

# THE PENDULUM SWINGS BACK: FORECASTING THE 2010 BRITISH ELECTION USING PM APPROVAL

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# Dynamic Forecasting

- Use the history of elections and party cycles to make predictive models
- Add the most relevant current information
- Create a model with a long enough lead time to beat the polls
- Use history of elections to predict how votes will translate into seats
- Quantify forecasting error and make probabilistic predictions about election outcomes – votes *and* seats

# Our Unique Approach

- We identify and quantify the swing of the electoral pendulum in British Politics
- We demonstrate that Prime Ministerial approval is an excellent predictor of elections
- We predict the makeup up of the House of Commons, not just the vote
- Monte Carlo analyses – we run 1,000,000 simulations of the election to give a probabilistic forecast instead of a single number

# Outline of the talk

- Finding the cyclical nature of British Elections
- The importance of Prime Ministerial Approval
- Defining our variables
- The Vote Model
- The Seat Model
- Monte Carlo Analyses

# Outline of the talk

- Finding the cyclical nature of British Elections

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# Party Swings

- Majority party changes frequently but at infrequent intervals
- Economy plays a roll as it goes through cycles
- Eventual fatigue with even very popular leaders and parties. For example, Churchill in 1945.
- Accumulation of grievances
- Here's the history of British party swings:

# Conservative Vote Lead

## General Elections 1832-2005



# Party Swings

- Seem to start in earnest during the interwar period – election of 1929 in particular
- Electorate became fully enfranchised
- Labour replaces Liberals as opposition
- Vast majority of seats become contested
- Estimate an AR2 Model for these elections:

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

Table: Autoregressive Components of the Vote in British Elections.

	1832- 2005	1868- 2005	1885- 2005	1918- 2005	1929- 2005	1945-2005
AR(1)	.71*** (.16)	.46*** (.13)	.32** (.13)	.39** (.13)	.51*** (.17)	.66*** (.18)
AR(2)	-.01 (.18)	-.08 (.94)	-.14 (.23)	-.18 (.25)	-.68* (.39)	-.43* (.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 (k autocorrelations)	3.9 (10)	4.5 (8)	4.6 (8)	2.7 (6)	3.6 (5)	2.7 (4)
N	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 .40 level.

Source: Craig (1981, p. 49), for elections 1832-1935, and King (2002, Appendix, p. 233), for elections 1945-2001.

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$  (one-tailed)

# Summary of Cycles

- Cycles evident as of 1929 election
- Periodicity of 4.9 elections
- Party can expect to win 2-3 elections before being driven out
- We could use this to make a rough forecast a full election in advance
- But, to reduce forecasting error we should add a short-term predictor

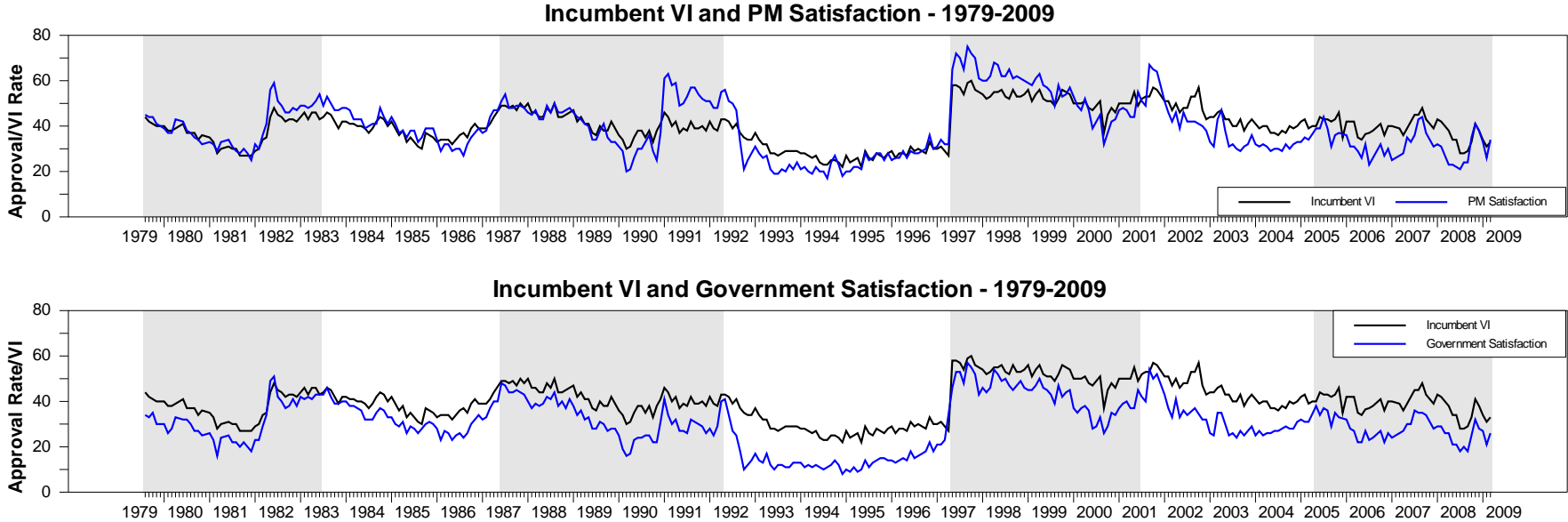
# Outline of the talk

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- The importance of Prime Ministerial Approval
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# Prime Ministerial Approval

- Retrospective theory of voting tells us that vote choice is based on past performance
- Incumbent PM is always in the race
- The economy is important but filters through PM approval
- Previous work shows strong effects of PM approval

# Figure 1: Incumbent Vote Intentions and Two Approval Measures



# PM Approval as Predictor

## Predicts Elections

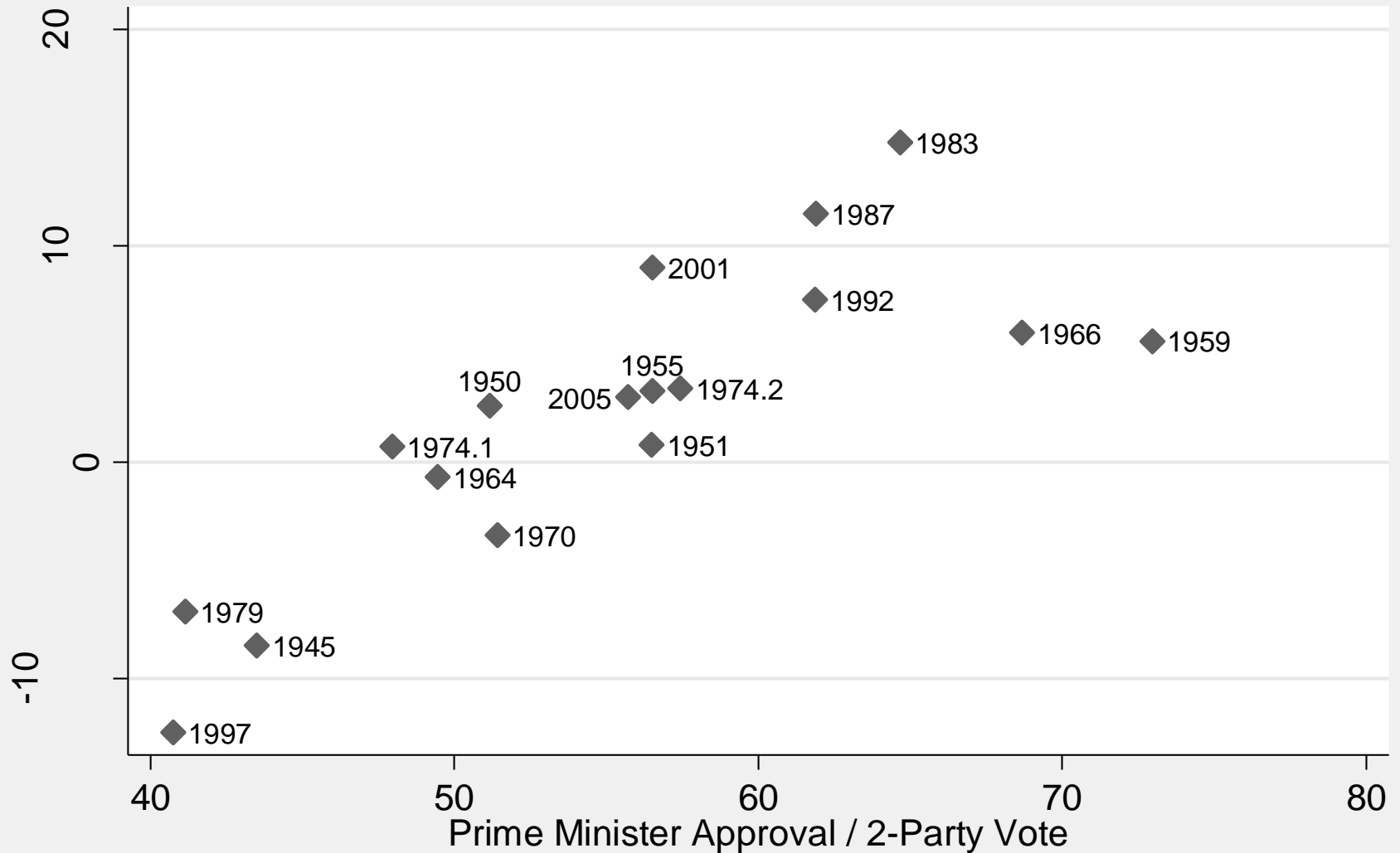
- Very close relationship between value of PM approval and electoral success of PM's party
- Reliable data beginning 1944

## Predicts Vote Intentions

- Between elections
- PM approval is consistently the variable most closely related to vote intentions for the governing party
- Overall, and almost all the time
- More so than governing party approval

Figure 1: PM Approval and Electoral Success 1945-2001

$r = .82$



**Figure 2: Two Satisfaction Gaps, 1979-2009**

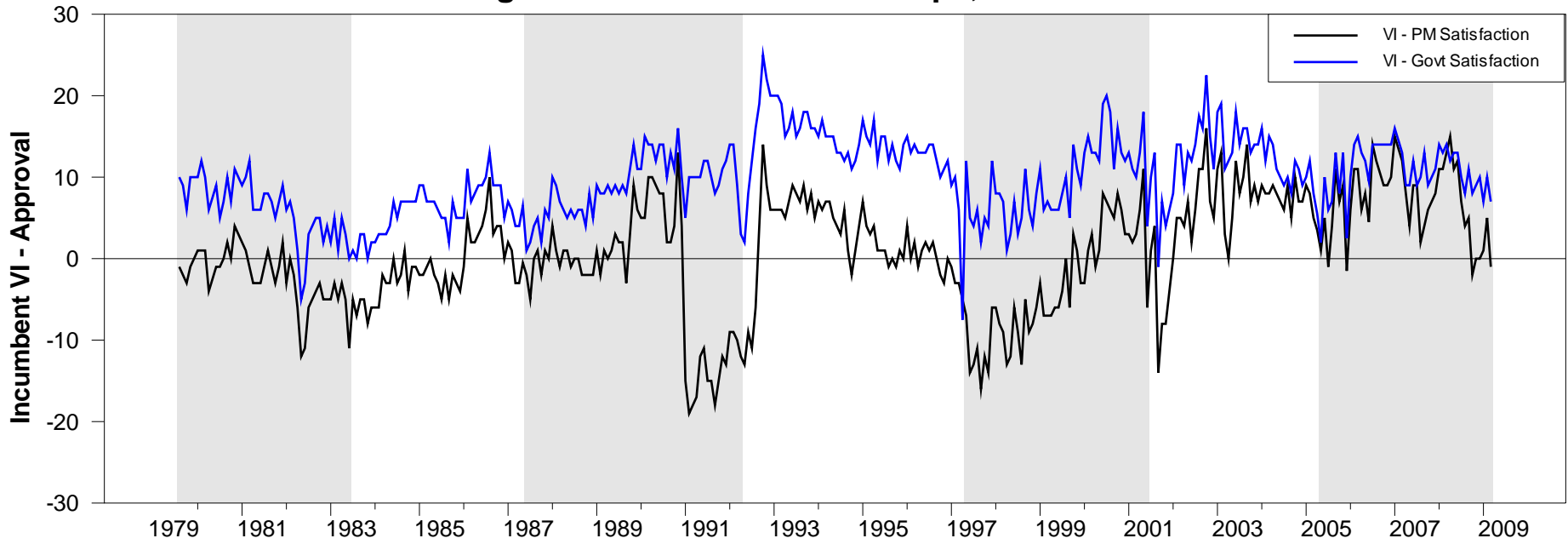









Table 1: Two Popularity Functions Compared, 1979-2009

Independent Variable	PM Approval Model		Government Approval Model	
	Coef. (s.e.)	<i>t</i>	Coef. (s.e.)	<i>t</i>
PM Approval	0.410 (0.026)	16.04***		
Gov. Approval			0.443 (0.030)	14.83***
(F) ECM	-0.359 (0.041)	-8.74***	-0.349 (0.042)	-8.33***
Major In	-4.450 (2.098)	-2.12*	-0.183 (2.122)	-0.09
Cameron In	-9.035 (1.799)	-5.02***	-8.563 (1.859)	-4.61***
Black Wed.	5.310 (1.860)	2.86**	2.831 (1.891)	1.50
Poll Tax	-2.193 (1.275)	-1.72*	-0.988 (1.319)	-0.75
Falklands	2.259 (1.058)	2.13*	2.061 (1.092)	1.89*
Berlin Wall	5.649 (1.804)	3.13***	4.295 (1.858)	2.31*
Gulf War	5.695 (0.949)	6.00***	0.931 (0.936)	0.99
Sept. 11 Attack	-6.137 (1.867)	-3.29***	-4.754 (1.908)	-2.49**
Aug-Oct 2002	4.889 (1.051)	4.65***	4.352 (1.079)	4.03***
Iraq War	-6.250 (1.274)	-4.91***	-5.883 (1.315)	-4.47***
Fuel Crisis	-7.371 (1.832)	-4.02***	-9.604 (1.870)	-5.14***
1997 Election	16.375 (1.99)	8.22***	21.259 (1.958)	10.86***
2001 Election	6.817 (1.282)	5.32***	6.361 (1.319)	4.82***
Unemployment <sub>t-1</sub>	-2.456 (0.885)	-2.76**	-2.151 (0.911)	-2.36**
Inflation	-0.475 (0.208)	-2.28*	-0.617 (0.216)	-2.86**
Inflation <sub>t-1</sub>	-0.396 (0.207)	-1.91*	-0.527 (0.214)	-2.46**
Inflation <sub>t-3</sub>	-0.446 (0.199)	-2.24*	-0.373 (0.206)	-1.81*
Mori EOI <sub>t-1</sub>	-0.010 (0.011)	-0.92	-0.006 (0.012)	-0.55
Constant	-0.426 (0.158)	-2.70**	-0.558 (0.163)	-3.41***
N	352		352	
Durbin-Watson	2.02		2.02	
R-Squared	0.71		0.69	
SS Residuals	1059.96		1127.43	

<b>Statistic</b>	<b>PM Approval Model</b>	<b>Government Approval Model</b>
<b>Variance</b>	149.10	113.44
<b>T-Statistic</b>	16.04 	14.83
<b>Standard Error of Estimate</b>	1.789 	1.846
<b>R-Squared</b>	0.71 	0.69
<b>Akaike Information Criterion</b>	2494 	2515
<b>Schwartz Criterion</b>	2575 	2596
<b>Residual Mean Square</b>	0.092 	0.095
<b>Davidson J-test <i>t</i></b>	6.237 	4.078

**Figure 2: Two Satisfaction Gaps, 1979-2009**

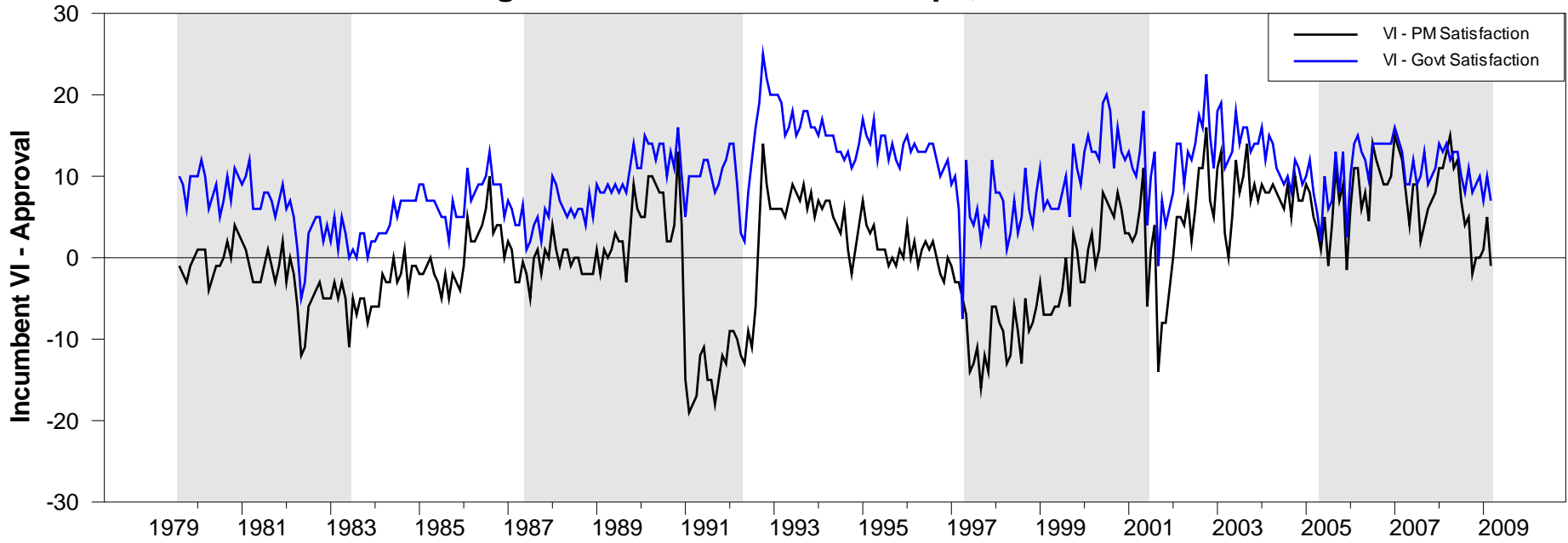


Table 3: GARCH-DCC(1-1) Estimates for PM Approval and Governing Party Vote Intentions, 1979-2009 &amp; Government Approval and Vote Intentions

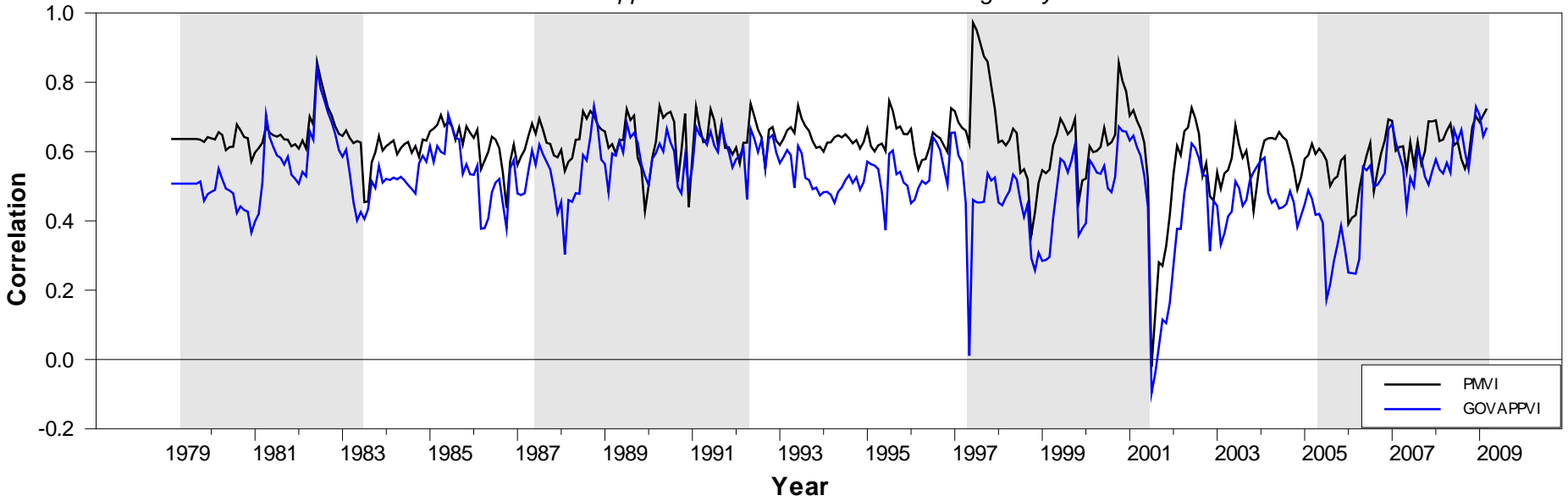
Parameter	Estimate	Standard Error	<i>t</i> -value
<b>PM Model</b>			
$c_{PM\ Approval}$	7.77	2.83	2.75**
$a_{PM\ Approval}$	0.14	0.06	2.55**
$b_{PM\ Approval}$	0.50	0.15	3.37***
$c_{Vote\ Intentions}$	11.42	2.15	5.31***
$a_{Vote\ Intentions}$	0.06	0.06	1.03
$b_{Vote\ Intentions}$	-0.16	0.15	-1.08
$\alpha$	0.122	0.040	3.018**
$\beta$	0.548	0.103	5.347***
$\bar{R}$		0.636	
<b>Gov't Model</b>			
$c_{Govt\ Approval}$	2.17	0.90	2.40**
$a_{PGovt\ Approval}$	0.21	0.70	3.06**
$b_{PGovt\ Approval}$	0.64	0.10	6.51***
$c_{Vote\ Intentions}$	11.42	2.15	5.31***
$a_{Vote\ Intentions}$	0.06	0.06	1.03
$b_{Vote\ Intentions}$	-0.16	0.15	-1.08
$\alpha$	0.124	0.035	3.548***
$\beta$	0.687	0.138	4.985***
$\bar{R}$		0.507	

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Estimation is based on the DCC-GARCH model:

$$h_t = c_i + a_i h_{t-1}^2 + b_i h_{t-1} \text{ for all } i=1,2 \text{ and } R_t = (1 - \alpha - \beta)\bar{R} + \alpha \varepsilon_{t-1} \varepsilon'_{t-1} + \beta R_{t-1}$$

### Figure 3: Dynamic Correlations

*PM and Government Approval Correlations with Governing Party Vote Intentions*



# Outline of the talk

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- Defining our variables
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# Dependent Variable

- Tory lead in the popular vote (and later seats)
- Focuses on two main parties
- Data from 1945-2005

# PM Approval

- Based on surveys 2 months before election day
- Adjusted for 2-party support
- Bounded at 35% and 65% of two party vote
- \*-1 for Labour PM

- $$\left( \frac{\textit{Approval}}{\textit{TwoPartyVote}} - 50 \right) * -1 \text{ (if PM is Labour)}$$

- E.g. In 2005: 
$$\left( \frac{39.7}{0.713} - 50 \right) * -1 = -5.68$$

# Outline of the talk

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- The Vote Model
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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
***p<.001 (one-tailed)		

Note: Dependent variable is Conservative vote lead. Parameter estimation was done with robust standard errors.  
N = 17

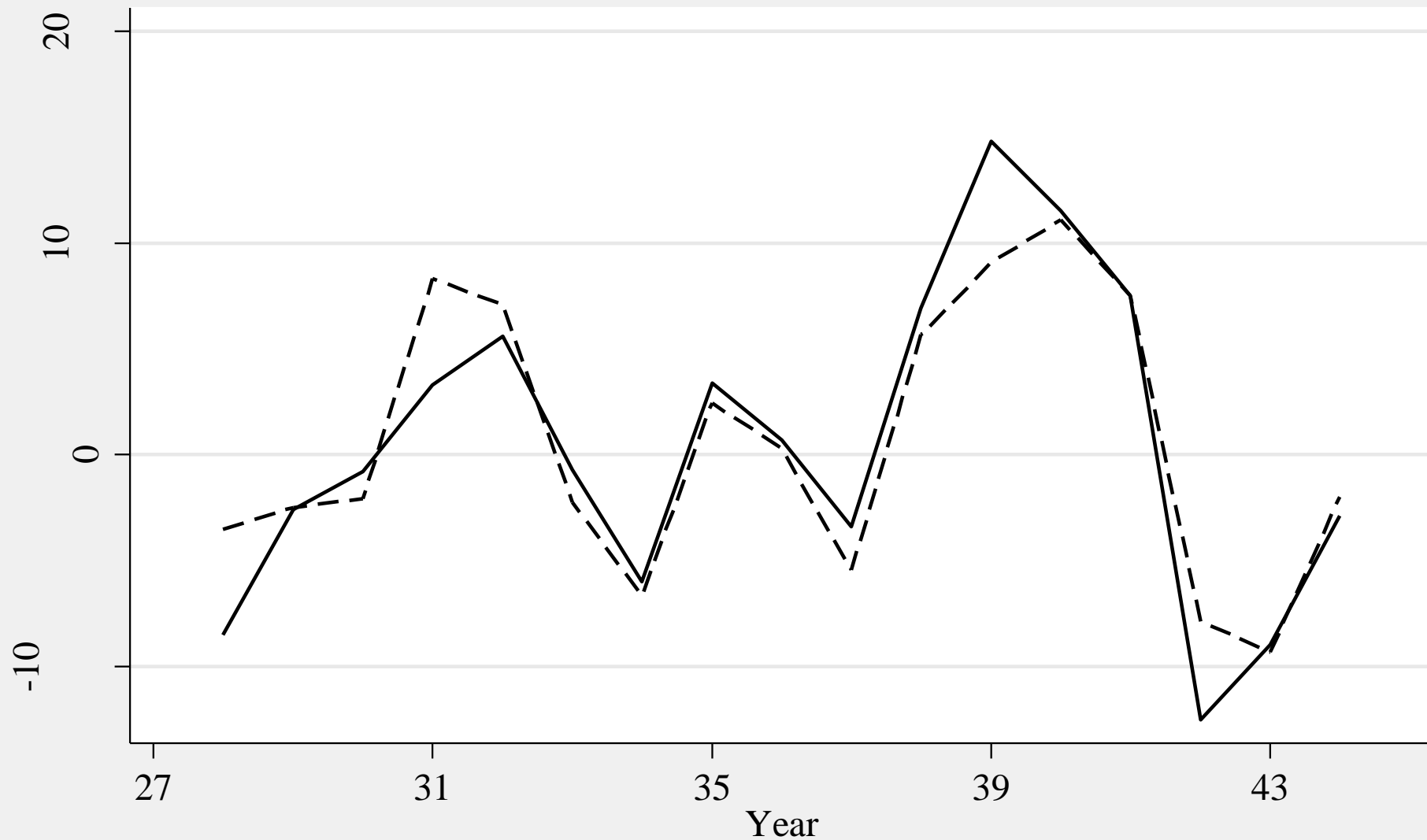
$$R^2 = .87, \quad \text{Adjusted } R^2 = .84$$

Standard error = 2.49  
LBQ = 1.19,

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

# Predicted and Actual Election Outcomes 1945-2005

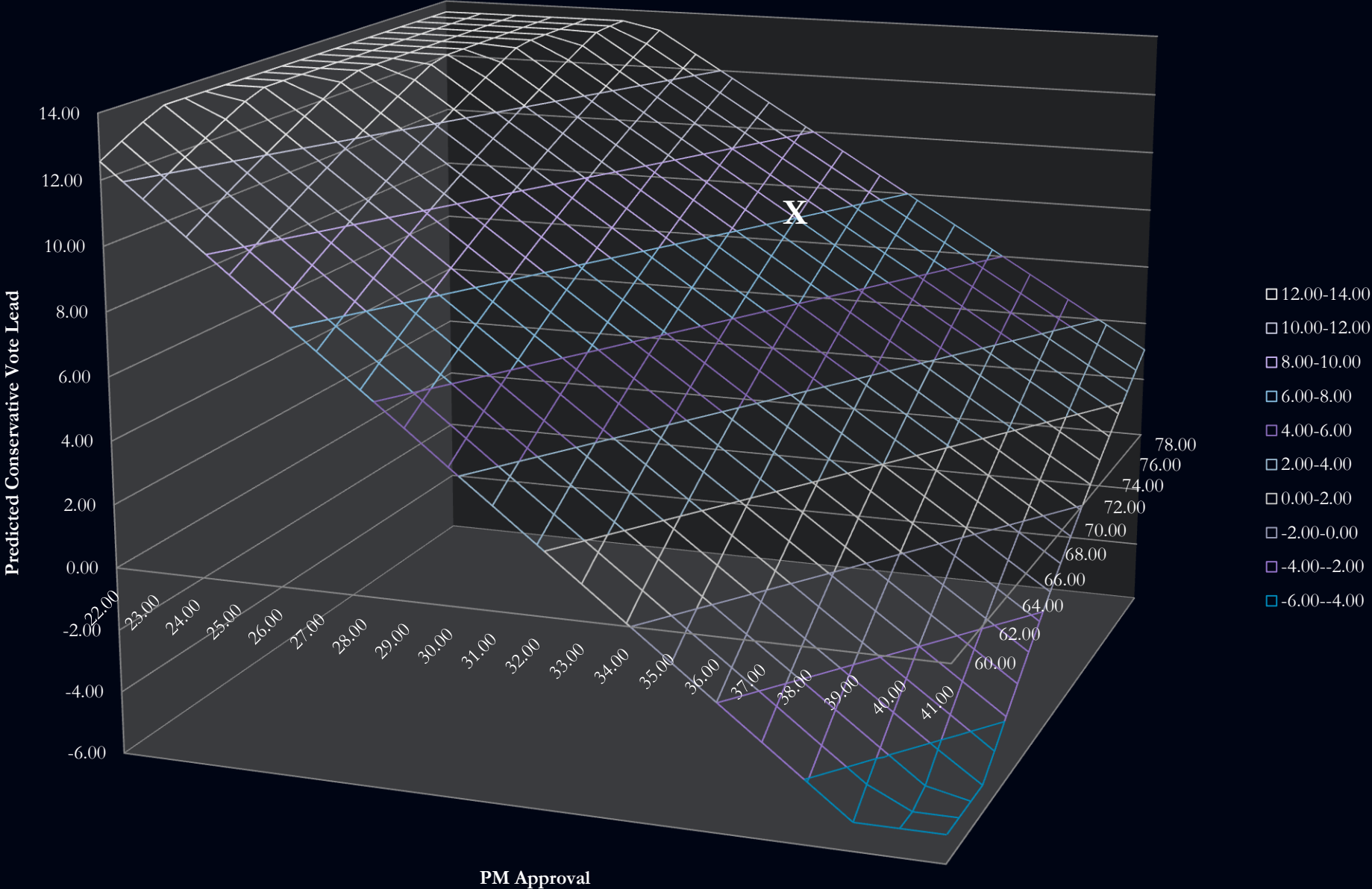


— Actual Conservative Lead      - - - - Predicted Conservative Lead

# Vote Model Notes

- Measuring the difference between Tory and Labour vote percentages
- Gets the winner right in every election, even the close ones (1951, 1964, 1974F)
- One-step-ahead forecasts are also all correct
- 2005 prediction of a 1.3% Labour lead
- Unknowns for 2010 are PM approval and strength of 3<sup>rd</sup> party support

**Figure 4: 2010 Voteshare Predictions Based on 2-Party Vote and PM Approval**



# Outline of the talk

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- The Seat Model
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# The Seat Model

- Predicting seats for Conservatives and Labour
- Two predictors
- The Conservative seat total in the last election
  - first order AR process captures the incumbency advantage
- The predicted vote lead in the current election

Table 6: Forecasting Conservative Seats from Votes in British Elections, 1909-2005

	Coefficient	Robust s.e.
Conservative Vote Lead	9.270***	0.329
AR(1)	0.576***	0.224
Constant	278.055	16.197

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

N = 26

\*\*\*p<.001 (one-tailed)

Figure 5: Votes to Seat Translation, 1832-2005

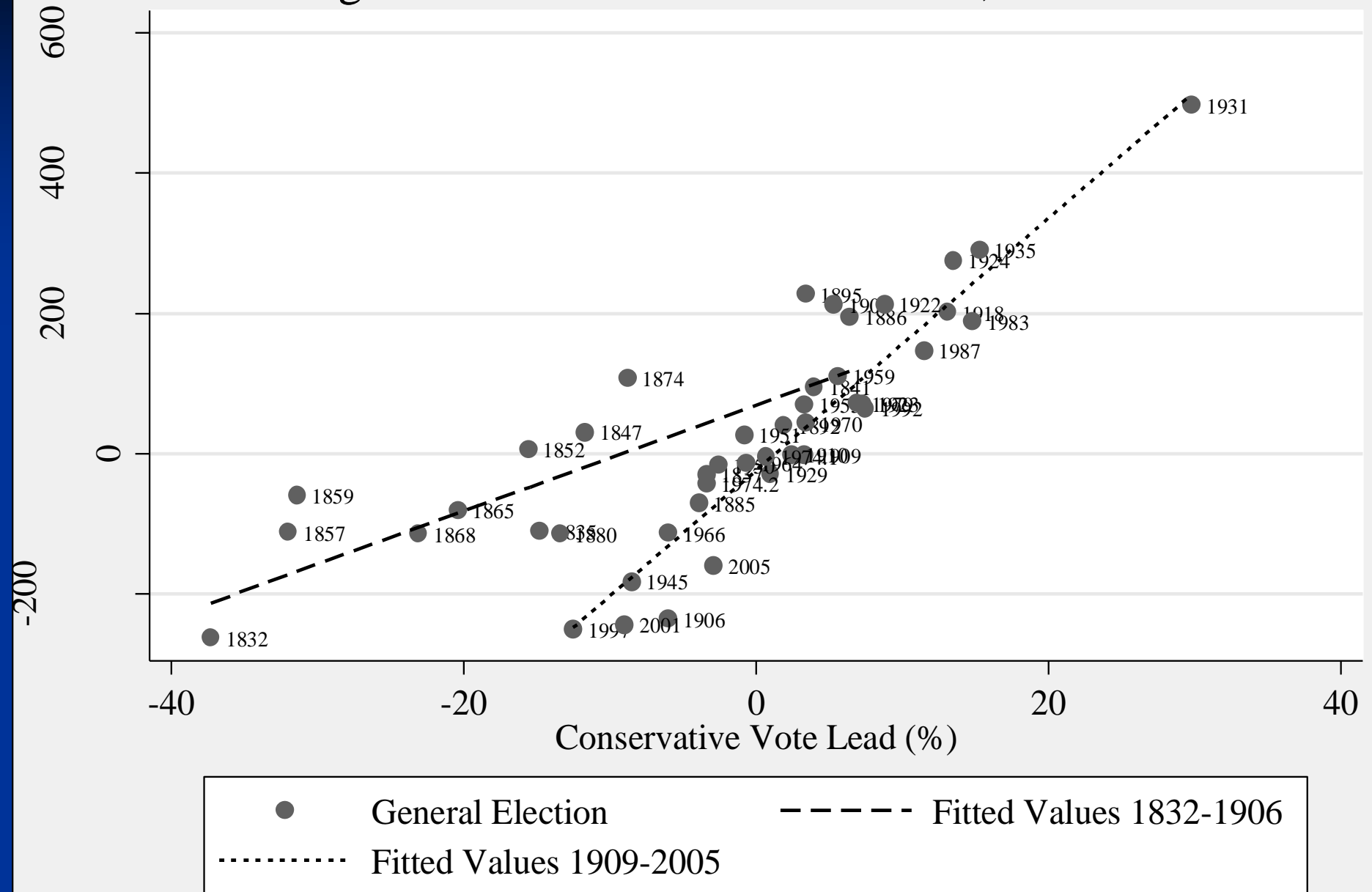
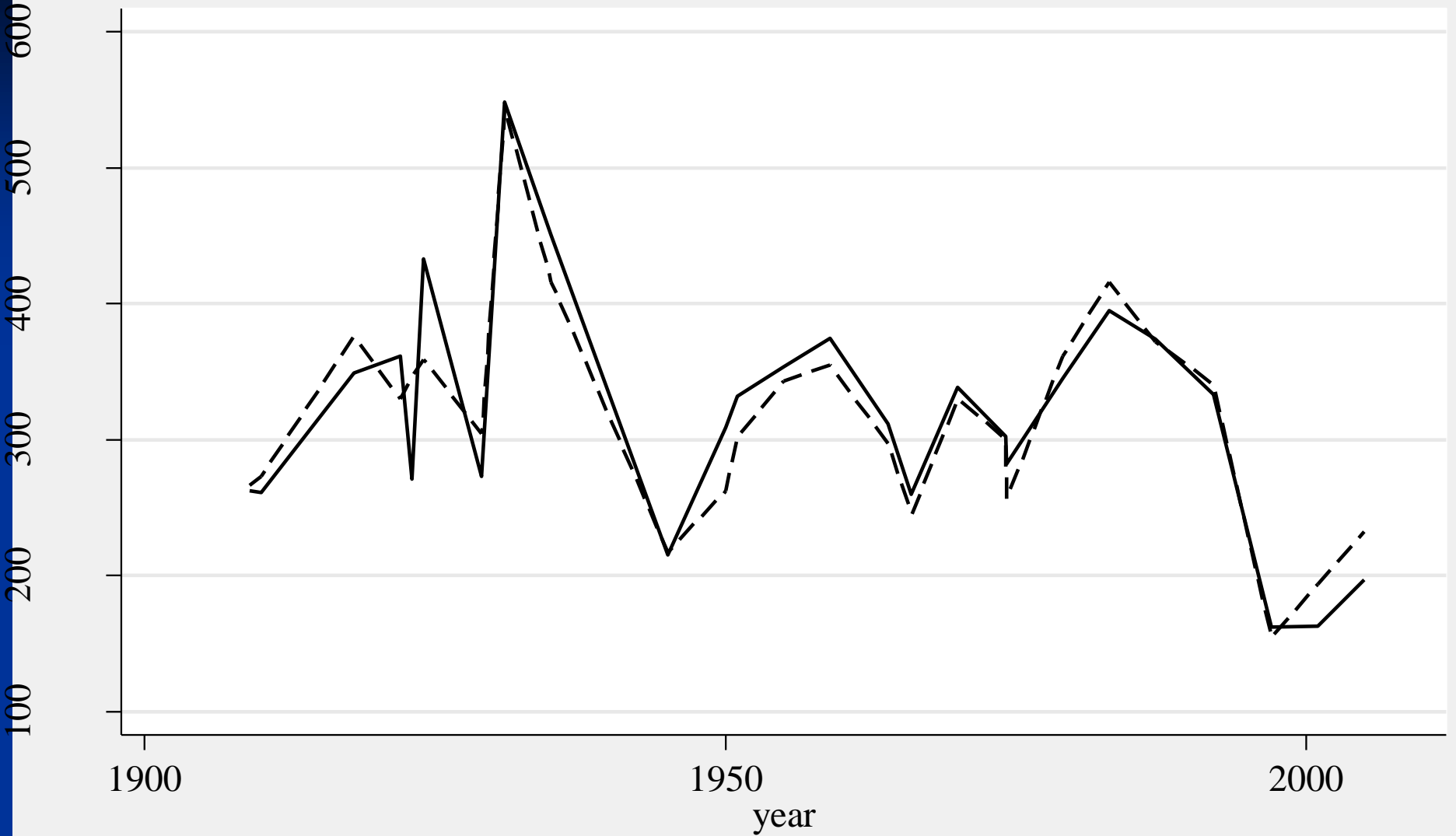


Table 5: Out-of-Sample Predictions of Seats

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

# Actual and Predicted Conservative Seats 1909-2005



— Actual Seats      - - - - Predicted Seats

# Seat Model Notes

- Each additional % lead for the Tories translates into 9.270 seats
- Seat predictions are even closer than votes – see 1974F and 1951 (vote and seat winners differed)
- Some recent surprises very close to perfect
- 96% of variance in seats explained
- In 2005 the Tories had to be more than 5 points ahead to win a plurality of seats
- Dead-heat would have given Labour 86 seat lead

# Seat Model for 2005 and 2010

- Prediction of 132.2 Labour lead based on actual 3% Labour lead
- Before the election, we forecast a 1.3% lead that would translate into a 107 seat Labour lead
- 2010: 311.5 Seats for Conservatives based on 6.9% vote lead
- But these are just point estimates – what about the error of the forecast
- There is uncertainty in the model, we should account for that

# Outline of the talk

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- Monte Carlo Analyses

# Monte Carlo Analyses

- We estimate a probability distribution for our forecast
- Simulate 1,000,000 elections using the parameters from our vote and seat models and the possible *true* values of PM approval
- For example, raw PM approval is defined as normally distributed with Mean=33 and SD=2
- Based on January MORI poll for mean and distribution of multiple polls for SD

Figure 6: Simulations for Conservative Seat Total

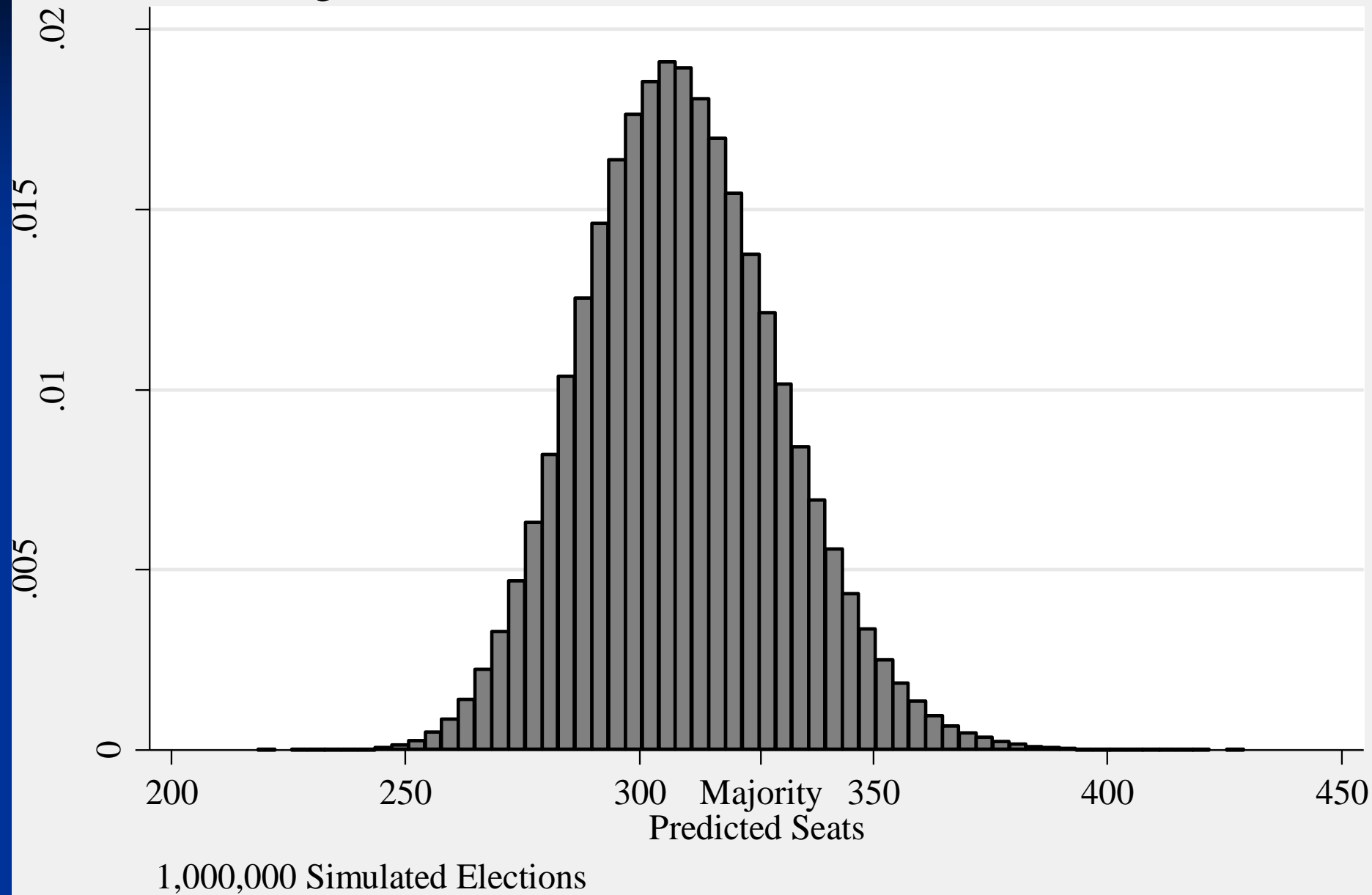
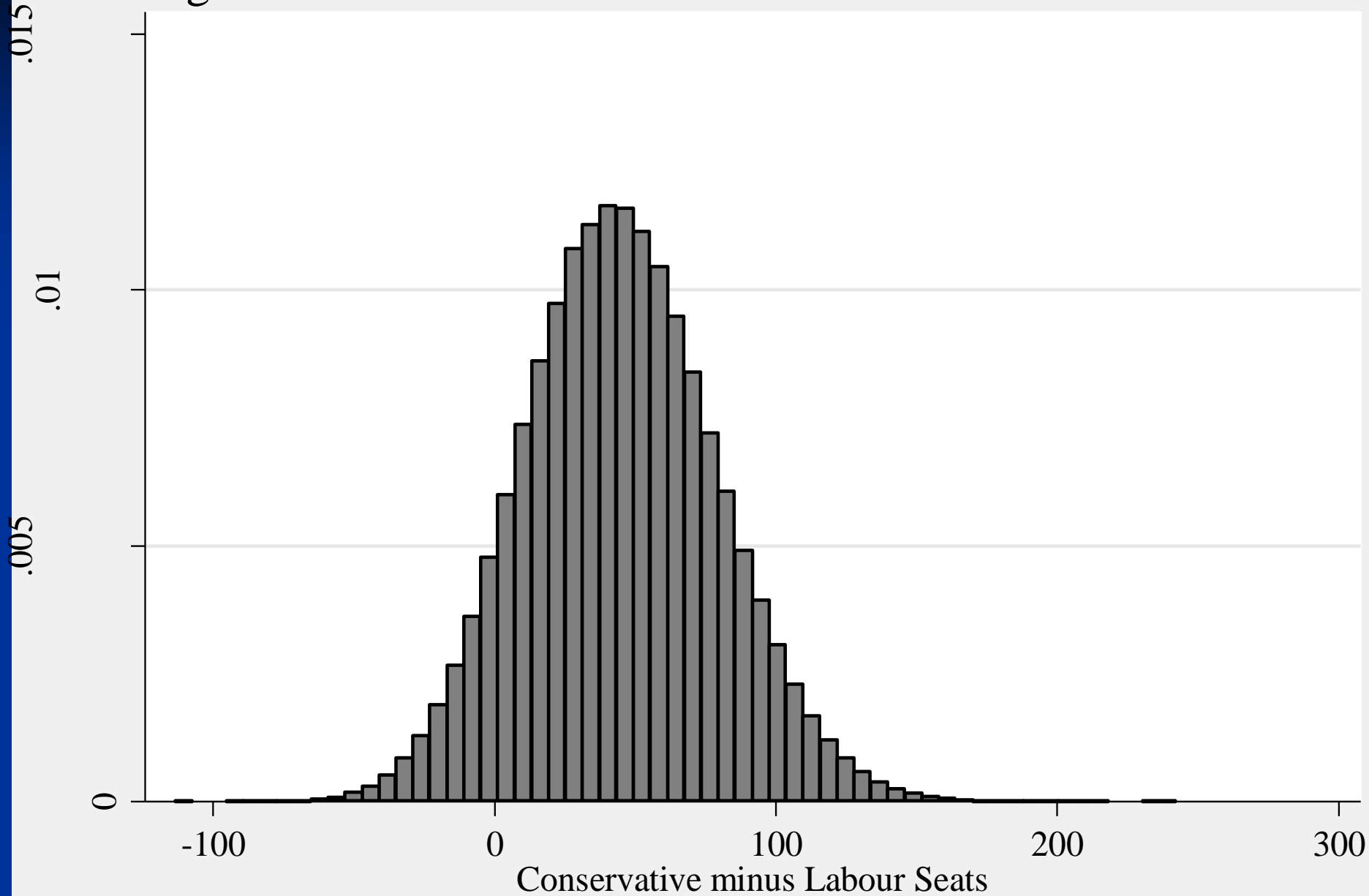


Figure 7: Simulations for Conservative Seat Lead over Labour



# Monte Carlo Notes

- Hung Parliament as most likely outcome
- Predict 311.5 seats for Conservatives with SD of 21 seats
- Probability of a Conservative Majority = 22%
- Very small chance of larger Conservative majority  $> 350$  seats = 3.6%
- Chances of Labour leading in seats = 9.26%

# Conclusions

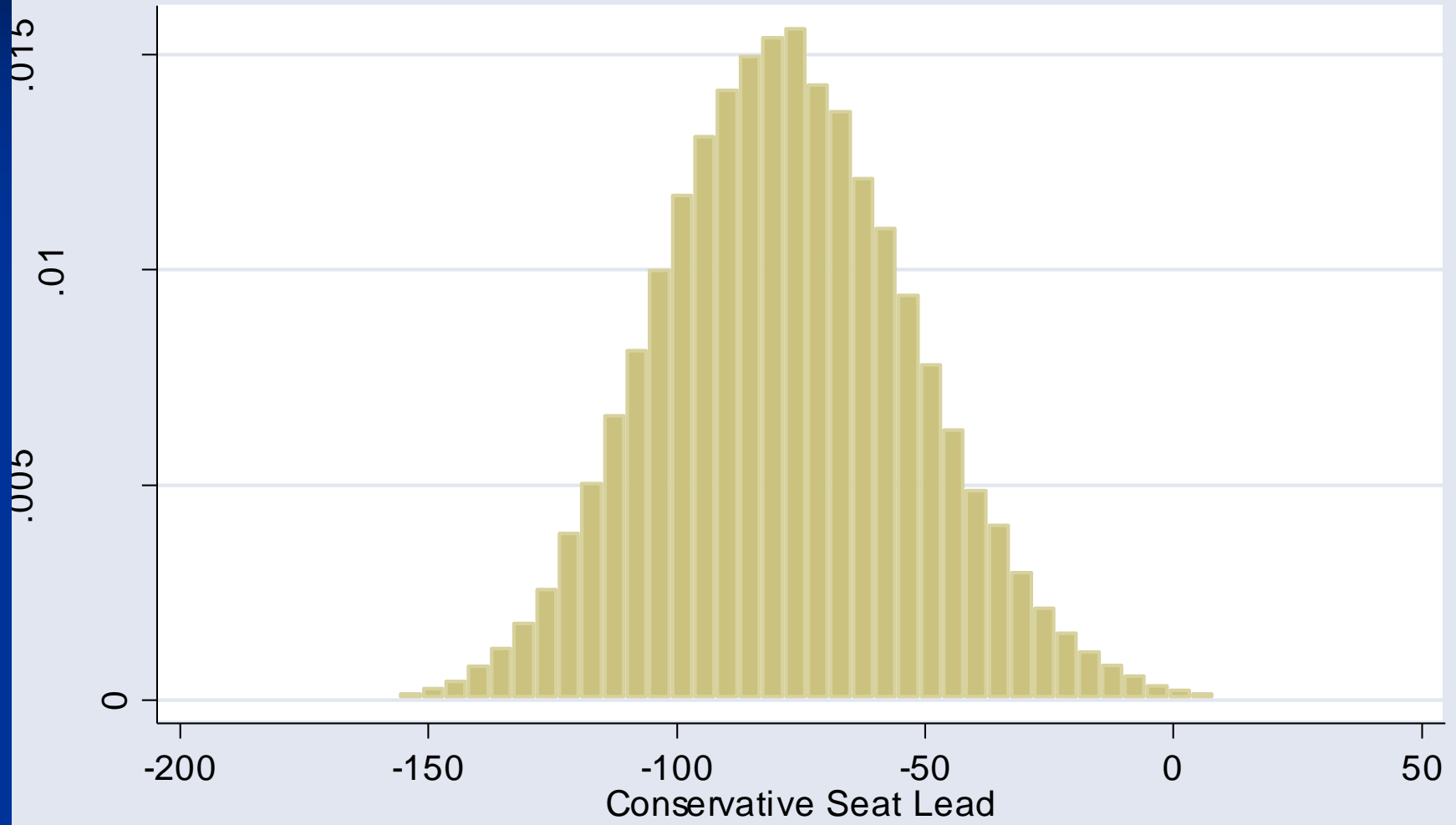
- British system goes through cycles of party support that are important as well as useful
- After 2 terms the pendulum begins to swing back
- PM approval is an excellent predictor – beyond the economy
- Using bias of electoral system to predict seats is imperative
- Forecasting model proved useful for 2005 and we'll see about the next election – Blair/Brown very unlikely to repeat Thatcher/Major transfer and 4<sup>th</sup> majority

# What If?

- The only things the model doesn't know are PM approval and two-party vote for the next election
- Suppose Gordon Brown is as popular as Blair was before the 2005 election

# Projections for 2009 - With a Popular Brown

Based on 100000 simulations



Assuming Brown is roughly as popular as Blair was in 2005

Figure 6: Party Leader Comparisons and Tory Success  
1959 - 2001

