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Politics and the Stock Market – Evidence from Germany

by

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Abstract

We analyze the interaction of stock market movements and politics in Germany. In contrast to the empirical evidence available for the U.S., we do not find that German stock market returns tend to be higher during liberal than during conservative governments. Also in contrast to results for the U.S., we find no evidence for an election cycle in German stock market returns. However, estimated popularity functions and VARs suggest that stock market returns have had an impact on the popularity of German governments. We find that this result is robust across different VAR specifications and time periods.

Key Words: Political business cycle; Stock market, Germany

JEL Classification: E32, E44, G12

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I. Introduction

Shortly before the 2002 general elections in Germany, the CEO of one of Germany's largest firms, Deutsche Telekom, was fired. This decision (though formally made by the responsible council at the Deutsche Telekom) was widely seen as a purely political measure initiated by Chancellor Schroeder to ensure the re-election of Germany's government. The Deutsche Telekom's shares had been on the political agenda from the very beginning. The reason for this was that its privatization had been intended to make share-holding more popular in Germany. Thus, its shares had been labelled "peoples shares", and for many people their investment in Deutsche Telekom shares was the first stockmarket investment they had ever made. As a consequence, many commentators argued that the returns on investing in Deutsche Telekom shares had been highly important for the governments' popularity.

This rather anecdotal evidence indicates that stock market movements may be of key importance for policy makers. Hence, data on stock market movements may be useful for testing the economic theory of political business cycles (PBC). This theory, as pioneered, for example, by Downs (1957) and Nordhaus (1975), predicts that governments' popularity should depend upon the state of the economy. In empirical applications, the state of the economy is usually measured by important macroeconomic variables like, for example, output growth, inflation, or the unemployment rate (see Nannestad and Paldam (1994) and Olters (2001) for surveys). However, there are good reasons to use stock market variables instead. First, stock markets are in the focus of media coverage on economic issues. Day by day, newspapers and television channels report stock market movements. Hardly any other economic variable enjoys a similar degree of public attention. It is, thus, plausible to conjecture that voters make up their minds on the state of the economy by considering information on stock market movements. Such a conjecture can also be rationalised by resorting to modern "behavioural" models, which imply that economic agents are, as a general rule, inattentive. In this perspective, stock markets are of relevance for governments' popularity simply because information on stock market movements is very easily available. Besides these plausibility-based arguments, using stockmarket data to test the implications of PBC theory is also justified economic reasoning. For example, Gärtner and Wellershoff (1999) make a case for using stock market data by arguing that the stock market is in general thought to be a leading indicator for real economic activity. Though one can, of course, debate on the indicator properties of the stock market, many commentators assume that it has at least some indicator properties.

Early empirical evidence on a four-year presidential election cycle in U.S. stock market returns was reported by Umstead (1977), Allvine and O'Neill (1980), and Huang (1985). The empirical results reported by these authors indicate that stock market returns are higher in the third and forth year of a presidency, and lower in the first and second year of a presidency. Moreover, their empirical results indicate that stock market returns tend to be higher on average during Democratic presidencies than during Republican presidencies. More recent empirical results documented by Gärtner and Wellershoff (1995, 1999) and Santa-Clara and Valkanov (2003) support in general the empirical results reported in the earlier literature. Gärtner and Wellershoff have reported that, during the first half of a presidency, the U.S. stock market tends to be bearish. In contrast, during the second half of a presidency, the U.S. stock market tends to be bullish. Santa-Clara and Valkanov have shown that stock market returns are higher during Democratic than during Republican presidencies. They have found that this difference is not explained by business-cycle variables, that it is not concentrated around election dates, and that it cannot be explained by differences in the riskiness of the stock market across Democratic and Republican presidencies. Thus, there seems to be a presidential election cycle in U.S. stock market returns, and the statistical properties of stock market returns during Democratic presidencies are different from those during Republican presidencies.[1] Clearly, against the background of the efficient market hypothesis discussed in the finance literature (see Fama 1991), these results are puzzling.

Given these interesting and puzzling results, evidence from countries other than the U.S. might yield important insights into the nature of the link between the political process and stock market movements. So far, however, empirical research is relatively silent in this respect. In this paper, we make an attempt to close this gap in the literature by providing empirical evidence on the link between the political process and stock market movements in Germany. Our results for the German stock market are significantly different from the results reported in the literature for the U.S. stock market. For example, in contrast to the empirical results available for the U.S. stock market, our empirical results indicate that in Germany stock market returns do not tend to be higher during liberal governments than during

1 Others have investigated whether significant predictable patterns in stock market movements around election dates are detectable. Niederhoffer et al. (1970) and Riley and Luksetich (1980), for example, use data for the U.S. stock market to analyze this question. In an international context, Pantzalis et al. (2000) provide empirical evidence on fluctuations of stock market returns around election dates. See also Peel and Pope (1983), among others, for an empirical study of the link between election dates and U.K. stock market returns. Vuchelen (1997) presents empirical evidence for Belgium. For further evidence, see also the literature cited by these authors.

conservative governments. Moreover, using the technique suggested by McCallum (1978), we did not find any evidence of a pronounced political cycle in German stock market returns. This latter result, however, does *not* imply that the political process in Germany and stock market movements are completely independent from each other. In fact, we found that stock market movements significantly affect the government's popularity as measured by its approval rate: the approval rate tends to increase when the stock market is bullish, and it tends to decrease when the stock market is bearish. Thus, it seems that, while stock market movements are largely unaffected by the political process, stock market movements influence the political process. The explanatory power of stock market movements for the governments' popularity is a reflection of the fact that stock market movements are forward-looking nature and, therefore, summarize agents expectations regarding the future state of the economy. The explanatory power of stock market movements for the governments' popularity provides a rationale for why the German chancellor fired the CEO of the Deutsche Telekom when the prices of its shares showed a pronounced downward trend.

We organize our paper as follows. In Section 2, we establish some stylized facts about stock markets movements and the politic process in Germany. In Section 3, we test for the presence of a political cycle in German stock market returns. In Section 4, we study the dynamic interplay between stock market movements and the government's popularity. In Section 5, we offer some concluding remarks.

II. Stylized facts

In order to obtain a first impression of the potential link between stock market movements and the political process, it is instructive to examine stock market movements around election dates. In order to measure stock market movements, we used the DAX stock market index. We used quarterly data. We used both the nominal and the real DAX stock market index. In order to obtain the real DAX stock market index, we deflated the DAX by the consumer price index. All data — unless otherwise stated — were taken from the OECD databanks "Main Economic Indicators" and "Economic Outlook". Though general elections took place in Germany before 1960, our sample period starts in 1960 and ends in 2002. We restricted our analysis to this sample period because the postwar reconstruction period after World War II certainly was a rather special period in both political and economic respects. Moreover, stock market data for the years before 1960 must be interpreted with some caution because during that time the German stock market was subject to regulations. Moreover, in the years after the

war, German newspapers did not report stock market movements on a regular basis, indicating that in those years the Germans had other things to do than to scrutinize stock market movements. A detailed discussion of these issues can be found in Gielen (1994).

In Panel A of Figure 1, we plot the nominal and real DAX stock market index together with the months in which general elections were held in Germany. In Panel B of Figure 2, we plot the value of the real DAX stock market index around election months and normalize the index in an election month so that it assumes the value 100.

― Insert Figure 1 about here. ―

Panel B of Figure 1 reveals that, based on the average stock market movements around all general elections in Germany since 1960, the DAX stock market index was on average not significantly higher before a general election than after one. However, when interpreting this result, one has to account for the fact that two general elections in Germany were irregular because the government's term in office was substantially shorter than usual and, even more important, because the end of its term came unexpectedly for the government. Hence, if the government had planned, as predicted by PBC theory, to promote economic conditions just before one of these two general elections, they actually did so unintentionally after the elections. If the two unexpected general elections are excluded from the sample, the results change slightly: the DAX stock market index is then somewhat higher before an election month than after it. However, as indicated by the confidence bands also plotted in Panel B, this difference in stock market movements before and after a general election is by no means statistically significant. Of course, the interpretation of this result should not be stretched too far and, before jumping to a far-reaching conclusion, more formal empirical work needs to be done. Notwithstanding, it is safe to say that Figure 1 provides a first indication that there is no pronounced political cycle in German stock market movements.

― Insert Table 1 here. ―

We next analyzed whether (continuously compounded) stock market returns are different during liberal than during conservative governments. This is interesting because a number of authors have reported that the average U.S. stock market returns during Democratic presidencies differ from stock market returns during Republican presidencies. In particular, many authors have reported that stock markets returns are on average higher during

Democratic presidencies than during Republican presidencies (see, e.g., Santa-Clara and Valkanov 2003, Huang 1985). As Santa-Clara and Valkanov (2003) discuss, this is still an unresolved puzzle. Some authors hypothesize that higher returns during more liberal governments may reflect a larger risk premium. Against the background of this hypothesis, it is interesting to analyze whether results comparable to those documented for the U.S. stock market can be obtained for the German stock market. Our results for the German stock market are summarized in Table 1. There, we compare nominal, real, and excess returns during liberal and during conservative governments. The results of these comparisons are in sharp contrast to those reported in the literature for the U.S. stock market. In fact, our results indicate that in Germany stock market returns have been on average higher during conservative governments than during liberal governments.

– Insert Table 2 about here. –

The results summarized in Table 1 should be interpreted with some caution for at least two reasons. First, while in the U.S., political power shifts relatively often, in Germany only three major shifts between more liberal and more conservative governments have occurred. Second, when computing the results we report in Table 1, we did not control for the influence of other variables which may have had an impact on stock market returns. In order to control for the influence of other variables, we followed Santa-Clara and Valkanov (2003) and regressed German stock market returns on dummy variables that represent the political orientation of the government and a set of control variables. We controlled for the influence of the short-term interest rate, the spread between the long-term and short-term interest rate, and a dummy variable that captures large stock market slumps (like the one observed in 1987). We estimated the following equation:

$$r_{t+1} = \beta_1 DC_t + \beta_2 DL_t + \beta_3 Control_t + u_t. \quad (1)$$

The estimation results are given in Table 2. It turns out that the difference between the average stock market returns across liberal and conservative governments are relatively small. In statistical terms, the difference is significant only at the 10 per cent level. This indicates that the political orientation of the government is hardly visible in the magnitude of stock market returns. Moreover, the results given in Table 2 clearly suggest that, in contrast to what has been found for the U.S., in Germany stock market returns during liberal governments have not been significantly higher than during conservative governments. Thus, we conclude

that a stylized fact that is well-established for the U.S. cannot be confirmed with German data: stock market returns are not systematically higher during liberal governments than during conservative governments.

III. Tests for a Political Cycle in Stock Market Returns

The result that stock market returns are hardly significantly higher during liberal than during conservative governments does not rule out the possibility that, irrespective of the political orientation of the government, the political process induces political cycles in stock market returns. How can such political cycles arise? In the PBC literature, answers to this question have been offered by adherents of at least two schools, namely the "opportunistic" and the "partisan" school.

Adherents of the opportunistic school argue that incumbent governments use expansionary policy measures to improve the economic situation just before an upcoming election. If expectations are not fully rational, the increase in overall economic activity will improve the re-election chances of the government (Nordhaus 1975). Even if voters form rational expectations, it can be rational for governments to conduct an expansionary policy before elections if temporary information asymmetries are important (Rogoff 1990). Such temporary information asymmetries can result in a so-called rational opportunistic cycle.

According to the adherents of the school of partisan cycles, political business cycle can arise if agents do not form rational expectations and more left-wing governments prefer a more expansionary and, thus, more inflationary policy, while more right-wing governments are more hawkish regarding inflation, but do not care as much about output growth and employment. We have already shown in Section 2 that, in contrast to what partisan PBC theory implies, there is no significant difference in stock market returns across left-wing and right-wing governments. Thus, basic partisan PBC models should have difficulties in shedding light on the link between the political process and stock market movements in Germany. This, however, does not necessarily mean that the partisan PBC theory has nothing to say about this link. In fact, the so-called rational partisan cycle theory, i.e., the partisan PBC theory extended to feature rational expectations, implies that one should not focus on the type of comparisons between left-wing and right-wing governments that formed the basis for our analysis in Tables 1 and 2. Rather, one should focus on periods in which left-wing

governments are replaced by right-wing governments, and vice versa (see Berger and Woitek 1997; Alesina and Roubini 1992).

In order to test for a political cycle in stock market returns, we followed Gärtner and Wellershoff (1995, 1999), who have used in their empirical analysis of political cycles in U.S. stock market returns a test tracing back to the research by McCallum (1978). In order to implement this test, we defined a dummy variable, E_t. Starting in the quarter in which an election was held, this dummy variable assumes the values 0,1,2,3,4,5,6,7,8,7,6,5,4,3,2,1,0. Thus, for each quarter between two elections, this dummy variable assumes a different value. This dummy variable can, therefore, be used to test whether systematic and statistically significant election cycles can be detected in stock market returns.

This test is not directly applicable to German data. The reason for this is that the political institutions in Germany are somewhat different from those in the U.S. Specifically, the election terms are not as regular as in the U.S. The length of an election term may differ due to unexpected elections (1972, 1983) and due to attempts to bring back the election date, after such an "irregular" election once has been held, to its traditional date in autumn. Thus, several terms can be shorter or slightly longer than a regular 16-quarter term. In order to account for such variations in the length of a term, we set, in the case of a shorter term, the dummy variable equal to zero in the quarter in which an irregular election occurs. If the length of a term exceeds 16 quarters, we set the dummy variable equal to zero during all additional quarters.

In order to test formally for the presence of an election cycle in German stock market returns, we estimated the following equation:

$$r_t = \beta_0 + \beta_1 \Delta E_t + u_t, \qquad (2)$$

where r_t denotes (nominal, real, or excess) stock market returns, Δ denotes the first difference operator, E_t denotes the McCallum dummy, and u_t denotes an error term. We used the first difference of the McCallum dummy because PBC theory implies that an election cycle should be detectable at the level of a stock market index. Thus, because Equation (2) is formulated in terms of stock market returns, we must use the first difference of the McCallum dummy (see also Gärtner and Wellershof 1995, 1999)

Under the null hypothesis that an election cycle is detectable in stock market returns – and against the background of the implications of PBC theory – the coefficient of the McCallum dummy, β_1, should be statistically significant and negative. The difference between the constant, β_0, and this coefficient captures the influence of the political process (i.e., the election cycle) on stock market returns.

When estimating Equation (2), we took into account two potential econometric problems. The first econometric problem is that it is unlikely that the error term, u_t, is a white noise error term, implying that standard hypothesis tests cannot be applied. We took this into account in two different ways. First, we computed robust standard errors in order to assess the statistical significance of the coefficients. We used the technique suggested by Newey and West (1987) to compute these robust standard errors. Second, we modeled the error term using an AR(1) process to achieve white noise errors. The second econometric problem is that there are a number of large outliers in the time series of German stock market returns. This is a problem that is quite common in financial econometrics. In order to deal with this problem, we followed Gärtner and Wellershoff (1995, 1999) and added a dummy variable to the right-hand side of Equation (2). This dummy variable covers periods of stock market "crashes". We counted every quarter in which stock market returns exceed -2 % as a "crash" period.

The estimation results are summarized in Table 3. As can be seen in Table 3, we estimated a number of alternative specifications of Equation (2). For example, we used nominal returns, real returns, and excess returns on the left-hand side of Equation (2). We also analyzed the implications of using alternative definitions of the McCallum dummy. For example, because the linear specification of the McCallum dummy may be too restrictive to detect pronounced election cycles in stock market returns, we also estimated a specification of Equation (2) in which the McCallum dummy raised to the power four is used as a regressor (see also Gärtner and Wellershoff 1995, 1999)

– Insert Table 3 about here–

The estimation results show that the "crash" dummy is always significant and has the expected negative sign. Moreover, the coefficient of the AR(1) process we use to model the

error term of Equation (2) is also statistically significant. The coefficient of the McCallum dummy, however, is in general not statistically different from zero. Only in two out of 12 specifications is this coefficient significant. Thus, all in all, the estimation results do not indicate that there is an election cycle in German stock market returns.[2] Even more interesting, the sign of the coefficient of the McCallum dummy is positive in all cases. PBC theory, in contrast, suggests that the sign of this coefficient should be negative. If the government tries to induce a political business cycle and stock market returns reflect this, it should be possible to observe negative returns in the quarters following an election and positive returns in quarters preceding an election. This is not what we find in the data.

Besides examining the possibility that a pure election cycle is detectable in stock market returns, we also took into account the possibility that a partisan cycle is detectable in stock market returns. It is clear from the results reported in Tables 1 and 2 that, in contrast to what the basic partisan PBC theory implies, there is no significant difference in stock market returns across left-wing and right-wing governments. Therefore, we focused on testing the implications of the rational partisan cycle theory. In particular, to test this theory, we followed Berger and Woitek (1997) and defined a dummy variable that assumes the value 1 when there is a change from a left-wing to a right-wing government ($D_t^{left \to right}$). We also defined a corresponding dummy variable that assumes the value one when there is a change from a right-wing to a left-wing government ($D_t^{right \to left}$). When defining these dummies, we took account of the historical fact that the German political system has not experienced many clear-cut swings in either direction because the majority of changes in government were driven by changes in political coalitions. Therefore, we followed the literature and considered the following changes: 1966 – change to the left (social democrats enter the government); 1969 – change to the left (Christian democrats leave the government); 1982 — change to the right (Christian democrats enter the government); 1998 — change to the left (social democrats win chancellorship).[3]

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[2] This result implies that the political process in Germany does not give rise to systematic and statistically significant cyclical movements in German stock market returns. Given the high degree of international integration of financial markets, this does not imply that a potential political cycle in U.S. stock returns does not transmit onto German stock market returns. For the international transmission of the U.S. election cycle to international stock returns, see Foerster and Schmitz (1997).

[3] One might also wish to take into account two other events. Berger and Woitek (1997) argue that in 1972 the swing from a left-wing to a right-wing government occurred because Karl Schiller, a prominent pro-market Social democrat, left the government. In a similar vein, one could argue that in 1999 a swing from "the left to the right" occurred because Oskar Lafontaine, an influential alleged left-winger among Social democrats, resigned from the office of minister of finance.

We used a regression equation of the format of Equation (2) to test the implications of the rational partisan cycle theory. Like Berger and Woitek (1997), we defined the dummy variables that account for changes in the political orientation of the government in two different ways: we used a dummy that assumes the value 1 for two quarters after an election, and we used a dummy that assumes the value 1 for four quarters after an election. Using both dummies should give us an impression of the robustness of our results. In order to assure that the residuals of the regression are white noise, we included in the estimation equation an AR(1)-process for the residuals and the crash dummy that already worked in Equation (2).

– Insert Table 4 about here. –

The estimation results are given in Table 4. The evidence for a political cycle in stock market returns is at best limited. Only one significant coefficient has the expected sign. In a nutshell, our results confirm the conclusion of Berger and Woitek that there is hardly any evidence for a partisan cycle in Germany.

IV. Time-Series-Based Evidence

The results we reported in Section 3 indicate that the political process in Germany does not cause statistically significant stock market movements. This, of course, does not automatically imply that there is no evidence for a causality which runs in the opposite direction. In fact, the anecdotal evidence we documented in the introductory section of this paper indicates that, at least in the perception of policy makers, stock market movements may have non-negligible feedback effects on the political process. In order to study this possibility and, thus, to gain further insights into the dynamic interplay between stock market movements and the political process, we used a more time-series-based approach. We estimated popularity functions and vector autoregressive (VAR) models.

In our empirical analysis, we used quarterly survey data on the government's popularity with voters compiled by the “Forschungsgruppe Wahlen”, Mannheim. Data are available in electronic form from 1977 onwards. In each survey, potential voters are asked whether they approve of the politics of the government. The answers can vary from +5 ("highly approve") to -5 ("highly disapprove"). For the months for which no survey data are available, we imputed values using linear interpolation.[4]

[4] We have no data for 36 out of 290 months (= 12 %).

IV.1 Tests Based on Popularity Functions

Empirical evidence on a possible role of stock markets movements in the political process can be obtained by estimating a popularity function. Standard popularity functions have frequently been shown to fit German data quite well (see Kirchgässner 1985). According to the popularity function we estimated, the *approval* rate (p_t) of the government depends negatively upon the unemployment rate (UR_t) and the inflation rate (IR_t). In order to control for persistence in the approval rate, we also included the lagged approval rate in the vector of regressors of our popularity function. In addition, we took into account that stock market returns may have had an impact on the approval rate. Hence, we estimated the following equation:

$$p_t = \beta_0 + \beta_1 p_{t-1} + \beta_2 UR_{t-1} + \beta_3 IR_{t-1} + \beta_4 r_{t-1} + u_t . \qquad (3)$$

We expect the coefficient of both the unemployment rate and the inflation rate to be negative and the coefficient of stock market returns to be positive.

Unlike the (seasonally adjusted) unemployment or inflation rate, stock market returns are known to be very volatile variable. Because voters know this, we also took into account the possibility that voters use past values of stock market returns to make up their minds about economic conditions. Therefore, we estimated both a version of Equation (3) in which only lagged stock market returns enter into the vector of regressors and a version of Equation (3) in which we include up to 4 lags of stock market returns in the vector of regressors. Table 5 summarizes the results of our estimations.

– Insert Table 5 here. –

All coefficients have the expected signs. Moreover, tests for well-behaved residuals reveal that the equations are correctly specified. As concerns the coefficients that capture the influence of stock market movements on the approval rate, they turn out to be significantly different from zero in all specifications. Hence, this result is robust across the different versions of Equation (3) we estimated. In fact, if lagged returns are also taken into account, the magnitude of coefficients of stock market returns even increases.

Given that the attention a broader audience pays to stock markets movements may have increased during the new –economy boom in the 1990s, it cannot be ruled out that the estimated relation is unstable over time. Thus, we tested for parameter stability. The test results are plotted in Figure 2. For the sake of brevity, we only present test results for a version of Equation (3) in which we include real returns in the vector of regressors. The results show that — despite some large one-quarter forecast errors — the popularity function is stable. Neither the CUSUM nor the CUSUMQ tests on overall instability show any indicators of parameter instability.

― Insert Figure 2 here. ―

IV.2 Evidence from VARs

While the estimation of the popularity functions has not yielded strong evidence for an important contemporaneous role of stock market movements for the political process, this does not rule out the possibility that stock market movements and the political process are dynamically linked. In order to analyze this possibility in detail, we estimated VAR models. We estimated a number of alternative VAR models because we believe that it is important to control for the influence of other variables than stock market movements on the popularity of the government.

We started with a benchmark bivariate VAR model in which we included the approval rate and stock markets returns only. As in the other sections of this paper, we used nominal returns, real returns, and excess returns. Basically, the estimation of this bivariate VAR amounts to a test for Granger –non causality. Such a test renders it possible to study whether one series Granger causes the other series, i.e., whether it is possible to predict the second series with information incorporated in the first series, and vice versa. Against the background of the results reported in the PBC literature and against the results reported in Section 4.1, we expect that stock market returns Granger-cause the government's popularity as measured by the approval rate. Given the results documented in Sections 3, we also expect that the approval rate does not exert a strong effect on stock market returns.

After estimating and testing the benchmark VAR, we included a number of other variables in the VAR in order to be sure that a potential link between stock market returns and the approval rate is not merely due to the influence of another variable like, e.g., inflation. We, therefore, estimated the following VAR models:

- The first model (VAR model 1) is our benchmark VAR model. It includes nominal stock market returns and the approval rate. In order to compute impulse response functions for this VAR, we applied a Choleski decomposition in order to recover the structural disturbances of the VAR from the disturbances of the reduced-form of the VAR. To this end, we ordered the variables in the VAR such that stock market returns can react contemporaneously to changes in the approval rate, but the approval rate cannot react to contemporaneous changes in stock market returns.
- The second model (VAR model 2) is a variant of the benchmark VAR model. It includes real stock market returns and the approval rate. The ordering of variables is as in VAR model 1.
- The third model (VAR model 3) includes excess returns and the approval rate. The ordering of variables is as in VAR model 1.
- The fourth model (VAR model 4) includes nominal stock markets returns and the approval rate. The ordering of variables is as in VAR model 1. As an exogenous (i.e., conditioning) variable, it includes both the unemployment and the inflation rate.
- The fifth model (VAR model 5) is identical to VAR model 4, but treats the inflation rate and unemployment rate as endogenous variables. In order to calculate impulse response functions, the ordering of variables is as follows: stock market returns, approval rate, unemployment rate, inflation rate. Impulse response functions based on this model were also calculated on the basis of an alternative ordering: inflation rate unemployment rate, approval rate, stock market returns.

We determined the lag length of all VAR models by means of the minimum Schwarz information criterion. In addition, we performed lag-exclusion tests based on a VAR with one additional lag. Furthermore, we conducted tests on well-behaved residuals, i.e. tests on autocorrelation, normality, and heteroscedasticity. Details regarding these tests can be found in Table 6. Against the results of these tests, we included two lags of the endogenous variables in our VAR.

― Insert Table 6 here. ―

Figure 3 shows the respective impulse response functions. It turns out that the response of government's approval rate to a one-standard-deviation shock in stock market returns is positive and, as indicated by the reported standard error bands, significant (Panel A of

Figure 3). This result is robust across the various VAR models we estimated. Thus, we conclude that stock market movements are a non-negligible determinant of the approval rate and, thus, of the popularity of the government.

– Insert Figure 3 here. –

The impact of a shock to the approval rate on stock markets returns is significant only in VAR models 1 to 4 (Panel B of Figure 3). This result suggests that there might be a dynamic interplay between stock market movements and the approval rate. However, as evidenced by the impulse response functions for VAR model 5, this result is quite sensitive to the specification of the VAR model. In fact, if one controls for the influence of inflation and unemployment, the effect of a shock to the approval rate on stock market returns ceases to be significant. This finding suggests that, while the popularity of German governments depends on stock market movements, governments are unable or unwilling to promote stock market returns to assure re-election. This result is a further piece of evidence that there is no political cycle in German stock market returns. It is also worth mentioning that this result is in line with the efficient market hypothesis.

It is interesting to examine whether the dynamic link between governments' popularity and stock market returns is asymmetric. For example, one could hypothesize that negative stock markets returns are often more closely monitored by the media and may, thus, be more harmful for the governments' popularity than positive stock markets returns of the same magnitude are beneficial. In order to test this hypothesis, we extended our bivariate VAR models (VAR models 1 to 3) to include dummy variables constructed in a way such that they capture the sign of stock market returns. We then performed exclusion tests to study the explanatory power of the dummies (Huh 1998). The tests are based on the following equations:

$$\begin{aligned} p_t &= \alpha_o + \Theta \cdot dummy_t + \sum_{i=1}^{S} \left(\alpha_i + \Theta_i^p dummy_t\right) p_{t-i} + \sum_{i=1}^{S} \left(\beta_i + \Theta_i^r dummy_t\right) r_{t-i} + \varepsilon_{1,t} \\ r_t &= \gamma_o + \Theta \cdot dummy_t + \sum_{i=1}^{S} \left(\gamma_i + \Theta_i^r dummy_t\right) r_{t-i} + \sum_{i=1}^{S} \left(\delta_i + \Theta_i^p dummy_t\right) p_{t-i} + \varepsilon_{2,t} \end{aligned} \tag{4}$$

The estimation results are reported in Table 7. As regards the equation for the approval rate, the hypothesis that the coefficient of the dummy variable is not significantly different from

zero cannot be rejected. In the equation for stock markets returns, there are no signs of asymmetry. However, this result is not surprising given that our VAR-based evidence has already revealed that changes in the approval rate provide virtually no information with respect to stock markets returns. As a consequence, adding an additional variable (like a dummy variable) to the equation is likely to improve the explanatory power of the model. Thus, we conclude that taking asymmetries into account does not alter the conclusions we draw from our VAR-based analysis.

― Insert Table 7 here. ―

V. Conclusions

We have established a number of interesting stylized facts about the link between stock market movements and the political process in Germany. We have found that, unlike in the U.S., stock market returns in Germany tend to be higher under conservative than under liberal governments. Moreover, we have found no evidence for political or election cycles in stock market returns. However, VAR-based evidence as well as evidence from popularity functions has revealed that stock market returns have an impact on the popularity of German governments.

To sum up, the results of our empirical research suggest that stock market movements may have had an impact on political variables (like, e.g., the approval rate). The evidence for a reverse causality, i.e., a causality that runs from political variables to stock market movements, is not very strong. We conclude from our results that, when one seeks to study whether the political process induces stock market movements, one should take account of the possibility that political variables are not strictly exogenous. This conclusion is in line with the results documented in the empirical literature that uses economic variables to forecast election outcomes and, thus, assumes that the outcome of the political process is endogenous.

An open question on the research agenda is why our results for German stock market data are so strikingly different from those documented in the earlier empirical literature for the U.S. stock market. Why does empirical evidence indicate that there is a "political cycle puzzle" in U.S. stock market returns but not in German stock market returns? Can the answer to this question be found by analyzing differences between the U.S. and German political system? Recent results reported by Persson and Tabellini (2002) could indeed be interpreted to

indicate that differences in the political system may be part of the explanation for the cross-country "political cycle puzzle" we have reported in this paper. Also, Vuchelen (2003) argues that, in contrast to countries with majoritarian electoral rules, election results in countries with proportional electoral rules contain less information about future policy because it is difficult to predict the composition of a multi-party coalition from election outcomes. This could be one reason for why we do not find a significant political cycle in German stock market returns.

Or are differences in stock market efficiency responsible for the stylized fact that there seems to be a "political cycle puzzle" in the case of the U.S. stock market but not in the case of the German stock market? Clearly, our results are more comfortable for adherents of the efficient market hypothesis than those found for the U.S. stock market. But, against the background of the international evidence on stock market movements around election dates, do we really want to believe that international differences in stock market efficiency give rise to cross-country differences in the importance of political variables for stock market movements? These are important questions, and the pay-off for finding an answer to these questions will be high for both financial economists and PBC theorists.

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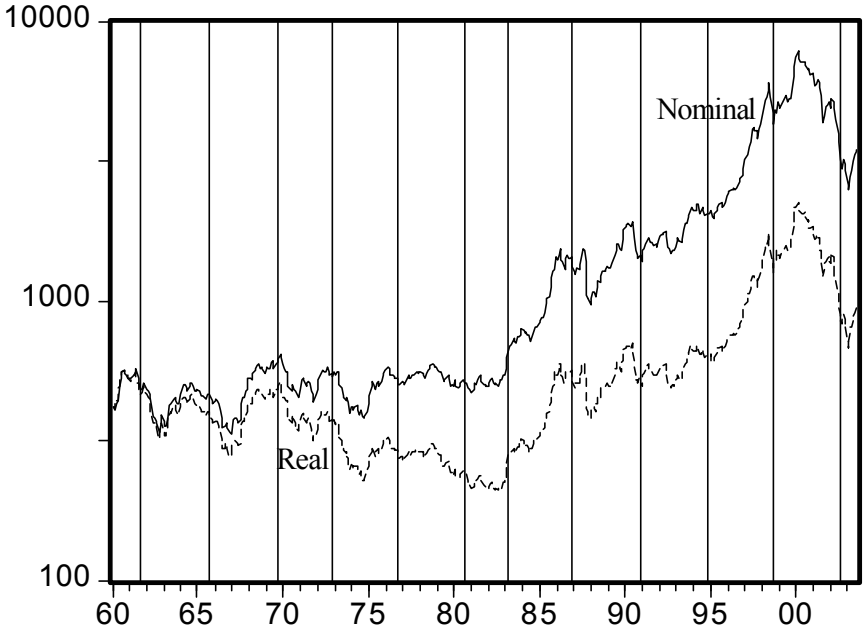
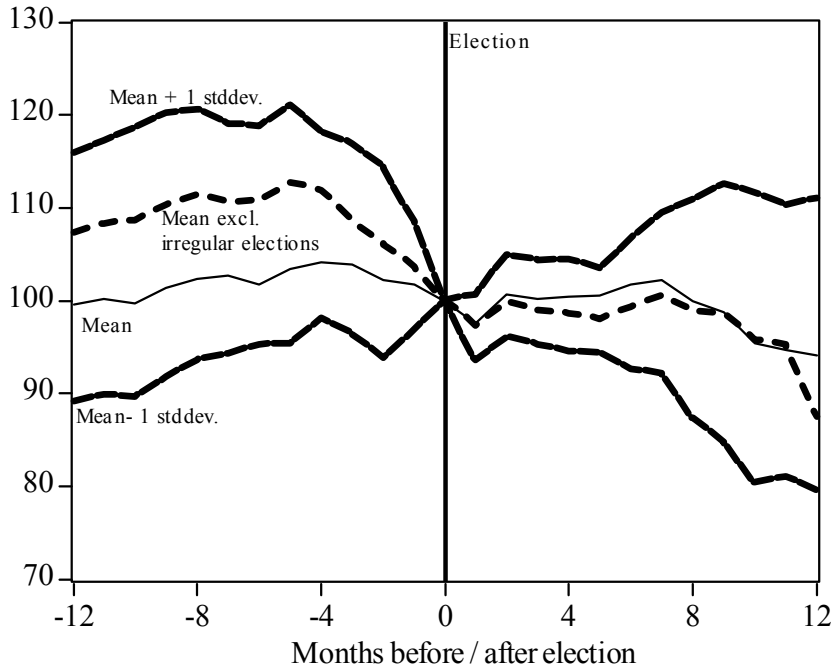
Figure 1 – General elections in Germany and the stock market

PANEL A

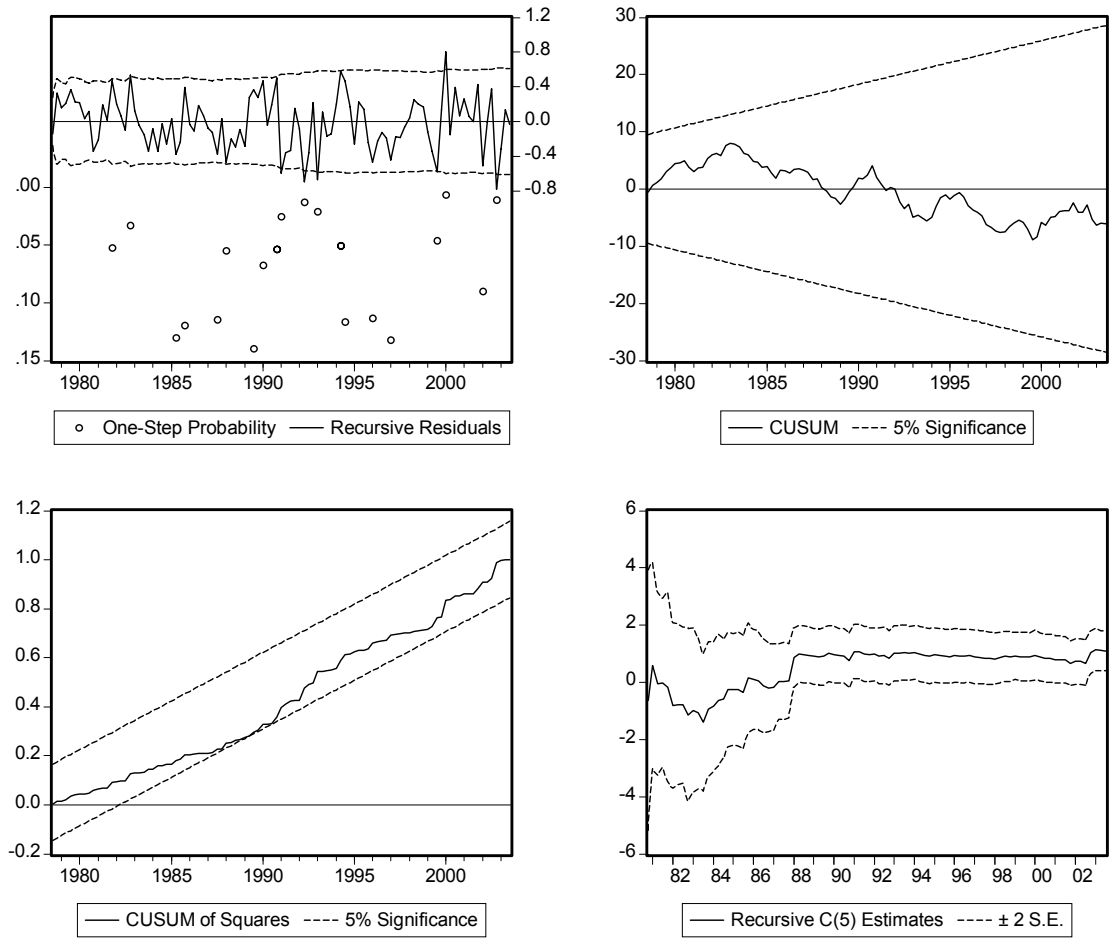


PANEL B



Note: Panel A shows the nominal and real DAX stock market index (logarithmic scaling) and months in which general elections took place in Germany (the vertical lines indicate the dates of general elections). Panel B plots the real DAX stock market index before and after elections. DAX in months of a general election = 100. Irregular elections: 1972, 1983.

Figure 2 – Tests for stability of the parameter in the popularity equation

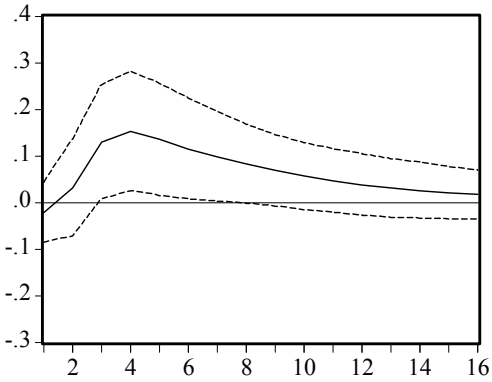


Note: This figure shows stability tests the popularity function based on excess returns (see are Column 5 of Table 5). The upper left panel of the figure shows the p-values of a one-step forecast Chow-test on overall parameter constancy. The upper right panel shows the results of a CUSUM test on parameter stability. The lower left panel shows the results of a CUSUMQ test of on parameter stability. The lower left panel shows recursive estimates of the coefficient representing the impact of excess stock market returns on the popularity of the government.

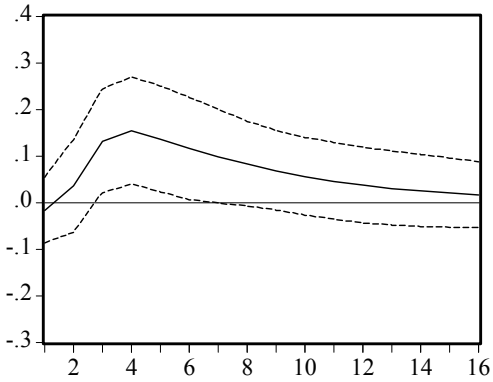
Figure 3 – Impulse response functions

Panel A

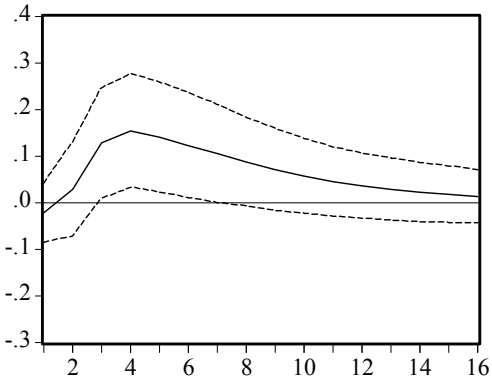
VAR model 1



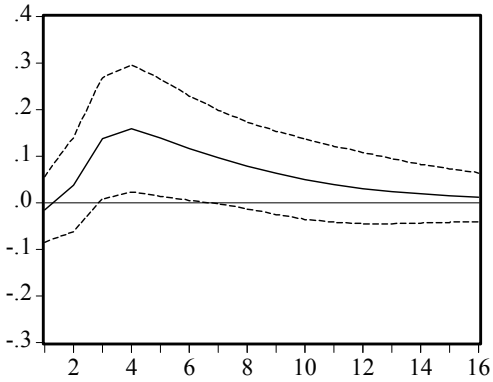
VAR model 2



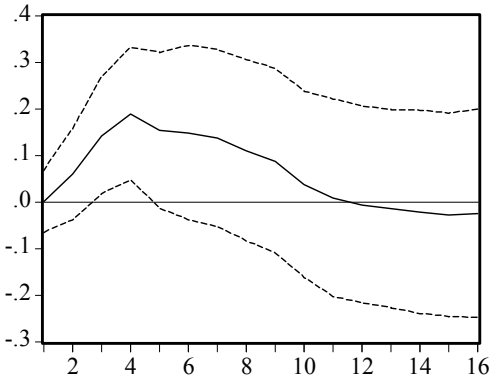
VAR model 3



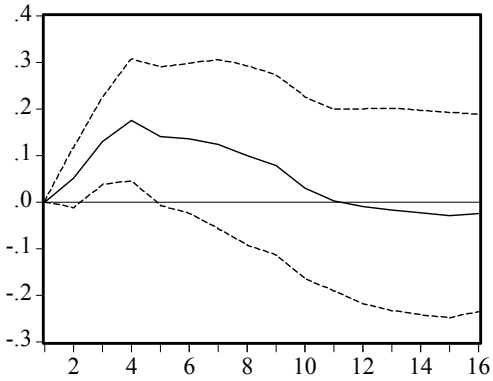
VAR Model 4



VAR model 5, ordering 1



VAR model 5, ordering 2

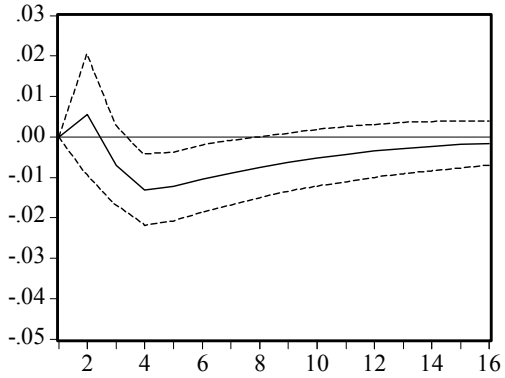


(to be continued)

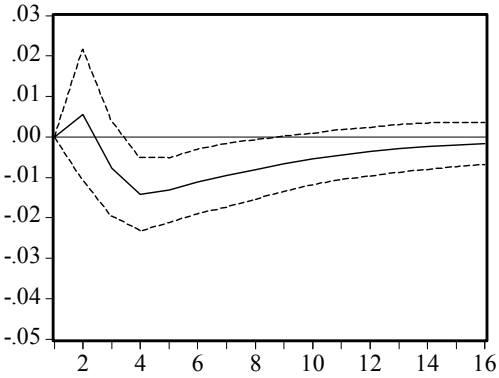
(cont.)

Panel B

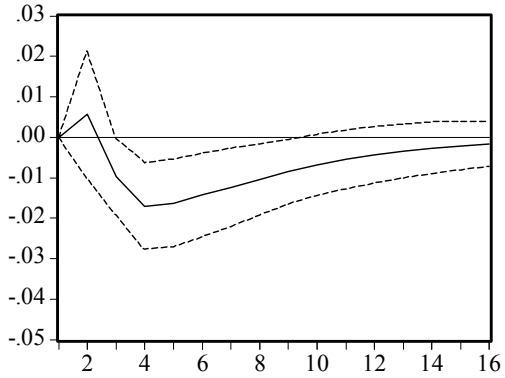
VAR model 1



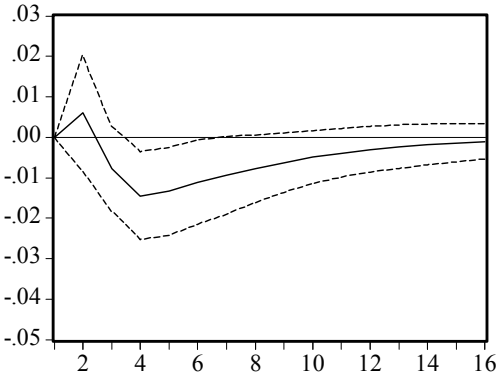
VAR model 2



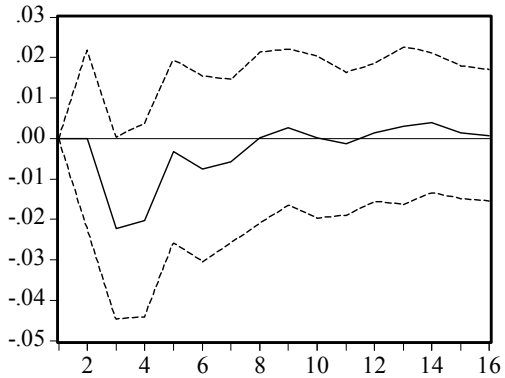
VAR model 3



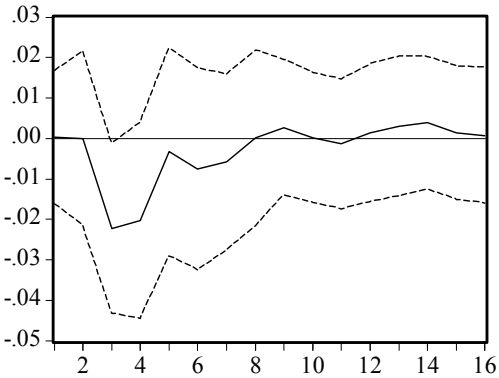
VAR model 4



VAR model 5, odering 1



VAR model 5, ordering 2



Note: Panel A depicts impulse response functions of approval rate to a one standard deviation shock to stock markets returns. Panel depicts impulse response functions of stock market returns to a one standard deviation shock to the approval rate.

Table 1 – Average stock markets returns by political orientation of central government (1961 to 2003)

Government led by	Average returns	Average returns otherwise	Test for equal mean [a)]	Test for equal median [b)]
Returns				
Conservatives (CDU chancellor)	0.023	-0.001	1.87*	2.12**
Liberals (SPD chancellor)	-0.008	0.023	2.62***	2.94***
Neutral ("Grand coalition")	0.042	0.008	1.34	1.52
Real returns				
Conservatives (CDU chancellor)	0.017	-0.010	2.12*	2.35**
Liberals (SPD chancellor)	-0.018	0.019	2.95***	3.23***
Neutral ("Grand coalition")	0.037	0.000	1.47	1.63
Excess returns				
Conservatives (CDU chancellor)	-0.028	-0.057	2.08**	2.34**
Liberals (SPD chancellor)	-0.067	-0.024	3.20***	3.47***
Neutral ("Grand coalition")	0.007	-0.046	2.00**	2.13**

*Note: *** (**, *) denotes rejection of the null hypothesis at the 1 (5, 10) percent level. a) t-test for an equal mean - b) Wilcoxon/Mann-Whitney test for an equal median.*

Table 2 – Tests for equal mean in stock market returns during liberal and conservative governments

Specification	Dummy for liberal-leaning government	Dummy for conservative-leaning government	Control variable coefficient	Test for equal coefficients a)
Returns				
Without control variable	-0.007 (-0.57)	0.021 (1.82)*	(-)	2.76*
Short-term interest rates	-0.005 (-0.22)	0.022 (1.09)	-0.0002 -0.07)	2.50
Interest rate spread	-0.017 (-1.46)	0.007 (0.52)	0.008 (2.43)**	2.12
Crash dummy	-0.005 (-0.42)	0.023 (2.00)**	-0.147 (-16.13)***	2.94*
Crash dummy and AR(1) process	-0.004 (-0.32)	0.019 (1.50)	-0.04 / 0.33 (-1.66)*/(4.50)***	1.52
Real returns				
Without control variable	-0.017 (-1.42)	0.015 (1.29)	(-)	3.63*
Short-term interest rates	-0.009 (-0.35)	0.022 (1.08)	-0.0013 (-0.46)	3.11*
Interest rate spread	-0.028 (-2.38)**	0.0001 (0.01)	0.0085 (2.61)***	2.93*
Crash dummy	-0.015 (-1.31)	0.017 (1.45)	-0.1414 (-17.49)***	3.83*
Crash dummy and AR(1) process	-0.015 (-1.03)	0.013 (1.01)	-0.04 / 0.34 (-1.35)/(4.51)***	2.00
Excess returns				
Without control variable	-0.066 (-4.52)***	-0.030 (-2.36)**	(-)	3.53*
Short-term interest rates	-0.006 (-0.24)	0.020 (1.01)	-0.001 (-3.30)	2.23
Interest rate spread	-0.084 (-6.87)***	-0.055 (-4.34)***	0.014 (4.09)***	3.10*
Crash dummy	-0.064 (-4.45)***	-0.028 (-2.25)**	-0.1237 (-12.80)***	3.57*
Crash dummy and AR(1) process	-0.062 (-3.45)***	-0.033 (-2.27)**	-0.02 / 0.40 (-0.83)/(6.06)***	1.52

*Note: *** (**, *) denotes rejection of the null hypothesis at the 1 (5, 10) percent level. a) Wald test.*

Table 3 – Tests for political cycles in German stock returns (McCallum regressions 1961 to 2003)

Constant	Political cycle variable	Crash dummy	AR(1) process	R^2	Test for Autocorrelation a)	Test for ARCH b)	Test for Normality c)
Nominal returns							
0.011 (1.37)	-0.006 (ΔE_t) (-1.19)	(-)	(-)	0.01	Order 1: 20.89*** Order 4: 23.72***	ARCH(1): 4.17** ARCH(4): 6.32	9.00**
0.012 (1.29)	0.0002 (ΔE_t) (0.05)	(-)	0.36 (5.17)***	0.13	Order 1: 2.30 Order 4:4.26	ARCH(1): 0.33 ARCH(4):0.66	19.66***
0.014 (1.72)*	-0.0008 (ΔE_t) (-0.20)	-0.25 (-10.47)***	0.36 (5.82)***	0.25	Order 1: 2.60 Order 4: 5.40	ARCH(1): 2.37 ARCH(4): 3.58	1.50
0.014 (1.74)*	>-0.0001 (ΔE_t^4) (-0.66)	-0.24 (-10.44)***	0.35 (5.78)***	0.25	Order 1: 2.44 Order 4: 5.13	ARCH(1): 2.29 ARCH(4): 3.72	1.34
Real returns							
0.004 (0.43)	-0.006 (ΔE_t) (-1.18)	(-)	(-)	0.07	Order 1: 22.47*** Order 4: 25.35***	ARCH(1): 4.28** ARCH(4): 6.38	5.64*
0.004 (0.046)	0.0006 (ΔE_t) (0.13)	(-)	0.38 (5.39)***	0.14	Order 1: 1.85 Order 4:4.27	ARCH(1): 0.39 ARCH(4): 3.30	16.66**
0.007 (0.81)	-0.0004 (ΔE_t) (-0.09)	-0.24 (-10.10)***	0.37 (6.06)***	0.25	Order 1: 2.16 Order 4: 5.85	ARCH(1):3.28* ARCH(4): 4.41	2.11
0.0.07 (0.81)	>-0.0001 (ΔE_t^4) (-0.38)	-0.24 (-10.11)***	0.37 (6.03)***	0.25	Order 1: 2.08 Order 4: 5.72	ARCH(1): 3.18 ARCH(4): 4.36	2.01
Excess returns							
-0.041 (-4.45)***	-0.008 (ΔE_t) (-1.49)	(-)	(-)	0.01	Order 1: 29.64*** Order 4: 32.20***	ARCH(1): 3.82** ARCH(4): 6.38	1.24
-0.045 (-3.67)***	0.0001 (ΔE_t) (0.97)	(-)	0.44 (6.64)***	0.19	Order 1: 1.47 Order 4:5.12	ARCH(1): 0.40 ARCH(4): 2.24	8.68**
-0.038 (-3.51)	-0.0006 (ΔE_t) (-0.15)	-0.24 (-8.83)***	0.45 (7.52)***	0.28	Order 1: 1.41 Order 4: 6.73	ARCH(1):3.71* ARCH(4): 4.87	1.66
-0.037 (-3.54***)	>-0.0001 (ΔE_t^4) (-0.59)	-0.23 (-8.77)***	0.45 (7.54)***	0.28	Order 1: 1.29 Order 4: 6.51	ARCH(1): 3.82* ARCH(4): 5.14	1.60

*Note: *** (**, *) denotes rejection of the null hypothesis at the 1 (5, 10) percent level. a) Breusch/Godfrey (1988) test for auotocorrelation (Observed R^2) b) Test for remaining ARCH-Terms (Observed R^2) c) Jarque-Bera test for normality.*

Table 4 – Tests for rational Partisan Cycles in stock market returns

Equation	Dummy switch from left to right-wing	Dummy switch from right to left-wing	Test for Normality a)	Test for Auto-correlation b)
Dummies with two quarter horizon	0.0234 (1.10) (-0.57)	-0.005 (-0.16) (1.82)*	1.70	2.20
Dummies with four quarter horizon	0.053 (2.85)***	-0.015 (-0.56)	1.97	2.32

*Note: *** (**, *) denotes rejection of the null hypothesis at the 1 (5, 10) percent level. a) Jarque-Bera test for normality. b) Breusch/Godfrey (1988) test for auotocorrelation (Observed R^2) of order 1.*

Table 5 – Estimates of popularity functions

	Dependent variable: Approval rate					
	Stock market variable					
Variable	(-)	Returns	Real returns	Excess returns	Real returns / Sum	Excess returns / Sum
Constant	0.61 (2.09)**	0.63 (2.22)**	0.64 (2.25)**	0.64 (2.24)**	0.84 (2.94)***	0.81 (2.86)***
Lagged approval rate	0.82 (13.04)	0.85 (13.91)***	0.85 (13.90)***	0.85 (13.94)***	0.80 (12.96)***	0.82 (13.27)***
Lagged unemployment rate	0.06 (-2.21)**	-0.07 (-2.40)**	-0.07 (-2.43)**	-0.06 (-2.31)***	-0.09 (-3.16)***	-0.08 (-2.92)***
Lagged inflation rate	-0.04 (-1.41)	-0.04 (-1.68)*	-0.04 (-1.60)	-0.03 (-1.12)	-0.05 (-1.98)**	-0.02 (-0.97)
Dummy for change of government	1.15 (3.56)***	1.20 (3.87)***	1.20 (3.17)***	1.20 (3.88)***	1.01 (3.30)***	1.02 (3.31)***
Lagged stock market returns	(-)	1.11 (3.16)***	1.11 (3.17)***	1.09 (3.17)***	2.25 16.14***	2.16 (15.97)***
R^2	0.85	0.86	0.86	0.86	0.88	0.88
Test for normality [a)]	3.71	0.19	0.18	0.25	0.04	0.06
Test for autocorrelation [b)]	7.78***	2.06	1.98	1.90	2.03	1.84
Test for heteroskedasticity [c)]	3.09	10.75	10.55	12.27	22.13	23.89*

*Note: *** (**, *) denotes rejection of the null hypothesis at the 1 (5, 10) percent level. a) Jarque / bera test for Normality — b) Breusch / Godfrey (1988) test for autocorrelation of order 1 — c) White test (without cross terms).*

Table 6 – Specification of the VAR models

	VAR Model 1	VAR Model 2	VAR Model 3	VAR Model 4	VAR Model 5
Minimum Schwarz criterion (at lag)	-1.18 (1)	-1.19 (1)	-1.16 (1)	-1.10 (1)	2.91 (1)
Lag exclusion test [a)] (at lag)	14.06*** (2)	14.25*** (2)	14.48*** (2)	14.73*** (2)	41.85*** (2)
Test for normality [b)]	8.65*	7.99*	5.02	6.63	39.39***
Test for autocorrelation [c)] at lag 1	3.44	3.37	2.38	3.70	19.98
Test for autocorrelation [c)] at lag 4	1.66	1.62	1.56	1.92	155.77***
Test for heteroskedasticity [a)]	38.61**	39.16*	41.04**	46.33	181.59
LogLiklihood	84.69	85.25	83.69	84.87	-99.10
Lag length	2	2	2	2	2

Note: a) Wald test for joint significance of all variables at the lag reported in brackets — b) Test for normality of the residuals based on Doornik and Hansen 1984) — c) Test for heteroscedasticity based on White (1980).

Table 7 – Results of dummy-variable-exclusion tests

Dummy	H_o: Dummies not different from zero in equation for returns		H_o: Dummies not different from zero in equation for popularity	
	Returns			
1 if stock-market return <0, 0 else	22.96	(0.00)	0.45	(0.82)
	Real Returns			
1 if stock-market return <0, 0 else	22.52	(0.00)	0.37	(0.87)
	Real Returns			
1 if stock-market return <0, 0 else	20.60	(0.00)	0.45	(0.77)

Note: F-Value (p-values in brackets).