Capitalizing on Partisan Politics: Expected Government Partisanship and Sector-Specific Redistribution in Germany

Michael M. Bechtel

Department of Politics and Management
University of Konstanz
Box D86
78457 Konstanz
Germany
michael.bechtel@uni-konstanz.de

Roland Füss

Endowed Chair of Asset Management
European Business School (EBS)
International University Schloss Reichartshausen
65375 Oestrich-Winkel
Germany

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Abstract

This paper examines the redistributive effects of government partisanship on economic sectors. Based on a rational partisan perspective and policy-induced campaign contribution models we expect that once in office, ideologically different parties deliver favourable policies to different industries, in order to enrich their electoral and sector-specific supporters. Using daily stock market data, we empirically evaluate whether and how the mean and the volatility of returns to four important economic sectors co-varied with the electoral prospects of a right-/left-leaning coalition in Germany from 1991 to 2005. This sheds light on the magnitude of sector-specific redistribution to be expected from ideologically different governments holding office. Our estimates show that the mean and the volatility of defence and pharmaceutical sector returns increase if a right-leaning government is becoming more likely to win the upcoming election. In contrast, an increase in the probability of a left-leaning government triggers higher returns to the alternative energy sector and increases the volatility of consumer sector returns. These findings suggest that parties indeed redistribute across industries.

1. Introduction

The impact of government partisanship on macro-economic indicators lies at the heart of research in political economy. Scholarship was able to demonstrate that government partisanship affects inflation, growth, and unemployment (Alesina et al. 1997, Hibbs 1977). We argue that parties can manipulate the economy in a more selective way than suggested by previous studies. Combining a rational partisan model of government (Alesina et al. 1997) and policy-induced campaign contribution models (Austen-Smith 1995; Hall and Deardorff 2006) we expect that once in office, parties implement economic policies designed to systematically discriminate between industries in order to enrich their electoral and sector-specific supporters. Using daily data from Germany we empirically evaluate this conjecture. We examine whether the mean and the volatility of stock returns to four economically important sector indices reacted systematically to the electoral prospects of left- and right-leaning coalitions winning office. Estimates from conditional volatility models show that the defence, alternative energy, and to some extent also the pharmaceutical and consumer industries are indeed influenced by the probability of a right/left-leaning coalition winning the next election and uncertainty about the election outcome.

Such responsiveness of sector returns to expectations about government partisanship implies considerable redistributive effects. This is because firms need stock investments as a source of capital to finance growth. If investment attractiveness of an industry decreases due to a government whose policies favour different sectors, the redistributive repercussions on both, shareholders as well as employees can be tremendous. In the last resort, firms will either file for bankruptcy or relocate cost-intensive parts of their value chain to another country (Hirschman 1970). In both cases, shareholders will suffer from capital losses (also relocation activities reduce profits) and people formerly employed in that industry will lose their jobs. On the other hand, those who invested in a sector which benefits from a government's policies will experience capital gains. Also, people working in that industry will enjoy wage increases and/or more individuals will get a job in that sector. Our results suggest that parties indeed enrich some industries at the expense of others, and underscore the need to decompose

partisan effects into their sector-specific parts, in order to learn about the true redistributive impact of government partisanship on the economy.

Several reasons make it especially interesting to study sector-specific reactions to expected government partisanship in Germany. First, Germany is economically dominant within the European Union and the Eurozone, and is one of the weightiest member states politically. Second, within the time frame studied (1991-2005), it features complete and balanced alternation in government as well as relatively long-ruling two-party coalitions in a multi, yet bipolar party system (Nohlen 2000: 312). This facilitates estimation of anticipated partisan effects (Blais et al. 1993) and allows us to take research on the political economy of financial markets out of a majoritarian context without having to rely on heroic or erroneous assumptions. Finally, while the time frame studied is advantageous to detecting effects of expected government partisanship, it is still of a reasonable size, which reduces the risk of overgeneralization and minimizes the danger of case heterogeneity and structural breaks confounding our results.

The structure of the paper is as follows: The next section reviews the literature on sector-specific effects of government partisanship. In section 3 we lay out the theoretical argument and its key assumptions, and subsequently derive empirically observable implications. Section 4 introduces the data and the estimation technique used for the empirical evaluation. Section 5 presents the results and section 6 concludes.

2. Government Partisanship, Elections, and Sector-Specific Redistribution

The impact of partisan politics on the economy has traditionally been of interest to scholars of political economy. Since the classic work by Douglas C. Hibbs (1977), one pertinent research question has been whether fluctuations of macroeconomic key variables such as inflation, unemployment and growth can be explained by government partisanship (Alesina 1987, Alesina et al. 1997). One strand of this literature has begun to empirically estimate how strong different parties redistribute wealth by looking at the reaction of stock returns to politics (Füss and Bechtel 2007; Knight 2006; McGillivray 2004, 2003). The idea behind this endeavour is that if rational investors are interested in maximizing their

wealth, the effect of political developments and decisions will be incorporated in today's stock prices (Fama 1970). On the aggregate level, return changes in the pre-election period will reflect the impact of parties' policies on the asset under consideration. Therefore, empirical research can exploit stock market reactions to politics in order to attain empirical estimates of the monetary impact of partisanship (Bernhard and Leblang 2006: 6-10; Roberts 1990: 290).

The origin of research on the effects of politics on stock returns dates back to the seminal studies by Stigler and Friedland (1962) and Niederhoffer et al. (1970). Since then, the responsiveness of stock returns to politics has experienced a steady increase in scholarly attention, as it provides a field for testing well established models of political economy (Hibbs 1977; Alesina et al. 1997). It may be of even greater interest to financial investors who aim to maximize their capital gains from stocks. The vast majority of past studies tried to analyze the determinants of overall stock market performance with a focus on the U.S. (Leblang and Mukherjee 2005; Herron 2000; Foerster and Schmitz 1997; Gärtner and Wellershoff 1995; Huang 1985). However, focusing on the overall performance of stock markets is subject to the criticism that political sensitivity might vary across industries. For example, in her excellent comparative study of redistributive politics in Western democracies, Fiona McGillivray points out the specific importance of changes in government partisanship for the steel sector in Germany: "A right-wing coalition entered government in 1982 and, despite its market-orientated ideology, began pumping taxpayers' money into steel plants in the Saarland and the Ruhr" (2004: 106). This had very positive consequences for the profitability of the steel sector, which before had suffered from huge reductions in turnover. Clearly, such heterogeneity in politically induced redistribution across economic sectors is effectively ignored if broad market movements are examined, in which sector-specific partisan effects are aggregated away.

Up until now, studies on sector-specific effects of government partisanship have been restricted to the U.S. political system and focused on single presidential elections. For the 1980 presidential election Roberts (1990) regresses daily defence industry security returns on the probability of Ronald Reagan winning the election and the probability of a Republican majority in Congress. He argues that

since Ronald Reagan chose defence policy as a major issue for his presidential campaign in 1980, his chances of winning the election should be positively related to defence industry securities. Indeed, the evidence suggests that shares of the defence sector portfolio gained 1.4 percentages on average as the probability of a Reagan victory and a Republican Congress majority increased by one percent (Roberts 1990: 303). Overall stock market performance however was not significantly affected by the expected partisanship of the presidency. As Roberts points out, "this finding is quite significant, for it indicates the inappropriateness of treating broad market movements as accurate assessments of the economic consequences of political events. Only by disaggregating the market reactions into relevant policy dimensions will the true implications emerge" (1990: 304).

Herron et al. (1999) examine sector-specific partisan effects in the 1992 presidential election. They model the U.S. economy as consisting of 74 economic sectors each represented by the appropriate Dow Jones Industry Group portfolio. Since the policies of different candidates (George Bush, Bill Clinton, Ross Perot) were expected to have different consequences for sector profits, the corresponding sector index prices should reflect these future effects on profitability. The estimations show that 15 out of 74 sectors were significantly influenced by changes in the electoral prospects of the presidential candidates. While the pollution control sector gained value as the probability of Bill Clinton getting elected increased, the cosmetics and personal-care sector, as well as the pharmaceutical sector suffered from the higher electoral prospects of the democratic candidate.

As this brief literature review demonstrates, our interest in sector-specific partisan effects on the stock market is not a novelty. Rather, in several respects we tie in with past research: we agree that partisan effects are unlikely to be distributed uniformly across industries. As this has implicitly been assumed by past research which focused on broad market movements, such an approach might lead to erroneous conclusions about the existence or non-existence of partisan effects. Also, in line with the literature we think that a first attempt to overcome this limitation is to start analyzing sector-specific consequences of government partisanship (Herron et al. 1999; Roberts 1990). Moreover, since the evidence so far is based on the analysis of single elections, it is not clear whether we can generalize

from these findings. Also, past work has exclusively focused on sector-specific reactions to expected government partisanship during U.S. presidential elections, while up until now no study has looked into the relevance of parties and elections for different industries in a consensus (or proportional) system. Consequently, we do not yet know whether parties matter (differentially) for the mean and volatility of returns to economic sectors in such an institutional environment. Our study is intended to start filling these gaps in the literature.

3. Parties' Policies and Industrial Sectors

Partisan models of government (Hibbs 1977, 1987; Alesina et al. 1997, Alesina 1987) argue that parties try to implement their ideologically determined ideal policies. This argument is based on the idea of the responsible party (Ranney 1971). From this perspective, parties offer diverse policy platforms, and voters choose the party whose policies seem the most beneficial. Thereby, democracy serves to ensure that policies are responsive to citizens' interests (Powell 2000). Since the electorate is characterized by interest heterogeneity, once in office, parties will enact economic policies which benefit some parts of the electorate at the expense of others.

For example, voters may have a preference for protecting the environment even if this means to forego gains from economic growth, which can induce a party to deliver favourable policies, e.g., subsidies or trade protection, to the alternative energy sector. At the same time, this reduces the relative profitability of firms producing energy using non-renewable sources. Others could be interested in increasing a country's international power, protecting the homeland, and fighting terrorism by building up military capacities. These demands can cause a party to aim at an increase in overall troop size and support the development and production of new and often very costly weapon systems. This of course requires an increase in defence expenditure, which benefits firms operating in this industrial sector. Consequently, parties which are responsible to voters' interests will pursue economic policies designed to systematically discriminate between industries in a way which is consistent with the preferences of their electoral supporters.

The idea of parties redistributing across economic sectors also follows from policy-induced campaign contribution models. From this perspective, campaign contributions of firms and industry associations are simply a type of investment which is supposed to yield (politically induced) future returns. Baron (1989) argues that candidates are able to make credible commitments to interest groups seeking the services of governments in exchange for campaign contributions. In the model interest groups are allowed to contribute to rival candidates, however, it is implicit that they only support those candidates with which they agree more on the policy issues they are interested in. The services provided may include "support for or opposition to certain types of particularistic legislation or intervention in cases" or action which benefits "one set of potential contributors and impose costs on another set. Labor, trade, and tax legislation have this property, as might intervention with the National Labor Relations Board and the Environmental Protection Agency" (Baron 1989: 47). Therefore, special interests can align with politicians or even with political parties if there is a high degree of party cohesion.[1]

Grossman and Helpman (1994) more explicitly theorize that industries get their ideal trade policies from the policymaker in exchange for campaign contributions. However, their model is not restricted to trade policy issues, but potentially applies to "social transfer schemes, environmental regulation, or government spending programs" (849). The party in government is interested in both, increasing aggregate welfare and campaign contributions. The reason is that given economic voting on the side of the electorate, a government which enhances welfare is more likely to get re-elected. The second factor increasing the probability of an electoral success is the amount of financial resources available for campaigning. Parties can get these resources from industries' lobbies in exchange for setting policies which benefit the respective industries.[2]

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[1] Party discipline is very pronounced especially in European (parliamentary) systems, where party leaders possess coercive mechanisms which induce a high degree of party cohesion (Cox and Mccubbins1992). Thus, this is a reasonable assumption.

[2] See also Austen-Smith (1995) for a model of informational lobbying. Ansolabehere et al. (2003) offer a different view.

Combining a rational partisan model of government and policy-induced campaign contribution models suggests that parties should pursue policies which differentially impact economic sectors, chosen strategically in order to optimally benefit their class-defined voters and the business interests from which they received support. These sector-specific partisan effects should be anticipated by rational investors producing return and return volatility responses to changes in expectations about government partisanship. The following section elaborates on this argument and presents the market micro-foundation of our study.

Rational Expectations, Government Partisanship, and Sector Profits

According to the discounted cash flow (or net present value) model, at time t, stock price S_t^i of sector i depends on its expected value $E\left[V_t^i\right]$, which equals the sum of all future sector dividends discounted to the present. Given a continuous stream of cash flows, the expected value of the sum of discounted future sector dividends is:

$$E_t[V_t^i] = E_t\left(\int_t^{+\infty} e^{-\delta k} D_k^i \mathrm{dk}\right), \tag{1}$$

where D_k^i denotes dividend payment at time k, and δ is a discount factor composed of a riskless interest rate r_F and a risk premium.[3] As t approaches infinity, $E\left[S_t\right]$ converges to s_t. To see how expectations about government partisanship are connected with the discounted cash flow model, note that the size of a dividend payment D_k^i of sector i equals i's profits divided by the number of shares (Miller and Modigliani 1961; Williams 1938). In other words, the size of sector profits determines the amount of capital available to be distributed as dividends.

The incumbent policymaker p^j can either be a (relative) supporter of an industry, in the sense that his policies are more beneficial to this sector than those of the other policymaker (in this case

[3] In finance, the capital asset pricing model (CAPM) is used to determine the appropriate discount factor δ for a share of firm i: $\delta_i = r_F + \beta_i(r_M - r_F)$. In this equation, r_M is the rate of return on the market portfolio, β_i is the systematic or market risk of a security, and $\beta_i(r_M - r_F)$ is the risk premium.

$j = b$), or his policies are less beneficial or even harmful to sector performance. Policy can be less beneficial in that sector profits increase, but increases are lower than under a sector-supporting government.[4] In the latter case $j = h$.

Prior to an election there are two possible states of the world: With probability $\Pr_t^b \in [0,1]$, a party or coalition wins whose policies are beneficial to sector performance, because these policies are designed to target this industry so as to align sectoral benefits with the preferences of supporting business interests. The probability of a government whose policies are relatively harmful, i.e., less beneficial or even harmful to profits of an industry is $\Pr_t^h = (1 - \Pr_t^b)$. To see how the expected value of investing in a sector varies with expectations about government partisanship, equation 1 can be extended as follows:

$$E_t[V_t^i] = \Pr_t^b \left(\int_t^{+\infty} e^{-\delta k} D_k^i \middle| p^b \mathrm{dk} \right) + (1 - \Pr_t^b) \left(\int_t^{+\infty} e^{-\delta k} D_k^i \middle| p^h \mathrm{dk} \right). \quad (2)$$

Equation 2 illustrates that rational expectations lead investors to value future dividends as the sum of two expected values: The first part equals the net present value of future sector dividends under a beneficial government, multiplied by the probability that this party or coalition will win the majority of seats in the upcoming election. The second part is the net present value of all future sector dividends under a government whose policies are harmful (or relatively less beneficial) to sector performance, multiplied by the corresponding probability. Multiplying out (2) and rearranging yields

$$E_t\left[V_t^i\right] = \left(\int_t^{+\infty} e^{-\delta k} D_k^i \middle| p^h \mathrm{dk} \right) + \Pr_t^b \left(\int_t^{+\infty} e^{-\delta k} \left[D_k^i \middle| p^b - D_k^i \middle| p^h \right] \mathrm{dk} \right). \quad (3)$$

[4] To illustrate, consider a simple economy consisting of two sectors. Suppose both sectors experience profits regardless of government partisanship, but their profits vary differently if government partisanship changes. While sector one experiences larger profits due to very beneficial policies, sector two which the incumbent might not care about, experiences only a slight increase in profits. Since their relative profitability, i.e., the difference between sector profits changes due to changes in government partisanship, there is a partisan effect on sector performance. In this model, benefiting different industries can but does not need to negatively affect the performance of other sectors in that these experience losses. For partisan effects to exist it suffices that different policymakers do not benefit sectors uniformly, which arguably is a weak and, given the strong incentives to discriminate between industries, plausible assumption.

This equation has a very intuitive interpretation. The value of sector i has a lower bound equal to the first integral in (3), which represents the discounted cash flow in a world in which h governs, which implements policies harmful to profits of that industry. However, this value rises with the probability of b winning office, which provided beneficial policies, times the surplus in profits achieved under that government. Thus, the expected value of a sector is reduced if b's victory becomes less likely. This is to say that today's sector return is the discounted post-election return based on investors' expectations about government partisanship.

To link the expected value of a sector with investors' trading behaviour and obtain predictions for the mean and volatility of returns, we rely on the work of Glosten and Milgrom (1985, see also Anderson 1996) as it has been modified by Leblang and Mukherjee (2005) in game-theoretic terms. However, instead of restating the full model, we offer a brief, non-formal description of the relevant causal mechanisms. In the stylized world of the model, trade takes place in the form of a sequential game. A trader takes prices as given and chooses whether to invest in or shifting his capital out of an industry by buying or selling securities from that sector. A risk-neutral market maker quotes stock prices and transfers (buys) the demanded (offered) stock amount to (from) the trader at each time interval. This causes prices to adjust in response to changes in supply or demand, respectively.

Prior to the election, the trader acquires information and forms expectations about the probability of a certain party winning the election. The trader chooses the optimal demand for stocks from a sector in accordance with his expectations about government partisanship. The market maker then adjusts quotes accordingly and the market will converge to the new equilibrium: If the value of investing in a sector increases (decreases), this will lead to higher (lower) stock returns to that industry. Moreover, if the expected value increases due to a higher probability of a government advantageous for that industry, this triggers higher demand, by that increasing the number of shares traded. To equilibrate supply and demand, the market maker optimally adjusts prices and volatility. In order to abate demand, he sets prices higher and also increases volatility to reduce demand from risk-averse traders (Karpoff 1986; Andersen 1996). In other words, when demand for stocks increases, higher trading volume is

associated with an increase in volatility. If investing in industry i becomes less attractive due to changes in expected government partisanship, demand falls. Again, the market maker responds by optimizing price and volatility. To achieve the optimal balance between supply and demand, he lowers prices, which creates incentives for risk-averse traders to buy or at least hold stocks, and sets volatility to low levels. Based on this market-micro foundation we expect to find the following relationship:

Hypothesis [Anticipated partisan effect]:
If the probability of a government beneficial to profits of industry i increases, the mean and volatility of returns to that sector increase.

Identifying the Sectoral Beneficiaries of Parties' Policies

In what follows we identify those industrial sectors which should be responsive to changes in government partisanship. To relate sectors and parties, our first source is information on campaign contributions made by firms and industry associations to different parties in election years from 1991 to 2005 (1994, 1998, 2002, and 2005). We assume that interest groups will support those parties which share (relatively) similar policies (see also Knight 2006). That is, interest group contributions are like signals in the market and provide strong cues about parties' preferences from which one can infer the characteristics of the party's policies (Wittman 1989). A contribution therefore indicates that the party's policy ideal point is comparably close to that of the interest group (Austen-Smith 1995, Hall and Deardorff 2006). The empirical evidence supports the hypothesis that "donors support candidates who value the same things that they do" (Brownars and Lott 1997; see also Hojnacki and Kimball 1999, 1998; Grenzke 1989).[5] Secondly, estimates of German parties' ideal policies are used to relate sectors to parties. For example, if a party has a strong preference for protecting the environment even if this means to forego gains from economic growth, its policies (e.g., government grants for investment in renewable energy plants, subsidies to producers of wind engines or solar cells, costs imposed on nuclear power plants) will be beneficial to profits of the alternative energy sector. A party could also place much weight on issues such as defence, protecting the homeland, and fighting terrorism by

[5] See Ansolabehere et al. (2003) for a review of the literature.

building up military capacities, leading to an increase in overall troop size and the support of developers and producers of (often very costly) weapon systems. Such policies would clearly benefit firms operating in the defence sector.

Data on the contribution behaviour of firms and associations were taken from the annual statement of accounts of German parties published as a document of the German Bundestag.[6] These documents reveal that some industries were relatively generous to almost all parties. Such non-discriminating, pooling contribution behaviour makes it impossible to draw reasonable inferences with regard to their political preferences. In order to convincingly identify the partisan preferences of an industry, only those sectors are considered which (i) contributed regularly, i.e., in at least three out of all four election years and (ii) gave financial support in an ideologically consistent way. Since Germany has a bipolar party system (Nohlen 2000: 312), a contribution behaviour is called ideologically consistent, if campaign contributions are made either exclusively to right (CDU and/or FDP) or left parties (SPD and/or the Greens). These two conditions assist in developing clear hypotheses on the sector-specific profit impact of expected government partisanship. We restrict our analysis to those sectors whose political preference we could clearly identify.

Table 1 shows which firms and business associations contributed according to the specified conditions along with information about their business area as well as turnover and employee figures (if available). The latter give us an idea of how important an industry is economically.

[table 1 about here]

Defence (CDU/FDP): Almost all major defence firms financially supported the CDU. These firms produce armoured vehicles (Rheinmetall DeTec AG, Kraus-Maffei), combat airplanes and helicopters (EADS), bombs and guided missiles (Diehl), and small arms systems (Heckler & Koch).[7] Based on the observed contribution behaviour the defence sector should generate higher profits under a

[6] The file names are BT-Drs. Nr. 13/3390; 13/4163; 14/2508; 14/3535; 14/5050. The files are also available from the authors upon request.

[7] These firms generate significant turnover ranging from 420 up to 5.2 billion Euros per year.

government consisting of a right-leaning CDU/FDP coalition than during the incumbency of a left-leaning SPD/Greens government. This also follows from the higher importance of defence and homeland security issues to conservative parties (Knight 2006; Roberts 1990). Consequently, if the electoral prospects of a right-leaning coalition increase, returns ton a portfolio of defence stocks should increase. As the expected value of a stock increases, investors will react by reallocating their investment portfolio. This portfolio rebalancing triggers higher trading volume, which causes not only increases in returns, but also in volatility (see e.g. Gallant et al. 1992; Glosten and Milgrom 1985).[8] Rational investors should anticipate that defence firms will perform better under a right-leaning (CDU/FDP) government. Therefore, we expect that

Hypothesis [Defence]: The mean and volatility of defence sector returns increase if the electoral prospects of a right-leaning (CDU/FDP) government increase.

Pharmaceutical sector (CDU/FDP): Business associations representing more than 340 developers and producers of pharmaceuticals as well as single firms (Altana, Pfizer) contributed regularly and in an ideologically consistent way to both right-leaning parties (CDU and FDP). Since only these two parties received financial support from the pharmaceutical industry, this suggests that a right-leaning CDU/FDP government should be more beneficial to sector profits. Again, rational investors should take into account the effect of government partisanship on the value of pharmaceutical firms in the pre-election time. They will rebalance their portfolio in response to changes in expectations about government partisanship. This leads to the following empirically observable implication:

Hypothesis [Pharmaceuticals]: The mean and volatility of pharmaceutical sector returns increase if the electoral prospects of a right-leaning (CDU/FDP) government increase.

Interestingly, this hypothesis contradicts the opinion of many practitioners, who argue that in the past decades neither party has brought about fundamental changes in health policy which would have affected the pharmaceutical sector in a significant way. The reasons, they point out, are that tax

[8] It will be obvious to the attentive reader, that this causal link requires trading volume to be interacted with the electoral probability in the empirical estimation.

revenues from the pharmaceutical industry are considerable and assessing the consequences of legislative action in the corresponding policy field is very difficult. This has prevented fundamental policy changes relevant for profits to that sector and will continue to do so in the future. If practitioners were correct, stock returns to the pharmaceutical sector should not react to changes in expected government partisanship. Eventually, this is a question to be answered empirically.

Consumer sector (SPD/Greens): The fourth sector which should be affected by parties' policies is the consumer industry. This is because tobacco firms as well as firms from the liquid foods industry, both represented by their industry associations, made contributions to the SPD. In addition, a major investment bank (Dresdner Kleinwort Wasserstein) published sector-specific buy recommendations conditional on different party coalitions winning the 2002 election.[9] This document identified the consumer sector as likely to fare especially well under a left-leaning government consisting of SPD and Greens. The reason is that left parties strengthen labour unions' in wage bargaining (Calmfors et al. 1988; OECD 2004), prefer minimum wages, and emphasize the importance of wage increases for fuelling demand. Consequently, profits of the consumer sector should benefit from left-wing governments. The empirically observable implication is that if electoral prospects of a left-wing coalition increase, the mean and the volatility of *consumer sector returns* will increase.[10]

Hypothesis [Consumers]: The mean and volatility of consumer sector returns increase if the electoral prospects of a left-leaning (SPD/Greens) government increase.

Alternative energy sector (SPD/Greens): The alternative energy industry is a significant sector in terms of turnover and employees. It generated 11.6 billion Euros turnover in 2004 and employed 130,000 people. Companies which contributed develop and produce wind energy plants (Nordex AG, EWO Energietechnologie GmbH, Ostwind-Verwaltungs-GmbH, Umweltkontor Renewable Energy, Windpark Wohlbedacht GmbH & Co, WPD Wind Projekt Development GmbH) and solar cells

[9] See http://www.dresdner-bank.de/medienservice.php?pdf_anzeigen=aktuell05090103; 12.11.2007. The document is also available from the authors upon request.

[10] However, it could be argued that expectations of higher labor costs associated with left-leaning governments may actually dampen future profits of firms in this industry. In this case, we would not find a significant correlation between sector returns and the probability of a left-wing coalition winning the election.

(Conergy AG, Ersol AG, First Solar AG, Q-Cells AG, SMA Technologie, Solarparc AG, Solarworld AG, Solon AG). Firms from the alternative energy industry almost exclusively supported the Greens. Two firms contributed to both, SPD and the Greens. The observed contribution behaviour suggests that profits of the alternative energy sector would benefit from a left-leaning (SPD/Greens) government.

This hypothesis is in accord with estimates of parties' ideal policies. Figure 1 displays the policy positions of the four major German parties on the environmental policy dimension ranging from 0 to 20. Low scores indicate that a party prefers to protect the environment even if this imposes costs in terms of lower economic growth. While CDU and especially the Liberals opposed the view that the environment should be protected even if this reduces economic growth, SPD and the Greens in particular were willing to pay the economic costs of environmental protection.[11]

In fact, when the SPD-Green coalition came into office in 1998, it started to subsidize the relatively small alternative energy sector, while at the same time legal restrictions were set on the operating time of existing nuclear power stations, thereby changing the relative profitability of this industry. Small private investors were subsidized if they invested in alternative energy plants and operators were given low interest loans. All this legislative action increased the profitability of the alternative energy sector and was severely criticized by the CDU and the FDP. Therefore, we hypothesize that

Hypothesis [Alternative energy]: The mean and volatility of alternative energy sector returns increase if the electoral prospects of a left-leaning (SPD/Greens) government increase.

Electoral Uncertainty and Stock Return Volatility

Often, outcomes of elections may be predictable to a large extent. In such a case, market actors can make their allocation decisions without having to fear that future economic conditions influenced by the next government may unexpectedly change from one second to another. Clearly, things look

[11] It would certainly be desirable to have ideal point estimates on more policy fields such as defense, labor market policy (affecting consumers) and health policy (affecting pharmaceuticals). To the best of our knowledge such data is not available. As regards these dimensions, we must for now rely on the identification strategy applied by past studies (Knight

very different if an election is close, because it becomes increasingly difficult to predict future government partisanship. Since stock markets reflect higher risk by higher volatility, past studies have hypothesized that an increase in electoral uncertainty is associated with higher stock market volatility. Indeed, the empirical evidence seems to support this conjecture (see e.g. Leblang and Mukherjee 2005 for theory and evidence).

However, this argument has been developed with the U.S. political system in mind. We do not think it can be taken out of the U.S. context and applied to more consensual political systems offhand. In consensus democracies, increasing electoral closeness between the major parties means that the upcoming election is less likely to produce an ideologically coherent government, which consists of either left- or right-leaning parties (Lijphart 1999). Instead, the more evenly electoral prospects are distributed between the major left- and right-wing parties, the higher the probability of a coalition between ideologically heterogeneous parties. Being forced to form a grand coalition, the government's policies result from a bargaining process between political actors whose ideal points are to the left and the right of the median.[12] As the outcome will lie in the zone of agreement, which is more moderate than that of ideologically homogeneous parties, grave policy changes are much less likely to occur. Consequently, electoral uncertainty may not imply policy uncertainty in consensus democracies. Rather, given such an institutional setting, higher electoral uncertainty can be interpreted as a signal of moderate policies or relative future economic policy stability, which implies less policy risk (Füss and Bechtel 2007). Therefore, since we are evaluating partisan effects in a consensus democracy, we expect higher electoral uncertainty to be associated with lower volatility:

Hypothesis 2 (Electoral Closeness):
Sector return volatility decreases if electoral closeness increases,

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2006; Mattozzi 2004), which used the contribution behavior of interest groups and firms as an indicator of relative policy closeness.

[12] Or mean, in the multidimensional case.

4. Research Strategy and Data

If markets are semi-strong form efficient (Fama 1970) all publicly available information that might influence the value of a given company will be incorporated in today's prices. On the aggregate level, price changes will then reflect the expected impact of government policies on future profits, thereby indicating the direction and strength of wealth transfers as a consequence of politics (Füss and Bechtel 2007; McGillivray 2004, 2003). Therefore, reactions of stock returns to expected government partisanship can be used to investigate the impact of parties' policies on the economy (Bernhard and Leblang 2006, Roberts 1990).[13] In order to put the hypotheses of anticipated, sector-specific partisan effects to a critical test, four economically important sector indices (defence, alternative energy, pharmaceuticals, and consumers) are analyzed which – given parties' policies and the contribution behaviour of firms – are most likely to be responsive to changes in expected government partisanship. If these sectors are immune to expected government partisanship, it is very unlikely that any other industry will be.

Dependent Variable: Sector Returns

The dependent variable is the continuously compounded sector return R_t at time t. The consumer and pharmaceutical indices were taken from Datastream. Since an alternative energy sector index was not available and the offered defence index did not cover the whole 1991-2005 period, we constructed both series according to the value index concept.[14] In doing so, let $P_{f;t}$ be the share price of firm f at time t, then the price P of the sector index i at time t is

$$P_{i,t} = \frac{\sum_{f=1}^{n} P_{f,t} \cdot MC_{f,t}}{\sum_{f=1}^{n} P_{f,0} \cdot MC_{f,0}} \cdot 100 \qquad (4)$$

[13] Although this research strategy is widely used in financial economics and increasingly in political science, it should be noted that it provides only an indirect measure of partisan effects on industries, which hinges on the stock market being semi-strong form efficient. In view of the strong financial incentives which reward wealth-maximizing behavior on stock markets, and given the substantial evidence supporting the semi-strong version of the efficient market hypothesis, we are confident that this assumption is justified.

where MC_f is the market capitalization of the stock *f*. In words, the sector index was created by summing up the value-weighted prices across all firms *n* from a sector at time *t* divided by the sum of the value-weighted prices across these firms in the base period. The trading volume series was created by summing up the number of shares (in '000) traded on a day in the respective sector. Daily figures are adjusted for capital changes and represent the consolidated volume across all German exchanges. Table A1 and figure A1 in the appendix provide detailed descriptive statistics. For all sectors data from 1991 to 2005 was available expect for the alternative energy sector. Due to restrictions on data availability, this series starts at the end of 1998.

Main Explanatory Variable: Expected Government Partisanship

Since we are interested in whether parties affect the well-being of economic sectors, we need to explicitly model rational expectations about government partisanship in the pre-election time. In Germany a single party never enjoys an absolute majority in parliament, and therefore, a coalition government must be formed. However, due to Germany's bipolar party system (Nohlen 2000: 321) and credible pre-electoral coalition commitments, we can assume that left-leaning parties (SPD and Greens) always prefer to form a left-leaning coalition and right-leaning parties (CDU and Liberals (FDP)) always prefer to form a right-leaning coalition (see also Carlsen and Pedersen 1999: 17-18).[15] This makes it possible to apply the "electoral option model" (Alesina et al. 1997: 114-116). To derive the electoral probability of a right-leaning (CDU/FDP) government we first sum up the polled vote shares for the CDU and the FDP. The probability of a right-leaning coalition formed by these two parties receiving a majority in the upcoming election at time *t* is:

[14] The firms used to create the defense sector index are: EADS, Cargolifter, Renk, IWKA, Daimler Chrysler, Rheinmetall, ThyssenKrupp. For alternative energy Plambeck, SAG Solarstrom, Solarparc, Solarworld, Nordex were included. Individual stock prices and trading volumes were also taken from this source.

[15] In the pre-election periods parties made explicit statements about their coalition preferences to which they adhered if given the chance to form a government. Therefore, it was never a question that these parties would form a coalition if they received a majority. Consequently, it is reasonable to assume that parties prefer to form minimal winning connected coalitions.

$$\Pr_t(Right) = \Phi\left[\frac{\left(\frac{Q_t^{CDU} + Q_t^{FDP}}{\sum_{j \in J} Q_t^j}\right) + \mu m - 50}{\sigma\sqrt{m}}\right] \qquad (5)$$

where Φ is the cumulative standard normal distribution, and Q_t^{CDU} and Q_t^{FDP} denote the proportions of citizens who intended to vote for the CDU and the FDP at time t.[16] To standardize their vote share we divide the polled proportion by the sum of vote shares received by all main German parties, i.e., $J = \{CDU, SPD, Greens, FDP\}$.[17] μ is the sample mean of daily changes in this standardized proportion, σ is the sample standard deviation in daily changes, and m is the number of days left until the next election. Since the range of this measure is the unit interval, the probability of a left-leaning government can be calculated as $\Pr_t(Left) = 1 - \Pr_t(Right)$. This operationalization accounts for both the time left until the next election and the variance in polling results. Therefore, we can make use of the whole time series and do not need to consider election years only.

Weekly polling data from Forsa, a renowned polling institute, are used for constructing electoral probabilities. The fact that this data starts in September 1991 determines the starting date of our sample.[18] One might argue that the polling data should be of daily frequency. However, such data does not exist, and consequently, also investors can only update their beliefs conditional on these weekly polling results. Therefore, electoral probabilities should be accurate measures of rational expectations about government partisanship given the latest results from publicly available opinion polls. Since theoretically expected government partisanship causes changes in demand for stocks of certain sectors,

[16] Indeed, since the mid 1980s these coalition preferences of parties have remained stable. Clearly, we do not discriminate between policies of a coalition and a single-party government. This is justified, because single-party governments do rarely occur in consensus democracies and – with the sole exception of the CDU-government from 1957 to 1961 – have never occurred in Germany. Rational investors which update their beliefs should take into account this fact.

[17] CSU vote shares are included in CDU vote shares.

[18] The Forsa data is available at the Central Archive for Empirical Social Research, University Cologne (series IDs: ZA3380, ZA3300, ZA2982, ZA3063, ZA2983, ZA2984, ZA2985, ZA3162, ZA3289, ZA3486, ZA3675, ZA3909, ZA4070, ZA4192). For 2005 the series is also available at http://www.wahlrecht.de/umfragen/forsa/2005.htm. Although we are aware of the so called "Politbarometer" data, which starts in 1977, we cannot increase our number of observations, since this series is only available on a monthly basis, and therefore inappropriate for constructing daily probabilities.

measured by trading volume, which triggers higher returns, we need to interact the electoral probability measure and trading volume in the empirical estimation.

In order to pick up possible effects of electoral uncertainty on the volatility of returns, we created an uncertainty measure, based on the electoral probabilities (Leblang and Mukherjee 2005). The idea is to define a mapping which reflects that uncertainty is minimal if the probability of a victory is either very high or very low, and that as the difference in electoral probabilities is becoming smaller, expectations of government partisanship are increasingly uncertain. This can be achieved by creating the variable *Electoral Uncertainty* in the following way:

$$e_t(\Pr_t(Right)) = \frac{1-4(\Pr_t^R - 0.5)^2}{\sqrt{m}}. \qquad (6)$$

Considering the numerator of this equation first, this defines an inverse U-shaped function which reaches its maximum 1 if the election outcome is very uncertain, i.e., $\Pr_t^R = \Pr_t^L = 0.5$, and equals its minimum value 0, if either the probability of a right-wing government or that of a left wing-government is 0 or 1. However, investors do not care much about whether the difference in electoral probabilities is either large or small when an election has taken place recently, because the election result is known and electorally induced uncertainty disappears. Therefore, the denominator hyperbolically downweights the raw electoral uncertainty measure as a function of the days *m* left until the next election.

Political and Economic Control Variables

To account for other factors which potentially influence sector returns we include a comprehensive set of political and economic variables in all estimations. Since the German stock market is strongly influenced by developments at the New York Stock Exchange, the lagged continuously compounded *Dow Jones Return* enters all estimations. In particular, inclusion of the Dow Jones ensures that our results are not just due to broad market movements. *Inflation* has to be controlled for, since investing in stocks should – according to orthodox models in finance – be more attractive relative to investing in real assets (e.g., commodities and real estate provide an inflation hedge) if inflation is low. Also the

interest rate as measured by the daily Frankfurt money market interest rate helps us to control for fluctuations in the relative profitability of stock investments.[19] *Monday* is a dummy variable which picks up the Monday effect, thereby controlling for a well-known market anomaly. We account for the fact that the 2005 election was an early and therefore unusual election by including the indicator variable *Early Election 2005*.[20] *2nd Chamber-CDU (SPD)* measures the number of votes CDU(SPD)-led states have in the second chamber of Germany's federal system. We also include a state election dummy, since state elections may affect the balance of power at the national level through their effect on the composition of state governments. Moreover, additional dummy variables were included to pick up confounding effects from the crisis of the European monetary system in September 1992 and the terrorist attacks on September 11th 2001.

Estimation Technique

Time series and financial time series in particular are characterized by a number of stylized facts. Most importantly, they often exhibit a time trend as well as a time-varying variance, i.e., periods of high (low) variance are followed by periods of high (low) variance, a phenomenon called conditional heteroscedasticity or volatility clustering. We tested whether ARCH effects are present in our dependent variables. The results from Lagrange multiplier tests confirm this conjecture. Also, autocorrelation diagnostic tests indicate the presence of volatility clustering. These results strongly suggest that a GARCH (generalized autoregressive conditional heteroscedasticity) framework is most appropriate given the characteristics of our dependent variables (see for example Engle 2001).

A key strength of the GARCH technique lies in the possibility to explicitly model both, the mean and the conditional variance of the dependent variable as a function of previous shocks, its own past variance as well as exogenous volatility regressors. This means that ARCH effects are considered as phenomena to be modelled rather than to be corrected for. As Bollerslev and Wooldridge (1992) show,

[19] The Dow Jones and inflation series were taken from Datastream, the money market interest rate was taken from the time series data base of the German central bank.

maximum likelihood estimation of GARCH parameters yields consistent results even if innovations are not Gaussian, although the standard errors have to be adjusted for residuals deviating from normality. We therefore apply Bollerslev and Wooldridge semi-robust standard errors throughout our estimations.

Before turning to the results, note that we tested the stationarity of all variables. Since in almost all cases these were trend-dominated, the Augmented Dickey-Fuller (ADF) as well as the Phillips-Perron (PP) unit root test failed to reject the null of non-stationarity. Therefore, all variables which are not stationary in levels or in logs enter the models in first differences.[21] After this transformation, the ADF as well as the PP test soundly reject the null of non-stationarity.

5. Findings

First, consider the results for the defence sector, which should benefit from a right-leaning government. Since theoretically higher expected profitability leads to higher demand for stocks, we need to include the variable *Trading Volume*, which measures the number of sector shares traded at German stock exchanges, and its interaction with the electoral probability of a right-leaning government ($\Pr_t(Right)$). Turning to the mean equation, the coefficient of $\Pr_t(Right)$ is positive although it fails to reach conventional significance levels. The interaction term (Trading Volume x $\Pr_t(Right)$) is positive and highly significant in the baseline model (table 1, I) where we control for the lagged Dow Jones return only. Subsequently, more variables are included in order to account for influences from other possibly relevant factors such as the inflation rate or the Monday effect (table 2, II-III). The coefficients of interest do not change if we estimate the equation with a comprehensive set of additional controls such as the number of votes of CDU-led states in the second chamber (*2nd Chamber-CDU*), the political shock associated with the *Early Election 2005*, elections taking place in one of the German states, the crisis of the European monetary system in September 1992, and the terrorist attacks on

[20] This indicator equals 1 for the period starting when Chancellor Gerhard Schröder announced his intention to bring about early elections in autumn 2005 and ending on July 1st, when the vote of confidence failed in parliament, as this paved the way for early elections in autumn 2005.

[21] Also, our dependent variables are not fractionally integrated. By definition, a variable is called fractionally integrated if it is neither integrated nor stationary. Since all our return variables are $I(0)$ fractional integration is not an issue.

September 11th 2001. With regard to significance the coefficients of interest remain largely robust against the inclusion of other political and economic control variables (table1, models II and III).

The estimates for our variance equation speak in favour of the hypothesis that electoral prospects of a right-wing coalition are positively related to the volatility of defence sector returns. Electoral probability as well as its interaction with trading volume both exert a significant influence on return volatility. Again, this result remains robust against influences from other variables (table 1, models II and III). Also, an increase in electoral uncertainty, which can be interpreted as a signal of relative policy stability exerts the hypothesized negative influence volatility. Both coefficients do not change once we add the full set of control variables.[22]

Research in behavioral economics shows that individuals react more strongly to negative than to positive information (Kahneman1979). Also, recent research in political science confirms that the effects of negative and positive information on public opinion are indeed asymmetric (Soroka 2006). This phenomenon is well-known in the realm of financial markets as the so called leverage effect (Black 1976). In order to assess the robustness of our results once we account for volatility reacting more strongly to negative than to positive information, we apply the TARCH(1,1) model (Glosten et al. 1993). In this model the variance equation is given by:

$$h_t = \omega + \alpha_1 \varepsilon_{t\text{-}1}^2 + \beta_1 h_{t\text{-}1} + \delta_{t\text{-}1} \gamma_1 \varepsilon_{t\text{-}1}^2 + \lambda_i X_{i,t} \qquad (7)$$

where ω is a constant, $\varepsilon_{t\text{-}1}^2$ represents prior shocks (ARCH term), $h_{t\text{-}1}$ is the past variance (GARCH term), and $X_{i,t}$ is a set of exogenous volatility regressors. $\delta_{t\text{-}1}$ is an indicator variable which equals 1 if the price innovation at time *t*-1 was negative and takes on the value 0 if a positive shock occurred. The TARCH model thus assumes that positive price innovations at time *t* have an effect on volatility in $t+1$ equal to α_1. In case of a negative shock ($\delta_{t\text{-}1} = 1$) the conditional variance additionally increases by $\gamma_1 \varepsilon_{t-1}^2$ and the combined marginal effect on volatility is picked up by the sum of the coefficients

[22] Table 1 also reports goodness of fit measures which are standard in case of GARCH estimations. These are the Akaike and the Schwarz information criteria (AIC and SIC). Lower values indicate a better fit.

$\alpha_1 + \gamma_1$. If a leverage effect exists, the coefficient γ_1 is positive, because negative price innovations more strongly affect volatility than positive innovations of the same magnitude.[23]

Table 1 (columns IV-VI) shows results from TARCH estimations for the defence sector returns. As can be seen from the significantly positive coefficient $\hat{\gamma}$, there is indeed an additional increase in volatility if the past price change was negative. Thus, on average, negative innovations more strongly affect volatility than positive innovations of the same magnitude. Note that the parameters of interest remain highly significant and experience only a marginal reduction in magnitude, which provides additional confidence in the results.

[table 1 about here]

The results for the pharmaceutical sector (table 1, VII-XII) suggest that expected government partisanship does systematically affect the mean of returns in this industry, although it is important to note that the interactive term is not significant. Therefore, it may well be that the net effect of expected government partisanship is not significantly different from zero. We will assess this possibility in more detail below. A relatively similar picture emerges for return volatility. The probability of a right-wing government winning the next election is associated with an increase in volatility, while the multiplicative term has a negative sign. At this moment, however, it is unclear whether a marginal change in the probability of a right-leaning government actually induces a significant change in the mean and the volatility of returns to the pharmaceuticals sector. We will turn back to this question within the next pages. Electoral uncertainty does not seem to exert any systematic influence on return volatility in the pharmaceutical sector.

Table 2 shows the results for the alternative energy and consumer sector, which both should benefit from a left-leaning coalition holding office. Consider the alternative energy sector first. The parameter estimate of the interactive term (Trading Volume x $\Pr_t(Left)$) is positive and significant

[23] The TARCH model can be considered a more conservative version of the exponential GARCH (EGARCH) model. This is because the TARCH model is more sensitive to violations of parameter restrictions than EGARCH.

(table 2, model I). This suggests that on average a joint increase in the electoral prospects of a left-wing coalition and trading volume triggers higher returns to the alternative energy sector. Note that this coefficient changes only marginally once we include additional control variables (table 2, models II and III).

Also, return volatility in the alternative energy sector is not immune to the political process, since the coefficient of the electoral uncertainty variable is negative and significant. A re-estimation of all specifications applying a TARCH model does not lead to notable changes in the estimates (table 2, models IV-VI). Since the TARCH-coefficient $\hat{\gamma}$ fails to reach conventional significance levels and is of negative sign, we conclude that no improvement in estimation efficiency can be achieved by accounting for asymmetric effects of past price innovations.

[table 2 about here]

Moving on to the consumer sector, the point estimates for our coefficients of interest are significant only in the variance equation, where an increase in the probability of a left-leaning government is associated with an increase in return volatility. Also, a joint increase in $\Pr_t(Left)$ and trading volume triggers higher volatility.

Ultimately, we are interested in the marginal effects of expected government partisanship on sector returns. Since our models include an interactive term we calculated the effect of a marginal change in the electoral probability on the mean and the volatility of returns to each of the sectors included in our analyses. Corresponding standard errors were derived from the variance-covariance matrix of the coefficient estimates. Table 3 presents the results.

[table 3 about here]

If the probability of a right-leaning government increases, returns to the defence and the pharmaceutical sector increase significantly. The point estimate (0.148) for the defence sector is more than three times the effect for the pharmaceutical sector. A difference-in-means test shows that this difference is highly significant (t=2.558). Thus, the defence sector seems to be significantly more

sensitive to expected government partisanship than the pharmaceutical sector. Also as concerns volatility effects, the picture remains the same. Return volatility of both sectors increases significantly in response to a higher probability of a right-leaning government. Again, the effect is much greater in size for the defence sector (t=3.098).

The finding of a relatively less politicized pharmaceutical sector resonates with arguments of practitioners, as these emphasize that neither left- nor right-leaning governments have ever caused fundamental changes in health policy affecting the pharmaceutical industry. A possible explanation put forward points to firms in this sector being responsible for a large part of government tax revenues paired with uncertainty of politicians about the likely effects of policy changes which are especially difficult to predict for this sector. This has prevented policymakers to cause policy changes which would affect this sector differentially. Anticipated partisan effects are less pronounced in the alternative energy and the consumer sectors. Better electoral prospects of a left-leaning government trigger higher returns to the alternative energy sector and higher volatility of consumer sector returns.

A possible objection is that our results are due to sensitivity of stock returns to changes in policy that would occur with any change in government. However, this argument assumes that our main explanatory variable is current government partisanship and this is, of course, not the case. In fact, as the theory clearly suggests, investors will anticipate the effect of government partisanship on sector profits, which is why our main independent variable is *expected* government partisanship. Moreover, since our dependent variable is of daily frequency, it is hardly possible that electoral probabilities are just a proxy for changes in government which occur at most every four years. We are therefore confident that our estimates indeed measure sector-specific, anticipated partisan effects.

6. Conclusion

Partisan models of government (Hibbs 1977, 1987; Alesina et al. 1997, Alesina 1987) relate economic policies and parties' ideologies. Combining a rational partisan model of government (Alesina et al. 1997) and ideology induced campaign contribution models (Austen-Smith 1995; Hall and Deardorff 2006) parties should implement economic policies designed to systematically discriminate between

industries. This is because by delivering favourable policies to different economic sectors parties can benefit their electoral and sector-specific supporters. Our identification strategy draws on the idea that if rational investors are interested in maximizing their wealth, the effect of government partisanship will be incorporated in today's stock prices. Thus, stock market reactions to electoral probabilities can be used to estimate the direction and the strength of wealth transfers as a consequence of government partisanship.

Estimates from GARCH(1,1) and TARCH(1,1) volatility models confirm that returns of the defence, alternative energy, pharmaceutical and consumer sectors were indeed influenced by the probability of ideologically different coalitions winning the upcoming election. More precisely and in line with our hypothesis, the defence industry seems to benefit from a right-leaning government and enhanced electoral prospects of a right-wing coalition cause an increase in return volatility. Increasing the probability of a left-wing government improves returns to the alternative energy sector. The electoral prospects of a left-leaning coalition are positively correlated with return volatility of the consumer industry. These effects remain robust against additional control variables and re-estimation using specifications which account for negative price changes having a stronger impact on volatility as positive innovations of the same magnitude.

The view that partisanship matters for the economy has been called into question lately. Some posit that globalization has dramatically reduced the room to maneuver for parties to pursue redistributive policies (Huber and Stephens 2001, Pierson 1996). Others point out that earlier findings supporting the importance of government partisanship may have been driven by failure to account for the pitfalls arising from time-series cross sectional data and specification problems (Kittel and Winner 2006). A key message of our study, which may also explain some of the recent null findings, is that research needs to take rational expectations of government partisanship seriously in both, theoretical and empirical terms.

Theoretically, our results call for taking anticipation effects seriously. To the extent that past research has failed to detect a relationship between stock market performance and current government

partisanship (e.g, Pierdzioch and Döpke 2006), this might be due to partisan effects having already been anticipated by the market. Empirically, scholarship should explicitly model rational expectations in order to provide a more accurate account of the underlying data generating process. Finally, since our findings suggest sector-specific reactions to expected government partisanship, research which focuses on how partisanship affects the economy as a whole runs danger of missing redistributive effects across industries. Therefore, future work should more strongly look into the sector-specific, redistributive consequences of government partisanship.

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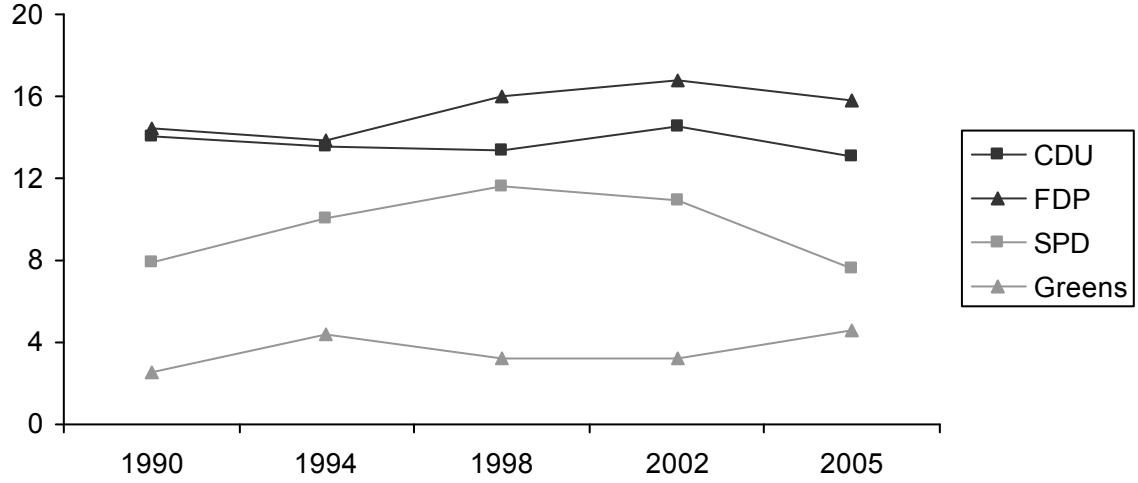
Figure 1: German parties' ideal points on the environmental dimension 1990, 1994, 1998, 2002, 2005 (Environmental protection vs economic growth)



Ideal point estimates based on a wordscore analysis (Laver et al. 2003) of party manifestoes. Data source: Debus (2007).

Table 1: Campaign contributions from firms and business associations (1994, 1998, 2002, 2005)

Economic Sector	Firm/Association	Business Area, Turnover, Employees	SPD	Greens	CDU/CSU	FDP
Defence	Rheinmetall DeTec AG	Producer of armoured vehicles (battle tanks, air portable infantry fighting vehicles, reconnaissance vehicles, self-propelled howitzers) weapons and ammunition, air defence and electronics, naval and air force applications; turnover in billion €: 1.4 (2005)/1.45 (2006)/1.8 (2007); employees: 7,200 (2007)			x	x
	EADS Deutschland GmbH	Producer of combat aircrafts, missile systems, defence and communications systems, defence electronics; average annual turnover from 2000 to 2005 in billion €: 5.2; employees: 116,000 (2007)			x	
	Diehl GmbH	Developer and producer of seeker-guided missiles, intelligent and conventional ammunition, training systems; turnover in billion €: 420 (2007)			x	
	Heckler & Koch GmbH	Developer and producer of small arms systems (self-loading pistols, submachine guns, assault rifles, machine guns, special purpose weapons, grenade launchers)			x	
	Krauss-Maffei AG	Developer and producer of battle tanks, infantry fighting vehicles, artillery and air defence systems, engineer equipment, protected and air-transportable wheeled vehicles; employees: 3000 (2007)				x
Pharmaceuticals	German Association of the Pharmaceutical Industry	Association of more than 260 firms developing, producing, and distributing pharmaceutical firms			x	
	German Association of Research-Based Pharmaceutical Companies	Association of 44 pharmaceutical firms			x	x
	Altana AG	Producer of pharmaceuticals			x	x
	Pfizer Deutschland GmbH	Developer and producer of pharmaceuticals			x	x
Consumers	Association of producers of carton packages for liquid foods		x			
	Association of tobacco firms	Association of tobacco firms consisting of: Philip Morris, British American Tobacco, Reemtsma, Austria Tabak, JT International Germany, Heintz van Landewyck, Joh. Wilh. von Eicken	x			
	Philipp Morris GmbH	Tobacco firm	x			
Alternative Energy	EWO Energietechnologie GmbH	Develops, plans, and operates wind energy plants		x		
	Nordex AG	Develops and produces wind turbines	x	x		
	Ostwind-Verwaltungs-GmbH	Develops, plans, and operates wind energy plants	x	x		

Umweltkontor Renewable Energy	Develops, plans, and operates wind energy plants	x
Windpark Wohlbedacht GmbH & Co	Develops, plans, and operates wind energy plants	x
WPD Wind Projekt Development GmbH	Develops, plans, and operates wind energy plants	x
Conergy AG	Develops, plans, and operates wind energy plants	x
Ersol AG	Recycling of silicon for solar cell production	x
First Solar AG	Operates solar plants	x
Q-Cells AG	Develops and produces solar cells	x
SMA Technologie	Develops and produces solar, wind, and combined energy plants	x
Solarparc AG	Operates solar and wind energy plants	x
Solarworld AG	Operates solar and wind energy plants	x
Solon AG für Solartechnik	Produces solar plant components	x

Table 2: GARCH and TARCH Models for Sector Returns (T = 3,615)

Parameters	Defence (GARCH)			Defence (TARCH)			Pharmaceuticals (GARCH)			Pharmaceuticals (TARCH)		
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Mean equation												
$\Delta \Pr_t(Right)$	0.021 (0.025)	0.025 (0.024)	0.020 (0.025)	0.027 (0.025)	0.032 (0.024)	0.027 (0.024)	0.016* (0.008)	0.016** (0.008)	0.019** (0.008)	0.019** (0.009)	0.022* (0.013)	0.022*** (0.005)
ΔTrading Volume	0.004*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.001*** (0.000)	0.001*** (0.000)
Trading Volume x $\Pr_t(Right)$	0.103** (0.044)	0.121*** (0.042)	0.124*** (0.039)	0.094*** (0.029)	0.106*** (0.028)	0.110*** (0.028)	0.020 (0.014)	0.021 (0.014)	0.019 (0.014)	0.020 (0.015)	0.013 (0.012)	0.014 (0.011)
ΔDow Jones$_{t-1}$	0.740*** (0.063)	0.742*** (0.060)	0.719*** (0.061)	0.730*** (0.060)	0.724*** (0.057)	0.697*** (0.057)	0.251*** (0.025)	0.250*** (0.025)	0.239*** (0.025)	0.240*** (0.024)	0.222*** (0.023)	0.220*** (0.022)
ΔInflation		-0.001 (0.026)	-0.091 (0.026)		-0.000 (0.026)	-0.014 (0.025)		0.062 (0.0242	-0.092 (0.293)		-0.118 (0.324)	-0.221 (0.302)
Monday		0.593*** (0.116)	0.610*** (0.119)		0.598*** (0.112)	0.631*** (0.111)		-0.006 (0.050)	0.004 (0.044)		0.026 (0.057)	0.027 (0.039)
$\Delta 2^{nd}$ Chamber-CDU			-0.001 (0.310)			-0.074 (0.308)			-0.127 (0.127)			-0.178 (0.133)
Early Election 2005			0.847* (0.449)			1.125** (0.490)			-0.073 (0.111)			-0.001 (0.097)
Constant	-0.609** (0.303)	-0.860*** (0.290)	-0.876*** (0.270)	-0.598*** (0.205)	-0.860*** (0.290)	-0.863*** (0.197)	-0.070 (0.072)	-0.073 (0.075)	-0.068 (0.073)	-0.085 (0.079)	-0.060 (0.567)	-0.059 (0.055)
Variance equation												
$\hat{\alpha}$	0.202*** (0.045)	0.194*** (0.039)	0.187*** (0.041)	0.168*** (0.050)	0.150*** (0.042)	0.139*** (0.038)	0.139*** (0.019)	0.134*** (0.018)	0.141*** (0.019)	0.098*** (0.018)	0.093*** (0.015)	0.073*** (0.014)
$\hat{\beta}$	0.707*** (0.034)	0.737*** (0.033)	0.727*** (0.033)	0.703*** (0.032)	0.744*** (0.028)	0.748*** (0.024)	0.776*** (0.026)	0.786*** (0.025)	0.782*** (0.024)	0.802*** (0.022)	0.781*** (0.021)	0.825*** (0.018)
$\hat{\gamma}$				0.137*** (0.042)	0.144*** (0.037)	0.159*** (0.035)				0.077** (0.031)	0.095*** (0.029)	0.091*** (0.024)
$\Delta \Pr_t(Right)$	0.279* (0.170)	0.294*** (0.133)	0.335** (0.145)	0.269* (0.160)	0.279*** (0.121)	0.297** (0.111)	0.017 (0.013)	0.016 (0.012)	0.021* (0.012)	0.021 (0.015)	0.018 (0.011)	0.019** (0.008)
ΔTrading Volume	0.052*** (0.002)	0.049*** (0.003)	0.052*** (0.003)	0.052*** (0.002)	0.051*** (0.003)	0.051*** (0.003)	0.009*** (0.001)	0.009*** (0.001)	0.008*** (0.001)	0.009*** (0.001)	0.007*** (0.000)	0.007*** (0.000)

Trading Volume x $\Pr_t(Right)$	0.241*** (0.044)	0.180*** (0.048)	0.153*** (0.045)	0.170*** (0.055)	0.104** (0.047)	0.081* (0.043)	-0.008 (0.006)	-0.012* (0.007)	-0.017*** (0.007)	-0.009* (0.005)	-0.025*** (0.005)	-0.015*** (0.004)
Electoral Uncertainty	-0.017*** (0.004))	-0.016*** (0.004)	-0.015*** (0.004)	-0.016*** (0.004))	-0.015*** (0.003)	-0.013*** (0.003)	0.001 (0.001)	0.001 (0.001	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Interest Rate		0.004 (0.032)	-0.012 (0.033)		0.008 (0.029)	-0.018 (0.025)		-0.007* (0.005	-0.008 (0.005)		-0.010*** (0.003)	-0.007*** (0.002)
$\Delta 2^{nd}$ Chamber-CDU			-2.115*** (0.723)			-2.264*** (0.507)			0.088 (0.134)			0.086 (0.112)
Early Election 2005			-0.926 (0.582)			-0.664 (0.436)			-0.204*** (0.030)			-0.153*** (0.025)
Constant	2.224*** (0.416)	1.687*** (0.494)	2.396*** (0.534)	2.521*** (0.477)	1.834*** (0.454)	1.783*** (0.399)	0.389*** (0.055)	0.400*** (0.068)	0.358*** (0.064)	0.289*** (0.041)	0.347*** (0.045)	0.233*** (0.036)
Diagnostics												
AIC	5.286	5.225	5.250	5.280	5.212	5.193	3.280	3.258	3.282	3.224	3.125	3.109
SIC	5.307	5.251	5.293	5.302	5.240	5.238	3.301	3.284	3.223	3.247	3.152	3.153
LogL	-9,540.01	-9,426.47	-9,462.92	-9,527.32	-9,402.71	-9,358.14	-5,915.44	-5,872.82	-5,723.18	-5,813.57	-5,630.27	-5,591.36

Coefficients shown with Bollerslev and Wooldridge semi robust standard errors in parentheses. ***, **, and * denote statistical significance at .01, .05, and .10 level, respectively. The mean and the variance equation of models III, VI, IX, and XII include additional indicator variables controlling for the crisis of the European monetary system in September 1992, the terrorist attacks on September 11th 2001, and state elections (coefficients not shown to conserve space).

Table 3: GARCH and TARCH Models for Sector Returns (T = 1,788 (Alternative Energy) / 3,614(Consumers))

Parameters	Alternative Energy (GARCH)			Alternative Energy (TARCH)			Consumers (GARCH)			Consumers (TARCH)		
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Mean equation												
$\Delta \Pr_t(Left)$	0.005 (0.152)	-0.003 (0.149)	-0.021 (0.137)	0.010 (0.150)	-0.001 (0.148)	-0.014 (0.136)	-0.007 (0.008)	-0.010 (0.008)	-0.011 (0.008)	-0.007 (0.008)	-0.008 (0.008)	-0.011 (0.008)
ΔTrading Volume	0.003 (0.003)	0.004 (0.003)	0.003 (0.003)	0.004 (0.003)	0.003 (0.003)	0.003 (0.003)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0000 (0.000)
Trading Volume x $\Pr_t(Left)$	0.329*** (0.102)	0.323*** (0.102)	0.342*** (0.100)	0.315*** (0.102)	0.304*** (0.102)	0.336*** (0.100)	-0.005 (0.010)	-0.000 (0.009)	0.001 (0.009)	-0.006 (0.009)	-0.009 (0.010)	0.004 (0.009)
ΔDow Jones$_{t-1}$	0.856*** (0.128)	0.858*** (0.129)	0.862*** (0.131)	0.854*** (0.129)	0.856*** (0.129)	0.863*** (0.131)	0.207*** (0.018)	0.217*** (0.018)	0.218*** (0.018)	0.207*** (0.018)	0.201*** (0.018)	0.221*** (0.018)
ΔInflation		0.098* (0.054)	0.100* (0.053)		0.095* (0.054)	0.098* (0.053)		0.005 (0.006)	0.005 (0.006)		0.007 (0.006)	0.005 (0.006)
Monday		0.704** (0.336)	0.754** (0.322)		0.648** (0.335)	0.717** (0.324)		-0.041 (0.033)	-0.039 (0.032)		-0.006 (0.032)	-0.036 (0.032)
Δ2nd Chamber-SPD			-0.164 (0.101)			-0.163* (0.098)			0.004 (0.161)			0.033 (0.138)
Early Election 2005			-0.653 (1.805)			-0.881 (1.777)			0.097 (0.103)			0.091 (0.100)
Constant	-1.160*** (0.392)	-1.276*** (0.401)	-1.350*** (0.393)	-1.094*** (0.393)	-1.174*** (0.398)	-1.299** (0.396)	0.059 (0.036)	0.057 (0.037)	0.046 (0.035)	0.062* (0.036)	0.072* (0.038)	0.030 (0.035)
Variance equation												
$\hat{\alpha}$	0.156*** (0.028)	0.150*** (0.028)	0.152*** (0.026)	0.166*** (0.045)	0.159*** (0.044)	0.161*** (0.041)	0.143*** (0.018)	0.150*** (0.019)	0.152*** (0.020)	0.150*** (0.023)	0.112*** (0.020)	0.146*** (0.023)
$\hat{\beta}$	0.687*** (0.045)	0.692*** (0.046)	0.702*** (0.043)	0.689*** (0.045)	0.694*** (0.046)	0.706*** (0.043)	0.801*** (0.024)	0.794*** (0.024)	0.781*** (0.024)	0.784*** (0.025)	0.825*** (0.023)	0.767*** (0.024)
$\hat{\gamma}$				-0.019 (0.053)	-0.016 (0.051)	-0.021 (0.047)				0.005 (0.032)	0.016 (0.028)	0.031 (0.031)
$\Delta \Pr_t(Left)$	-1.384 (1.457	-1.247 (1.354)	-0.808 (1.062)	-1.320 (1.385)	-1.220 (1.322)	-0.779 (1.032)	-0.015** (0.007)	0.014** (0.006)	0.013*** (0.006)	0.015** (0.007)	0.015** (0.006)	0.015** (0.006)

ΔTrading Volume	0.284***	0.278***	0.267***	0.282***	0.274***	0.269***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.016)	(0.015)	(0.017)	(0.016)	(0.015)	(0.017)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trading Volume x Pr_t (*Left*)	0.448	0.591	0.559*	0.452	0.581	0.540*	0.016***	0.019***	0.022***	0.019***	0.014***	0.023***
	(0.380)	(0.378)	(0.316)	(0.379)	(0.374)	(0.316)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)
Electoral Uncertainty	-0.041**	-0.045**	-0.033**	-0.040**	-0.046**	-0.030*	-0.000	-0.000	-0.000*	-0.000	-0.000	-0.001*
	(0.020)	(0.020)	(0.015)	(0.020)	(0.019)	(0.016)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Interest Rate		0.546	0.772		0.467	0.728		0.004**	0.003*		0.000	0.005**
		(0.533)	(0.470)		(0.524)	(0.466)		(0.002)	(0.002)		(0.001)	(0.002)
Δ2nd Chamber-SPD			1.227*			1.197*			-0.004			-0.038
			(0.632)			(0.632)			(0.114)			(0.088)
Early Election 2005			3.754			3.589			-0.042**			-0.045***
			(6.365)			(5.996)			(0.017)			(0.017)
Constant	16.309***	13.839***	9.940***	16.121***	13.727***	10.035***	0.014	0.007	0.016	0.017*	0.004	0.019
	(2.826)	(3.126)	(2.676)	(2.826)	(3.100)	(2.681)	(0.009)	(0.010)	(0.011)	(0.010)	(0.008)	(0.012)
AIC	6.654	6.656	6.602	6.656	6.651	6.611	2.519	2.559	2.574	2.534	2.507	2.578
SIC	6.691	6.702	6.672	6.696	6.700	6.685	2.539	2.585	2.617	2.546	2.535	2.623
LogL	-5,936.90	-5,935.01	-5,878.91	-5,937.15	-5,929.68	-5,886.29	-4,539.10	-4,609.24	-4,625.79	-4,547.56	-3,552.22	-4,633.27

Coefficients shown with Bollerslev and Wooldridge semi robust standard errors in parentheses. ***, **, and * denote statistical significance at .01, .05 and .10 level, respectively. The mean and the variance equation of models III, VI, IX, and XII include additional indicator variables controlling for the crisis of the European monetary system in September 1992, the terrorist attacks on September 11th 2001, and state elections (coefficients not shown to conserve space).

Table 4: Marginal Effects of Expected Government Partisanship on Sector Returns

	Defence	Pharmaceuticals	Alternative Energy	Consumers
Mean equation				
$\Pr_t(Right)$	0.148***	0.038**		
	(0.043)	(0.017)		
$\Pr_t(Left)$			0.320*	-0.009
			(0.171)	(0.012)
Variance equation				
$\Pr_t(Right)$	0.472***	0.001**		
	(0.152)	(0.015)		
$\Pr_t(Left)$			-0.249	0.038***
			(1.096)	(0.008)

Quantities given are marginal effects based on GARCH estimations with Bollerslev and Wooldridge semi-robust standard errors. Standard errors computed from the variance-covariance matrix of the coefficient estimates. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Appendix

Table A1: Descriptive statistics

	Mean	Min	Max	St.dev.	Skewness	Kurtosis	JB test
Defence Sector							
Return	0.0615	-24.6681	51.7542	3.5383	1.0090	19.2859	40,563***
Trading Volume	4,417.05	30.00	68,639.40	4,141.40	3.0649	30.7942	122,053***
Pharmaceutical Sector							
Return	0.0436	-9.2116	7.7235	1.3033	-0.2041	7.2108	2,695.853***
Trading Volume	736.44	7.00	23,969.00	1,103.55	4.7323	67.0575	631,737.3***
Alternative Energy Sector							
Return	0.2554	-34.2414	60.0194	7.3576	1.0043	12.1180	6,501.685***
Trading Volume	312.21	2.30	6,498.10	551.32	4.4081	30.8233	63,498.86***
Consumer Sector							
Return	0.0447	-7.2777	5.7509	1.0203	-0.1094	7.7859	3,457.236***
Trading Volume	430.22	2.00	17,641.00	873.30	7.3914	104.607	1,588,398***
Other Variables							
Dow Jones Returns	0.0435	-7.4541	6.1543	1.0006	-0.2527	7.9448	3,721.39***
Interest Rate	4.2151	1.4000	9.8000	2.1719	1.2810	3.6487	1,052.00***
Inflation Rate	2.0949	0.2000	6.3200	1.3811	1.4729	4.5521	1,670.42***
$\Pr_t(Right)$	46.8891	0.0000	99.3430	16.2687	-0.3362	3.5612	115.5718***
$\Pr_t(Left)$	53.1109	0.6570	100.0000	16.2687	0.3362	3.5612	115.5718***
Electoral Uncertainty	89.0290	0.0000	100.0000	18.2262	-2.9084	11.6130	16,274.96***
2nd Chamber-CDU	32.1864	24.000	51.000	6.1788	1.3300	4.2504	1301.785***
2nd Chamber-SPD	36.5130	18.000	45.000	6.0692	-1.2879	4.2635	123.046***

Mean, min, max, and standard deviation (St.dev.) in percentages except for trading volume (in '000). ***, **, and * denote statistical significance at the .10, .05 and .01 level. JB = Jarque-Bera test for normal distribution. For all sector series the number of return observations equals T = 3,615 except for the alternative energy sector, where T = 1,790.

Figure A1: Daily defence, alternative energy, pharmaceutical, and consumer sector returns (continuously compounded)