Stony Brook University

Asymmetric Retrospective Voting:

A Theoretical Model and Empirical Evidence of Negativity Effects in Voters' Response to the Economy

A Dissertation Presented

by

Roland Kappe

to

The Graduate School

in Partial Fulfillment of the

Requirements

for the Degree of

Doctor of Philosophy

in

Political Science

Stony Brook University

December 2012

Stony Brook University
The Graduate School

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Abstract of the Dissertation

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2012

Prospect theory tells us that humans pay more attention to losses than to comparable gains. My dissertation seeks to apply this insight to the field of retrospective voting and in particular economic voting.

First, I develop a formal model of asymmetric retrospective voting which allows for incorporating loss aversion. Then, the empirical implications of this theoretical model are tested using a variety of methodological approaches. First, the model's predictions about human behavior are tested directly in a laboratory experiment using a simplified version of the asymmetric retrospective voting model. In a second step, the analytical focus is widened, turning from the individual to the aggregate level: Using monthly time-series data, the asymmetric retrospective voting model is tested using the reaction of aggregate vote intentions to changes in economic conditions and evaluations. In a final step, using the broadest lens, the implications of the model with respect to the "cost of ruling", i.e. the empirical phenomenon of declining vote shares for incumbent governments, are tested using a large cross-national sample of elections.

For my parents, Horst and Marita.

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Chapter 1

Introduction

1.1 Introduction

The recent financial crisis and its aftershocks have not only pushed large parts of the world into recession and cost millions of people their jobs - the aftermath also left incumbent governments crumbling, facing the wrath of their citizens.

The relationship between the state of the economy and the electoral fate of incumbent governments has inspired a large research program in political science. Theoretical models and especially empirical studies of 'economic voting' have proliferated since the late 1960s (Nannestad and Paldam 1994, Lewis-Beck and Stegmaier 2000, Hibbs 2006). Their common theme is that voters judge incumbents - at least in part - based on the economic situation. Recessions, high unemployment or spikes in price levels can seal the fate of a previously popular government. Voters are assumed to collectively punish incumbents for bad times and reward them for good times with re-election. This

reward and punishment behavior constitutes one possible (minimalist) way in which citizens can hold their leaders accountable (cf. Schumpeter 1942, Barro 1973, Ferejohn 1986, Przeworski 1999 but also Fearon 1999, Anderson 2007).

Research from psychology however also shows that people respond more strongly to losses than to comparable gains (Kahneman and Tversky 1979, Baumeister et al. 2001). It has therefore occasionally been suggested that voters punish more than they reward (Mueller 1970, Bloom and Price 1975, Lau 1982, Claggett 1986, Nannestad and Paldam 1997, 2002). This dissertation tries to add to this literature by investigating the claim about an asymmetric response to the economy: Do voters punish incumbents for bad times, but fail to reward them for good times?

To answer this question, I first build an agent-based model of retrospective voting that takes psychological research, specifically prospect theory, into account and incorporates loss aversion - or negativity bias - into voter behavior. In a second step, I use time series data on government popularity in the United Kingdom and Germany to test whether public opinion reacts to the state of the economy in an asymmetric fashion. The analysis shows that rising unemployment hurts government popularity while an improving labor market does not translate into higher popularity. In a final step, I use cross-national data and show that the same asymmetric response to the economy can be found in actual election results from more than sixty democratic countries.

The dissertation makes four main contributions to the existing body of work. The relevant aspects of the vast literature on economic and retrospective voting that are specific to each part of this dissertation will be reviewed in more

detail in the respective chapters. The main contributions are:

I. The asymmetric retrospective voting model introduced here is - to the best of my knowledge - the first formal model of retrospective voting to incorporate a loss aversion or a negativity bias. Previous theoretical models assume that voters' response to changes in payoffs or observed incumbent performance is linear and symmetric. This is inconsistent with what psychology, especially prospect theory, tells us about human behavior. The model therefore relaxes this symmetry assumption. Incorporating negativity bias leads to aggregate level predictions that are *prima facie* more 'realistic' in terms of dynamics and alternation in power, compared to the predictions of previous models. Furthermore, the model produces two empirical implications that are tested in subsequent chapters: a 'cost of ruling' and an aggregate-level asymmetry.

II. The asymmetric response to negative and positive changes implied by prospect theory requires a reference point to encode what qualifies as a 'gain' or a 'loss'. A given rate of economic growth or inflation for example is *per se* neither 'good' nor 'bad' and an evaluation as such requires a yardstick or expectation for comparison. This dissertation proposes a method for estimating an aggregate level reference point. Only after having obtained the reference point is it possible to investigate the asymmetric response hypothesis, e.g. test whether losses are weighed more heavily than gains. The estimation method proposed here is based on *threshold models*. This arguably only constitutes a first shot at this problem, but it opens up possible avenues for future research with respect to modeling reference points more generally.

III. The method to estimate the reference points uses an econometric tech-

nique known as *threshold models* (Hansen 1996, 2000). This dissertation is - to the best of my knowledge - the first application to introduce this innovative method to political science. It allows for estimating a nonlinear effect of some independent variable where the slope depends on whether the value falls above or below some unknown threshold level. It is possible to test whether the threshold specification is appropriate and - most importantly - retrieve the threshold value, which - as this dissertation shows - can be an important quantity of interest in and of itself. The estimation method is already well established in other fields and has desirable properties. It could be of great use to applied researchers in many different subfields of political science.

IV. The dissertation re-evaluates claims about an asymmetric response to the state of the economy using more and newer data and state-of-the-art statistical methods, thus improving upon previous research that produced somewhat inconclusive results. The time series of government popularity in Britain and Germany cover monthly measurements of the political and economic variables for more than thirty years, and the analyses presented here offer improvements in modeling the dynamic properties of the series, as well as in directly modeling the asymmetric retrospective voting model's quantities of interest, namely the reference point. While previous tests were limited to single-country studies, this dissertation is also the first study to test the hypothesis of an asymmetric response to the economy comparatively, using a large cross-national dataset of election results.

The next part of this introduction briefly sketches the theoretical background and previous work in political science that focused on negativity effects.

The individual chapters include more specific reviews of the broader economic and retrospective voting literature pertaining to the analyses at hand. The last part of the introduction is a brief outline of the chapters of this dissertation.

1.2 Theoretical Background

Prospect theory, originally formulated by Kahneman and Tversky (1979), has dramatically changed our understanding of human decision-making. One of the basic tenets of this behavioral model of decision-making under risk is that people systematically differ in their behavior, depending on whether they perceive their choices to be in the domain of gains or in the domain of losses. In short, depending on the location of their reference point, people are more risk-averse (with respect to gains) or more risk-taking (with respect to losses). Furthermore their hypothesized value function is steeper in the domain of losses: In contrast to what expected utility theory would predict, when evaluating choices, we tend to weigh losses heavier than gains of equal size. In other words, "losses loom larger than gains". Figure 1.1 displays a hypothetical value function implied by prospect theory

This *loss aversion* resonates with a research program in social psychology on the so-called negativity-bias, or what is sometimes referred to as a "grievance- or valence asymmetry" or the "preferential detection of negative stimuli", and comprises a body of theoretical claims and compelling evidence for humans' notoriously lopsided processing of information: We all detect negative stimuli faster (Dijksterhuis and Aarts 2003), pay more attention to neg-

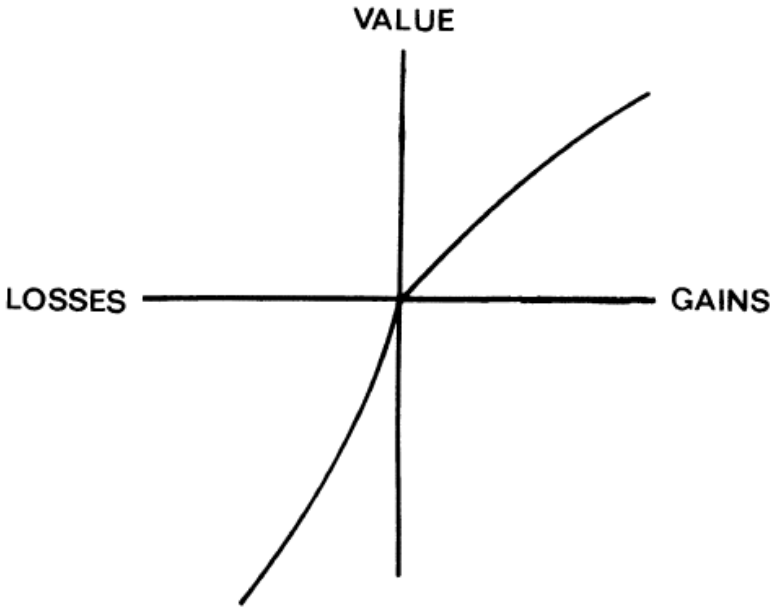

FIGURE 3.—A hypothetical value function.

Figure 1.1: Value Function implied by Prospect Theory (from Kahneman and Tversky 1979)

ative information (Wason 1959, Fiske 1980, Ito et al 1998) and weigh losses more than gains of equal size (Kahneman and Tversky 1979). In short: "bad is stronger than good" (Baumeister et al. 2001). The basic effect is easy to understand and presumably deeply rooted in our evolutionary adaptation to an environment in which avoiding a potential threat was more important than a foregone opportunity. When presented with a stimulus of some sort, a sound, a picture, a word, another person, we automatically evaluate whether the stimulus is positive or negative (Bargh et al 1992). Negative stimuli are "stronger" in many respects (Baumeister et al 2001). We tend to detect nega-

tive stimuli better than positive stimuli, we devote more attention to negative information, and we are persuaded more easily by bad news than good news (Dijksterhuis and Aarts 2003, Wentura et al. 2000). The empirical support for a broad class of negativity effects is well established, encompassing a range of methods, such as direct behavioral studies, subliminal priming and neurological evidence (Ito et al 1998, Rozin and Royzman 2001, Polls et al 2001, Baumeister et al 2001). The root cause of this behavior can be found in evolutionary psychology. When presented with a stimulus, for example a noise, it can be advantageous to quickly classify the noise into a simple threat/no-threat scheme, which helps avoiding ending up as the main course on a predator's dinner table or losing a pecking order fight to the moment of surprise. As Dijksterhuis and Aarts (2003) put it: "A quick categorization of stimuli allows for the rapid onset of appropriate behavior (i.e., approach or avoidance)." Digging deep towards the roots of human behavior, McDermott, Fowler and Smirnov (2008) present a model of behavior consistent with what evolutionary biologists call optimal foraging theory and are able to show how prospect theory preferences may be advantageous from an evolutionary perspective.

In sum, the literature in psychology supports the idea that prospect theory type behavior, specifically the observation that "losses loom larger than gains", is indeed a universal feature of human decision-making, grounded in our evolutionary history.

Studies showing negativity effects in political science are relatively sparse, but the idea that voters punish more than they reward has been proposed sev-

eral times. Even before V.O. Key (1964) characterized voters as the "rational god of vengeance and reward", the authors of *The American Voter* already observed that

> "[...] prosperity clearly benefits the administration party, but it has nothing like the magnitude of the effect that would result from economic distress. A party already in power is rewarded much less for good times than it is punished for bad times." (Campbell, Converse, Miller and Stokes 1960: 555)

In the very first analysis of a 'popularity function', i.e. a model of government popularity, usually featuring macroeconomic indicators, Mueller (1970) actually hypothesized that the yardstick voters use to judge the U.S. President might be the change in unemployment from the beginning to the end of a President's term. He modeled this effect in a strictly asymmetric fashion in the sense that the effect of reductions in unemployment are constrained to zero and finds that only worsening conditions affect presidential popularity. Bloom and Price (1975) can be credited for basically laying out the idea of differential effects due to a valence asymmetry and even reference some early work from psychology. They show that the effect of changes in income on vote choice is contingent on whether an election takes place in times of rising or falling incomes. Following the Bloom and Price model, Claggett (1986) finds asymmetric effects of economic conditions on aggregate vote shares in congressional elections going back to 1886. For the United Kingdom on the other hand, Headrick and Lanoue (1991) test for and reject the existence of asymmetric effects of unemployment and inflation on government popularity for

the period 1953-1987. Lau (1982) finds negativity effects in job approval and voting behavior and rules out *post hoc* rationalization and, more importantly, the non-equivalence of the positive and negative information as potential rival explanations. He later (Lau 1985) extends these findings using NES data from 1968 to 1980 and finds some evidence for a negativity bias in evaluations of presidential candidates. Offering a more elaborate model of negativity bias in information processing, Meffert et al (2006) show that voters in a campaign environment are more likely to select negative information about candidates, but counterargue negative information about their preferred candidate. In a similar vein, Goren (2002) - using NES data from 1984-1996 - shows that in line with theories about negativity effects in impression formation, partisan bias (i.e. positive or negative attitudes towards the other party) moderates the relationship between character weakness and evaluations of presidential candidates. The partisan opponents "look for" signs of character weakness. By contrast, Kiewiet (1983) and Lewis-Beck (1988), using individual level data find no asymmetric effects in the economic voting context. This however lead to a critique by Nannestad and Paldam (1997) who point out that whether voters react more strongly to bad than to good times is essentially a time-series question that is impossible to answer using individual level cross-sectional data. They use rolling cross-sections and show the existence of a grievance asymmetry in economic voting in Denmark using quarterly individual level data from 1985 through 1992. They also discuss the question of picking thresholds (which they solve *ad hoc*) and speculate about the possibility that the individual level grievance asymmetry leads to the cost of ruling phenomenon.

This link, which also emerges from the formal model presented below, is also at the center of another of Nannestad and Paldam's (2002) papers and provided the impetus for trying to build a theoretical model of this relationship. Recently, Soroka (2006) shed some light on a possible mediating mechanism, namely the role of the mass media, by showing evidence of negativity effects for the relationships between economic factors, media coverage and subjective evaluations of the economy. Investigating in which way the media's possibly exaggerated focus on negative news affects the relationship between economic conditions and popularity would be an interesting avenue for future research. Interestingly, the results of Soroka's article actually imply one reason why most of the more recent individual level studies of economic voting (e.g. Duch and Stevenson 2008), if they test for asymmetries, fail to find such effects. All individual level studies rely on voters' subjective economic evaluations rather than measures of actual economic factors. These subjective evaluations are however presumably already 'contaminated'. Voters' subjective evaluations of the real economy already suffer from negativity bias, but the transmission between subjective evaluations of the economy and subjective evaluations of the government does not include some additional perceptual bias. In a way, the negativity bias that affects both voters' evaluation of the economic situation and the evaluation of the government is already 'priced in'.

In sum, while there are some successful efforts to include the notion of negativity bias - or loss aversion - into the economic voting paradigm, they remain relatively rare. Furthermore, while a number of theoretical models of retrospective voting have been created (Barro 1973, Fiorina 1981, Ferejohn

1986, Persson and Tabellini 1990, Alesina, Londregan and Rosenthal 1993, Alesina and Rosenthal 1995, Hibbs 2006, Bendor et al 2011), none of them include the possibility of asymmetric evaluations. This dissertation seeks to fill this gap by proposing a behavioral model of asymmetric retrospective voting.

Asymmetric evaluations implicitly require a reference point. Most of the existing empirical work approaches the question of asymmetric evaluations in an *ad hoc* fashion, usually setting the explicit or implied reference point by *fiat*. This dissertation proposes a more theoretically satisfying approach by *estimating* the aggregate-level reference points using threshold models.

Finally, existing empirical studies testing for asymmetric evaluations of the economy are usually single-country or even single-survey studies. This dissertation adds a comparative perspective by testing for asymmetric effects of the economy in a large cross-national dataset of election results.

1.3 Outline of this Dissertation

Chapter 1 provided a brief introduction, focusing on the main contributions of this dissertation and outlined the theoretical background and previous work on negativity effects in political science.

Chapter 2 introduces the asymmetric retrospective voting model. Previous formal models of the principal-agent relationship between voters and politicians assume voters' responses to payoffs or information to be symmetric. The model presented here relaxes this assumption and incorporates loss aversion relative to an endogenous reference point. The model is implemented as an

agent-based simulation. Governments differ by a continuous competence level and produce an economic output that is the product of their competence level and a random shock. Voters observe only the output and evaluate it against an internal reference point that is endogenously determined, and then update their propensity to vote for the incumbent. In the asymmetry condition, below reference point performance is weighed heavier. A number of results can be derived from simulations: (1) Accountability: the simplified retrospective voting mechanism is sufficient to induce relatively high levels of government quality. (2) Aggregate-level asymmetry: Introducing loss aversion into voter behavior also leads to an aggregate level asymmetry. (3) Cost-of-ruling: the model predicts an average decline in vote share for the incumbent government during their time in office. The subsequent chapters test these empirical implications.

Chapter 3 tests the asymmetric response to economic conditions that is implied by prospect theory using more than thirty years of monthly time series of government popularity in the United Kingdom and Germany. Testing for an asymmetric response requires information about what constitutes positive and negative changes, or in other words, the location of the reference point. This chapter proposes a procedure for estimating an aggregate level reference point using an innovative econometric technique known as *Threshold Models* (Hansen 1996, 2000). Having located the reference point, we can test whether above and below reference point effects are equivalent or whether the effects are asymmetric as theory predicts. The analysis shows that there is indeed evidence of reference-point dependent, asymmetric behavior, most notably in

the effect of the unemployment rate on governmental approval. As unemployment increases, the government loses support. Reductions in unemployment, however, yield little or no increases in government popularity.

Chapter 4 provides a comparative test of the asymmetric retrospective voting model using election results from more than sixty democratic countries over twenty-five years. The data corroborate the idea of a cost of ruling. The analysis then uses threshold models to estimate aggregate-level reference points and finds clear evidence of an asymmetry in the relationship between economic performance and incumbent party vote share. If the economy grows at an average rate or above, voters are not more likely to vote for the incumbent. If the economy slows to below-average growth, voters punish the incumbent party. A similar result emerges for unemployment: Above reference point levels of unemployment decrease incumbent vote shares, while below reference point unemployment has no effect. The results for inflation suggest that any deviations from a country-specific optimal level of inflation will be punished electorally, albeit with a more severe penalty for high inflation rates. These results strongly support the findings of the previous chapter. Economic voting is reference-point-dependent and asymmetric, with a generally stronger response to bad performance.

Chapter 5 summarizes the results and discusses some implications as well as avenues for future research.

Chapter 2

The Asymmetric Retrospective Voting Model

2.1 Introduction

The theoretical literature on retrospective voting provides us with a set of models that describe the principal-agent relationship between voters and politicians and allow us to derive conditions under which voters can hold politicians accountable (Kramer 1971, Nordhaus 1975, Fiorina 1981, Ferejohn 1986, Alesina, Londregan and Rosenthal 1993 and Alesina and Rosenthal 1995).

While these models differ greatly in their exact implementation of the underlying principal-agent relationship, they all share the assumption of symmetric evaluations. Good performance leads to rewards at the polling booth, bad performance leads to punishment, with voters being even-handed rather than vengeful in their performance evaluations. At the same time, theoretical and empirical work in psychology and behavioral economics, such as the literature on prospect theory, established the existence of loss- or risk-aversion - or more generally - negativity effects: In short, humans react more strongly

to negative than to positive stimuli (Kahneman and Tversky 1979, Bargh et al 1992, Baumeister et al. 2001, Dijksterhuis and Aarts 2003).

This chapter presents an attempt to modify an existing model of retrospective voting in order to incorporate this well established feature of human decision-making.

Specifically, the chapter starts out by implementing an agent-based model that is based on a simplified version of the Ferejohn (1986) model[1]. Ferejohn characterizes the interaction between voters and politicians as a principal-agent model in which the government chooses an effort level, and voters, unable to observe the government's true effort or competence, use a performance based retrospective voting rule. He then derives conditions under which the government will perform in the voters' interest. The agent-based model presented here implements a modified version of the Ferejohn model. Most importantly, it relaxes the assumption that the effects of positive and negative changes in voters' utility on their propensity to re-elect the incumbent are symmetric.

In its most general form, retrospective voting models consist of the following setup:

(1) Incumbent governments make policy choices or have properties (e.g. types of varying quality) that result in an output of the political system. This output, usually together with some form of exogenous shock, constitutes the policy outcome.

[1]Agent based models allow for greater flexibility in modeling decision rules and adaptive behavior compared to analytical models, and are enjoying increasing popularity in political science (cf Taber and Timpone 1996, Fowler and Smirnov 2005, 2007, Bendor et al 2011, Laver and Sergenti 2011).

(2) Voters observe the outcome associated with the incumbent government and - depending on what decision-making process they use - change their propensity to vote for a given incumbent or an alternative candidate.

Existing models also differ in their assumptions about the relative complexity of the decision-making rules or rationality of the players on both the voter and the candidate side: the spectrum ranges from the oldest, and simplest models of retrospective voting by Kramer (1971), Nordhaus (1975) and Fair (1978), over sanctioning models (Ferejohn 1986) to the competency or "signal-extraction" based "rational retrospective voting" models by Alesina and Rosenthal (1995), and Persson and Tabellini (1990). A contemporary variation may be found in adaptively rational models of retrospective voting, e.g. Bendor, Kumar and Siegel (2010).

The development of explicit models of retrospective voting began with a handful of seminal articles in the 1970s. Gerald Kramer (1971) was the first to write out, and empirically test, a model of how an incumbent government's track-record with respect to the economy might be related to its vote share. This macro-level relationship between the changing tides of the economy and the vote has remained the core idea in the vast literature on retrospective and "economic" voting. Nordhaus (1975) contributed the idea of a political business cycle, i.e. in order to increase their chances of reelection, governments exploit the voters' myopia to induce growth artificially via inflation before elections, which is the 'paid for' in the post election periods. Fair (1978) provides a generalization of Kramer's idea and shifts the empirical focus from congressional to presidential elections.

One major achievement of both the Nordhaus (1975) and Fair (1978) articles is that they go beyond the hypothesized macro-level relationship by specifying how to get from individual (micro-level) voter utility functions to a testable statistical model on the macro-level: Voter utility depends crucially on a set of variables capturing the relevant actions of the incumbent during her term in office, the weights associated with these different factors and their lags (discounting) and a "reference level" that needs to be specified. All these factors - incumbent performance, weights and reference levels - are by definition common to all voters, a simplification that will partially be relaxed in the model presented here. Douglas Hibbs' excellent review (2006: 568) provides a good summary and explanation of the basic idea and the necessary assumptions.

In a next step, Fiorina's (1981) book provided a take on retrospective voting as a sanctioning mechanism but focused more on the empirical than the theoretical side. Ferejohn (1986) however takes a closer look at the strategic interaction between politicians and the electorate and sets up a basic principal-agent model, an idea I will return to below.

While the initial articles spawned a massive - almost exclusively empirically oriented - research program into "vote and popularity functions", the fact that the voters in these classic models don't behave rationally, i.e. fail to anticipate the politicians' behavior, rendered the models problematic from the vantage point of many economists after the rational expectations revolution (Lucas 1976, Sargent and Wallace 1975, Nannestad and Paldam 1994).

In a second wave however, Alesina, Londregan and Rosenthal (1993), Alesina

and Rosenthal (1995), and Persson and Tabellini (1990) suggested different variations on the retrospective voting theme. They turn away from the sanctioning view, as politicians and voters would anticipate each other's actions, rendering manipulation impossible. Their model is based on incumbent's policy choice in an "expectation-augmented Phillips curve", which is subject to random economic shocks, which in turn are partly a function of incumbent competence. The focus then is on the voters' problem of extracting the government's competency signal in a noisy environment. Brief summaries can be found in Hibbs (2006), Alesina, Roubini and Cohen (1997) and Duch and Stevenson (2008). These models constitute the most rigorous and perhaps best-explored class of retrospective voting models, but - being in line with the concept of rational expectations - also put the highest (and perhaps unrealistic) demands on voter's cognitive capacities.

Dismissing the older sanctioning models solely on the basis of their inconsistency with rational expectations may be desirable from a certain theoretical angle, but seems short-sighted given our knowledge about human behavior and the empirical work that has been accumulated.

The recent economic voting literature (Duch and Stevenson 2008) and models of rational retrospective voting (e.g. Alesina and Rosenthal 1995) have focused predominantly on the selection side, while the question of accountability has been addressed in the empirically oriented political behavior literature - especially with respect to the capacities of the voters - but less so int theoretical models of retrospective voting.

The general idea of treating voters and politicians as a special case of a

principal-agent model, as proposed in Ferejohn (1986), provides a good starting point for the development of a behavioral model. Ferejohn provides optimal incumbent and voter strategies in a highly simplified repeated game.

The theoretical model starts from the following premises:

There exists an information asymmetry between voters and the politicians in government. Politicians due to choice or inherent quality, implement policies that affect the voters' welfare. Voters can (at fixed points) terminate the politician's tenure/contract, but they cannot easily change the politician's compensation level. Voters and politicians thus form a special case of a principal agent model. This relationship is additionally characterized by multiple players on both the voter and the politicians' side and institutional arrangements that constrain the choices of both types of players. Finally, the empirical literature strongly suggest that contracts are renewed contingent on some observable performance criteria.

Given the principal-agent nature of this relationship, voters generally face two types of problems confronting the agent (politician/party) side:

(i) adverse selection, i.e. the question of how to select "types" of politicians with certain desirable characteristics such as competence, honesty or certain policy preferences, while the institutional setup may or may not favor candidates with those characteristics; and

(ii) moral hazard, the incentive of politicians to make policy choices that increase their own utility (however defined) irrespective of their previous voters' preferences.

The first problem conceptualizes the principal's problem with respect to

the agent as the selection and retention of exogenous quality types, while the second problem concerns the question of how to induce desirable agent behavior, rendering it a choice variable of the agent, e.g. in terms of effort or what policies are implemented.

Practically, this distinction amounts to the treatment of the government player in the agent-based model: the government's policy choice can either be treated as endogenous and modeled as a strategic choice of a rational (or adaptively-rational, or heuristics-guided) decision-maker; or it can be treated as exogenous, with the government's type drawn from some distribution.

In order to keep the model as clean and simple as possible, and in line with the more recent literature, the focus of this chapter will be on the adverse selection problem conceptualized as the retention of quality candidates.

The model presented here modifies an existing theoretical model of retrospective voting (Ferejohn 1986), focusing on the aspect of selection - and especially retention, as we shall see later - of quality candidates, and models voter decision making as dynamic and adaptive rather than forward looking and optimizing. Most importantly, the asymmetric retrospective voting model relaxes the assumption that the response to positive and negative changes in utility is symmetric.

The next section introduces the agent-based model, its assumptions about the nature of the principal-agent relationship between voters and politicians, the players' decision rules and the sequence of actions. It also describes the way the symmetry assumption is relaxed and how exactly negativity bias is incorporated into the model. The third section outlines the setup of the simulations

conducted in order to analyze the predictions of the model. The fourth section presents a number of results that can be derived from the simulation. These are - in short: (i) accountability, (ii) asymmetric evaluations in the aggregate, (iii) a "cost of ruling", and (iii) a relationship between asymmetry, alternation in power and government quality in the sense that more asymmetric evaluations lead to more alternation in power, but lower quality governments while also reducing the variance in government quality. The final section discusses the limitations of the model, possible avenues for future research, and the empirical implications of the model for the following chapters.

2.2 The Model

The model presented here follows Ferejohn's (1986) seminal contribution but implements a simplified version with adaptive agents. The setup of the model is as follows: There are P parties[2] competing in elections with N voters. Each voter i votes probabilistically using an adaptive rule outlined below. The party that receives the most votes becomes the incumbent government.

Each period, the incumbent government observes a random shock to the system. In the economic voting tradition, this would be the nation's overall economic performance. Let's label this random shock θ, and assume that $\theta \in \Theta$, where $\Theta \sim$uniform(0,1).

In the next step the incumbent party chooses an action α, which determines the payoff for the incumbent party and the citizens. This can be thought of as

[2]For the simulation results presented here, in order to avoid the question of coalition formation and attribution of responsibility in coalition governments, the number of parties has been limited to two.

either an effort or competence level, and is assumed to be fixed for the party in government, such that $\alpha_{p,t} = \alpha_{p,t-1}$ if party p is the incumbent. For the opposition party, a new (potential) competence level is drawn randomly with $\alpha \in A$, where $A \sim$uniform(0,1).[3]

Since the incumbent party's action is simply determined by its type, specifying an explicit party utility function is inconsequential in the sense that parties are not engaging in utility maximizing behavior. The effort or competence level is chosen randomly for a new government and fixed until the party is voted out of office. This also means that any eventual higher effort or performance is exclusively a consequence of the elimination of low performance governments by the voters and not a consequence of optimizing or strategic behavior on the part of the incumbent government.

While this assumption could be modified to incorporate other characteristics of the political system such as shirking or other detrimental effects potentially associated with long-term incumbents (and I will return to this question in the discussion)[4], the goal for this chapter is to produce a simple model of retrospective voting that focuses on the selection aspect in the principal-agent relationship between voters and politicians. Furthermore, it is easy to imagine

[3]The distributions of the economic shocks θ and party competence levels α were both normalized to run from 0 to 1, which makes an intuitive interpretation of the induced competence levels and payoffs possible. For reasons of simplicity, a uniform distribution rather than a truncated normal or a more complicated probability function was chosen for the random draws of these parameters. Note that neither party competence levels, nor the reference points converge to one of the boundaries over the simulation runs. Nevertheless, future robustness checks could verify whether assuming different probability distributions has an effect on the results.

[4]A future extension of this model could explore the effect of varying this assumption, i.e. compare stable against variable competence levels, e.g. by characterizing competence as an autoregressive process and varying the value of the persistence parameter or by treating competence as an adaptive choice process.

that a given incumbent's quality or competence level is in fact stable.

The random shock and the government's competence level jointly determine the voters' payoff for a given time period :

$$U_{it}(\theta, \alpha) = \theta_t \alpha_{p=G} \tag{2.1}$$

The voters cannot observe α directly, and can therefore not condition their voting decision on actual government competence, but rather have to decide based on observed performance, i.e. $\theta\alpha$. In order to do so, voters require a benchmark against which to compare observed performance. Existing models usually assume that the underlying distributions from which the random shocks and incumbent quality are drawn, are known to the voters. This assumption makes it easy to derive optimal behavior but also lacks realism. This model does not require the voters to have any outside information about the parameters of the model. They form evaluations based only on observed performance. Performance is - as prospect theory would suggest - evaluated in relation to an internal reference point τ (as in threshold), which is determined endogenously in an adaptive process described below.

If the observed performance $\theta\alpha$ is greater than the reference point τ, voters become more likely to vote for the incumbent. If the observed performance is less than the expected performance, voters become less likely to vote for the incumbent. For a detailed introduction of aspiration based adaptive rules, see Bendor et al's (2011) recent book. In this model, a given voter's probability of voting for the incumbent government, denoted by π_t^G, is updated as follows,

$$\pi_t^G = \begin{cases} \frac{\pi_{t-1}^G + \lambda\beta\pi_{t-1}^G}{(\pi_{t-1}^G + \lambda\beta\pi_{t-1}^G) + \pi_{t-1}^{\neg G}}, & \text{if } \theta\alpha \geq \tau \\ \frac{\pi_{t-1}^G - \beta\pi_{t-1}^G}{(\pi_{t-1}^G + \beta\pi_{t-1}^G) + \pi_{t-1}^{\neg G}}, & \text{if } \theta\alpha < \tau \end{cases} \tag{2.2}$$

where π_{t-1}^G is last period's probability of voting for the government party, λ is an asymmetry parameter described in detail below and β is a (fixed) step-size parameter. Note that the denominator above is only introduced to assure that the probabilities of voting for a given party sum to 1. Importantly, the only difference between the updating rules for above and below reference point changes lies in the introduction of the asymmetry parameter, λ, which acts as a discount factor for above reference point performance[5].

As we can see, performance can be above or below the reference point τ. In the symmetric case ($\lambda = 1$), above-expectation performance has the same effect on a voter's propensity to re-elect the incumbent as below-expectation performance. In the asymmetric case ($\lambda < 1$), below-expectation performance has a stronger effect on voters' propensity to re-elect the incumbent than above-expectation performance. In the extreme case of ($\lambda = 0$), above-expectation performance has no effect on voters' propensity to re-elect the incumbent, only worsening conditions induce a behavioral change.

Instead of having a fixed, exogenously determined benchmark level to

[5]This functional form, rather than e.g. a multiplier for negative effects, was chosen in order to assure that the parameter space for the asymmetry parameter contains the special cases of symmetric behavior ($\lambda = 1$), the standard assumption and extreme asymmetry, i.e. a zero effect for good news ($\lambda = 0$), and allows for a sweep of the whole parameter space by running simulations with random draws of λ between 0 and 1. There is some evidence in the literature that negative information is weighted about twice as much as positive information (Tversky and Kahneman 1992, Abdellaoui et al. 2007), in this model, this would then correspond to a λ of about 0.5.

evaluate performance, voters adjust their reference point dynamically as a weighted-average of last period's reference point and the deviation of actual performance from expected performance, weighted using a persistence parameter γ, which is set at a fixed value for the current model:

$$\tau_t = (1 - \gamma)\tau_{t-1} + \gamma(\theta\alpha_{t-1}) \tag{2.3}$$

Modeling the aspiration adjustment in this form follows Bendor et al (2011).[6]

After this step, the votes are cast. Voters vote probabilistically for either the incumbent or the opposition party. The party that obtains a majority of the votes takes office. The (new) opposition party gets a new leadership, i.e. draws a new competence level $\alpha \in A$, and the model starts from the beginning.

Table 2.1 provides a short stylized outline of the steps of the agent-based model. The complete R code for the model can be found in the appendix.

[6]Using a simple weighted-average rule with a single parameter γ controlling the degree of persistence to model the aspiration adjustment process follows Bendor et al (2011), who show that it has desirable properties (it is a linear, deterministic, stationary Markov process), and it has been used in other models of endogenous aspiration adjustment (cf Cyert and March 1963, Karandikar et al 1998)

Table 2.1: Outline of a single cycle of the asymmetric retrospective voting model

1)	Nature draws random shock θ
2)	Government party produces overall performance $\theta\alpha$, based on random shock and competence level
3)	Voters receive payoff and adjust propensity to re-elect the incumbent government based on observed performance relative to reference point. Asymmetric evaluations are introduced at this step: Performance can be above or below expectation. In the symmetric case $\lambda = 1$, above-expectation performance has the same effect on re-election propensity as below-expectation performance. In the asymmetric case $\lambda < 1$, below-expectation performance has a stronger effect on voters' propensity to re-elect the incumbent than above-expectation performance. In the extreme case of $\lambda = 0$, above-expectation performance has no effect on voters' propensity to re-elect the incumbent, only worsening conditions induce behavioral change.
4)	Voters adjust reference point τ.
5)	Voters vote, majority party takes office.
6)	Opposition party draws new competence level α.
7)	Start over.

2.3 Simulation Results

In order to investigate the behavior of the model and its predictions, a large number of simulations were conducted. Typically, for each individual simulation run, the electorate consisted of 1001 voters (to avoid ties) and the election cycle outlined above was run for 1000 time periods, for a total of 1 million simulated elections. In general, the model generates a sequence of elections with results that mirror what can be observed in the real world. The voters vote for different parties, change their vote choice in response to economic shocks, and parties alternate in power. Figure 2.1 shows a typical simulation run with λ=0.5, i.e. negative changes being twice as strong as positive changes.

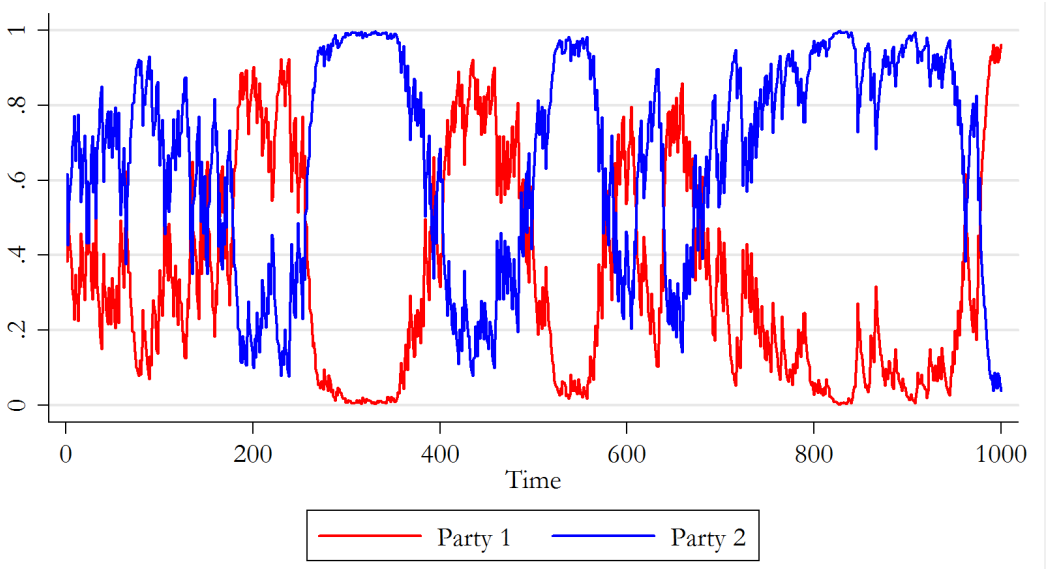

Figure 2.1: Party Vote Shares in a Typical Simulation Run)

This pattern of changing political fortunes and alternation in government

is reassuring from a face validity perspective. The model does not produce degenerate predictions, e.g. one party staying in office indefinitely. Additional simulations with a length of 100,000 election periods were conducted to ensure that the process does not in fact settle to some final static state. At times, high quality incumbents get re-elected a large number of times, but only until a combination of high expectations on the part of the electorate and bad economic times lead to electoral losses removing them from office. After this first look, let's turn to a more thorough analysis of the model's predictions. Table 2.2 provides an overview of the parameter values for the simulation.

Table 2.2: Simulation Parameters

Number of Simulations	1000
Asymmetry Parameter (λ)	$\sim$ uniform(0,1)
Elections per Simulation (T)	1000
Number of Voters (N)	1001
Parties (P)	2
Economic Shock (θ_t)	$\sim$uniform(0,1)
Challenger Competence (α)	$\sim$uniform(0,1)
Adjustment Parameter (β)	0.5
Adjustment Parameter (γ)	0.1

1000 simulations with $0 \leq \lambda \leq 1$ fixed for that simulation run. An additional number of simulations was conducted with λ=0, λ=0.5 and λ=1 to further explore these special cases.

2.3.1 Retrospective Voting and Accountability

The first and obvious question of course is: Does retrospective voting lead to better governments? Is the simple adaptive voting rule sufficient to select

and retain high quality types? Recall that the party competence levels α are drawn randomly from a (0,1) uniform distribution. If the retrospective voting rule described above does not actually lead to better performing governments, then - in expectation - the average government competence level should be 0.5, since E[A]=0.5.

The simulation results show that the average government quality markedly exceeds this minimum benchmark. In the symmetric case, i.e. over 100 simulation runs with λ=1, the average government quality is α=0.75 (s.d. = 0.19), which is significantly ($p < 0.01$) higher than the expected value of government quality if the voting rule had no effect. The same holds true for the asymmetric case and all possible values of λ. See Table 2.3 below for more detailed results. The presence of a simple retrospective voting rule leads to government competence levels that are higher than what could be expected due to chance.

Why is this the case? While α is not the only factor determining incumbent re-election, it does affect a government's chances. Higher quality governments are more likely to produce higher performance, and will thus be retained longer, while low quality governments - if elected - are eliminated more rapidly.

2.3.2 Introducing Negativity Bias

The main focus of this chapter is on the effects of introducing negativity bias. Prospect theory suggests that utility is evaluated in relation to a reference point and that below reference point values (losses) are weighted more heavily than gains. Consequently, in the asymmetric retrospective voting model, an individual, endogenous, dynamic reference point τ is introduced and voters

evaluate government performance against this yardstick. Losses ($u_{it}(\theta, \alpha) < \tau$) are weighted heavier than gains ($u_{it}(\theta, \alpha) \geq \tau$) by discounting gains with the asymmetry parameter λ. In order to investigate the consequences of asymmetric evaluations, for each of the Monte Carlo simulations, a different asymmetry parameter λ was drawn at random from a $\sim$ uniform(0,1) distribution. By varying λ in this way, we can determine what the consequences of different degrees of negativity bias are; ranging from the special case of symmetric evaluations ($\lambda = 1$) over intermediate levels (e.g. $\lambda = 0.5$, meaning losses having twice the value of positive news), to the special case of complete discounting of gains, i.e. no change in vote propensities following gains.

What are the consequences of introducing negativity bias into the individual voter decision making process? Three predictions about aggregate level effects can be derived from the model, two of which will be tested in the following empirical chapters. The first is that an aggregate level asymmetry in response to shocks arises from individual level negativity bias. The second model prediction is the existence of what has been called a "cost of ruling", i.e. the erosion of incumbent support over time. The third concerns the relationship between asymmetric evaluations, alternation in power and the selection of high quality types. The following three sections present these results in more detail.

2.3.3 Asymmetric Response in the Aggregate

Negativity bias in individual level evaluations leads to an aggregate level asymmetry: changes in performance have an asymmetric effect on incumbent party

vote share. The easiest way to see this is by plotting the change in incumbent party vote share against the change in economic performance. Figure 2.2 shows this for one typical simulation run with 1000 elections and a moderate level of negativity bias ($\lambda = 0.5$).

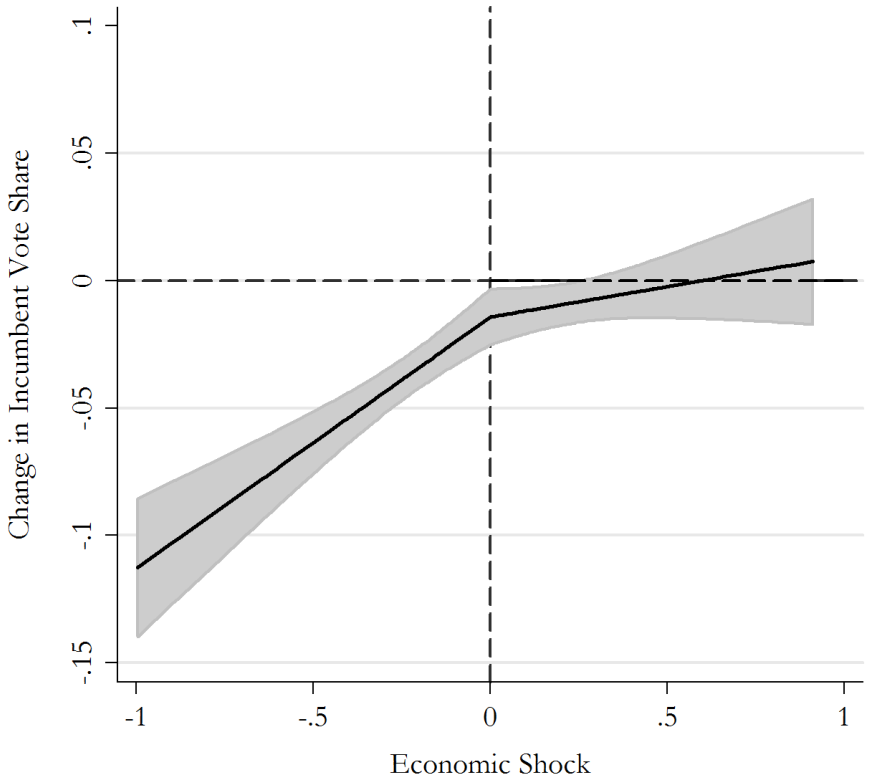

Figure 2.2: Simulated Effect of Asymmetric Evaluations $\lambda = 0.5$

The model produces the classic expected relationship between change in economic performance and incumbent vote share, but the response of the electorate is asymmetric. Negative changes are punished more severely than positive changes are rewarded. Incumbents clearly lose when conditions deterio-

rate, but may not profit from improvements. This prediction of an aggregate level asymmetry in response to changes in economic conditions leads to the main hypothesis to be tested in the subsequent empirical chapters:

Asymmetry Hypothesis: *Negative (below reference point) changes in economic conditions have a stronger effect on incumbent vote shares in elections (and governmental approval in polls) than positive (above reference point) changes.*

2.3.4 Cost of Ruling

The second prediction that can be derived from the model is the existence of what Nannestad and Paldam (2000) have called the "cost of ruling": the empirical regularity that on average, incumbent governments lose votes over time.

If voters were even-handed in their assessments of incumbent performance, one would not expect a systematic decline in incumbent vote shares. The model reflects this. In simulations with symmetric evaluations ($\lambda = 1$), the average change in incumbent party vote share is zero. However, as evaluations become more asymmetric, the incumbent party's average vote share declines up to the point of having to expect an electoral loss of almost 5% in the extreme asymmetry condition ($\lambda = 0$). Table 2.3 below lists the average cost of ruling for varying levels of asymmetric evaluations. The more biased evaluations become, the higher the cost of ruling. Figure 4.2 displays the average cost of ruling as a function of the degree of asymmetry $(1 - \lambda)$ for all simulation runs.

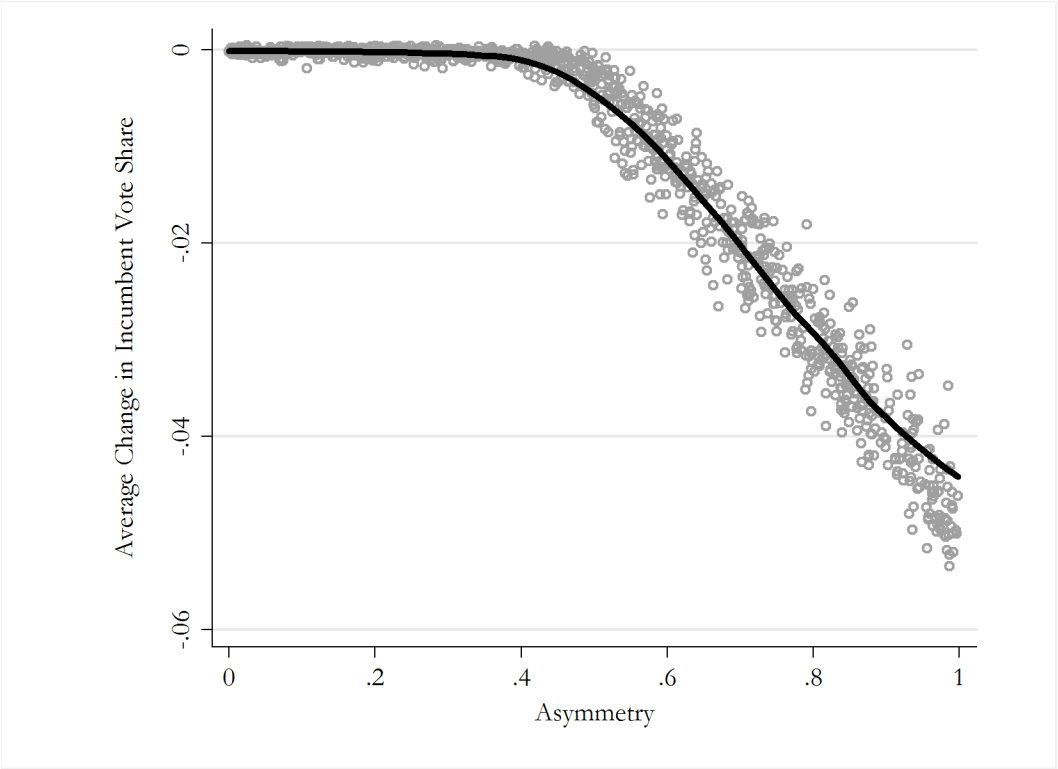

Figure 2.3: Asymmetry and the Cost of Ruling

For even-handed or only slightly biased evaluations, the cost of ruling is essentially zero, but as negativity bias increases, the cost of ruling increases dramatically. An electorate that punishes more than it rewards, will produce incumbents who can expect to lose power quickly.

2.3.5 Asymmetry, Alternation and Government Quality

The third nexus of results that can be derived from the model concerns alternation in power and average government quality. How often does the party in

office change? This question is of course directly linked to the cost of ruling discussed above, since predicting average losses for the incumbent translates into opportunities for the opposition and thus faster turnover.

If evaluations are symmetric, meaning that voters both punish and reward incumbent governments, the incumbent's ex-ante probability of re-election can reach very high levels. A high quality incumbent facing an even-handed electorate can remain in power for a long time. As a consequence, over all simulations, we see fewer alternations in government. In the special case of no negativity bias, the political process can become very static, with an incumbent being re-elected (almost) indefinitely.

As asymmetry increases - meaning voters pay more and more attention to losses - the reward aspect of the retrospective voting rule becomes less influential. While voters keep punishing governments for decreases in utility, there is no possibility to reward and retain high quality incumbents. As a consequence, as the asymmetry parameter increases, the number of alternations in power increases.

In the most extreme case of $\lambda = 0$, the political process becomes very volatile. Incumbents stand little chance to stay in power for more than a few election periods. There is no reward for good performance, and at the slightest sign of problems, the electorate will dispose of the government.

Table 2.3 shows the proportion of times in which the incumbent stayed the same, or in other words, an incumbent's ex-ante probability of re-election for a given degree of asymmetry. As asymmetry increases, the rate of alternation goes up, meaning the probability of re-election goes down.

Table 2.3: Quality and Reelection Probability for Increasing Levels of Asymmetry

Asymmetry λ	Quality $\bar{\alpha}$	Var.in Quality SD_α	Worse than chance %	Re-election Probability	Cost of Ruling
1	0.746	0.032	0.144	0.995	0.00
0.9	0.746	0.036	0.130	0.995	-0.02
0.8	0.702	0.042	0.181	0.994	-0.03
0.7	0.694	0.057	0.188	0.993	-0.04
0.6	0.672	0.103	0.150	0.985	-0.15
0.5	0.679	0.177	0.063	0.956	-0.56
0.4	0.654	0.228	0	0.885	-1.56
0.3	0.640	0.239	0	0.826	-2.44
0.2	0.625	0.250	0	0.766	-3.40
0.1	0.613	0.254	0	0.706	-4.42
0	0.605	0.257	0	0.674	-4.92

Results are based on 1000 simulation runs with 1000 elections each while varying Asymmetry $(1 - \lambda)$. Quality is the average (over all simulations) of the mean government quality $(\bar{\alpha})$. Variability is the average of the standard deviation of government quality. The % worse than chance column indicates the proportion of simulation runs in which the average government quality was below what would be expected if governments were drawn randomly. The probability of re-election is the proportion of cases in which the incumbent was re-elected. And finally, the "cost of ruling" is the average percentage loss in vote share an incumbent party incurs.

The failure to retain high quality incumbents as asymmetry increases, of course also has implications for the average government competence, or to put it differently, for the average utility voters can expect at a given level of asymmetry.

We established earlier, that the presence of the simple retrospective voting rule leads to government competence levels that are markedly higher than what one would expect due to chance. While the first selection is essentially

random, i.e. there is no screening or signaling in the model, accountability is achieved by retaining high quality types and dismissing low quality types.

The average government quality is however strongly affected by asymmetry. As mentioned before, in the symmetric case and for very low levels of negativity bias, high quality incumbents can expect to be re-elected for relatively long periods of time. Voters benefit from these long spells of high competence incumbents. The simulation results show that in the symmetric case, the average government quality is α=0.75.

As asymmetry increases however, the process becomes more volatile and voters are unable to retain even high-quality types for extended periods of time. If randomly occurring bad economic times lead to an almost mechanical dismissal of the incumbent government at the earliest occasion, then voters are doomed to frequently replace unlucky but high quality incumbents with low quality challengers.

As a consequence, as negativity bias increases, average government quality decreases. Figure 2.4 shows the distributions of average government quality over the simulation runs with symmetric evaluations, moderate asymmetry and extreme negativity bias. Average government quality levels for intermediate degrees of asymmetry can also be found in Table 2.3.

The box-plots also reveal another facet of the relationship between asymmetry and average government quality. While symmetric evaluations yield the highest government competence levels on average, they also come with the largest variance in government competence. The same successful retention mechanism that benefits voters in the case of good types, can also lead

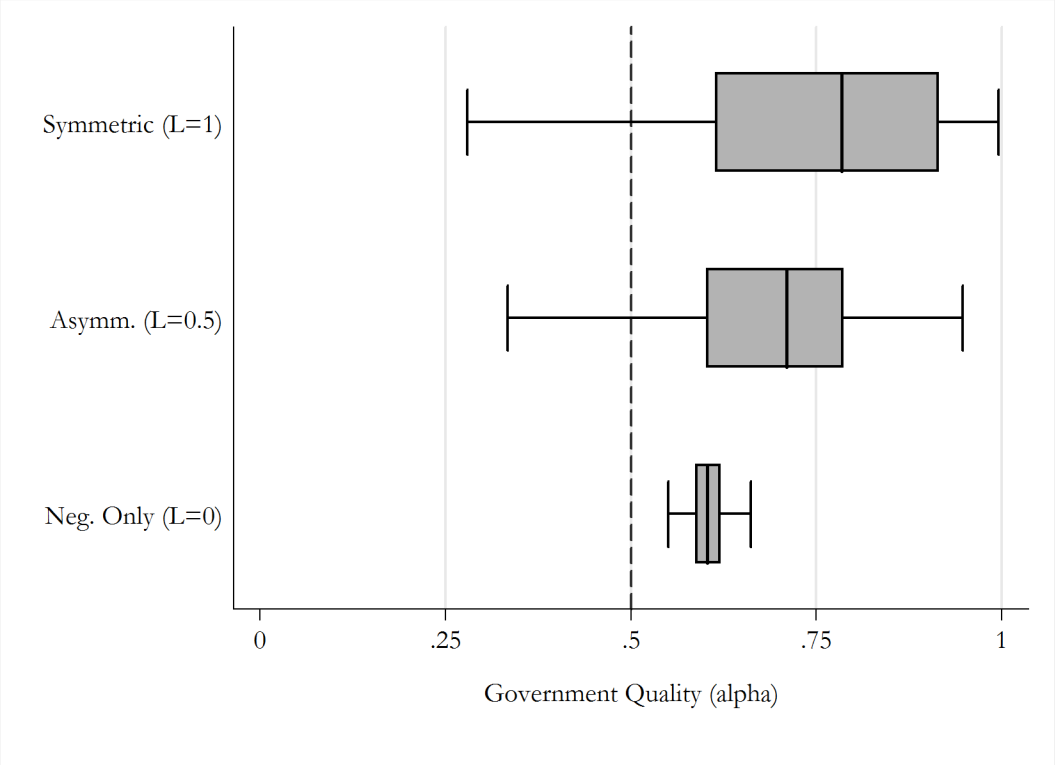

Figure 2.4: Government Quality for Different Levels of Asymmetry

to vastly inferior outcomes by failing to dispose of mediocre incumbents. In a non-negligible number of simulation runs, the adaptive retrospective voting mechanism actually performs worse than if government's were chosen randomly each round. An unlucky combination of a few positive shocks for low quality types and gradually lowered expectations by the electorate can mean 'getting stuck' with a low quality government for extended periods of time. Extreme asymmetry on the other hand yields lower average government competence levels due to the inability to retain high quality types in the long-run, but being hypercritical also makes it nearly impossible to get stuck with low quality types for more than one election period. The model here suggests that

voters might face a trade-off between higher average yield and risk. A question that may warrant further investigation. Table 2.3 shows - for different values of λ - the average and standard deviation of government quality, as well as the proportion of runs (consisting of 1000 election periods!) in which voters did worse than chance.

2.4 Discussion

This chapter proposed a model of retrospective voting that allows for asymmetric responses to positive and negative changes in utility relative to a reference point. The model, based on a variation of the principal-agent mechanism introduced by Ferejohn (1986), was implemented as an agent-based model and a large number of simulated elections were conducted to analyze the predictions of the model. Several results can be derived based on the simulations.

Firstly, the simplified retrospective voting mechanism is sufficient to induce average levels of government quality that markedly exceed a minimum benchmark. In other words, introducing an accountability mechanism - no matter how imperfect - leads to better governments.

Secondly, introducing negativity bias in individual voter evaluations leads to an aggregate level asymmetry; below-expectation performance has a stronger effect on the incumbent vote share than performance that exceeds expectations. This prediction will be tested empirically in the two following chapters.

Thirdly, the model predicts that on average, incumbents face a decline in vote share over their time in office. This theoretical prediction corresponds to

the well-known empirical regularity of a "cost of ruling", and will be tested using cross-national election data.

Finally, the degree of asymmetry affects the frequency of alternation in power. As the negativity bias in evaluations increases, the likelihood of incumbents staying in office decreases. In the most extreme case, governments alternate very frequently. On the other end of the spectrum, symmetric evaluations lead to very few alternations in power. As a consequence, there is also a direct relationship between the frequency of alternation in power and government quality. As the degree of asymmetry and therefore the frequency of alternation increases, government quality decreases. Voters are unable to retain quality incumbents. However, as the degree of asymmetry and therefore the frequency of alternation increases, the *variance* of government quality decreases. Strong negativity bias means high frequency of alternation and no retention of high quality types, but makes it also less likely to "get stuck" with a low quality incumbent. While testing this prediction exceeds the scope of this dissertation, this interesting set of results may warrant future empirical investigations into the relationship between negativity bias, alternation in power and government quality.

While the model generates some interesting predictions, it is also important to consider its limitations. The model simplifies the Ferejohn (1986) model even further and changes the focus from the moral hazard to the selection aspect of the principal agent relationship between voters and candidates. While the behavior of the model mirrors real political systems and generates useful predictions, it of course paints a radically simplified picture of the political

process. Voters care only about one issue (the economy) and have shared preferences, making this essentially a valence issue. There are no trade-offs and parties are characterized only by their type, differing in quality but devoid of any other characteristics. In future modeling efforts, it would be interesting to combine the present principal agent model with the aspects of more traditional, e.g. Downsian models of party competition and explore the interaction of quality candidate selection and retention on the one hand and divergent voter preferences in a policy space on the other hand. The model also deviates from both the rational expectations paradigm and classic rational choice assumptions about voter behavior. Expectations are formed in a simple adaptive process and voters are not forward looking and optimizing, but rather retrospective and adaptive, and they exhibit systematic deviations from the standard rational choice model in the form of loss aversion or negativity bias.

These modeling choices are conscious and a best effort to strike a balance between simplicity and realism. Future research could however further explore the parameter space of potential decision rules for all actors. The basic structure of the political process is known, and formal modelers should investigate the implications of varying decision-making mechanisms across the spectrum between a lower bound of random behavior and an upper bound of fully informed, forward-looking, optimizing agents.

Another interesting avenue for future research would be to introduce heterogeneous agents, i.e. parts of the electorate being myopic nature-of-the-times voters and others more closely resembling the normative ideal of the rational economic man.

In sum, the simple asymmetric retrospective voting model introduced here starts with more realistic assumptions about voter behavior. The limiting symmetry assumption that is common to all retrospective voting models is relaxed and voter's subjective reference points, a necessary condition for decision-making in line with prospect theory, are formed adaptively - and are therefore endogenous to the model. The simulation runs produce sequences of elections that mirror real political systems in terms of dynamics, vote shares and alternation in office. Finally, the model generates some interesting empirical implications. We will now turn to the empirical testing of those predictions in the chapters that follow.

Chapter 3

Asymmetric Effects of the Macroeconomy on Government Popularity in Great Britain and Germany

3.1 Introduction

The tsunami of the recent financial crisis and subsequent recession has swept away incumbent governments all across the globe. But not only recently have the changing tides of the macroeconomy impacted the fortunes of politicians. For more than four decades, the political consequences of economic performance have been at the heart of one of the largest and most prolific research programs at the intersection of political science and economics. Whether a country's economy grows or shrinks, whether people find jobs or get laid off, and whether prices for food, gas and housing are stable or sky-rocketing has a direct impact on everyone's life. In a democratic society however, consumers are not only objects of these macro-economic tides. After all, elected govern-

ments set the long-term rules of the economic game and often also intervene into markets on a more short-term basis, so the very consumers that either benefit from - or are hurt by - the changes in economic conditions are also voters; the "rational god of vengeance and reward", in V.O. Key's words (1964: 568). Not surprisingly, "the economy" and the "handling of the economy" by the government regularly score highest on the list of important topics in surveys of voters. Whether these "gods" are truly rational and whether they also reward - or mostly punish - are the ongoing debates this dissertation is set out to contribute to. Nevertheless, the basic idea of retrospective or economic voting has created a number of both theoretical models of this relationship (Kramer 1971, Fiorina 1981, Alesina and Rosenthal 1995, Bendor, Kumar and Siegel 2011) as well as ample empirical evidence for a connection between economic conditions and vote choice or incumbent popularity (Hibbs 1977, Lewis-Beck and Paldam 2000, Lewis-Beck and Stegmaier 2007, Duch and Stevenson 2008).

At the same time, theoretical and empirical work in psychology and economics established the existence of so-called negativity effects. In short, people react more strongly to negative information than to positive information. If the existence of negativity effects can be established in the processing of politically relevant information, this would have important implications for many fields in political science as well as for our normative view of democracy. The goal of this chapter is to combine these findings from psychology with traditional studies in the economic voting paradigm, specifically concerning the relationship between macroeconomic performance and government popularity.

Studies of government popularity have been one of the work horse models

in the economic voting literature and the United Kingdom has been featured prominently. The first systematic studies of the effect of the economy on government popularity were published by Mueller (1970) for the U.S. case and Goodhart and Bhansali (1970) for the United Kingdom. These articles were the first to create a 'popularity function' by relating approval of the government to macroeconomic variables, specifically unemployment and inflation. These first papers jump-started a literature that estimated several variants of the popularity function, usually adding political events, especially wars and crises, to the equation, but obtained similar results with respect to the importance of inflation and especially unemployment for government popularity in the U.K. (Chrystal and Alt 1981, Whiteley 1986, Clarke et al 1986, Norpoth 1987, 1991). Hibbs and Vasilatos (1981) and Hibbs (1982) provide some of the most thorough analyses of the economy-popularity relationship in Britain. All these earlier studies rely on aggregate level measures of popularity and *objective* economic indicators. The big advantage of this lies in the - at least short term - exogeneity of the variables describing the state of the economy. While governments influence the economy, the month-to-month variation in unemployment or inflation however is - without much doubt - exogenous to government popularity. Voters may start to disapprove of the government because they are dissatisfied with increasing unemployment, but it is hard to believe that monthly variation in government popularity affects the number of people out of work. This virtue of the exogeneity of objective economic indicators unfortunately seems to have been forgotten in the more recent empirical literature that relies mostly on peoples' subjective evaluations of

the economy, which have convincingly been shown to be affected by political evaluations (DeBoef and Kellstedt 2004) and tainted by respondent's partisan views (Conover, Feldman, and Knight 1986, 1987, Evans and Andersen 2005, Ladner and Wlezien 2007, Gerber and Huber 2010). This endogeneity problem is one of the reasons this dissertation relies on objective economic indicators. While the overwhelming majority of these studies found some relationship between the macroeconomic situation and the vote or popularity of the government, researchers expecting to find a universally fitting vote or popularity function were disappointed finding that the magnitude and statistical significance of the economic vote varied considerably across different national contexts as well as over time (Nannestad and Paldam 1994, Anderson 1995, Lewis-Beck and Stegmaier 2000, Anderson 2007). This apparent instability of the vote/popularity function led many researchers to turn to the question of microfoundations, and begin studying economic voting using individual level survey data. This turn towards individual level data unearthed a whole host of possible individual-level contingency conditions of the economic vote (Anderson 2007). It also meant a turn away from objective economic indicators to voters' subjective evaluations of the economy, which spurred fierce debates over whether voters are prospective or retrospective, the former being more desirable from a rational voters point of view, but the latter receiving more evidence (Fiorina 1981, Sanders 1991, MacKuen, Erikson and Stimson 1992, Clarke and Stewart 1994, Norpoth 1996), and whether they are more concerned about their personal "pocketbook" or are "sociotropic" (Kiewiet 1981, Chappell and Keech 1985, Lewis-Beck 1988, Sanders 2000, Clarke et al 2000,

Carey and Lebo 2006). By focusing on objective economic conditions and aggregate measures of popularity, the analysis presented here avoids some of these issues, although investigating the interaction between asymmetric evaluations and these different conceptions of economic voting using individual data might be an interesting avenue for future research.

Some previous studies have suggested the possibility of different effects for positive and negative changes: In the U.S. Mueller (1970) modeled an asymmetric effect of the unemployment rate on presidential approval. Bloom and Price (1975) can be credited for basically laying out the idea of differential effects due to a valence asymmetry and even referencing some early work from psychology. They show that the effect of changes in income on vote choice is contingent on whether the election takes place in times of rising or falling incomes. For the United Kingdom however, Headrick and Lanoue (1991) test for and reject the existence of asymmetric effects of unemployment and inflation on government popularity for the period 1953-1987, although they qualify their own results observing that the effect of unemployment was most pronounced during the Thatcher years, i.e. in times of rising unemployment, while the effect of inflation on popularity was strongest when inflation was on the rise, namely 1953-1979. Nannestad and Paldam (1997) use rolling cross-sections to show the existence of a grievance asymmetry in economic voting in Denmark using quarterly individual level data from 1985 through 1992. They also discuss the question of picking thresholds (which they solve *ad hoc*). Recently, Soroka (2006) sheds some light on a possible mediating mechanism, namely the role of the mass media, by showing evidence of negativity effects

for the relationships between economic factors, media coverage and subjective evaluations of the economy. Investigating in which way the media's possibly exaggerated focus on negative news affects the relationship between economic conditions and popularity would be an interesting avenue for future research. Furthermore, the results of Soroka's article actually imply one reason why most of the more recent individual level studies of economic voting (Duch and Stevenson 2008) fail to find asymmetric effects. All individual level studies rely on voters' subjective economic evaluations rather than measures of actual economic factors. These subjective evaluations are however of course already 'contaminated'. Therefore one cannot expect to find an *additional* asymmetry in the relationship between subjective evaluations of the economy and evaluations of the government. The negativity bias that affects voters' evaluation of the economic situation and the evaluation of the government is already 'priced in'.

This chapter hopes to add a recent perspective to these mixed results. The basic theoretical idea of asymmetric evaluations was laid out in the first chapter, and the second chapter presented an agent-based model of asymmetric retrospective voting. The model started with a simple version of the principal agent relationship between voters and politicians. Then negativity bias was introduced into voter decision-making. Analyzing the simulation results lead to several empirical predictions on the aggregate level. First and foremost, the individual level asymmetry in evaluations translates into an aggregate level asymmetry in the relationship between economic performance and support for the incumbent. Negative changes are punished more severely than positive

changes are rewarded. This result provides the basis for the main hypothesis to be tested empirically in this chapter:

Asymmetry Hypothesis: *Negative (below reference point) changes in economic conditions have a stronger effect on incumbent support than positive (above reference point) changes.*

This chapter will show the existence of such asymmetric evaluations in the relationship between economic indicators and the popularity of the government. Specifically, the analysis suggests that in the aggregate, bad economic news decrease approval rates more than good news.

Testing the Asymmetry-Hypothesis requires information about what constitutes positive and negative changes, or in other words, the location of the reference point. One of the contributions of this chapter is to propose a procedure for estimating an aggregate level reference point. This is possible using an econometric technique known as *Threshold Models* (Hansen 1996, 2000). Having located the reference point, we can test whether above and below reference point effects are equivalent, or whether negative (below reference point) 'news' have stronger effects on the approval rate.

This chapter applies this procedure to the relationship between macroeconomic factors and monthly data on governmental approval - as a proxy for popular support - in two advanced democracies, the United Kingdom and Germany, using time series data from the late 1970s to 2011.

The data show that there is indeed evidence of reference-point dependent

asymmetric behavior, most notably in the effect of the unemployment rate on governmental approval. As unemployment increases, the government loses support. Reductions in unemployment, however, yield little or no increases in government popularity.

The remainder of this chapter is structured as follows: the next section describes the proposed procedure for estimating reference points and testing for asymmetric effects. The third section applies this procedure, using time series data on governmental approval in the United Kingdom, the fourth section replicates the findings using time-series data on governmental approval in Germany and the last section concludes.

3.2 Testing Asymmetric Effects using Threshold Models

The goal of this chapter is to test for asymmetric effects depending on a reference point when the reference point is unknown. The first part is straightforward. Let's assume the effect of an independent variable x on some dependent variable y depends on the value of x such that the effect of x, i.e. the slope of the regression coefficient is different for values of x above and below some threshold level τ. We can model this nonlinear relationship by allowing $x \geq \tau$ and $x < \tau$ to have different slopes. Practically, we estimate

$$y = \beta_0 + \beta_1 x + \alpha_1 I x + \epsilon \tag{3.1}$$

where β_0, β_1 and α_1 are parameters to be estimated, ϵ is an error term and I is an indicator function with

$$I = \begin{cases} 0 & \text{if } x \geq \tau \\ 1 & \text{if } x < \tau \end{cases} \tag{3.2}$$

The effect of x on y if $x \geq \tau$, is β_1 and the effect of x on y if $x < \tau$, is given by $\beta_1 + \alpha_1$. In order to detect whether there exists an asymmetric effect of x, we only need to compare the slopes above and below the reference point, i.e. assuming stronger negative effects, test whether $\alpha_1 > 0$.

In terms of the theoretical idea at hand, if we think about the relationship between the approval rate and economic performance, we would assume approval to be higher if performance is better. However, in line with prospect theory, the strength of the effect should depend on whether economic performance falls into the domain of gains or the domain of losses, in other words whether the value is above or below a reference point. If performance is below the reference point (domain of losses), the effect on approval should be stronger than if it is above the reference point (domain of gains).

The problem of course is that we don't know the reference point! [1]

A solution for similar kinds of problems has been proposed in the econo-

[1] An ad-hoc solution would be to simply assume a reference point based on theoretical considerations, and fit a model with e.g. $\tau = 0$. This comes with strong assumptions however. Consider evaluations of the economy and growth as an example. Fixing τ at 0 means economic growth - no matter how meager - is seen as in the domain of gains while only actual recessions are perceived as in the domain of losses. In reality however slow growth rates tend to be evaluated as a decidedly "bad" thing.

metric literature under the term threshold models, originally starting with Tong and Lim (1980) and Hansen (1996). This dissertation applies this technique to the problem of asymmetric evaluations. Since the reference point τ is unknown, it should be estimated along with the other parameters of the model. Due to the nonlinearity however, τ cannot be estimated via ordinary least squares. Hansen (1996, 2000) suggests estimation of thresholds via conditional least squares using the following concentration procedure: first, the model is estimated separately for all possible values of τ, which yields the sum of squared errors for each model, as a function of τ. Then, by searching over all values of τ, we find the model with parameter $\hat{\tau}$ that minimizes the sum of squared errors. The OLS estimates of this model with threshold parameter $\hat{\tau}$ are consistent estimates of our parameters of interest (Hansen 1996). The problem with this however is to know whether a reference-point (or threshold) model is appropriate in the first place, since under the null hypothesis of no threshold effect, the parameter $\hat{\tau}$ is not identified. The solution for this is a likelihood ratio test using p-values based on a bootstrap to simulate the asymptotic sampling distribution of the test statistic (cf. Hansen 1996, 2000). This paper follows Hansen's approach:

Proposed procedure for testing the Asymmetry Hypothesis:

1. *Test for presence of reference point using Hansen's threshold models.*
2. *Estimate reference point and different slopes for values above and below the reference point.*
3. *Test whether slopes are different above and below the reference point*

In a first step, this testing procedure will be applied to the relationship between macroeconomic factors and governmental approval using time series data from the United Kingdom.

3.3 Analysis using British Data

3.3.1 Data and Operationalization

The dependent variable of interest, Governmental Approval, stems from Ipsos-MORI's monthly 'Political Monitor' and is defined as the percentage of survey respondents answering "satisfied" when asked *"Are you satisfied or dissatisfied with the way the Government is running the country?"*. The survey has been conducted in this form from August 1979 through September 2011. The data were downloaded from the polling firm's website [2].

While the focus is on objective economic factors and support for the government, the popularity of the Prime Minister has been found to be tightly correlated with government satisfaction and cannot be ignored in specifying a model of the public's evaluations of the government (cf. Clarke and Stewart 1995). Prime ministerial approval data stem from the same source as the Governmental approval data: Ipsos-MORI's monthly 'Political Monitor', and is defined as the percentage of survey respondents answering "satisfied" when asked *" Are you satisfied or dissatisfied with the way [Prime Minister's Name] is doing his job as Prime Minister?"*.

Monthly macroeconomic data and consumer confidence measures were ob-

[2] www.ipsos-mori.com

tained from the OECD's database of monthly economic indicators [3]. Consumer Confidence is the monthly, OECD-wide standardized consumer confidence indicator, and identical to Eurostat's harmonized consumer confidence indicator, which, for the United Kingdom, is based on a nationally representative telephone survey conducted by GfK.

The independent variables of interest are macroeconomic fundamentals: the standardized unemployment rate, inflation and the long-term interest-rate, as well as the monthly performance of the stock market.

3.3.2 Dynamic Considerations

Several recent studies suggest that approval rates and other factors of interest are neither stationary $I(0)$ nor integrated of order $I(1)$, but rather fractionally integrated of order $I(d)$ (Box-Steffensmeier and Smith 1996, Lebo and Clarke 2000, Lebo, Walker and Clarke 2000, Clarke et al. 2004). This makes intuitive sense, since fractionally integrated series can arise from aggregating series with different memory processes. Stationarity tests indeed suggest that the series at hand are fractionally integrated. We use Robinson's (1995) semi-parametric method to estimate the fractional differencing parameter $\hat{d}$ for each series and difference the series accordingly using ARFIMA models in order to remove autocorrelation.[4] The estimates of the order of integration for each series can be found in Table 3.1.

[3] stats.oecd.org

[4] While accounting for the fractionally integrated nature of the series using ARFIMA models is the preferred method, ignoring these dynamics and estimating the models simply using differenced (d=1)data yields very similar results and leaves the conclusions in terms of reference point dependent asymmetry tests unchanged.

Table 3.1: Tests for Order of Fractional Integration

Variable	$\hat{d}$	SE_d	t(d=0)	t(d=1)	Decision
Government Approval	0.88	(0.046)	19.037***	-2.596***	$\hat{d}$
PM Approval	0.85	(0.046)	18.388***	-3.245***	$\hat{d}$
Consumer Confidence	0.95	(0.046)	19.470***	-1.082	$\hat{d}$, 1
Unemployment	1.43	(0.046)	21.325***	9.262***	$\hat{d}$, 1
Inflation	1.18	(0.046)	21.325***	3.877***	$\hat{d}$, 1
Long Term Interest Rate	1.04	(0.046)	21.416***	0.865	$\hat{d}$, 1
Stock Market	-0.05	(0.047)	-1.07	20.375***	0

Previous research suggests a tight relationship between the public's evaluations of the government as a whole and the Prime Minister (Lebo and Clarke 2003). Figure 3.1 shows the evolution of governmental and prime ministerial approval over the investigation period.

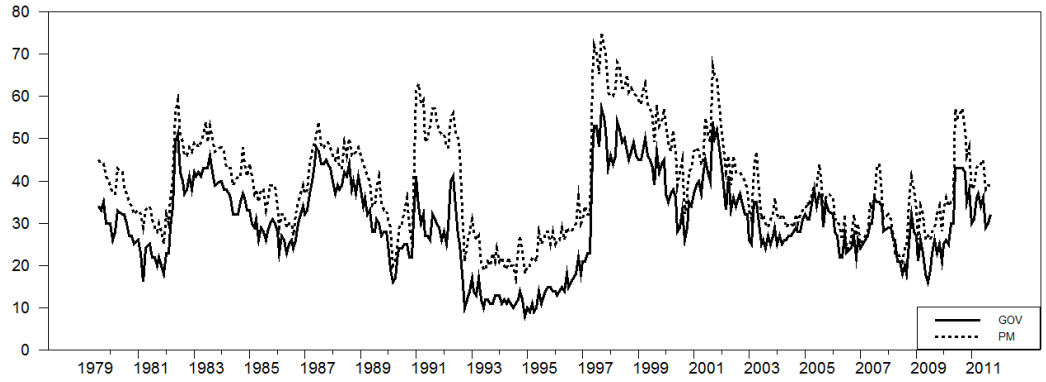

Figure 3.1: Government and PM Approval 1979-2011

The close correlation between the two approval series (and the consumer confidence indicator) suggests that these variables could be cointegrated. While the focus of this paper is on the determinants of governmental approval, it is

important to model the dynamic relationship between the variables correctly. To this end, we test for a (fractional) cointegrating relationship between governmental approval, PM approval and consumer confidence, estimating the following cointegrating relationship (coefficients below, standard errors in parentheses):

$$\begin{array}{lccccc} \text{Gov't Approval}_t = & \beta_0 & + \beta_1 \text{PM Approval}_t & + \beta_2 \text{Cons.Confid.}_t & + \epsilon_t \\ & 3.646 & 0.732 & 0.216 & \\ & (0.895) & (0.019) & (0.027) & R^2 = 0.85 \end{array}$$

We find that the order of integration of the residuals is lower than for the original series ($\hat{d}_{residuals} = 0.66, SE(\hat{d}) = 0.05$). Governmental approval, PM approval and consumer confidence appear (fractionally) co-integrated. In order to take this dynamic relationship into account, we add the lagged residuals as the appropriate fractional error correction mechanism (FECM) into the models of government approval estimated below.[5]

3.3.3 Threshold Models

Having taken into account the dynamic properties of the series of interest in terms of order of integration, and after modeling the cointegrating relationship between governmental and prime ministerial approval and consumer confidence, we estimate the baseline model of government approval as a function of prime ministerial approval, consumer confidence, unemployment, inflation, the long-term interest rate and stock market performance. Optimal

[5]While modeling the cointegrating relationship of these series by including an error correction mechanism in the models below is the preferred method, ignoring this relationship and estimating the models without an ECM yields very similar results and leaves the conclusions in terms of reference point dependent asymmetry tests unchanged.

lag length for the explanatory variables was chosen using the AIC and inspection of the the cross-correlation functions. The Durbin-Watson statistic and visual inspection of the residuals show that there is no residual autocorrelation. Estimation results are presented in Table 3.3, Column 1. The results show the expected short term effects of prime ministerial approval and consumer confidence, with a reasonably strong error correction mechanism. The only objective economic variable that appears to have a strong and significant effect on government approval is the unemployment rate. Increases in unemployment significantly decrease government approval. Finally, it should be noted that this model - based mostly on PM approval, consumer confidence and unemployment - explains a large share of the variance in the approval rate for the United Kingdom.

Having established a (symmetric) baseline model, we can now test for asymmetric effects using threshold models as described above.

What results should we expect? If respondents exhibit reference-point dependent asymmetric behavior in line with prospect theory and our Asymmetry Hypothesis, we would expect to see threshold effects in the evaluation of economic indicators. Since the only important objective factor in explaining popularity seems to be the unemployment rate, we expect asymmetric behavior to be most visible in the effect of unemployment on approval. Both prime ministerial approval and Consumer Confidence are evaluations itself. If the behavior hypothesized above operates on the level of perception or evaluation of reality, we would actually not expect any 'additional' asymmetries in the relationship between these different evaluations. In other words, the nega-

Table 3.2: Threshold Tests: British Data

Variable	Threshold	$\hat{\tau}$	F_{max}	p-value
PM Approval	No	3.1897	2.329	0.199
Consumer Confidence	Yes	0.1611***	3.647	0.003
Unemployment	Yes	-0.0043**	3.064	0.029
Inflation	No	-0.2968	2.141	0.295
Long Term Interest	No	-0.0367*	2.691	0.085
Stock Market	No	1.1946	2.046	0.326

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

tivity bias is already 'priced in'. Finally, since the models are estimated in (fractional) differences, i.e.they are statements about the effect of changes, an estimated reference point close to zero would make sense conceptually. While in other models any deviation from some optimal level (e.g. inflation target and growth) would be a good guess for the reference point, here the framing of increases in unemployment as a loss and decreases as a gain would seem natural. Table 3.2 provides estimates of the threshold parameter $\hat{\tau}$, as well as the results of likelihood ratio tests for each explanatory variable.

There is strong evidence for threshold effects, i.e. reference-point dependent evaluations for both the unemployment rate and consumer confidence. The reference-point for the unemployment rate is - as expected - virtually equal to zero, and the potential reference point for consumer confidence is relatively close to zero as well, meaning that objectively positive changes are evaluated as gains and negative changes as losses. In order to test the Asymmetry Hypothesis, however, we also have to look at the difference in the slopes for values above and below the reference point. Since the results for the long-term

interest rate are somewhat ambiguous, we will investigate potential asymmetric effects for this series as well. To summarize, while these results tell us that there is evidence of a break, i.e. potentially reference point dependent behavior in the unemployment and consumer confidence series, we now have to test whether the different effects above and below the reference point are consistent with the asymmetry hypothesis or not. To this end, Table 3.3 presents the results of the estimated threshold models for unemployment, consumer confidence and the interest rate each separately as well as combined in one model. For clarity of presentation, the coefficients and standard errors for values above and below the reference point are displayed.

The main results are the asymmetric evaluations in the relationship between unemployment and approval. The threshold tests indicated a reference-point near zero. The estimation results show that the slope coefficients are consistent with the Asymmetry Hypothesis. In the symmetric model, the parameter estimate for the effect of unemployment is -3.843. When the coefficient is allowed to vary above and below the estimated threshold, a different picture emerges. Increases in unemployment (losses) show a much larger effect than reductions in unemployment (gains). The coefficient for increases above the reference point (- 6.415) is almost twice the size of the coefficient in the symmetric baseline model, while the effect of reductions in unemployment on approval is small and not statistically significant. Figure 3.2 shows the effect of unemployment on governmental approval.

When bad news of rising unemployment break, governmental approval goes down significantly. The government is being held responsible for negative

Table 3.3: Estimation Results: Baseline and Threshold Models

	Symmetric	Unemp	CC	LTI	U, CC, LTI
Δ^d PM Approval$_t$	0.675***	0.673***	0.675***	0.674***	0.672***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Δ^d Cons. Conf.$_t$	0.100***	0.096***		0.099***	
	(0.035)	(0.035)		(0.035)	
Δ^d CCI$_t \leq \hat{\tau}$			0.105*		0.083
			(0.060)		(0.061)
Δ^d CCI$_t > \hat{\tau}$			0.094		0.107
			(0.065)		(0.065)
Δ^d Unemployment$_{t-2}$	-3.843***		-3.843***	-3.828***	
	(1.000)		(1.001)	(1.000)	
Δ^d U$_{t-2} > \hat{\tau}$		-6.415***			-6.387***
		(1.745)			(1.752)
Δ^d U$_{t-2} \leq \hat{\tau}$		-0.937			-0.940
		(1.896)			(1.904)
Δ^d Inflation$_t$	-0.356	-0.314	-0.358	-0.387*	-0.337
	(0.228)	(0.228)	(0.229)	(0.230)	(0.231)
Δ^d Interest Rate$_t$	-0.102	-0.098	-0.099		
	(0.329)	(0.328)	(0.331)		
Δ^d LTI$_t \leq \hat{\tau}$				0.397	0.329
				(0.563)	(0.565)
Δ^d LTI$_t > \hat{\tau}$				-0.639	-0.568
				(0.592)	(0.596)
Stock Market$_t$	0.014	0.015	0.014	0.012	0.013
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
$\Delta^d ECM_{t-1}$	-0.203***	-0.203***	-0.203***	-0.200***	-0.200***
	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
Constant	0.011	0.220	0.023	0.129	0.295
	(0.100)	(0.150)	(0.154)	(0.147)	(0.207)
R^2	0.74	0.74	0.74	0.74	0.74
Durbin-Watson	2.01	2.03	2.02	2.02	2.03
N	376	377	376	376	377

Notes: Dependent Variable:Δ^d Government Satisfaction, monthly from 1979:11 to 2011:02. Standard Errors in Parentheses, Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

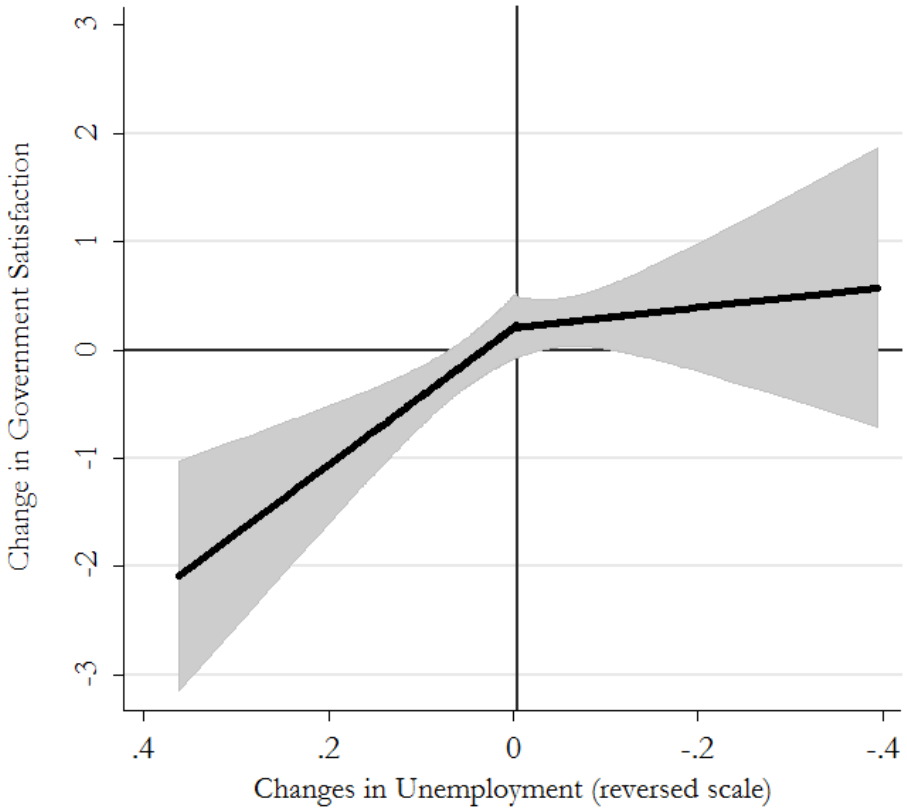

Figure 3.2: Effect of Unemployment on Government Satisfaction

changes. Positive changes on the other hand, do not lead to a comparably large (or any) increase in approval. The government can expect to be punished for bad economic outcomes without being rewarded even-handedly for good times.

The results for consumer confidence are less interesting. Hansen's threshold estimator indicates the presence of a break in the effect of consumer confidence on approval. However, inspecting the coefficients above and below the threshold shows that the difference, while in line with the Asymmetry Hypothesis, is

only small and not statistically significant. The effect of consumer sentiment is only slightly stronger for negative changes than for positive changes.

Finally, the signs of the differential effects of the Long Term Interest Rate are in line with expectations, but do not reach statistical significance.

We can conclude that - at least for the direct effect of unemployment on approval in the aggregate - the effect of changes depends on whether they are above or below a reference point. Furthermore, in line with our theoretical expectations, "bad news" affect the approval rate significantly more strongly than "good news".

3.3.4 Robustness Checks

This section provides a series of robustness checks for the results presented above. For the sake of simplicity, the models presented above do not include interventions for well known shocks to the series, such as the effect of the Falklands War or September 11, 2001. While this approach increases transparency and replicability across different national contexts, it may invite criticism of model misspecification, since these shocks - clearly not caused by macroeconomic conditions and therefore not part of the estimated data-generating process - are not properly removed from the series and might distort the estimated effects. In order to alleviate those concerns, an intervention analysis taking into account election months, changes in party leadership, the effects of the Falklands War, the Poll Tax riots, Black Wednesday, September 11 and the Iraq War was conducted, removing these shocks from the series. The residuals of this cleansed approval series were then used to estimate the baseline and

threshold models, and the results are almost identical to the analysis presented above. Table3.4 provides the estimation results.

The results are very similar, with the exception of the effect of prime ministerial approval. This is not particularly surprising, since the events included as interventions massively affected both PM and government satisfaction, so that some of the variation explained by e.g. the events of September 11, 2001 was (falsely?) attributed to the popularity of the Prime Minister.

The asymmetric effects of unemployment however, remain virtually identical across model specifications.

Section 3.3.2 above discussed the dynamic properties of the series under investigation and the motivation for using fractional integration methods. Nevertheless, a criticism sometimes levied at ARFIMA methods concerns the complexity of the method or interpretability of the results. In order to preempt such criticism, an additional set of robustness checks is presented in order to show that the results do not depend on this modeling choice. There is strong indication that most of the series are integrated of order I(d), meaning they are neither simply stationary nor a random walk, but they rather exhibit long memory. Nevertheless, one alternative method is to simply difference the series, i.e. treat them as I(1). Table 3.5 shows that the results regarding asymmetric effects of unemployment do not depend on this modeling choice. Model 1 reproduces the main model from Table 3.3, an ARFIMA model showing the asymmetric effect of unemployment. Model 2 treats government satisfaction as integrated of order I(1) and uses the differenced series. Model 3 treats all

Table 3.4: Robustness Checks: Interventions

Dependent Variable: Δ^dGovernment Satisfaction, monthly 1979-2011

	Symmetric	CC	Unemp	LTI	U, CC, LTI
Δ^d PM Approval$_t$	0.389***	0.391***	0.387***	0.388***	0.389***
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
Δ^d Cons. Conf.$_t$	0.102**		0.098**	0.102**	
	(0.043)		(0.043)	(0.043)	
Δ^d CCI$_t \leq \hat{\tau}$		0.167***			0.153***
		(0.058)			(0.059)
Δ^d CCI$_t > \hat{\tau}$		0.002			0.012
		(0.074)			(0.075)
Δ^d Unemployment$_{t-2}$	-3.816***	-3.782***		-3.811***	
	(1.247)	(1.244)		(1.247)	
Δ^d U$_{t-2} > \hat{\tau}$			-6.480***		-6.197***
			(2.163)		(2.168)
Δ^d U$_{t-2} \leq \hat{\tau}$			-0.803		-1.053
			(2.352)		(2.355)
Δ^d Interest Rate$_t$	-0.300	-0.233	-0.298		
	(0.410)	(0.411)	(0.409)		
Δ^d LTI$_t \leq \hat{\tau}$				0.197	0.098
				(0.651)	(0.652)
Δ^d LTI$_t > \hat{\tau}$				-0.752	-0.538
				(0.617)	(0.621)
Δ^d Inflation$_t$	0.179	0.139	0.222	0.137	0.158
	(0.285)	(0.285)	(0.285)	(0.288)	(0.288)
Stock Market$_t$	0.010	0.007	0.011	0.009	0.008
	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
$\Delta^d ECM_{t-1}$	-0.179***	-0.181***	-0.179***	-0.175***	-0.178***
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)
Constant	0.012	0.131	0.227	0.093	0.365*
	(0.124)	(0.143)	(0.185)	(0.149)	(0.207)
Interventions	Yes	Yes	Yes	Yes	Yes
R-squared	0.395	0.398	0.396	0.395	0.397
N	376	376	377	376	377

Notes: Dependent Variable:Δ^dGovernment Satisfaction, monthly from 1979:11 to 2011:02. Standard Errors in Parentheses, Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.5: Robustness Checks: Treating Fractionally Integrated Series as I(1)

	(1)	(2)	(3)	(4)
PM Approval	0.673***	0.658***	0.664***	0.666***
	-0.022	-0.023	-0.022	-0.023
Cons. Confidence	0.096***	0.096**	0.085**	0.077**
	-0.035	-0.038	-0.036	-0.037
Unemployment $\leq \hat{\tau}$	-6.415***	-5.967***	-3.546***	-2.833**
	-1.745	-1.886	-1.26	-1.291
Unemployment $> \hat{\tau}$	-0.937	-1.129	-1.604	-1.527
	-1.896	-2.049	-1.74	-1.784
Inflation	-0.314	-0.269	-0.445*	-0.35
	-0.228	-0.247	-0.233	-0.239
Interest Rate	-0.098	-0.023	-0.167	-0.033
	-0.328	-0.354	-0.34	-0.349
Stock Market	0.015	0.012	0.017	0.015
	-0.022	-0.023	-0.023	-0.023
Constant	0.22	0.211	0.068	0.053
	-0.15	-0.162	-0.148	-0.151
ECM	-0.203***	-0.269***		
	-0.051	-0.055		
Durbin-Watson	2.03	1.99	2.28	2.49
R-squared	0.74	0.7	0.72	0.71
N	377	377	376	376

Notes: Dependent Variable:Government Satisfaction, monthly from 1979:11 to 2011:02. Standard Errors in Parentheses, Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

independent variables as integrated of order I(1). While the coefficients change because of the scale of the dependent variable, the results with respect to the existence of asymmetric effects unemployment remain practically identical.

Furthermore, in section 3.3.2 we identified a (fractional) co-integrating relationship between prime ministerial and government satisfaction, warranting

the introduction of an error correction mechanism. While this is the preferred modeling strategy given theoretical ideas about the data generating process and given the tests performed above, it can be shown that the main results regarding asymmetric effects of unemployment are not contingent on this modeling choice. Model (4) in Table 3.5 displays the result for all variables in differences also excluding the error correction mechanism. The results remain unchanged.

In sum, there is robust evidence for an asymmetric relationship between the unemployment rate and governmental approval. Increasing unemployment leads to an erosion of support for the incumbent, reductions in unemployment however do not translate into comparable gains. As the robustness checks presented here have shown, this finding does not depend on specific modeling choices. The evidence for an asymmetric effect is robust to a variety of alternative model specifications.

The next section - in a way - presents another type of robustness check. Do the results hold in a completely different political system, using an entirely different dataset?

3.4 Replication using German Data

This section replicates the findings from the previous sections and tests the Asymmetry Hypothesis using monthly data on governmental approval in Germany from 1977 to 2010.

3.4.1 Data and Operationalization

The approval data stem from the monthly "Politbarometer" survey conducted by Forschungsgruppe Wahlen in Mannheim. The time series used here spans the period from January 1977 through December 2010. The dependent variable is the percentage of respondents who say they approve of (literally: "are content with") the performance of the government. The data are available through the online repository of GESIS, the Leibniz-Institute for the Social Sciences[6]. Figure3.3 shows the development of public satisfaction with the performance of the government in Germany over time.

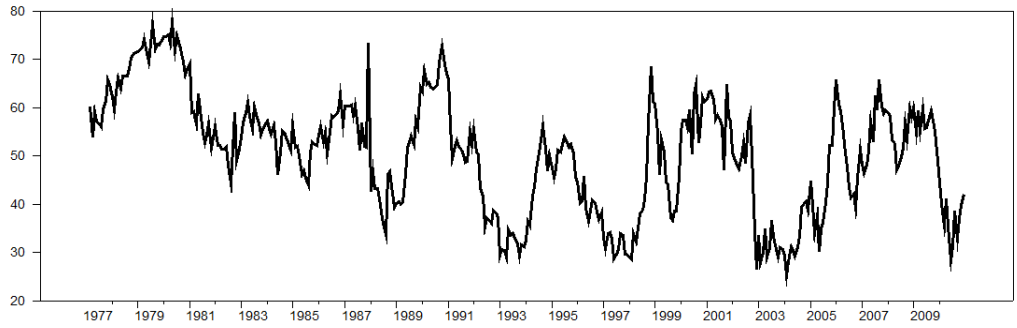

Figure 3.3: Government Satisfaction in Germany 1977-2010

The independent variables of interest are consumer confidence and macroeconomic fundamentals: the standardized unemployment rate, inflation, the index of industrial production and the long-term interest-rate, as well as the monthly performance of the major German stock market index, DAX. Consumer Confidence is the OECD-wide standardized consumer confidence indicator, and identical to Eurostat's harmonized consumer confidence indicator.

[6] www.gesis.org/en/elections-home/politbarometer/

Monthly macroeconomic data and consumer confidence measures were obtained from the OECD's database of monthly economic indicators[7].

3.4.2 Dynamic Considerations

As in the analysis of the British data, we first have to take the dynamic properties of the time series into account. Similar to section3.3.2, stationarity tests suggest that the series at hand are fractionally integrated. As with the British data, Robinson's (1995) semi-parametric method was used to estimate the fractional differencing parameter $\hat{d}$ for each series and to difference the series accordingly in order to remove autocorrelation. The estimates of the order of integration for each series can be found in Table 3.6.

Table 3.6: Tests for Order of Fractional Integration

Variable	$\hat{d}$	SE_d	t(d=0)	t(d=1)	Decision
Government Approval	0.81	(0.045)	17.89***	-1.98**	$\hat{d}$
Consumer Confidence	1.12	(0.045)	21.87***	2.65***	$\hat{d}$, 1
Unemployment	1.59	(0.045)	21.87***	13.03***	$\hat{d}$, 1
Inflation	1.03	(0.045)	21.60***	0.65	1
Interest Rate	1.08	(0.045)	21.87***	1.77*	$\hat{d}$, 1
Stock Market	0.23	(0.045)	3.31***	-17.01***	$\hat{d}$, 0
Industrial Production	1.09	(0.045)	21.87***	1.99**	$\hat{d}$, 0

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Unlike in the British case, while there are measures of the popularity of the German Chancellor available for some of the time periods, these have not been included continuously in the Politbarometer studies. Furthermore,

[7] stats.oecd.org

tests for cointegrating relationships between the variables did not indicate that government satisfaction and e.g. consumer confidence form a long term equilibrium relationship. Consequently, no error correction mechanism was included in the estimations that follow.

3.4.3 Threshold Models

The first step after dealing with the dynamic properties of the series, is to establish a baseline model. This symmetric model of government popularity as a function of consumer confidence, unemployment, inflation, the long-term interest rate, the index of industrial production, and the performance of the German stock market index DAX can be found in Table3.8, Column 1. The optimal lag length for the explanatory variables was chosen using the AIC and inspection of the the cross-correlation functions.

The results show the expected strong effect for consumer confidence. However, while all macroeconomic indicators show the expected sign, none of them reaches statistical significance. This is somewhat surprising, especially after the strong results from the British study. Is the popularity of the German government not affected by increases or reductions in unemployment? The previous analyses have argued that the "true" relationship between economic performance and government popularity should be asymmetric, so we might suspect that the lack of significant effects might be due to the fact that the symmetric baseline model fails to take this into account.

Therefore the next step in testing the Asymmetry Hypothesis is to test for the existence of threshold effects using Hansen's (1996) method. Table3.7 pro-

Table 3.7: Threshold Tests: German Data

Variable	Threshold	$\hat{\tau}$	F_{max}	p-value
Consumer Confidence	No	-2.389	3.854	0.235
Unemployment	Yes	0.0753*	5.488	0.065
Inflation	No	-0.156	3.485	0.315
Long Term Interest	No	0.114	1.651	0.832
Stock Market	No	0.0326	2.449	0.553
Industrial Production	No	-0.438	4.306	0.162

* $p < 0.1$ * $p < 0.05$ *** $p < 0.01$

vides estimates of the threshold parameter $\hat{\tau}$, as well as the results of likelihood ratio tests for each explanatory variable.

Applying Hansen's test for threshold effects in the relationship between economic indicators and governmental approval in Germany yields results that are somewhat similar to the results for Great Britain discussed above. An indication of a threshold effect, i.e. a breakpoint in the relationship, can only be found for the unemployment rate. The threshold tests suggest that changes exceeding 0.0753 have a different effect on governmental approval than changes below this point.

The next step is to estimate the different slopes above and below the threshold and investigate whether they are actually substantively different, and whether the results support the Asymmetry-Hypothesis. Following the Asymmetry Hypothesis, we would expect the effect of unemployment on approval to be both negative and - more importantly - stronger for losses, i.e. for above reference point increases in the unemployment rate. In other words, bad news from the labor market should have a stronger effect than good news.

The second column in Table3.8 presents estimation results where the slope of the unemployment coefficient was allowed to vary depending on whether changes fall above or below the estimated threshold level. While the effect of the unemployment rate in the symmetric model (1) was not statistically significant, taking potentially asymmetric behavior into account yields estimation results in line with the theoretical expectations. The effect of above reference point changes (losses) is strongly negative and significant, while the effect of below reference point changes (gains) remains not significant and actually reverses its sign. The standard procedure of forcing a linear, symmetric relationship hides the clear effect of the unemployment rate.

Previous tests had produced somewhat ambiguous results with respect to the effect of inflation in Germany. While Hansen's bootstrap test does not reject the null hypothesis of symmetric effects for inflation, once asymmetric effects using the estimated reference point are included into the model, there is some tentative evidence that above reference point increases in the inflation rate do in fact have the hypothesized negative effect on citizens' satisfaction with the government. Below reference point changes however remain small and not significant.

The replication of the British results using approval data from Germany provides some additional support for the hypothesized asymmetric relationship between economic performance, most notably unemployment, and government popularity.

Above reference point increases in unemployment lead to popularity losses for the incumbent, while below reference point reductions in unemployment

Table 3.8: Estimation Results: Baseline and Threshold Models

	Symmetric	Unemp.	Infl.	U, I
	(1)	(2)	(3)	(4)
Δ^d Cons. Conf.$_t$	0.413***	0.415***	0.413***	0.414***
	(0.093)	(0.093)	(0.092)	(0.091)
Δ^d Unemployment$_{t-1}$	-0.737		-0.946	
	(3.032)		(2.977)	
Δ^d U$_{t-1} > \hat{\tau}$		-9.290*		-9.752**
		(5.056)		(4.905)
Δ^d U$_{t-1} \leq \hat{\tau}$		4.885		4.912
		(4.207)		(4.158)
Δ^d Inflation$_t$	-0.581	-0.573		
	(0.671)	(0.669)		
Δ^d Inflation$_t > \hat{\tau}$			-1.972**	-1.929**
			(0.966)	(0.961)
Δ^d Inflation$_t \leq \hat{\tau}$			0.595	0.522
			(0.866)	(0.862)
Δ^d Interest Rate$_t$	-0.445	-0.257	-0.344	-0.134
	(1.085)	(1.085)	(1.071)	(1.071)
Δ^d Industrial Production$_t$	0.132	0.113	0.116	0.100
	(0.153)	(0.153)	(0.150)	(0.149)
Δ^d Stock Market$_t$	5.746	6.446	5.746	6.416
	(5.010)	(5.001)	(4.945)	(4.932)
Constant	-0.111	0.129	0.152	0.383
	(0.218)	(0.248)	(0.250)	(0.271)
R-squared	0.052	0.060	0.058	0.067
N	395	395	404	404

Notes: Dependent Variable:Δ^d Government Satisfaction in Germany, monthly from 1978:01 to 2010:12. Standard Errors in Parentheses, Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

do not translate into comparable gains.

3.5 Discussion

Prospect theory suggests that people evaluate changes in an asymmetric fashion. Depending on a reference point, the value of positive changes (gains) and negative changes (losses) differs, with negative changes affecting evaluations and decision-making more strongly. The asymmetric retrospective voting model presented in Chapter 2 included negativity bias in voter evaluations and predicted an aggregate level asymmetry in the relationship between economic shocks and incumbent support.

The goal of this chapter was to test this Asymmetry-Hypothesis empirically. The problem with detecting these asymmetric effects however is that the reference point used to evaluate economic shocks as "positive" or "negative" is generally unknown. This chapter proposed a procedure to estimate aggregate reference points using threshold models (Hansen 1996). Having located the reference point, one can test whether above- and below-reference point effects are indeed different and whether negative (below reference point) changes have stronger effects - as predicted by the Asymmetry-Hypothesis.

The present study then successfully applied this procedure to the relationship between macroeconomic indicators and governmental approval in the United Kingdom and Germany using monthly time series from the late seventies to today. The analysis provides strong evidence for asymmetric effects with respect to changes in unemployment. If unemployment rises, the gov-

ernment will be held accountable in the sense of a decrease in public support. If things turn to the better however, public support will not increase in the same fashion. In the long run, this asymmetry in public evaluations leads to an erosion of support for incumbent governments.

Chapter 4

Cross-National Evidence of Asymmetric Retrospective Voting using Election Results

4.1 Introduction

The purpose of this chapter is to explore the macro level consequences of a well-known feature of human behavior in the realm of economic voting. A large body of literature in psychology has established the presence of a negativity bias, or - in prospect theory terms - loss aversion, in human decision-making. In short, people respond more strongly to negative information - or losses - than to positive information - or gains. The theoretical model presented above incorporates this negativity bias into a simple retrospective voting model and - based on simulation results - predicts two empirically testable implications on the aggregate level: (i) a 'cost of ruling', i.e. an average loss in vote share for the incumbent party, and (ii) an asymmetric response in incumbent support to changes in economic conditions, i.e. negative changes have a stronger effect

on popularity than positive changes.

The previous chapter, using monthly survey data from the UK and Germany since the late 1970s, has shown that this asymmetry in peoples' response to positive and negative information conditions the effect of the economic situation, especially unemployment, on the popularity of the government. Survey respondents state they are less satisfied with the government when objective economic conditions deteriorate, more so than the corresponding increase in satisfaction when conditions improve. The next logical step then, is to verify that this finding based on public opinion data also has consequences for actual political behavior. In other words, do voters punish incumbent governments on the election day, in line with the mechanism put forward in this dissertation.

The second rationale for this chapter is to build a wider basis of evidence. The previous chapter demonstrated the existence of the hypothesized effects using monthly time series data for two advanced democracies. Do the results extend beyond these cases? Does the same asymmetry characterize electoral behavior in countries as diverse as Austria and Bangladesh?

To this end, I analyze a large number of elections stemming from over sixty democratic countries around the world, and find evidence for both: a 'cost of ruling', and the asymmetry hypothesis.

The remainder of this chapter is organized as follows: The next section briefly outlines the theoretical background, reviews the relevant literature and derives the hypotheses based on the predictions of the theoretical model presented above. The third section describes the data and methods used to test these predictions empirically using a cross-national dataset of election results.

Section 4 presents the results of the data analysis, providing support for a cost of ruling and the asymmetry hypothesis, and Section 5 concludes.

4.2 Theory and Hypotheses

Prospect theory tells us that humans pay more attention to losses than to comparable gains (Kahneman and Tversky 1979). The asymmetric retrospective voting model outlined above incorporates this basic feature of human behavior, and - not surprisingly - predicts an aggregate level asymmetry, as well as an average decline in incumbent vote shares. Incumbent governments on average lose votes during their tenure in office. This decline in voter support for the incumbent government is a theoretical prediction that can be derived from the asymmetric retrospective voting model presented in Chapter 2, but it is also an already well-established empirical regularity. This average decline in the incumbent government's vote share (or "cost of ruling"), and also it's possible root in voters' negativity bias or loss aversion, has not gone unnoticed. Nannestad and Paldam (2000) who can be credited for coining the term, provide the most in-depth discussion of this empirical regularity. Based on election results from nineteen countries, they estimate the average "cost of ruling" to be about 2.5%. This means that on average, an incumbent government can expect to lose 2.5% of its vote share over a term in office.

In the United States, a similar phenomenon, the fact that the President's party regularly suffers a 'midterm loss', has been observed for decades (cf Erikson 1988), and several theories - more or less specific to the American

institutions and electorate - have been put forward, starting with Campbell's (1960) idea of a cycle of surge and decline. Tufte (1975, 1978) and Kernell (1977) added the notion of midterm elections as a referendum on presidential performance - which is compatible with the asymmetric retrospective voting model. An alternative explanation is offered by Paldam and Skott (1995) and Stevenson (2002) who develop a 'median gap' model based on a spatial model of two party competition. If parties deviate from the median voter position, due to 'visibility' concerns or other reasons, centrist voters with ideal points between the two parties may choose to alternate their vote between the 'too left' and 'too right' choice. This essentially boils down to a form of dynamic split-ticket voting. Nannestad and Paldam (2000) convincingly show that the empirical regularity is not at all limited to the U.S. case and discuss the theoretical merits of models proposed to explain it.

Arbitrating between these different, partly overlapping explanations for the 'cost of ruling' is unfortunately not possible with the data at hand. Therefore, while multiple explanations for the same empirical phenomenon are possible, the asymmetric retrospective voting model presented here of course makes predictions above and beyond the cost of ruling. The empirical test of the Asymmetry Hypothesis therefore takes center stage.

Nevertheless, in line with previous findings (Nannestad and Paldam 2000), and based on the theoretical prediction derived from the asymmetric retrospective voting model, the first hypothesis is:

Cost-of-Ruling-Hypothesis: *In a given election, the incumbent government party's vote share declines compared to the previous election.*

Adding something new to the existing body of theory and evidence in the field of economic voting is not an easy task. The idea of a link between 'the economy' - or even more broadly, people's living conditions - and the popularity and fate of their leaders probably predates any systematic analysis in economics or political science by centuries. Being able to hold an elected - or at least in some sense dependent - leader accountable lies at the heart of our concept of democracy. It is therefore not surprising that political scientists have produced a vast literature on what is commonly - and somewhat technically - called economic voting.

The study of economic voting in its current form arguably goes back to V.O. Key (1966), who was among the first to suggest that voters might engage in some form of retrospective voting. The first systematic studies of the effect of the economy on vote choice and government popularity were published in a set of ground-breaking articles by Mueller (1970), Kramer (1971) and Goodhart and Bhansali (1970). Mueller (1970) introduced the first 'popularity function' by relating the popularity of the U.S. president to economic performance, namely unemployment. Goodhart and Bhansali (1970) did the same for the popularity of the prime minister and the government of the United Kingdom. In the U.S. context, Kramer (1971) and Tufte (1975, 1978) were the first to show that actual election results can be predicted using economic data. Finally, Hibbs (1979, 1982, 1987) provided some of the most thorough analyses of the economy-vote/popularity relationship. All these early studies rely on aggregate-level vote results or measures of popularity and *objective* economic indicators. While the idea of a political business cycle (Nordhaus

1975) was suggested early on, it has received relatively little empirical support. One big advantage of these early studies therefore lies in the - at least short term - exogeneity of the variables describing the state of the economy. While governments of course influence the economy, the month-to-month variation in unemployment or inflation is without much doubt exogenous to presidential popularity. Voters may start to disapprove of the government because they are unsatisfied with increasing unemployment, but it is hard to believe that monthly variation in presidential popularity affects the number of people out of work. This virtue of the exogeneity of objective economic indicators has unfortunately been somewhat forgotten in the more recent empirical literature that relies mostly on voters' subjective evaluations of the economy. These subjective evaluations have convincingly been shown to be affected by political evaluations (DeBoef and Kellstedt 2004) and tainted by respondents partisan views (Conover et al. 1986, Evans and Andersen 2005, Ladner and Wlezien 2007, Gerber and Huber 2010). This endogeneity problem is one of the reasons this dissertation relies on objective economic indicators instead.

The early work on aggregate-level vote and popularity functions was pioneered in the U.S. political context, but has been widely replicated in different national contexts. One of the first systematic studies overall, Goodhart and Bhansali (1970), showed economic effects in the popularity function for the United Kingdom, and studies following in their footsteps have probably made Britain the second most studied case of economic voting (Whiteley 1986, Clarke et al 1986, Norpoth 1987, Sanders 2000, Clarke et al 2000, Clarke and Lebo 2003, Carey and Lebo 2006). Other countries followed suit. See

also Chapter 3 for a more detailed discussion of this literature. While the overwhelming majority of these studies found some relationship between the macroeconomic situation and the vote for, or popularity of, the government, researchers "failed" to find a universally fitting vote or popularity function. The magnitude and statistical significance of the economic vote varied considerably across national contexts (Powell and Whitten 1993, Nannestad and Paldam 1994, Anderson 1995, Lewis-Beck and Stegmaier 2000, Anderson 2007).

This apparent instability of the vote/popularity function over countries and over time led to two new strands of the economic voting literature. One branch, mirroring a similar movement in macroeconomics, turned to the question of microfoundations, and began to study economic voting using individual level survey data (cf Kinder and Kiewiet 1979, Fiorina 1981, Lewis-Beck 1988, Nannestad and Paldam 1993, van der Brug et al 2007, Duch and Stevenson 2008).

The other new branch of the economic voting paradigm that grew out of the instability observation is the attempt to explain the cross-country variation in the economic vote, focusing mainly on the institutional differences between countries (Powell and Whitten 1993, Whitten and Palmer 1999, Nadeau et al 2002). Powell and Whitten (1993) were the first to propose a cross national measure of 'clarity of responsibility' , suggesting that - in order to reward or punish the government - voters must be able to attribute responsibility. In the context of separation of powers, coalitions or minority governments, they argue, it may be possible for incumbents to avoid being blamed for bad economic performance, thus reducing the strength of the economic vote. Under

high clarity of responsibility on the other hand (unicameralism, unitary control of executive and legislative by one party), the government is more likely to be held accountable. This idea has since been developed further in Whitten and Palmer (1999), Anderson (1995) in the context of popularity functions, and Nadeau et al (2002). The results support the idea that the economic vote is indeed contingent on the institutional context. Exactly which institutional factors are most relevant, however, is still up for debate. While not the primary focus of this dissertation, the analyses below include tests taking Powell and Whittens notion of clarity of responsibility into account.

The idea of an asymmetric response to economic conditions has occasionally made an appearance in the economic voting literature: Even before Key (1966), the *The American Voter* (Campbell et al 1960) foreshadowed the asymmetric response to good and bad times economic that is the focus of this dissertation:

> "[...] prosperity clearly benefits the administration party, but it has nothing like the magnitude of the effect that would result from economic distress. A party already in power is rewarded much less for good times than it is punished for bad times." (Campbell, Converse, Miller and Stokes 1960: 555)

Also in the very first analysis of a popularity function, Mueller (1970) actually hypothesized that the yardstick voters use to judge economic performance might be the change in unemployment from the beginning to the end of a president's term. He also modeled this effect in a strictly asymmetric fashion

in the sense that the effect of reductions in unemployment are constrained to zero. The analyses presented here can therefore be understood as a direct extension of this early line of work, however with estimated instead of assumed reference points, and an unconstrained model that allows us to test for - rather than assume - an asymmetric response.

Bloom and Price (1975) follow the same intuition and model the effect of changes in income on incumbent vote share, contingent on whether the election takes place in times of rising or falling incomes. Claggett (1986) provides some additional evidence of asymmetric effects of economic conditions on aggregate vote shares in congressional elections.

After these first positive results, the existence of an asymmetric response has mostly been disputed (Kiewiet 1983, Lewis-Beck 1988, Headrick and Lanoue 1991, Radcliff 1994, Duch and Stevenson 2008, but see also Nannestad and Paldam 1997), or simply ignored. One of the reasons for this loss of interest, especially in economics, may be that this type of voter behavior violates assumptions about forward looking rationality. The theoretical argument put forward in this dissertation, however, finds itself in close agreement with the early *empirical* models, and provides a behavioral microfoundation that is not grounded in classic rationality. The basic theoretical idea of asymmetric evaluations was laid out above and the second chapter presented an agent-based model of asymmetric retrospective voting. The model started with a simple version of the principal-agent relationship between voters and politicians. Then negativity bias was introduced into voter decision-making. Analyzing the simulation results lead to several empirical predictions on the aggregate

level. First and foremost, the individual level asymmetry in evaluations translates into an aggregate level asymmetry in the relationship between economic performance and incumbent vote share. Negative changes are punished more severely than positive changes are rewarded. Together with the previous evidence for asymmetric retrospective voting, this result provides the basis for the main hypothesis to be tested empirically in this chapter:

Asymmetry Hypothesis: *Negative (below reference point) changes in economic conditions have a stronger effect on incumbent party vote share than positive (above reference point) changes.*

This chapter will show the existence of such asymmetric evaluations in the relationship between economic indicators and the incumbent party's vote share. Specifically, the analysis suggests that in a large, cross-national sample of election results, bad economic performance leads to larger decreases in incumbent vote shares than good performance leads to electoral rewards.

Testing the Asymmetry-Hypothesis requires information about what constitutes positive and negative changes, or in other words, the location of the reference point. This analysis uses the same procedure for estimating an aggregate level reference point that was introduced in the previous chapter, utilizing an econometric technique known as *Threshold Models* (Hansen 1996, 2000). Having located the reference point, we can test whether above and below reference point effects are equivalent, or whether negative (below reference point) values have stronger effects on the incumbent vote share, as suggested by the asymmetry hypothesis.

4.3 Data and Method

The data analysis tests these hypotheses, corroborating evidence from previous studies that showed a 'cost of ruling'. It also provides evidence for an aggregate level asymmetry in the relationship between a country's macroeconomic conditions and the incumbent government's electoral performance.

The data comprise election results from 365 democratic elections in 67 countries since 1980 and corresponding macroeconomic indicators. The full list of countries, and the first election for which vote shares and economic data was available, can be found in Table 4.1.

The main dependent variable is the *Incumbent Party Vote Share* and stems from Hellwig and Samuels (2007). The appendix to their article contains detailed descriptions of the data collection and coding rules. The authors built a dataset of election results in order to investigate the impact of globalization on the link between economic performance and voter support for the incumbent government. They find some evidence of a moderating effect of trade openness and capital mobility on the economic voting link, which suggests that more open economies see less economic voting. This is an important result, but of no particular concern to this analysis. The strength of economic voting is contingent on several factors, both on the individual level and on the aggregate, institutional level (cf. Anderson 2007, Lewis-Beck and Stegmaier 2000, 2009), but rather than attempting to build an all-encompassing model taking into account different institutional structures, globalization, voter sophistication and other suggested moderators, the purpose of this cross-national analysis is to test for an asymmetry in the effect of economic indicators using as broad

and simple a model as possible. If the "true" effect of the economy on the incumbent vote share is hidden under layers of contingencies (Anderson 2007), ignoring those layers would likely result in a failure to detect any economic voting at all. That being said, section 4.4 below investigates the relationship between one of the well-established moderating factors, 'clarity of responsibility' (cf. Powell and Whitten 1993, Whitten and Palmer 1999), and the asymmetry in economic voting.

In order to capture differences in incumbent party strength and other factors, this analysis follows Hellwig and Samuels' (2007) modeling strategy, and includes the current incumbent party's vote share in the previous election (*Lagged Vote Share*) as a control. Alternative models using the change in incumbent party vote share yield virtually identical results.

The main independent variables are major macroeconomic performance indicators: Economic Growth (annual percentage change in real GDP per capita), Unemployment (following the ILO definition, Worldbank 2012) and Inflation (annual growth rate of the GDP deflator). All economic data are based on the World Development Indicators (Worldbank 2012), as they appear in Hellwig and Samuels (2007) and Teorell et al (2011).

Table 4.1 lists the country averages of the change in incumbent vote share - or "cost of ruling", economic growth, unemployment and inflation for all 67 countries in the analysis.

Table 4.1: List of countries included in the analysis and their average cost of ruling, growth, unemployment and inflation

Country	First Election in Dataset	Cost of Ruling	Economic Growth	Unempl. Rate	Inflation Rate
Argentina	1985	-6.0	0.1	11.6	583.4
Australia	1980	-1.6	2.2	8.2	5.6
Austria	1983	-1.9	2.3	3.9	2.4
Bangladesh	1996	2.8	-1.9	2.5	4.2
Belgium	1985	-1.0	2.0	9.5	2.2
Bolivia	1989	-9.9	0.3	8.8	7.1
Botswana	1994	-11.7	4.2	21.2	11.5
Brazil	1990	-4.7	-1.5	7.9	553.0
Bulgaria	1994	-5.0	-2.1	16.6	350.7
Canada	1980	-9.0	2.8	9.0	4.1
Chile	1993	-2.9	3.1	6.2	6.8
Colombia	1982	-4.8	1.2	11.4	26.1
Costa Rica	1982	-7.7	0.5	6.1	26.2
Czech Republic	1998	-2.0	1.2	6.9	6.9
Denmark	1984	-1.0	1.8	6.7	3.3
Dominican Rep.	1994	-4.7	3.3	15.4	7.8
Ecuador	1988	-10.4	-1.5	8.6	2.1
El Salvador	1985	-2.9	2.1	8.8	4.9
Estonia	1995	-22.7	2.9	11.0	20.6
Finland	1982	-4.8	2.2	9.1	4.3
France	1981	-1.8	1.5	9.5	4.6
Germany	1994	-3.7	1.3	9.0	1.5
Greece	1981	0.3	1.6	7.9	14.4
Honduras	1997	-2.2	2.2	3.3	22.3
Hungary	1994	-1.4	2.3	8.4	13.3
India	1996	-5.4	4.2	2.8	7.8
Ireland	1981	-5.7	4.0	12.8	4.9
Israel	1981	-5.3	1.5	7.6	82.1
Italy	1983	-4.7	1.9	10.2	6.1
Jamaica	1980	-13.3	-1.3	18.2	17.9
Japan	1980	-0.5	2.5	2.9	1.4
Korea, South	1992	1.8	7.4	2.9	5.6
Latvia	1998	-13.6	6.3	12.8	4.1
Lithuania	1996	-11.1	5.9	14.9	7.3
Macedonia	1998	-5.8	2.4	32.9	2.5
Madagascar	2001	-0.7	3.0	5.3	7.3

Continued on next page

Table 4.1 – *continued from previous page*

Country	First Election in Dataset	Cost of Ruling	Economic Growth	Unempl. Rate	Inflation Rate
Mali	1997	12.3	4.2	3.3	1.0
Mexico	2000	-6.7	5.1	2.6	12.1
Moldova	2001	19.8	2.3	7.3	12.1
Netherlands	1986	-3.2	2.2	6.9	1.8
New Zealand	1987	-3.7	1.9	6.6	3.0
Nicaragua	1996	0.3	1.1	10.7	8.4
Norway	1981	-2.2	2.2	3.8	5.1
Panama	1999	14.7	2.7	11.8	0.8
Paraguay	1998	13.1	0.0	5.3	11.0
Peru	1990	-9.0	-4.2	8.0	2280.7
Philippines	1992	-0.9	1.2	8.9	9.1
Poland	1993	2.9	3.8	15.0	18.6
Portugal	1980	-0.4	3.5	6.3	12.0
Romania	1996	-16.3	3.1	6.9	44.7
Russia	2000	17.7	5.8	9.8	37.7
Seychelles	2002	-7.4	-17.6	9.8	3.6
Slovakia	1998	-6.0	4.2	16.6	4.3
Slovenia	1996	-4.4	3.9	7.2	8.3
South Africa	1999	3.8	-1.0	25.4	7.1
Spain	1982	-5.6	2.3	18.6	7.1
Sri Lanka	2001	-7.9	-2.8	7.9	13.7
Sweden	1982	-1.9	1.7	5.0	5.0
Switzerland	1991	-0.5	-0.4	2.7	2.3
Thailand	1992	-6.5	5.3	1.7	3.5
Trinidad and Tobago	1981	-11.3	1.8	15.1	4.7
Turkey	1991	-8.4	3.2	8.5	59.2
Ukraine	1998	4.8	2.9	10.5	12.4
United Kingdom	1983	-3.2	1.9	8.7	3.9
United States	1980	-1.3	2.1	6.3	3.5
Uruguay	1994	-6.1	1.5	10.3	22.1
Venezuela	1983	-5.6	-1.1	9.7	21.7

Close inspection of the table reveals that the distribution of inflation is highly skewed, with a median rate of 5.3% but several episodes of hyperinflation, specifically in South America, pulling the mean to about 80% and

massively increasing the standard deviation. Estimating the economic vote simply based on the level of inflation would result in estimates unduly influenced by relatively few extreme outliers. In order to mitigate this problem, a logarithmic transformation would be desirable. Since the log function is not defined for negative values and approaches infinity for values close to zero, this is not possible. To solve this problem I follow the transformation procedure proposed in Khan and Senhadji (2001), using a hybrid function that is linear for values below or equal to one and logarithmic for values above one. This yields a distribution of transformed values of inflation that is approximately normal.

While economic growth, unemployment and inflation are the most commonly used variables in studies of economic voting (Paldam 1981, Nannestad and Paldam 1994, Lewis-Beck and Stegmaier 2000), the use of additional economic indicators was considered, but ultimately not pursued due to lack of cross-nationally comparable data. Including unemployment and inflation in addition to economic growth already reduced the number of cases from Hellwig and Samuels' (2007) 449 elections to 365 due to missing data on these economic indicators.

In order to test the asymmetry hypothesis, this chapter uses the same method for testing and estimation of reference point dependent behavior as described above. First a symmetric baseline model is estimated, then a threshold - or reference point - in the effect of some independent variable is estimated via a concentration technique. In a final step, it can be tested whether the effects of above and below reference point effects are identical or not. See

Section 3.2 for details.

Close inspection of Table 4.1 also shows that there is considerable between-country variation in all economic indicators. This is not surprising given the diverse countries included in the analysis. Average election year economic growth for example is 7.4% in South Korea and only -0.1% in Switzerland. Estimating only one common threshold means assuming that the reference point that classifies performance as a gain or a loss is identical for all countries. Given the differences in economic development between the countries in the analysis, this seems far-fetched, since a growth rate of 1.5% would be about average for Germany or France during the observation period, but a noticeable economic slump for countries like India or Thailand. While estimating country specific thresholds is currently not feasible using Hansen's threshold procedure since there are only relatively few elections for each country in the dataset, perhaps a model using Bayesian methods and partial pooling of the thresholds could be designed and possibly used to estimate country specific reference points in the future. For the present study, a simpler solution to circumvent this problem was chosen: All economic variables were 'within-standardized' by subtracting the country mean. This preserves the within country variance, while removing the between country variance. Note that we are still estimating a reference point, but only after we have removed the between-country variation in economic factors.

4.4 Results

Verifying that incumbent governments indeed suffer from an electoral "cost of ruling" does not require sophisticated testing procedures. Inspection of the country averages of the change in incumbent party vote share in Table 4.1 gives away the main result: On average, incumbent governments lose 3.9% of their vote share (but with a standard deviation of 11%, cf Table 4.2).

Table 4.2: Average Change in Incumbent Party Vote Share

	Mean	SD	N
Growth	-3.1	11.2	285
Recession	-6.9	9.7	80
Total	-3.9	10.9	365

This supports the cost of ruling hypothesis, but is slightly higher than Nannestad and Paldam's (2000) estimate which was based on a smaller, more homogenous sample of advanced industrialized democracies. The data analyzed here corroborate the results of previous studies that found a cost of ruling using a a broader set of election results.

Turning from the cost of ruling to the asymmetry hypothesis, and following the earliest models of vote and popularity functions, the simplest way to look for some sort of asymmetric behavior would be to look at the average vote loss during periods of economic growth and recession, see Table 4.2. Incumbent governments lose more votes in recessions than in periods of growth. The problem with this however is that this picture could also be consistent with

a symmetric response to the economy. Therefore, we now properly test the Asymmetry Hypothesis following the testing procedure outlined above:

The first step is to estimate a symmetric baseline model that explains incumbent party vote share in an election as a function of lagged vote share, economic growth, unemployment and inflation. Model (1) in Table 4.4 presents estimation results for such a baseline model. Much of the variation is explained by the lagged vote share. The coefficients of the economic voting variables have the correct signs, politically reasonable magnitude, and with the exception of inflation, reach statistical significance. In line with previous results, higher economic growth increases the incumbent party's vote share, while higher unemployment decreases it. There is clear evidence of economic voting. A one percent increase in growth for example is associated with a 0.39 percent increase in incumbent vote share, while a one percent increase in unemployment decreases support by about 0.42 percent.

This dissertation however argues that this symmetric baseline model is misspecified and does not capture the real magnitude of the economic vote, because the coefficients of the economic factors are constrained to be symmetric for positive and negative changes, thus obscuring the stronger effect of bad economic news. In order to relax this restrictive assumption, I first use the threshold testing procedure outlined above to estimate the reference point τ. The results of threshold tests for economic growth, unemployment and inflation are presented in Table 4.3. Hansen's (1996) bootstrap F-test for the existence of a threshold effect is significant for economic growth and inflation, but - surprisingly - not for unemployment. The estimated threshold

Table 4.3: Threshold Tests using Hansen's Bootstrap Method

Variable	Threshold $\hat{\tau}$	F-Test$_{max}$	Bootstrap p-value
Economic Growth	-0.0569**	5.646	0.023
Unemployment	1.4517	2.345	0.319
Inflation	0.8000***	4.318	0.009

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

for economic growth is close to zero, as one could expect. Recall that the independent variables are within-standardized. Therefore a threshold close to zero means that economic growth above the country average is considered a gain, while below average growth is considered a loss.

The estimated reference points for inflation and unemployment are somewhat above zero. Slightly higher than average inflation is treated similar to average or below average inflation, higher deviations however have a different - and presumably stronger - effect on the incumbent vote share. The same is true for unemployment, although it has to be noted that the threshold test for unemployment is not statistically significant, meaning that the likelihood ratio test comparing the threshold model to the symmetric model cannot be conclude that they are in fact different from each other. In light of the previous results however, and given that the effect sizes are relatively small, the underlying likelihood ratio test may simply not have enough power to detect the asymmetry that becomes apparent when estimating separate slopes (see below). While the results for unemployment are therefore somewhat inconclusive, taken together with the other evidence presented here, nevertheless a clear picture emerges.

Having estimated the reference points, we can estimate different slopes for above and below reference point values and test whether - as the asymmetry hypothesis would suggest - below reference point economic performance has a stronger effect on incumbent vote share than above reference point performance. Models (2) through (5) in Table 4.4 present estimation results taking asymmetric behavior with respect to economic growth, unemployment and inflation into account.

The effect of economic growth on incumbent party vote share in the constrained, symmetric model barely reached statistical significance. Relaxing the symmetry constraint, and allowing the effect of positive and negative news to vary, yields results supporting the asymmetry hypothesis. Looking at Model (2), the effect of bad, i.e. below reference point performance is significant and almost doubles in magnitude compared to the symmetric model, while the effect of good, i.e. above reference point growth now becomes statistically indistinguishable from zero and actually reverses its sign. There is clear evidence of economic voting, but only if economic performance is below par. Figure 4.1 illustrates this asymmetric relationship by plotting the effect of economic growth on the change in incumbent vote share.

The same result holds for unemployment. There was already some evidence of economic voting in response to the unemployment rate in the symmetric model. Allowing the slopes to vary for above and below reference point values yields results supporting the asymmetry hypothesis. The effect of low, i.e. below reference point unemployment is indistinguishable from zero. But, if unemployment is high and exceeds the reference point, voters respond strongly

Table 4.4: Asymmetric Effects of the Economy on Incumbent Party Vote Shares

	(1)	(2)	(3)	(4)	(5)
Lagged Vote Share	0.712***	0.719***	0.716***	0.703***	0.709***
	(0.048)	(0.050)	(0.048)	(0.048)	(0.049)
Growth	0.387*		0.385*	0.254	
	(0.206)		(0.208)	(0.206)	
Growth $\geq \hat{\tau}$		-0.208			0.076
		(0.400)			(0.423)
Growth $< \hat{\tau}$		0.920***			0.443
		(0.290)			(0.337)
Unemployment	-0.417*	-0.373*		-0.399*	
	(0.215)	(0.213)		(0.208)	
Unempl.$\geq \hat{\tau}$			-0.721**		-0.655**
			(0.281)		(0.277)
Unempl.$< \hat{\tau}$			0.111		0.080
			(0.409)		(0.410)
Inflation	-0.345	-0.333	-0.317		
	(0.421)	(0.396)	(0.429)		
Inflation $\geq \hat{\tau}$				-1.837***	-1.616**
				(0.598)	(0.669)
Inflation $< \hat{\tau}$				1.046**	0.896
				(0.518)	(0.549)
Constant	6.948***	7.706***	7.477***	8.104***	8.670***
	(1.872)	(1.900)	(1.904)	(1.914)	(1.939)
R^2	0.487	0.492	0.489	0.499	0.499
N	365	365	365	365	365

Notes: Dependent Variable: Incumbent Party Vote Share, Robust Standard Errors in Parentheses, Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

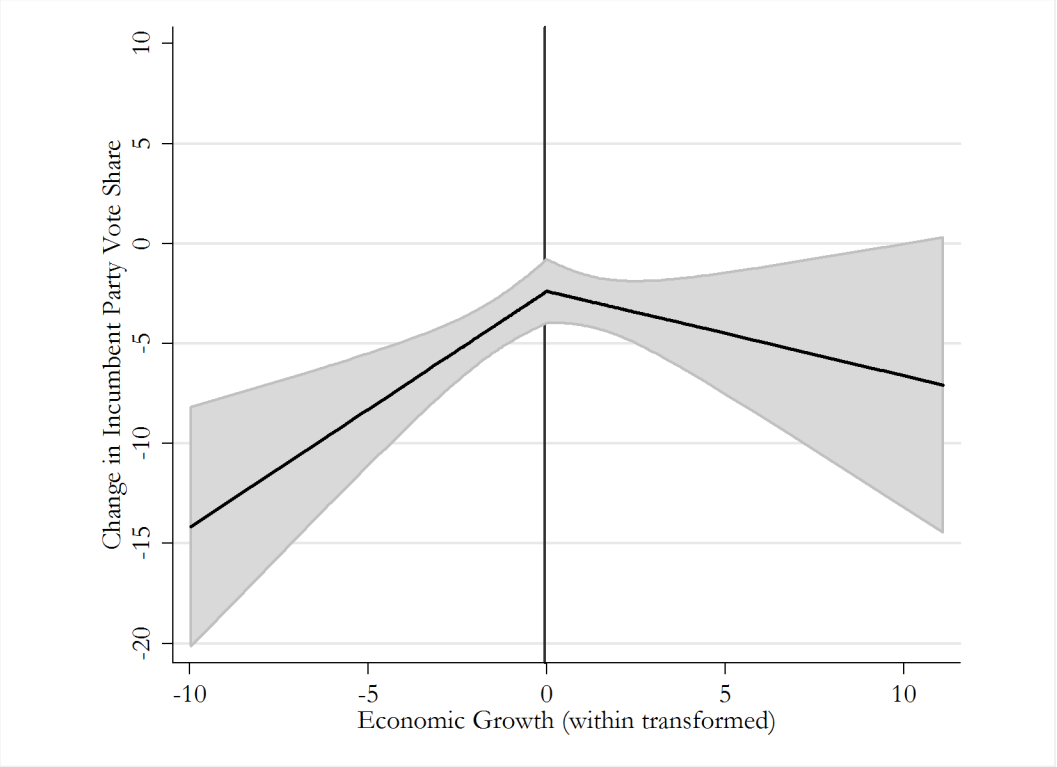

Figure 4.1: Asymmetric Effect of Economic Growth on Change in Incumbent Vote Share

and punish the incumbent government. The magnitude of the voters' response to negative changes almost doubles compared to the symmetric baseline model.

A similar result also obtains for inflation. While the effect in the traditional symmetric model was not statistically significant, taking reference point dependent behavior into account changes this picture dramatically. Voters seem to value an optimal level of inflation, slightly above the country average. Inflation in excess of this threshold leads to sharp decreases in incumbent vote share. Interestingly, below the threshold, vote share actually increases as inflation increases. In other words, any deviation from this optimal level is punished.

This effect echoes the findings of Fischer (1983, 1993), and Khan and Senhadji (2001), who provide evidence of threshold effects in the relationship between inflation and growth; and it is also consistent with the general idea of optimal (non-zero) inflation rate targets as practiced central banks.

Clarity of Responsibility

A sizable literature on cross-national differences in economic voting suggests, that the strength of the economic vote is contingent on whether voters are able to attribute responsibility for the economic situation to a specific party in government. Starting with Powell and Whitten (1993), it has been argued that some institutional arrangements, such as a clear separation of powers, veto players and coalition governments make it harder to identify which party to hold accountable. Under these 'low clarity of responsibility' conditions, one should expect the economic vote to have a less pronounced effect.

'High clarity of responsibility' on the other hand, ideal-typically exemplified by Westminster-style democracy, should be more conducive to attributing responsibility, making it possible for voters to hold the government accountable for the situation of the economy. Studies since Powell and Whitten (1993) have repeatedly found that clarity of responsibility has an effect on the strength of the economic vote. While not the primary focus of this analysis, it is nevertheless a legitimate question to ask how this institutional moderator interacts with the asymmetric effects shown above. Does negativity bias influence voter decision-making equally in both types of regimes? Following the previous literature, a simple, dichotomous measure of clarity of responsibility, going back

to Powell and Whitten (1993), is used to split the sample of elections into high and low clarity groups and estimate reference point dependent behavior separately. Table 4.5 presents threshold tests for the high and low clarity samples.

Table 4.5: Threshold Tests for High and Low Clarity Regimes

Low Clarity, N=288			
Variable	Threshold $\hat{\tau}$	F-Test$_{max}$	Bootstrap p-value
Economic Growth	-0.8798**	4.204	0.0150
Unemployment	-2.0724**	3.561	0.034
Inflation	-0.0101*	3.149	0.0750
High Clarity, N=77			
Economic Growth	-0.3560	2.810	0.1840
Unemployment	3.2533	2.305	0.3400
Inflation	0.5675**	4.0727	0.0230

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results provide a strong indication of reference point dependent behavior for all economic indicators in the low clarity elections. In the high clarity group however, reference point dependent behavior seems limited to the effect of inflation. Is the economic vote more asymmetric under low clarity of responsibility? The estimation results for models that allow for asymmetric behavior are somewhat inconclusive: Models (6) and (8) in Table 4.6 present the symmetric baseline case. The results are consistent with the view that the economic vote is indeed contingent on clarity of responsibility.

The magnitude of the economic vote coefficients is much smaller in low clarity elections, and does not reach statistical significance. In the high clarity

Table 4.6: Asymmetric Effects and Clarity of Responsibility

	Low Clarity		High Clarity	
	(6)	(7)	(8)	(9)
Lagged Vote Share	0.739***	0.736***	0.369**	0.334**
	(0.069)	(0.067)	(0.135)	(0.134)
Growth	0.238		0.639*	0.513
	(0.298)		(0.348)	(0.306)
Growth $\geq \hat{\tau}$		-0.196		
		(0.475)		
Growth $< \hat{\tau}$		0.566		
		(0.537)		
Unemployment	-0.186		-1.176***	-1.086***
	(0.342)		(0.377)	(0.338)
Unempl.$\geq \hat{\tau}$		-0.284		
		(0.278)		
Unempl.$< \hat{\tau}$		0.185		
		(0.944)		
Inflation	-0.040		-0.864	
	(0.472)		(0.947)	
Inflation $\geq \hat{\tau}$		-1.163		-2.006**
		(1.396)		(0.902)
Inflation $< \hat{\tau}$		0.954		1.138
		(0.825)		(1.163)
Constant	5.811**	7.612***	24.809***	27.196***
	(2.782)	(2.635)	(6.760)	(6.923)
R-squared	0.472	0.480	0.245	0.267
N	288	288	77	77

Notes: Dependent Variable: Incumbent Party Vote Share, Robust Standard Errors in Parentheses, Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

condition however, both economic growth and unemployment have a strong and significant effect on the incumbent party vote share.

Relaxing the symmetry assumption using the estimated reference points from Table 4.5, the emerging picture remains somewhat blurry. While the threshold tests clearly indicated reference point dependent behavior in the low clarity condition, looking at Model (7), the differences in the slopes of above and below reference point values are not statistically significant from each other. The size of the effects of the 'bad news' range of economic growth, unemployment and inflation is close to the size of the effects in the general asymmetry models presented above. The magnitude and direction of the effects is consistent with the Asymmetry Hypothesis, but none of the economic voting variables reaches statistical significance.

In the high clarity condition, the threshold tests only indicated reference point dependent behavior for the inflation variable. This is supported by the estimation results. Above reference point inflation has a somewhat stronger effect on the incumbent party vote share than below reference point inflation.

In sum, the results hint at the possibility of more asymmetric behavior in low clarity elections than in high clarity elections. This conclusion would make some sense intuitively: possibly undeserved but severe punishing of the governing party if the attribution of responsibility is unclear and more even-handed economic voting when it is clear who is and who is not to blame. These results however remain somewhat speculative and future research could help disentangle the relationship between institutional clarity of responsibility and asymmetric retrospective voting.

4.5 Discussion

This chapter provided a test of the asymmetric retrospective voting model based on election data from 67 democratic countries. The goal was to test whether the implications of the asymmetric retrospective voting model, namely a 'cost of ruling' and the Asymmetry Hypothesis, could be corroborated on the macro-level. Analyzing the results of 365 elections around the world considerably extends the range of the more fine-grained, country-specific results of the previous chapter, and also provides a test that is based on actual voting behavior.

The analysis uses threshold models to estimate aggregate-level reference points and finds clear evidence of an asymmetry in the relationship between economic performance and incumbent party vote share. If the economy grows at an average rate or above, voters are not more likely to vote for the incumbent. If the economy slows down and exhibits below-average growth however, voters are quick to punish the incumbent party. Although the result of the threshold tests was inconclusive, the same result emerges for unemployment: Above reference point levels of unemployment result in a sharp decrease in incumbent vote shares, while below reference point unemployment appears inconsequential. The results for inflation suggest that any deviations from a country specific optimal level of inflation will be punished electorally, although with a more severe penalty for high inflation rates. These results strongly support the findings of the previous chapter. Economic voting is reference point dependent and asymmetric, with a generally stronger response to bad performance.

Chapter 5

Conclusion

The objective of this dissertation was to offer a current approach to the question of voters' asymmetric response to the economy. The relationship between the economic situation and the popularity and electoral success of incumbent governments has received much attention in political science. Research from psychology however also shows that people respond more strongly to losses than to comparable gains, which would imply that voters punish more than they reward. This dissertation investigates this asymmetry hypothesis and ties these literatures together. While the notion of asymmetric evaluations has been suggested in the empirical literature and is implied by general theories of human decision-making, there has been no attempt at formalizing this idea in the realm of retrospective voting. The second chapter fills this gap and proposes an agent-based model of asymmetric retrospective voting. Previous formal models assume that voters' responses to the economy are linear and symmetric. This is inconsistent with research from psychology. The model

therefore relaxes this symmetry assumption and incorporates negativity bias into voter decision-making. Simulation results show that incorporating negativity bias produces the 'cost of ruling' phenomenon and leads to an aggregate-level asymmetry in the relationship between observed economic performance and support for the incumbent. Negative changes are punished more severely than positive changes are rewarded.

The third chapter tests the asymmetry hypothesis using more than thirty years of monthly time series data of government popularity in the United Kingdom and Germany. Apart from using state-of-the-art methods to model the dynamics of the popularity functions, the chapter improves upon previous empirical accounts of asymmetric evaluations by turning from an *ad hoc* or implicit specification to an explicit modeling of reference point dependent behavior. Testing for an asymmetric response requires information about what constitutes positive and negative changes, or in other words, the location of the reference point. This dissertation proposes a procedure for estimating an aggregate level reference point using threshold models. Having located the reference point, it is possible to test whether above and below reference point effects are equivalent or whether the effects are asymmetric, as theory predicts. The analysis shows that there is indeed evidence of reference point dependent, asymmetric behavior, most notably in the effect of the unemployment rate on governmental approval. As unemployment increases, the government loses support. Reductions in unemployment, however, yield little or no increases in government popularity.

The fourth chapter provides a comparative test of the asymmetric retro-

spective voting model using election results from more than sixty democratic countries over twenty-five years. The data corroborate the idea of a cost of ruling. The analysis then uses threshold models to estimate aggregate-level reference points and finds clear evidence of an asymmetry in the relationship between economic performance and incumbent party vote share. If the economy grows at an average rate or above, voters are not more likely to vote for the incumbent. If the economy slows to below-average growth, voters punish the incumbent party. A similar result emerges for unemployment: Above reference point levels of unemployment decrease incumbent vote shares, while below reference point unemployment has no effect. The results for inflation suggest that any deviations from a country-specific optimal level of inflation will be punished electorally, albeit with a more severe penalty for high inflation rates. These results are consistent with the findings of the previous chapter and strongly support the theoretical claims put forward in this dissertation. Economic voting is reference point dependent and asymmetric, with a generally stronger response to bad performance.

In sum the results provide clear evidence that voters respond to changes in economic conditions in an asymmetric fashion. Voters punish the government for bad economic times, but do not offer an equal reward for good economic times. This effect seems to be especially pronounced for the unemployment rate. Rising unemployment quickly wipes out an incumbent's popularity and represents a clear and present danger to its electoral prospects. The reverse however is not true. Governments presiding over reductions in unemployment cannot necessarily expect to be rewarded electorally.

This dissertation makes several contributions to the existing literature on economic and retrospective voting, but it also has some limitations - and creates new questions, opening up several interesting avenues for future research: The dissertation represents the first attempt at incorporating loss aversion into a theoretical model of retrospective voting. The resulting asymmetric retrospective voting model generates several aggregate level implications, some of which have been tested empirically in the subsequent chapters. That being said, the model in its current form can most certainly still be improved upon. First and foremost, an exploration of a variety of decision rules could show that the results are robust to the exact specification of updating rules. Another interesting question concerns the exact source of the asymmetry. Prospect theory suggests that loss aversion may be a consequence of the differences in adjustment to the status-quo after gains and losses. This could easily be explored by varying the persistence of the reference point updating mechanism rather than modeling the negativity bias directly. Secondly, the government player is currently determined completely by its type. It is not a strategic actor. Introducing strategic - or adaptive - politicians would be a good addition, and could shed light on the moral hazard aspect of the principal agent relationship between voters and politicians. On the voter side, expectations are formed in a simple adaptive process and voters are not forward-looking and optimizing, but rather retrospective and adaptive, and they exhibit systematic deviations from the standard rational choice model in the form of loss aversion. Future research could further explore the (unfortunately infinite) set of potential decision rules for all actors. The basic structure of the po-

litical process is fixed, so it would be interesting to explore the implications of varying decision-making mechanisms across some spectrum between a theoretical lower bound of essentially random behavior and an upper bound of fully informed, forward-looking, optimizing agents. Another interesting avenue for future research would be to introduce heterogeneous agents, in line with the received wisdom of American politics that parts of the electorate are immutable partisans, others myopic nature-of-the-times voters, while again others perhaps more closely resemble the normative ideal of the rational economic man. Fourthly, in the present form, voters care only about one issue (the economy) and have shared preferences, making this essentially a valence issue. It would be interesting to combine the present principal-agent model with the aspects of more traditional, e.g. Downsian, models of party competition and explore the interaction and trade-offs of candidate selection and retention on the one hand and divergent voter preferences in a policy space on the other hand. Finally, the current model provides a radically simplified form of the political process. The comparative literature on economic voting has generated several hypotheses about the moderating effect of specific institutions on economic voting. Modeling specific institutions might lead to additional insights and testable hypotheses that relate to the existing 'clarity of responsibility' literature.

The asymmetric response to negative and positive values implied by prospect theory requires a reference point to encode what qualifies as a 'gain' or a 'loss'. Any empirical assessment has to - implicitly or explicitly - specify a reference point. This dissertation proposes a method for *estimating* an aggre-

gate level reference point. While this constitutes an improvement upon the *ad hoc* treatment in previous studies, more sophisticated models of specifying reference points would mean better tests of the asymmetry hypothesis. The current method only estimates one aggregate level reference point. The next logical step would be to allow reference points to vary over time (perhaps following some simple autoregressive process) and to allow for heterogeneity, perhaps using multilevel models. A possible extension then could also be to simultaneously estimate an equation for the reference point, modeling it as as a function of other factors, such as voter sophistication, knowledge of the economic situation and partisan biases.

This dissertation re-evaluates claims about an asymmetric response to the state of economy using more and newer data and state-of-the-art statistical methods, thus improving upon previous research that produced somewhat inconclusive results. The time series of government popularity in Britain and Germany cover monthly measurements of the political and economic variables for more than thirty years, and the analyses presented here offer improvements in modeling the dynamic properties of the series, as well as in directly modeling the asymmetric retrospective voting model's quantities of interest, namely the reference point. A logical extension of this research would be to extend these analyses of government popularity (or vote intentions) to a more diverse set of countries. The problem however is often still the availability of the political time series, which are taken from individual polling firms and include many national idiosyncrasies. Another extension that I explore in a different study that is not part of this dissertation is the relationship between macroeconomic in-

dicators and subjective economic evaluations. The same asymmetric response that characterizes the popularity function also affects subjective evaluations, specifically consumer sentiment.

This dissertation is the first study to provide a macro-comparative perspective on the asymmetry hypothesis, by using election results from more than sixty democratic countries over twenty-five years. The problem of estimating reference points was solved using threshold models, and country differences were taken into account by within-standardizing the variables. This means that the reference points are country specific, but this modeling choice may be too restrictive. Letting reference points vary freely is however not feasible given the small number of elections per country, but a model using Bayesian methods and partial pooling of the thresholds might make it possible to estimate country-specific reference points more directly. One very interesting extension here would also be to look at whether voters look at performance myopically, or whether they look at performance relative to other, perhaps neighboring countries, taking into account that longer cycles of the world economy fall outside the control of their elected leaders.

This discussion shows that there are many possible avenues for future research. The present study has provided a new theoretical model of asymmetric retrospective voting, and tested the asymmetric response hypothesis using time-series and cross-national data, making several contributions to the existing empirical literature. While perhaps not providing the ultimate answer to all questions about voters' asymmetric responses to the economy, it has certainly added some new questions and suggested some ways forward.

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Appendix A

R Code for the Asymmetric Retrospective Voting Model

```
#########################################################################
###   MONTE CARLO SIMULATION  - Setup
#########################################################################

R=1000 ## Number of Monte Carlo Runs

mc_data=array(0,dim=c(R,17)) ## Monte Carlo Data Set, obs= run
## 1: asymmetry parameter
## 2: mean voter utility
## 3: mean party utility


for (r in 1:R) { ##   MONTE CARLO LOOP

lambda=runif(1)
voteadjstep=runif(1)
aspadjstep=runif(1)


#########################################################################
###    THE MODEL
#########################################################################

N=1001                  # N voters
```

```
T=1000 # T time points
P=2 # P parties
partylist=1:P

storage=3+P
pop=array(0,dim=c(N,storage))  # VOTER VARIABLES:
# 1 utility,
# 2 aspiration level,
# 3 party choice,
# 3+1 to 3+P: vote propensities per Party


party=array(0,dim=c(P,5))  # PARTY VARIABLES:
# 1 utility, 2 alpha (effort level),
# 3 vote share

data_s=array(0,dim=c(T,P)) # DATASET:
# first dimension: Time(t=0 to t=T)
# 1 first party share
# 2 second party share
# .. up to P-th party share

data_a=array(0,dim=c(T,P)) # DATASET:
# first dimension: Time(t=0 to t=T)
# 1 first party alpha
# 2 second party alpha
# 3 P-th party alpha

data_g=array(0,dim=c(T,4)) # DATASET:
# government
# inc vote share
# change in inc vote share

data_theta=array(0,dim=c(T,1)) # DATASET:
# theta

data_u=array(0,dim=c(T,2)) # DATASET:
# first dimension: Time(t=0 to t=T)
# 1 average voter utility
# 2 gov party utility
```

```
theta=runif(1) # random shock

party[1:P,2]=runif(P) # initial party alpha level (party in gov effort level)

pop[1:N, 2]=(runif(N)) # initial aspiration level ~Uniform[0,1] for each voter
pop[1:N, 4:storage]=1/P # initial vote propensity for each party strcitly 1/P
#voteadjstep=.5 # vote propensity adjustment stepsize if not drawn
#aspadjstep=.1 # aspiration adjustment stepsize if not drawn

gov=1 # set first party to be in gov


########################################################################
###   Time Loop
########################################################################


for (t in 1:T) { ##   time loop

theta=runif(1) # economic shock
alpha=party[gov,2] # setting government effort level

party[gov,1]=1-alpha # government party gets income
pop[1:N,1]=alpha*theta # voters get income

### write theta and utilities to data
data_theta[t,1]=theta
data_u[t,2]=party[gov,1]
data_u[t,1]=alpha*theta

### write party effort level a to data
data_a[t,1:P]=party[1:P,2]

### write government party to data
data_g[t,1]=gov
data_g[t,2]=alpha


### voters update vote propensity:
for (i in 1:N) {

 # if performance BELOW aspiration
```

```
 if (pop[i, 1]<pop[i,2])  {
 propg=pop[i,(3+gov)] # store old Pr(vote=gov)
 pop[i,(3+gov)]=propg-(voteadjstep*(propg)) # adjust Pr(vote=gov) by stepsize
 pop[i,4:(3+P)]=pop[i,4:(3+P)]/sum(pop[i,4:(3+P)]) # set all Pr(vote=i) = Pr(vote=i)/SUM
 }

 # if performance HIGHER than aspiration
 if (pop[i, 1]>pop[i,2])  {
 propg=pop[i,(3+gov)]
 pop[i,(3+gov)]=propg+(lambda*voteadjstep*(propg))
 pop[i,4:(3+P)]=pop[i,4:(3+P)]/sum(pop[i,4:(3+P)])
 }
}

### voter update aspiration
pop[1:N,2]=(1-aspadjstep)*pop[1:N,2]+aspadjstep*(pop[1:N,1]-pop[1:N,2])


### voters make party choice
for (i in 1:N) {
 pop[i,3]=max.col(t(rmultinom(1, size=1, prob=c(pop[i,4:(3+P)]))))    # probabilistic vo
 #pop[i,3]=which.max(pop[i,4:(3+P)]) # deterministic voting
}

### parties calculate their vote share
for (p in 1:P) {
 party[p,3]=sum((pop[1:N,3]==p))/N
}

### incumbent vote share:
data_g[t,3]=party[gov,3]   # inc vote share
if (t>1) {data_g[t,4]=party[gov,3]-data_s[t-1,gov]}  # change in inc vote share


### party with most votes is next government
gov=which.max(party[,3])

### gov party updates effort level. (perhaps if re-elected, lower effort)
party[-gov,2]=runif(1)   # all BUT the gov parties draw new alpha
##party[1:P,2]=runif(P)   # all parties draw new alpha
##party[gov,2]=alpha/2 # gov party sets alpha=alpha/2
```

```
########  DATASETS  ########

### write vote shares to data
data_s[t,1:P]=party[1:P,3]



} ## end of time loop

#########################################################################
#########################################################################


mc_data[r,1]=lambda # Lambda
mc_data[r,2]=mean(data_theta[,1]) # Theta(mean)
mc_data[r,3]=sd(data_theta[,1]) # Theta(sd)
mc_data[r,4]=mean(data_u[,1]) # mean(_U_i_)
mc_data[r,5]=sd(data_u[,1]) # sd(_U_i_)
mc_data[r,6]=mean(data_u[,2]) # mean(_U_pgov)
mc_data[r,7]=sd(data_u[,2]) # sd(_U_pgov)
mc_data[r,8]=mean(data_s[,1]) # mean(party1share)
mc_data[r,9]=sd(data_s[,1]) # sd(party1share)
mc_data[r,10]=mean(data_g[,1]) # mean(party in gov)
mc_data[r,11]=mean(data_g[,2]) # mean(ALPHAgov)
mc_data[r,12]=sd(data_g[,2]) # sd(ALPHAgov)

  alt=array(0,dim=c(T,2)) # calculating no of alternations
  alt[,1]=data_g[,1]
  for (i in 2:T) {
  if (alt[i,1]!=alt[i-1,1]) alt[i,2]=1
  }

mc_data[r,13]=sum(alt[,2]) # Alternations

mc_data[r,14]=voteadjstep   #votestep
mc_data[r,15]=aspadjstep    #apsirationstep


mc_data[r,16]=mean(data_g[1:T,3]) # mean incumbent vote share
```

```
mc_data[r,17]=mean(data_g[1:T,4]) # mean change in incumbent vote share


cat(paste("Iteration #:", r, "-", date(), "\n"))
flush.console()



} ##   END of MONTE CARLO LOOP

##########################################################################
##########################################################################

write(mc_data, file = "rk_mc_data5.txt", ncolumns = R)


# END
```