

## **The PM and the Pendulum: Dynamic Forecasting of British Elections**

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We apply a dynamic perspective to forecasting votes and seats in British elections. Our vote model captures the swing of the electoral pendulum between the two major parties while using prime ministerial approval as the (sole) short-run predictor of vote choice. The seat model incorporates the inertia of the previous seat distribution while translating votes into seats. The models forecast the lead of one major party over the other (percentage for votes and number for seats). The statistical estimation includes data on British elections since 1945, although the test for cycles (swing of the electoral pendulum) goes as far back as 1832. The vote model picks the winner of every one of the 1945–2005 elections (out-of-sample forecasts) and is rarely off by more than 2 percentage points. The seat model does almost as well, rarely missing the seat lead by more than 25.

Election forecasting is too important to leave to bookmakers, pollsters and pundits. Voting research has made great strides in identifying key determinants and regularities of partisan choice. We know a great deal about what makes voters support candidates of a particular party and even how these motivations have changed in recent years. Although many students of voting seem to despair at picking just a handful out of the multitude of possible explanations, a growing group has succeeded in distilling insights of electoral research into mathematical formulae to forecast British elections. Some have focused on modelling party support measured in polls ('popularity functions').<sup>1</sup> This type of forecasting can avail itself of a large database and draw on a wide set of predictors. Yet whatever hints about the future may be inferred from popularity functions, the dependent variable is still a subjective measure of party support, not the vote on election day. In contrast, 'vote functions' are designed to forecast the actual outcome, be it votes or seats, but are able to use only a very limited set of predictors since the universe of cases (elections) is so small.<sup>2</sup> Vote functions for British elections, at best, start with the 1945 case, which provides for an  $N$  of seventeen.

What is distinctive about this effort to offer a vote-function forecast for British elections is the specification of a cyclical dynamic. We are able to identify a definite swing of the

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<sup>1</sup> See Paul Whiteley, 'Electoral Forecasting from Poll Data: The British Case', *British Journal of Political Science*, 9 (1979), 219–36; David Sanders, 'Popularity Function Forecasts for the 2005 UK General Election', *British Journal of Politics and International Relations*, 7 (2005), 174–90. An earlier version of this model proved uncannily with its forecast of a Conservative victory in 1992 when many polls, including exit polls, picked Labour to win. See David Sanders, 'Government Popularity and the Next General Election', *Political Quarterly*, 62 (1991), 235–61.

<sup>2</sup> See Anthony Mughan, 'General Election Forecasting in Britain: A Comparison of Three Simple Models', *Electoral Studies*, 6 (1987), 195–207; M. S. Lewis-Beck, R. Nadeau and E. Belanger, 'General Election Forecasts in the United Kingdom: A Political Economy Model', *Electoral Studies*, 23 (2004), 279–90; Helmut Norporth, 'Forecasting British Elections: A Dynamic Perspective', *Electoral Studies*, 23 (2004), 297–305; and Paul F. Whiteley, 'Forecasting Seats from Votes in British General Elections', *British Journal of Politics and International Relations*, 7 (2005), 165–73.

pendulum in British elections, which proves extremely helpful for forecasting. Besides that, we rely on just one other predictor of the vote: the prime minister's standing in the public eye. This may seem like a risky decision, but parsimony comes at a premium in election forecasting, especially for a model that already includes a dynamic element. Even in the parliamentary system such as the British case, no other factor promises to encapsulate all the short-term forces in an election better than PM approval. Our seat model, which translates votes into seats in parliament, also incorporates a dynamic element, one that recognizes the inertia generated by incumbency.<sup>3</sup> To test the robustness of these forecast models, we compute out-of-sample forecasts as well as one-step-ahead forecasts for the most recent elections, and simulate the distribution of the expected error of the 2005 forecast.

#### THE ELECTORAL PENDULUM IN BRITAIN

It is not uncommon in British politics for a general election to bring about a change in the party control of government. The swing of the electoral pendulum is as British as ale and kidney pie. The Labour victory in 1997 was just the latest of many elections since 1832, in which the government was defeated by the opposition. The electoral pendulum nonetheless does not swing with the clockwork-like precision of another British institution – Big Ben.<sup>4</sup> For if it did, this phenomenon would have long been noted and exploited in forecasting. Some governing parties manage to hang on to their majority through three or even four elections, as the Conservatives did from 1979 to 1997; others lose it after a single term. So if the metaphor of the pendulum has any utility at all for elections, it must be allowed to swing in an irregular fashion, though not so irregularly as to be utterly erratic. What forces would prompt the electoral pendulum to swing with any discernible pattern? What theory would postulate electoral cycles?

One likely suspect would be another phenomenon prone to cyclical change and connected with the outcome of elections – the economy. Just as good economic times alternate with bad ones, governing parties may fare well or poorly at the polls. This is the standard premise of economic-voting studies, the literature on which is too voluminous to be covered in this article.<sup>5</sup> The business cycle, nonetheless, is not as regular as the biblical prophecy of seven lean years followed by seven fat years. Recessions and inflationary bursts also do not occur frequently enough to account for swings of the electoral pendulum.

Instead of economics, it may be psychology that provides the key to those swings.<sup>6</sup> Like people in everyday life, voters experience fatigue with the way things are and yearn for novelty. The slogan, 'It's time for a change', is a staple of campaigning by the opposition. The longer a party has been in power, the more chances it has had to make mistakes and disappoint its supporters. What is more, mistakes that are forgiven when a party has just

<sup>3</sup> See Whiteley, 'Forecasting Seats from Votes', for this feature as well.

<sup>4</sup> A graphic display of this swing of the pendulum, however, uses Big Ben as a backdrop. See Sir Ivor Jennings, *The British Constitution*, 5th edn (Cambridge: Cambridge University Press, 1966), p. 52.

<sup>5</sup> For a recent state-of-the-art volume on this subject, see Han Dorussen and Michael Taylor, eds, *Economic Voting* (London: Routledge, 2002); for reviews, see Michael Lewis-Beck and Mary Stegmaier, 'Economic Determinants of Electoral Outcomes', *Annual Review of Political Science*, 3 (2000), 183–219; and Helmut Norpoth, 'The Economy', in Lawrence LeDuc, Richard Niemi and Pippa Norris, eds, *Comparing Democracies* (Thousand Oaks, Calif.: Sage Publications, 1996), pp. 299–318.

<sup>6</sup> Angus Campbell, Philip E. Converse, Warren E. Miller and Donald E. Stokes, *The American Voter* (New York: Wiley, 1960), pp. 554–6.

taken the reins may carry bigger penalties when its leaders have had time to prove themselves. Some claim that the ‘cost of ruling’ inevitably erodes popular support for governing parties; others postulate a ‘coalition-of-minorities’ effect, whereby the cumulative costs of dissatisfaction with government policies outweigh the cumulative benefits of satisfaction.<sup>7</sup>

Whatever the explanation may be, the identification of periodic movement in something like the vote is a daunting task all by itself. When a pendulum swings with an irregular beat (frequency), and the extent of the swing (amplitude) is not constant, mathematical functions like sine-waves are of no use. In a classic work some years ago, the British statistician George Udny Yule offered an ingenious solution.<sup>8</sup> He proposed, maybe even invented, a probability model for cycles whose period and amplitude are irregular. The probabilistic element derived from white noise ( $u_t$ ), with the specific form of the resulting stochastic process being second-order autoregression:<sup>9</sup>

$$z_t = b_1 z_{t-1} - b_2 z_{t-2} + u_t$$

The second-order autoregressive model, Yule proved, was able to track the irregular fluctuations of sunspot observations over a span of 175 years. With only two parameters of opposite sign and lags going no further than two time points, this model succeeded in estimating the periodicity of the sunspot fluctuations (10.6 years). It was also able to provide estimates of the random disturbances that affect the periodicity and magnitude of those fluctuations.

Britain has a history of general elections that is long enough to permit the application of this type of model. It also has an electoral system that has largely remained the same, especially the first-past-the-post rule. And one of the major parties is still the same, at least in name. The size of the electorate, of course, has vastly expanded since 1832, and one of the leading parties in the nineteenth century sharply declined in electoral standing during the twentieth century.<sup>10</sup> Over nearly two centuries the vote division between the two largest parties nonetheless exhibits features of remarkable stability. For the most part, the vote lead stays within boundaries of 20 points, plus or minus. The second feature worth noting is the long-run average of the vote lead:  $-2.2$ , which is statistically indistinguishable from the zero-mark of equal division. And finally, the electoral pendulum swings back and forth: twelve of the forty-four elections since 1832 produced lead changes in the national division of the party vote.<sup>11</sup>

<sup>7</sup> Martin Paldam, ‘How Robust is the Vote Function?’ in Helmut Norpoth, Michael Lewis-Beck and Jean-Dominique Lafay, eds, *Economics and Politics: The Calculus of Support* (Ann Arbor: University of Michigan Press, 1991), pp. 9–31; Anthony Downs, *An Economic Theory of Democracy* (New York: Harper and Row, 1957), pp. 55–60; and John E. Mueller, *War, Presidents and Public Opinion* (New York: Wiley, 1973), chap. 9.

<sup>8</sup> George Udny Yule, ‘On a Method of Investigating Periodicities in Disturbed Series, with Special Reference to Wolfer’s Sunspot Numbers’, in *Statistical Papers of George Udny Yule* (New York: Hafner, 1971), pp. 389–420 (originally published in 1927).

<sup>9</sup> Thanks to Box and Jenkins, processes of this sort have become widely familiar as ARIMA models. See George E. P. Box and Gwilym Jenkins, *Time Series Analysis: Forecasting and Control* (San Francisco: Holden-Day, 1976).

<sup>10</sup> The vote data come from F. W. S. Craig, *British Electoral Facts 1832–1980* (Chichester: Parliamentary Research Service, 1981), p. 49 (elections 1832–1935), and Anthony King, *Britain at the Polls, 2001* (New York: Chatham House, 2002), Appendix, p. 233 (elections 1945–2001).

<sup>11</sup> Statistical tests confirm the existence of equilibrium for British elections through the rejection of the null hypothesis of random-walk behaviour (Dickey-Fuller  $t = -3.6$ ,  $p < 0.05$ ; Phillips–Peron  $t = -3.7$ ,  $p < 0.01$ ). On the concept of electoral equilibrium and a random-walk model of elections, see Donald E. Stokes and Gudmund

TABLE 1 *Autoregressive Components of the Vote in British Elections*

	1832–2005	1868–2005	1885–2005	1918–2005	1929–2005	1945–2005
AR(1)	0.71*** (0.16)	0.46*** (0.13)	0.32** (0.13)	0.39** (0.13)	0.51*** (0.17)	0.66*** (0.18)
AR(2)	−0.01 (0.18)	−0.08 (0.94)	−0.14 (0.23)	−0.18 (0.25)	−0.68* (0.39)	−0.43* (0.21)
Constant	−3.9 (6.3)	1.2 (3.0)	3.4* (1.7)	4.1* (2.1)	2.2* (1.4)	0.6 (1.8)
Standard error (residuals)	9.9	8.8	8.0	8.7	7.5	5.7
LBQ ( <i>k</i> auto- correlations)	3.9 (10)	4.5 (8)	4.6 (8)	2.7 (6)	3.6 (5)	2.7 (4)
<i>N</i>	44	35	32	24	20	17

*Note:* The time-series variable is the Conservative vote lead over the other major party (Liberals until 1918, Labour since then) in general elections. Parameter estimation was done with robust standard errors. None of the LBQ measures indicates significant residual autocorrelation at even the 0.4 level.

*Source:* F. W. S. Craig, *British Electoral Facts 1832–1980* (Chichester: Parliamentary Research Service, 1981), p. 49 (elections 1832–1935), and Anthony King, *Britain at the Polls, 2001* (New York: Chatham House, 2002), Appendix, p. 233 (elections 1945–2001).

\* $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.001$  (one-tailed).

The evidence shown in Table 1 supports the hypothesis that the electoral pendulum in Britain swings with some statistical regularity, but only in the modern phase of British politics. Specifically, elections since 1929 exhibit the significant second-order autoregression that points to a periodic alternation of party fortunes. Given the estimates for the two autoregressive parameters, a positive 0.51 for AR(1) and a negative 0.68 for AR(2), Yule's formula yields a periodicity estimate of 5.0 for British elections.<sup>12</sup> In other words, it takes about five elections to complete a full electoral cycle, which encompasses the rule of both major parties in succession. With a midpoint of roughly 2.5, a party can expect to win about two to three elections in a row before being driven from power by the voters.<sup>13</sup> At least, that is the pattern borne out by the elections since 1929. Why since then? Why not before? What is so special about that election?

For one, the expansion of the franchise that began in 1832 with the Reform Act reached its conclusion, for all practical purposes, just in time for the 1929 election. As the right to vote was extended and equalized in successive reforms (1867, 1884, 1918 and 1928), elections became increasingly an exercise in mass democracy in Britain. And along with

(*F*'note continued)

R. Iversen, 'On the Existence of Forces Restoring Party Competition', in Angus Campbell, Philip E. Converse, Warren E. Miller and Donald E. Stokes (eds.), *Elections and the Political Order* (New York: John Wiley, 1966), pp. 180–93. For an application to British elections, see Norpoth, 'Forecasting British Elections'.

<sup>12</sup> Yule, 'On a Method of Forecasting Periodicities', p. 403.

<sup>13</sup> This is the same dynamic that was also identified in American presidential elections and first used in forecasting the 1996 contest. See Helmut Norpoth, 'Is Clinton Doomed? An Early Forecast for 1996', *PS: Political Science & Politics*, 28 (1995), 201–7; for 2004, see Helmut Norpoth, 'From Primary to General Election: A Forecast of the Presidential Vote', *PS: Political Science & Politics*, 37 (2004), 737–40.

that development, the electoral pendulum began to swing in a more regular fashion, as indicated by the growth of the negative AR(2) parameter. It is well known that the less involved portion of the public contributes disproportionately to electoral change.<sup>14</sup>

Two, the 1929 election redefined the major-party battle in Britain. It was the first time that the newly formed Labour party captured the most seats in the House of Commons, while drawing nearly even in votes with the Conservatives. Britain got its first Labour prime minister. From now on party competition was between Labour and the Tories (Conservatives). Swings of the electoral pendulum between these two parties have proved more frequent and regular than those between Tories and Liberals before. Perhaps in the new age of mass democracy they would have been as frequent and regular between Tories and Liberals had the latter survived as a major party.

Three, by the time of the 1929 election virtually all the 600 or more constituencies featured races that were contested. Gone was the practice where many seats were won without opposition and hence without a count of votes. It was not uncommon in elections up until 1910 for nearly half of the MPs to be elected without opposition. Under these conditions the aggregate vote count across constituencies would sometimes fail to signal a turnover of the seat majority in the Commons. A full count of votes under conditions of competition in all but a few constituencies would make that less likely.

The cyclical dynamic detected in British elections since 1929 puts us in a position to make a forecast for the next election right after the one just held. It is a forecast whose biggest plus also happens to be its biggest minus. Its advantage is that it is unconditional. We know all the information we need to make it with certainty: the values of our predictors (vote in 2001 and 2005). Unfortunately, that is not a lot of information for making a fairly accurate forecast. And so the price is a big forecast error. Before the latest election, the autoregressive model predicted a Tory victory, which is consistent with our periodic estimate of about five elections for a full cycle. After two terms in office the governing party was due for at least a decline, if not a defeat. The point forecast gave the Tories a vote lead of 8.7 percentage points over Labour. But beware: with a standard error that is about as large (7.2 percentage points) it would have been very risky to bet on this forecast. The only way to lower this risk is to add short-term conditions of the election to the forecast model.

#### PRIME MINISTERIAL APPROVAL AND THE VOTE

Having accounted for a significant cyclical movement of British electoral politics in the longer run, we now turn to determinants of elections in the short run. Unlike attempts to explain the voting choices after the fact, forecasting models of election outcomes are, by necessity, exercises in minimalism. Since the cyclical dynamic of our model already consumes the equivalent of two predictors, we decided to put our faith in just a single explanatory factor that makes theoretical sense, is measurable and is available enough time ahead of the event. Our choice: prime ministerial approval.

The choice of prime ministerial approval accords well with the retrospective theory of

<sup>14</sup> For evidence in British elections, see David Butler and Donald E. Stokes, *Political Change in Britain* (New York: St Martin's Press, 1969), pp. 220–3.

voting.<sup>15</sup> In a nutshell, this theory claims that voters re-elect a governing party when they are satisfied with its performance, and that they vote for the opposition when they are dissatisfied with the governing party in office. In British general elections, an incumbent prime minister is always in the race, leading the governing party in a contest for another parliamentary term. Economic variables, to be sure, are a favourite predictor of elections, but much of their effect on the vote must pass somehow through evaluations of incumbents, specifically the prime minister in Britain. Over time the ups and downs of prime ministerial approval have been shown to register the state of the economy along with foreign policy events.<sup>16</sup> So the inclusion of economic variables should not be expected to improve the accuracy of a vote forecast derived from prime ministerial approval.

Without any doubt prime ministerial approval is closely intertwined with the evaluation of the government's performance.<sup>17</sup> Our preference for prime ministerial approval rests on its broader range, encompassing the more personal elements as well: 'party leaders have enough hold on the public's consciousness and are, by the nature of their office, sharply enough set apart by party for popular feeling towards them to have demonstrable effects'.<sup>18</sup>

Analysis of data from the British Elections Studies has shown the influence of leader evaluations for vote choices in Britain.<sup>19</sup> Research relying on aggregate-level time-series data has complemented this evidence in a variety of ways. Both the approval of the incumbent prime minister and prime ministerial preferences (which party leader would make the best prime minister) closely track party support.<sup>20</sup> During the period of Conservative rule (1979–96), in particular, monthly measures of prime ministerial satisfaction and governing party support were found to be strongly correlated (0.91).<sup>21</sup> What is more, this relationship proves to be fractionally cointegrated. In other words, short-term shocks that move the two away from each other will be eroded as the variables return to equilibrium. Between election days, the popularity of the British prime minister moves party support in a powerful fashion.

On election day, as Figure 1 illustrates, prime ministerial satisfaction casts a strong light on governing party success, too.<sup>22</sup> The pattern is quite clear. In almost every instance where

<sup>15</sup> For a classic definition, see Gerald H. Kramer, 'Short-Term Fluctuations in U.S. Voting Behavior', *American Political Science Review*, 65 (1971), 131–43; also Morris P. Fiorina, *Retrospective Voting in American National Elections* (New Haven, Conn.: Yale University Press, 1981).

<sup>16</sup> C. A. E. Goodhart and R. J. Bhansali, 'Political Economy', *Political Studies*, 18 (1970), 43–106; John Hudson, 'Prime Ministerial Popularity in the UK: 1960–81', *Political Studies*, 32 (1984), 86–97; Helmut Norporth, *Confidence Regained: Economics, Mrs. Thatcher and the British Voter* (Ann Arbor: University of Michigan Press, 1992), chap. 8; David Sanders, 'Government Popularity and the Next General Election', *Political Quarterly*, 62 (1991), 235–61.

<sup>17</sup> This is the measure used in the forecast model of Lewis-Beck *et al.*, 'General Election Forecasts in the United Kingdom'.

<sup>18</sup> Butler and Stokes, *Political Change in Britain*, chap. 17.

<sup>19</sup> Harold D. Clarke, David Sanders, Marianne C. Stewart and Paul Whiteley, *Political Choice in Britain* (Oxford and New York: Oxford University Press, 2004), chap. 4; Norporth, *Confidence Regained*, chaps. 5–7.

<sup>20</sup> Harold D. Clarke and Marianne C. Stewart, 'Economic Evaluations, Prime Ministerial Approval and Governing Party Support in Britain: Rival Models Reconsidered', *British Journal of Political Science*, 25 (1995), 145–70; Harold D. Clarke and Matthew Lebo, 'Fractional (Co)integration and Governing Party Support in Britain', *British Journal of Political Science*, 33 (2003), 283–301; and Richard Nadeau, Richard B. Niemi and Timothy Amato, 'Prospective and Comparative or Retrospective and Individual? Party Leaders and Party Support in Great Britain', *British Journal of Political Science*, 26 (1996), 245–58.

<sup>21</sup> Clarke and Lebo, 'Fractional (Co)integration', p. 285.

<sup>22</sup> The question typically asks: 'Are you satisfied or dissatisfied with [name] as Prime Minister?' For elections from 1945 to 1997 we relied on Gallup polls. See Anthony King, ed., *British Political Opinion 1937–2000: The*

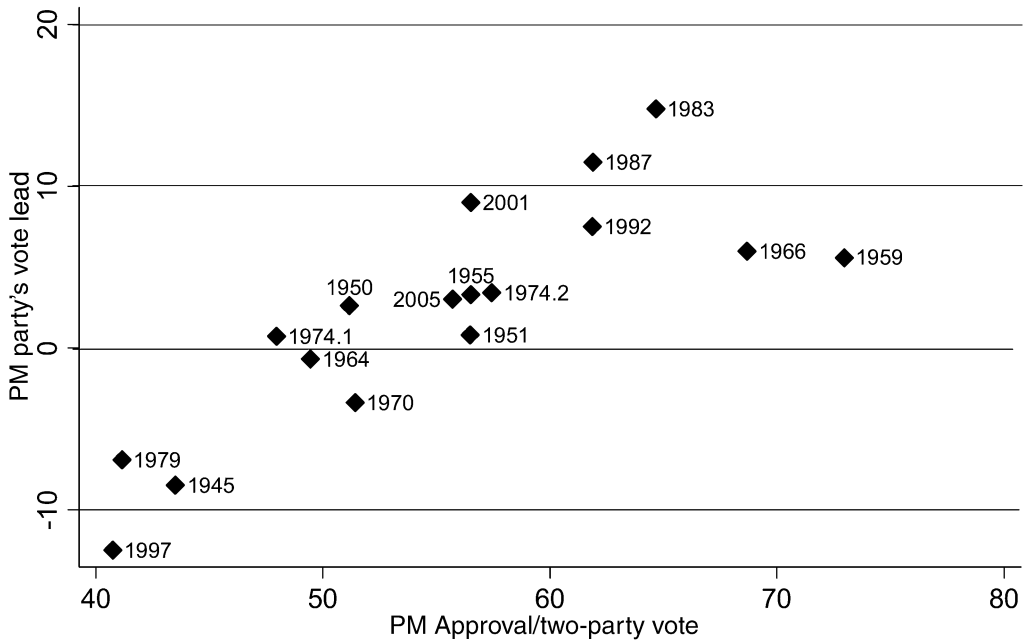


Fig. 1. PM Approval and electoral success, 1945–2001  
 Note:  $r = 0.82$ .

the prime minister commands an approval rating above the 50-point mark prior to a general election, the governing party goes on to defeat the opposition in the vote count. And nearly every time the prime minister's rating falls below 50 points the governing party ends up behind in the vote count.<sup>23</sup> The election of 1970 marks the only occasion where a governing party (Labour) lost even though the prime minister (Harold Wilson) had an approval above 50. By the same token, the February 1974 election is the only one where the governing party (Conservatives) came out ahead in votes even though the prime minister (Edward Heath) was below 50 per cent in approval. The outcomes of recent elections fit well within the overall pattern. In 1997, John Major's poor rating, the all-time low in the chart for a prime minister standing for re-election, presaged the electoral fall of the Conservatives. In 2001, Tony Blair's highly respectable rating secured an easy re-election victory for his party.

It must be noted that our measure of prime ministerial satisfaction is adjusted for the extent of third-party support. A low rating of, say, 40 per cent satisfied is not as bad for the governing party when third parties are expected to command 25 per cent of the vote as compared to 5 per cent. With 75 per cent of the vote going to the two major parties,

(Footnote continued)

*Gallup Polls* (London: Politico, 2001). With that source no longer available, we have turned to MORI, ICM and YouGov polls since then. See [www.mori.com/polls/trends/](http://www.mori.com/polls/trends/) and [pollingreport.co.uk](http://pollingreport.co.uk). Whenever possible, we formed the average from surveys two and three months prior to the date of a general election. For a detailed explanation of how we constructed the measure of prime ministerial approval, see the Appendix.

<sup>23</sup> This threshold closely approximates the one for presidential elections in the United States when incumbent presidents are running. Only Harry Truman (in 1948) won re-election with an approval rating below 50 points.

a prime minister would only need a 37.5 rating to appeal to half of these voters; with 95 per cent, a 47.5 rating would be required.<sup>24</sup>

Also note that these approval measures come from surveys conducted about two months before election day. The timing allows us to make a forecast at the moment when parliament is dissolved and the date of a new election is set. It implies, however, that the ensuing election campaign is not factored into our forecast. To the extent that the conventional wisdom holds true – campaigns largely activate and reinforce existing predispositions – our timing decision may not hurt the forecast. As a practical matter, our hands are tied anyhow since prime ministerial approval measures are not available much later than two months before election day, and almost never during the campaign month.

Though quite strong, the relationship between prime ministerial satisfaction and vote choice is not linear. The pattern displayed in Figure 1 makes clear that the electoral benefits from prime ministerial satisfaction taper off at the upper end of the scale; the same is probably true for the lower end as well. Beyond a rating of 65 per cent (adjusted, to be sure, for the extent of third-party support), a prime minister adds little to the governing party's vote in a general election. This makes good sense, given the bedrock of partisan support each of the major parties enjoys in the British electorate. While non-linear models are well equipped to handle diminishing-return effects of something like prime ministerial satisfaction, they are too costly with only seventeen elections available for model building. So instead we have decided to cap the range of the prime ministerial satisfaction scale at 65. Within this range, the relationship between prime ministerial satisfaction and the vote is quite linear. How well does prime ministerial approval along with the swing of the electoral pendulum predict the vote division in British elections?

#### FORECASTING THE VOTE

Table 2 presents the statistical estimates for our vote model with data from seventeen elections (1945–2005). To recapitulate, the dependent variable (Conservative Vote Lead) is the difference between the Conservative vote percentage and the Labour vote percentage. This measure is used for all elections, regardless of whether the Tories were in government or opposition. As a result, for any election with Labour in office the predictor 'PM satisfaction' must be inverted.<sup>25</sup> Both the cyclical dynamic (the two AR-parameters) and PM satisfaction prove highly significant. It is worth noting that the former shows up undiminished in the multivariate specification. That tells us that PM approval is not the source of the cyclical dynamic of the vote; nor is any other vote determinant such as economic performance that is absorbed by this satisfaction measure. The palpable electoral cycle operates independently of those forces.

Our vote model, which combines the autoregressive dynamic with PM satisfaction, picks the winner of the vote in every general election since 1945, as can be seen in

<sup>24</sup> A special adjustment had to be made for the 1945 election. With Labour having been part of the wartime government, we discounted the partisan effect of Prime Minister Churchill's satisfaction rating by a factor of 2. His satisfaction rating prior to the 1945 election (87 per cent) thus enters as 43.5 per cent into the analysis.

<sup>25</sup> PM satisfaction ratings are inverted at the midpoint of the scale (50), so we subtract 50 from every rating first and then multiply this difference by  $-1$  for a Labour prime minister. Hence a Labour prime minister with a rating of 58 per cent, would be scored as  $(58 - 50) \times -1 = -8$ , while a Tory prime minister with a 58-point rating would count as  $(58 - 50) = 8$ . Also recall that ratings are constrained to be below 65 and that the raw satisfaction percentages reported in polls are adjusted for the extent of third-party support. For more details, see the Appendix.



TABLE 2 *A Forecast Model of the Vote in British Elections*

	Coefficient	Robust s.e.
Prime Minister Approval	0.623***	0.063
AR(1)	0.771***	0.117
AR(2)	-0.661***	0.169
Constant	0.549	0.752

*Note:* Dependent variable is Conservative vote lead. Parameter estimation was done with robust standard errors.  $N = 17$ .  $R^2 = 0.87$ , Adjusted  $R^2 = 0.84$ . Standard error = 2.49. LBQ = 1.19,  $p > \chi^2_{(6)} = 0.98$ . \*\*\* $p < 0.001$  (one-tailed).

Table 3. These are out-of-sample predictions, meaning they are based on model estimates that do not include the specific election being forecast. To take an example, the forecast for 1997 is based on data from 1945 to 1992, and from 2001 to 2005, to estimate the model, whose parameter estimates will differ from those presented in Table 2 (based on all seventeen elections). The resulting out-of-sample forecast for 1997 gives Labour a lead of 7 per cent, which misses the result (12.5 per cent) by 5.5 points. Though a fairly big deviation, the forecast still gets the winner right. Most of the out-of-sample predictions fall within 2 points of the actual vote. What is more, our vote model performs quite well in the real close cases such as 1951 (a 0.8 per cent Tory vote loss), 1964 (a 0.7 per cent Tory vote loss), and the February 1974 election (a 0.7 per cent Tory vote victory). When the model is off by larger amounts in its predictions, there is little harm since the outcome is a landslide (1955, 1983 and 1997). Additionally, as a measure of overall fit the mean absolute error (MAE) of the model is 2.2.<sup>26</sup>

An even tougher test yet of the model's forecasting prowess is its ability to forecast an election ahead of time, with only elections up to that time included in the model estimation. Just as if one were looking ahead to the next election. That, of course, cannot be done for each of the seventeen elections, but only for recent ones, since we need a reasonable pool of elections for model estimation. The one-step-ahead-forecasts displayed in Table 3 go as far back as 1979, the model for which uses ten cases to estimate three parameters. So, if we were to pretend to travel back in time to about two months before the 1979 election, our model would have forecast a Conservative vote victory over Labour by 3.2 percentage points. The actual margin was 6.9 points, so the model missed it by 3.7 points, but got the outcome right. Going on to 1983 and further elections, this type of forecast also

<sup>26</sup> Lewis-Beck cites the MAE as 'a rough idea of how much real error the model generates, at least after the fact' (Michael Lewis-Beck, 'Election Forecasting: Principles and Practice', *British Journal of Politics and International Relations*, 7 (2005), 145–64). See also James E. Campbell, 'Polls and Votes: The Trial-Heat Presidential Election Forecasting Model, Certainty, and Political Campaigns', in James E. Campbell and James C. Garand, eds, *Before the Vote: Forecasting American National Elections* (Thousand Oaks, Calif.: Sage, 2000).

TABLE 3 *Out-of-Sample Predictions and One-Step-Ahead Forecasts of the Vote*

Election	Actual Tory lead	Out-of-sample		One-step-ahead	
		Prediction	Error	Forecast	Error
1945	- 8.5	- 3.3	5.2	-	-
1950	- 2.6	- 2.3	0.3	-	-
1951	- 0.8	- 2.8	- 2.0	-	-
1955	3.3	8.4	5.1	-	-
1959	5.6	7.3	1.7	-	-
1964	- 0.7	- 2.3	- 1.6	-	-
1966	- 6.0	- 6.8	- 0.8	-	-
1970	3.4	2.2	- 1.2	-	-
1974 F	0.7	0.2	- 0.5	-	-
1974 O	- 3.4	- 6.5	- 3.1	-	-
1979	6.9	6.0	- 0.9	3.2	- 3.7
1983	14.8	8.9	- 5.9	8.6	- 6.2
1987	11.5	11.2	- 0.3	11.0	- 0.5
1992	7.5	6.5	1.0	7.8	0.3
1997	- 12.5	- 7.0	5.5	- 6.2	6.3
2001	- 9.0	- 9.6	- 0.6	- 9.2	- 0.2
2005	- 2.9	- 1.3	1.6	- 1.3	1.6

gets it right each time, missing the actual result by less than a single point in 1987, 1992 and 2001.

For the most recent election, the one-step-ahead forecast in Table 3 (the same, by necessity, as the out-of-sample forecast in this case) gives Labour a narrow lead.<sup>27</sup> The key is Blair's approval rating. Figure 2 shows the rise and fall of the predicted Labour lead in 2005 with changing levels of prime ministerial approval. At the point marked by the vertical line, which represents Blair's pre-election rating, Labour could expect to count on a lead of 1.3 points over the Tories. This is an adjusted approval rating, to be sure, which takes third-party strength into account. But remember that this adjustment is standard procedure in our analysis, not a special feature of 2005.<sup>28</sup> So with only about seven in ten voters planning to vote for one of the major parties, Blair's seemingly low approval rating

<sup>27</sup> This, we must admit, differs from our forecast issued on 24 March 2005, which predicted a Tory vote victory by 3.8 points. The difference is due to a revision of Blair's approval rating and the adjustment factor for third-party strength. The March forecast relied on a single polling organization, whereas the forecast reported here combined the ratings from all we were able to locate, after the fact (MORI, ICM and YouGov). We also used the average of third-party support in these polls to adjust Blair's 'raw' approval rating.

<sup>28</sup> The average of polls used in this analysis put Blair's 'raw' approval at 39.7 per cent and the third-party share at 28.7 per cent. That converts to an adjusted rating of  $39.7/(1 - 0.287) = 55.7$ .

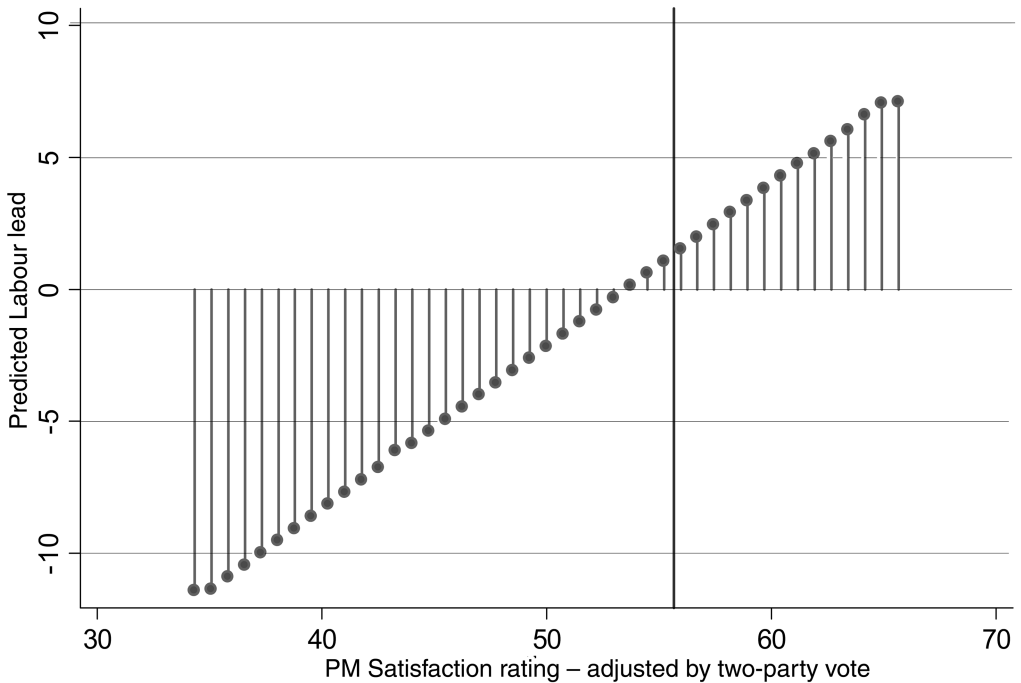


Fig. 2. Labour lead in the two-party vote

was actually good enough to give his party the lead over the Tories. What is more, it was big enough to overcome the likely downturn in Labour's fortunes predicted by the cyclical dynamic of our model. With two terms in office, the odds were not favourable for another electoral affirmation of Labour's rule. The slender margin of victory in 2005 is a tribute to the dynamic component of our model.

#### FORECASTING SEATS

The outcome of the popular vote, of course, is not nearly as consequential for governing as is the distribution of seats. The party with the most votes in British general elections is not invariably rewarded with a majority of seats, or even most seats, in the Commons. As recently as February 1974, the party winning the popular battle was beaten in the seat count. Are these instances just fluky exceptions to the rule, or do they manifest an electoral bias?

Research has produced evidence of bias, but of a bias whose partisan direction has flipped.<sup>29</sup> While the Tories were the beneficiaries in post-war elections until about 1970, the advantage has swung to Labour since then, and massively so in 1997. In other words, Labour these days can expect to come up with an edge in seats while losing the vote to

<sup>29</sup> For a discussion of the causes and changing nature of the bias in electoral proportionality, see: Ron Johnston, Charles Pattie, David Rossiter, Danny Dorling, Iain MacAllister and Helena Tunstall, 'New Labour's Landslide and Electoral Bias: An Exploration of Differences between the 1997 UK General Election Result and the Previous Thirteen', in J. Fisher *et al.*, eds, *British Elections and Parties Review* 9 (London: Cass, 1999).

TABLE 4 *Forecasting Seats from Votes in British Elections*

	Coefficient	Robust s.e.
Conservative Vote Lead	15.657***	0.804
AR(1)	0.819***	0.120
Constant	- 44.259	29.691

*Note:* Dependent variable is Conservative seat lead. Parameter estimation was done with robust standard errors.

$N = 17$ .

$R^2 = 0.96$ , Adjusted  $R^2 = 0.95$ .

Standard error = 26.73.

LBQ = 5.04,  $p > \chi^2_{(6)} = 0.54$ .

\*\*\* $p < 0.001$  (one-tailed).

the Tories, up to a certain point. Oddly as it may sound, the Tories these days are the underprivileged party, electorally speaking. What is more, the huge Labour landslides in 1997 and 2001 have built up an inertia in seats that acts as a cushion in subsequent elections. Who likes to give up a seat, in parliament or on the bus? Some MPs may be able to cling to their seats even when an unfavourable vote tide threatens to unseat them. A first-order autoregressive process is designed to capture this incumbency advantage. One useful aspect of this is that it allows the bias of the electoral system to be incorporated in a dynamic fashion. The bias varies depending on how big it was the last time.

The estimates in Table 4 confirm both the pro-Labour direction of the electoral bias (forty-four seats) and the pronounced inertia of parliamentary seats (0.82). Once Labour won its first landslide, in 1997, the party's seat cushion was protected from erosion in the next election even with a diminished vote lead, contributing to another Labour landslide in 2001. For 2005, a one-step-ahead forecast in the event of a dead heat in votes gave a Labour lead of (can you believe it?) eighty-six seats.

Our seat model performs impressively, as can be seen in Table 5. The out-of-sample forecasts pick the winner in all but one election, the exception being a case where the vote winner came in second in seats (1951), though even here the seat forecast barely misses getting it right. In half of the seventeen elections since 1945, the forecast's error is fewer than fifteen seats. In particular, the model gets several close calls right (1964, 1970 and 1974 February), and the biggest deviation occurred quite a while ago (1950). The mean absolute error is only twenty-one seats and it is reassuring that the surprising fourth majority for the Conservatives in 1992 is predicted within seventeen seats, and the scope of Labour's enormous 254-seat landslide in 1997 is predicted within just seven seats. These two elections also offer a useful analogy for the 2005 election. With the electoral cycle pointing to a swing of the pendulum the government appeared to have had enough of a seat cushion to survive for one more term. Looking ahead to the next election, the swing might be less avoidable – though a switch in prime minister to Gordon Brown could manage to replicate the electoral success of the Thatcher/Major transition.

It must be noted that the seat predictions presented in Table 5 rely on the actual vote, not the predicted vote. That may demonstrate how well the vote translates into seats, but it does not help us make a seat forecast ahead of an election. For such a forecast we

TABLE 5 *Out-of-Sample Predictions of Seats*

Election	Actual Tory lead	Predicted Tory lead	Error
1945	- 180	- 165.3	14.7
1950	- 16	- 88.1	- 72.1
1951	26	- 1.3	- 27.3
1955	68	75.3	7.3
1959	107	92.0	- 15.0
1964	- 13	- 3.8	9.2
1966	- 110	- 102.9	7.1
1970	42	31.4	- 10.6
1974 F	- 4	- 6.2	- 2.2
1974 O	- 42	- 75.8	- 33.8
1979	70	110.1	40.1
1983	188	194.0	6.0
1987	147	136.2	- 10.8
1992	65	82.3	17.3
1997	- 254	- 260.6	- 6.6
2001	- 247	- 196.3	50.3
2005	- 159	- 132.2	26.8

obviously have to rely on a forecast of the vote. In the case of the 2005 election, that yields a one-step-ahead forecast of a 107-seat lead for Labour over the Tories, based on a predicted vote lead of 1.3 points.<sup>30</sup> To secure such an enormous seat lead with a (predicted) vote lead of just 1.3 points is a tribute to the pro-Labour bias of the vote-seat translation and the carry-over effect from the landslide of 2001. It would have taken a vote lead of more than 5 percentage points for the Tories to just draw even with Labour in the Commons.

Even so, a forecast of a 107-seat lead need not ensure a majority in the Commons. Whether or not it does, depends on the number of seats for all third parties combined. Even more daunting than forecasting the votes and seats of the two major parties is doing so for third-party voting. While this was beyond the scope of our forecast model, Whiteley was able to solve the problem of estimating third-party seats and generate a very accurate forecast of the Labour majority in 2005.<sup>31</sup> Lacking such guidance we had to condition our forecast of a majority on a guess of third-party seats. With pre-election polling in 2005 showing third-party support even stronger than in 2001 (when these parties obtained eighty

<sup>30</sup> This differs from our seat forecast issued on 24 March 2005, which predicted a Labour lead of only twenty-six seats. The change is the result of revising the predicted vote lead from 3.8 points in favour of the Tories to one favouring Labour by 1.3 points. Also note that the out-of-sample prediction for 2005 reported in Table 5 is based on the actual vote in 2005, not the predicted vote.

<sup>31</sup> Whiteley, 'Forecasting Seats from Votes'.

seats), a Labour majority was a close call in 2005, even with a lead of 107 seats over the Tories.

The forecast of a specific seat lead is, of course, just that – a point estimate of a future event. It is extremely unlikely that the next election will turn out exactly as predicted. If it did, it would just be dumb luck. There is truth to the saying that you cannot predict the future if the standard is perfection. What kind of dispersion of the future around the forecast of a specific seat lead should we be prepared to expect? To wit, given the point forecast of a 107-seat lead, how likely was it that Labour would win (or lose) the seat battle? Win enough seats, say eighty, to secure a majority? Win another landslide?

To answer such questions we estimate a probability distribution for our forecast. We simulate 100,000 random versions of the 2005 election, based on the 1945–2001 model estimates (thus not including any vote or seat data for the 2005 case). Each parameter estimate of the 1945–2001 models for votes and seats, given the standard errors of these parameters, provides distributions from which to sample randomly.<sup>32</sup> Likewise, our key predictor of the vote, prime ministerial approval, has a distribution from which to draw random samples.<sup>33</sup> The resulting vote predictions for the 2005 election were then fed into our seat model along with randomly selected values for the other parameters of that

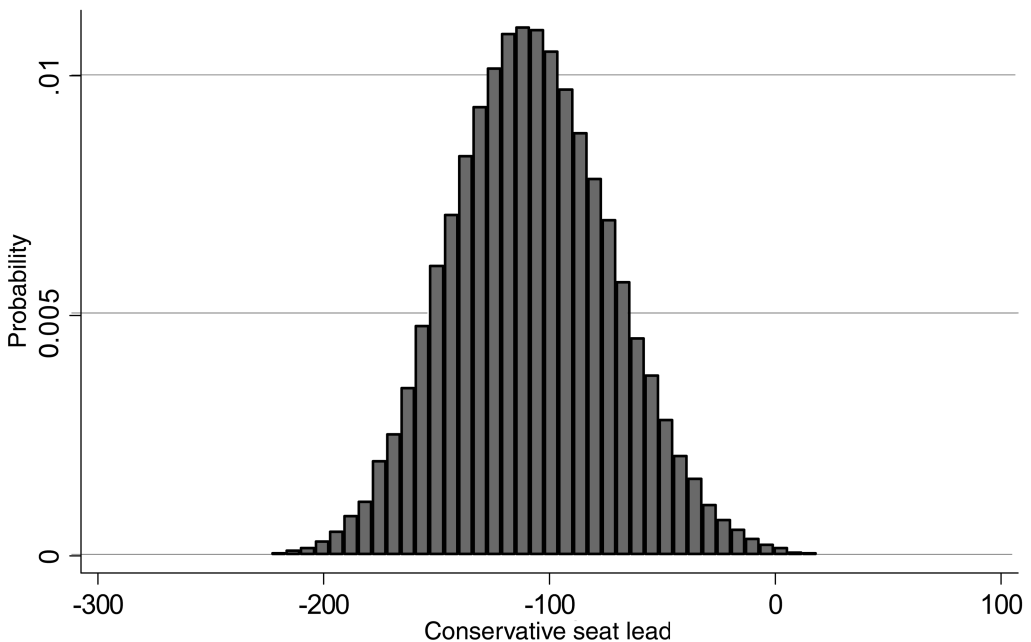


Fig. 3. Probabilities for 2005 seat distribution  
Note: Based on 100,000 simulations.

<sup>32</sup> Each probability distribution is defined by the coefficient and standard error estimated in the 1945–2001 models. For example, in each simulation, the coefficient for the PM variable is drawn from a normal distribution with a mean of 0.617 and a standard deviation of 0.058. Autoregressive parameters are constrained between 1 and  $-1$ .

<sup>33</sup> Based on a series of polls from June 2003–February 2005, we define this distribution as normal with a mean of 37.5 and a standard deviation of 1.5.

model.<sup>34</sup> Doing this 100,000 times gives us the ability to speak of the likelihood of various outcomes.

As shown in Figure 3, the simulation indicates a near certainty (0.998) that Labour would win a plurality of seats. Despite the narrow lead in the popular vote, as predicted by the vote model, there was almost no chance that the Tories could pull ahead in seats. What is more, Labour's chance of winning a majority of seats (more than eighty) was quite high (0.777). Yet the likelihood of repeating a landslide of 1997 and 2001 dimensions (lead of over 200) was almost nil (0.003). The big unknown in this simulation, however, was the size of the third-party contingent. If those parties managed to secure far more than the eighty seats assumed here, Labour might still fall short of a majority with a 107-lead over the Tories. In the end, third parties captured a total of ninety-two seats in 2005, which would have turned a 107-seat lead into a majority of barely fifteen.

#### CONCLUSION

Election forecasting has much to gain and nothing to lose from considering the dynamic of change, whatever the explanation may be. Every election, in some way, builds on one or more previous ones. Although it is impossible to say precisely when and by how much the electoral pendulum will sway, its swing in British elections proves regular enough for forecasting. Since 1929, when Labour first won a general election, government control in Britain has changed hands in eight elections. Our forecast model for British elections exploits the swing of the electoral pendulum with the help of a second-order autoregressive process. In a nutshell, after two terms in office the odds favour the opposition in a general election.

In addition to the cyclical pattern, our vote model relies on just a single predictor in the short run: prime ministerial approval. It is a measure that encapsulates incumbent performance across the board of issues plus personal evaluations of the top government leader. The 50 per cent level of prime ministerial approval is a critical threshold – the party of the PM has lost only one election with approval above that mark and won only once when below it (as adjusted for the size of third-party support). Blair's adjusted approval rating in 2005 was good enough to give Labour a narrow lead in the vote, overcoming the downturn predicted by the cyclical dynamic of our vote model.

We doubt whether the inclusion of economic variables would markedly improve the accuracy of this forecasting model. The economy, to be sure, matters for elections, but it does so typically by working its way through the popularity of the government, which our model explicitly captures through prime ministerial approval. Economic variables are the staple of popularity functions. So what value can they add to the vote function if popularity is the key predictor here? More likely, consideration of the opposition may improve forecasting performance. It is small comfort that most forecast models of elections suffer from this omission. The retrospective theory of voting, of course, says that elections are referendums on incumbent performance, and there always is an incumbent prime minister in a British general election. Several elections nonetheless strongly hint at the influence of public assessments of opposition leaders. In 1983, Michael Foot's abysmal rating

<sup>34</sup> The parameters of the 1945–2001 SEATS model give us the distribution from which we draw randomly a constant, a coefficient for VOTE, and an autoregressive parameter for our simulations. Note that this procedure uses no information from the 2005 election itself and thereby differs from our 2005 seat forecast based on the actual 2005 vote, which gives Labour a lead of 132 seats (Table 5).

probably helped Prime Minister Margaret Thatcher gain a bigger victory than her own approval predicted, just as in 1997, Blair's impressive rating as opposition leader may have added to Labour's margin. In the 2005 election, Michael Howard's poor image as the Conservative leader did little for his party's prospects. There might well be improvements to be made in models by considering how to include the opposition in the calculus of voting in British elections.

#### APPENDIX

Here we outline the general and specific decision rules we followed to construct our prime ministerial satisfaction variable. We could find no source that reliably asked the PM satisfaction question at the same point prior to every election going back to 1945. The British Gallup Poll, administered most months since 1945, provides us with the bulk of our data, but ends prior to the 2001 election. For 2001 we rely on MORI, the only organization we were able to locate, but for 2005 we took advantage of additional polls by ICM and YouGov and averaged them with the MORI poll.

More specific decision rules we used are as follows:

*Months used:* We are interested in pre-campaign ratings primarily to give our forecasting tool some lead time. We use the last two pre-election polls not conducted in the month of the election or the month before the election, but not any further back than six months before the election. The only exceptions are for the 1955 election for which only one poll was available in that window and the 2005 election, where three poll ratings were available.

*Third-party support:* We reason that a given satisfaction rating is more helpful to a prime minister as support for the two major parties decreases. That is, assuming that third-party and minor-party voters are not satisfied with the prime minister, we are interested in the proportion of two-party voters that are satisfied. Thus, we divide the PM satisfaction rating by the proportion of the two-party vote. These figures are based on the aggregate vote intentions from polls taken the same months as the PM question.

*Midpoint:* So that we can have a midpoint of zero for our measure, we subtract 50 from each observation. This is an innocuous transformation.

*Party of the prime minister:* Since our dependent variable is measured in terms of Conservative support, higher values for the PM variable need to reflect better Conservative prospects. Thus, we multiply the variable by  $-1$  for Labour prime ministers.

*Boundaries for the variable:* The effects of PM satisfaction are expected to be non-linear to the extent that at a certain point higher (or lower) ratings will cease to help (or hurt) a prime minister's party (see Figure 1). Rather than transform all of the data, we simply truncate two observations at  $-15$  and  $+15$ . A logarithmic or similar transformation seems unwarranted given the additional complication and given that the data are approximately normally distributed.

*Churchill's 1945 rating:* Winston Churchill's impressive 87 per cent approval rating at the end of the Second World War was as the leader of a coalition containing two major parties. We halve the number as a best guess of how many coalition supporters preferred him to Labour's Clement Attlee.

In sum, our variable is constructed as follows with the only caveat being the truncation of 1959's and 1966's values:

$$\left( \frac{\text{Approval}}{\text{Two Party Vote}} - 50 \right) \times -1 \text{ (if prime minister is Labour).}$$

Table A1 lists the details of how each value of our PM variable is constructed.



TABLE A1 *Calculating the Adjusted PM Approval Measure*

Election	Poll and months used	Calculation	Adjusted PM approval
5 July 1945	Gallup – April & May	$\left(\frac{87}{2} - 50\right)$	- 6.50*
23 February 1950	Gallup – September & Dec.	$\left(\frac{44}{0.86} - 50\right) \times -1$	- 1.16
25 October 1951	Gallup – May & July	$\left(\frac{50}{0.885} - 50\right) \times -1$	- 6.50
26 May 1955	Gallup – January†	$\left(\frac{52}{0.92} - 50\right)$	6.52
8 October 1959	Gallup – July & August	$\left(\frac{64.5}{0.884} - 50\right)$	15.00‡
15 October 1964	Gallup – July & August	$\left(\frac{45}{0.91} - 50\right)$	- 0.55
31 March 1966	Gallup – January & Feb	$\left(\frac{65.5}{0.91} - 50\right) \times -1$	- 15.00‡
18 June 1970	Gallup – March & April	$\left(\frac{45.5}{0.885} - 50\right) \times -1$	- 1.41
28 February 1974	Gallup – Nov. & Dec.	$\left(\frac{37.5}{0.782} - 50\right)$	- 2.05
10 October 1974	Gallup – July & August	$\left(\frac{42.5}{0.74} - 50\right) \times -1$	- 7.43
3 May 1979	Gallup – February & March	$\left(\frac{36}{0.875} - 50\right) \times -1$	8.86
9 June 1983	Gallup – March & April	$\left(\frac{45.5}{0.7175} - 50\right)$	13.37
11 June 1987	Gallup – March & April	$\left(\frac{41}{0.6775} - 50\right)$	10.47
8 April 1992	Gallup – January & Feb.	$\left(\frac{48}{0.775} - 50\right)$	11.94
1 May 1997	Gallup – February & March	$\left(\frac{34.5}{0.825} - 50\right)$	- 8.18
7 June 2001	MORI – March and April	$\left(\frac{45.5}{0.805} - 50\right) \times -1$	- 6.52
5 May 2005	ICM (Jan.), MORI (Feb.), YouGov (March)§	$\left(\frac{39.7}{0.713} - 50\right) \times -1$	- 5.68

\*The 1945 PM approval rating is adjusted for the coalition government headed by Churchill.

†Only poll available in selection window.

‡Truncated within + 15/ - 15 range.

§Last poll of each organization available before election.

