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THE RELATION BETWEEN POLITICS AND FINANCE – POLITICAL AGREEMENT
AND THE STOCK MARKET

DAVID SAMUEL HELLE (42016)

A Project carried out on the Master in Finance Program, with the supervision of
Antonino Emanuele Rizzo

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Abstract: This thesis analyzes the relation between political agreement measured by government popularity and abnormal stock market returns. Evidence from a study of daily cumulative abnormal returns following 100 events and from a market-level OLS regression with monthly frequency suggests that a relation does exist. Shocks to government popularity produce significant cumulative abnormal returns in the short term. As the price level changes upon political shocks, abnormal returns in the following month are weakly negative due to the readjustment of expected returns.

Keywords: Abnormal returns, government popularity, political sentiment, event study

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1 Introduction

Following the efficient market hypothesis, current share prices incorporate any information available to investors, wherefore persistently earning excess returns—also known as abnormal returns or alpha—is not possible. In an attempt to on the one hand explain excess returns and on the other hand identify investment strategies that do manage to consistently generate excess returns, practitioners and scholars have researched various possible determinants of stock price movements. While numerous explanatory variables have been examined academically, including even various political variables, this thesis sets out to analyze the relation between government popularity and abnormal stock market returns in Germany. Evidence for such a relation would on the one hand contribute to scholars' efforts in identifying determinants of stock prices and on the other hand help investors optimize investment strategies by taking political agreement into account.

Using historical stock prices from the *Deutsche Aktienindex* (DAX) as the stock market measure and monthly survey data from the German *Politbarometer* conducted by the *Forschungsgruppe Wahlen* as a measure for government popularity, two types of statistical analyses are performed to examine the effect of government popularity on abnormal stock returns at two different points in time. First, an event study establishes a link between 100 political shocks and cumulative abnormal returns (CAR). For the event study, daily stock market data is used, so that the effect of an event on abnormal returns within only a few days following that event are observed. Second, an OLS regression with abnormal returns as the dependent and lagged government popularity as the independent variable with a monthly frequency is conducted. Inflation and unemployment serve as control variables. Due to the different time frequencies used in the two analyses, the measured effect is assumed to reflect mainly changes in realized returns in the case of the event study, and changes in expected returns in the case of the OLS regression, respectively, where expected returns are a

backward-looking measure of past realized returns and not the same as investors' forward-looking required rate of return. The rationale behind this is that in the short term realized returns change due to a change in stock prices, whereas a month later, the price effect has vanished while expected returns now capture the recent realized returns. Different specifications serve as robustness tests for both analyses.

The results indicate that a relation between government popularity and stock returns does exist. The event study produces consistently significant results under various specifications. As returns are analyzed on a daily basis, the positive (negative) mean of CARs obtained for events which cause a positive (negative) shock to government popularity suggests that realized returns increase (decrease) following such events. In other words, stock prices adjust upwards (downward) upon positive (negative) shocks to government popularity as a result of decreased (increased) risk, hence producing positive (negative) abnormal returns around the time of the event. After a short lag of unknown exact length, expected returns—which are based on past realized returns—adjust accordingly. This effect is predominantly measured in the OLS regression, which is performed using a monthly frequency in order to analyze the effect after the market had time to react. The OLS regression reveals a weakly significant effect at this high level of analysis, with a negative coefficient for government popularity at a 10% significance level only under a few specifications. The negative coefficient indicates that for an increase in government popularity, abnormal returns tend to drop in the following month. This result is plausible, because once prices have stabilized at their new higher equilibrium after a political shock occurred, realized returns move back to their pre-shock level, while expected returns start capturing the higher recent realized returns.

The obtained results lead to the conclusion that political agreement, measured by government popularity, does influence stock market prices in Germany, and hence is a

determinant of returns. Amongst others, scholars may continue to analyze the relation between politics and finance by isolating several real exogenous political events and examining whether the relation described in this thesis holds significantly. Investors should be aware of the role that politics plays in the movement of stock prices and act accordingly. For example, investors should pay attention to events that are likely to change people's agreement with their political leaders. In the case of a positive shock, it is recommended to hold one's assets to benefit from the expected increase in market prices. Vice versa, in the case of a negative shock, investor who are able to anticipate the shock may want to sell their assets as soon as possible before prices drop.

This thesis is organized as follows. Chapter 2 reflects on the extant literature on the effect of different sources of political risk on financial markets, investor and political sentiment, and the direction of causality in the relation between politics and the stock market. Political risk may result from general uncertainty regarding the political process, elections, political decision-making, as well as political cycles. Sentiment captures irrational beliefs and expectations about future economic and political developments. Chapter 3 summarizes the data used for analysis and the methodological approach to both analyses performed. Chapter 4 provides an overview and interpretation of the results and a discussion about the limitations and implications of the findings. Finally, chapter 5 closes this thesis with concluding remarks.

2 Literature review

Since risk is the key determinant of stock prices, this first paragraph is dedicated to stock market risk resulting from political factors. Pastor and Veronesi (2013) show that uncertainty in the political environment creates risk premia as prices react to political policy changes. This effect is stronger under weak economic circumstances, which intuitively is in line with the concept of leverage effects, arguing that volatility tends to rise stronger following a large

price fall than following a price rise of the same magnitude. This finding is consistent with Brogaard and Detzel (2012) who provide evidence for a positive relation between risk due to economic governing and equity premia in an international setting. In contrast to these findings, political risk has no impact on risk premia in Canada, suggesting that this type of risk can be diversified away (Beaulieu et al., 2005). The burden remains with companies that are most affected by political policies. Nasimi et al. (2018) find evidence for a significant predicting power of both political and macroeconomic uncertainty for stock prices in the UK, particularly for FTSE-100 listed firms. In addition to confirming the weak effect of political uncertainty on future equity prices identified by Erb et al. (1996), Nasimi et al. (2018) note that macroeconomic risk has a stronger impact. Evidence from Egypt indicates that political uncertainty—even though differently strong—does have an effect on the mean-volatility relation in all of the eight most actively traded market sectors (Ahmed, 2017). Pastor and Veronesi (2012) examine the reaction of stock prices to political decisions, and conclude that, on average, prices tend to decrease significantly as regulatory changes are announced. The more uncertain investors are regarding the effects of the new policy, the greater prices tend to fall. The authors suggest that the evidence is partially explained by the tendency of legislative amendments to come as a reaction to times of recession. Arin et al. (2012) find that the effect of the political process on abnormal returns is only weak, whereas volatility is strongly affected by political variables. By identifying economic shocks and linking them to political developments, Kim and Mei (2001) provide evidence that political events in Hong Kong significantly impact both mean returns and risk on the financial market. Similarly, Bin (2015) finds that the impact of politics on the stock market depends on the perception of the general political risk in a country. Treating elections as a source of political risk, Pantzalis et al. (2000) and Li and Born (2006) find significant excess returns generated in the two weeks prior to important elections, particularly when the outcome is highly uncertain. These findings confirm that investors require a premium for higher uncertainty,

here being of political nature. Obradović and Tomić (2014) analyze excess returns after the 2012 US presidential election to find a mostly negative effect on returns of NYSE listed stocks. A unique case of little market turbulence was the 2016 US presidential race (Desiatkov and Tjahjaktana, 2016). Hashim and Mosallamy (2020) find no significant relation between political campaigns and market risk in both Egypt and the US, but do provide evidence for higher excess returns and decreased volatility after the announcement of election results. The authors argue that both markets are efficient concerning the reflection of political news. Murtaza et al. (2015) analyze a number of major political events in Pakistan to find that only changes to the legislation trigger market reactions, which are found to take only a few days, while events that do not lead to new laws have no effect on stock returns. This finding is in contrast to Nazir et al. (2014) who argue that political events generally impact returns on the Pakistani market, which takes about 15 days to correct mispricing. Studies from the US (Leblang and Mukherjee, 2005), the UK (Herron, 2000; Hudson et al., 1998; Gemmil, 1992; Jensen and Schmith, 2005), Brazil (Jensen and Schmith, 2005), and Germany (Füss and Bechtel, 2008), amongst others, provide evidence in favor of the rational partisan theory, which suggests that the economy does better under conservative than left-leaning political leadership. Accordingly, the odds of a conservative government increase returns prior to elections. Moreover, various studies relate identified risk premia in stock prices to political cycles (Santa-Clara and Valkanov, 2003; Herbst and Slinkman, 1984; Sturm, 2011). These premia are relatable to the political orientation of the governing party (Hensel and Ziemba, 1995; Johnson et al., 1999). Sy and Zaman (2011) provide contradicting evidence, showing that risk volatility throughout political cycles can explain excess returns. A general relation between the government's political orientation and excess returns cannot be formulated on an international level (Snowberg et al., 2007; Cahan et al., 2005; Anderson et al., 2008). Contradicting findings may be due to structural differences between economies such as the degree of a country's economic development (Stoian and

Tatu-Cornea, 2015). Belo et al. (2013) demonstrate predictability of equity returns over political cycles depending on firms' level of exposure to legislative decision-making, suggesting that the market underreacts to foreseeable political policy-making. As one factor of exposure, Oehler et al. (2013) identify a company's marginal tax rate to be positively related to excess returns right before political elections.

While financial theory suggests that irrationality is immediately corrected by arbitrageurs, a significant relationship between investor sentiment—defined as an unexplainable belief about investment risk and future cash flows (Baker and Wurgler, 2006)—and abnormal returns would indicate that irrational investor sentiment may endure over time and cause mispricing. Investor sentiment as a significant determinant of stock prices has been identified in numerous studies (De Long et al., 1990; Huang et al., 2014; He, 2012; Schmeling, 2009). The role of political sentiment is manifested by Angelini et al. (2018) who show that sentiment on US president Trump since his election has had a significant effect on stock returns and other market measures. Political beliefs play a role for investing, as right-wing voters tend to be more active on the stock market (Kaustia and Torstila, 2012). According to political theory, investing into stocks shifts people rightward on the political scale (investor class theory) and increases the overall interest and engagement in politics (asset effect theory) (Richardson, 2010; Glassman, 2001; Nadler, 2000). Moreover, Bonaparte et al. (2017) verify that optimism towards the economy and the stock market is influenced by people's political partisanship as well as the current political environment. With a party in power that they can affiliate with, voters tend to take on more risk in their investments. Meeuwis et al. (2019) argue that investors increase the equity share and market beta of their portfolios post-election if the election outcome is in their favor. For example, US investors adjust the composition of their portfolios for weights in industries such as tobacco or guns if the party in power changes (Addoum and Kumar, 2016). This bias is not limited to amateurs.

A study on partisan professionals in the US shows that investment analysts are more likely to downward-adjust corporate credit ratings if they don't agree with their political leader, that is, if they are not affiliated with the US president's party (Kempf and Tsoutsoura, 2019).

Finally, while the literature review so far illuminated various angles of the impact of politics and mediating variables such as sentiment on the stock market, this paragraph focuses on the direction of causality. Evidence that the state of the economy impacts voting behavior has long been on hand (Downs, 1957; Nordhaus, 1975; Fair, 1978; Fair, 1996). MacKuen et al. (1992) and Erikson et al. (2000) add that voters take not only past economic performance into account but also consider future expectations when forming an opinion on politicians. Basing their research on this rationale, Wisniewski et al. (2012) show that the Price-to-Earnings ratio, which is forward-looking by definition, is significantly positively related to approval rates of a president. In a German study, in addition to examining existing evidence from the US on political cycles and higher stock market returns under conservative governments, for which no prove in German data is found (Bohl and Gottschalk, 2005), Döpke and Pierdzioch (2006) document a robust effect of stock returns on government popularity. Generalizing their findings, the authors conclude that a bullish stock market increases the government's approval rate and vice versa while dissenting the reverse causality. Similarly, a US president's reelection chances are documented to be tied to past net stock returns (Prechter et al., 2012; Sturm, 2011). Angelini et al. (2018), however, only find evidence for Trump's popularity to influence stock returns, not the other way around. According to Kirchgaessner (2016), inflation, unemployment, and growth are the key factors influencing voters' mood. Following a study by Geys and Vermeir (2008), government popularity is negatively associated with unemployment but surprisingly positively related to inflation. Harrison and Marsh (1998) see no reason to believe why the economy is strictly

relatable to government popularity and instead argue that, at best, economic developments determine a base level of political agreement rather than explain temporary fluctuations.

Reflecting on the extant literature, it can be said that a relation between politics and finance is indeed reported from various perspectives, be it political uncertainty, partisanship, or political cycles that influence the stock market. At the same time, research suggests that economic performance may also determine developments in the political landscape.

3 Methodology

3.1 Data sources

As suggested by the literature (e.g. Döpke and Pierdzioch, 2006), historical stock prices on the German DAX are used as the stock market variable. From Bloomberg, prices on both a monthly and daily basis are obtained from March 1977 until December 2018¹. Abnormal returns are calculated by subtracting expected returns from realized returns.

A measure for government popularity is obtained from the German *Politbarometer*, a survey conducted regularly by the *Forschungsgruppe Wahlen*, Mannheim. Since March 1977, the institute for political research has been examining the public opinion on political developments in Germany. In at least monthly frequencies, German voters' opinions on parties, politicians, election manifestos, etc. are collected. The variable "Skalometer: Regierung" (engl.: "Rating: Government") has been part of the survey since the first data collection in 1977, and asks respondents to state their level of satisfaction with the government in office. The answer scale ranges between -5 (highly unsatisfied) and +5 (highly satisfied). The richest available dataset including the variable of interest is the partial

¹ Additionally, daily returns starting in December 1976 were obtained to calculate cumulative abnormal returns, which are used in the event study

cumulation 1977-2018². Respondents are randomly selected and factor weights created to allow for analyses representative for the German vote-eligible population. These factor weights serve the purpose of correcting sampling design imbalances such as sampling probability, age, gender, education, etc., and account for an unrepresentative selection of Eastern versus Western German respondents in some periods. Before the German reunification in 1990, only Western Germany was considered in the survey. After 1990—except for the years from 1996 until 1998—, unproportionally many answers were collected in Eastern Germany in order to facilitate particularly precise analyses on the “new Eastern states”. Only for the years from 1990 until 1995, no factor weight correcting for regional differences is available. Since participation on the German stock market requires no eligibility to political elections in Germany, one arguably does not need to adjust the raw answers. Yet, since it is impossible to collect data representative for DAX investors, a government popularity rate that is representative for German voters may be a good proxy. For reasons of robustness, both unweighted and weighted answers are used for analysis.

In order to account for factors influencing the stock market other than the political measure, inflation and unemployment rates are used as control variables, as suggested by the literature (e.g. Kirchgaessner, 2016; Geys and Vermeir, 2008). Monthly inflation rates for the period of analysis are obtained from OECD’s online databank on the German consumer price index (CPI). Monthly unemployment rates are found from the “Bundesagentur für Arbeit”, the federal labor agency in Germany.

3.2 Event study—CARs following positive and negative events

The main idea behind the event study is to test abnormal returns following events that cause shifts in the government popularity rate. Significant abnormal returns following event dates

² Study number ZA2391, version: 11.0.0, doi:10.4232/1.13431, published 2020/02/10

would be strong evidence for the existence of a relation between political agreement and the stock market. Abnormal returns are measured on a daily basis. Since expected returns only adjust with a certain lag of time, the essentially measured variable is realized returns following event dates. It is expected to find positive abnormal returns for events that cause positive shocks in the government popularity rate and vice versa. Under the event study methodology, abnormal returns will be cumulated over several days because the effect of an event on returns is not expected to play out on the same day that the event occurs. Instead, the abnormal returns of several days after the day of the event are added up to reflect the time that the news take to spread and create an impact on the stock market. A three-step framework is applied to test the formulated hypothesis, consisting of the identification of events with positive and negative shocks to government popularity, the measurement of CARs, and the significance testing of mean CARs following the identified events. The exact procedure for each step will be elaborated on in the following.

Selecting events can either be achieved by identifying real political events such as federal elections or important political decisions by the government, or by detecting large shifts in the government popularity rate. The decision for either one approach comes at a trade-off. Choosing specific events ensures that the changes in government popularity are caused by real events, but the selection may be arbitrary and non-exhaustive. Following the latter approach, the selection of events occurs fully objectively, but the events cannot entirely be associated to real past events. For the sake of objectivity and data richness, events are identified by the greatest monthly changes in the government popularity rate, hereafter referred to as “shocks”. As explained above, the survey data on government popularity is aggregated on a monthly basis to ensure a constant frequency, where data was collected up to two times a month either rather at the beginning or at the end of the month. Given this inaccuracy of the survey data in terms of the exact date of the event, it is necessary to estimate

when exactly the shock occurred. For a shift in government popularity in month t_0 , the shock can be assumed to have occurred between the middle of month $t-1$ and the beginning of month t_0 . Since the exact date of the shock can only be approximated, the starting point in time for cumulating abnormal returns needs to be picked so that it is highly likely to capture the day of the shock. This point in time is likely to range between ten trading days in the case that the shock occurred at the end of a month and that prices adjust quickly and 30 days in the case that the shock occurred at the beginning of a month and that prices adjust slowly. This range is rather broad and more precise assumptions will be based on manual testing. Only monthly changes are considered; periods with missing survey data are not considered. Linear interpolation would not be useful in this case because it may falsely identify a month as one in which an event has occurred. Following this procedure, the 100 months with the greatest changes in the government popularity rate are identified and divided into “positive” and “negative” events. A positive (negative) event is one after which the government popularity rate went up (down). The absolute monthly change is obtained and ranked by magnitude. The event study is performed using both unweighted and weighted survey data on government popularity.

Two assumptions need to be made for the measurement of CARs. First, the timespan over which expected returns are calculated needs to be defined. Since daily returns are used for this analysis, the number of days that past realized returns are averaged over should presumably be about one to one-and-a-half trading months. Second, the cumulation period—that is, the number of days that CARs span over—needs to be determined. This timespan should capture the period of time that an event takes to effectively trigger a stock market reaction. Given that not only the timing of the selected events is unknown but also the exact date on which an event started, the cumulation period and the starting point in time need to be chosen so that the likelihood of capturing the starting point in time of an event and the

period of time that it takes an event to unfold its effect on stock prices is maximized. After making the necessary assumptions, the CARs are calculated just like abnormal returns with the difference that all daily abnormal returns within the chosen timespan are summed up. Given that in equilibrium abnormal returns are equal to zero, this summation should only return values significantly different from zero if political events indeed have a significant effect on stock prices. Abnormal returns are the difference between realized returns and expected returns, where realized returns for this analysis are exclusively approximated by log returns for the sake of simplicity. In the case of daily returns, the difference between simple returns and log returns is vanishingly small.

In order to test the significance of CARs, the CARs in periods of identified events will be regressed only on a constant. The formal equation thus looks as follows.

$$CAR_t = \alpha \quad (1)$$

Testing the significance of the coefficient α , it is expected that positive events produce a significantly positive α and vice versa. In addition to the assumptions described above, two refinements are introduced to account for possible biases. First, since the number of identified events (100) was picked arbitrarily, it may be the case that events are being considered in the analysis for which the change in government popularity is diminishingly small. In order to account for this possibility, minimum CAR thresholds are added to the base case scenario. Concretely, CAR thresholds of 3% and 5% are introduced. Second, in the case that two events are identified in two consecutive months, the CARs in the period of the latter event may be biased by the realized returns of the previous event that would be used to calculate expected returns. Hence, possible mitigation strategies for this potential problem include the elimination of consecutive events and the neglect of overlapping days between two events when calculating expected returns for the latter event. The former approach of eliminating consecutive events instead of adjusting expected returns is followed

for three reasons. First, since the exact point in time of an event cannot be precisely identified, it is difficult to determine the overlapping period between two consecutive events. Second, the data reveals that in many cases not only two but up to five events follow one another. In these cases, it is practically impossible to adjust expected returns reasonably. Third, after eliminating consecutive events, 68 events and 70 events remain using unweighted and weighted survey data, respectively, which is assumed to be sufficient to perform the analysis.

3.3 OLS regression—Abnormal returns regressed on lagged government popularity

The main idea behind the OLS regression is to associate past proxies for political agreement with abnormal returns in the following period. Fundamentally, the OLS regression is specified as follows. One period t is equal to one month.

$$Abnormal\ return_{t_0} = \alpha + Gov\ pop_{t-1} + Control\ Variables_{t-1} \quad (2)$$

Three different basic OLS regression equations are formulated, where the dependent variable is simple abnormal returns and log abnormal returns, respectively. Expected returns are approximated as a 12-month moving average of past realized returns. For each of these basic formulations, different combinations of control variables are tested—that is, no control variable, only inflation, only unemployment, or both inflation and unemployment. Further, the government popularity rate is calculated using weighted and unweighted survey data, respectively. Missing survey data is once left as a missing data point and once filled using linear interpolation. Thus, a total of 32 OLS regressions are performed to test the sign and significance of the political measure's coefficient.

It is expected to find a negative coefficient for government popularity, implying that higher levels of government popularity in period t_{-1} are assumed to be associated with lower abnormal returns in period t_0 . The rationale behind this expected relation is as follows. As

the case in the event study, a higher level of government popularity leads to a higher level of investor confidence, which implies reduced risk perceived by investors. This in turn leads to an increase in stock prices within a short period of time after a positive shock to the government popularity rate. The effect on prices, which implies higher realized returns, only lasts for a short period of time, presumably a few days. So far, the described effect is congruent with the event study. Important for the interpretation of the OLS study is what happens to expected returns in the following month. Expected returns, which are calculated as the moving average of past realized returns, will only adjust in the following period, since the increased realized returns of period t_{-1} will only be considered in the moving average of past realized returns in period t_0 . Therefore, as the survey data is aggregated on a monthly basis and returns in period t_0 are regressed on government popularity in period t_{-1} , the measured effect is not driven by realized but by expected returns. Hence, with realized returns in the month following a change in government popularity being back to the pre-shock level but expected returns capturing the high realized returns from the previous month, abnormal returns are expected to be negative. If this expectation holds, it could be concluded that the market efficiently adjusts prices within a month after a political shock.

Before moving on to the discussion of the results, it shall be reaffirmed that the two analyses are not standalone but in fact measuring the same effect but at two different points in time. In short, government popularity is expected to be positively associated with abnormal returns within the first few days after an event, driven by a change in realized returns, and negatively associated with abnormal returns in the following month, driven by an adjustment in expected returns after realized returns have recovered from the political shock.

4 Discussion

4.1 Results of the event study

The results of the event study are summarized in tables 1.1 to 1.4 and 2.1 to 2.4 (see appendix). Each table shows the coefficient of the constant under three different assumptions for the number of days that determines expected returns (X), the cumulation period for abnormal returns (Y), and the starting point in time for measuring CARs (Z). The combination of assumptions is summarized in the vector ($X|Y|Z$), which is given in each table. Testing different combinations of assumptions reveals that $25 \leq X \leq 30$, $20 \leq Y \leq 22$, and $Z = 15$ fit the data best. The three different combinations of assumptions shown in the output tables are (30|21|15), (27|22|15), and (25|20|15) for the unweighted survey data. For the weighted survey data, the second combination is adjusted to and (27|20|15), as these values produce even stronger results. Further, each table shows the coefficient of the constant using minimum CAR thresholds of 3% and 5% in addition to the scenario in which no minimum CAR restriction is imposed. Tables 1.1 to 1.2 and 2.1 to 2.2 are based on unweighted survey data; tables 1.3 to 1.4 and 2.3 to 2.4 are based on weighted survey data. Tables 1.1 to 1.4 show the outputs when using all 100 events; tables 2.1 to 2.4 show the outputs after eliminating consecutive events. For reasons of simplicity only log returns are tested in the event study, and the unit of abnormal returns is unadjusted percentages. That is, for a coefficient of the constant of 0.01, mean CARs are positive 1% under the stated assumptions.

The outputs show that almost all coefficients are significant, in most cases even at a 5% significance level. Of all 36 regressions performed, only eight produce non-significant coefficients, six of which occur when using unweighted survey data and non-consecutive events only. All coefficients have the expected signs; that is, positive signs for events with positive shocks to government popularity and negative signs for events with negative shocks

to government popularity. In other words, an event that increases (decreases) government popularity creates positive (negative) CARs in the days following the event. For instance, tables 1.1 and 1.2 show that positive events lead to positive average CARs as high as 1.89%, 4.47%, and 6.19%, when applying CAR thresholds of 0%, 3%, and 5%, respectively, and assuming $X=30$, $Y=21$, and $Z=15$. Negative events lead to average CARs of -1.36%, -3.24%, and -4.51%, respectively, applying the same assumptions and restrictions. All of these coefficients are significant at a 5% significance level. It is important to note that for higher minimum CAR thresholds, the coefficients increase, because lower CARs are not considered when calculating the mean CARs. More important than the difference in magnitude, however, is that the coefficient independent of the CAR threshold remains significant.

4.2 Results of the OLS regression

For the purpose of interpreting the coefficients obtained from the OLS regression, it is critical to recall that government popularity is based on an eleven-step scale and note that abnormal returns are multiplied by 100, so that a value of one refers to an abnormal return of 1%. Accordingly, a coefficient of one would imply that for an increase of one unit in government popularity in period $t-1$, abnormal returns increase by 1% in the following period t_0 . Tables 3.1 and 3.2 show the regression outputs for simple abnormal returns regressed on unweighted government popularity without and with linear interpolation, respectively. Tables 3.3 and 3.4 repeat the identical calculations with the difference that government popularity is measured by the weighted survey data. Tables 4.1 to 4.4 test the same hypotheses as tables 3.1 to 3.4, but abnormal returns are based on log returns instead of simple returns as before. The OLS regression results confirm the expectation of finding a negative coefficient for government popularity when stock market performance is indicated by abnormal returns. This holds true under all tested specifications, and is fully in line with the general intuition derived from financial theory in the previous chapter. However, the

coefficients are significant only under a few specifications. At a 10% significance level, the coefficient for government popularity is found to be significant in regression equations 3.1.3, 4.1.3, and 4.1.4. To recall, equation 3.1.3 regresses simple abnormal returns on unweighted government popularity without linear interpolation, where only unemployment is used as a control variable. The coefficient is -0.7156, meaning that an increase in lagged government popularity by one unit leads to a decrease in simple abnormal returns by 0.7156%. Equations 4.1.3 and 4.1.4 regress log abnormal returns on unweighted government popularity without linear interpolation, where equation 4.1.3 considers only unemployment as a control variable and equation 4.1.4 considers both inflation and unemployment as control variables. The coefficients for government popularity in equations 4.1.3 and 4.1.4 are -0.7393 and -0.7645, respectively, allowing for a similar interpretation as given above. Interestingly, no significant coefficients are found when using weighted government popularity or applying linear interpolation. However, the coefficients and p-values for all specifications are fairly close to one another. Whether using simple or log abnormal returns does not change the results by a lot, and neither does the application of linear interpolation or factor weights for government popularity rates. The p-value of the obtained coefficients lies around 10% independently from the combination of assumptions and restrictions. In conclusion, the OLS regression produces the expected outputs, although the results are weak given the low level of significance. Yet, it is fair to say that the level of analysis in this case is rather high, so that even finding significant coefficients at all is a good sign.

4.3 Limitations

Despite the plausible results, the performed analyses are subject to limitations which will be discussed in this subchapter along with suggestions for future research.

The three potential limitations are the assumed inference from survey data on the German government's popularity to the German stock market, reverse causality, and data availability.

First, the survey data is limited to the German people and can either be unadjusted to observe the respondents of randomly selected German citizens or corrected by the factor weights to find the opinion of the representative German body of electors. Arguably, neither approach may be perfectly accurate, because the German stock market is not limited to German investors or investors eligible to vote, respectively. This thesis pursues the best possible mitigation strategy by using both the unweighted and weighted government popularity rate.

Second, as often the case in academic research, the question of missing or reverse causality cannot be conclusively answered. By associating abnormal returns with lagged values of government popularity in the OLS regression, reverse causality is arguably mitigated, though. While the relationship appears plausible based on the theory and the obtained results, it is in contrast to Döpke and Pierdzioch (2006), who claim that the stock market as a proxy for the state of the economy influences government popularity and not the other way around. As for the event study, the described methodology includes no real events and instead aims for objectivity. Thus, as for the OLS regression, it cannot be said with absolute certainty that the selected events are in fact the trigger of the market reaction and not other factors.

Third, the richness of data constitutes a limiting factor to the statistical tests performed. While the survey data for government popularity is available since March 1977 and the data on historical prices go back even further—allowing for a relatively large sample size even using a monthly frequency—certain robustness tests using other variables as measures for stock market performance and political agreement cannot be performed in a meaningful way. Such variables include trading volume for the German DAX, voters' perception of Angela Merkel's performance as German chancellor and voters' perception government performance on two-step scale. While it may seem subjective to determine the required sample size, it is striking that in contrast to the regression analysis exhibited in this thesis,

for which a timespan of 41 years is used, no other similar measures of political agreement—all with a shorter timespan—produce significant results.

Future research opportunities may be pursued to fill existing gaps. First, the significance on abnormal volume may be tested again in the future when a longer time series of data is available. Second, alternative measures for political approval may be considered. Data on the popularity of individual leading politicians may be of interest, for example. This could serve as a robustness test for the analyses performed in this thesis. Also, an own approval index could be created from social media or news media data. This approach would even facilitate data collection in shorter frequencies. Third, real past events such as important political decisions with a strong impact on the German population may be considered in the event study to strengthen the explanatory power of the analysis by establishing a clear link between a political event and the stock market reaction. However, researchers would need to find ways to minimize subjectivity in selecting the events. Fourth, as this thesis is limited to Germany, the relation between government popularity and the stock market should be tested in other countries, too. A comparison across countries would reveal if the identified relation holds consistently across different countries or if it—like other phenomena discussed in the literature—is bound to the general characteristics of certain countries.

4.4 Implications for financial theory and practice

Overall, the two analyses produce consistent results. The implications of this thesis' findings discussed in the following subchapter cover the theory on the dynamic between expected and realized returns, the robustness of the efficient market hypothesis, the role of politics in finance, and practical advice for researchers and practitioners.

In accordance with the financial theory on the relation between realized and expected returns, the empirical results imply that a decrease in expected returns comes with an

increase in realized returns and vice versa; that is, realized and expected returns move in opposite directions. Expected returns here refer to a forward-looking measure of the required rate of return. The general relation discussed in financial theory is given as

$$P = \frac{D}{k}, \quad (3)$$

where P = price, D = cash flows, and k = required rate of return. The forward-looking required rate of return, k , adjusts the cash flows for their inherent risk and corresponds, in equilibrium, to a stock's expected rate of return. Therefore, abnormal returns should be equal to zero, in equilibrium, as the realized return should match the expected return. With no changes in government popularity, abnormal returns should lie around zero. In the case of an external political shock, the risk perceived by market participants changes, wherefore a change in stock prices occurs. This effect follows from the relation given in equation 3. Assuming the political shock to be positive, risk (k) decreases, so that prices (P) increase. Since the required rate of return represents the future expected return that investors ask for in exchange for their money, and because price changes determine realized returns (since realized returns are a function of today's price minus yesterday's price), it can be concluded that future expected returns and realized returns move in opposite directions. While future expected returns cannot be effectively measured—which is why past realized returns are used as proxies for expected return—the correctness of the relation given in equation 3 is implicit in the results of the performed analyses. Only if prices do increase upon a decrease in perceived market risk, the event study and OLS regression will produce the expected, significant coefficients. Given that expected returns in the analyses are approximated by past realized returns, the interpretation based on the signs of the obtained coefficients is different from the dynamic between future expected returns and realized returns outlined above. As explained, P increases upon an increase in government popularity, mediated by a decrease in k . This is, on average, all happening within a few days after the event. When prices

increase, realized returns within these few days increase as well. Therefore, as the event study has shown, realized returns within the days following an event increase when government popularity increases and vice versa. Within this period of a few days, expected returns have not had the time to adjust yet. Only after an event has put a price increase into effect, expected returns increase, too. At this later point in time, however, realized returns are back around their pre-shock level because prices have found their new equilibrium. Hence, the moving average of past realized returns is greater than the most recent realized returns, and the OLS study indicates a negative sign for the coefficient of government popularity in period $t-1$.

The efficient market hypothesis is a key theoretical concept in finance. Only when assuming rationality and arbitrageurs' deliberate attempt to correct mispricing, financial markets can be assumed to price equities efficiently and accurately. In a perfect world, current stock prices would reflect all publicly or privately available information, relevant news would reach all investors instantaneously, and investors would rationally translate that news into action immediately. However, just as the past has shown that prices tend to change prior to public announcements and that factors other than the market performance can be used to construct market-beating investment portfolios, this thesis has contributed to the list of evidence claiming that stock prices are not formed perfectly rationally and that consistently earning excess returns is possible when applying the right factors. Yet, one may have to accept that markets are limited to human rationality and speed when it comes to efficiency. As it naturally takes time to obtain and process new information, a lack of speed may not imply market inefficiency. Quite the contrary, the significant effect of the analyzed political determinant on abnormal returns shows that the financial market in Germany does react according to the theoretical concepts. Therefore, as the DAX has shown to react to external

shocks with a certain lag of time, it can be inferred that financial markets may not be fully efficient but surely quite efficient.

The role of politics in finance has been heavily discussed around the globe over the past decades. While the effect of the political process on abnormal returns has been shown to be weak, political turmoil has been demonstrated to cause significant shocks to financial markets. This is in line with this thesis' findings, which does not look into the political process in general but does link indicators for political events to abnormal returns. Not verified by this thesis is the literature's predominant opinion that investors do pay close attention to elections and the political orientation of their government. As no particular events are identified and no analysis on a party-level performed, this statement cannot be conclusively validated; however, this thesis does back the claim that investors do look into political variables. This inference is in accordance with the literature's perception that political leadership is one of the key determinants of the stock market from a political side. For instance, hope for better political leadership can create optimism given campaign promises, leading to a decrease in risk perceived by investors. Moreover, investors have been shown to react to changes in the political landscape. While this thesis restricts the OLS regression to a high level, it does seem consistent with findings that investors rebalance their portfolios, adjust their investment volume, and choose different asset classes when facing political shocks. Evidence on the existence of political cycles, although mixed, takes the same line. Most controversially in the bigger picture appears to be the issue of causality of the relation between political agreement and the stock market. While the extant literature finds that the state of the economy influences the approval rate of a government with little support for the reverse logical direction, this thesis does unveil evidence for an influence of political variables on the stock market performance. To sum this up, this thesis' outcomes

do not only appear consistent in themselves and plausible considering financial theory but are also generally in line with key aspects in the controversial literature on the topic.

Given the results of this thesis on top of a long list of evidence of anomalies in financial markets, it is undeniable that the stock market is not independent from external factors. While this is no news, this thesis supports the claim that political variables as determinants of the stock market should be closely considered. As it is researchers' goal to identify such determinants to explain observable phenomena, they should be aware of the importance of fundamental political conditions as a relevant factor for investors. Practitioners are mainly interested in constructing profitable portfolios. Therefore, it is key to identify trends impacting risk and thereby prices. Testing the CAPM, a firm's size, book-to-market, and momentum have been used to beat CAPM based portfolios, as small, high book-to-market, and recent winner stocks tend to outperform a purely market based model. Additionally, factors such as recessions and booms, monetary policy tightening, and surprise inflation are not perfectly correlated with the market, so that the CAPM fails to fully capture their risk adequately. In support of the Arbitrage Pricing Theory (APT), which claims that expected returns can be modelled using multiple determining factors, investors should incorporate political factors into their pricing models.

5 Conclusion

In short, this thesis examines the influence of political agreement measured by government popularity on abnormal returns. It is found that CARs following events that shock government popularity are significantly different from zero, where the sign of the CAR depends on the type of shock. Further, for an increase in government popularity in any given month, abnormal returns in the following month are weakly but significantly negative. These results allow for three key takeaways. First, government popularity as a measure of political agreement does influence the stock market. Second, the theoretical concept that realized and

expected returns move in opposite directions holds. As shocks to government popularity change the level of market risk perceived by investors, prices adjust in the opposite direction of risk. Third, the market absorbs political shocks quite efficiently as abnormal realized returns are only observed for a short period of a few days. In the month following an event, prices have reached their new equilibrium, wherefore the OLS regression produces a negative coefficient for lagged government popularity. Overall, the two analyses performed in this thesis—which effectively measure the same effect but at two different points in time as both regress abnormal returns on a daily and monthly basis, respectively—are consistent in themselves and with financial theory. Both scholars and practitioners should be aware of the explanatory power of political variables on financial markets when researching determinants of stock prices and constructing their portfolios, respectively.

Appendix

Table 1.1 – Cumulative abnormal returns around positive events regressed on constant – Events determined by unweighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	0.0189** (0.0092)	0.0447** (0.0176)	0.0619** (0.0267)
(27 22 15)	0.0153 (0.0098)	0.0407* (0.0213)	0.0695** (0.0297)
(25 20 15)	0.0183** (0.0089)	0.0527** (0.0200)	0.0730** (0.0278)

Notes: X = Expected return based on an X-day MA of past log returns; Y = CARs span over a Y-day period; Z = CAR period starts Z days before the first of a month

Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.2 – Cumulative abnormal returns around negative events regressed on constant – Events determined by unweighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	-0.0136** (0.0067)	-0.0324** (0.0152)	-0.0451** (0.0201)
(27 22 15)	-0.0142** (0.0060)	-0.0273** (0.0122)	-0.0386* (0.0208)
(25 20 15)	-0.0132** (0.0066)	-0.0358** (0.0169)	-0.0469** (0.0210)

Table 1.3 – Cumulative abnormal returns around positive events regressed on constant – Events determined by weighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	0.0189* (0.0102)	0.0369** (0.0171)	0.0530* (0.0263)
(27 20 15)	0.0192* (0.0099)	0.0391** (0.0181)	0.0621** (0.0260)
(25 20 15)	0.0185* (0.0097)	0.0415** (0.0183)	0.0609** (0.0254)

Table 1.4 – Cumulative abnormal returns around negative events regressed on constant – Events determined by weighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	-0.0157** (0.0065)	-0.0334** (0.0129)	-0.0450** (0.0201)
(27 20 15)	-0.0146** (0.0064)	-0.0328** (0.0147)	-0.0398* (0.0224)
(25 20 15)	-0.0143** (0.0062)	-0.0311** (0.0148)	-0.0439* (0.0223)

Table 2.1 – Cumulative abnormal returns around positive, non-consecutive events regressed on constant – Events determined by unweighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	0.0247** (0.0120)	0.0667** (0.0241)	0.0841** (0.0286)
(27 22 15)	0.0214 (0.0132)	0.0594* (0.0283)	0.0821** (0.0329)
(25 20 15)	0.0248** (0.0116)	0.0713** (0.0242)	0.0899** (0.0288)

Table 2.2 – Cumulative abnormal returns around negative, non-consecutive events regressed on constant – Events determined by unweighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	-0.0139 (0.0090)	-0.0320 (0.0210)	-0.0440 (0.0270)
(27 22 15)	-0.0148* (0.0082)	-0.0317* (0.0166)	-0.0423 (0.0269)
(25 20 15)	-0.0141 (0.0086)	-0.0360* (0.0195)	-0.0436 (0.0257)

Table 2.3 – Cumulative abnormal returns around positive, non-consecutive events regressed on constant – Events determined by weighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	0.0258* (0.0132)	0.0513** (0.0219)	0.0707** (0.0292)
(27 20 15)	0.0274** (0.0128)	0.0535** (0.0210)	0.0738** (0.0275)
(25 20 15)	0.0266** (0.0127)	0.0523** (0.0207)	0.0725** (0.0270)

Table 2.4 – Cumulative abnormal returns around negative, non-consecutive events regressed on constant – Events determined by weighted government popularity

(X Y Z)	CAR threshold		
	0%	3%	5%
(30 21 15)	-0.0166* (0.0083)	-0.0393** (0.0170)	-0.0461* (0.0247)
(27 20 15)	-0.0174** (0.0082)	-0.0423** (0.0166)	-0.0614** (0.0268)
(25 20 15)	-0.0164** (0.0078)	-0.0405** (0.0169)	-0.0578* (0.0259)

Table 3.1 – Simple abnormal returns regressed on unweighted government popularity without linear interpolation

	(1)	(2)	(3)	(4)
Constant	2.9369 (1.9705)	2.9070 (1.9780)	5.4312 (3.6355)	5.7509 (4.0266)
Gov pop _{t-1}	-0.4773 (0.3193)	-0.4847 (0.3217)	-0.7156* (0.4327)	-0.7358 (0.4466)
Infl _{t-1}		0.0346 (0.1687)		-0.0351 (0.1894)
Unem _{t-1}			-0.1170 (0.1432)	-0.1305 (0.1610)

Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.2 – Simple abnormal returns regressed on unweighted government popularity with linear interpolation

	(1)	(2)	(3)	(4)
Constant	2.2670 (1.8587)	2.2732 (1.8658)	3.8249 (3.4402)	4.3620 (3.8168)
Gov pop _{t-1}	-0.3698 (0.2994)	-0.3684 (0.3015)	-0.5196 (0.4089)	-0.5543 (0.4229)
Infl _{t-1}		-0.0069 (0.1552)		-0.0570 (0.1747)
Unem _{t-1}			-0.0726 (0.1348)	-0.0952 (0.1517)

Table 3.3 – Simple abnormal returns regressed on weighted government popularity without linear interpolation

	(1)	(2)	(3)	(4)
Constant	2.7751 (1.9874)	2.7456 (1.9962)	4.9943 (3.6496)	5.3042 (4.0645)
Gov pop _{t-1}	-0.4486 (0.3205)	-0.4545 (0.3225)	-0.6601 (0.4335)	-0.6801 (0.4489)
Infl _{t-1}		0.0304 (0.1685)		-0.0331 (0.1901)
Unem _{t-1}			-0.1037 (0.1430)	-0.1167 (0.1614)

Table 3.4 – Simple abnormal returns regressed on weighted government popularity with linear interpolation

	(1)	(2)	(3)	(4)
Constant	2.1752 (1.8756)	2.1850 (1.8840)	3.5649 (3.4558)	4.1136 (3.8556)
Gov pop _{t-1}	-0.3532 (0.3008)	-0.3514 (0.3026)	-0.4866 (0.4101)	-0.5229 (0.4256)
Infl _{t-1}		-0.0097 (0.1551)		-0.0565 (0.1753)
Unem _{t-1}			-0.0645 (0.1345)	-0.0873 (0.1522)

Table 4.1 – Log abnormal returns regressed on unweighted government popularity without linear interpolation

	(1)	(2)	(3)	(4)
Constant	3.0501 (1.9944)	3.0252 (2.0020)	5.5946 (3.6796)	5.9941 (4.0753)
Gov pop _{t-1}	-0.4962 (0.3232)	-0.5024 (0.3256)	-0.7393* (0.4379)	-0.7645* (0.4520)
Infl _{t-1}		0.0289 (0.1707)		-0.0439 (0.1917)
Unem _{t-1}			-0.1193 (0.1450)	-0.1363 (0.1629)

Table 4.2 – Log abnormal returns regressed on unweighted government popularity with linear interpolation

	(1)	(2)	(3)	(4)
Constant	2.3563 (1.8832)	2.3678 (1.8904)	3.9749 (3.4855)	4.6006 (3.8669)
Gov pop _{t-1}	-0.3844 (0.3034)	-0.3817 (0.3055)	-0.5401 (0.4143)	-0.5804 (0.4284)
Infl _{t-1}		-0.0128 (0.1573)		-0.0664 (0.1770)
Unem _{t-1}			-0.0754 (0.1365)	-0.1018 (0.1537)

Table 4.3 – Log abnormal returns regressed on weighted government popularity without linear interpolation

	(1)	(2)	(3)	(4)
Constant	2.8748 (2.0116)	2.8510 (2.0206)	5.1233 (3.6940)	5.5126 (4.1138)
Gov pop _{t-1}	-0.4652 (0.3244)	-0.4700 (0.3264)	-0.6795 (0.4387)	-0.7047 (0.4544)
Infl _{t-1}		0.0245 (0.1706)		-0.0416 (0.1925)
Unem _{t-1}			-0.1051 (0.1447)	-0.1214 (0.1634)

Table 4.4 – Log abnormal returns regressed on weighted government popularity with linear interpolation

	(1)	(2)	(3)	(4)
Constant	2.2524 (1.9004)	2.2683 (1.9088)	3.6840 (3.5014)	4.3213 (3.9063)
Gov pop _{t-1}	-0.3658 (0.3047)	-0.3627 (0.3066)	-0.5032 (0.4155)	-0.5453 (0.4312)
Infl _{t-1}		-0.0158 (0.1571)		-0.0656 (0.1777)
Unem _{t-1}			-0.0664 (0.1364)	-0.0929 (0.1542)

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Declaration of Authorship

Last name: Helle

First name: David Samuel

I swear that I have written this

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on my own and with no other help than the literature and other supportive material listed in the appendix. Citations of sentences and parts of sentences are declared as such, while other imitations are clearly marked and linked to original sources with regards to extent and intention of the statements made. This thesis has never been handed in to any examination authority before and it is also not yet published.

Place, date: Lisbon, January 4, 2021

Signature:

A handwritten signature in blue ink, appearing to read 'Helle', enclosed within a large, loopy circular flourish.