Supplementary materials

A. Sources and coding of the data

Data

The study data focus on question about incumbent vote share and its predictors, namely incumbent vote intention, economy and terms. Data were collected from different sources. The sample covers the electoral years in six Western countries: Australia (1955–2016), Canada (1957–2015), Denmark (1960–2015), Germany (1957–2013), UK (1955–2017) and USA (1956–2016).

Variables and coding

- Vote
  Vote in favor of the incumbent party or coalition in a country election year (%)
  Country specific data sources:

    – Australia: data from Australian Electoral Commission website (`www.aec.gov.au`).
    – Canada: 1957-2008 from Bélanger and Godbout (2010); 2011, 2015 from various polling firms (Wikipedia). See also, Mongrain (Forthcoming).
    – Denmark: `www.parlgov.org`.
    – Germany: `www.parlgov.org`.
    – UK: data from PollBase (Mark Pack's spreadsheet).
    – USA: data from Lewis-Beck and Tien (2016).

- Absolute residuals
  Absolute difference between observed values and predicted values (prediction errors) based on the incumbent vote model (Table 1 in the manuscript).

- Economy
  GDP growth rate two quarters prior to the date of election.
  In most cases, data are growth rates compared to the same quarter of the previous year. The data were retrieved from stats.oecd.org/index.aspx?queryid=350OECD.Stat for: Australia (1958–2016), Canada (1963–2015), Denmark (1964–2015), Germany (1961–2017), the UK (1959–2017) and the USA (1956–2016).
  For some electoral years, quarterly GDP data are not available (Australia 1955; Canada 1957, 1958, 1962; Denmark 1960; Germany 1957; UK 1955). For

these election years, we make use of annual GDP growth rates, that we retrieved knoema.com/HSWE/historical-statistics-of-the-world-economy-1-2008-ad?tsId=1000910here. These annual data were then transformed to construct an estimate of the GDP growth rate at -6 months. For doing so, we follow Bélanger and Gélineau (2010, p. 98) and apply the following formula:

$$\rho = [\rho_{t-1} \times \frac{(12 - \sigma_t)}{12}] + [\rho_t \times \frac{\sigma_t}{12}] \tag{1}$$

where ρ is the annual economic indicator, σ is the month for which we want to calculate the GDP growth rate (in our case, 6 months before the election), and t is the year at -6 months.

- Vote intention
  Vote intentions in favor of the incumbent party or coalition within country electoral year (%).

  – Australia:
    - McAllister, Ian, Malcom MacKerras and Carolyn Brown Boldiston. 1998. *Australian Political Facts* (2nd edition). Chapter 5: Public Opinion Polls. South Melbourne: Macmillan, Education.
    - Roy Morgan Research Centre. 2016. www.roymorgan.com/morganpoll/federal-voting/primary-voting-intention-trend-1901-2016Primary Voting Intentions (%) Long-Term Trends (1901–2016).

  – Canada:
    - Election Almanac. 2016. www.electionalmanac.com/ea/historic-canada-election-polls/Historic Canada Election Polls.
    - Pickup, Mark. 2018. dataverse.harvard.edu/file.xhtml?fileId=3132379version=RELEASED Federal Election Vote Intention Polls: 1945–2011.

  – Denmark
    - Gallup Political Index, Denmark, 1957–2015 (per courtesy of Rune Stubager, University of Aarhus)

  – Germany:
    - Jérôme, Bruno, Véronique Jérôme-Spéziari and Michael Lewis-Beck. 2017. "The Grand Coalition Reappointed but Angela Merkel on Borrowed Time." *PS: Political Science & Politics* 50(3): 683–685 (see notes 7 and 9, 685).
    - Norpoth, Helmut and Thomas Gschwend. 2010. "The Chancellor Model: Forecasting German Elections." *International Journal of Forecasting* 26(1): 42–53.

  – Great Britain:
    - Pack, Mark. 2018. www.markpack.org.uk/opinion-polls/PollBase: Opinion

Polls Database from 1943–Today.

- King, Anthony. 2000. British Political Opinion, 1937–2000. The Gallup Polls. London: Politico's Publishing.

- www.ipsos.com/ipsos-mori/en-uk/political-monitor-archiveIPSOS MORI Political Monitor Archive. 1979–2017.

– United States:

- Campbell, James E. 2016. "The Trial-Heat and Seats-in-Trouble Forecasts of the 2016 Presidential and Congressional Elections." *PS: Political Science & Politics* 49(4): 664–668.

- Lewis-Beck, Michael S. and Charles Tien (2016). "The Political Economy Model: 2016 US Election Forecasts." *PS: Political Science & Politics* 49(4): 661-663.

- Time
A rank was assigned to each electoral year, with the oldest electoral year taking the value of 1 and the most recent electoral year taking the maximum value for a given period. Scores are rescaled from 0 to 1.

B. COUNTRY-SPECIFIC MODELS

TABLE 1   *Linear regression models for incumbent vote share in Australia, Canada, Denmark, Germany, UK and USA (country-specific models)*

	UK	Australia	Canada	Denmark	Germany	USA
Vote intention	0.78***	0.37**	0.47*	0.83***	0.71***	0.51***
	(0.14)	(0.10)	(0.22)	(0.09)	(0.14)	(0.08)
Economy	0.54	-0.08	-0.34	0.32	0.72**	0.91**
	(0.33)	(0.24)	(0.91)	(0.26)	(0.23)	(0.27)
Constant	7.79	34.52***	19.63*	6.43	15.09*	22.24***
	(5.82)	(4.46)	(8.86)	(3.14)	(6.03)	(4.03)
N	17	23	20	21	17	16

Notes: Entries are unstandardized coefficients regression with standard errors in parentheses. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests).

Figure 1.   Absolute unstandardized residuals for incumbent vote model in Australia, Canada, Denmark, Germany, UK and USA (1955–2017), errors from country-specific models
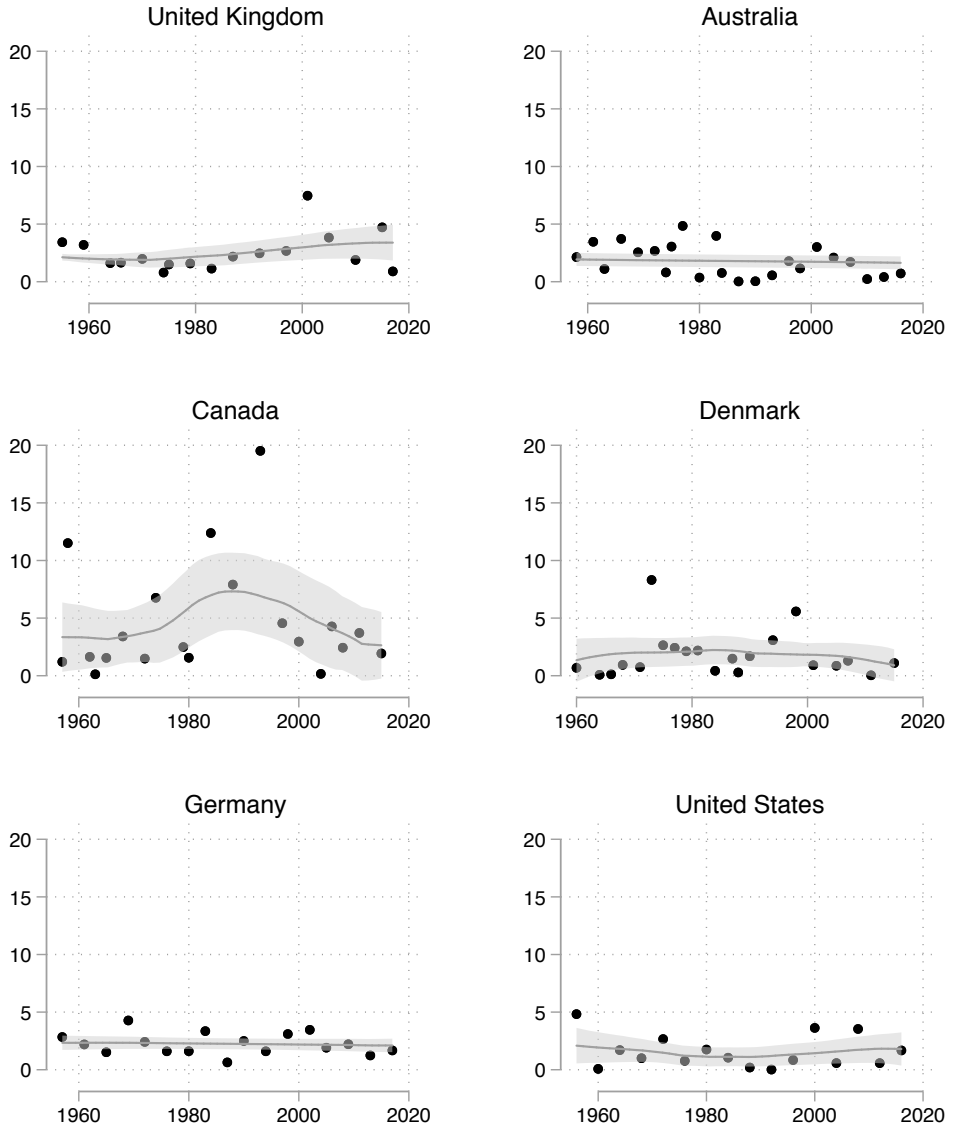
Note: Absolute unstandardized residuals and local polynomial smoother line. Grey area represents the 95% confidence intervals.

C. DIFFERENT OPERATIONALISATIONS OF TIME

TABLE 1 *Linear regression for absolute residuals of the incumbent vote model, different operationalisations of time*

	(1)	(2)
Time	2.39	
	(5.08)	
Time^2	-1.96	
	(4.72)	
Years since 1955		0.01
		(0.01)
Australia	-0.55**	-0.50***
	(0.10)	(0.01)
Canada	2.40***	2.40***
	(0.01)	(0.01)
Denmark	-0.74**	-0.67***
	(0.14)	(0.00)
Germany	-0.35**	-0.33***
	(0.05)	(0.02)
USA	-1.00***	-0.98***
	(0.04)	(0.01)
Constant	2.21	2.55***
	(0.92)	(0.29)
N	114	114
R^2	0.173	0.170

Notes: Entries are unstandardized coefficients regression with standard errors in parentheses (clustered by country) The data are weighted to account for the under- and overrepresentation of countries in the dataset. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests).

D. DISREGARDING OUTLIERS

Looking at our main results (Figure 1 in the manuscript) it is clear that the forecasting model performed extremely poorly in a select number of elections, with absolute prediction errors of more than 10 percentage points. To identify influential cases, we calculated Cook's Distance (D) and identify influential cases as those for which: $D > 4/(n-k-1)$.[1] The D value exceeds this threshold for four elections: Canada 1958, 1984, 1993 and Denmark 1973.[2]

Various techniques can be used to handle outliers in a dataset (Kennedy 2008). Here, we remove the four most extreme outliers from the dataset. For our purposes, excluding these outliers represents a fairly stringent test, given that most of these outliers relate to elections in the beginning of our sampling period (1958, 1973, 1984 and 1993)

[1]Where n is the number of cases, and k is the number of explanatory variables. For 114 cases and 7 explanatory variables (vote intentions, GDP, and five country dummies), the threshold is 4/114 - 7 - 1 = .038.

[2]It is not surprising that our general forecasting model performs less well for these four elections. Both the 1958 and 1984 federal elections in Canada were landslides for the Progressive Conservative Party which won more than 50% of the popular vote and a clear majority of seats on the two occasions. The 1993 Canadian election was a watershed election which saw the collapse of the Progressive Conservatives and the arrival of two new political parties in the House of Commons; the Reform Party and the Bloc Québécois (Johnston 2017). The 1973 general election in Denmark has been described by Peter Mair (2002, p. 215) as 'one of the most substantial electoral shifts ever to have occurred in Europe, resulting in an immediate doubling of the number of parties represented in parliament'. This election is known as *Jordskredsvalget* which means literally 'landslide election' in Danish.

TABLE 1 *Linear regression models for incumbent vote share in Australia, Canada, Denmark, Germany, UK and USA, outliers are excluded (1955–2017)*

	b	(s.e.)
Vote intention	0.58***	(0.08)
Economy	0.58**	(0.14)
Australia	7.01***	(0.28)
Canada	-3.27***	(0.19)
Denmark	-0.40	(0.27)
Germany	5.42***	(0.39)
USA	3.83*	(1.03)
Constant	15.84**	(3.41)
N	110	
R^2	0.867	

Notes: Entries are unstandardized coefficients regression with standard errors in parentheses (clustered by country). The data are weighted to account for the under- and overrepresentation of countries in the dataset. For country dummies variables, UK is the reference category. Significance level: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests).

TABLE 2 *Mean absolute prediction error for different time periods, outliers excluded*

Time period	MAE statistic
MAE, 1955–1985	2.24
MAE, 1986–2017	2.45
MAE, 1955–1970	2.25
MAE, 1971–1986	2.23
MAE, 1987–2002	2.54
MAE, 2003–2017	2.35

Notes: Average absolute prediction errors from the pooled model.

TABLE 3 *Linear regression for absolute residuals of the incumbent vote model in Australia, Canada, Denmark, Germany, UK and USA (1955–2017), outliers excluded*

	b	(s.e.)
Time	0.49	(0.54)
Australia	-0.60***	(0.01)
Canada	0.34***	(0.00)
Denmark	-1.09***	(0.01)
Germany	-0.46***	(0.02)
USA	-1.17***	(0.01)
Constant	2.61***	(0.26)
N	110	
R^2	0.110	

Notes: Entries are unstandardized coefficients regression with standard errors in parentheses (clustered by country). The data are weighted to account for the under- and overrepresentation of countries in the dataset. For country dummies variables, UK is the reference category. Significance level: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests).

E. GOVERNMENT APPROVAL DATA

For three countries, government approval data is available since the 1950s (approval for the Chancellor in Germany, the Prime Minister in the UK and the president in the USA). For Germany we can estimate a model with government approval data measured between one and two months before the election, for the UK and the USA, we estimate models with a three or six months lag.

In Table 1 we present the results of four different models explaining the incumbent vote by means of information on government approval and the economy. Government approval data in Germany is only available at -1 or -2 months. For the UK and the USA, approval data are available at -3 months and at -6 months. Approval data for Germany are retrieved from Norpoth and Gschwend (2017). Data for the UK are Gallup and IPSOS data (see Lewis-Beck and Dassonneville 2015). Data for the USA come from Lewis-Beck and Tien (2016).

In Model 1, we only include the German data – which is the only country for which the lag structure is two months. In Model 2, we pool the data from Germany, the UK and the USA, using government popularity data from two or three months before the election. In Model 3, we limit the analyses to the two countries for which we have a government approval measure three months before the election; the UK and the USA. Finally, in Model 4 we focus on the same two countries, but we include government popularity data measured six months before the election.

TABLE 1 *Linear regression models for incumbent vote share in UK, USA and Germany, government popularity as an independent variable*

	Model 1 DE		Model 2 DE, UK, USA		Model 3 UK, USA		Model 4 UK, USA	
Gov. popularity (-2/-3 months)	0.18	(0.11)	0.28	(0.08)	0.35	(0.09)		
Gov. popularity (-6 months)							0.34	(0.08)
Economy	1.41***	(0.30)	0.99	(0.39)	0.43	(0.05)	0.79	(0.16)
Country dummy (ref: UK)								
Germany			3.91	(1.40)				
USA			8.57**	(0.31)	8.77*	(0.50)	7.71*	(0.43)
Constant	35.40***	(6.77)	26.51*	(2.72)	24.94	(3.51)	24.47	(3.02)
N	17		50		33		30	
R^2	0.635		0.764		0.847		0.787	

Notes: Entries are unstandardized coefficients regression with standard errors in parentheses (clustered by country). Significance level: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests).

Subsequently, we take the predictions from the four models in Table 1, calculate the absolute forecasting error of these models (i.e., the absolute difference between the

prediction of the model and the incumbent vote) and regress this absolute error on time. The results of these analyses are reported in Table 2. Across the four models, the coefficient of the time-variable does not show indications of a significant change in the size of the prediction errors of the structural models presented in Table 1 of Appendix E.

TABLE 2   *Linear regression for absolute residuals of the incumbent vote model*

	Model 1		Model 2		Model 3		Model 4	
Time	-1.04	(1.59)	-0.15	(0.35)	0.66	(1.22)	-0.71	(0.68)
Country dummy (ref: UK)								
Germany			0.27**	(0.01)				
USA			-0.95***	(0.00)	-0.47*	(0.02)	-0.22	(0.03)
Constant	3.86***	(0.94)	3.20**	(0.17)	2.35	(0.60)	3.43	(0.35)
N	17		50		33		30	
R^2	0.028		0.056		0.025		0.011	

Notes: Entries are unstandardized coefficients regression with standard errors in parentheses. Errors from the Models 1 to 4 in Table 1 in this Appendix. Significance level: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests).

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