higher political risk. This trend started with the 2016 Brexit referendum which raised concerns about the future of the Euro, European economic policies and financial markets. The election of Donald Trump as president of the United States (US), who advocated significant changes to the status quo worldwide (Nguyen, Nguyen, Do & Nguyen, 2024).

Increasing concerns about political and economic policy uncertainty emerged against the global financial crisis and growing partisan policy disputes. Relationships within and between countries in Europe have been strained by events like Russia's annexation of Crimea in 2014 and the refugee crisis, which gave rise to right-wing political viewpoints and escalated threats to regional security. This research thus focuses on an intriguing and question about how political risk affects financial markets.

Surprisingly, since Niederhofer, Gibbs and Bullock (1970) examined market activity during US elections, there has been an empirical body of work examining the relationship between political elections and stock market performance, mostly in the United States.

Zulianello & Larsen (2021) detailed a fresh, intriguing new dataset on the support for populist parties over the last 40 years for the key ideational variants of populist parties to shed light on the success of populist parties in elections for the European Parliament: populists on the left, right, and with valence. (see Attachments 1 – Aggregate support for populist parties in European Parliament Elections, 1979 -2019).

Their research revealed that, in general, right-wing populist parties are widespread throughout the European Union and are distinguished by a notable electoral performance, despite significant cross-national variations. In contrast, left-wing and valence populism are territorially concentrated in delimited areas.

As a result, the study witnessed the strengthening of right-wing populism throughout Europe. There are more right-wing populist parties, and they hold a significant number of seats in the European Parliament.

Politicians are driven by ideology, pursue distinct partisan agendas, and implement distinct policies while holding public office. Left (right) parties will tolerate higher (lower) inflation to achieve lower (higher) unemployment and higher (lower) growth since the upper-class fears' inflation more than unemployment, this results in different reactions from the financial markets to election outcomes (Lausegger, 2021).

By filling in a gap in the research, this study attempts to address the rise of right-wing parties and their effect on the financial markets by presenting evidence of election-related instability.

In accordance with this research design, the specific objectives of this work are:

1 - Use the DCC-GARCH model to simulate dynamic correlations between six European stock indexes.

2 - Analyse the impact of elections on correlations between stock indexes.

3 - To acknowledge the influence of extreme right-wing parties on European financial markets and contribute to the literature regarding political risk.

Thus, the inquiry we are looking into is:

H1: Has election uncertainty a significant impact on stock return and stock volatility in pre and post-election periods?

H2: Does the emergence of far-right movements in several of European nations lead to unstable financial markets?

This paper offers the following main contributions to the literature.

There exists a gap in research on populism which tends to focus on politicians rather than on financial markets. This research addresses that by assessing the prevalence of populism and analyses its impact on the market's volatility.

Additionally, and particularly in times of economic weakness, political unpredictability increases stock market volatility and correlation. Greater variance in the prospective new

policies of the government raises risk premia, stock return correlations, and volatilities (Pastor & Veronesi, 2013). This study aims to shed further light in the issue of volatility around politic elections and its impact on financial markets, so that investors can evaluate their premium risk.

The results of this research are especially intriguing because of the advent of this new political reality and the dearth of studies analysing the rise of extreme right-wing parties in European nations.

The following section on this paper provides: section 2 an overview of the related literature about politic risk, section 3 and 4 describes the dataset and methods, used to evaluate the connectiveness between election and Financial Markets volatility. Section 5 presents and discuss empirical results, finally section 6 concludes the present study.

2. LITERATURE REVIEW

2.1. Political Risk

These days, populism is spreading around the world and has even reached nations like Sweden and Germany that were formerly thought to be immune to it. Many contend that the rise of authoritarian populism threatens democracy, open markets, the protection of minorities, civil liberties, and the checks and balances included in the constitution, as well as the liberal global order. (Guriev & Papaioannou, 2022).

Populist, or extreme right-wing parties have emerged in several regional or national elections in Europe since the end of the 20th century, confirming previous studies (Iglesias-Pascal, Paloma & Benítez, 2021).

A fascinating study that Ivarsflaten (2008) created, concluded that, as the empirical parts of that study demonstrated, all successful populist right parties consistently rallied around only one of these complaints, the immigration grievance. In several nations, the populist right vote was explained by the other two grievance mobilization models, which focused on political corruption and elitist and economic shifts.

Another line of research, add an additional essential query is whether political factors influence return variations or the other way around. The findings suggested that election results do not serve as a proxy for the anticipated status of the economy, somewhat corroborate the underlying premise made in the article that election results are exogenous phenomena. On the other hand, economic factors could be useful in forecasting election results. Endogenizing the political cycle is a challenging issue that needs more research (Chrétiena & Coggins, 2009). Therefore, this study contributes with information on this subject.

The study that examined if the market's response would be the same if a party won and took power for the second time in a row was equally fascinating (Chavali, Alam & Rosario, 2020). It suggested that the stock market's reaction was more intense when a party took power for the first time than the second time.

However, Goodell, Mcgee and McGroatye (2020), draws a distinction, their study concludes that a variation in the likelihood of the incumbent party influence variations in financial uncertainty. Furthermore, according to study, a significant amount of the changes in financial uncertainty in the final run-up to United States presidential elections are driven by these incumbent-party electoral uncertainty shocks. Their hypothesis states that a higher likelihood of a non-incumbent party candidate winning the election should result in more uncertainty over economic policies.

Their empirical findings support this theory explaining how financial uncertainty is impacted by electoral uncertainty. In the lead-up to elections, stock return and volatility are significantly impacted by election uncertainty.

2.2. Relevance of the selected countries

The literature validates the return of an extreme right-wing political force to Andalusia and Spain, which had all but vanished since the country's democratic transition in 1978 (Iglesias-Pascoal et al., 2021). Spain is a strong case study for this subject because of the extreme right parties' increasing influence there.

A fascinating analysis on the Italian populist experiment was carried out by Balduzzi, Brancati, Brianti and Schiantarelli (2020), who suggested that recent years have yielded intriguing data to assess the impact of political risk shocks on the economy. According to the research, worries about the populist parties' electoral success as well as their declared positions and policies toward the European Commission and the Euro negatively impacted the cost of borrowing for the banking industry and the government, which also caused equity prices to decline and become more volatile.

Both statistically and quantitatively significant is the impact on financial factors. Balduzzi et al. (2020) study presented some evidence that this is exactly the case, showing that shocks involving political risk can also have a general negative impact on the real economy. They highlight the significance of the Italian Presidency, the European Commission, and the European Central Bank in mitigating the adverse impacts on financial markets and the real economy.

Lastly, there is proof that political risk shocks in Italy have repercussions on the financial markets of other nations, particularly Spain and Portugal. Because of the exposure, it is crucial to include, Italy, Spain and Portugal in this study.

The right-wing populists have had a significant rise in France (28.7% in 2014 and 26.8% in 2019), as well as a significant success in the most recent European Parliamentary elections that resulted in the overthrow of the Marcon government. France serves as an interesting case study for this topic because of its political volatility. (see attachments 1 – Aggregate support for populist parties in European Parliament Elections, 1979 -2019), (Zulianello & Larsen's 2021).

The radical right-wing populism (RRP) was able to exert more influence and drag major party agendas in its direction as it gained traction, especially after coming to power in 2000. This resulted in a significant strain on RRP in Austrian politics (Hayes & Dudek, 2020).

Therefore, by exerting pressure for stricter policies surrounding asylum seekers and migration in general, the RRP, now in a position of power, has been able to exacerbate the radicalization cycle. For this reason, Austria was another country selected because those occurrences create political instability, which is vital to assess in relation to the financial market.

The remarkable ascent of the new populist right party led by the gregarious Pim Fortuyn in the Netherlands in 2002, Among all politicians, Pim Fortuyn was able to garner the greatest amount of media attention, and the List Pim Fortuyn (LPF) unexpectedly received 17% of the vote, (Koopmans & Muis, 2009).

The political space created for the radical right by mainstream parties' decisions is among the most significant enabling elements for its rise. On the other hand, actual data indicates that this kind of electoral niche had existed for a far longer time. The Dutch political class maintained its commitment to multiculturalism throughout the 1998 election campaign by using political correctness to undermine the credibility of the party that was actively opposed to immigration at the time.

Volkert Van der Graaf, a far-left radical animal rights activist, killed him in May 2002 while he was running for election to the Dutch parliament. Van der Graaf claimed that he killed him to stop him from using Muslims as *scapegoats* and attacking *the weak members of society* in his quest for political power.

The Netherlands is a particularly fascinating country to research how elections affect the financial markets because of the controversial events carried out by the far-right and far-left parties.

2.3. Political Risk Premium

When the economy is struggling, the government tends to alter its policies, essentially giving the market protection, according to Pástor & Veronesi (2013) model. Political unpredictability lowers the value of this implicit put protection. Even though political shocks are orthogonal to underlying economic shocks, this uncertainty fetches a risk premium. The risk premium induced by political uncertainty is larger in a weaker economy.

Additionally, political unpredictability increases the correlation and volatility of markets, particularly in times of economic weakness. Greater variability in prospective new government policies raises risk premia, stock return correlations, and volatilities.

Furthermore, Cheng, Kong and Wang (2021) findings strongly imply that political unpredictability has a significant influence on the shift in the A-H share premium. These results add to our understanding of the factors that influence the A-H share premium and advance our understanding of political unpredictability in financial markets.

Another strand of the literature (Gagliardi & Zenios, 2022) refers that Political risk at the national level frequently bleeds over into neighbouring nations and creates a shared systemic element impacting international financial markets. They document that countries with higher politics-policy uncertainty have higher exposure to priced global political risk, as measured by covariation with the P-factor, and thus earn higher average returns. Their research identified global political risk as a new source of common variation in international returns.

The literature records cycles in corporate investment that line up with international national election dates. When growth prospects and economic conditions are considered, businesses cut their investment spending by an average of 4.8% during election years compared to non-election years. The size of the investment cycles fluctuates depending on the features of the nation and elections (Julio & Yook, 2012).

According to a different line of research, macroeconomic performance may have suffered in recent years due to increased policy uncertainty in the US and Europe. Additionally, they indicate that policy uncertainty has a significant impact on the cross-sectional pattern of employment growth, investment rates, and stock-price volatility (Baker, Bloom & Davis, 2015).

The purpose of this study is to provide additional insight into the topic of political election volatility and its effects on financial markets, enabling investors to assess the premium risk they are taking.

2.4. GARCH Models

When modelling stationary time series with constant volatility, the autoregressive moving average (ARMA) model performs well. On the other hand, financial market asset prices fluctuate over time.

The most well-known and effective conditional heteroscedastic models for volatility forecasting are the ARCH/GARCH (Generalized Autoregressive Conditional Heteroskedasticity) models of Engle (1982) and Bollerslev (1986), which have been modified in a variety of ways and have many applications, for example volatility modelling and forecasting.

The use of GARCH and Dynamic Conditional Correlation - Generalized Autoregressive Conditional Heteroskedasticity (DCC-GARCH) models is extended to several financial scenarios by Andersen, Bollerslev, Diebold and Labys (2003) and Bauwens, Laurent and Rombouts (2006), including the examination of macroeconomic and financial shocks.

These studies highlight how crucial it is to use dynamic models to accurately represent the intricacies present in the interconnections across international financial markets.

The research emphasizes that the degree of the election shock is influenced by several variables, including a slim victory margin, the absence of legislation requiring voting, a shift in the government's political stance, and the inability to form a coalition with a majority of parliamentary seats. (Bialkowski Gottschalk & Wisniewski, 2008).

The present multifaceted crisis in the Eurozone has made the study of contagion and spillover effects among markets and countries a prominent research field in recent years. The possible negative impacts of the global financial crisis have garnered attention recently (Macdonald, Sogiakas & Tsopanakis, 2018). Dynamic correlations can be thoroughly and adaptably analysed using models such as DCC-GARCH, which offers important insights into how markets react to various kinds of political shocks.

The purpose of the event research methodology is to look at how an event affects a particular dependent variable. The company's stock price is a frequently utilized dependent variable in event studies. "A study of the changes in stock price beyond expectations (Abnormal returns) over a period of time (event window)" is the definition of such event research, according to Woon (2004, p.1). It ascribes the anomalous results to the event's consequences. The goal of the event study approach is to ascertain whether an occurrence is linked to an unusual stock price effect. This allows the researcher to deduce the event's importance.

In the next session, the variables and sample are described.

3. DATA

To study the volatility around elections days in Europe, the study compiled 6 European Union (EU) members, with a recent rise in extreme-right wing parties. The data was selected from Yahoo on June 20Th 2024. The countries studied are Austria, Spain, France, Netherlands, Italy and Portugal. The literature review provides a thorough explanation of the selection process for these countries.

The data set begins on 14th February 2017 and ends 11th April 2024. The period covers at least two elections for each country. Once our intention is to investigate the volatility around those elections, it was given 20 days after the first election date and 20 days before the last election date.

Selecting a window size that works well for analysing volatility near election day is crucial. The literature on this subject is divided; some authors support shorter durations (Nippani & Medlin., 2002), while others support longer ones (Pantzalis, Stangeland & Turtle, 2000). A middle period of 10, 15, and 20 days was selected for this investigation.

Table 3.1 summarizes same important facts about the 6 countries selected and 13 elections were included in the sample. According to Carey (2008), Austria, Spain, Netherlands and Italy have democratic parliamentary constitutional regime and Portugal France a hybrid regime therefore in the study were included only parliamentary elections.

Column 2 of table 1 indicates the name of the country, and column 3 indicates its acronyms. Column 4 Indicates the stock index used as a proxy of overall indexes. Column 5 of table 1 indicates the index starting date analysed in this study. Column 6 indicates the date of the first election included for each country, column 8 the last election included, and column 7 is filled if there was an election between the dates described above. Column 9 indicates the number of elections included in the study for each country.

The dates of the elections were primarily found online and in newspapers searches.

TABLE 3.1- DATA DESCRIPTION

	EU Member	Acronym	Stock Index	Index Starting Date	First election included	Others elections included	Last election included	Number of elections
1	Austria	**AT**	ATX	14 February 2017	15 October 2017		29 September 2019	2
2	Spain	**ES**	IBEX35	14 February 2017	10 November 2019		23 July 2023	2
3	France	**FR**	CAC40	14 February 2017	11 e 18 jun 2017		12 e 19 jun 2022	2
4	Netherlands	**NL**	AEX	14 February 2017	17 March 2021		22 November 2023	2
5	Italy	**IT**	FTSEMIB	14 February 2017	4 March 2018		25 September 2022	2
6	Portugal	**PT**	PSI20	14 February 2017	6 October 2019	30 January 2022	10 March 2024	3

Source: Own

ATX - Austrian Traded Index (^ATX) is a free float market-cap weighted price index made up of the most liquid and largest stocks of companies traded on Vienna Stock Exchange and listed in the "prime market ". The index is calculated in EUR and disseminated in real time (Wienerborse, 2024); therefore, it was chosen as a proxy of the Austrian Stock Market.

IBEX 35 - *Índice Bursátil Español*, is the benchmark index of the Spanish Stock Exchange, also known as Bolsa de Madrid. It consists of the 35 most actively traded stocks on the Madrid Stock Exchange and is used to gauge the performance of the Spanish equity market (simplefex, 2024), for that reason, it was chosen as a proxy of the Spanish Stock Market.

CAC40 – Cotation Assistée en Continuous CAC40 (^FCHI) – is an important index for the French stock market, reflecting the performance of the top 40 companies listed on the Euronext Paris Exchange. This uses a free-float market capitalisation methodology to determine the weight of each stock based on the number of shares available for trading. By monitoring this index, investors can understand the performance of leading French companies and gauge the overall health of the French economy (5paisa, 2024), consequently, it was chosen as a proxy of the French Stock Market.

AEX - Amsterdam Exchange Index is a free float market capitalisation weighted index that reflects the performance of the 25 largest and most actively traded shares listed on Euronext Amsterdam and is the most widely used indicator of the Dutch stock market (Euronext, 2024), thus, it was chosen as a proxy of the Dutch Stock Market.

FTSE MIB - Milano Indices di Borsa is the primary benchmark Index for the Italian equity markets. The Index is comprised of highly liquid, leading companies across Industry Classification Benchmark (ICB) sectors in Italy. It measures the performance of 40 Italian equities and seeks to replicate the broad sector weights of the Italian stock market. The FTSE MIB Index is market cap-weighted after adjusting constituents for float (Borsaitaliana, 2024), on that account, it was chosen as a proxy of the Italian Stock Market.

PSI20.LS - Portuguese Stock Index- is a free float market capitalisation weighted index that reflects the performance of the most actively traded shares listed on Euronext Lisbon and is the most widely used indicator of the Portuguese stock market (Euronext, 2024), so it was chosen as a proxy of the Portuguese Stock Market. Most of the data on the components of the national indexes came from Yahoo.

For the six indexes under study, Table 3.2 provides descriptive statistics for return series.

TABLE 3.2 – DESCRIPTIVE STATISTICS FOR RETURN SERIES

Variable	Obs	Mean	Std.dev	Min	Max	DF test Z(t)
LAT	1828	0.0002225	0.0132703	-0.136486	0.1074447	-40.216
LFR	1828	0.000394	0.0115975	-0.1227677	0.0838948	-43.213
LES	1828	0.0001383	0.0117838	-0.1405922	0.0857301	-44.104
LNL	1828	0.0003762	0.0106416	-0.1075264	0.0897055	-45.273
LIT	1828	0.000398	0.0130058	-0.1692788	0.0892674	-43.078
LPT	1828	0.0002215	0.0101653	-0.0975758	0.0782333	-40.564

Dickey-Fuller test for unit root Critical Value Z(t)		
1%	5%	10%
-3.430	-2.860	-2.570

H0: Ramdow walk without drift, d=0

Mackinnon approximate p-value for Z(T) = 0.0000.

Source: Adapted from Stata

There are a total of 1828 observations for all variables.

The Dickey Fuller test is used to determine if time series are stationary. This kind of unit root test allows us to determine whether the time series has a unit root at all. A time series' unit root tells us whether the series is following a stochastic trend that deviates from its mean value. When a time series has a unit root, it becomes non-

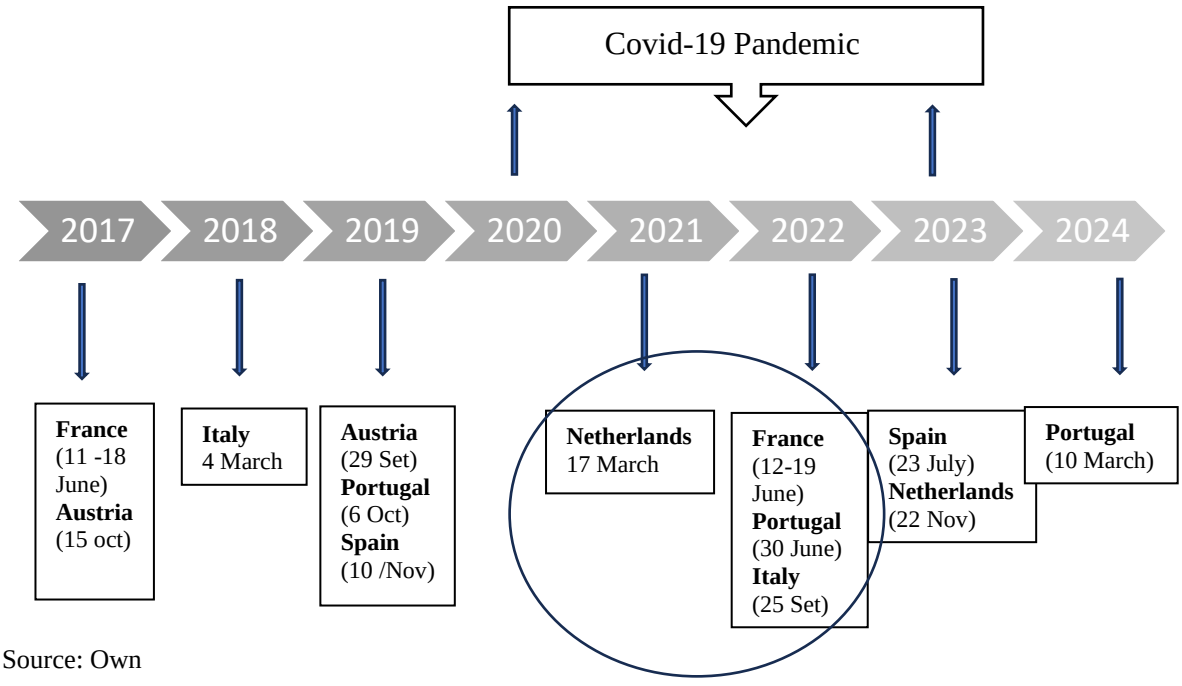
stationary, which makes it more difficult to draw statistical conclusions from it and make forecasts for the future.

The null hypothesis is rejected, and the time series is deemed stationary if the test statistic is less than the crucial value or if the p-value is less than a pre-specified significance level (e.g., 0.05).

Table 3.3 displays the election timetable. It is crucial to note that four elections were held during the pandemic.

In line with the International Health Regulations, the World Health Organization (WHO) stated on January 30, 2020, that the new coronavirus outbreak qualifies as a Public Health Emergency of International Concern (PHEIC), which is the highest alert level recognized by the Organization. The WHO declared on May 5, 2023, that the COVID-19 pandemic would no longer be classified as a PHEIC.

TABLE 3.3 – ELECTIONS SCHEDULE



Source: Own

The reason those dates are so crucial is that there was a lot of financial market volatility during the epidemic, so data from that time should be analysed cautiously (See Appendix 16).

In the following session, the applied methodology is described, which explains de stationary test and the GARCH model procedures used.

4. METHODOLOGY

4.1. Stationarity Tests

Dickey and Fuller (1979) developed a procedure for testing whether a variable has a unit root or, equivalently, that the variable follows a random walk.

Compare the p-value to the selected significance level, usually 0.05, to evaluate the findings of the Dickey and Fuller test. Reject the null hypothesis that a unit root exists, and the series is stationary if the p-value is less than 0.05. If not, the null hypothesis implies non-stationarity; do not reject it.

This study also performed the Phillips–Perron (1988) test that a variable has a unit root. The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process. Phillips–Perron uses Newey–West (1987) standard errors to account for serial correlation, whereas the augmented Dickey–Fuller test uses additional lags of the first-differenced variable.

4.2. GARCH models

In line with previous studies, Engle (1982, 2001, 2002), this paper uses generalized autoregressive conditional heteroskedasticity (GARCH) models that are linear in squares and cross products of the data, when time varying correlations are estimated.

An event study often assumes that the market responds quickly to new information and is based on the semi-strong version of market efficiency. As a result, the market value of a company's shares is determined by adding the present market value to the total expected future dividends. Based on this supposition, the impact of an event on a business or economy can be evaluated by examining the corresponding effect on the stock of the business or the country index (Foecking, Wang & Huynh, 2021).

The returns are analysed by taken the first log ratio.

$$y_{it} = log(X_{it}) \,/\, log\,(x_{it-1}) \quad (4.1)$$

Following previous studies, Bialkowski, Gottschalk and Wisniewski (2008), using a volatility event-study methodology, it assesses how elections affect the second moment

of return distribution. Within a GARCH (1,1) model, the study begins by isolating the country-specific component of variance:

$$R_{ii,t} = \alpha + \beta R^*_t + \varepsilon_{it}, \varepsilon_{it} + \sim N(O, h_{i,t}) \quad (4.2)$$

$$h_{ii,t} = \gamma_0 + \gamma_1 h_{i,t-1} + \gamma_2 \varepsilon^2_{i,t-1} \quad (4.3)$$

Notation:

$R_{i,t}$: Return of stock market index in country *i* on day *t*

R^*_t: Global stock market index on day *t*

ε_{it} : Country-specific part of index returns

$h_{i,t}$: Conditional Variance

Using the Maximum Likelihood approach, (4.2) and (4.3) are jointly estimated during the time just before the event window.

This study respects the convention used in the literature to estimate the benchmark model for the kind of event investigations outlined by Brown and Warner (1985) is minimum 250 daily returns.

To gauge unusual volatility, this study considers the variation in ε_{it} around the event date in relation to its regular non-event level.

The GARCH model could be used as a reference point since it can show what the volatility would have been in the absence of the election.

It is important to note that, (4.3) is a one-step-ahead forecast and will not generate an event-independent projection. For any value of t > 0, there will be measured the impact of an election will have on the values of $h_{ii,t}$ (measured by ε_{it}).

This problem is readily fixable by making the volatility forecast conditional only on the information set available prior to the event. For this reason, the volatility benchmark for the k-th day of the event window is defined as a k step-ahead forecast of the conditional variance based on the information set available on the last day of the estimation window t*:

First step: Forecasting the conditionals volatilities, by GARCH (1,1) model, using the following formula:

$$E\left(h_{i,t*+k}|\Omega_{t*}\right) = \hat{\gamma_0} \sum_{j=0}^{k-1}\left(\hat{\gamma_1} + \hat{\gamma_2}\right)^j + \left(\hat{\gamma_1} + \hat{\gamma_2}\right)^{k-1} \hat{\gamma_1}\, h_{i,t*} + \left(\hat{\gamma_1} + \hat{\gamma_2}\right)^{k-1} \hat{\gamma_2}\, \hat{\varepsilon}^2_{i,t*} \quad (4.4)$$

The distribution of the residuals during the event window can be described as followed:

$$\varepsilon_{i,t} \sim N\left(AR_t, M_t \,.E\left[h_{i,t}\,|\Omega_{t*}\right]\right)$$

Where:

M – Is the multiplicative effect of the event on volatility
AR – Is the event-induced abnormal return
t>t*

Under the null hypothesis that investors are not surprised by election outcomes, the value parameter M, should equal one.

It should be noted that the residuals would have a normal distribution and zero mean if they were derived using the cross-section average. Assuming that there is residual orthogonality, their variance would be:

$$\mathrm{Var}\left(\varepsilon_{i,t} - \frac{1}{N}\sum_{i=1}^{N}\varepsilon_{i,t}\right) = M_t\left[E\left[h_{i,t}|\,\Omega_{t*}\right]\frac{N-2}{N} + \frac{1}{N^2}\sum_{j=1}^{N}E\left[h_{j,t}|\,\Omega_{t*}\right]\right] = M_t.EIDRV_{i,t} \quad (4.5)$$

Where:
$EIDRV_{i,t}$ - Event independent demeaned residual variance
N – Is the number of events included in the sample.

M_t is the major interest parameter because the study's goal is to measure the impact of elections on stock market volatility.

In line, with previous studies, Boehmer, Musumeci and Poulsen (1991) and Hilliard and Savickas (2002), this study uses, the method of estimating this event-induced volatility multiple rests on combining residual

standardization with a cross-sectional approach.

Keep in mind that the estimate $M_t^{\wedge}$, can be calculated as the cross-sectional variance of demeaned residuals, standardized by the event-independent demeaned residual standard deviation [EIDRVi,t]1/2:

$$M_t^{\wedge} = \frac{1}{N-1} \sum_{i=1}^{N} \frac{\left(N.\varepsilon_{i,t}^{\wedge} - \sum_{j=1}^{N} \varepsilon_{j,t}^{\wedge}\right)^2}{N.(N-2).E[h_{i,t}|\Omega_{t*}] + \sum_{j=1}^{N} E[h_{j,t}|\Omega_{t*}]} \quad (4.6)$$

Where:

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

And

t>t^*

Because Mt equals one, the demeaned standardized residuals under the null hypothesis have a standard normal distribution. Thus, on any day t within the event window, the abnormal percentage change in volatility is

$\left(M_t^{\wedge} - 1\right)$

Second step: For an event window (t_1, t_2), the abnormal return (AR) can be calculated as followed (Foecking et al., 2021):

When an index's actual return is compared to its predicted or market return, it is called the abnormal return (AR), which is the exceptional profit of the investment.

Consequently, the abnormal return can be represented by εi,t. This leads to the abnormal return formula that looks like this (Historical Mean Model):

$$E(R_{i,t}) = \overline{Rt} \quad (4.7)$$

The cumulative abnormal return (CAR) is the sum of all abnormal returns over a chosen event window and is calculated as follows:

$$\text{CAR}_{i,t} = \sum_{i=t1}^{t2} ARi,j \quad (4.8)$$

Where:

t1 = start of the event window.

t2 = end of the event window.

Finally, the cumulative average abnormal returns (CAAR) can be calculated. The CAAR is the sum of the average abnormal return over the event window and examines the aggregate effect of the abnormal returns, especially if the impact of the event is not solely on the event day itself.

The following formula is used to calculate the CAAR:

$$\text{CAAR} = \frac{1}{n}\sum_{i=1}^{n} CAR(t1,t2) \quad (4.9)$$

A description of the empirical results follows in the next session.

5. EMPIRICAL RESULTS

5.1. Correlations among the countries

Table 5.1 displays the correlations between the study's participating nations.

TABLE 4.1 - CORRELATIONS AMONG VARIABLES

Dynamic condicional correlation Mgarch Model						
Variables	Coeficient	std. err.	z	P>|z|	[95% Conf.	Interval]
Corr(LAT, LFR)	0.7441	0.0168	44.36	0.000	0.7123	0.7770
Corr(LAT, LIT)	0.7507	0.0164	45.78	0.000	0.7186	0.7829
Corr(LAT, LPT)	0.6228	0.0231	26.91	0.000	0.5774	0.6682
Corr(LAT, LNL)	0.6855	0.0200	34.2	0.000	0.6462	0.7248
Corr(LAT, LES)	0.7379	0.0172	43.01	0.000	0.7042	0.7715
Corr(LFR, LIT)	0.8601	0.0010	88.2	0.000	0.8410	0.8792
Corr(LFR, LPT)	0.6477	0.0220	29.49	0.000	0.6047	0.6908
Corr(LFR, LNL)	0.8818	0.0085	104.02	0.000	0.8652	0.8984
Corr(LFR, LES)	0.8353	0.0113	73.99	0.000	0.8132	0.8944
Corr(LIT, LPT)	0.6563	0.0214	30.61	0.000	0.6143	0.6983
Corr(LIT, LNL)	0.8005	0.0135	59.37	0.000	0.7741	0.8267
Corr(LIT, LES)	0.8316	0.0115	72.19	0.000	0.8091	0.8542
Corr(LPT, LNL)	0.6221	0.0232	26.81	0.000	0.5767	0.6676
Corr(LPT, LES)	0.6873	0.0200	34.36	0.000	0.6481	0.7269
Corr(LNL, LES)	0.7550	0.0162	46.41	0.000	0.7231	0.7869
Adjustment						
lambda1	0.0196	0.0024	7.88	0.000	0.1471	0.2446
lambda2	0.9497	0.0084	112.34	0.000	0.9332	0.9663
Sample: 15 feb 2017 thru 10 apr 2024					Obs: 1828	
Distribution: Gaussian					Log likelihood = 40478.69	

Source: Output Stata

DCC GARCH model is applied to capture the degree of volatility correlation change or spillover between two variables. The volatility is dynamic and time varying. This correlation varies between 0.622 (Portugal and Netherlands) and 0.88 (France and Netherlands), indicating that Portugal and the Netherlands have less volatility spillover pairwise and France and the Netherlands have more.

Portugal exhibits the lowest degree of spillover volatility between 0.68 and 0.622, whereas the Netherlands exhibits the highest degree of volatility spillover between 0.88 and 0.622.

France and Italy are another pairwise with a noteworthy degree of correlation (0.86), to which it is pertinent to refer. The correlation between all the variables is positive.

5.2. Event Study around election date

The variables in the period under analysis appear to have a positive association according to the DCC GARCH model, however when we evaluate the CAAR for subperiods (parliamentary elections), the variables behave differently and sometimes even in the other way.

The analysis of the events surrounding election days for the countries under consideration is displayed in the tables below.

Using tailed tests Wilcoxon for averages, it was investigated if the average CAARs are statistically different from zero.

AUSTRIA

The Cumulative Average Abnormal Return (CAAR) for the Austrian elections in 2017 and 2019 are displayed in Table 5.2.

TABLE 5.2 – CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTIONS DAY - AUSTRIA

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon							
Windows	**CAAR(-10,10)**	**CAAR (-15,15)**	**CAAR(-20,20)**	Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR (-20,20)**
	Austria Event date: 16oct2017				**Austria Event date: 30sep2019**		
LAT	**0.83%**	**-0.82%**	**-0.94%**	**LAT**	**-1.15%**	**4.73%**	**8.84%**
LFR	2.37%	3.21%	1.13%	LFR	-0.47%	0.37%	3.89%
LES	-0.39%	-1.43%	-4.71%	LES	1.50%	4.91%	7.34%
LIT	-1.67%	-0.79%	-2.86%	LIT	-0.62%	1.99%	5.69%
LNL	1.63%	4.05%	-2.20%	LNL	-0.59%	0.58%	3.79%
LPT	-1.15%	-1.94%	-2.48%	LPT	-1.64%	0.70%	4.03%
Ptf CARs	0.28%	0.39%	-1.27%	Ptf CARs	-0.50%	2.20%	5.58%
CAAR group	0.30%***	0.42%***	-1.23%***	CAAR group	-0.48%***	2.23%***	5.62%***
*** p-value < .01, ** p-value <0.05, * p-value <0.1							

Source: Adapted from Stata output

The outcomes of the 2017 elections had a negative effect on Austria, Italy, Spain and Portugal variables and a positive effect on the other countries; in contrast, the 2019 elections had a favourable effect on all variables (20 days window).

However, the CAAR greatly increases if we extend the window to 15 or 20 days, in 2019. In 2019, Austria achieves a noteworthy CAAR of 8,84% (20 days window).

The results of the Austrian elections for the years examined are shown in the table below.

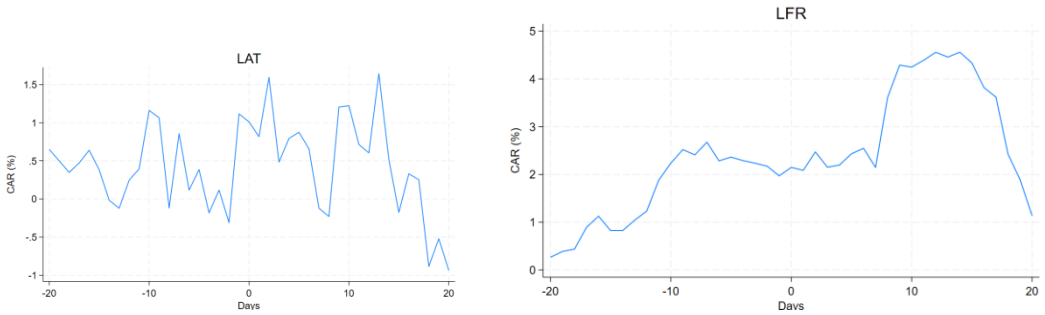
TABLE 6.3 - ELECTIONS RESULTS - AUSTRIA

Elections - Austria	15/10/2017	29/09/2019	WING
Austrian People's Party/*Österreichische Volkspartei* (ÖVP)	31.5%	37.5%	Populist, Christian-democratic and liberal-conservative
Social Democratic Party of Austria/*Sozialdemokratische Partei Österreichs* (SPÖ)	26.9%	21.2%	Centre-left, social democratic
Freedom Party of Austria/*Freiheitliche Partei Österreichs* (FPÖ)	26.0%	16.0%	National-conservative, right-wing populist, eurosceptic, and far-right
The New Austria/*Das Neue Österreich und Irmgard Griss, Bürgerinnen und Bürger für Freiheit und Verantwortung* (NEOS)	5.3%	8.1%	Liberal
List Pilz/*Liste Pilz* (PILZ)	4.4%		Green and left-wing populist
The Greens/Green Alternative/*Die Grünen/Die Grüne Alternative* (GRÜNE)	3.8%	13.9%	Green political party
Others	2.2%	3.3%	

Source: Own

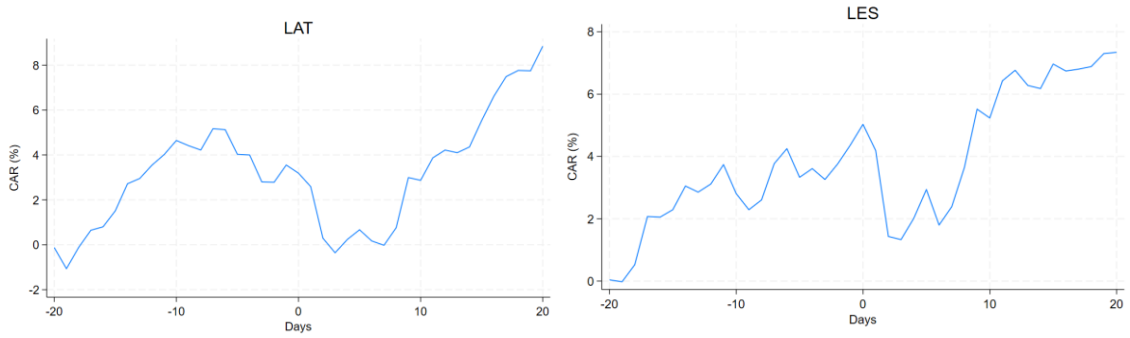
In both elections, the winning party was the same, and it did not secure a majority in any of the years that were being examined. The results suggest that the markets were pleased with the 2019 election result and dissatisfied with the 2017 outcome.

GRAPH 5.1 - AUSTRIA ELECTION 2017 – CAR - LAT AND LFR



Source: Output Stata

GRAPH 5.2 - AUSTRIA ELECTION 2019 - CAR - LAT AND LES



Source: Output Stata

Graph 5.1 displays the Cumulative Abnormal Return (CAR) for Austria and France Index for the Austria Elections 2017 on the y line and the number of days till the event on the x line. (see graphs for all variables in Appendix 1).

In contrast to the France index, which displays a growing CAR for the same period, Austria exhibits extreme volatility throughout the course of the 20-day window.

Graph 5.2 displays the CAR for Austria and Spain Index for the Austria Elections 2019 on the y line and the number of days till the event on the x line. Every variable behaved in a comparable way. A rising CARR up until the event, followed immediately after by a sharp decline, after which the index begins a gradual recovery. (see graphs for all variables in Appendix 2).

FRANCE

Table 5.4 shows the Cumulative Average Abnormal Return (CAAR) for the elections in France in 2017 and 2022.

TABLE 7.4 – CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTIONS DAY - FRANCE 2017

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon							
Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**	Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**
	France 1st round Event date: 12jun2017				**France 2nd round Event date: 19jun2017**		
LAT	-6.96%	-5.3%	-3.8%	LAT	-4.13%	-6.98%	-5.68%
LFR	**-3.82%**	**-6.93%**	**-10.47%**	**LFR**	**-6.37%**	**-8.54%**	**-8.79%**
LES	-6.88%	-9.46%	-13.26%	LES	-8.61%*	-12.28%**	-13.08%*
LIT	-3.97%	-6.99%	-7.59%	LIT	-3.76%	-6.25%	-8.55%
LNL	-3.57%	-5.84%	-8.54%	LNL	-5.51%*	-7.35%*	-6.70%
LPT	-3.51%	-5.36%	-8.43%	LPT	-7.41%*	-8.17%	-7.17%
Ptf CARs	-4.79%	-6.64%	-8.67%	Ptf CARs	-5.96%	-8.26%*	-8.33%
CAAR group	-4.77%**	-6.61%**	-8.63%**	CAAR group	-5.94%**	-8.23%**	-8.29%**
*** p-value < .01, ** p-value <0.05, * p-value <0.1							

Source: Adapted from Stata output

TABLE 8.5 – CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTIONS DAY - FRANCE 2022

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon							
Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**	Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**
	France 1st round Event date: 12jun2022				**France 2nd round Event date: 20jun2022**		
LAT	-11.17%*	-11.76%	-8.05%	LAT	-16.00%**	-15.32%*	-10.55%
LFR	**-7.82%**	**-5.97%**	**-6.68%**	**LFR**	**-8.81%**	**-8.73%**	**-3.69%**
LES	-7.83%	-3.58%	-2.95%	LES	-6.38%	-9.83%	-5.83%
LIT	-11.8%*	-12.47%	-11.38%	LIT	-12.49%**	-13.47%*	-13.22%
LNL	-4.97%	-4.07%	-4.46%	LNL	-6.33%	-5.30%	-0.94%
LPT	-3.37%	1.74%	4.41%	LPT	-3.01%	-4.33%	0.30%
Ptf CARs	-7.81%	-6.00%	-4.82%	Ptf CARs	-8.83%*	-9.47%	-5.63%
CAAR group	-7.78%**	-5.96%***	-4.76%***	CAAR group	-8.81%**	-9.43%**	-5.57%***
*** p-value < .01, ** p-value <0.05, * p-value <0.1							

Source: Adapted from Stata output

In all cases, the CAAR produced negative results. The Austria index, with a negative Abnormal Return of 16%, yielded the maximum loss in the second round of the 2022 elections (Table 5.5).

The Portuguese index performed the best, with few losses and, in the second round of the 2022 French elections, an outlier with a positive CAAR on a 15- and 20-days window (Table 5.4 and 5.5).

The table below displays the first and second round results of the French elections for the years under consideration.

TABLE 9.6 - ELECTIONS RESULTS - FRANCE 2017

Elections - France	11/06/2017	WING	2nd Round	18/06/2017
Rainaissance - LREM	28.21%	Liberal centre	LREM/MODEm	49.12%
The Republicans - LR	15.77%	Liberal conservative	LR/UDI/DVD	26.95%
Nacional Front - FN	13.20%	National, right-wing populist, and far-right	FN	8.75%
France Unbowed - FI	13.20%	Left, Eco-socialist, democratic socialist	PS/PRG/DVG	7.49%
Socialist Party - PS	7.44%	Centre Left, social democratic, pro-european	FI	4.86%
Ecologist	4.30%	Ecologist		
Democratic Movement - MoDem	4.12%	Centre to centre right, liberal and Christian democratic		
Unios of Democrats and Independents - UDI	3.03%	Liberal		
Miscellaneous Right - DVD	2.76%	centre-right or right-wing candidates who are not members of any large party		
Others	8.00%		Others	2.83%

Source: Own

TABLE 10.7- ELECTIONS RESULTS - FRANCE 2022

Elections - France	12/06/2022	WING	2nd Round	19/06/2022
Ensemble	25.75%	LREM + MoDem + small parties	Ensemble	38.57%
NUPES	25.66%	FI+PS+PCF+ small parties	NUPES	31.60%
RN	18.68%	FN	RN	17.30%
UDC	11.29%	UDI + Centrists	UDC	7.29%
REC	4.24%	Far right	DVG	1.97%
DVG	3.14%	Miscellaneous left	REG	1.28%
ECO	2.67%	Ecologists	DVD	1.11%
DVD	2.33%	Miscellaneous right	DVC	0.48%
REG	1.28%	Regionalist	PRG	0.17%
Others	4.96%		Others	0.23%

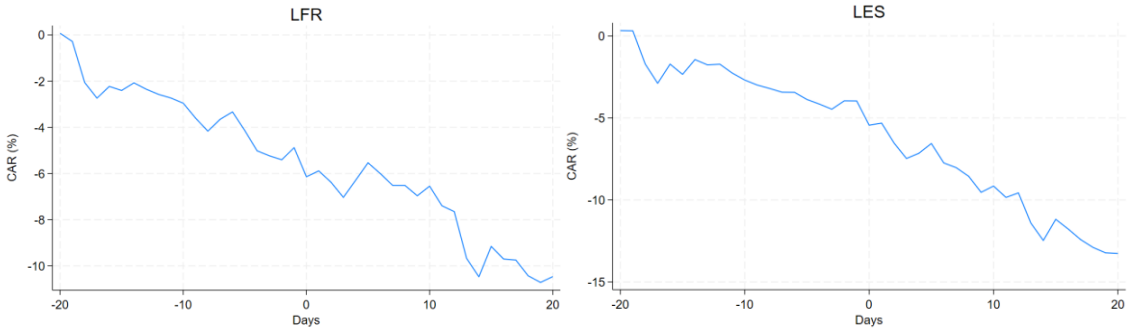
Source: Own

It is worth noting that the electoral system in France provides for a run-off election after one week if no party secures an absolute majority.

There was no shift in the parties' ideologies from 2017 and 2022, despite their titles changing. Based on their respective ideological wing, the parties formed coalitions. By examining tables 5.6 and 5.7, we can verify.

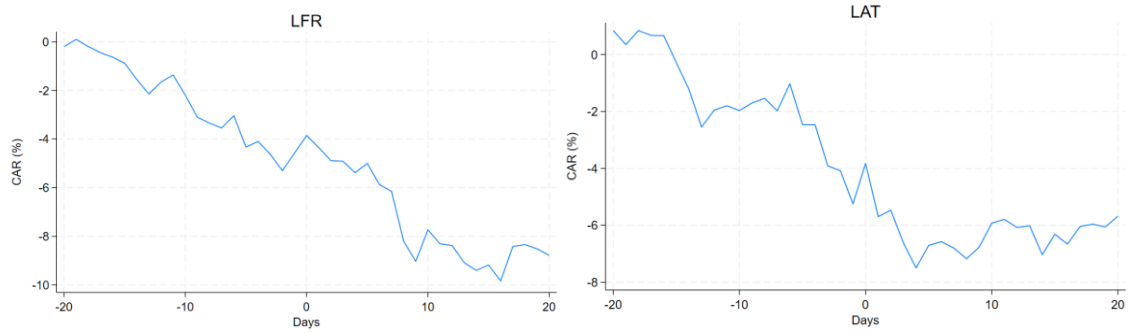
The winning party was therefore the same. As a result, in every scenario, the financial markets for the analysed indexes experienced a negative reaction.

GRAPH 5.3 - FRANCE ELECTION 2017 - 1ST ROUND - CAR - LFR AND LES



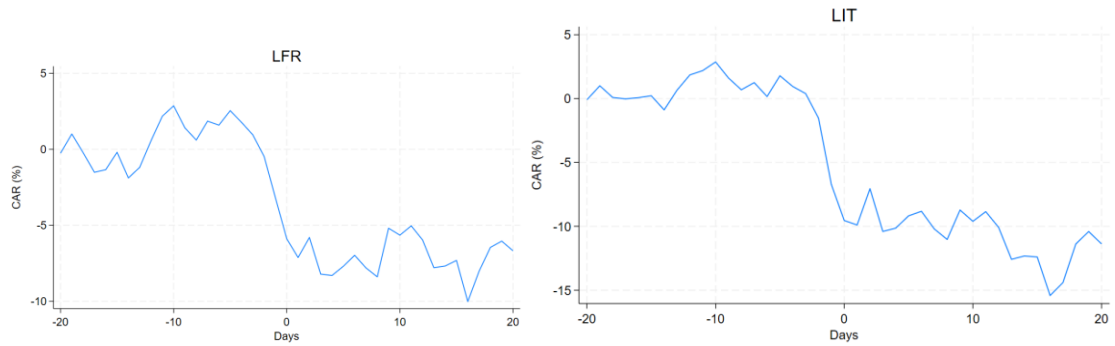
Source: Output Stata

GRAPH 5.4 - FRANCE ELECTION 2017 - 1ST ROUND - CAR - LFR AND LAT



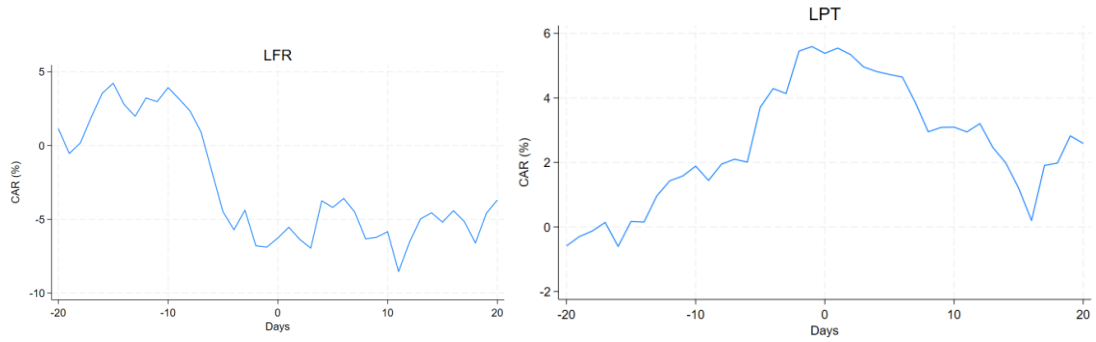
Source: Output Stata

GRAPH 5.5 - FRANCE ELECTION 2022 - 1ST ROUND - CAR LFR AND LIT



Source: Output Stata

GRAPH 5.6 - FRANCE ELECTION 2ND ROUND - CAR LFR AND LPT



Source: Output Stata

The CAR of the French index for each of the four electoral acts under analysis is displayed in Graphs 5.3 through 5.6. Financial markets are volatile, yet there is a discernible downward tendency that almost always has negative outcomes. (see all graphs in Appendix 3 to 6).

SPAIN

The Cumulative Average Abnormal Return (CAAR) for the 2019 and 2023 Spanish elections is displayed in the table below.

TABLE 11.8 – CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTIONS DAY - SPAIN

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon							
Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**	Windows	**CAAR(-10,10)**	**CAAR[-15,15]**	**CAAR[-20,20]**
	Spain Event date: 11nov2019				**Spain Event date: 24jul2023**		
LAT	0.64%	1.89%	3.34%	LAT	2.58%	-0.66%	1.30%
LFR	2.97%	1.89%	2.02%	LFR	2.30%	-1.51%	-0.62%
LES	**-1.12%**	**-1.78%**	**1.00%**	**LES**	**1.10%**	**-1.81%**	**-0.16%**
LIT	3.17%	1.08%	2.54%	LIT	2.14%	-0.10%	1.71%
LNL	1.65%	1.71%	3.21%	LNL	1.82%	-1.89%	-4.26%
LPT	1.51%	1.81%	2.59%	LPT	2.13%	1.36%	1.43%
Ptf CARs	1.47%	1.09%	2.44%	Ptf CARs	2.01%	-0.78%	-0.11%
CAAR group	1.48%***	1.12%***	2.48%***	CAAR group	2.04%***	-0.74%***	-6%***
*** p-value < .01, ** p-value <0.05, * p-value <0.1							

Source: Adapted from Stata output

Table 5.8 shows that both Spanish elections had a favourable effect on CAAR during a 10-day period. The CAAR has benefited from the 2019 election results, with Spain being the lone exception.

Nevertheless, the outcomes of the 2023 election only had a favourable effect for ten days window and a negative effect for fifteen- and twenty-days window. The findings imply that the financial markets for the studied indexes responded favourably to the political change.

Although it appears that the market had a bad reaction within a 15–20-day period. Perhaps to better comprehend these consequences, it would be prudent to examine the effects of the initial political measures put in place.

The results of the Spanish elections for the years examined are shown in the Table 5.9.

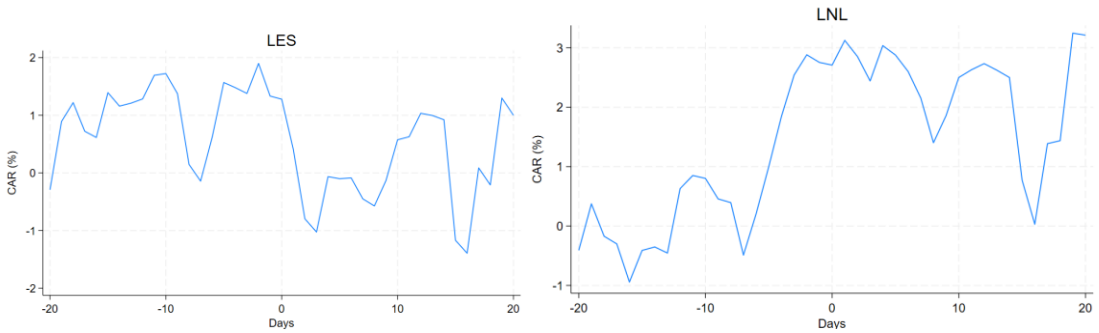
TABLE 12.9- ELECTIONS RESULTS - SPAIN

Elections - Spain	10/11/2019	23/07/2023	WING
Spanish Socialist Workers' Party - PSOE	28.0%	31.70%	Social - democratic
People's Party - PP	**20.8%**	**33.10%**	Conservative, Christian-Democratic
Voice - Vox	15.1%	12.38%	National-conservative, right-wing populist, and far-right
Unidas Podemos	12.9%	0.0%	Left wing to far left
Junts		1.6%	Left wing to far left
Citizens - CS	6.8%	0.0%	Liberal
Sumar		12.33%	Left wing to far left
Republican Left of Catalonia - Sovereigntists - ERC	3.6%	1.9%	Coalition, left
Others	12.9%	7.0%	

Source: Own

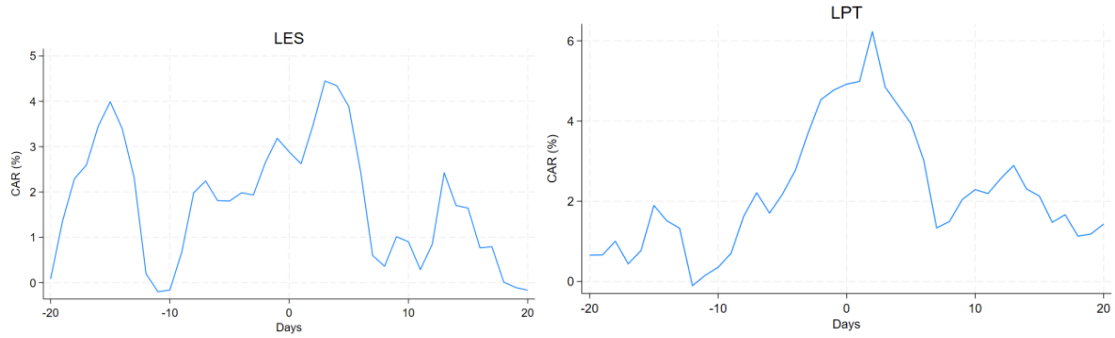
The results of the Spanish elections in 2019 and 2023 required a shift in the party's leader. There was no absolute winner and the far-left party's popularity increased, as displayed in Table 5.9.

GRAPH 5.7 - SPAIN ELECTION 2019 - CAR LES AND LNL



Source: Output Stata

GRAPH 5.8 - SPAIN ELECTION 2023 - CAR - LES AND LPT



Source: Output Stata

Graph 5.7 displays the CAR for Spain and Netherlands Index for the Spain Elections 2019 on the y line and the number of days till the event on the x line. The most volatile results are shown by Spain and the Netherlands; however, all variables peak close to the event day. (see graphs for all variables in Appendix 7)

Graph 5.8 shows the number of days to the event on the x line, and the CAR for Spain and Portugal Index for the 2023 Spain Elections on the y line. There is a timid surge following the event, even though all variables show significant volatility towards this election. (see graphs for all variables in Appendix 8)

ITALY

The table below shows the Cumulative Average Abnormal Return (CAAR) for the Italian elections in 2018 and 2022.

TABLE 13.10 – CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTION DAY - ITALY

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon							
Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**	Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**
	Italy Event date: 05mar2018				**Italy Event date: 26sep2022**		
LAT	-1.00%	-1.88%	-8.92%	LAT	-7.60%	-3.77%	-4.72%
LFR	-2.20%	-1.82%	-6.27%	LFR	-6.54%	-2.69%	-3.13%
LES	-2.68%	-4.12%	-8.86%	LES	-7.81%	-4.56%	-4.52%
LIT	**-2.64%**	**-3.50%**	**-6.97%**	**LIT**	**-5.70%**	**-3.12%**	**-0.07%**
LNL	-1.37%	-1.72%	-6.74%*	LNL	-7.23%	-6.49%	-8.65%
LPT	-3.96%	-2.41%	-6.39%	LPT	-12.28%**	-10.70%*	-11.69%*
Ptf CARs	-2.30%	-2.57%	-7.36%*	Ptf CARs	-7.87%	-5.23%	-5.47%
CAAR group	-2.29%**	-2.55%**	-7.32%**	CAAR group	-7.84%**	-5.19%**	-5.41%**
*** p-value < .01, ** p-value <0.05, * p-value <0.1							

Source: Adapted from Stata output

The results of the 2022 Italian elections showed a notable shift in power; the winning party had finished fifth in the previous elections 2018, as shown in Table 5.11.

As a result, the CAAR turns negative for all windows in 2022, with a loss of up to 12.28% in Portugal. However, the 2018 elections had a detrimental effect as well; The maximum CAAR lost was 8.92%, in Austria (Table 5.10).

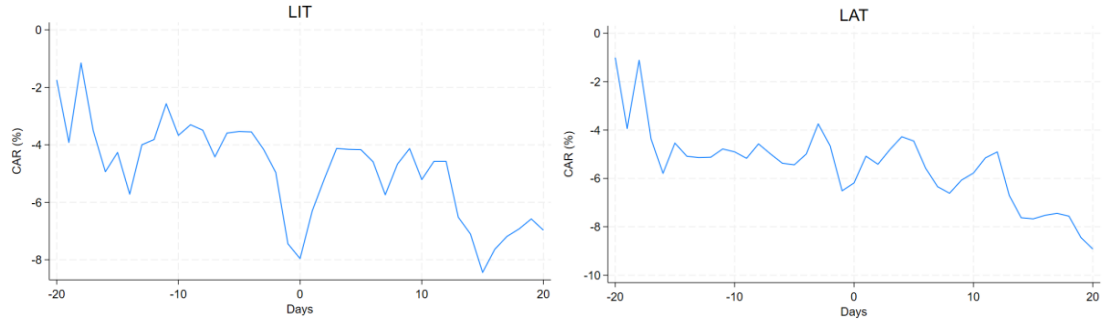
The Italian election results for the relevant years are shown in the table below.

TABLE 14.11 - ELECTIONS RESULTS - ITALY

Elections - Italy	04/03/2018	25/09/2022	WING
Five Star Movement - M5S	32.68%	15.43%	Social - democratic
Democratic Party - PD	18.76%	19.04%	Right-wing populist
Lega per Salvini Premier - Lega	17.35%	8.79%	Centre-Right
Force Italy - FI	14.0%	8.11%	Liberal, Conservative, Christian-Democratic, Liberalism, populism
Brothers of Italy - FdI	**4.35%**	**25.98%**	National, conservative, right wing, populism
Free and Equal - FdU	3.39%	0.0%	Left wing
Others	9.50%	22.6%	

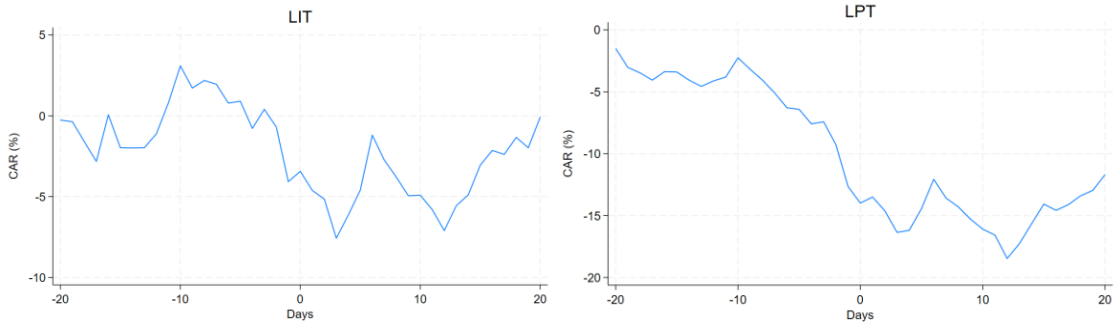
Source: Own

GRAPH 5.9 - ITALY ELECTION 2018 - CAR LIT AND LAT



Source: Output Stata

GRAPH 5.8 - ITALY ELECTION 2022 - CAR - LIT AND LPT



Source: Output Stata

Graph 5.9 shows the number of days to the event on the x line, and the CAR for Italy and Austria Index for the 2018 Italian Election. Once more, every variable has a similar pattern, but strangely, there is a notable negative peak close to the event day. (see graphs for all variables in Appendix 9)

In Graph 5.10, the CAR for Italy and Portugal Index for the 2022 Italian Election is displayed. Given that the 20-day window for the Italy election of 2022 marks the fourth election held during the pandemic, all indexes exhibit extreme volatility. Once more, all

the factors are pointing negatively during the Italian election result, with Portugal, France, and the Netherlands never moving out of the red. (see graphs for all variables in Appendix 10).

NETHERLANDS

The Cumulative Average Abnormal Return (CAAR) for the elections in the Netherlands in 2021 and 2023 is displayed in the Table below.

TABLE 15.12– CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTION DAY - NETHERLANDS

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon							
Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**	Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**
	Netherlands Event date: 17mar2021				**Netherlands Event date: 22nov2023**		
LAT	2.00%	4.40%	6.17%	LAT	4.17%	6.21%	10.84%
LFR	3.96%	5.97%	7.56%	LFR	5.67%	8.13%	8.43%
LES	2.90%	4.11%	5.98%	LES	10.41%*	11.19%*	11.65%
LIT	6.09%	5.59%	4.48%	LIT	5.96%	7.90%	8.42%
LNL	**4.72%**	**6.23%**	**2.95%**	**LNL**	**4.78%**	**8.25%**	**8.38%**
LPT	3.11%	5.76%	3.62%	LPT	5.53%	2.56%	3.89%
Ptf CARs	3.81%	5.34%	5.12%	Ptf CARs	6.07%	7.36%	8.58%
CAAR group	3.84%***	5.38%***	5.17%***	CAAR group	6.10%***	7.40%***	8.64%***
*** p-value < .01, ** p-value <0.05, * p-value <0.1							

Source: Adapted from Stata output

The most unexpected CAAR results from both elections were displayed by the Netherlands elections, in 2023, average abnormal returns were very high—they reached 11,65% in Spain. The Netherlands is the only nation to hold elections on Wednesdays, working day. The results for all variables in both elections are displayed in Table 5.12.

The Netherlands election results for the relevant years are shown in the Table 5.13.

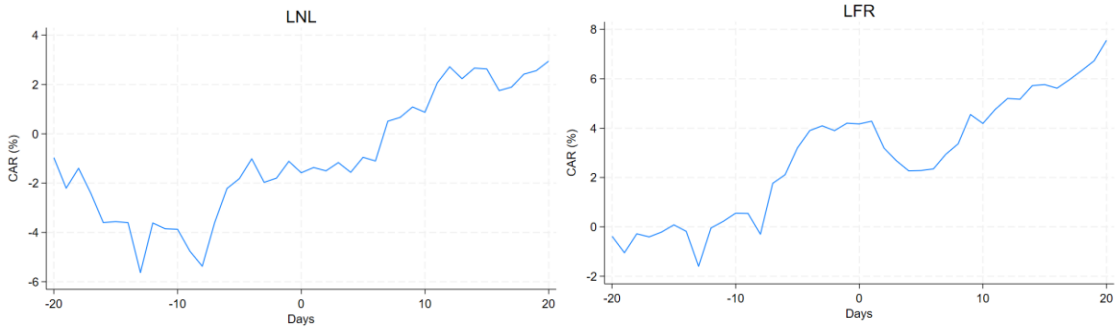
TABLE 16.13 - ELECTIONS RESULTS - NETHERLANDS

Elections - Netherlands	17/03/2021	22/11/2023	WING
People's Party for Freedom and Democracy - VDN	21.87%	15.24%	Conservative Liberal
Democrats 66 - D66	15.02%	6.29%	Social Liberal
Party for Freedom - PUU	**10.79%**	**23.49%**	**Nationalist and right-wing populist**
Christian Democratic Appeal - CDA	9.5%	0.00%	Christian-Democratic
New Social Contract - NSC		12.88%	centre-right, anti-establishment, Christian democratic
Socialist Party - SP	5.98%	0.00%	Democratic socialist
Farmer–Citizen Movement - BBB		4.65%	Agrarian and right-wing populist
Labour Party - Pvda	5.73%	15.8%	Social - democratic
Others	31.10%	21.7%	

Source: Own

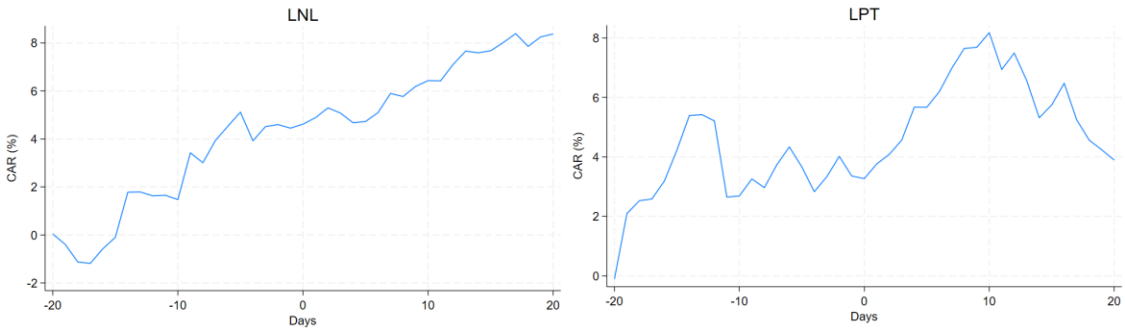
It is noteworthy to mention that the Netherlands transitioned from a liberal and conservative government in 2021 to a right-wing and nationalist government in 2023. Despite this significant political shift, the financial markets reacted favourably. Additional outcomes are shown in table 5.13.

GRAPH 5.9 - NETHERLANDS ELECTION 2021 - CAR - LNL AND LFR



Source: Output Stata

GRAPH 5.10 - NETHERLANDS ELECTION 2023 - CAR LNL AND LPT



Source: Output Stata

In Graph 5.11, the CAR for Netherland and France Index for the 2021 Dutch Election is displayed. First, it should be noted that the 2021 Netherlands election will be the first one held for the indexes under study during the epidemic. It is evident that the CAR is increasing with an upsurge around the event date. (see graphs for all variables in Appendix 11).

In Graph 5.12, the CAR for Netherland and Portugal Index for the 2023 Dutch Election is displayed. The finds about the Dutch elections are quite intriguing. Once more, all indices show an increasing trend during the window, apart from Portugal, and no particularly strong performance on the day of the event. (see graphs for all variables in Appendix 12).

PORTUGAL

The table below shows the Cumulative Average Abnormal Return (CAAR) for the Portugal elections in 2019, 2022, and 2024.

TABLE 17.14– CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTION DAY – PORTUGAL 2019 AND 2022

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon							
Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**	Windows	**CAAR(-10,10)**	**CAAR(-15,15)**	**CAAR(-20,20)**
	Portugal Event date: 07oct2019				**Portugal Event date: 31jan2022**		
LAT	0.42%	4.84%	9.16%	LAT	-2.30%	-6.94%	-13.59%
LFR	-0.98%	0.93%	3.30%	LFR	-4.70%	-7.00%	-8.47%
LES	2.73%	3.63%	5.22%	LES	-2.45%	-2.77%	-2.31%
LIT	1.35%	1.90%	5.50%	LIT	-4.69%	-6.65%	-8.29%
LNL	-0.53%	0.75%	2.13%	LNL	-5.35%	-8.79%	-10.61%
LPT	**-0.14%**	**0.92%**	**4.32%**	**LPT**	**-2.60%**	**-2.30%**	**-0.66%**
Ptf CARs	0.46%	2.15%	4.93%	Ptf CARs	-3.68%	-5.75%	-7.30%
CAAR group	0.48%***	2.18%***	4.97%***	CAAR group	-3.66%**	-5.71%**	-7.25%**
*** p-value < .01, ** p-value <0.05, * p-value <0.1							

Source: Adapted from Stata output

Surprisingly, all the study's variables showed negative CAAR in response to a majority government. However, in every window, 2019 and 2024 displayed positive CAAR. Furthermore, the Spanish index showed unexpectedly large gains in 2024, achieving a gain of 8.22%.

The CAR graph in the 2019 elections had a V-shape, in the 2022 election it was indefinite, and in the 2024 election it increased. With respect to the three elections in Portugal that were the subject of the analysis, the indices did not exhibit any trend pattern in relation

to the event. As a result, the findings are highly intriguing and pave the way for additional research to clarify the findings. Tables 5.14 and 5.15 present all the CAAR's results for potential consultation.

TABLE 18.15 -CUMULATIVE AVERAGE ABNORMAL RETURN AROUND ELECTIONS DAY - PORTUGAL 2024

Event Study with common event date, with 3 event windows, using the Generalised Sign test by Wilcoxon			
Windows	CAAR(-10,10)	CAAR(-15,15)	CAAR(-20,20)
	Portugal Event date: 11mar2024		
LAT	2.84%	3.55%	5.16%
LFR	1.64%	3.88%	3.82%
LES	7.66%	1.75%	8.22%
LIT	5.07%	7.30%	7.26%
LNL	1.90%	1.99%	2.71%
LPT	**-1.21%**	**1.02%**	**1.64%**
Ptf CARs	2.99%	4.74%	4.79%
CAAR group	3.02%***	4.78%***	4.84%***
*** p-value < .01, ** p-value <0.05, * p-value <0.1			

Source: Adapted from Stata output

The results of the Portuguese elections for the scrutinized years are shown in the table below.

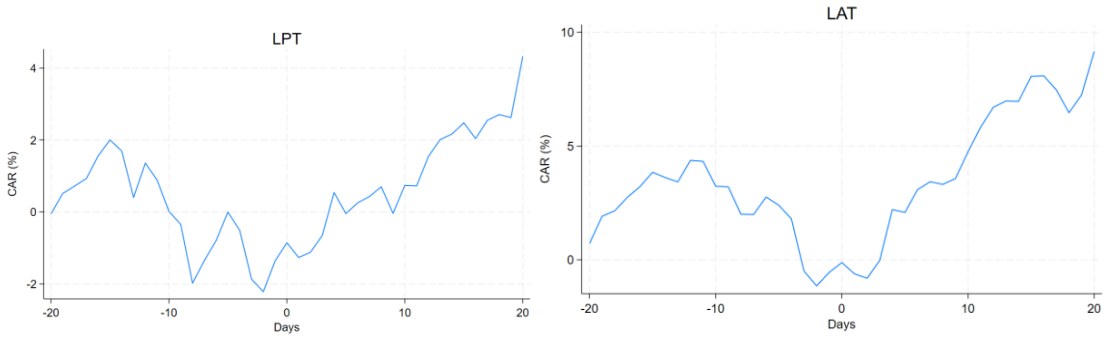
TABLE 19.16- ELECTIONS RESULTS - PORTUGAL

Elections - Portugal	06/10/2019	30/01/2022	10/03/2024	WING
Socialist -PS	36.35%	41.38%	28.00%	Social Democratic
Social Democrate -PSD	**27.77%**	**27.66%**	**28.80%**	Liberal Conservative
Left Bloc - BE	9.52%	4.40%	4.40%	Left wing populist
Unitary Democratic Coalition - CDU	6.3%	4.3%	3.20%	Comunist
People's Party - CDS	4.22%	1.60%	0.00%	Christian-Democratic, conservative
People Animal Nature - PAN	3.32%	1.58%	2.00%	Environmentalist, animal rights,and animal welfare
Chega	1.29%	7.18%	18.10%	National conservative, right-wing populist
Liberal Iniciativa - IL	1.29%	4.92%	4.90%	Liberal
Others	9.90%	7.00%	10.6%	

Source: Own

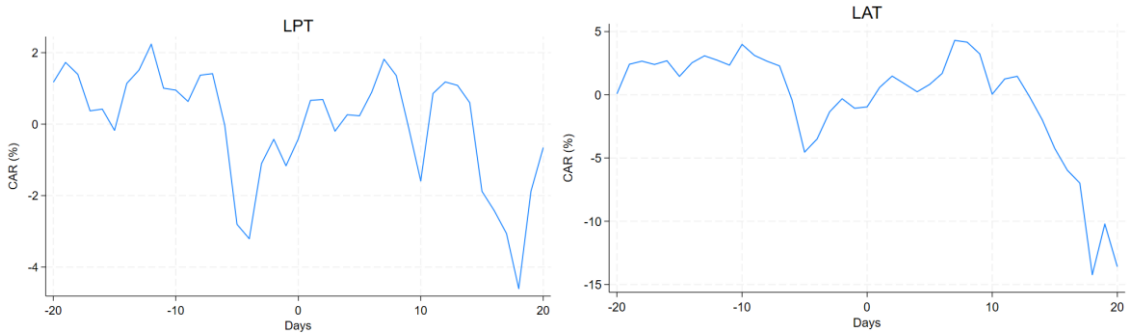
In 2022, Portugal's minority centre-left government was strengthened by a majority government. However, it was narrowly defeated by a minority centre-right government in the 2024 election. For more details on the Portuguese election outcomes over the course of three years, see table 5.16.

GRAPH 5.11 - PORTUGAL ELECTION 2019 - CAR - LPT AND LAT



Source: Output Stata

GRAPH 5.12 - PORTUGAL ELECTION 2022 - CAR - LPT AND LAT



Source: Output Stata

The Appendix 13 and 14 contains the graphs of all the variables in addition to those of Graph 5.13 and 5.14.

5.3. Implications for investors

The findings suggest that the market responds sharply to political exchanges, regardless of the direction it takes, so validating the perception of political risk associated with elections within the financial markets.

Investors approach the financial market in three ways: through arbitrage, speculation, and hedging. Arbitrage involves taking advantage of price differences to achieve a guaranteed profit, since this study does not address this scenario, it will concentrate on the other two: hedging and speculating.

DCC-GARC model predicted a positive correlation between the variables over the given time, the variables exhibit both positive and negative CAAR depending on the circumstances when we analyse subperiod data, such as elections, however, the factors

displayed all showed outcomes that were either favourable or negative, supporting the earlier findings.

Investors should therefore take that into account while building a portfolio using these variables, both in the short and long term.

In both the first and second rounds of elections, France has negative CAAR. In all windows, the loss might reach up to 13% (Spain). This is valuable information that can be used for hedging or speculation.

Similar trends may be seen in Italy; however, at this stage, the Portuguese index is the most volatile, with a negative CARR of up to 12,28%.

Conversely, the Netherlands has a positive CAAR in both elections; the Spanish index achieved the maximum gain of 11,65%.

Portugal had intriguing behaviour as well. The elections in 2019 and 2024 resulted in a positive CAAR, whereas the elections in 2022 resulted in a negative CAAR.

When utilized prudently, this data can greatly assist investors in their speculative or hedging endeavours.

The maximum and minimum CARR values attained by the six indices examined in respect to the elections under consideration are displayed in Table 5.17.

This table, which is crucial for investors, lets evaluate the possible return that could be concealed in the indexes' volatility during an election.

TABLE 20.17- SUMMARY TABLE OF MAXIMUM AND MINIMUM CAAR FOR ALL ELECTORAL ACTS

Elections	LAT				LFR				LES				LIT				LNL				LPT				CAR Graph shape
	Min		Max		Min		Max		Min		Max		Min		Max		Min		Max		Min		Max		
	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	CAAR	w	
AT 2017									-4.71%	20									4.05%	15					Uns
AT 2019			8.84%	20																	-1.64%	10				V
FR 2017									-13.26%	20													-3.51%	10	↘
FR 2017									-13.08%	20			-3.76%	10											↘
FR 2022									-12.47%	15													4.41%	20	↘
FR 2022	-16.00%	10																					0.30%	20	↘
ES 2019			3.34%	20					-1.78%	15													4.41%	20	⌒
ES 2023			2.58%	10													-4.26%	20							⌒
IT 2018	-8.92%	20	-1.00%	10																					V
IT 2022															-0.07%	20					-12.28%	10			V
NL 2021	2.00%	10					7.56%	20																	⌒
NL 2022											11.65%	20									2.56%	15			↗
PT 2019			9.16%	20	-0.98%	10																			V
PT 2022	-13.59%	20																					-0.66%	20	Uns
PT 2024											8.22%	20									-1.21%	10			↗

Source: Own

Where:

CAR – Cumulative Abnormal Return

CAAR – Cumulative Average Abnormal Return

Min – Minimum CAAR

Max – Maximum CAAR

Uns – Unshaped CAR Graph

W – Windows (days)

V – V-shaped graph

↘ - steep chart of decline

⌒ - Inverted u-shaped chart

↗ - Chart with a steep ascent

The Table 5.17 displays the volatility of the financial markets along with some tendencies; where there is risk, there is also possibility for profit.

The Austrian, Spanish, and Portuguese indices are the most volatile. These are the indices that show the lowest values, but they also show the highest values most of the time.

The four elections that were held during the pandemic are indicated by the horizontal gray lines. It is noteworthy to emphasize that other than Portugal, no country substantially modifies the CAAR pattern acquired outside of the pandemic period. This implies that the elections' influence on the CAAR persisted during this time.

On the other hand, the investor can optimize the abnormal return if he anticipates the lower and upper peaks with respect to election day. The study results and directions for further research are displayed in the next session.

6. CONCLUSIONS

The conclusions of this study can be summarized as follows:

First, the complete sample dynamic connectedness analysis of volatility revealed that the total connectedness of the volatility series varied from 62,21% (Pairwise Netherlands/Portugal) to 86,01% (France/Italy). This suggests that there are significant conditional correlations between the six European indexes.

As a result, the variables are not appropriate for hedging strategies and shouldn't be retained in their whole on a portfolio; yet the study presents some intriguing findings for investors who wish to speculate.

Second, the Spanish index proves to be the most volatile, with the largest CAAR 11,65% (Netherlands 2023) and the biggest decline CAAR 13,08% (2018 second round France elections). This information is crucial to a speculative investor, to know the directions of the index volatility towards an event (elections).

Thirdly, France had the most consistent results, with a curve that was obviously dropping and had no discernible peak over the window period, and negative CAR in all indexes and electoral acts examined.

Fourth, we were able to identify the negative peak on election day thanks to Italy's V-shaped graph for the two elections under study. Investors who wish to purchase low and sell high need to be aware of this pattern and this information.

Lastly, the only two nations with a positive influence on the indices under study, whose upper peak matches with election day, are Spain and the Netherlands, who have an inverted u-shaped graph. Finding the other peak in the anticipation window is crucial in these situations.

The study's drawbacks included the discovery that the 20-day window was too short because, in most cases, it was impossible to identify the opposite peak of volatility. An individual study of the variables and/or the addition of variables to the model are

warranted in some situations due to another constraint, which has to do with some unexpected results that the model is unable to explain.

This analysis opens several paths for future research.

The first point to emphasize, given the significant volatility spillover across these indices, is the significance of figuring out the dynamic volatility connectivity among the 27 EU member states to identify which nations are transmitters of volatility and receivers of volatility, (Zhang & Hamori, 2022, Diebold & Yilmaz, 2012, Gabauer, 2020).

It was not able to identify volatility peaks during the examination. Finding the other peak while extending the window's duration from 20 to 30 or even 40 days would be an intriguing line of inquiry, as we typically discovered one of the peaks quite near to the day of the event but failed to locate the other.

Compared to a situation where volatility is constant, investors are less likely to hang onto a stock with an unrealized gain and are more likely to sell their position because of this increased risk perception. But when volatility shifts are noticed for indices with consistent historical volatility, investors' inclination to sell shifts in the unrealized loss area (Orihara, 2024).

Symmetric windows have been used in this study, but it would be interesting to try asymmetric windows to see if anticipation and adjustment happen at the same rate.

In fact, it would be possible to determine the maximum possible return in an event like elections by conducting a study specifically for adjustment.

Investors gained valuable information from all variables, particularly if speculating was the goal. But the study only found an association with the elections themselves, not with the direction of the vote. Therefore, increasing the number of countries being analysed would be an intriguing additional research direction.

Including different kinds of variables in the model, like majority or minority governments, would be an additional avenue for investigation. Alternatively, if the turbulence reaches the party's initial economic and political policies after it was elected.

The remarkable outcomes of this inquiry, in certain nations, pave the way for additional inquiries to shed light on certain findings.

For instance, the two-round election system in France makes speculation more likely because of the country's higher and longer-lasting volatility than in other nations. Therefore, one feasible avenue of inquiry would be to examine an analysis of the event for the French elections over a longer time frame and with a window larger than 30 days, which justifies expanding the window to 40 days in this case or employing windows measured in weeks, extending the analysis period, adhering to certain patterns found in the literature (Wagner, Zeckhauser & Ziegler, 2018).

An intriguing avenue of research would be to objectively validate this conclusion by extending the study's duration to validate this pattern in the Italian elections, as the indices under examination in both elections displayed a V-shaped tendency. It is significant information for investors to find a pattern of volatility in an event.

On election day, the Netherlands was the only nation to have a positive volatility peak; the negative peak was obscure. Therefore, finding the other peak by lengthening the window to at least 30 days and widening the time frame—and cross-referencing the data with those from prior elections—would be an intriguing avenue of research.

Portugal would also make an intriguing case study because, in the three elections that were examined, the indices' behaviour at the election was unexpected. In the one election where there was a winning party with an absolute majority, the indices showed negative CAAR, underscoring the significance of analysing Scientifically speaking, this variable (Governments in the majority versus those in minority).

This study used the historical mean model to calculate returns; however, the same study could have been conducted with the market model or the CAPM model, which would have produced different CAR values. Given that the indices are not appropriate for portfolio construction, exploring the other models may yield unexpected findings and provide an intriguing avenue for research (Damodaran, 1999).

Simply put, keeping in mind the study's research questions:

H1: Has election uncertainty a significant impact on stock return and stock volatility in pre and post -election periods?

H2: Does the emergence of far-right movements in several of European nations lead to unstable financial markets?

It can draw the conclusion that the return and volatility of the indices examined before and after elections are affected by elections. However, there is no evidence that far-right parties cause volatility in the financial Markets.

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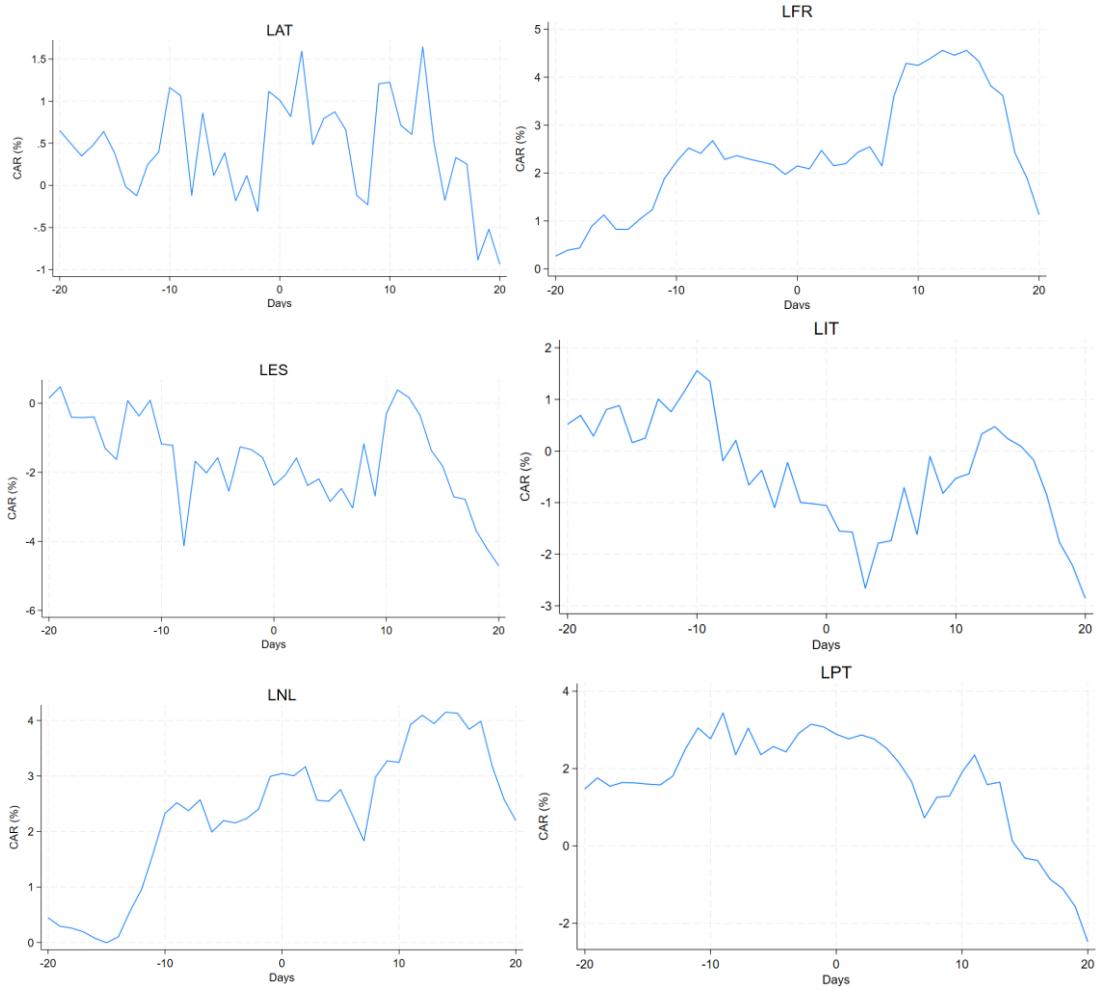
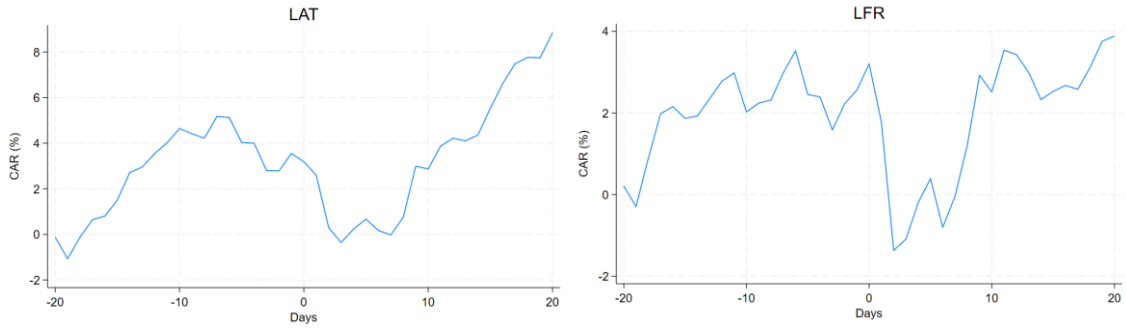
APPENDICES

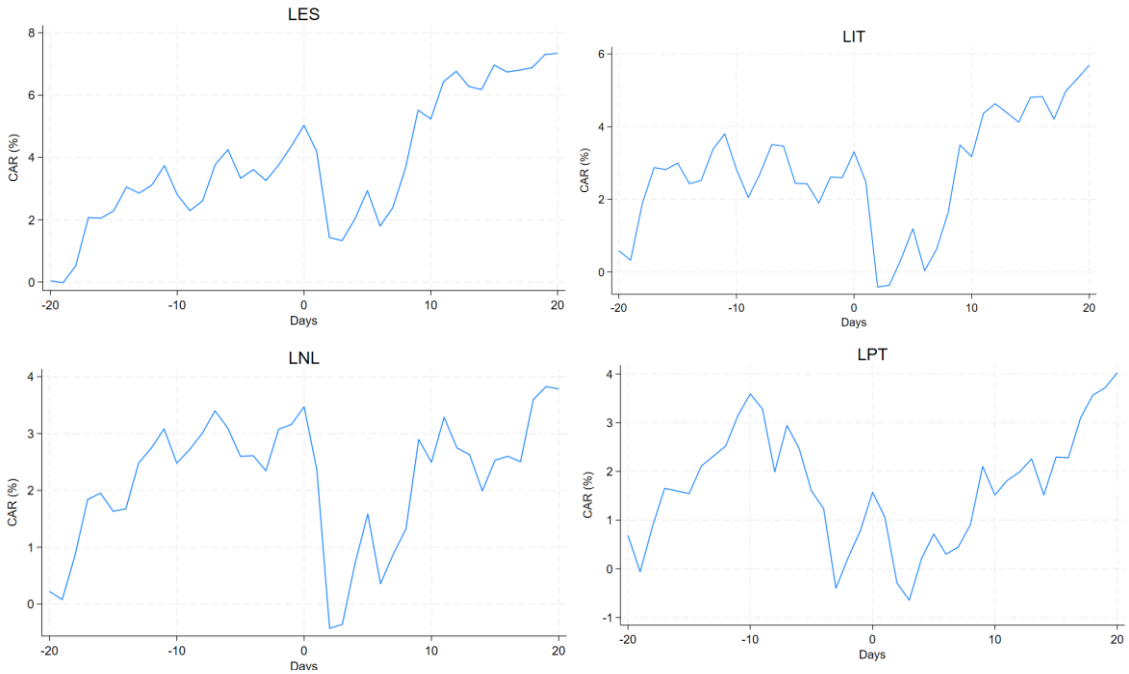
APPENDIX 1 - AUSTRIA ELECTION 2017 - CAR - ALL VARIABLES



Source: Output Stata

APPENDIX 2 - AUSTRIA ELECTION 2019 - CAR ALL VARIABLES





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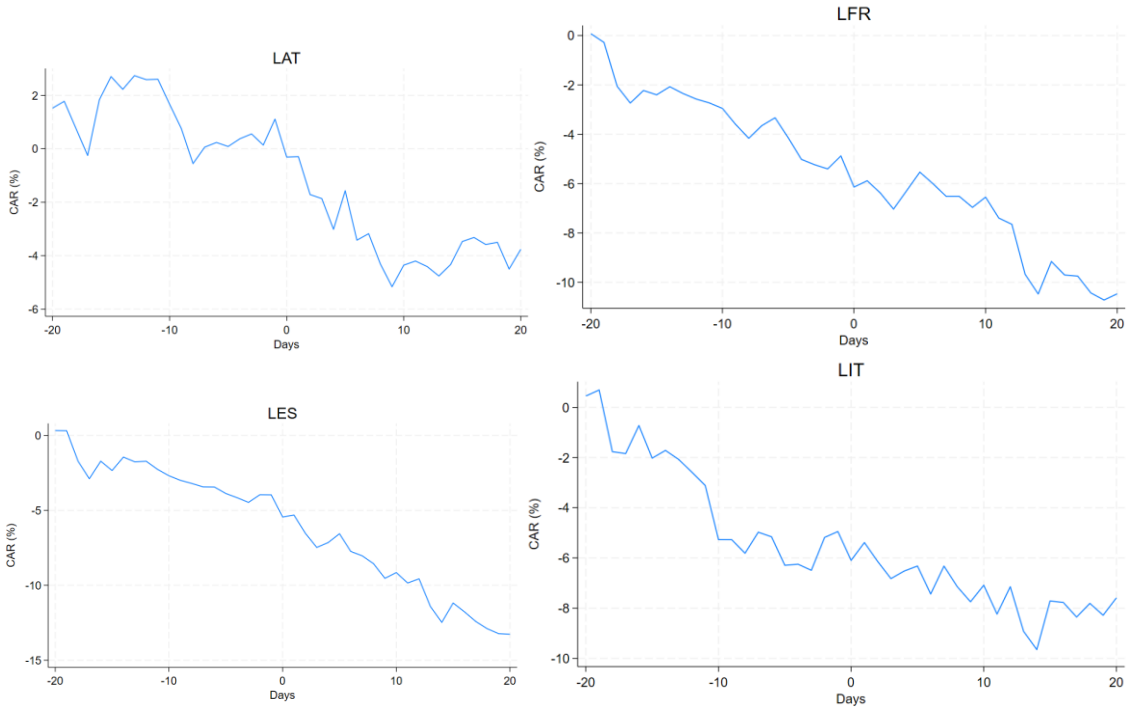
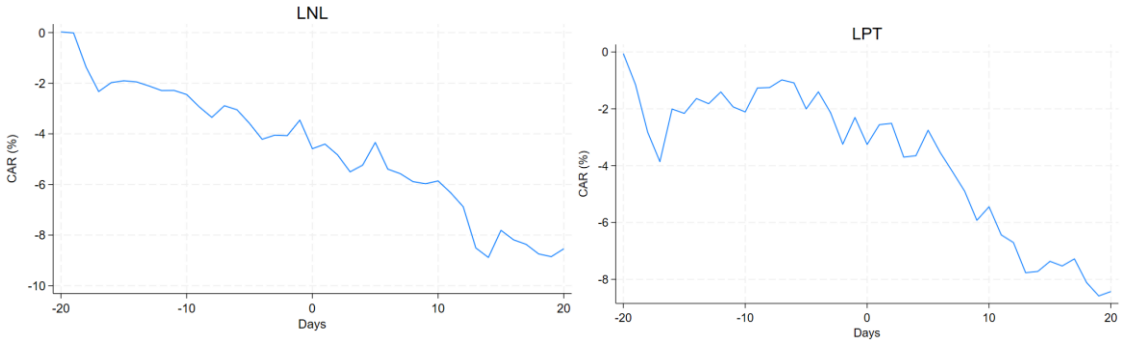
APPENDIX 3 - FRANCE ELECTION 2017 - 1ST ROUND - CAR - ALL VARIABLES





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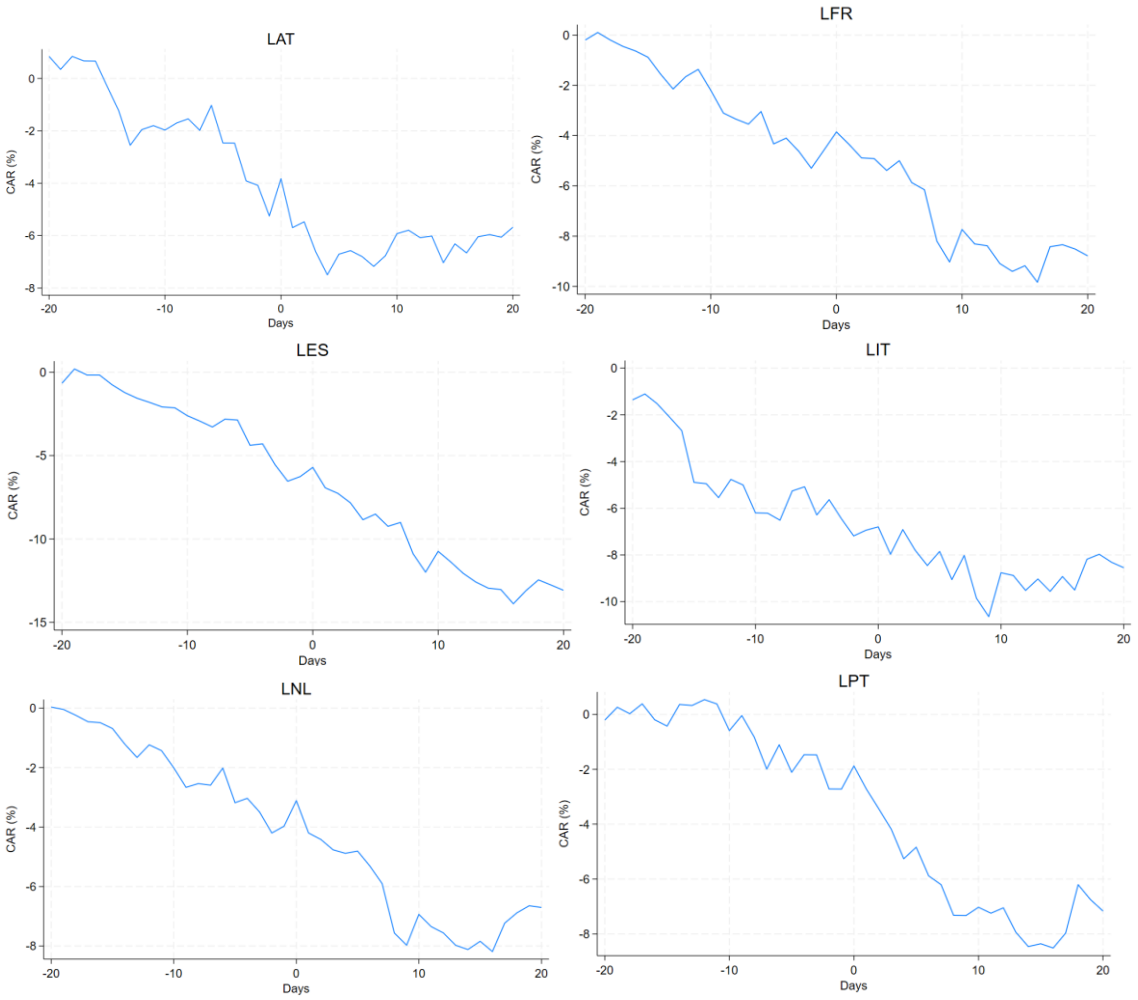
APPENDIX 4 - FRANCE ELECTION 2017 - 2ND ROUND - CAR - ALL VARIABLES



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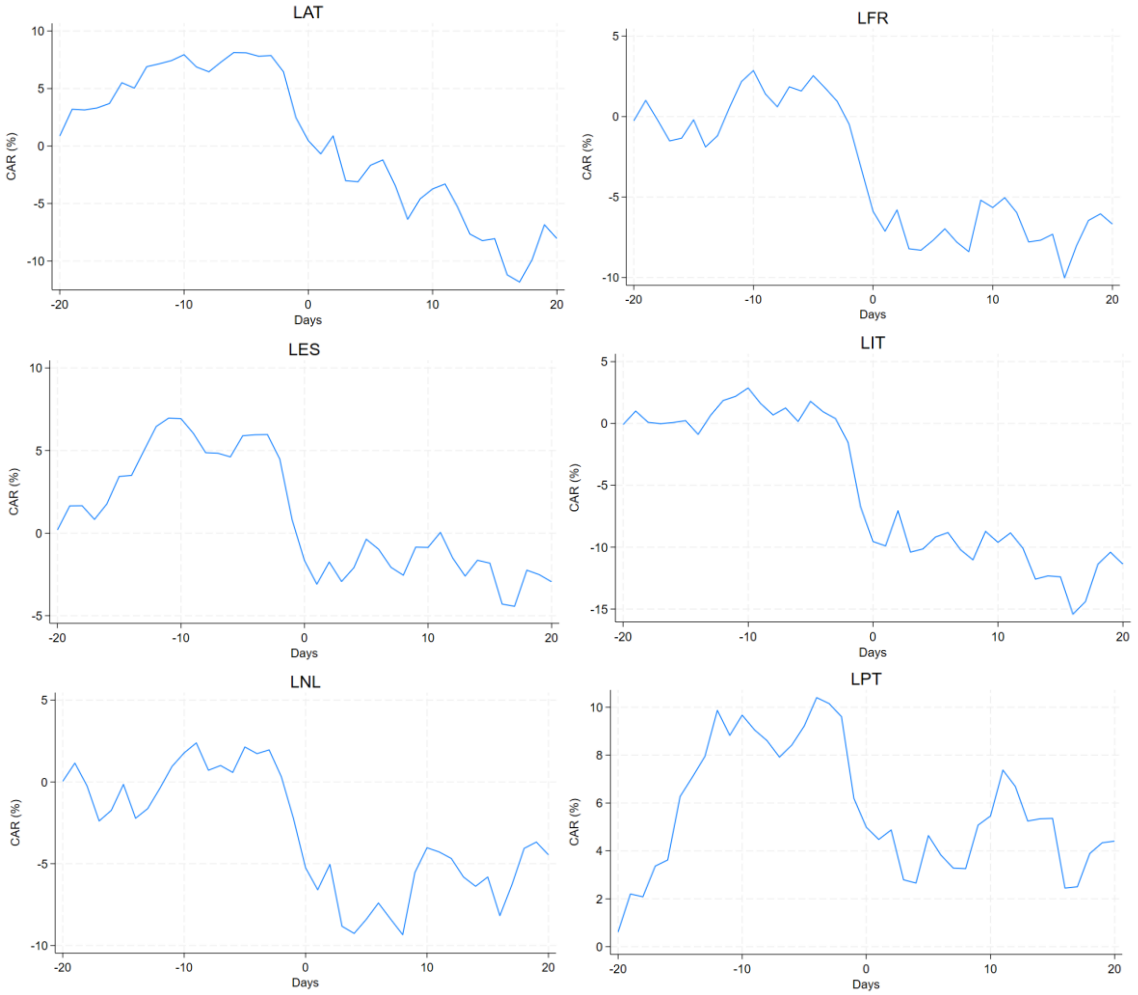
APPENDIX 5 - FRANCE ELECTION 2022 1ST ROUND - CAR - ALL VARIABLES



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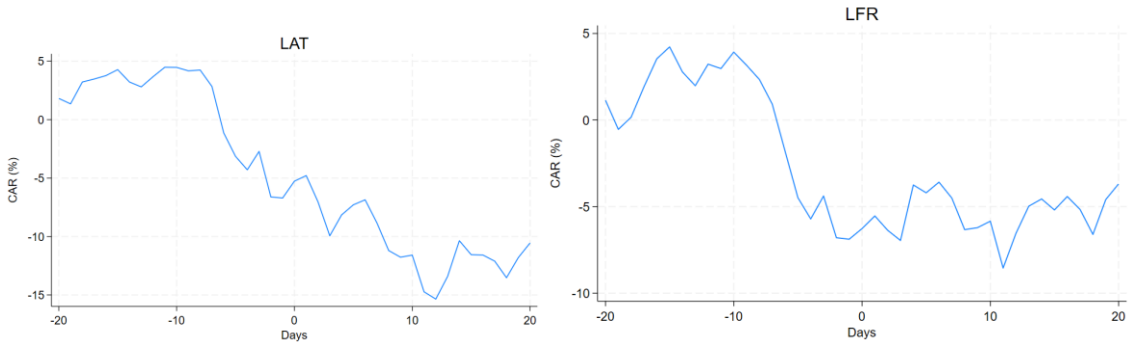
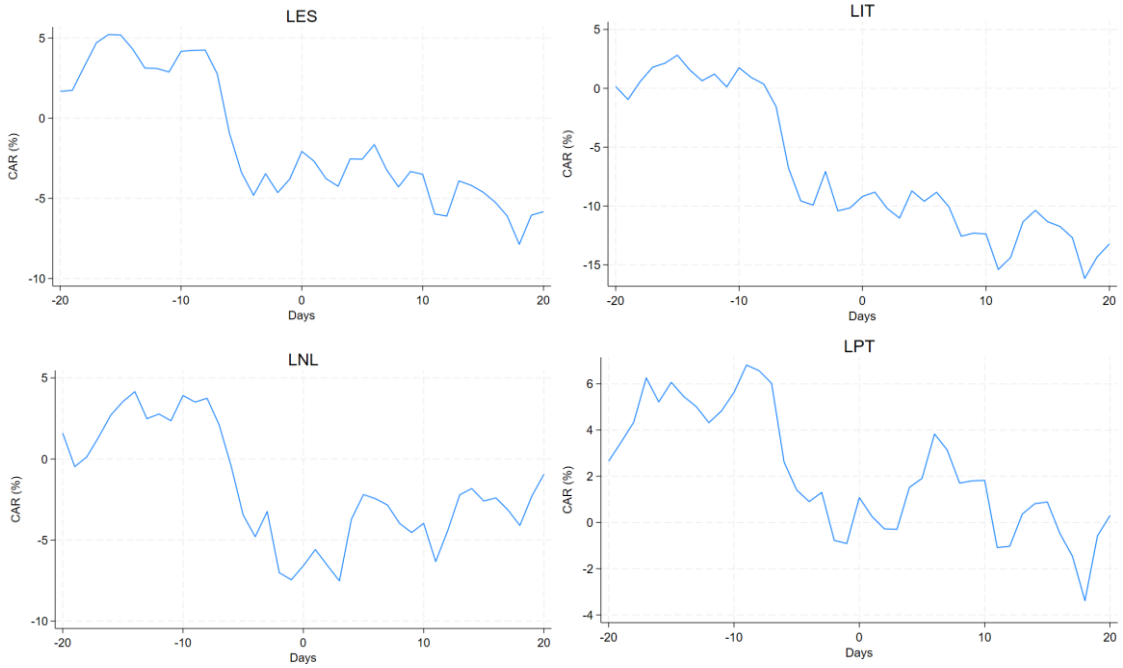
APPENDIX 6 - FRANCE ELECTION 2022 2ND ROUND - CAR - ALL VARIABLES





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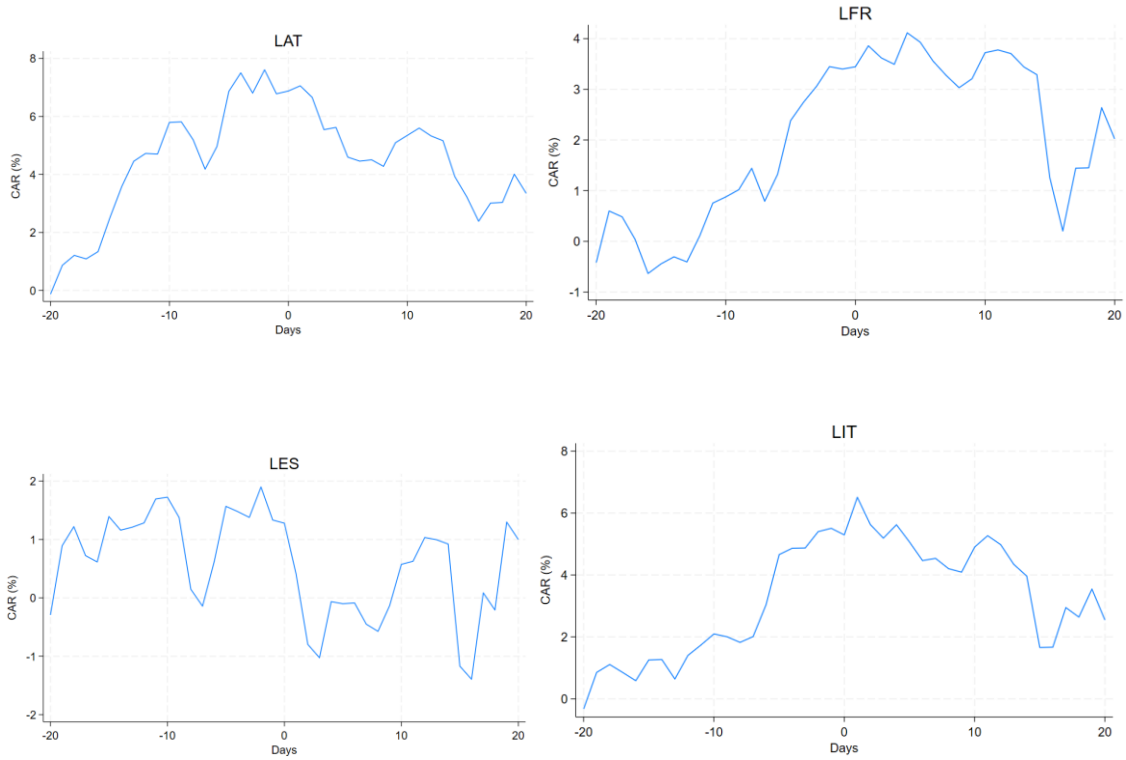
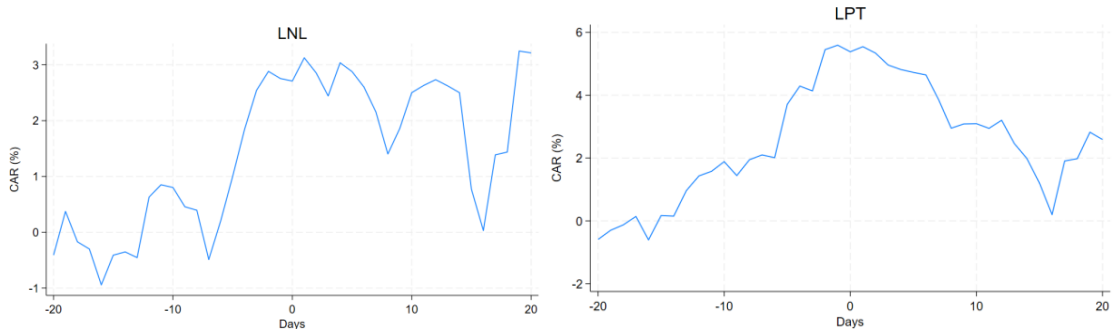
APPENDIX 7 - SPAIN ELECTION 2019 - CAR - ALL VARIABLES





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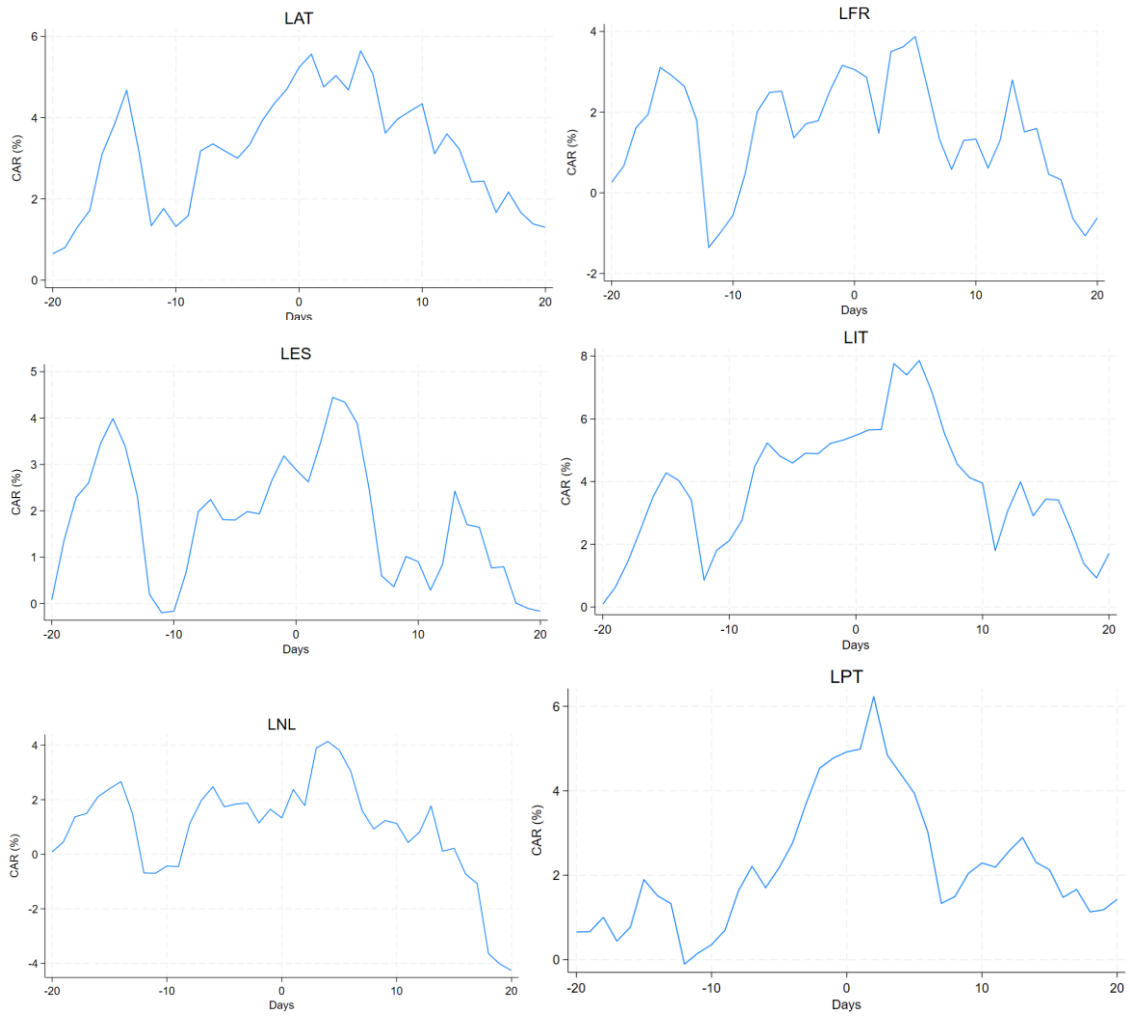
APPENDIX 8 - SPAIN ELECTION 2023 - CAR - ALL VARIABLES



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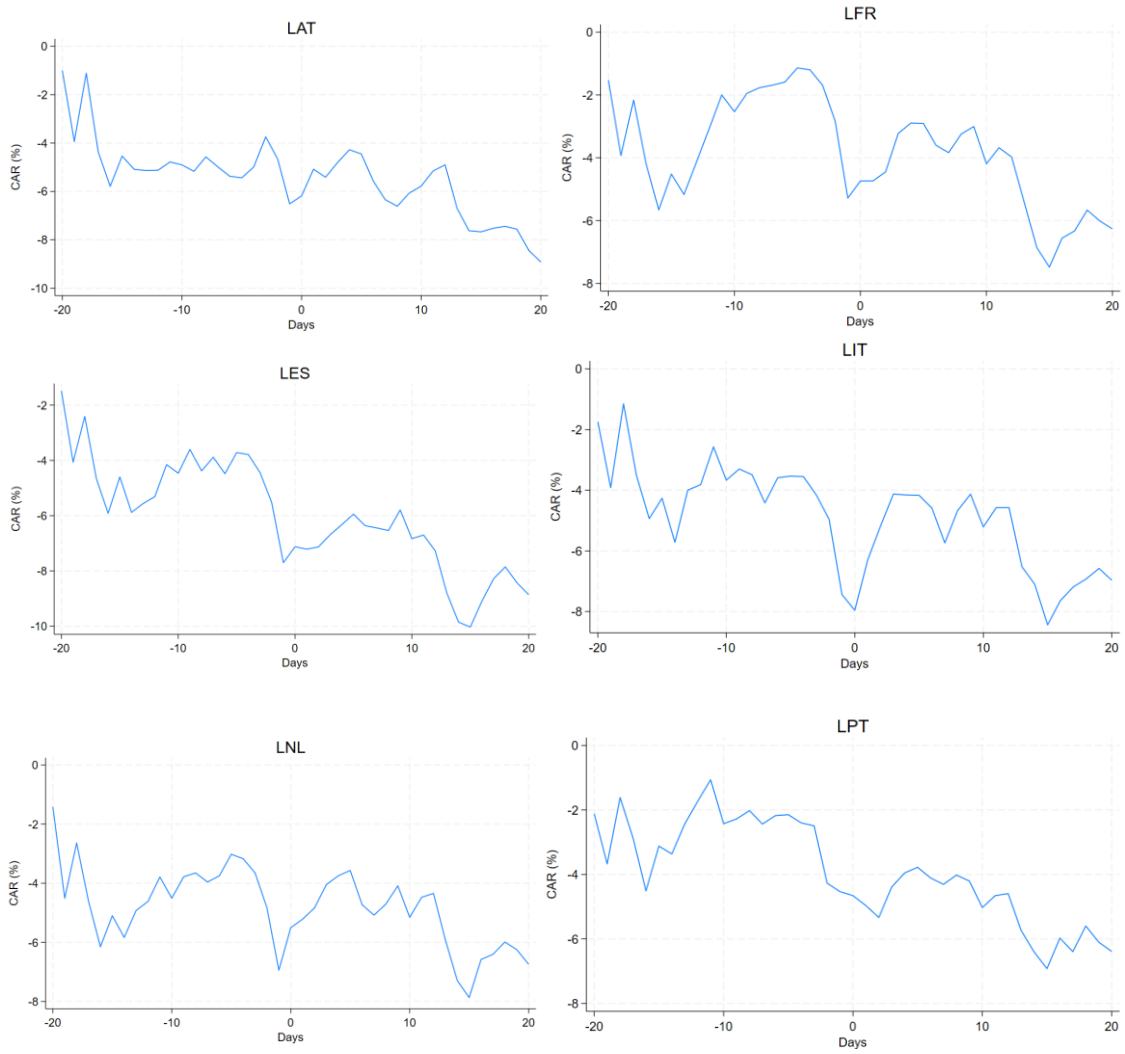
APPENDIX 9 - ITALY ELECTION 2018 - CAR - ALL VARIABLES



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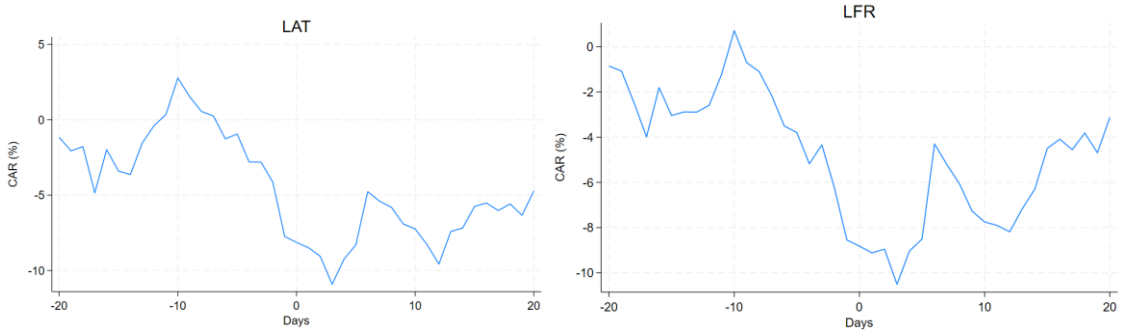
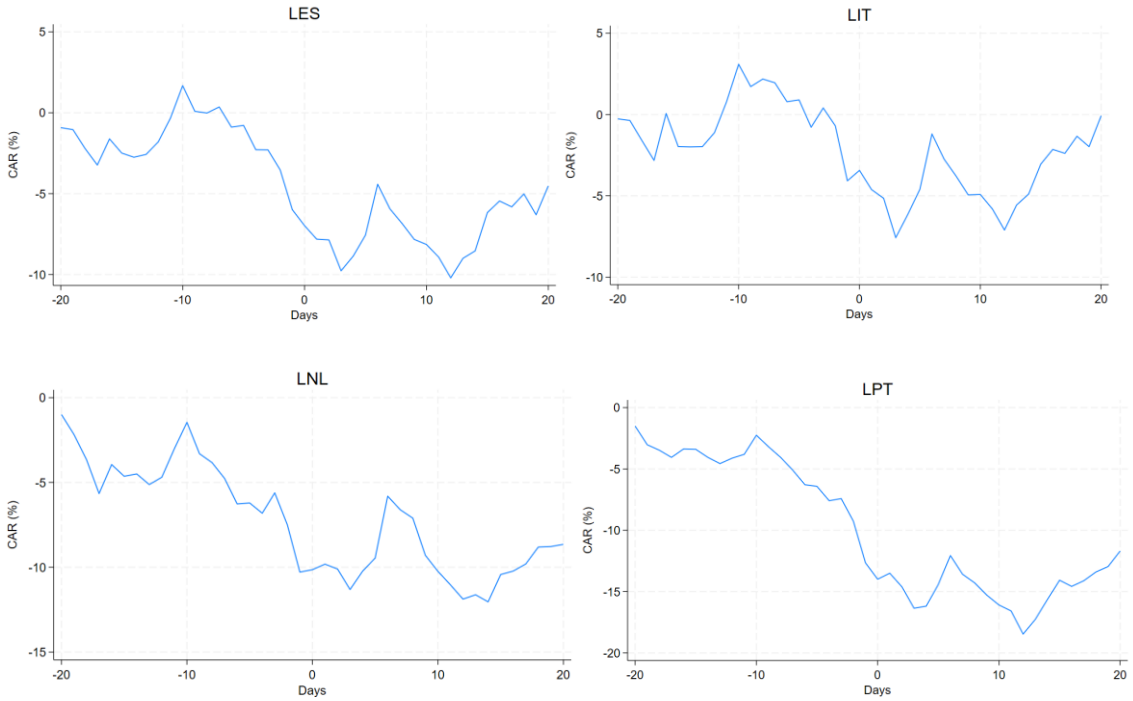
APPENDIX 10 - ITALY ELECTION 2022 - CAR - ALL VARIABLES





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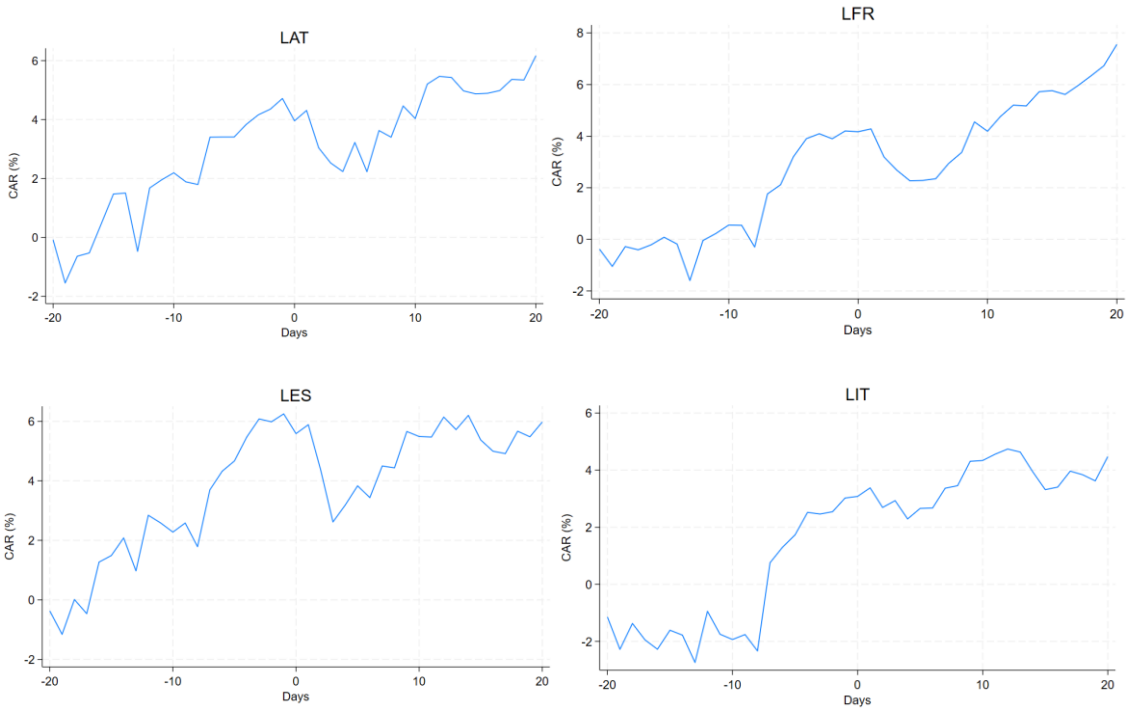
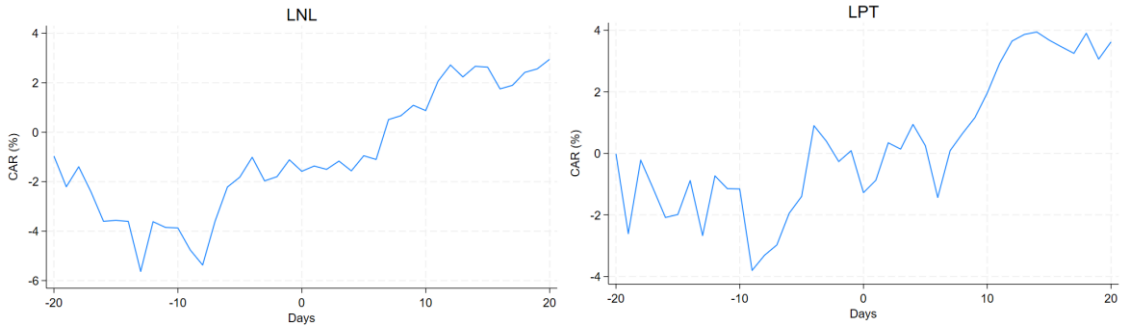
APPENDIX 11 - NETHERLANDS ELECTION 2021 - CAR - ALL VARIABLES





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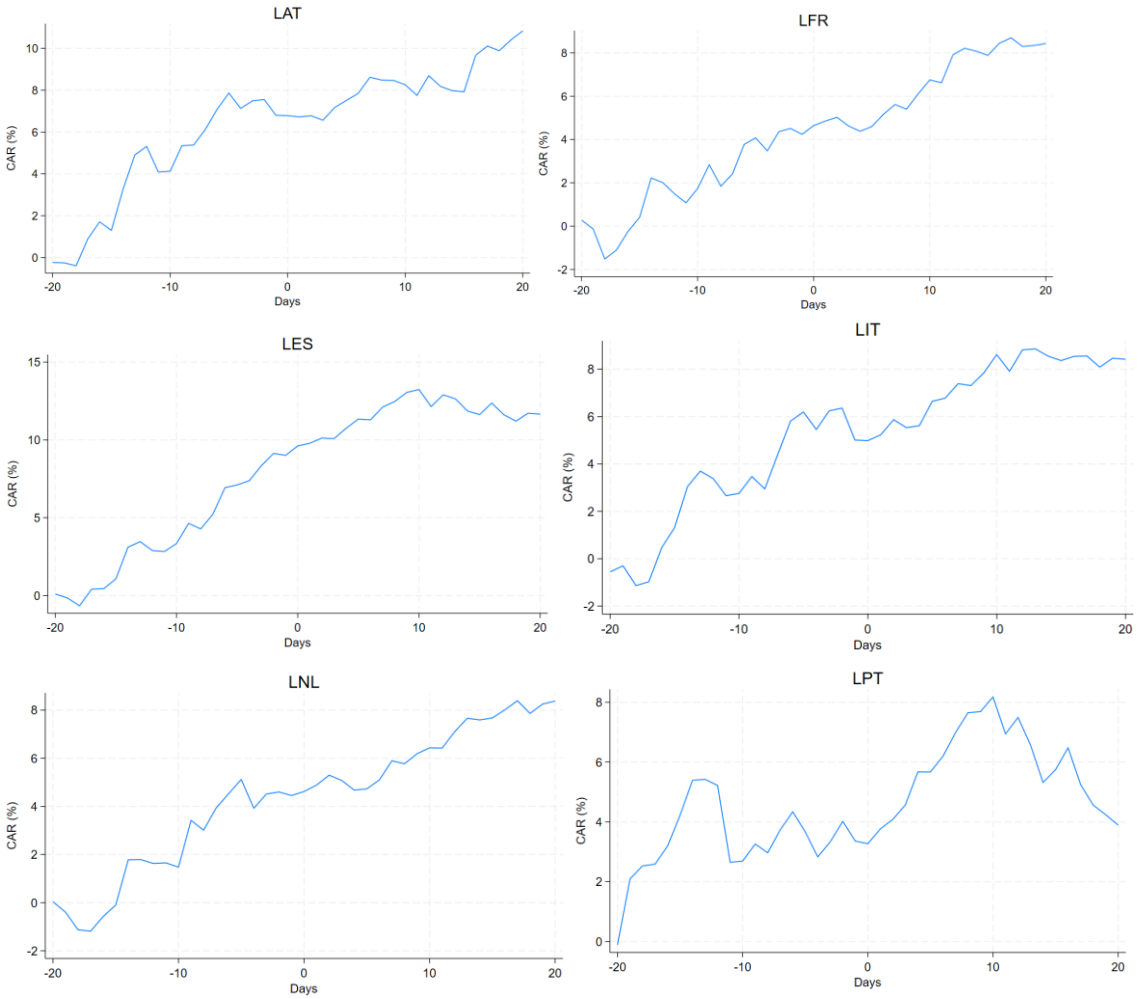
APPENDIX 12 - NETHERLANDS ELECTION 2023 - CAR - ALL VARIABLES



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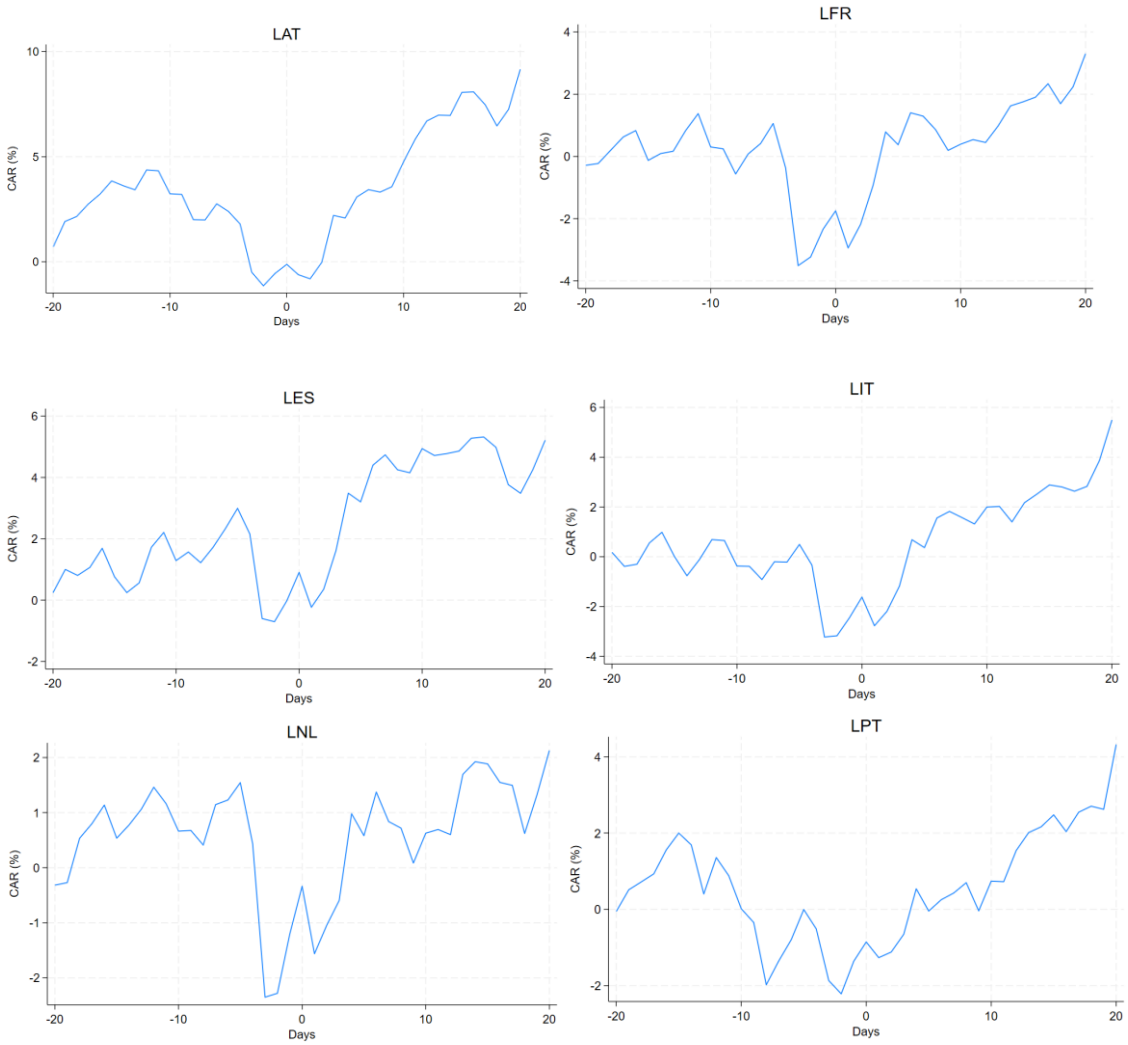
APPENDIX 13 - PORTUGAL ELECTION 2019 - CAR - ALL VARIABLES



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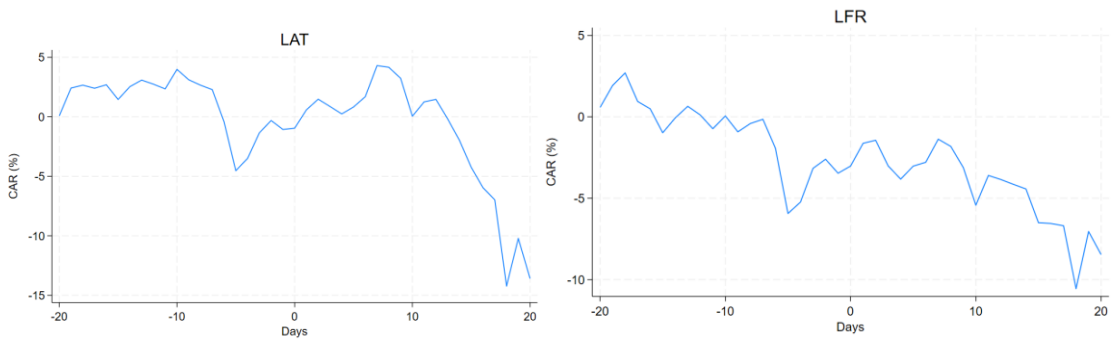
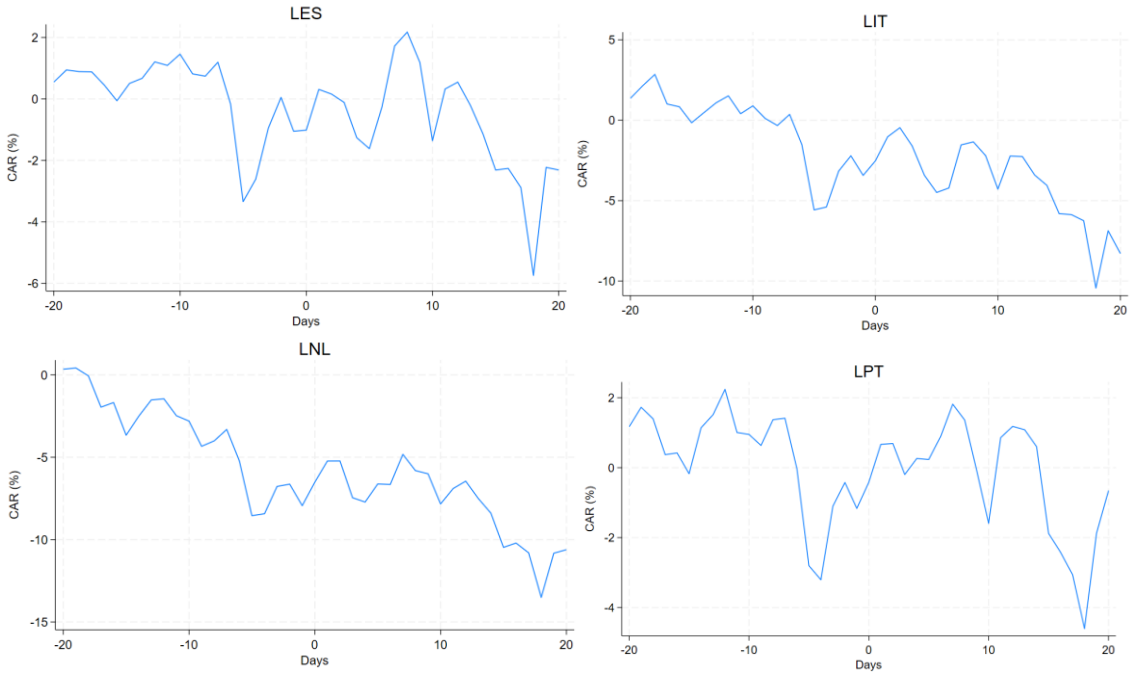
APPENDIX 14 - PORTUGAL ELECTION 2022 - CAR - ALL VARIABLES





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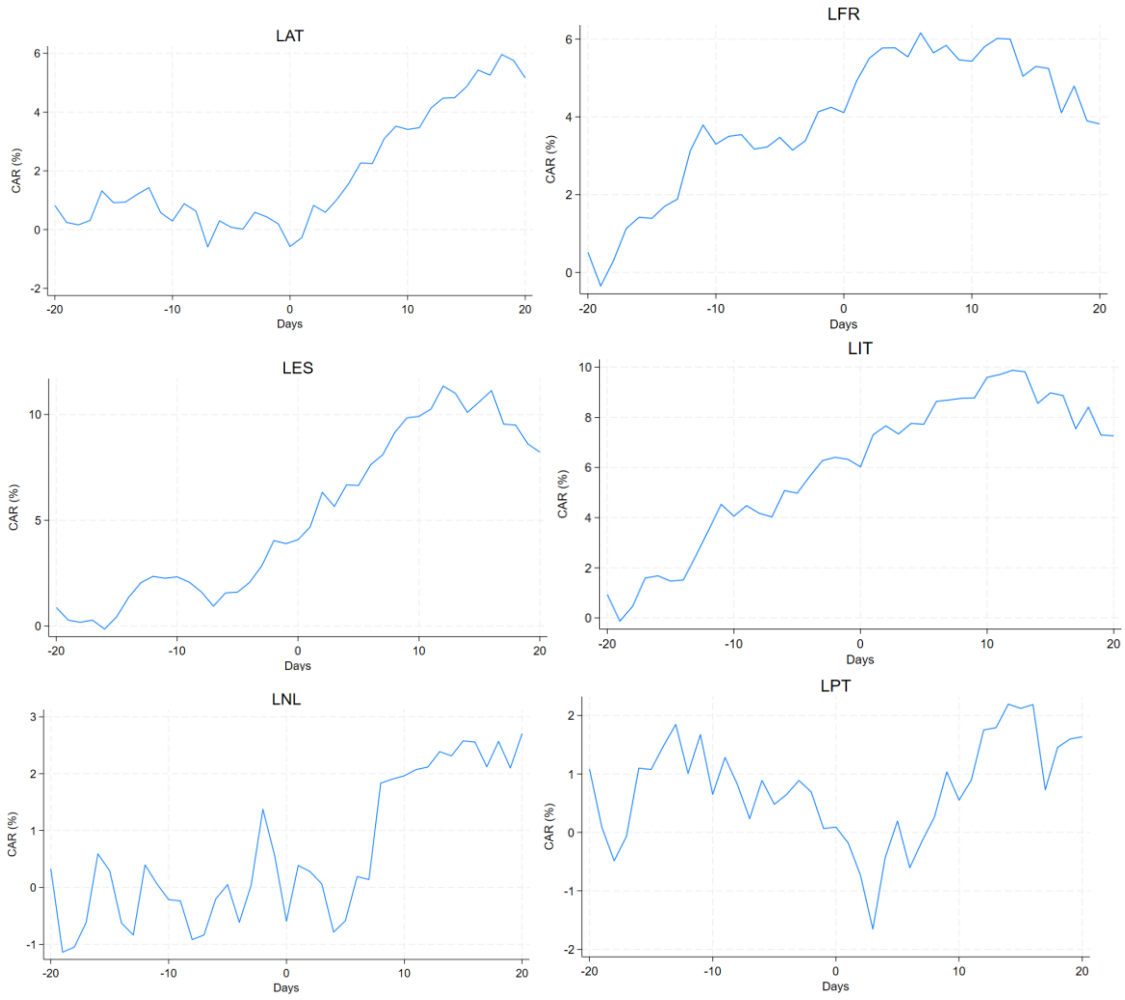
APPENDIX 15 - PORTUGAL ELECTION 2024 - CAR - ALL VARIABLES



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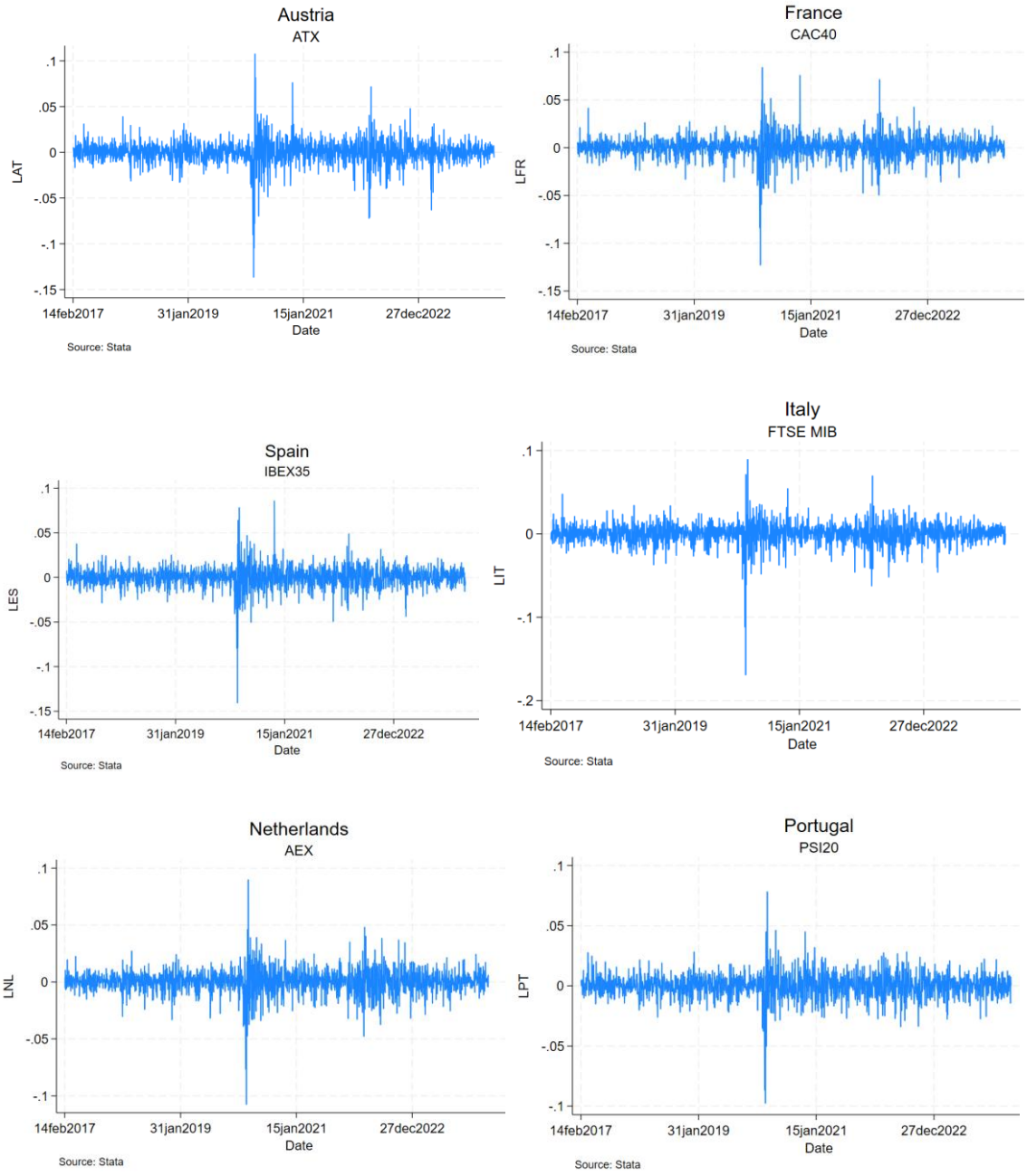
APPENDIX 16 - INDICES VOLATILITY



ATTACHMENTS

ATTACHMENTS 1 - AGGREGATE SUPPORT FOR POPULIST PARTIES IN EUROPEAN PARLIAMENT ELECTIONS, 1979–2019

Country	1979	1984	1989	1994	1999	2004	2009	2014	2019
Denmark	5.8	3.5	5.3	2.9	6.5	6.8	15.3	26.6	10.8
Netherlands		2.5	1.5	2.3	5.5	2.6	17	13.3	14.5
Ireland		4.9	2.2	3	6.3	11.1	11.2	19.5	11.7
Greece		41.6	36	37.6	6.9	4.1	11.9	32.8	34.6
France		11	11.7	10.5	9	10.1	8.1	28.7	33.1
Belgium		13	4.1	10.8	10.9	17.1	15.7	7.6	13.8
Luxembourg			2.9	9.3	9	8	7.4	7.5	10
Italy			1.8	37.2	29.7	25.9	45.5	47.9	66.6
Germany			8.7	8.6	7.5	8	9.2	7.8	16.5
Great Britain				1	8	22.6	22.7	28.6	34.9
Sweden					0.3	1.1	3.3	9.7	15.3
Finland					0.8	0.5	9.8	12.9	13.8
Austria					23.4	20.3	35	20.2	17.2
Slovenia						22.7	29.6	34.3	52.1
Slovakia						26.7	5.6	11.1	12.6
Poland						37	28.9	31.8	49.1
Lithuania						49.8	13.2	14.3	7.8
Hungary						0.3	71.2	66.2	62.2
Czech Republic							6.7	20.9	31.2
Bulgaria							49.1	48.1	45.7
Spain								9.6	16.3
Romania							8.7	6.4	
Estonia								5.3	12.7
Croatia								3.9	10.4
Portugal									1.5
Cyprus								6.8	

Source: Adappted from Zulianello & Larsen (2021,5).

“A orientação desta dissertação foi feita ao abrigo do projeto
“**IPL/IDI&CA2024/CRYPTORISK_ISCAL”.**