Asymmetric Evaluations: Government Popularity and Economic Performance in the United Kingdom

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Abstract

This article introduces a new method for testing asymmetric, reference-point-dependent behaviour in economic voting. Specifically, prospect theory suggests that people exhibit loss aversion, which crucially depends on a reference point. In practice, this reference point is often unknown. This article proposes a procedure to estimate reference points from the data using threshold models, and then test whether above- and below reference point effects are equivalent, or whether negative changes have stronger effects as predicted by prospect theory. This method is applied to the relationship between economic performance and government popularity in the United Kingdom, using monthly time series data over the last thirty years. The results show that there is asymmetric, reference-point-dependent behaviour, most notably in the relationship between unemployment and government popularity.

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1 Introduction

This article introduces a new method for testing asymmetric, reference-point-dependent behaviour, and provides evidence for an asymmetry in the relationship between economic performance and government popularity. Building on early studies of economic voting (Mueller 1970, Goodhart and Bhansali 1970, Bloom and Price 1975), and prospect theory (Tversky and Kahneman 1991), an analysis of thirty years of government popularity data in the United Kingdom shows that the electorate indeed responds more strongly to negative economic shocks than to positive shocks. These results are in line with research on negativity effects in psychology (Baumeister et al. 2001) and political science (Lau 1982, 1985, Nannestad and Paldam 1997, Soroka 2006, 2014), but stand in contrast to other work on economic voting (Kiewiet 1983, Headrick and Lanoue 1991, Duch and Stevenson 2008, Hibbs 2012, Lewis-Beck and Stegmaier 2013).

The main contribution of this article is the introduction of a method for testing this asymmetric, reference-point-dependent behaviour in a systematic fashion. Standard models in the economic voting literature do not consider asymmetric evaluations, and routinely assume a linear relationship between economic performance and government popularity or vote choice (Sanders 2000, Lewis-Beck et al. 2004, Lewis-Beck and Nadeau 2012, Hibbs 2012). Testing asymmetric effects requires explicit or implicit specification of a reference point that defines whether changes are perceived as gains or losses. If asymmetric effects are tested at all, assumptions about the location of a reference point are made in an ad hoc manner. By contrast, this article proposes a novel procedure to test for asymmetric effects in the relationship between economic factors and government popularity: The theoretical literature in psychology and behavioural economics stresses the importance of reference points for the evaluation of changes as either 'gains' or 'losses'. This article suggests a method to estimate aggregate level reference points from the data using threshold models (Hansen 1996, 2000). Having estimated the reference point, one can test whether above- and below-reference point effects are equivalent, or whether – as hypothesised – negative (below reference point) changes have stronger effects on government popularity.

This method is applied to the relationship between macroeconomic performance and government popularity in the United Kingdom, using time series data from 1979 to 2011. The data show that there is evidence of asymmetric, reference-point-dependent behaviour, most notably in the effect of unemployment on government popularity.

The remainder of the paper is structured as follows: The next section outlines the basic theoretical concept of reference-point-dependent asymmetric evaluations and negativity effects, drawing on a large literature within psychology and more recent work in economics and political science. The third section describes the proposed procedure for estimating reference points and testing for asymmetric effects. The fourth section applies

this procedure to time series data of government popularity in the United Kingdom and the last section discusses the results.

2 Theory: Asymmetric Effects in Economic Voting

Prospect theory has changed our understanding of human decision-making (Kahneman and Tversky 1979, Tversky and Kahneman 1991). One of the basic tenets of this behavioural model of decision-making is that people systematically change their behaviour, depending on whether they perceive their choices to be in the domain of gains or in the domain of losses. Crucially, the encoding of a choice or payoff as a gain or loss depends on a *reference point*, often the status quo. Depending on the location of the reference point, people are not only more risk-averse with respect to gains and more risk-seeking with respect to losses, but they also weigh losses heavier than gains of equal size. In other words: "losses loom larger than gains" (Kahneman and Tversky 1979).

This *loss aversion* (Tversky and Kahneman 1991) resonates with a large research programme in social psychology on what is sometimes also called "negativity bias", and comprises a body of theoretical claims and compelling experimental evidence for humans' lopsided processing of information: We detect negative stimuli faster, pay more attention to them, and weigh losses more than gains of equal size (Bargh et al. 1996, Wentura et al. 2000, Rozin and Royzman 2001, Baumeister et al. 2001, Gehring and Willoughby 2002, Dijksterhuis and Aarts 2003). In short: "bad is stronger than good" (Baumeister et al. 2001).

There is a large and growing body of work on both prospect theory and more general negativity effects in political science and particularly political psychology (Lau 1982, 1985, Quattrone and Tversky 1988, Meffert et al. 2006, Soroka 2006, 2014, Stanig 2013). Furthermore, the idea of asymmetric evaluations has some tradition with respect to how voters reward or punish governments: Before V.O. Key characterised the electorate as the "rational god of vengeance and reward" (Key 1964, p. 568), the authors of *The American Voter* already observed that "a party already in power is rewarded much less for good times than it is punished for bad times" (Campbell et al. 1960, p. 555). One of the studies that started modern economic voting research suggested the possibility of different effects for positive and negative changes: Mueller (1970) proposed one of the first models of a 'popularity function' and – without using this terminology – hypothesised an asymmetric effect of the unemployment rate on presidential approval by specifying a model that takes the unemployment rate at the time of inauguration as a reference point. He finds that only worsening conditions affect presidential approval. Not long after, Bloom and Price (1975) suggested that such differential effects might be due to a valence asymmetry, and they also reference some early evidence from psychology. Their study shows 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. Kernell (1977) is the first to propose and test for 'negative voting' as an explanation for the 'midterm loss' phenomenon in the U.S., and Claggett (1986) corroborates these results, finding asymmetric effects of economic conditions on aggregate vote shares in U.S. congressional elections. Lau (1982, 1985) analyses negativity effects in presidential approval and voting behaviour, and rules out both post-hoc rationalisation and, importantly, the non-equivalence of the positive and negative information as potential rival explanations. The definitive recent work on negativity effects in politics is Soroka (2014)'s excellent book. It provides a good overview of theoretical perspectives and – using extensive analyses of cross-national survey data – traces negativity effects through the political process, from the real economy to newspaper tone, to economic sentiment and popularity of the government.

This article broadly follows this line of research. However, one of the limitations of the existing work discussed here, is that if asymmetric effects are tested, the location of reference point is – explicitly or implicitly – chosen by fiat. This article relaxes this assumption and instead proposes a new method for testing reference-point-dependent behaviour in a systematic and rigorous fashion.

Apart from this new method, the empirical analysis provides a test for asymmetric effects of economic performance on government popularity in Britain. While the previous paragraph focused on literature broadly supporting the notion of an asymmetry, the existence of such negativity effects has also been disputed. Most prominently, Kiewiet (1983) and Lewis-Beck (1990), and more recently Duch and Stevenson (2008) find no evidence of asymmetric effects using individual level data. This type of empirical work has been to criticised 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 difficult to answer using studies that are either purely cross-sectional or dominated by the cross-sectional variance. Nannestad and Paldam (1997) use rolling cross sections showing asymmetric effects in economic voting in Denmark based on quarterly individual level data from 1985 through 1992. Turning our focus back towards the United Kingdom, Headrick and Lanoue (1991) test for, and reject, the existence of asymmetric effects of unemployment and inflation on government popularity for the 1953-1987 period. More recently, however, Soroka (2006, 2014) finds some evidence of negativity effects in the relationship between economic factors and public opinion.

This article builds on Nannestad and Paldam (1997), Soroka (2014) and earlier work in the economic voting literature (Mueller 1970, Bloom and Price 1975), and attempts to integrate this strand more tightly with the ideas of prospect theory, specifically reference-point-dependent behaviour and loss aversion (Tversky and Kahneman 1991). This theoretical perspective also opens up a direct methodological path towards testing for asymmetric effects in the relationship between objective economic indicators and government popularity. Specifically, this article proposes a procedure to test asymmetric effects in a

more direct and rigorous fashion: The theoretical literature stresses the importance of reference points for the evaluation of changes as either 'gains' or 'losses'. The following section provides a method to estimate (aggregate) reference points directly from the data, using threshold models (Hansen 1996). Having located the reference point, one can test whether above and below reference point effects are equivalent, or whether below reference point changes have stronger effects on government popularity. The latter would be the expectation based on prospect theory, and thus constitutes our theoretical prediction:

Asymmetry Hypothesis: *Negative (below reference point) changes in economic performance have a stronger effect on government popularity than positive (above reference point) changes.*

The next section sets out the method to test the *Asymmetry Hypothesis*, which is then applied to the relationship between macroeconomic factors and government popularity in the United Kingdom, using monthly time series data from August 1979 to September 2011.

3 Testing Asymmetric Effects using Threshold Models

The main goal of this paper is to test for asymmetric effects that depend 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

$$y_i = \beta_0 + \beta_1 x_i + \alpha_1 I x_i + \epsilon_i \tag{1}$$

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

$$I = \begin{cases} 0 & \text{if } x_i \geq \tau \\ 1 & \text{if } x_i < \tau \end{cases} \tag{2}$$

The effect of x on y if $x_i \geq \tau$, is β_1 and the effect of x on y if $x_i < \tau$, 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. So practically, to test for

negativity effects, one can just test whether $\alpha_1 > 0$.

In terms of the theoretical idea at hand, if we think about the relationship between government popularity and economic performance, we would generally expect popularity 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, or 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 government popularity should be stronger than if it is above the reference point (domain of gains). The crucial problem of course is that the reference point τ is unknown.[1]

This article proposes a solution to this problem by treating the reference point dependence as a 'threshold effect'. A strategy for dealing with this – similar – type of problem can be found in the econometric literature, starting with Tong and Lim (1980) and Hansen (1996, 2000), and can be adapted for our purpose. Since the reference point τ is unknown, it should be treated as a model parameter and $\hat{\tau}$ be estimated along with the other parameters of the model. Due to the nonlinearity however, $\hat{\tau}$ cannot simply be estimated via OLS. Hansen (1996, 2000) suggests estimation via conditional least squares using the following concentration procedure: first the model is estimated separately for the range of possible values of τ, which yields the sum of squared errors for each model as a function of τ. Then, by searching over the values of τ, we find the model with parameter $\hat{\tau}$ that minimises the sum of squared errors. Hansen (1996, 2000) provides asymptotic theory showing that the parameter estimates of this model with threshold $\hat{\tau}$ are unbiased and consistent estimates of our parameters of interest. The remaining problem with this course of action, however, is how we can 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 problem is a likelihood ratio test using p-values based on a bootstrap that simulates the asymptotic sampling distribution of the test statistic (Hansen 1996, 2000). This paper follows Hansen's approach to threshold estimation and – in summary – proposes the following procedure to test the *Asymmetry Hypothesis*:

Proposed procedure for testing the Asymmetry Hypothesis:

1. *Test for presence of a reference point using Hansen's threshold models.*
2. *Estimate the 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*

[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 popularity 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, though, slow growth rates tend to be evaluated as a decidedly 'bad' thing.

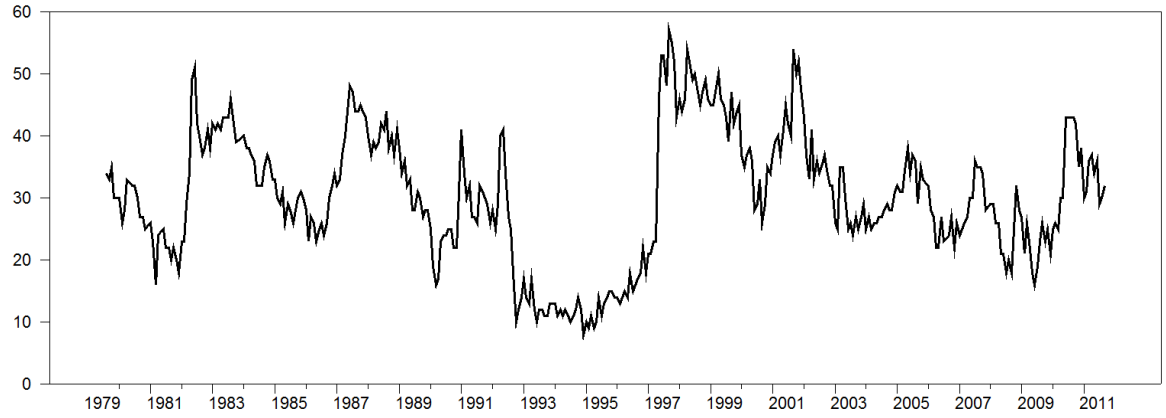

Figure 1: UK Government Popularity 1979-2011

This estimation and testing procedure is now applied to the relationship between macroeconomic factors and government popularity using time series data from the United Kingdom.

4 Results

4.1 Data and Operationalization

The dependent variable of interest, *Government Popularity*, 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 continuously in this form from August 1979 through 2011. The data can be downloaded from the polling firm's website[2]. Figure 1 shows government popularity over the investigation period.

The key monthly macroeconomic time series to feature in models of government popularity in the UK are the rates of unemployment and inflation (Goodhart and Bhansali 1970, Hibbs 1977, Norpoth 1987, Clarke et al. 1990, Van der Brug et al. 2007, Lewis-Beck and Stegmaier 2013). Data were obtained from the OECD's database of monthly economic indicators[3], and all data and replication files are available on the author's website[4].

Several recent studies suggest that government popularity and many of the other time series 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, 1998, Byers et al. 1997, Box-Steffensmeier and Tomlinson 2000, Lebo et al. 2000, Clarke and Lebo 2003).

[2]Government popularity data are available under 'Political Monitor' at ipsos-mori.com
[3]Time series of monthly economic indicators can be downloaded at stats.oecd.org.
[4] [removed for peer review]

Table 1: Tests for Order of Fractional Integration

Variable	$\hat{d}$	SE_d	t(d=0)	t(d=1)	Decision
Government Popularity	0.88	(0.046)	19.037***	-2.596***	$\hat{d}$
Unemployment	1.43	(0.046)	21.325***	9.262***	$\hat{d}$, 1
Inflation	1.18	(0.046)	21.325***	3.877***	$\hat{d}$, 1

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 (auto-regressive fractionally integrated moving average) models in order to remove autocorrelation.[5] The estimates of the order of integration for each series can be found in Table 1.

4.2 Threshold Models

Having taken into account the dynamic properties of the series of interest in terms of order of integration, we can now estimate the baseline model of government popularity as a function of economic performance data, namely unemployment and inflation. Optimal lag length for the explanatory variables was chosen using the AIC and inspection of the cross-correlation functions.[6] Estimation results are presented in Table 3, column (1) below. The Durbin-Watson statistic, Ljung-Box Q test, and visual inspection of the residuals indicate that there is no residual autocorrelation. The results show that over the investigation period, the unemployment rate is the only objective economic measure that has a strong and significant effect on government popularity. As expected, increases in unemployment significantly decrease government popularity.

Having established a (symmetric) baseline model, we can now test for asymmetric effects using threshold models as described above. What results should we expect? Firstly, if voters exhibit reference-point-dependent asymmetric behaviour in line with prospect theory, one would expect to see threshold effects in the evaluation of economic indicators. The strongest objective economic factor in explaining popularity over this time period is the unemployment rate, so one would expect asymmetric behaviour to be present in the effect of unemployment on popularity. Secondly, since the dynamics of the popularity

[5]While accounting for the fractionally integrated nature of the series using ARFIMA models is the preferred method, section 4.4 below shows that 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.

[6]The modeling strategy here broadly follows Hendry's logic of general-to-specific modeling (Hendry and Richard 1982, Campos et al 2005). The results are robust to the inclusion of additional lags. Replication materials for additional models are available on the author's website.

Table 2: Threshold Tests

Variable	Threshold	$\hat{\tau}$	F-test$_{max}$	Bootstrap p-value
Unemployment	Yes	-0.095	6.15*	0.038
Inflation	No	0.025	2.31	0.535

Notes: Results from threshold tests (Hansen 2000) * $p < 0.05$

time series are modelled as (fractional) differences, i.e. they are statements about the effects of changes, a reference point close to zero would make sense conceptually. While in other models any deviation from some optimal level (e.g. an inflation target) 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 most natural.

Table 2 provides estimates of the threshold parameter $\hat{\tau}$, as well as the results of the likelihood ratio tests for each explanatory variable. There is strong evidence for a threshold effect for the unemployment rate. The estimated reference point is – as expected – close to zero. There is no evidence of a threshold effect for inflation. While this indicates that there is reference-point-dependent behaviour in the relationship between government popularity and unemployment, in order to actually test the *Asymmetry Hypothesis*, we however also have to look at the difference between the slopes for values above and below the reference point, to see whether the effects are statistically significantly different from each other, and whether the estimates are actually consistent with theory.

The results of the threshold model are presented in Table 3, column (2). For clarity of presentation and interpretation, the coefficients and standard errors for values above and below the reference point, rather than for the change in the slope are displayed. The results support the expected asymmetric relationship between unemployment and government popularity. The threshold test 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 an average effect, over all values of unemployment, is –4.1. When the coefficient is allowed to vary above and below the estimated threshold $\hat{\tau}$, a different picture emerges. Increases in unemployment (losses) have a much larger effect on popularity than reductions in unemployment (gains). The effect of unemployment for increases above the reference point is –9.1, almost twice the size of the coefficient in the symmetric baseline model. The effect of reductions in unemployment is not statistically significant. Not surprisingly, the asymmetric model also fits the data better (LR-test: $\chi^2(1) = 8.39, p = 0.0038$). Following the testing procedure outlined above, we can use a t-test as a formal test to confirm that slopes are indeed different above and below the reference point ($t = -2.90, p = 0.004$). The result supports the *Asymmetry Hypothesis*. There is reference-point-dependent behavior in the relationship between unemployment and government popularity. If unemployment

Table 3: Estimation Results: Baseline and Threshold Models

	(1) Symmetric	(2) Asymmetric
Δ^d Unemployment$_{t-2}$	-4.146**	
	(1.943)	
Δ^d Unemployment$_{t-2} > \hat{\tau}$		-9.058***
		(2.564)
Δ^d Unemployment$_{t-2} \leq \hat{\tau}$		4.038
		(3.417)
Δ^d Inflation$_t$	-0.722	-0.627
	(0.441)	(0.438)
Constant	-0.024	0.270
	(0.191)	(0.215)
R^2	0.019	0.040
log-likelihood	-1041.39	-1037.20
AIC	2088.79	2082.39
Durbin-Watson	1.87	1.89
Ljung-Box Q	30.3	32.3
N	381	381

Notes: Dependent variable:Δ^d Government Popularity, monthly from 1979:11 to 2011:02. Standard errors in parentheses, significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

rises, government popularity falls. The government is being held responsible for the 'bad news'. Falling unemployment on the other hand, does not lead to an increase in government popularity. The government can expect to be punished for bad economic outcomes without being equally rewarded for good times.

4.3 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 much discussed effect of the Falklands War (Norpoth 1987, Sanders et al. 1987, Clarke et al. 1990). While this approach increases transparency and replicability across different national contexts, it may invite criticism of model misspecification, since these types of exogenous shocks – many of which are unrelated to 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 was conducted, taking into account all election months, changes of the Prime Minister, the wars in the Falklands and Iraq, the ERM crisis, and the September 11 attacks, thereby purging the effects of these shocks from the government popularity time series. Model (3) in Table 4 provides

the estimation results. Since the popularity and economic time series are all estimated as (fractional) differences, the interventions enter in (fractionally) differenced form as well. This implies that the effects materialise quickly as an abrupt pulse, but decay slowly, following the same pattern as the popularity series overall.[7] The results of the model with interventions are similar to the simpler analysis presented above. Overall, the evidence in support of the *Asymmetry Hypothesis* appears to be robust to the inclusion of a variety of non-economic shocks.

The beginning of the analysis section above discussed the dynamic properties of the time series under investigation, and laid out the motivation for using fractional integration techniques. A criticism occasionally levied at ARFIMA methods concerns the complexity of the method and the lack of direct interpretability of the results. In order to alleviate such concerns, an additional set of robustness checks is presented in order to show that the results do not depend on this modelling choice. There is a strong indication that most of the series are integrated of order $I(d)$, meaning they are neither simply stationary, nor a random walk, but that they rather exhibit long memory. Nevertheless, an alternative and indeed simpler method to deal with the dynamic nature of the popularity time series is to use ARIMA methods, treat the series as being either $I(0)$ or $I(1)$, difference it accordingly, and use additional auto-regressive and moving-average parameters to remove remaining autocorrelation. Models (4) and (5) in Table 4 follow this logic. Model (4) treats government popularity as $I(0)$, and estimates an auto-regressive parameter of 0.93, while Model (5) treats government popularity as integrated of order $I(1)$, and simply uses the differenced series. While the exact values of the coefficients of course change with model specification, the substantive result with respect to the existence of asymmetric effects of unemployment on government popularity, remains the same.

As the robustness checks presented here have shown, the main findings do not depend on particular modelling choices. There is robust evidence in support of an asymmetric relationship between the unemployment rate and government popularity in Britain. Increasing unemployment leads to an erosion of support for the incumbent government, while reductions in unemployment do not translate into comparable gains.

5 Conclusion

This article introduced a new method for testing asymmetric, reference-point-dependent behaviour in the relationship between economic performance and government popularity. Specifically, prospect theory suggests that people evaluate changes in an asymmetric way. Depending on a reference point, the value of positive changes ('gains') and negative changes ('losses') differs, with negative changes affecting evaluations and decision making

[7] Alternative specifications, e.g. using up to three additional lags for each event, have been explored as well. None of these choices affect the overall results in support of the *Asymmetry Hypothesis*.

Table 4: Robustness Checks

	(3) ARFIMA Intervention	(4) ARIMA (1,0,0)	(5) ARIMA (0,1,0)
Unemployment$_{t-2} > \hat{\tau}$	-7.581***	-4.639*	-4.508*
	(2.490)	(2.591)	(2.522)
Unemployment$_{t-2} \leq \hat{\tau}$	2.652	-1.625	-1.595
	(3.293)	(2.981)	(2.668)
Inflation$_t$	-0.347	-0.300	-0.454
	(0.427)	(0.331)	(0.433)
Falklands War	6.935***		
	(2.620)		
PM Major	4.548		
	(2.966)		
Gulf War	10.220***		
	(2.980)		
ERM crisis	-5.870**		
	(2.623)		
PM Blair	8.002***		
	(2.618)		
September 11, 2001	8.738***		
	(2.623)		
Iraq War	5.790**		
	(2.629)		
PM Brown	3.027		
	(2.625)		
PM Cameron	-5.760**		
	(2.646)		
Election dummies	(omitted)		
AR(1)		0.934***	
		(0.020)	
Constant	0.207	30.389***	-0.016
	(0.204)	(3.233)	(0.194)
R^2	0.189	0.020	0.015
log-likelihood	-1007.647	-1038.042	-1040.723
AIC	2051.295	2088.084	2089.447
Durbin-Watson	1.87	2.01	2.07
Ljung-Box Q	35.1	27.6	31.4
N	381	381	381

Notes: Dependent variable: Government popularity. Standard errors in parentheses, significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

more strongly. While this loss-averse behaviour can be modelled in a straightforward manner, the problem with detecting these asymmetric effects, is that the reference point used to evaluate performance as 'positive' or 'negative' is generally unknown and – in practice – is often assumed by the researcher. This paper therefore proposes a new procedure to estimate a reference point directly from the data using threshold models. Having estimated the reference point, one can test whether above- and below reference point effects are equivalent, or whether, as hypothesised here, negative (below reference point) changes have stronger effects.

This method is then applied to the well-established relationship between economic performance and government popularity in the United Kingdom, using monthly time series data over the last thirty years. The data analysis shows that there is strong evidence of asymmetric, reference-point-dependent behaviour, notably in the effect of the unemployment rate on government popularity. If unemployment rises, the government will be punished in the sense of a decrease in public support. By contrast, if unemployment falls, public support will not rebound equally. In the long run, this asymmetry in public evaluations can be expected to lead to an erosion of support for incumbent governments as suggested by e.g. Nannestad and Paldam (1997).

Robustness checks show that the results are not sensitive to particular modelling choices. Specifically, we conducted an intervention analysis to cleanse the time series of the effects of unexpected events, such as the war in the Falklands or the September 11 attacks, but the asymmetric relationship between unemployment and government popularity remains virtually unchanged. Similarly, while ARFIMA models are the preferred method to model the dynamic properties of the time series at hand, robustness checks show that ignoring the fractionally integrated nature of government popularity, and simply using the differenced series instead, has no discernible impact on the substantive results.

One potential limitation concerns the estimation of the reference point from aggregate data. While the long time series used here don't readily allow for alternative research designs, underlying individual heterogeneity could of course pose problems. That being said, this criticism would equally apply to all aggregate level models of political behaviour. Furthermore, the testing for and estimation of reference-point-dependent behaviour from the data represents an improvement over the current practice, where asymmetric behaviour is either ignored, and positive and negative effects thus constrained to be equal, or where the reference point is chosen *ad hoc* by the researcher.

In sum, the article provides the literature on economic voting and government popularity with a new method to test for – and estimate models that allow – asymmetric, reference-point-dependent behaviour, and – using this method – the study lends additional support to the view that the popularity of the government in the United Kingdom decreases when unemployment rises, but popularity will not recover in the same way

when unemployment falls.

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