

The Politics of Procedural Choice

Regulating Legislative Debate in the UK House
of Commons, 1811–2015



Niels D. Goet

Lady Margaret Hall

Thesis submitted in partial fulfilment of the
requirements for the degree of DPhil in Politics in
the Department of Politics and International
Relations at the University of Oxford

Trinity 2017

Abstract

All democratic organisations operate under a particular set of rules. Such procedures are implemented by the very individuals that create and maintain them, usually under a majority voting rule. This research project engages with the question of why and how members of parliament “abdicate” procedural power, focusing on the evolution of the rules of debate in the UK House of Commons. Working from newly collected data on the reform of Standing Orders of the House spanning 205 years (1811–2015), as well as records of over six million speeches, it provides a new perspective on procedural choice. Framing debate as a platform for speech-as-filibuster behaviour, I develop a formal model where the decision to support an anti-dilatory reform is primarily a function of *polarisation*. I show that legislators adopt restrictive rules when they are more likely to share policy preferences with colleagues within their party. The presence of shared views, then, motivates MPs to prioritise responsible use of the common resource of plenary time over individual policy influence. Both empirically and theoretically, my research offers new insights into the process of parliamentary reform in the absence of party discipline, and studies how the dynamics of procedural choice change as political parties enter the stage. Methodologically, it makes a contribution to the text-as-data field, exploring the use of novel machine-learning techniques in the measurement of political preferences.

To my parents.

Acknowledgements

Writing the acknowledgements to a dissertation is generally left to the very end, and with good reason. When I started my DPhil in October 2014, I certainly could not have imagined how many wonderful individuals would play a positive role in the completion of my thesis, be it academically or by their good company, wisdom, advice, or otherwise. This page is dedicated to my family, friends, and fellow academics who have accompanied me on my DPhil journey. I can only assure them that, even though these one-and-a-bit pages represent but 0.5 per cent of this dissertation's word count, they have my full gratitude.

First, I should like to acknowledge my parents and my brother, whose dedication and support throughout have allowed me to pursue my dreams. I have tried not to bore them too much with my stories about parliamentary rules of procedure and computational text analysis. Needless to say I failed miserably in that endeavour.

My work has also benefited from the input of colleagues at Oxford, as well as Harvard University, which hosted me for a six-month fellowship, and the University of Geneva. I should in particular like to thank Andy Eggers, Simon Hug, Daniel Ziblatt, Jonathan Slapin, Johannes Lindvall, Andreas Murr, Andrew Peterson, Sven-Oliver Proksch, and Arthur Spirling for valuable comments on work that have found their way into this dissertation.

Individual chapters of this thesis have benefited from input by Kyle Jaros, Roosmarijn de Geus, Jordan Mansell, Blake Ewing, Max Goplerud, Katerina Tertychnaya, and Eric Guntermann. I should in particular like to mention Raphael Heuwieser, who has contributed immeasurably to the development of this dissertation. As to any remaining omissions or shortcomings, the usual disclaimer applies.

My time at Oxford would not have been as enjoyable without the members of the Middle Common Room of Lady Margaret Hall, who were a second family to me in Oxford.

Alistair Clark deserves special mention. We met on the first day of our coming up to Oxford, in 2012, and have been friends ever since. My time at Oxford would most certainly have not been the same without our friendship, and I am grateful for his support, advice, and great company throughout.

Financial support from my College, Lady Margaret Hall, and from the Department of Politics and International Relations, is gratefully acknowledged.

Last, but certainly not least, I should like to thank my supervisor, Radoslaw Zubek, for invariably assessing my work with a critical eye. More importantly, his insistence on my extending my stay at Oxford for a third year of research ensured that I met the love of my life, Mari, whose support has been instrumental in the successful completion of this work.

N. D. G., Oslo, 13th February 2018

Glossary

AUROC	Area Under the Receiver Operator Characteristic
BBC	British Broadcasting Company
BCS	British Candidate Survey
BoW	Bag-of-Words
BPD	British Political Development
CA	Correspondence Analysis
CI	Credible Interval
CMP	Comparative Manifesto Project
CPG	Conditional Party Government
CPR	Common-Pool Resource
DiD	Differences-in-Differences
DNB	Dictionary of National Biography
DTM	Document-Term Matrix
DV	Dependent Variable
DVM	Diermeier-Vlaicu Model
DWT	Durbin-Watson Test
ECDF	Empirical Cumulative Distribution Function
EDM	Early Day Motions
EP	European Parliament
EU	European Union
FSA	Finite-State Automaton

HC Deb	House of Commons Debate
HCPP	House of Commons Parliamentary Papers
HCSO	House of Commons Standing Order
HL Deb	House of Lords Debate
HMDC	Harvard-MIT Data Centre
HPS	High Party Strength
ILP	Independent Labour Party
IQR	Interquartile Range
IRT	Item Response Theory
IV	Independent Variable
KST	Kolmogorov-Smirnov Test
LD	Liberal Democrat
LDA	Latent Dirichlet Allocation
LDS	Levenshtein Distance
LPS	Low Party Strength
LRC	Labour Representation Committee
MCAR	Missing Completely At Random
MCMC	Markov Chain Monte Carlo
MP	Member of Parliament
MPS	Medium Party Strength
NAA	National Assistance Act
NB	Naive Bayes
NHS	National Health Service
NLF	National Liberal Foundation
NLP	Natural Language Processing
OCR	Optical Character Recognition
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares

P-A	Principal-Agent
PCA	Principal Component Analysis
PCT	Procedural Cartel Theory
PM	Prime Minister
PMB	Private Member's Bill
PoS	Part-of-Speech
PPD	Posterior Predictive Distribution
PPS	Parliamentary Private Secretary
RCE	Research Computing Environment
RSE	Robust Standard Error
SD	Standard Deviation
SE	Standard Error
SGD	Stochastic Gradient Descent
SIMEX	Simulation-Extrapolation
SNP	Scottish National Party
SO	Standing Order
SRF	Scale Reduction Factor
TF-IDF	Term Frequency–Inverse Document Frequency
TUC	Trades Union Congress
UK	United Kingdom
UN	United Nations
US	United States
VIF	Variance Inflation Factor
WFM	Word Frequency Matrix
XML	Extensible Markup Language

Contents

<i>List of Figures</i>	xvii
<i>List of Tables</i>	xx
1 Introduction	
Designing Rules of Debate	27
1.1 The Relevance of Rules of Debate	30
1.2 Argument	34
1.3 Existing Perspectives on Procedural Choice	37
1.4 Research Design and Data	45
1.5 Structure	49
I Modelling Procedural Choice	53
2 Theory	
Filibustering, Polarisation, and Procedural Choice	55
2.1 Assumptions	58
2.2 Breaking Away from the Legislative State of Nature (H1)	63
2.3 Polarisation: Escaping the Tragedy of the Commons (H2)	74
2.4 Off-median Procedures under Strong Parties (H3)	87
2.5 Conclusions	91

II Measuring Polarisation and Procedural Choice 95

3 Measuring Polarisation with Text Analysis

Evidence from the UK House of Commons, 1811–2015 **97**

3.1 Measuring Preferences Using Speech Data 100

3.2 Challenges of Measuring Preferences with Text 103

3.3 Evaluating Text Analysis Measures: A Common Framework for
Assessing Validity 106

3.4 Case Selection: The UK Parliament 110

3.5 Data: 6.2 Million Parliamentary Speeches 112

3.6 Poisson Scaling Approaches 115

3.7 Machine Learning: Dealing with High-Dimensional Data and Par-
liamentary Dynamics 127

3.8 Validation Exercise 136

3.9 Conclusions 151

4 UK Standing Orders Reform, 1797–2015

A New Dataset **155**

4.1 A New Dataset of Standing Orders and Procedural Reform, 1797–
2015 157

4.2 Patterns and Trends 160

4.3 A New Coding Scheme for Measuring Anti-dilatory Reform 167

4.4 Automated Cross-Validation: Lessons and Challenges 185

4.5 Conclusions 198

III Empirical Analysis 201

5 The End of “Gentlemanly Debate”

Electoral Reform and the Road to Obstruction **203**

5.1 Data and Methods 206

5.2	Repeated Interaction and Informal Cooperation: Norms of Debate in the Early 1800s	210
5.3	Exogenous Shocks: The Nineteenth-Century Reform Acts	212
5.4	Scarcity of Plenary Time	216
5.5	Group Size and Cohesion: Undermining the Prerequisites for In- formal Cooperation	228
5.6	The End of the “Gentleman’s Agreement”: Changes to Norms and the Rise of Obstruction	238
5.7	Conclusions	243
6	Preferences, Obstruction, and Unlimited Debate	
	Procedural Choice in the House of Commons, 1811–2015	247
6.1	Data and Measures	248
6.2	Results	262
6.3	Procedural Choice and Party Strength	269
6.4	Conclusions	283
7	Conclusion	
	From “Grand Inquest of the Nation” to Parliamentary Machine	285
7.1	Findings: Evidence for the “Speech-as-Filibuster” Model	287
7.2	The Debate on Procedural Choice	291
7.3	Generalisability	293
7.4	Text-as-Data: Measuring Polarisation with Speeches	295
7.5	Directions for Future Research	298
7.6	Concluding Observations	300
	Bibliography	303
	Appendices	325
A	Supporting Materials for Chapter 3	327
B	Supporting Materials for Chapter 4	352

C	Supporting Materials for Chapter 5	364
D	Supporting Materials for Chapter 6	371
 <i>Index</i>		 396

List of Figures

2.1	Schematic Overview of the Theory	57
2.2	Schematic Overview of the First Stage of the Theory	64
2.3	Schematic Overview of the Second Stage of the Theory	75
3.1	Patterns of Speech-making in the Commons, 1811–2015	114
3.2	The Effect of Sparsity Reduction, Aggregation by Session	118
3.3	The Effect of Sparsity Reduction, Aggregation by Debate	119
3.4	Number of Dimensions in the Estimation	123
3.5	Wordshoal Estimates, 1811–2015	125
3.6	Stacked Distribution of Error Terms for Scaling Estimates	126
3.7	Polarisation, 1811–2015 (SGD Impl. 1 & 2)	133
3.8	Polarisation, 1811–2015 (SGD Impl. 3 & 4)	134
3.9	SGD Estimates, Illustrated 1811–2015	140
3.10	Comparison with Comparative Manifesto Project rile Scores	141
3.11	Correlation with British Candidate Survey Data	142
3.12	Correlation of Individual-level Estimates Between Sessions, 1811– 2015	143
3.13	ECDF, 1983–1987 (Machine Learning)	145
3.14	ECDF, 2001–2005 (Machine Learning)	146
3.15	ECDF, 1983–1987 (Wordshoal)	147
3.16	ECDF, 2001–2005 (Wordshoal)	148

3.17	R^2 of MP-level Estimate Regressions on Mean Party Positions . .	150
4.1	Illustration of the Construction of the HCSO Dataset	159
4.2	Structure of the HCSO Dataset	160
4.3	Number of Consolidated Versions of the Standing Orders Adopted, 1811–2015	162
4.4	Increase in Volume of the Standing Orders, 1797–2015	163
4.5	Textual Changes to the Standing Orders, 1797–2015	164
4.6	Tracing the “Life” of an Article (Public Money)	166
4.7	Bubble Plot of Manual Coding Results, 1811–2015	184
4.8	Automated vs. Manual Coding (Initiative), 1811–2015	195
4.9	Automated vs. Manual Coding (Debate Duration), 1811–2015 . .	196
4.10	Automated vs. Manual Coding (Member Speech), 1811–2015 . . .	197
5.1	Patters of Speech-making in the Commons, 1811–1900	218
5.2	Credible Intervals Debate Participation, 1811–2015	227
5.3	Obstruction Attention, 1811–1900	243
6.1	Credible Intervals (Full Sample, 1811–2015)	265
6.2	The Effect of Polarisation on Reform, Full Sample	267
6.3	Credible Intervals for Polarisation	268
6.4	Credible Intervals for Polarisation*Obstruction	271
6.5	Effect of Polarisation*Obstruction, Full Sample	272
6.6	Credible Intervals (Low Party Strength, 1811–1880)	274
6.7	Credible Intervals (Medium Party Strength, 1880–1945)	276
6.8	Credible Intervals (High Party Strength, 1945–2015)	278
6.9	Effect of Polarisation Conditional on Obstruction (High Party Strength, 1945–2015)	279
A1	WFM Size Over Time	336
A2	Correlation Wordfish and String Kernel PCA over time	338

A3	Polarisation in the UK House of Commons, 1811–2015 (Implementation 3 and 4; Weights not Truncated)	342
A4	ECDF 1983–1987, Machine Learning (Balanced on MP)	343
A5	ECDF, 2001–2005, Machine Learning (Balanced on MP)	344
A6	ECDF 1983–1987, Machine Learning (Balanced on MP)	345
A7	ECDF, 2001–2005, Machine Learning (Balanced on MP)	346
A8	Wordshoal Estimates, 1811–2015 (Procedural Phrases Included) .	350
B9	The Impact of Pre-processing Decisions on Automated Measurement, 1811–2015	362
D10	Geweke Diagnostics (Full Sample)	386
D11	Geweke Diagnostics (Low Party Strength)	386
D12	Geweke Diagnostics (Medium Party Strength)	387
D13	Geweke Diagnostics (High Party Strength)	387

List of Tables

3.1	Evaluation Scheme for Speech-Based Measures of Polarisation . .	107
3.2	A Weighting System to Account for Debate Dynamics	132
3.3	Correlation Matrix for SGD Implementations	135
3.4	Validation Scores for <code>Wordshoal</code> and Machine Learning Implemen- tations	136
4.1	HCSO Amendments, 1660–2015	161
4.2	A Typology of Rules of Debate (Simplified)	169
4.3	A Typology of Rules of Debate (Detailed)	172
4.4	Manual Coding Summary Statistics	183
4.5	N-Gram Selection - Examples of PoS Patterns	190
4.6	Dictionary Examples (Ranked)	191
4.7	Dictionary Construction (Examples)	192
4.8	Identification Dictionaries for Procedural Change	194
5.1	Constituency Size and Contested Elections, 1807–1900	214
5.2	Time Scarcity - Regression Results	221
5.3	Paired Means Difference Tests of Debate Participation Before and After Reform Acts	224
5.4	Participation in Debates, 1807–1900	230
5.5	UK Public General Acts, 1810–2015	231
5.6	Participation in Divisions, 1835–1910	232

5.7	Participation in Divisions by Constituency Size, 1835–1910	233
5.8	Economic Interests in the House of Commons, 1832, 1868, 1900	237
6.1	Summary Statistics for Independent Variables	250
6.2	Labour and Conservative Party Membership, 1960–1992	257
6.3	Labour and Conservative Central Party Spending, 1964–1992	257
6.4	Institutional Reform in the UK House of Commons (1811–2015), Bayesian Binary Logit Analysis	266
6.5	Institutional Reform in the UK House of Commons (Low Party Strength, 1811–1880), Bayesian Binary Logit Analysis	275
6.6	Institutional Reform in the UK House of Commons (Medium Party Strength, 1880–1945), Bayesian Binary Logit Analysis	277
6.7	Institutional reform in the UK House of Commons (High Party Strength, 1945–2015), Bayesian Binary Logit Analysis	280
A1	House of Commons Sessions, 1810–2015	327
A2	Examples of Removed Procedural Phrases	334
A3	Correlations Machine Learning Estimates (NB vs. SGD)	348
A4	Correlations Machine Learning Estimates (Procedural Removed vs. Not Removed)	349
B1	Standing Orders Reform, 1811–2015	352
C2	Time Scarcity - Regression Results (Robustness Checks)	366
C3	Time Scarcity - Regression Results with Workload DV	367
C4	Time scarcity - Regression Results (Robustness Checks, Workload DV)	368
C5	Effect of Constituency Size on Participation, Bayesian Linear Es- timates (1811–1831)	369
C7	Effect of Constituency Size on Participation, Bayesian Linear Es- timates (1869–1885)	369
C6	Effect of Constituency Size on Participation, Bayesian Linear Es- timates (1832–1868)	370

C8	Effect of Constituency Size on Participation, Bayesian Linear Estimates (1886–1918)	370
D9	The Effect of Polarisation (Full Sample)	373
D10	The Effect of Obstruction (Full Sample)	373
D11	The Effect of Polarisation*Obstruction (Full Sample)	374
D12	The Effect of Polarisation and Obstruction Without Interaction Terms (Full Sample)	375
D13	The Effect of Polarisation (Low Party Strength)	376
D14	The Effect of Obstruction (Low Party Strength)	376
D15	The Effect of Polarisation*Obstruction (Low Party Strength)	377
D16	The Effect of Polarisation and Obstruction Without Interaction Terms (Low Party Strength)	378
D17	The Effect of Polarisation (Medium Party Strength)	379
D18	The Effect of Obstruction (Medium Party Strength)	379
D19	The Effect of Polarisation*Obstruction (Medium Party Strength)	380
D20	The Effect of Polarisation and Obstruction Without Interaction Terms (Medium Party Strength)	381
D21	The Effect of Polarisation (High Party Strength)	382
D22	The Effect of Obstruction (High Party Strength)	382
D23	The Effect of Polarisation*Obstruction (High Party Strength)	383
D24	The Effect of Polarisation and Obstruction Without Interaction Terms (High Party Strength)	384
D25	Institutional Reform in the UK House of Commons (1811–2015), Uniform Priors	388
D26	Institutional Reform in the UK House of Commons (Low Party Strength, 1811–1880), Uniform Priors	389
D27	Institutional Reform in the UK House of Commons (Medium Party Strength, 1880–1945), Uniform Priors	390
D28	Institutional Reform in the UK House of Commons (High Party Strength, 1945–2015), Uniform Priors	391

D29	Institutional Reform in the UK House of Commons (1811–2015), Outliers Removed	392
D30	Institutional reform in the UK House of Commons (Low Party Strength, 1811–1880), Outliers Removed	393
D31	Institutional reform in the UK House of Commons (Medium Party Strength, 1880–1945), Outliers Removed	394
D32	Institutional reform in the UK House of Commons (High Party Strength, 1945–2015), Outliers Removed	395

Introduction

The Politics of Procedural Choice

At the start of the nineteenth century, members of the UK House of Commons were sovereign. They could start a debate, talk virtually indefinitely, take the floor to speak on any motion, and freely interrogate Cabinet Ministers. By the end of the nineteenth century however, members of parliament (MPs) faced an arsenal of restrictions, including procedures to close debates, rules to impose time limits on speeches, and a Speaker with the power to adjourn legislative debates and discipline members. This research project is concerned with explaining the remarkable transformation of the British House of Commons from a “procedural state of nature” to an efficient law-making machine over the past 200 years.

The evolution of the British Parliament began at the start of the nineteenth century, when a number of momentous changes transformed the Commons into a more restrictive arena for plenary discussions. The first restriction was implemented in 1811, when “orders of the day”—the Parliament’s official agenda of business—were given precedence on Mondays and Fridays. The introduction of these “Order Days” presented a clear advantage to the government because it chiefly introduced business in this form (cf. Cox 1987, Chapter 6).

Seven decades later, in 1882, Prime Minister (PM) William Ewart Gladstone's Liberal Government introduced a closure procedure, which allowed a majority of members to end a debate on a bill and proceed to a vote. Although it was reformed in 1887¹ due to its inefficiency (the rule was only used *twice* during its five-year existence), it was a first important step towards introducing government control over the House's business, and was an important tool to tackle obstruction. Both reforms were hotly contested, requiring nineteen and fourteen parliamentary debates respectively before they were finally put to a vote (Kof 2015).

Arthur Balfour's "railway timetable" reforms of 1902 are yet another important episode in the House's institutional history. Prime Minister Balfour introduced two sitting days for every four-day working week and reduced the time for questions to forty minutes. Furthermore, (opposed) private business was set to be at the end of session days, supplemental questions were limited to one, and more notice was required for oral answers (Eggers and Spirling 2014b, p. 875).

This trend—of limiting the rights of individual legislators—continued into the late-twentieth and twenty-first centuries. In July 1988, for example, the House adopted a rule allowing the Speaker to impose time limits on speeches if a large number of MPs registered to speak. Even more, such time limits were made more restrictive in June 1998.² More recently, in October 2007, a rule was passed under the Brown Administration that restricted the time for emergency debates to one and a half hours.

At the same time, the House also experienced long periods of procedural stasis. The introduction of the aforementioned Order Days in 1811 was for example followed by a period of thirty-six years during which no anti-dilatory reforms occurred. Similarly, the years 1859 to 1866 (preceding the Second Reform Act), and the periods 1920–1926, 1934–1946, and 1949–1956 have shown remarkable

¹The original rule proposed that closure could be invoked upon a simple majority of 200 MPs; and, if only forty objected, 100 MPs. In the 1882 version, the closure could only be proposed by the Speaker; the 1887 amendment extended that prerogative to any MP.

²The imposed time limit per speech was reduced from ten to eight minutes.

procedural stability. The history of the institutional design of rules of debate in the UK House of Commons over the past 200 years thus shows interesting patterns of change and stability.

The evolution of the “mother of parliaments” raises an important empirical puzzle: *why do actors vote to reduce their own rights?* (see also Krehbiel 2004). Why did MPs choose to put an end to unlimited debate when they did? What happened in the early 1800s that made the introduction of new, and more restrictive rules of debate unavoidable? And, how can we explain the progressive reduction of MPs’ rights in debates over the past two centuries? In addressing such questions, this research project engages with this important and overlooked aspect of democratic organisation: the management of plenary time in legislative assemblies.³ In particular, the research focuses on procedures that affect the distribution of plenary time, i.e. rules that determine the ability of MPs to use debate to delay the legislative process, and thereby shape policy. In contrast to previous studies, my “speech-as-filibuster” approach focuses on individual legislator preferences to explain the timing of *anti-dilatory reforms*.⁴

My findings show that legislators implement more restrictive rules for the distribution of plenary time in legislative debates⁵ when the House is polarised. Under these conditions, concerns about the loss of speech-as-filibuster influence is mitigated. The effect of polarisation is contextualised by accounting for al-

³Whereas the latter is a particular class of the former (cf. Kreppel 2014), I shall use “legislature”, “parliament” and associated terms (e.g. legislators, parliamentarians, etc.) interchangeably. Unless otherwise specified, these terms refer to (members of) the lower chamber of the Parliament of the United Kingdom of Great Britain and Northern Ireland, i.e. the House of Commons.

⁴Defined as changes to an existing rule or rules, or the addition of new clauses to the Standing Orders that reduce the opportunities that MPs have to delay the proceedings on a bill. “Anti-dilatory reform” is referred to in a variety of ways in this dissertation. Possible names include, but are not limited to: “anti-dilatory reform”, “restriction”, “procedural change”, and, as its antonym, “freedom-enhancing reform”. The common element in these terms is the imposition or removal of a limit on the behaviour of MPs during legislative debates. “Reform” as such may refer to the addition of a new article to the official rules of the House of Commons—the Standing Orders—the deletion of an old one, or the amendment of an existing procedure that changes the *freedom of MPs to claim plenary time during legislative debates*.

⁵In this context, “legislative debate” refers to discussions held in the plenary on primary legislation (i.e. Bills and Acts), including both government and private members’ bills (PMBs).

ternative explanations advanced in the literature on institutional design, such as majority size, obstruction, and changes in party control. Therefore, the approach adopted here allows for a more comprehensive perspective on the forces that shape legislators' decisions about institutional design.

The remaining parts of this introductory chapter are structured as follows. First, it explores how the study fits into broader discussions on the evolution and impact of democratic institutions. Second, it introduces a theory of institutional change that focuses on the utility that MPs derive from employing the speech-as-filibuster against their own party. Third, it discusses how my theoretical framework fits into the dominant approaches to procedural choice from the literature on the US Congress and the UK House of Commons that emphasise party discipline, obstruction, and workload. Fourth, the chapter discusses the research design and data. Finally, it lays down the structure of the thesis, giving a brief outline of the individual chapters.

1.1 The Relevance of Rules of Debate

Before presenting an overview of the core argument—further explored in Chapter 2—I briefly outline the ways in which rules of debate matter for our understanding of democratic institutions, and what we stand to learn from studying such procedures in detail.

1.1.1 Collective Action

First, the transformation of the UK House of Commons in terms of rules of debate speaks to a wider question of collective action in democratic institutions. In a democratic organisation, the members that form the institution are at the outset given equal rights. These members subsequently need to collaborate to establish certain rules. Usually under a majority voting procedure, they vote to implement procedures that limit individual freedoms to safeguard a “common good”, which may well be the institution itself, or simply the need to maintain efficiency.

Such acts—to adopt formal rules—are expensive: they impose a personal cost to individual actors, whose potential extraction rate becomes increasingly limited.

Yet, formalisation of such interactions is crucial: the consequences of over-exploitation—of natural resources, security, or otherwise—can be detrimental and threaten the very survival of the commons. It is with reason that such collective action dilemmas and their institutional solutions have occupied scholars across many contexts and times (e.g. Hardin 1968; Ostrom 1990; Ostrom, Gardner, and Walker 1994).

My dissertation engages with this important topic, of how individual actors reconcile their self-interest with collective concerns. The distribution of time—whether it be in parliament or in other organisations—is particularly important for the study of democracy. This process has an inherent ambivalence. The over-exploitation of time by an actor—i.e. obstruction—conveys significant political advantages. At the same time, such behaviour harms the ability of an organisation collectively to fulfil the tasks that it was designed to perform. Whereas individually actors need freedom to promote their own agenda, collectively unlimited speaking creates chaos. How do legislators overcome the seemingly intractable conflict between maintaining one’s individual power (i.e. unlimited debate) and safeguarding the institution by using time responsibly? This key issue of collective action lies at the core of my research project.

1.1.2 Institutional Design and its Consequences

The scope of my study goes beyond collective action problems; it is also concerned with the conditions under which institutions change and evolve. The design of rules to serve the collective interest is a topic that occupies policy makers in national and international organisations alike, including, for example, the World Bank, the Organisation for Economic Co-operation and Development (OECD), or the United Nations (UN). In these cases, policy makers have to grapple with a wider constellation of political powers and geopolitical realities. However, the core of the issue remains the same: how to design institutions that serve their

members. This may for example concern the design of competition authorities in the OECD⁶; the allocation of votes among members in the World Bank; or, in national parliaments, the distribution of agenda-setting rights.

No institutional arrangement is cost-free. Inclusion of too many actors (i.e. access for all) may be debilitating for democratic institutions, while excluding too many actors undermines the legitimacy of the procedural choice that is made. The variety of possible institutional choices, the actors involved, and the process by which reforms are made are all key components of how organisations develop and evolve. In engaging with the question of institutional design, my project can truly take the *longue durée* (Pierson 2004) approach: the UK House of Commons has a virtually uninterrupted history of institutional reforms over the nineteenth, twentieth, and twenty-first centuries. My case presents us with pertinent and substantively interesting variation that can inform our understanding of the creation and maintenance of institutions, as well as how they change, generating insights for policy-makers beyond the UK context.

Such insights are particularly important, as the choice of formal rules that structure interactions between actors in turn affects policy outcomes. For example, several studies find that the relative distribution of agenda-setting powers has important consequences for who gets to shape policy (e.g. Baron and Ferejohn 1989; McCarty 2000). For rules of debate specifically, this seems particularly prescient in the UK context where discussion has traditionally had an important role in the policy formation process. Even in today's Parliament legislative proposals are almost entirely examined through the process of debate, including public and delegated legislation (Blackburn, Kennon, and Wheeler-Booth 2003). Indeed, plenary time is the *sine qua non* of democratic organisation. The quality of democracy hinges on the ability of the government to pass legislation in parliament within a time frame that balances the need for efficiency with proper scrutiny and debate. If debate has an impact on public policy, a proper under-

⁶OECD policy makers focused on this issue between 2014 and 2015.

standing of the procedural environment in which such discussions take place has a broader societal relevance.

1.1.3 British Political Development

Finally, my study contributes to a newly emerging research agenda that focuses specifically on British Political Development (BPD)—the historical evolution of the British political system in the period between the Great Reform Act (1832) and the Fourth Reform Act (1918). BPD uses rational choice theory to investigate specific historical decisions, works from new data and methods, and applies ideas from various bodies of literature and disciplines to generate hypotheses about the evolution of British political institutions, and in particular, that of the House of Commons (Spirling 2014).

Although this renewed interest among political scientists in the institutional history of the House of Commons has advanced our understanding of key episodes of reform in many important ways⁷, we still lack a complete picture of procedural reforms of the UK House of Commons. Here, the study makes both an important empirical and theoretical contribution to BPD. First, it offers a unique and complete dataset of consolidated versions of the Standing Orders for each amendment date in the House of Commons from 1811 to 2015 (see Chapter 4), as well as a new measure of ideological polarisation over that period (see Chapter 3). In addition, the construction of these datasets required the gathering of information that may seem trivial at first, but is difficult to obtain in practice. The appendices to this thesis include a rich host of data on, for example, session dates, amendment dates, and government composition that can be used by researchers who are interested in the study of the House’s historical development.

Building on this renewed interest in the UK’s institutional history, the current study bridges the gap between studies of the US legislature and the UK House

⁷These include, for example, studies of the successful passage of the 1867 Reform Act (Moser and Reeves 2014), the difficult trajectory of the introduction of the secret ballot (Kam 2014), the rise of the institution of the “Shadow Cabinet” (Eggers and Spirling 2016), and the introduction of the closure rule of 1882 and its reform in 1887 (Kob 2015).

of Commons. It tests key ideas advanced in the US literature in the context of the Westminster system, and examines the causes of institutional changes in the UK's political landscape through a new theoretical lens. As such, the research serves as an important complement to earlier historical studies of Westminster development (e.g. Bagehot 1873/2011; Cox 1987; Fraser 1960; Rutherford 1914).

1.2 Argument

My theory of institutional design combines insights from the literature of common-pool resource (CPR) problems from resource economics (e.g. Dales 1968; Hardin 1968; Ostrom 1990) and a model of procedural choice by Diermeier and Vlaicu (2011). The tension between individual and group rationality is a central tenet of this work, exemplified by Hardin's tragedy of the commons, the formalisation of this theory as a prisoner's dilemma (Dawes 1975), Olson's *The Logic of Collective Action* (1965), and, of course, Hobbes' conception of "man in state of nature" (for an overview, see Ostrom 1990). At the heart of this paradox is a free-rider problem: when a good is in limited supply, open to all, desirable, and its use is competitive, each actor faces incentives to free-ride on the contributions of others. In the context of parliamentary debate this means over-exploitation of an important common-pool resource that may be regarded as the *sine qua non* of policy-making: plenary time.

Building on this literature, I develop a formal model where the decision to support an anti-dilatory reform is a function of two parameters: i) political polarisation⁸; and ii) party strength. The aim of the model is to specify the conditions under which the ability to use obstruction—i.e. the speech-as-filibuster—to ex-

⁸My definition of polarisation (further clarified in Chapter 3 is derived from Krehbiel's "weak parties model" (Krehbiel 1991). Polarisation denotes the degree to which members within a party consistently share the same opinion across policy issues. The term is mostly applied in relation to the unit of analysis, i.e. the parliamentary session. Therefore, "high levels" of polarisation refer to a situation where each individual party in the legislature during a session is *ideologically homogeneous*.

tract policy concessions from one's own party yields a lower pay-off for MPs.⁹ This is assumed to pave the way for parliamentarians to adopt reforms.

1.2.1 Electoral Reform: Group Size, Heterogeneity, and Party Strength

In its first stage, my theory develops a political-historical narrative to explain why the House of Commons transitioned to a situation of responsible use of plenary time to one of over-exploitation. This is due to a breakdown of informal norms that had previously kept transgressors in check. The Great Reform Act of 1832, and to a lesser degree its siblings of 1867 and 1884, introduced a competitive element to plenary debate. The growth in the number of electors meant that MPs had to cater to a more diverse set of interests and show their aptitude as legislators. Participation rates rose, increasing the number of MPs that regularly participated in House business ("effective group size"), while at the same time the entry of a new class of legislators reduced the socio-economic (and ideological) homogeneity of the House. Meanwhile, parties were relatively weak and lacked the power to enforce cooperative behaviour.

The combination of these three parameters—group size, ideological diversity, and lack of external enforcement—undermined the threat of credible punishment of non-cooperative behaviour. Whereas previously informal norms had prevented legislators from obstructing parliamentary business, now, the Commons faced a common-pool resource problem as obstruction became a crucial tool for parliamentarians to shape policy.

⁹"Obstruction" refers to a specific form of obstructive behaviour in the context of this study: the use of speech to delay legislative debate. Obstruction comes in many shapes and forms, such as filibustering (e.g. Krehbiel 1998; Wawro and Schickler 2006), abstention (e.g. Noury 2004; Rosas and Shomer 2008; Vermeule 2007), or, in the US legislature in particular, committee gate-keeping (e.g. Crombez, Groseclose, and Krehbiel 2006; Denzau and Mackay 1983) (see Wawro and Schickler 2010, for an overview). Here, obstruction relates to a situation where MPs over-exploit plenary time—i.e. delay proceedings on a proposal—with the purpose of extracting policy concessions (for an alternative model of obstruction, which focuses on its use as a signalling device, see Patty 2016). Although aware of their distinctions, I use the terms "obstruction", "obstructionism", and "filibuster" interchangeably, all denoting the "speech-as-filibuster" behaviour that lies at the core of the theory and empirical analysis.

Here, legislators are caught in a “procedural dilemma”: they can give up rights to obstruct, ending (or further reducing) unlimited debate; but in so doing they undermine their own ability to influence policy. MPs are faced with an intra-party delegation problem: by adopting anti-dilatory rules, they empower a smaller set of colleagues to take the floor, who may then advance their own agenda.

1.2.2 Polarisation

The second stage of the theory develops a formal model of the speech-as-filibuster that produces predictions for when legislators can extricate themselves from the procedural dilemma. The model shows, drawing from work by Diermeier and Vlaicu (2011), that when the House is polarised, legislative debate in the plenary satisfies two crucial conditions that induce MPs to accept anti-dilatory reforms.

First, the concentration of shared views on policy within parties in the House allows MPs to overcome concerns related to delegation of procedural prerogatives. From the viewpoint of the individual legislator, proposals from the minister and colleagues from their own party are likely to be the ones that they like. MPs estimate a greater likelihood of their preferences being translated into policy. Specifically, when the opinions of MPs on bills are consistently clustered along party lines they are willing to give up rights as they can expect like-minded legislators to propose and defend similar policies. This reduces the utility they derive from filibustering, and therefore, of having completely free access to the floor. Then, parliamentarians may as well give up dilatory power because any proposal emanating from their own party is likely to satisfy their own ideological preferences.

Second, in a polarised House, an individual MP is less likely to share the motives that members of the opposing side have to filibuster. Across the possible set of proposals that are put to the floor, a parliamentarian is more likely to support those that come from their own party. Filibustering from the other party is therefore more likely to go against that parliamentarian’s interests. Curbing

the ability to delay legislative debates then becomes a viable strategy to defend one's policy preferences.

Thus, both sides of the institutional dilemma are solved: i) MPs are less concerned with their individual access to plenary time as they can safely delegate such rights to others within their own party; and ii) as regards obstructive behaviour by members on the other side of the aisle, MPs are less accepting of legislative deadlock.

1.2.3 Party Strength

At a third, and final stage, the theory advances predictions about procedural choice at different levels of party institutionalisation *over time*. The formal model developed in Chapter 2 incorporates a party strength parameter that points to three dynamics that reduce the effect of polarisation.¹⁰ First, as the costs of defection (i.e. obstruction) increase, MPs should derive less utility from pursuing filibustering strategies. Second, party leaders are able to manipulate the agenda, tabling bills that are ideologically proximate to a majority of members. Third, the capacity of parties to facilitate bargains among their members grows, making it more attractive for legislators to enforce procedures that empower their party leadership. Therefore, the degree to which the views of legislators correspond to those of colleagues should affect their vote on procedures less under conditions of party strength. Instead, MPs support procedural change when high levels of polarisation combine with a threat to their party, i.e. when they face a high degree of obstruction from the opposing side.

1.3 Existing Perspectives on Procedural Choice

The primary aim of this dissertation is to explain the transformation of the UK House of Commons from a “legislative state of nature” to an institution with a complex set of rules of debate. In so doing, it provides insights into the process whereby self-interested actors can collaborate to construct and safeguard a

¹⁰In the context of this thesis, “party strength” refers to the degree to which a party is institutionalised.

democratic institution, and informs our understanding of the formal rules within which MPs operate and policy is shaped. In this section I discuss the existing literature on parliamentary reform and highlight how the research presented in this dissertation advances and improves on current work.

My study addresses two gaps in the literature. First, most theories rely on party strength and discipline to explain the adoption of restrictive rules. When we adopt a *longue durée* (Pierson 2004) perspective on procedural change, it soon becomes apparent that this is inappropriate for the study of early parliaments, where such party institutions did not yet exist. Second, my project goes further than existing research in explaining and setting out how actors can build democratic institutions, i.e. how they are able to reconcile individual rationality with larger, group interests.

1.3.1 *The Explanatory power of Party Discipline*

Research on institutional design in parliaments has traditionally taken a comparative approach. It focuses on cross-sectional variation in, for example, the role of the Speaker (Jenny and Müller 1995), the right to table amendments (Mattson 1995), electoral system design (Rose 1983), or the use of restrictive rules (Döring 2003). In addition, some authors take a historical perspective and examine individual cases of institutional change (Cox 1987; Huber 1996a,b; Slagter and Loewenberg 2009).

More recently, new data collection efforts have sparked a renewed interest in the study of long-term trajectories of institutional change. My dissertation fits into this growing field of research on democratic organisation and evolution in Western Europe, which draws from a well-established literature on procedural change on the US Congress (e.g. Binder 1996, 1997; Schickler 2000, 2001). The ambition of such research is to trace reforms to parliamentary rules over time, and includes studies of, for example, minority rights (Sieberer, Müller, and Heller 2011), committee powers (Zubek 2015), and agenda power (Carroll, W. Cox, and Páchon 2006; Zubek 2011; Zucchini 2011).

Yet, by and large the focus of such research is on a limited time frame (for example the post-WWII context, e.g. Zubek 2015) or specific episodes of institutional design such as the closure procedures in the UK House of Commons and the German *Bundestag* (e.g. Koß 2015). In his seminal work *Politics in Time: History, Institutions, and Social Analysis* (2004), Pierson warns against prioritising individual initial institutional choices and moments of great change over long-term evolutionary processes. In the study of democratic institutions, and in legislatures in particular, the focus on single episodes to inform our understanding of how democratic institutions evolve is even more pressing. When we adopt a long-term view of a parliament's development, important gaps in the existing literature emerge.

First, existing theories are unable to explain how a parliament makes the first jump from a legislative state of nature to a bare-bone set of restrictive rules. In so doing, they neglect the important tension within democratic organisations between individual and collective rationality. How can members of an organisation adopt a restrictive rule if to do so restricts each individual's rights? Traditional explanations of procedural choice rely on some form of party discipline or strength to get around this problem. For example, two important perspectives from the US literature—the conditional party government and procedural cartel theory (see below)—incorporate some measure of party strength to explain why and when reforms are adopted.

The focus on political parties is problematic. In the legislative state of nature, a parliament makes decisions through a majority voting rule, and there are no strong parties with the ability to enforce discipline. In other words: the organisation's members are co-equal agenda-setters (e.g. Cox 2006; Diermeier and Vlaicu 2011). How then, does a parliament extricate itself from a legislative state of nature? Existing literature has as of yet to offer a convincing answer.

Second, if we again take the long-term view on institutional choice, it is not entirely clear that party discipline is conducive to the implementation of restrictive rules once we have moved away from the legislative state of nature. We

may expect a need for restrictive rules to emerge precisely when there is a lack of party-level discipline to enforce cooperative behaviour. Theorising about reform in this context may prove especially useful. Any comprehensive explanation of institutional change should be able to generate predictions for procedural choice under these conditions, as well as for when parties do become more powerful.

1.3.2 Reconciling Individual with Collective Rationality

When we move beyond the legislative state of nature, some progress has been made to explain both continuity and change in parliaments. Yet, a second lacuna remains: the question of how MPs reconcile their individual preference for unlimited debate with the collective interest of legislative efficiency. With some exceptions (Eggers and Spirling 2014b; McLean 2001; McLean and Bustani 1999; Moser and Reeves 2014), existing accounts make the implicit assumption that MPs lack agency and are largely unaware of the adverse, long-term effects of restrictions on their power as individual legislators. An important consequence of time pressure is an inability to put forward one's proposals as a legislator. To subsequently curb access to the floor similarly is tantamount to surrendering policy influence. Here, power is transferred from the individual parliamentarian to a centralised institution, such as the party leader, or the Speaker of the House. What, then, motivates MPs to accept an abdication of policy power?

Traditional accounts offer no explanation of the individual considerations that MPs make to pursue such a strategy. More concretely, they leave us to wonder how legislators balance the individual advantages of unlimited debate—the ability to over-exploit plenary time to extract policy concessions—with the collective interests of parliament as a whole: the need to *legislate* in a timely and efficient manner. When are members able to prioritize the collective interest of parliament? Or, under what conditions are MPs simply overruled by their party? Linking macro-patterns such as increases in workload or obstructive behaviour to the individual choices that MPs make, over-simplifies the decision-making process. Such studies consider one side of the trade-off (i.e. the costs of non-action)

and under-estimate the agency of MPs and the utility they may derive from implementing anti-dilatory reforms (or rather: how a particular constellation of conditions may compensate for progressing to a procedural environment that, on the face of it, yields a lower utility to MPs).

Although traditional accounts of procedural choice offer important building blocks to theorise about this trade-off, they mostly proclaim an almost natural, secular transition of the allocation of time to the government. My perspective builds on key insights from such studies. The first stage of my theory (set out in greater detail above) focuses on important transformations in the scope of the agenda of the House and its effect on MPs' behaviour. The literature on the UK House of Commons provides valuable insights in this respect. Several earlier studies attribute the growth in ministerial control over the past two centuries to time pressure caused by the addition of 100 Irish members after 1800, the nineteenth-century electoral reforms, and Irish obstruction (e.g. Bryce 1921; Cox 1987; Fraser 1960; Wheare 1963).

Recently, the British Political Development research agenda has added to our understanding of these historical instances of reform. Koß (2015) for example studies the introduction of the closure rule in 1882 and its reform in 1887, arguing that the House adopts reforms to its rules when legislative obstruction is undertaken by anti-system parties. Under these conditions, mainstream political groups are able to commit to propose a restrictive rule.

The notion of "heresthetics" (Riker 1980, 1996) has also re-entered the debate on procedural choice in the House of Commons as part of the BPD agenda. This perspective argues that members accept institutional changes because effective leaders manage to alter the dimensions of conflict on the reform. This creates scope for new coalitions to emerge and support procedural change. Building on work by McLean (2001) and McLean and Bustani (1999), Moser and Reeves (2014) show with a quantitative analysis of 60 legislative votes and 3,200 speeches that a reduction in the dimensionality of debate under the minority Conservative government created an opportunity to pass the Second Reform Act of 1867.

Finally, Eggers and Spirling (2014b) study the emergence of government agenda-setting powers, using evidence from over half a million Commons speeches to show that the increase in ministerial responsiveness in the late nineteenth century explains the willingness of MPs to cede procedural power. The rise of a mass electorate meant that members became increasingly aware that finding ways to embarrass the government yielded greater electoral pay-offs than agenda control. Therefore, they agreed to a *quid pro quo*: institutional opportunities to question the government were traded for greater agenda control.

From the literature on the US Congress, the “efficiency” account of legislative organisation also offers insights into the pressures that legislators face as a parliament’s workload increases. Here, a parliament adopts restrictive rules in order to deal with the pressures imposed by a busy agenda (i.e. workload) and increases in membership (e.g. Cooper and Young 1989; Jenkins 1998).¹¹ MPs can collaborate to extricate themselves from problems that stem from a lack of time by implementing procedures that limit access to the plenary. Cox (2006) for example claims that the unregulated character of the “legislative state of nature” means that when the number of bills that are tabled rises above a minimum threshold, a “plenary bottleneck” emerges. When a group of legislators subsequently brings a controversial bill to the floor, it may be met with obstruction. The proposers will need to limit both *delay* powers and improve special *proposal* rights. Therefore, higher workload should lead to a greater probability that restrictive rules are adopted.

The nature of the “legislative state of nature” is perhaps best explained in Cox’s seminal work on the development of ministerial control in the House of Commons (Cox 1987), where he shows that an increase in legislative business produces a collective action problem that is addressed through restrictive rules. As more MPs engaged in parliamentary affairs, the time available to each diminished. If each member individually had the unrestricted ability to use ex-

¹¹Jenkins (1998) attributes the development of the standing committee system in the early US Congress to the pressures of the War of 1812 against Britain, which required greater efficiency.

traordinary procedures to speak in the plenary at any time, they would use it, and chaos would ensue. To escape this “tragedy of the commons”, members abolish their own rights.

In these accounts, the rise in time pressure in the House raised important questions about its functioning, and even its survival. This requires an institutional response, i.e. the implementation of formal rules. Rutherford (1914) for example argues that members adopted restrictive rules of debate in response to obstruction, to “save” the House from being undermined. In turn, according to Fraser (1960, p. 460), the Irish obstructionist tactics of the late nineteenth century were merely part of a larger phenomenon of an increase in the volume of speeches and amendments that led to reform. Rather, the growing acceptance of the notion that the parliament’s main purpose was to pass legislation—both in the media and among members—paved the way for change. Both perspectives betray elements of the struggle of reconciling the collective interest (“saving” the Parliament) with individual interests (the struggle to table one’s own amendments and make speeches) that figures prominently in my own theory.

The core of the problem that legislators face—of time scarcity and obstruction—plays an important role in my theory. However, my theoretical framework goes further in exploring how, when faced with time pressure, legislators are able to overcome the concern of giving up their own freedom in debates in the interest of the collective. It also explains under what conditions the freedom to filibuster matters more and when it is less consequential.

My approach focuses more explicitly on the tension that legislators face in reconciling collective and individual interest in matters of procedural choice. Here, my work builds on two important theories from the literature on the US Congress. First, “procedural cartel theory” (PCT) (Cox and McCubbins 1993, 2005, 2011) posits that when parliament is polarised, party members delegate negative agenda powers to their leaders, who will then form a procedural cartel with the aim of manipulating the agenda such that only proposals that benefit the majority of the party make it to the floor. Members must support the extra-

legislative institution of the party caucus on key institutional matters in order to maintain membership, and therefore it ‘stabilizes key features of the structure of the House’ (Cox and McCubbins 1994, p. 218). This bond is valuable to members because it advances their position through, for example, committee assignments, majority status, and re-election (Cox and McCubbins 1994, pp. 218-222). Later work has extended this model from the US Congress to, for example, Germany (Chandler, W. Cox, and McCubbins 2006), Italy (Cox, Heller, and McCubbins 2008), and Israel (Akirav, Cox, and McCubbins 2010).

My theory, which also incorporates a party strength parameter, similarly allows for such manipulation of the agenda. However, the formal model shows more clearly how such behaviour by party leaders affects the utility that MPs derive from unlimited debate, and how and when political parties become a prime consideration with respect to legislators’ individual procedural choices.

Second, the “partisan” model of institutional change, or rather, the “conditional party government” (CPG) model (Aldrich 1995; Aldrich and Rohde 2009; Binder 1996, 1997; Dion 1997) combines insights from the “efficiency” account outlined above with theories of the role of parties in structuring legislative institutions. It points to the effect of the strength of the majority party¹² as well as minority obstruction on parliamentary reform (Aldrich 1995; Aldrich and Rohde 2009; Binder 1996, 1997). Binder for example argues that the majority party needs to be sufficiently united over policy issues in order to support the suppression of procedural rights. If it is fractionalised, dissident members are unlikely to want to support restrictions that may harm their influence when they wish to challenge their own party.

¹²Such *party strength* is a function of the internal homogeneity of the majority party and the relative size of the majority party. Binder (1996) interacts the two terms in her study. I shall keep them separate to be able to assess the competing visions put forward by Binder (1996) and Dion (1997). There is some disagreement between Binder (1996) and Dion (1997) here. Whereas the former argues that larger parties possess the strength to pass reforms; the latter posits that smaller majorities are more cohesive and therefore more likely to be able to pass reforms. I find evidence for neither perspective in this study.

This notion—that rules affect the ability of MPs to influence policy—also features in the “non-partisan” account of institutional change: the ideological balance of power model. Here, the policy positions of legislators provide the key explanatory mechanism (Schickler 2000; Schickler and Rich 1997). Rules become more restrictive when the median member of parliament moves in the direction of the median ideological position of the majority party. When this happens, the median voter will more likely support greater agenda control for the majority, as it is likely to defend policies that bring outcomes closer to their ideal point.

Both CPG and the balance of power model posit that the procedural choice of members is a reflection of their views on policy. Again, my theory combines insights from both perspectives, as it is equally concerned with the use of obstructive tactics of members and the ideological composition of parties. However, it theorises more explicitly about the utility of the “speech-as-filibuster” as a tool to influence one’s own party. By framing the transfer of procedural rights as an intra-party delegation game, and specifying the utility functions with respect to the use of obstruction, my perspective reconciles these key dynamics—ideology, filibustering, and formal rules—in one, parsimonious model.

Building on these key insights, my approach seeks to avoid aggregating “the party” into a collective unitary actor. Instead of proclaiming an almost natural, secular transition of the allocation of time to formal rules, I seek to understand, formalise, and explain both the legislative state of nature as well as the individual considerations that MPs make to “abdicate procedural power”. Building on the literature on institutional choice and minority rights in the UK and the US legislature, I show how MPs navigate the tension between individual and collective interests.

1.4 Research Design and Data

To test the predictions set out by the theory, I rely on a large-n longitudinal study of the UK House of Commons, studying procedural reforms in every session for a period covering over 200 years of parliamentary history (1811–2015). The UK

is one among few parliaments in the world that has a virtually uninterrupted history. As such, it allows me to assess the temporal explanatory strength of the theory, and to consider the impact of political parties on the mechanisms that lead to reform. The findings are cross-validated with qualitative evidence where possible, drawing from a rich collection of data from parliamentary debates as well as information from secondary sources.

The empirical contribution of this thesis relies on a myriad of newly collected data and new methods. The analysis itself employs a combination of frequentist and Bayesian statistics, machine learning, computational text analysis, and insights from natural language processing. The generation of the dependent and main independent variable each have dedicated chapters that rely and build on new insights from computational text analysis applied to the study of institutional history.

1.4.1 A New Dataset: 200 Years of Parliamentary Reform

The dependent variable of the study is anti-dilatory reform, defined as *a change to a provision or the introduction of a new clause in the Standing Orders that reduces the ability of MPs to delay the proceedings on a bill*. In order to trace these changes, I draw from a new and complete dataset on the Standing Orders of the House of Commons for each session from 1811 to 2015 that I created for this project. Reforms are recorded for each parliamentary session.¹³ The dependent variable is created through manual coding of changes, cross-validated using automated methods.

Readers may object that such formal rules are only a small part of the institutional regulations that guide parliamentary debate. Indeed, rules are often derived from other sources, such as intra-party regulations, or informal practices and conventions. However, there are reasons to prioritise the study of formal procedures over informal rules. First, data on conventions are difficult to obtain,

¹³A “parliamentary session” is the period that starts with the State Opening of Parliament, and ends with prorogation of the session. Although usually a session lasts twelve months, historically there have been multiple shorter sessions.

and are often party-specific or unwritten. Formal rules may be an imperfect proxy, but they are arguably the best available. It is with reason, therefore, that a majority of recent contributions in the procedural choice debate focus on formal rules (e.g. Sieberer, Meißner, et al. 2016; Sieberer, Müller, and Heller 2011; Zubek 2015).

Second, informal conventions and formal rules do not operate in a vacuum. They mutually influence one another and, over time, formal rules are tweaked to reflect informal practices. In the UK case for example, the practice of giving formal notice of the questions to be asked at a sitting, by printing them on the Notice Paper, had already begun shortly after the Great Reform Act of 1832 (Cox 1987, p. 62). Subsequently, a Standing Order was adopted to formalise this convention in March 1888, with some small adjustments that gave the Speaker of the House greater power to allow ad hoc questions.¹⁴

Third, the *formalisation* of rules in and of itself implies the occurrence of a substantively important institutional change. Conventions, albeit significant, have less structuring power. The need to formalise a rule implies a degree of uncertainty about existing conventions. More importantly, it demonstrates the need for a rule that is *enforceable* and therefore has potential implications for all actors that fall within the remit of the new procedure.

1.4.2 Measuring Polarisation: 6.2 Million Speeches

To measure the main independent variable, polarisation, I develop and apply computational text analysis techniques to records of speeches made in the House of Commons. I use data from the *Hansard* archives. The data include all legislative sessions between 1811 and 2015, covering 205 years of parliamentary debates, and consisting of over 6.2 million individual records. Substantial efforts were made to

¹⁴See Standing Order 20 of 7th March 1888, which reads as follows: ‘That Notices of questions be given by Members in writing to the Clerk at the Table, without reading them *viva voce* in the House, unless the consent of the Speaker to any particular question has been previously obtained.’

process and clean these data and to obtain the appropriate party labels, relying on important new data gathering efforts and both primary and secondary sources.

Methodologically, I employ and build on several techniques to estimate legislator preference positions, including **Wordshoal** (Lauderdale and Herzog 2016), adapted forms of the standard **Wordfish** algorithm (Slapin and Proksch 2008), and correspondence analysis (CA). Importantly, I make the case for the use of novel machine learning approaches to measuring political polarisation, which avoids important issues such as the high-dimensionality of data that affects traditional scaling methods (Peterson and Spirling 2018).

This thesis has a strong methodological component and contributes to the growing computational text analysis field. Such techniques are increasingly being used to answer substantive questions in political science (e.g. Eggers and Spirling 2014b; Herzog and Benoit 2015; Proksch and Slapin 2015). A core part of the research engages with the challenges of computerised analysis of political texts, develops new applications, and evaluates their advantages and disadvantages. It focuses on issues such as multi-dimensionality, parliamentary power dynamics in debates that influence our estimates, the methods that may be used to assess validity, and the strategies for extracting latent variables based on the estimates.

In so doing, the dissertation exemplifies the contributions that the text-as-data field offers to the study of long-term historical developments. Two contributions stand out. First, the dissertation provides a framework for evaluating several new implementations of text analysis models to measure polarisation in the UK House of Commons (Chapter 3). As such, the thesis provides a more structured approach to assess text-as-data measures, allowing us to use them to study substantive and important questions in political science. Second, the thesis advances a new, simple approach to study procedural texts that allows for automated cross-validation of manual coding of *substantive* changes (Chapter 4).

1.5 Structure

The thesis consists of seven chapters, including this introduction. It has three parts. The first part consists of Chapter 2, which presents the theoretical framework for studying institutional change in the House of Commons. It begins by outlining a model for understanding why and when a democratic organisation departs from a “procedural state of nature”, that is, when it first adopts a restrictive rule and transitions from unlimited to restricted debate. Here, I draw from the common-pool resource literature, and set out a number of key parameters that are conducive to responsible use of plenary time. I subsequently show how such an informal institutional equilibrium breaks down as these parameters change. I argue that over-exploitation of plenary time is likely to occur when effective group size increases, homogeneity of parliament declines, and enforcement mechanisms are lacking (H1).

The chapter further outlines how a new institutional equilibrium emerges. When faced with a procedural dilemma—where obstruction is acceptable and common, and legislators are unwilling to give up their individual powers—legislators need to be given some alternative means to shape policy. Here, I argue that members are likely to consent to anti-dilatory reforms when the policy costs of doing so are low. This happens when the distributional homogeneity of policy preferences along party lines is high (H2). I further theorise this dynamic under conditions of strong parties, arguing that here both polarisation and obstruction need to be present to produce anti-dilatory reform (H3).

Part II consists of Chapters 3 and 4, and deals with the measurement of the main predictor and the dependent variable. It explores how we can extract meaningful information from historical speech records and Standing Orders. Here, I employ several computational text analysis techniques, including scaling models and machine learning algorithms.

Chapter 3 presents a comparative assessment of different text analysis algorithms that can be used to estimate legislator positions in the UK House of

Commons. It presents several different estimation strategies, and assesses their relative performance (i.e. validity) against a comprehensive set of criteria. In so doing, it develops a new validation scheme, and engages with important issues in text-based estimation of preferences such as the high-dimensional nature of our data and power dynamics in parliamentary debates.

Chapter 4 engages with the question of measuring institutional reform. The chapter: i) presents a completely new and complete dataset of the Standing Orders of the House of Commons that covers the period 1811–2015; ii) develops a new coding scheme for the evaluation of procedural changes in terms of their filibustering power; iii) shows general trends in the transformation of the House’s procedures using a variety of text-as-data approaches; and iv) includes a cross-validation exercise.

The two chapters of Part III of the dissertation comprise the core of the empirical contribution. Chapter 5 focuses on the first hypothesis, and describes the significant exogenous transformations that led to a breakdown of the informal procedural consensus in the House and set in motion a broader process of reform. It shows how the behaviour of MPs changed in response to the electoral reforms. Subsequently, it links this development to a breakdown of informal constraints, producing a situation in which plenary time is over-exploited, as well as the procedural dilemma that ensued.

Chapter 6 concentrates on the conditions under which procedural reforms are adopted, tackling the question of *why members of parliament vote to implement restrictive rules*. It studies the changes in the House of Commons’ rules of debate from 1811 to 2015 and presents a test of H2 and H3, weighing the impact of several contextualising variables such as majority size and electoral constraints.

Finally, Chapter 7 attempts to put the findings in a wider context. It first gives a brief overview of the results, after which it reviews the theoretical implications of the research for the study of procedural choice in legislatures. And finally, it outlines a number of avenues for future research, focusing both on the

substantive empirical findings, and the use of text-as-data in the political science discipline.

The thesis has four appendices: Appendix A contains additional supporting material for the computational text analysis techniques employed in Chapter 3; Appendix B gives a detailed overview of all anti-dilatory reforms in the House of Commons from 1811 to 2015 that forms the basis of the analysis in Chapter 4; Appendix C provides additional models and model checks for the empirical analysis in Chapter 5; and Appendix D contains supporting material for the empirical tests of Chapter 6.

PART I

Modelling Procedural Choice

Theory

Filibustering, Polarisation, and Procedural Choice

This chapter advances a theory of procedural choice that explains how a democratic organisation evolves from a procedural state of nature to one that encompasses a complex set of rules. It provides a theoretical answer to two questions. The first question asks why a process of reform starts when it does: when does a pre-existing institutional equilibrium break down, causing a “need” for procedures to emerge? The aim of the first part of this chapter is to theorise about informal institutional equilibria—where formal rules are absent—and how they collapse.

The second question that motivates this chapter asks under what conditions a change to a parliament’s procedures is introduced once the original equilibrium has broken down. This part focuses on the *timing* of procedural choice, i.e. the question of why an anti-dilatory rule is adopted at a specific time.

The answers to both questions advanced in this chapter frame the process of procedural choice as a common-pool resource (CPR) problem. The CPR liter-

ature is concerned with explaining the management and governance of resources that are in short supply yet accessible to all. It is interested in the role that institutions play in ensuring responsible use¹ of such “common-pool resources” (Hardin 1968; Ostrom 1990; Ostrom, Gardner, and Walker 1994). The question of how to build organisations that safeguard the CPR emerges when many actors face individual incentives to use it, leading to an unsustainable rate of extraction.

Building on this literature, the theory makes three broad claims, summarised in Figure 2.1. First, democratic organisations can successfully manage a resource—here, plenary time—through informal cooperation, provided three conditions are met: i) the common-pool resource is not in short supply; ii) the institution’s members are drawn from similar socio-economic backgrounds; and iii) there is some form of enforcement mechanism to induce cooperative behaviour. A breakdown of these three conditions undermines pre-existing boundaries on legislator behaviour, leading to over-exploitation of the common-pool resource of plenary time. Under these conditions, filibustering (or: obstruction) becomes a crucial tool for MPs to exercise policy influence.

Second, members of the organisation face a “procedural dilemma” when such a breakdown occurs: they can limit freedom in plenary debates to tackle obstruction, but this is tantamount to giving up rights to engage in debate and influence policy. MPs face an intra-party delegation problem: when parliament adopts procedural restrictions, some MPs are privileged over others. These “privileged” legislators have greater opportunities to defend their policies and face incentives to shirk and bring legislative outcomes closer to their ideal point. Therefore, MPs will only give up powers when they can be sure that party colleagues will defend similar policies, offering them a credible alternative policy-influencing mechanism to offset the loss of filibustering power. In sum, the decision to adopt a formal restriction on debate is a function of the utility that legislators derive from filibustering as a policy-influencing mechanism *vis-à-vis their own party*.

¹In this literature, “responsible use” is defined as the maintenance of a rate of extraction that does not exceed supply.

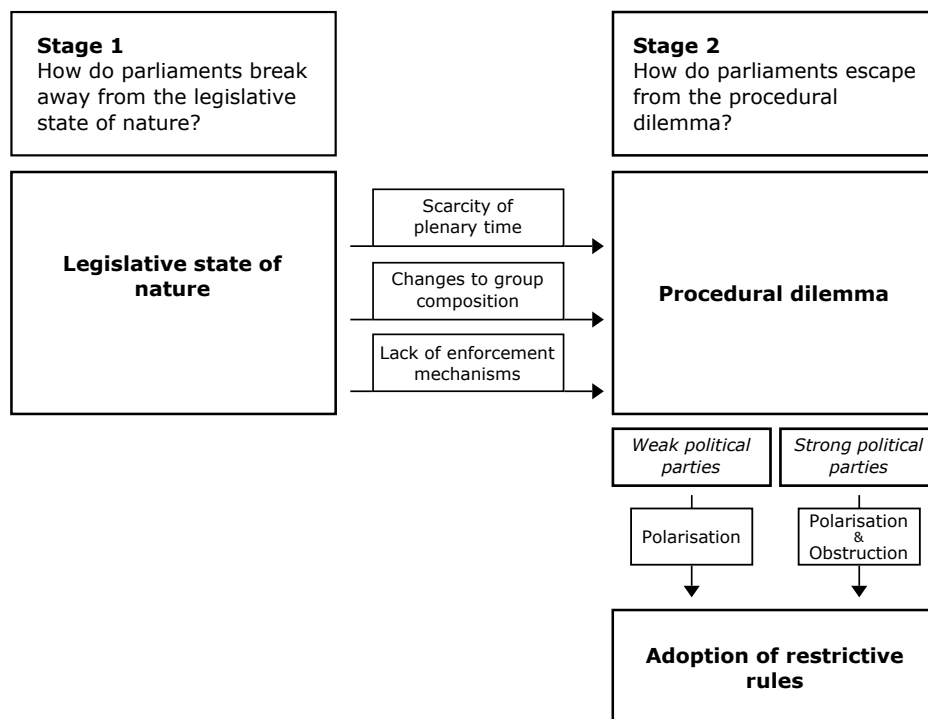


Figure 2.1: Schematic Overview of the Theory

Third, party strength undermines the impact of polarisation—i.e. the concentration of shared policy preferences within parties—the effect of which then becomes dependent on the presence of obstruction. When advanced party institutions are present, they are able to manipulate the agenda, enforce cooperation by attaching punishment to defection (i.e. obstruction) or withholding office promotion, and provide institutional opportunities for trading favours on bills. The filibuster, then, has less value to the legislator as a policy-shaping tool when parties are strong. However, when the party’s members are ideologically close *and* their agenda is threatened by obstruction from the other side of the aisle, they band together to protect it by enforcing restrictive rules.

In proposing and developing these three interrelated parts, the chapter seeks to advance a unifying theory to explain how democratic institutions emerge from a “legislative state of nature” (Cox 2006), and how they evolve over time. In so doing, it theorises about a particular class of rules: anti-dilatory rules. Such

procedures are intended to limit the ability of MPs to delay business on a bill and include, for example, time limits on speeches and procedures to end debates. They are pertinent to legislative organisations because they affect the distribution of time among members, and hence their ability to influence policy. The character and scope of anti-dilatory reform in the UK Parliament will be explored in greater detail in Chapter 4.

This chapter is structured as follows. Section 2.1 discusses the main assumptions of the theory with regards to MP behaviour, as well as to the purpose and nature of the filibuster in the UK House of Commons. Section 2.2 focuses on the breakdown of informal norms and the rise of the filibuster as a policy-influencing mechanism (H1). Section 2.3 introduces the main hypothesis, which links intra-party polarisation to the likelihood of anti-dilatory reform (H2); and Section 2.4 theorises the effect of polarisation under conditions of strongly institutionalised political parties (H3). Finally, Section 2.5 summarises the main claims of the theory and concludes.

2.1 Assumptions

The approach adopted in this thesis is rooted in the distributive perspective on legislative organisation.² This view is individualistic in its axiomatic foundation and holds that the principal function of a legislature as a collective choice body is to allocate policy benefits among actors. Legislative institutions manage the process through which gains from trade are realised and optimised. Parliamentary procedures are adopted in line with the preferences of legislators, in order to avoid non-cooperative behaviour.

2.1.1 *The Nature of Institutions and Change*

I make three assumptions about the nature of parliamentary organisation. First, in line with rational choice theory, I take a functional and instrumental view of institutions. Actors are rational individuals who seek to further their interests,

²For a comprehensive overview of this perspective, see Krehbiel (1991).

and act strategically on the basis of fixed preferences to maximise their pay-off from rules (Calvert 1995; Greif and Laitin 2004; Knight 1992; North 1990; Shepsle 1986; Tsebelis 1990; Weingast 2002). Behaviour is guided by the logic of consequentialism: the expected pay-off of strategies informs the choices that actors make. Political bargaining is a perpetual collective action dilemma that can be overcome by creating institutional rules.

Second, I assume that institutional reform depends critically on the behaviour and preferences of *individual members of parliament*. Here, I follow Ostrom (1990, pp. 13-15) in claiming that individuals collectively can extricate themselves from a collective action problem. Institutional change is not dependent on a central authority—in this case, a party machinery or the Cabinet—but hinges on the aggregate behaviour of individual actors. Moreover, institutional rules are not exogenous as some early rational choice contributions assume (e.g. North 1990); rather they emerge from repeated interactions among rational actors who pursue their individual policy preferences (e.g. Calvert 1995).

The third assumption is that anti-dilatory reforms—procedural changes that undermine the ability of legislators to delay legislative business—have a dual character. Tsebelis (1990) distinguishes between “efficient” and “redistributive” changes (see also Sieberer, Müller, and Heller 2011, p. 952). The first category of change favours all actors, whereas the latter benefits a small group of players. The redistribution of access to plenary time—and the concomitant concentration of policy influence—is what makes anti-dilatory reform problematic to individual legislators. In this collective action dilemma, MPs are constantly aware of the trade-off between the efficiency-promoting nature of anti-dilatory reform, and its redistributive consequences.

2.1.2 *Why MPs Talk*

A rational choice approach to institutional design requires us to make assumptions about the goals that MPs pursue through these organisational structures. I assume that legislators take the floor because of *policy concerns*. Existing litera-

ture points to a wide variety of purposes of speech-making in parliament. It is for example used to claim credit and advance re-election prospects (cf. Eggers and Spirling 2014a; Mayhew 1974; Proksch and Slapin 2012, 2015), and to address information asymmetries and provide cues for legislators (cf. Austen-Smith 1990; Austen-Smith and Riker 1987; Banks 1991). However, the important endogenous *legislative* role of parliamentary speech is under-valued and overlooked. As a device for shaping policy, it has been qualified as “cheap talk” that has no effect on legislative decisions (Austen-Smith 1990).

Yet, literature on minority rights in the US Congress suggests that speech does, indeed, affect policy, but does so indirectly through obstruction (e.g. Binder 1997; Dion 1997; Schickler 2000). MPs can extract policy concessions when they use speech to delay proceedings on a bill. The best-known example of such behaviour is the “filibuster” in the US Senate (Wawro and Schickler 2006)—a situation where MPs prevent a vote on a proposal by continuously extending debate. This rule has been the subject of some academic attention in the US context (Beeman 1968; Bruce I. 1985; Wolfinger 1971).

The theory I present here builds on this perspective and assumes that a key purpose of speech-making is to *obstruct to influence policy*.³

Obstruction and Lawmaking in the UK House of Commons

Such a view of parliamentary speech is not controversial in the US context. Here, filibustering is one of the best-known parliamentary tactics. As the *sine qua non* of democratic freedoms, it plays a central role in US public imagination and in the legislative process (Wawro and Schickler 2006). In the UK context, obstruction

³These perspectives on the purpose of speech are of course not entirely separable. I do not exclude the possibility that debate serves the purpose of addressing information asymmetries and of canvassing voters. However, the manifestation thereof is policy-based behaviour: MPs seek to implement policies that deliver for their constituents in line with their electoral promises, or talk to signal their position on bills to their colleagues. The formulation of such promises is to a great extent informed by the values they hold, or the group of legislators that they selected themselves into (i.e. their party). In the end, the goal of attaining their preferred policy is the prime motivation for legislators’ actions, regardless of whether clientelistic (Wilson 1980, p. 369), particularistic (Mayhew 1974, pp. 53–55), or other incentives factor into that preferred policy.

is usually not characterised as a central feature of *lawmaking*. It is primarily associated with the names of Charles Stewart Parnell and Joseph Biggar, whose obstructive tactics to advance the Irish nationalist cause in the late 1800s inspired much academic debate (e.g. Fraser 1960; Redlich 1908; Rush 2001, Chapter 1).

However, from anecdotal evidence, we know that obstruction is and has been used more regularly than general histories and studies of the UK House of Commons suggest. And, MPs do so with the explicit goal of influencing the outcomes of the legislative process, rather than to purely undermine the incumbent government (or as in the case of Parnell and Biggar, to undermine the institution of parliament itself). At the committee stage of debate, which came after the second reading, bills were discussed on a clause-by-clause basis and allowed members to speak as often as they liked. Moreover, the House had—and still has—an open recognition rule. When an MP wishes to speak, they only have to rise from their chair, after which the Speaker may give them the floor. The Speaker is, by all means, a neutral institution who has no party affiliation and whose decision to grant opportunities to speak should not be informed by political considerations.

This set-up offered ample opportunity for filibustering. It is therefore no wonder that MPs made grateful use of that freedom.⁴ Although historically procedural changes have made it more difficult to filibuster legislation, MPs have continued to employ the tactic occasionally to influence legislative politics after

⁴For example, between 12 and 27 July 1831, during the committee stage of the Great Reform Act, which sought to extend the franchise, a group led by Sir Robert Peel (Tamworth) made strategic use of obstruction to delay its passage. They made a combined total of 231 speeches, with Peel accounting for 48 of these (Thornley 1960, p. 43). Further, about a decade before taking on the premiership, William Ewart Gladstone had himself applied such tactics to delay the adoption of the 1857 Divorce Bill (officially: “Matrimonial Causes Act 1857”). The bill sought to establish a new Divorce Court, and to Gladstone it represented a usurpation of the authority of the Church. At the committee stage, on one day the House sat for ten hours during which Gladstone made 29 speeches, of various lengths (Morley 1903, p. 571).

the turn of the century, and into the twenty-first.⁵ Such behaviour has not gone unnoticed: a petition to strike the option from the menu of parliamentary tactics gained 50,697 signatures in 2016. The petition said the filibuster is ‘archaic, repugnant, and has no place in a modern parliament.’⁶

These instances of obstruction in the House’s history illustrate two important foundations of the theory laid out in this chapter. First, filibustering *was* used with the explicit goal of influencing legislative outcomes. Second, the tactic was not limited to the 1870s and the 1880s, the period that is widely regarded as the apex of parliamentary obstruction, and which has received most academic attention for that reason. Rather, filibustering was used throughout the nineteenth, twentieth, and twenty-first centuries.

Extracting Policy Concessions Through Speech

Unlimited debate is valuable because it allows legislators who oppose a bill to leverage opportunity costs to extract policy concessions. The Minister, who proposes legislation, is primarily interested in governing *efficiently* and can therefore less afford to delay the implementation of the Cabinet’s legislative agenda. If MPs have the possibility to speak about an issue for a considerable amount of time, the Minister may make a number of concessions to expedite the implementation of new policies. A similar logic applies to bills submitted by individual MPs: those who oppose can afford delays because this allows them to force the proposer to withdraw or amend the bill; conversely, the proponents are more

⁵Tory barrister Sir Ivan Lawrence for example holds the record for the twentieth century, speaking for four hours and 23 minutes to oppose the 1985 Fluoridation Bill. Further, in 2005, Labour’s Andrew Dismore (Hendon) blocked the Criminal Law (Amendment) (Protection of Property) Bill through a 197-minutes speech. On 20 November 2015, MP Philip Davies prevented the passage of the Compulsory Emergency First Aid Education (State-Funded Secondary Schools) Bill by speaking on it for 52 minutes. Together with other members, the Tory MP for Shipley filibustered until time ran out to vote on the proposal. He had previously demonstrated his aptitude at filibustering, by taking the floor for 92 minutes to block the adoption of free parking for caregivers at hospitals, and speaking for 60 minutes on the Tenancies (Reform) Bill together with fellow Tory MP Christopher Chope.

⁶See <https://petition.parliament.uk/petitions/111441>.

amenable to making concessions as the passage of the legislative proposal is key to their policy agenda.⁷

As explained above, the assumption made in this chapter is that MPs are primarily policy-interested (Krehbiel 1998) and use debate to advance their policy agenda (see also: Maltzman and Sigelman 1996; Martin 2011; Morris 2001). Discussions in the plenary are valuable to MPs because they are able to extract policy concessions by stalling debate on specific bills that they oppose. The procedural choices of individual members should therefore be informed by their views on policy (see also Binder 1996, p. 11). As such, we have to look at debate and the rules that guide it through the lens of *filibustering*: the ability of MPs to make speeches without constraints is, I argue, a potent policy tool that MPs value to different degrees according to circumstance.

2.2 Breaking Away from the Legislative State of Nature (H1)

In the legislative state of nature, all legislatures face one crucial problem: how to decide on the distribution of plenary time. Here, members of parliament are co-equal agenda setters and each vote carries, at least in theory, the same weight. The distributional consequences of time allocation, and the process of dividing the resource itself, may create significant problems for a parliament. When each legislator has the power to speak whenever they want, excessive use of that prerogative may lead to deadlock. Such a situation often requires a procedural answer, for example in the form of limits on the length or number of speeches.

Yet, in practice such behaviour does not emerge out of thin air. Members of parliament do not suddenly start to over-exploit a common resource that is crucial to their institution's survival. Instead, a parliament in the legislative state of nature enjoys an institutional equilibrium that relies on informal modes of cooperation. At this stage in a legislature's development, the filibuster is not

⁷Note that the theory is not committed to any particular view of how such influence is exercised in practice. I envision two possible scenarios: first, MPs may pre-empt filibusters by formulating more moderate proposals *ex ante*; second, such speech-as-filibuster influence may be exercised behind closed doors by threatening to filibuster or to continue to do so.

an important device for legislators to shape policy. To understand why and when the speech-as-filibuster becomes important to MPs we turn to the first stage of the theory, as illustrated in Figure 2.2.

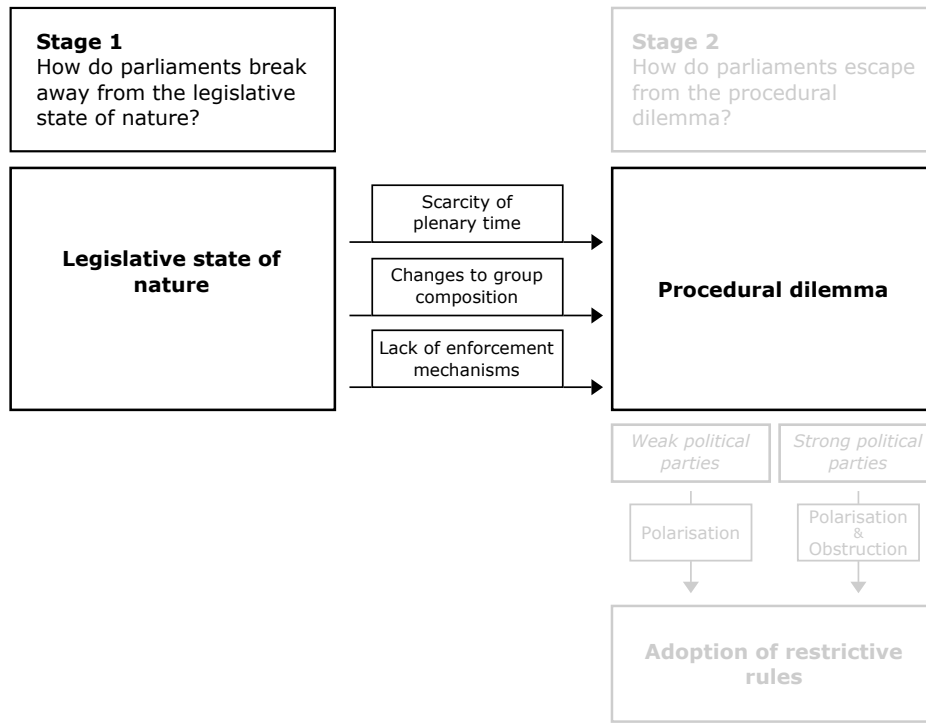


Figure 2.2: Schematic Overview of the First Stage of the Theory

The common-pool resource literature suggests that excessive use (i.e. filibustering) can be avoided when: i) the resource is available in abundance; ii) membership of the organisation is small and homogeneous; and iii) there is some form of centralised authority with the ability to enforce cooperation (e.g. Hardin 1968; Olson 1965; Ophuls 1973).⁸ To understand why a democratic organisation breaks away from the legislative state of nature, we first need to theorise about these three parameters that lead to over-exploitation. This may yield some insight into when and why MPs started using the common resource of plenary time in

⁸Olson for example argues that ‘unless the number of individuals is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, *rational, self-interested individuals will not act to achieve their common or group interests*’ (Olson 1965, p. 2, emphasis in original).

an irresponsible way, which may, under certain conditions lead to the imposition of a restriction.⁹

Crucially, it is the *desirability* of the resource of plenary time that changes in the first stage of the theory: under conditions of scarcity and heterogeneity of the group, plenary time becomes a highly desirable resource to legislators who need it to shape policy. When there is no mechanism to enforce cooperation to prevent excessive resource exploitation (of time), the filibuster becomes a cheap and easy-to-use tool to shape policy.

2.2.1 *The Informal Institutional Equilibrium: Repeated Interaction and Informal Cooperation*

First, we need to understand the character of debate in a parliament that has no formalised procedures. In this non-contractual environment, there are no formal institutions to enforce cooperative behaviour. The incentive to over-extract plenary time is always there. Yet we see that this does not necessarily occur in the procedural state of nature. In order to understand this, I build on the notion of non-contractual, informal cooperation (cf. Dixit 2004). In particular we are interested in “private ordering in the shadow of the law”—the phenomenon whereby most “contract breaches” are solved by private interactions rather than by high-order institutions such as the courts (e.g. Macaulay 1963; Mnookin and Kornhauser 1979; Williamson 1996).

Resorting to formal mechanisms of conflict resolution often involves non-trivial costs, and leads to outcomes that are sub-optimal to those that can be achieved through private ordering (which usually comes in the shape of long-term relationships or arbitration, cf. Dixit 2004, p. 10). Such costs consist of a limitation of individual freedom to pursue one’s agenda, i.e. to table bills and to

⁹Note that the nature of debate implies that the analogy of the common-pool resource does not translate perfectly to the parliamentary context, as the benefits from the use of plenary time are not completely exclusive. First, actor A may benefit from actor B speaking to obstruct, if such obstruction has the effect of blocking a proposal far removed from their ideal point (indeed this is a key explanatory mechanism in my theory, see below). Second, there are informational purposes related to speech-making: an actor might gain new information from the expert on the topic talking in a plenary session (Austen-Smith 1990).

take the floor to defend said proposals. Formal procedures empower a smaller, privileged set of actors who may not necessarily share a legislator's opinion, as will be explored in greater detail below.

Focusing on an ordinal classification of “costs” of particular institutional strategies provides a useful starting point for our discussion of the institution of debate. In what follows, we make the assumption that—in the legislative state of nature—the costs of the breakdown of cooperation exceed those of collaboration under formal rules, and cooperative interaction under informal rules is the least costly option:

$$\begin{aligned} C(\text{breakdown}) &> C(\text{cooperation under} \\ \text{formal procedures}) &> C(\text{informal cooperation}) \end{aligned} \quad (2.1)$$

In the context of an organisation (a collection of individuals) that operates under a particular set of rules and norms (the “institution”), informal, relational forms of cooperation are preferable and the least costly strategy available.¹⁰ Cooperation based on long-term relationships, much like arbitration, has an informational advantage, which means that resolution of conflicts is of better quality, yielding higher pay-offs (or lower costs) for both parties. “Arbitration forums” can also develop area-specific knowledge and expertise, which makes them particularly suitable to solve the types of conflict that arise within the organisation (cf. Dixit 2004, p. 11).

Such a non-contractual form of cooperation (i.e. self-enforcing governance) is viable provided some conditions are satisfied. In particular, there has to be an equilibrium where members of the “organisation” recognise that any gains from opportunistic behaviour are offset by lower future pay-offs. In the literature on common-pool resource problems, the mechanism that ensures cooperative

¹⁰See North (1990) for a useful discussion of the distinction between “organisations” and “institutions”.

behaviour is framed in terms of discount rates—the degree to which individuals value current benefits over future pay-offs (e.g. Ostrom 1990, pp. 34–35). The extent to which actors are able to prioritise future benefits over short-term gains, in turn, depends on the existence of informal norms that constrain behaviour. In particular, one of the key assumptions of my theory is that legislators are interested in making *policy*; a complete breakdown of parliament would certainly hamper that goal.

The “Shadow of the Future”: Informal Enforcement Mechanisms

In small, homogeneous groups of individuals, incentives for filibustering are diminished. Game-theoretic models of such relationships show that if parties (or individuals) interact with each other on a regular basis, and the future is valued strongly enough relative to the present, the “shadow of the future” (Axelrod 1984) exercises a strong constraint on behaviour. In repeated interaction games, the possibility of a collapse of long-term cooperation diminishes the impulse to pursue short-term gains (e.g. Abreu, Milgrom, and Pearce 1991; Dal Bó 2005; Ostrom 1990; see also Dixit 2004, pp. 12–13). In practice, this means that the incentive to filibuster to achieve one’s policy objectives is diminished.

Smaller groups are better able to engage in collaborative behaviour (Olson 1965). Coordination is easier: credible commitment and mutual monitoring are less exacting, and transaction costs are lower (see also Ostrom 1990, Chapter 2). Opportunistic behaviour undermines the existing relationship, and therefore diminishes future pay-offs. Informal cooperation in small groups presupposes a preference for “relational contracts”—‘informal agreements sustained by the value of future relationships’ (Baker, Gibbons, and Murphy 2002, p. 39)—over formal arrangements.

Dixit’s (2004) model of “lawlessness and economics” proposes that actors can realise gains from interaction in the absence of contracts and third-party enforcement by relying on such informal norms. If an individual deviates from the norm of cooperation, this will discourage other actors from transacting with

that person in the future. The assumption is that information about the violations of the rules travels easily in the group and reaches potential future partners, so violators of norms are ostracised (Dixit 2004, p. 12).

In the context of the UK parliament, cheaters will see their own initiatives founder. Their bills and amendments will be voted down on the floor, and their speeches ignored. In other words: going against informal norms is tantamount to surrendering *policy influence*, which is what MPs are assumed to desire most. The spectre of being relegated to the margins acts as a powerful constraint on legislator behaviour.

The costs of shifting to formal rules acts as a deterrent to abusing unlimited debate. In equilibrium, we have a relatively small group of legislators who are ideologically and socio-economically proximate to one another and are, because of repeated interaction, committed to maintaining a filibuster-free plenary arena. We may expect codified procedures to emerge when the threat of formal institutions no longer acts as a deterrent. Here, the second-optimal strategy (in terms of costs) is some maintenance of cooperation, but under *formal* rules. “Breakdown” is a second alternative. However, this latter strategy exceeds the costs of collaborating under some formal constraints given our assumptions. It seems reasonable to assume that a parliament needs to maintain some form of cooperation. A complete breakdown produces insurmountable endogenous and exogenous costs: MPs would lose the ability to legislate altogether, and parliament would collapse.

2.2.2 *Exogenous Shocks: Electoral Reform*

What causes a breakdown in the equilibrium of cooperation under informal procedures? In other words: what causes the deterrent effect of formalisation of debate rules to break down, and makes the filibuster a strategy that legislators are willing to pursue? The answer lies in the democratisation of the political system in which the legislature operates. I argue that changes to the composition and role of a parliament—caused by greater electoral pressure—pave the way for a more competitive arena, where filibustering becomes a *modus operandi* for MPs

locked in a procedural dilemma. Specifically, the three parameters identified by the CPR literature align to lead to over-exploitation (i.e. filibustering): i) plenary time becomes scarce; ii) parliament's composition changes, increasing information asymmetries; and iii) informal rules and constraints lack the enforcement power they had previously.

Scarcity of Plenary Time

As nations democratise and an electoral connection develops, the CPR of plenary time faces both a demand and a supply problem. On the demand side, the claims on the legislature's agenda and time increases, for two reasons (cf. Cox 1987). First, legislators need to deliver solutions for constituents to ensure (re-) election. MPs can no longer count on patronage to "buy" votes but instead need to design, table, and pass legislation that serves the interests of those they represent. Alternatively, MPs need to show by speaking up in parliament that they are actively pursuing the mandate they have been given by their constituents. Electoral pressure remains an individual-level problem because demands of the public on each legislator will vary between regions and/or districts.

Second, as the size of the electorate increases and the conditions on voting rights are relaxed, MPs have to cater to a larger set of interests. The electorate includes a greater number of groups whose nature and composition is more varied than before. The scope of legislation that needs to be brought forward to serve such demands increases dramatically. In other words: the *legislative* role of parliament is increasingly pronounced, and time becomes more desirable to legislators. As every bill needs to be proposed and voted on in the plenary, the growth in the parliament's legislative scope requires greater amounts of plenary time.

On the supply side, the strategies for increasing plenary time are limited. A parliament can decide to add an extra sitting day, or extend the schedule by a couple of extra hours. At some point however, such strategies become less viable as we hit the limit of how much work can be fit into a day or week. Combined,

these two dynamics make it more likely that demand exceeds the supply of plenary time, making it truly a scarce resource.

Effective Group Size and Cohesion

Second, the changed nature of a legislature's work undermines the informal collaborative environment with respect to debate. Relational forms of self-governance are reliant on shared expectations of the boundaries of acceptable behaviour. The creation and maintenance of such common understandings depend on communication among the members of the group that adhere to them, which, in turn, hinges on group size and cohesion. Both variables affect the quality of information (about violations of norms) and the credibility of punishment (Abreu 1998; Abreu, Milgrom, and Pearce 1991; Dixit 2004; Ostrom 1990).¹¹

Electoral reform not only affects the *work* that legislators perform, it also changes who participates, as well as the membership of a parliament. As MPs are forced to cater to their constituents' needs, they will have to attend and participate regularly. Moreover, candidates sourced from different demographics will stand for elected office. On both counts, there are significant alterations to the number of individuals that participate in legislative business—i.e. parliament's "effective size"—as well as its socio-economic composition. As the cohesiveness of the group declines, and its size grows, informational asymmetries arise and the prospect of credible punishment declines, making individual choices to use plenary time excessively less costly.

A Lack of Enforcement Mechanisms

Third, and relatedly, the changes to group composition produce a decline in the quality of information and the credibility of punishment, undermining traditional norms as related to unlimited debate. Informal rules no longer suffice to induce cooperative behaviour. An important parameter of responsible CPR use is therefore no longer satisfied.

¹¹For example, Duffy and Ochs (2009) find that cooperation is more likely to yield positive results (i.e. cooperative behaviour) as subjects gain experience under fixed matching, and not under random matching infinitely repeated games.

Whereas legislators could previously count on their colleagues not to abuse the possibility of unlimited debate to advance their agenda, electoral pressure combined with a scramble for plenary time makes such assumptions harder to make. In other words: legislator A does not know whether, when, and with what level of commitment legislator B will resort to obstructive tactics. Thus, as the time available to individual MPs declines because of the increase in the scope of parliament's agenda, informal norms for cooperative behaviour are insufficient to make unlimited debate manageable.¹² Such uncertainty about the strategic behaviour of appropriators of the commons is part and parcel of CPR models, and is a driving force behind over-use of the CPR (Ostrom 1990, p. 34).

Hypothesis

This leads to the first theoretical proposition of this chapter:

Hypothesis 1 (Equilibrium break-down) *Increases in the size of the electorate lead to greater time scarcity, compositional changes to the group of legislators that are active in parliament, and a weakening of informal rules.*

The changes to the use of speech, in terms of a higher volume of speeches, is a manifestation of a less directly observable change in norms that relate to the institution of debate in the House of Commons. The hypothesis leads to a number of observable implications that will be tested in Chapter 5. First, the hypothesised causal mechanism that links franchise reform to changes in behavioural patterns works indirectly, through alterations to the socio-economic composition of parliament. We should therefore observe that, at the individual level, members speak more after reforms than before, controlling for factors such as seniority and election years. Second, we should observe an overall increase in the number and length of speeches shortly after the reform acts. Third, if these aspects of MP behaviour are indeed a consequence of the number of interests they

¹²In the UK case, this problem was compounded by the fact that the length of the parliamentary session decreased after 1800 (Fraser 1960, p. 448).

need to represent, we should observe that members from larger constituencies are disproportionately affected. Finally, we should witness a growing willingness among legislators to challenge existing traditions and conventions in parliament after electoral reform.

2.2.3 Locked in a Procedural Dilemma

The resource economics literature consistently concludes that when a common-pool resource is open to a number of users, the withdrawal rate exceeds the optimal economic level of use (e.g. Clark 1980, 2010; Dasgupta 1979). In the context of legislative debate, we are faced with an appropriation problem. In this class of issues, in the words of Ostrom (1990, p. 48), we are concerned with the allocation ‘of a fixed, time-independent quantity of resource units so as to avoid rent dissipation and reduce uncertainty and conflict over the assignment of rights.’ The resource is in limited supply, and we need to find a way to avoid over-exploitation of the CPR, i.e. filibustering.

Why MPs Need the Filibuster-through-Speech

Why do MPs wish to retain the power to filibuster when they can resort to other strategies to influence policy, such as simply voting down or amending proposals? Why do they not sacrifice the freedom to obstruct in the interest of efficiency? First, from the perspective of one single member the filibuster is, in spite of its crudeness, a powerful, and easy-to-use device. It is effectively a single-member veto that does not require collective action. A legislator can simply stand and talk. By contrast, voting has the costs of building an alliance, and the probability of having the decisive vote is small.

Second, legislators face a lack of positive agenda rights under conditions of time scarcity (see also Cox 2006). When time pressure in the House goes up, the (estimated) probability that an individual MP’s amendment or proposal is tabled declines. The sheer number of proposals, coupled with egalitarian agenda rights, means that defending one’s policies becomes a haphazard affair. The ability of a

member to see their preferences translate into law is no longer a matter of skill alone.¹³

A similar logic applies to voting. As explained above, the quality of information diminishes when the effective size and cohesion of the group declines, making it difficult for legislators to make counter proposals (i.e. amendments), and to estimate how much support a proposal will get. Voting down a bill is an option that always remains open to MPs at the very end of the legislative process, but foregoing the filibuster is tantamount to surrendering policy influence right away.

Over-exploitation in a “Procedural Vacuum”

MPs therefore abuse the “procedural vacuum”: they employ the opportunities of unlimited debate to leverage opportunity costs on others. Parliament is locked into a procedural dilemma. On the one hand, MPs wish to cling onto their right to delay debates because this is an indispensable option available to them to bring policies back in line with their ideal point when floor time is scarce. On the other hand, if MPs refrain from implementing anti-dilatory reforms they will suffer from the obstructive tactics employed by those on the opposite side of the aisle. Consequently, MPs wish to limit the ability of others to delay legislative business but at the same time realise that to do so means abdicating their own policy influence.

As MPs emerge from the procedural state of nature, they are caught in a “procedural dilemma”. We have an increased demand for time (for speaking); a larger group of legislators; more heterogeneous preferences; and lower-binding quality of the social norms. Consequently, MPs are faced with over-exploitation (i.e. filibustering) by their colleagues. We move beyond the benevolent setting within which people try to pursue their goals and collectively over-use their time, to a situation where some individuals are trying to capture the extra benefits of

¹³In the UK House of Commons, it became quite literally a question of chance: one of the early innovations of procedure was to introduce a lottery for private members’ bills (see Cox 1987, p. 49).

over-exploitation. Obstruction is now a strategic tool: some MPs build political power on draining the commons.

2.3 Polarisation: Escaping the Tragedy of the Commons (H2)

Now we turn to the second of the two questions posed at the start of the chapter: how can a parliament escape the procedural dilemma? The core argument of this chapter is that members *can* collaborate to overcome over-exploitation. At this second stage of the theory—illustrated in Figure 2.3—MPs will implement restrictions on debate when their policy preferences are clustered along party lines, i.e. when the legislature is *polarised*. In simple terms: in non-polarised legislatures, MPs favour the freedom to obstruct because they are far from their party median, and can therefore not count on their colleagues to support similar proposals; in polarised legislatures, majority party MPs find themselves close to their party median (and potentially influential) so they do not need obstructive tools.

2.3.1 Off-median Procedures under Majoritarianism

To develop this intuition in a more structured way, I turn to an important—and empirically untested—contribution on this topic by Diermeier and Vlaicu (2011). The Diermeier-Vlaicu model (hereinafter: DVM) argues that when legislator preferences in parties are correlated, they face policy-driven incentives to commit to inegalitarian agenda rules.¹⁴ The model assumes that: i) every policy issue is one-dimensional, and preferences are single-peaked; and ii) all decisions in parliament are made in under majority-rule bargaining procedures.¹⁵ Procedurally, off-median deviations—i.e. rules that benefit some actors over legislators that are

¹⁴DVM also builds on Krehbiel’s “weak parties” perspective, which states that the combination of procedural endogeneity (i.e. members vote on procedures) and majoritarianism should lead to a stable status quo, where median policies (and median procedures) are the norm (Krehbiel 2004).

¹⁵Note that this presupposes the absence of party-level constraints such as the party leadership or caucus.

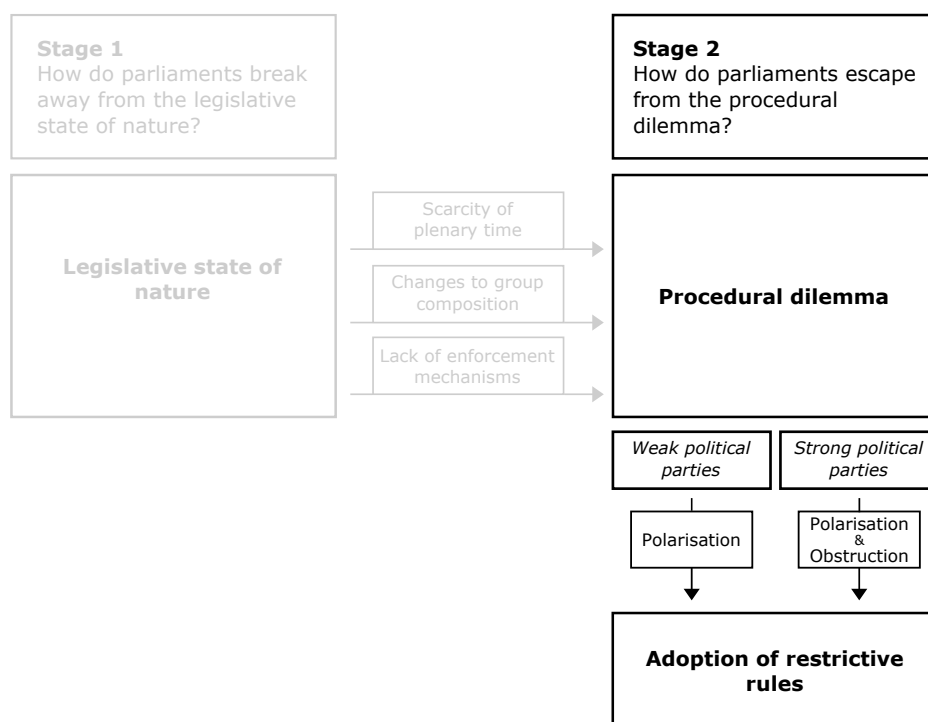


Figure 2.3: Schematic Overview of the Second Stage of the Theory

at the parliamentary median—arise when there are costs to bargaining (opportunity costs), and when preferences are polarised into distinct camps across policy issues (i.e. bills).

DVM applies to amendment rights. When a legislature faces time constraints, the ability to set the agenda—i.e. having the right to be the first mover of a bill—conveys an advantage. The costs of bargaining subsequently fall to those who wish to amend the proposal. Specifically, these involve resources that need to be expended on bargaining over this proposal rather than others, i.e. opportunity costs. In this context, agenda power becomes a valuable resource. This device may be captured by an agenda-setting coalition, but only if legislators in that group share similar preferences. When they are more likely to be on the same side of any one issue than not, MPs can limit their transaction costs by relying on the bargaining advantage that their colleagues have on different kinds of bills. If, subsequently, polarisation increases, a tightening of agenda control

conveys even greater benefits on the members of that group. In this case, MPs will vote to limit agenda access, for example by restricting amendment rights.

The model proposed by Diermeier and Vlaicu (2011) provides important theoretical leverage on the question of how off-median rules emerge in parliamentary democracies in the absence of party discipline.¹⁶ In parliamentary systems, legislative behaviour is largely structured by *parties*. Even though the strength of political parties shows variation over time, the ultimate transfer of power associated with adopting formal procedures is not between government and opposition. Rather, the balance is struck *within* the party, between the front- and the backbenches. DVM gives some perspective on the question of how intra-party ideological dynamics lead to inter-party solutions.

It is important to note here that the theory focuses on shared preferences within *all* parties in the legislature. Polarisation, then, is a measure of the spatial concentration of ideal points within a boundary defined by the array of opinions that exist in parliament. If legislators are close to each other within political groups (i.e. when they share similar preferences) across issues, the House is *polarised*. Conversely, if the distribution of ideal points is spread out, the assembly is *non-polarised*. When I use the term “polarised legislature”, I thus refer to a parliament in which the members of each party are concentrated on opposite

¹⁶Veto rights (such as the filibuster) and proposal powers (such as the amendment opportunities that DVM theorises about) are not substitutes. Most prominent among the differences between the two institutions is the effect of time horizons: whereas proposal rights confer a direct advantage, the utility of veto power is dependent on the assumption that the future will bring better proposals (cf. McCarty 2000, p. 508). The extension of DVM to obstruction by debate—which is effectively a veto right—is therefore less straightforward. Yet, the “filibuster through speech” is, I argue, a special kind of veto right. As proposed above, it is first and foremost intended to extract policy concessions. The extreme outcome would be to block the passage of a bill altogether (effectively preventing parliament from progressing to a final passage vote), but it can also take the form of an amended proposal making it to the floor that can then be supported by the obstructing member. In the UK case, the proposing party can make such amendments directly on the floor. The crux of DVM, in my view, is the question of how members can safeguard their policy influence when they give up certain freedoms. To Diermeier and Vlaicu (2011), amendment rights are an important manifestation of this. However, the ability to filibuster—to extract policy concessions—falls into a similar set of procedures whose prime goal is to bring legislation closer to any one ideal point.

sides consistently over a large set of one-dimensional policy continua (i.e. bills or proposals).

2.3.2 *A Formal Model of Procedural Choice*

In what follows, I take the basic intuition from DVM and build on the CPR literature to argue that the decisions that MPs make to reform rules can be brought down to two simple parameters: i) preference polarisation; and ii) the presence of an external arbiter (i.e. party discipline). Here, we are interested in the utility that legislators derive from *the availability of the speech-as-filibuster tool* (i.e. unlimited debate). The formal model will demonstrate that in *polarised* legislatures, opportunities for filibustering yield a lower pay-off. MPs will therefore collaborate to implement restrictions. The formal model acts as the key to understanding individual-level choices about the adoption of anti-dilatory rules.

Procedural Choice as an Intra-party Delegation Game

The choice to adopt a formal restriction on debate raises an intra-party delegation problem in the form of a principal-agent (P-A) framework. In the absence of strong parties, by accepting limitations on their rights legislators are effectively transferring power from themselves to a (more or less) randomly drawn member in the parliament. Under conditions of strong parties, such delegation of powers is likely to benefit the party leadership. In both cases, MPs are giving up *policy influence* as they are reducing their power to pursue debate freely, i.e. the possibility to filibuster and extract policy concessions.

Legislators may recuperate some of that influence by building a coalition of members that share similar interests on an ad hoc basis, depending on the legislation that is under discussion. Subsequently, such a group may designate an MP who will take the floor to defend their interests. Like the standard principal-agent framework (Kiewiet and McCubbins 1991), this opens up the prospect of “shirking”: the agent can move away from the agreed-upon policy and pursue a strategy that brings legislation closer to their own preferences.

In a parliament, this issue does not arise only between, for example, ministers and backbenchers (cf. Saalfeld 2000); but also between individual members. Here, it emerges in a repeated game of bill-specific coalitions where MPs have varying degrees of information about the ideological position that a fellow member within their party will take on any one issue. The possibility of shirking imposes individual-level ideological costs on accepting restrictions. Legislators lose policy influence as they have a diminished ability to filibuster. In addition, they face the prospect of further divergences from their ideal point as actors who *are* successful at taking the floor may pursue different interests.

The extent of the delegation problem is dictated by expectations that MPs have about the behaviour of their co-partisans: the need for a filibuster-as-policy-influence mechanism hinges on the probability that party colleagues share preferences across the set of issues that are debated in parliament. If a member can, based on previous experience, expect colleagues to support similar policies, they will be more comfortable delegating powers to co-partisans at the expense of their individual prerogatives. In this case, the probability of shirking is diminished. In the following sections, “previous experience” will be defined in terms of clustering of legislator preferences across policy areas; and “delegating powers” refers to the adoption of restrictive procedures.

The Game

My model closely follows Martin and Vanberg’s (2005) theory of coalition government. I assume that the utility that MPs derive from filibustering is dependent on three considerations: i) the distance between the actor’s ideal point and that of the original proposal; ii) the costs of bargaining and building coalitions to challenge a bill; and iii) the costs of filibustering.

For the discussion that follows, we assume that a legislator has committed to stand against a proposal. The question answered by the model is what strategy the MP thus committed will pursue: to filibuster or not to filibuster. In the latter case, the parliamentarian will build a coalition to go against the proposal through

more standard means, such as voting. In practice, the choice from the strategy set $A \in \{\text{filibuster}, \text{not filibuster}\}$ can be framed as a simple game. Assume two legislators, A (the PROPOSER) and B (the CHALLENGER). The game includes the following steps:

1. Legislator X_k (the PROPOSER) is drawn randomly from a pool of legislators, with $k = \{1, 2, 3, \dots, k\}$;
2. This legislator makes a proposal at their ideal point $\omega \in \mathbb{R}$;
3. A second legislator (the CHALLENGER) is drawn randomly from the pool, who has preference P ;
4. CHALLENGER chooses between the strategies $A \in \{\text{filibuster}, \text{not filibuster}\}$ in response to PROPOSER's proposal. If they decide to filibuster, they pay a cost c . If instead they decide to challenge the bill but not through a filibuster, CHALLENGER needs to build an ad hoc coalition of ideologically proximate members to mount an effective challenge to the bill through, for example, votes, bargaining, and counter-proposals (amendments). In this scenario, a process of bargaining ensues among the coalition, which produces an agreed-upon proposal at $\frac{P}{x}$ that its members will defend;
5. The final policy p that is adopted depends on CHALLENGER's decision to filibuster, or to challenge the proposal through other means with a coalition of legislators. In the first case, the policy will be the original proposal ω . In the second case, p will be a function of the original proposal (ω), and the opportunity costs that CHALLENGER can leverage on the PROPOSER. The latter are represented by the formula $\frac{t_c}{t_p}$, where t_c and t_p are the opportunity costs that CHALLENGER and PROPOSER respectively are willing to accept. Conversely, if CHALLENGER decides to build a coalition to counter the bill through other means, p will be at the coalition bargain $\frac{P}{x}$.

A few aspects of this game need further clarification. First, a “proposal” refers to any initiative that represents some ideal point, and that requires time in

the plenary. It can denote both a bill or an amendment. Second, we assume that parties are collections of individuals that are ideologically proximate (Krehbiel’s “weak parties” model (2004)). Similarly, the coalitions envisioned in this game that emerge when filibustering is not pursued bring together legislators that share preferences. But these coalitions are, depending on polarisation (more on this below), not necessarily sourced from the same parties. They are ad hoc and bill-specific and vary across the many one-dimensional policy spaces that are associated with an equal number of bills.

In the case of NOT FILIBUSTER, CHALLENGER will try to bring the proposal back in line by negotiating an ad hoc coalition, thus introducing a negotiation parameter $x \geq 1$. The final policy—that the coalition will aim to achieve through means other than obstruction¹⁷—is some function of a compromise within the Pareto set $[0, P]$, but is a result of the negotiation process, and can therefore be denoted as $\frac{P}{x}$.

To reiterate: in what follows, we assume that a legislator has committed to being a CHALLENGER, that is, the absolute cost of accepting the original proposal ($|P - \omega|$) exceeds what a policy-interested MP is willing to incur and the opportunity costs that the legislator is willing to bear (t_c) are low. We are therefore purely interested in the strategy profile $A \in \{\text{filibuster}, \text{not filibuster}\}$.

Utility Functions

As we are operating under time scarcity, the majority—and the one group of legislators whose utility function we are interested in—are those who are not the PROPOSER. Analogous to agenda setter models often used in the study of parliamentary procedures (e.g. Dewan and Spirling 2011; Martin and Vanberg 2005; Romer and Rosenthal 1978), I assume that CHALLENGER’s pay-off is a function of the final policy that is adopted p multiplied by the opportunity costs they can extract, minus the costs of filibustering. Policy preferences are assumed to be derived from distances between the proposed bill or amendment and the

¹⁷The most prominent of which would be voting, but also includes personal influence, counter-proposals, etc..

ideal point of the actor (P) in a one-dimensional Euclidean space, and the final policy p . The utility functions of CHALLENGER can be represented as follows:

$$U_{challenger} = \begin{cases} -d^{\frac{|P-\omega|}{t_c/t_p}} - c & \text{if CHALLENGER decides to filibuster.} \\ -|P - \frac{P}{x}| & \text{if CHALLENGER decides not to filibuster} \end{cases} \quad (2.2)$$

The initial motivation to filibuster derives from the distance of the original proposal ω from the ideal point of the legislator P . This is represented in the function by $|P - \omega|$. Subsequently, part of the utility is dictated by the nature of the bargain struck with colleagues that can be pursued through means other than filibustering. The bargain lies at $\frac{P}{x}$, i.e. the ideal point that the coalition will aim to achieve through parliamentary tactics. $|P - \frac{P}{x}|$ in the formula captures how close that bargain is to the ideal point of the legislator.

Parameters: Opportunity Costs, Party Strength, and Personal Costs

The distance between the bargain and CHALLENGER's ideal point is weighted by the parameter $\frac{t_c}{t_p}$ where $t_p > 0$ and $t_c > 0$, and $t_c \geq t_p$. This represents the ratio of opportunity costs related to filibustering that the CHALLENGER and the PROPOSER respectively are willing to accept. The PROPOSER incurs opportunity costs by spending time defending a bill against a filibuster at the expense of pursuing other items on their agenda (t_p). Vice versa, the CHALLENGER loses time that could be spent on constituency service, their own proposals, or other initiatives that might be closer to their ideal point (t_c) (see also Wawro and Schickler 2006, p. 30). Thus, when CHALLENGER is willing to accept greater opportunity costs (t_c goes up), $\frac{t_c}{t_p}$ goes up, and the policy cost incurred, represented by the difference between the ideal point of CHALLENGER P and the original proposal ω , declines.

The party leadership also possesses means to punish members who “defect” on key bills in plenary debate, i.e. who filibuster¹⁸, introducing an exogenous cost parameter d to engaging in filibustering ($d \geq 1$) (a *carte blanche* for filibustering would imply that $d = 1$). The degree to which the distance of an individual MP to the proposal matters is a function of the significance that the party leadership attaches to the bill, and thus the costs that it is willing to impose on MPs in case they defect. This is a reflection of the fact that, in making the choice to filibuster, the MP has to be mindful of how such behaviour will harm their career prospects, which are largely controlled by the party. It is important to note that in a parliament’s early development, d will be close to zero, as strong parties are absent (see Section 2.4 for a discussion of this parameter in the context of strongly institutionalised parties).

Finally, there is a cost parameter c ($c > 0$) that represents purely personal costs (loss of sleep, energy, etc.) related to the activity of filibustering, and, importantly, reputation costs.

Inequalities: The “Filibuster Threshold”

Re-arranging expression 2.2, we find the following “filibuster threshold”¹⁹

¹⁸Such punishment could come in the form of, for example, blocking front-bench promotion (e.g. Benedetto and Hix 2007; Hix and Noury 2016; Kam 2009; Sieberer 2006).

¹⁹Assuming $P - \omega \geq 0$ and $P - \frac{P}{x} \geq 0$, we arrive at the filibuster threshold through the following steps. MPs choose to filibuster when

$$\begin{aligned} -d \frac{|P - \omega|}{t_c/t_p} - c &> -|P - \frac{P}{x}| \\ \frac{-dP + d\omega}{t_c/t_p} - c &> -P + \frac{P}{x} \\ -dP + d\omega &> (t_c/t_p) \left(-P + \frac{P}{x} + c\right) \\ d\omega &> (t_c/t_p) \left(-P + \frac{P}{x} + c\right) + dP \\ \omega &> \frac{(t_c/t_p) \left(-P + \frac{P}{x} + c\right)}{d} + P = \tilde{\omega} \end{aligned}$$

Thus the challenger chooses to filibuster if:

$$\omega > \frac{(t_c/t_p) \left(-P + \frac{P}{x} + c\right)}{d} + P = \tilde{\omega}$$

$$\tilde{\omega} \equiv \frac{(t_c/t_p) \left(-P + \frac{P}{x} + c \right)}{d} + P \quad (2.3)$$

The equilibrium strategy for CHALLENGER can be denoted by the following proposition:

Proposition 1: *for CHALLENGER, if $\omega \leq \tilde{\omega}$, accept ω and instead try to build a floor-voting coalition. If $\omega > \tilde{\omega}$, filibuster.* (1)

Filibustering is the dominant strategy either when the time that needs to be spent on obstruction to extract a concession becomes smaller, or where the distance between the original proposal P and the amended bill or the amendment after policy concessions $\frac{P}{x}$ becomes greater. As this distance grows, it reduces the utility of filibustering. For example, when $x = 1$, the distance between the compromise and CHALLENGER's ideal point is zero; and when $x = 2$ CHALLENGER and their partner in the coalition split the difference in ideological terms.

The utility functions (Eqn. 2.2) also mean that, keeping the distance constant, the more time is lost on a filibuster, the less utility CHALLENGER derives from filibustering.

It is important to note that P can also lie at the status quo. And, when the coalition decides that the status quo is preferable to the bill or amendment ω —which is often the case in filibustering—there is no compromise needed within the coalition. Here, $x = 1$ and $|P - \frac{P}{x}| = 0$, which, given the formula would result in the lowest possible commitment to filibustering, *ceteris paribus*.

As pointed out earlier in this chapter, the efficacy of filibustering lies in the ability of the CHALLENGER to leverage opportunity costs on the other actor. The parameter $\frac{t_p}{t_c}$ in the formula accounts for this, as, assuming the distance between

the original proposal and the CHALLENGER's ideal point remains constant, higher opportunity costs for PROPOSER (t_p) increase the overall utility of filibustering. The parameter can be seen as relative commitment, and is an expression of how important the proposal is to each actor. It also represents resource and transaction costs associated with the activity of negotiating and maintaining the ad hoc coalition that could have been expended elsewhere.

The utility of filibustering thus is higher under three conditions, *ceteris paribus*: i) when CHALLENGER is more accepting of opportunity costs relative to the PROPOSER; ii) when the ideological costs that would be incurred if the original proposal ω passes are high; iii) when the coalition compromise is far removed from CHALLENGER's ideal point (denoting a low pay-off to coalition-building). If the latter is not the case, legislator k is better off simply voting against, and not expending the resources to build a coalition to challenge the proposal through other means.

2.3.3 Non-Polarised Legislatures

We can now relate polarisation to the formal model developed above. In a non-polarised legislature, FILIBUSTER yields a high pay-off and members will therefore not vote to reduce their ability to use this important tool.

First, as the MP is not in a like-minded set of legislators, the kind of proposal that is made from within their party—whether a bill or amendment—is on average less likely to be close to the member's ideal point. The proposal that makes it to the floor is *more likely* to be further removed from any one randomly selected legislator k within the party. As this is the case, CHALLENGER is willing to incur greater opportunity costs. The better strategy for this actor is to filibuster to directly extract policy concessions on the bill that has been proposed. In this intra-party delegation game, this means that in the utility function (Eqn. 2.2), $\frac{t_p}{t_c}$, which represents the opportunity costs that PROPOSER accepts relative to those that CHALLENGER is willing to face, is structurally lower.

Second, the building of a coalition to challenge the bill through alternative, and more acceptable means (such as voting) is *more* costly in ideological terms. As members are ideologically far removed from one another within a party, the bargaining over a compromise policy that should be defended happens among members that have divergent preferences. Consequently, the eventual compromise is likely to be further way from the ideal point of CHALLENGER, which reduces the utility of that strategy.

We can conceive of bills (or amendments) voted on the floor as a collection of different dimensions. On each dimension, MP A has a preference. When voting coalitions fluctuate (i.e. when opinions are not clustered within clear party labels) the probability of success for MP A is dependent on a costly bargaining process. Building ad hoc coalitions bears significant costs under conditions of low polarisation: it requires protracted bargaining under imperfect information, which means that MP A not only faces transaction costs, but also ideological costs in the form of concessions that need to be made to garner support. In terms of the utility function (Eqn. 2.2), the higher ideological costs of bargaining lead to an increased outcome of $|P - \frac{P}{x}|$, which represents the proximity of the ideal point of the legislator to the proposed policy.

MPs could in theory rely on individual-level vote trading so that they support each other's decisions on high-priority bills. However, the temptation to renege on such implicit, ad hoc contracts undermines the implementation of such a mechanism (Weingast and Marshall 1988). Uncertainty on the position of colleagues—as is the case under low polarisation—undermines collaboration.

Third, in a non-polarised legislature the MP (CHALLENGER in the model) is more acceptant of personal opportunity costs precisely because alternative strategies are less likely to yield a higher pay-off (t_c grows). As parliament is divided into smaller groups, an amendment or proposal is unlikely to garner significant support because they straddle many possible dimensions of conflict. VOTE AGAINST has a higher probability of success, as a final passage vote (or a vote at any stage of the legislative process for that matter) reduces the bill's dimensions

to three possible choices: vote in favour; vote against; or abstain. Yet, the MP is better off by pursuing FILIBUSTER. The option of voting against is—absent party-level disciplinary mechanisms (more on that below)—always open to the legislator. By not resorting to FILIBUSTER, however, they surrender any possibility of extracting policy concessions through obstruction. In other words, they will fail to leverage opportunity costs.

2.3.4 *Polarised Legislatures*

When parliament is polarised, MPs are on average more likely to find themselves on the same side of any one issue across different policy dimensions. Polarisation allows individual legislators to attach a higher probability to the chance that any proposal that reaches the floor (more closely) reflects their ideal point. Even though members of any one political group may find themselves on different sides of an issue on certain occasions, on average the probability that they share the same view is higher. Legislative debate in a polarised setting satisfies two crucial conditions that induce MPs to implement restrictions on debate: i) legislative proposals from the minister (or other centralised authorities) or colleagues are likely to be the ones that they like, and ii) the reasons that motivate members of the opposition to filibuster are the ones they do not share.

In terms of the model: i) the distance between the “coalition bargain” and CHALLENGER’s ideal point ($|P - \frac{P}{x}|$) converges to zero in a polarised House (coalition-building becomes less costly); and ii) alternative proposals made by colleagues are, on average, more likely to correspond with the ideal point of CHALLENGER, meaning that the opportunity costs that CHALLENGER is willing to incur t_c goes down. As there is a shared (ideological) agenda among legislators within a party, opportunity costs to the challenger t_c are more likely to be more or less equal to those of the proposer t_p . It therefore becomes less likely that the threshold for CHALLENGER to pursue FILIBUSTER (Eqn. 2.3) is satisfied. This means that the choice for NOT FILIBUSTER becomes more likely, and therefore, MPs are willing to give up procedural freedoms.

When polarisation is high, both sides of the delegation problem outlined above are solved: i) in terms of policy power when accepting anti-dilatory reform, MPs are less concerned with their individual access to plenary time as they can safely delegate such rights to others within their party; and ii) as regards obstructive behaviour by members on the other side of the aisle, MPs are less accepting of legislative deadlock.²⁰

The above leads to the central hypothesis advanced in this thesis:

Hypothesis 2 (Polarisation) *Parliament is more likely to adopt anti-dilatory reforms in a given session when it is polarised, i.e. when there is a high concentration of shared preferences within the political parties in the House.*

In summary, the second stage of the theory is about within-party delegation of prerogatives to engage in plenary debates on legislative proposals. The crux of the theory is the question of whether MPs want to have the opportunity to resort to filibustering against their own party when they are faced with a bill that is far removed from their ideal point. The utility of filibustering fluctuates as a function of polarisation.

2.4 Off-median Procedures under Strong Parties (H3)

Until now, we have explored the expectations of the model in the absence of party strength. How does the rise of political parties over time affect the politics of procedural choice? In this section I will argue that strong party institutions reduce the independent effect of polarisation, for three reasons: i) the utility of filibustering as a policy-influencing tool declines as party disciplinary powers increase; ii) party leaders are able to manipulate the agenda, reducing the probability that proposals are ideologically remote from legislators within the party; and iii) the

²⁰It is hard to envision a direct link, temporally, between polarisation and procedural reform. Just as the “shadow of the future” restrains current action, past experience informs the choices that actors make in the present. MPs need to build consistent expectations of being on the same side of issues to allow them to overcome the downsides of limiting their rights. In the empirical analysis, such a dynamic is accounted for by including levels of polarisation across both the current and the directly preceding session.

capacity of parties to facilitate bargains increases, making it more attractive for legislators to support rules that empower political parties.

2.4.1 *Party Influence, Filibustering, and Procedural Choice*

When parties are still in development, polarisation is both a necessary and sufficient condition for reform to take place. Under strong parties, this is no longer the case. Here, my theory corresponds more closely with the conditional party government thesis, and incorporates elements of procedural cartel theory. Following the former (see in particular Binder 1996, 1997), I argue that when parties are strong, the choice to adopt restrictive rules is informed by *both* polarisation and obstruction. Here, the combined effect of high levels of intra-party agreement on policy issues and greater use of obstructive tactics is necessary and sufficient to motivate MPs to adopt reforms.

Three important changes occur in the context of strong parties. First, assuming that they are a PROPOSER in the model, the party leader has two options to reduce the utility of filibustering to MPs (see utility functions of Eqn. 2.2 above). First, they can propose bills that satisfy the preferences of a majority of party members, much like “procedural cartel theory” claims (Cox and McCubbins 1994, 2005, 2011). In other words, they can set the proposal at an ideal point so that for any randomly selected member of their party k , the distance $|P - \omega|$ is likely to be lower. Under conditions of strong parties, the party leader is increasingly likely to fulfil the role of PROPOSER, and we may therefore expect $|P - \omega|$ to be structurally lower on average across all MPs within the party.

Second, the leadership can impose greater costs by attaching negative consequences to defection, i.e. to pursuing a filibuster against one’s own party. The leadership can, for example, block promotion to the front-benches (e.g. Benedetto and Hix 2007; Hix and Noury 2016; Kam 2009; Sieberer 2006). The equilibrium strategy for CHALLENGER is still captured by Proposition 1: if $\omega \leq \tilde{\omega}$, an MP will accept ω and instead try to build a floor-voting coalition; and if $\omega > \tilde{\omega}$, the legislator will filibuster. Now, however, parameter d in the threshold condition is

no longer negligible, because the costs of filibustering are higher as a function of party discipline. The utility of filibustering is structurally lower when the party is willing and able to exercise disciplinary mechanisms.

Third, as the attractiveness and usefulness of the “speech-as-filibuster” tool declines because of the two above-mentioned developments, the desire to safeguard it on the basis of ideological considerations diminishes. In addition, whereas previously members operated under ad hoc coalitions, they now have a dedicated platform for trading favours across policy issues. The presence of strong parties and the institutions that they bring reduces the costs of negotiating concessions to their members. The existence of a group of more homogeneous legislators, selected by the party, increase the scope for non-contractual relations and arbitration in a situation similar to the legislative state of nature (Dixit 2004). Political parties facilitate transactional relations among co-partisans, including logrolling and building consensus. Consequently, the adoption of formal rules *is no longer necessary as an intra-party delegation mechanism*. Instead, most concerns over policy agreement within the party are managed internally.

What, then, motivates legislators to adopt reform? From the discussion above, it is clear that polarisation should no longer exercise an effect independently—the role of this variable has been supplanted by intra-party mechanisms. By contrast, it is positively related to anti-dilatory reform in combination with obstruction.

First, the role of the speech-as-filibuster, although diminished, has not vanished completely. Party power disproportionately affects voting behaviour by its members. On the intra-party level, voting discipline is paramount. The power of the vote is indispensable to making policy, and is subject to greater control by the party, which wishes to safeguard its programme. Here, defection can be seen as the ultimate act of defiance (cf. Proksch and Slapin 2015, p. 7). It is therefore not surprising that a vote against the party line (often) carries prohibitive costs

to the MP.²¹ Using debate as a means to challenge the party therefore remains an important alternative option to party members. As long as MPs toe the party line when it comes to votes, they may enjoy the relative freedom to engage in debate as they choose (Schwarz, Traber, and Benoit 2015).

Such freedoms only become a problem when obstructive behaviour undermines the party's legislative agenda. When parties are strong, MPs are willing to delegate procedural powers as there is a greater chance that their preferences have the full force of the party behind them, increasing the likelihood of the implementation of their preferred policy. The need to do so, however, only arises when their party—which has now become the prime mechanism to formulate, defend, and pass their preferred policy—is threatened by obstructive tactics.

MPs should be more likely to support delegation of debating rights if on balance, they are more likely to share similar preferences with the party leaders (under conditions of polarisation) *and* parliament faces obstruction by legislators from other parties in the House. The above leads to the following hypothesis:

Hypothesis 3 (Party strength) *Under strongly institutionalised political parties, the positive effect of polarisation on the likelihood of anti-dilatory reform is dependent on the presence of obstruction.*

It is important to briefly revisit the link between the utility derived from intra-party filibustering and the adoption of restrictive procedures. From the discussion above, it seems paradoxical that members adopt restrictive rules when the utility of filibustering is low, when the degree to which MPs engage in this tactic is actually high. My response to this potential criticism is twofold.

First, the formal model and utility functions capture the degree to which legislators wish to have *the freedom to pursue filibustering should they need such strategies to influence policy*. I do not pre-suppose an indirect causal relationship whereby polarisation is positively related to the creation of anti-dilatory rules,

²¹Proksch and Slapin (2015) for example argue that such costs may include termination of a government, or at the individual level, loss of party support.

through an increase in filibustering. Rather, the degree to which legislators estimate that they need to have the freedom to use obstruction as a potential means of intra-party policy influence is key; and that estimation is determined by the extent to which there is polarisation.

Second, and most importantly, the theory is about *intra-party dynamics of delegation of power in plenary debates*. The formal model explains within-party delegation of prerogatives to engage in debate. The utility of filibustering may fluctuate as a function of polarisation; meanwhile, the use of obstruction as a means to influence policy between the two main parties—government versus opposition—persists. In other words: the model does *not* propose that aggregate-levels of filibustering in the House are high when that behaviour yields a high pay-off at the individual level. The trigger for reform under strong parties lies in aggregate-level obstruction between opposition and government.

This part of the theory builds on important insights from the conditional party government and procedural cartel theory. In line with the former, both partisan needs (i.e. obstruction) and strength (i.e. homogeneity) inform procedural choice (cf. Binder 1996). Further, the theory borrows from the latter to understand *why* political parties are able to satisfy the policy preferences of legislators. In combination with insights from the literature on party development and defection (e.g. Benedetto and Hix 2007; Hix and Noury 2016; Kam 2009; Sieberer 2006), my theory offers a comprehensive view on how the rise of parties reduces the utility that MPs derive from the filibuster as a tool to influence their own party, paving the way for reform.

2.5 Conclusions

This chapter has advanced a theory of procedural choice with regards to parliamentary rules of debate that focuses on the policy interests of individual legislators. The framework generates testable expectations about MP- and parliament-level outcomes, that, although specific to the UK House of Commons, provide a unifying theory to explain how a parliament extricates itself from a “legislative

state of nature” where majoritarian decision-making and egalitarian procedures are present.

In summary, this chapter makes three interrelated claims. First, franchise reform and the creation of an electoral connection creates a problem for legislative assemblies, as they engender higher levels of over-exploitation of plenary time (i.e. filibustering). An increase in the effective size of parliament—i.e. the number of individuals that participate regularly—as well as a change in its socio-economic composition jeopardise traditional norms that make unlimited debate feasible. Coupled with time scarcity and increasingly difficult access to the parliamentary agenda, the filibuster becomes an important policy-influencing mechanism. A procedural dilemma emerges as legislators are unable to reconcile their individual interests in unlimited debate—to influence policy—with the collective rationality of safeguarding the common good of legislative efficiency.

Second, an end to this “procedural dilemma” is found when relatively stable coalitions of ideologically proximate individuals reduce the utility of filibustering as a mechanism for within-party policy influence. The choice to give up the “speech-as-filibuster” will only be made when MPs can count on colleagues to support and defend similar policies: under these conditions, the delegation of opportunities to speak is no longer tantamount to surrendering policy influence.

Third, as parties develop and institutionalise we need to consider both levels of partisanship (i.e. polarisation) and needs (the use of obstructive tactics). The utility of the speech-as-filibuster diminishes as party leaders are increasingly able to manipulate the agenda such that proposed policies are supported by a majority of members, defection on key votes becomes more costly, and the party offers institutionalised opportunities for building policy coalitions and logrolling. Instead, restrictive rules are adopted when the party—which is now crucial to maintaining an individual legislator’s policy preferences—is threatened by obstruction, and its members are ideologically proximate.

According to this theory, rules of debate are primarily designed to manage intra-party ideological divergences. We gain theoretical insight into the utility

of restrictive rules and the rise of political parties by framing the mechanism in terms of a principal-agent relationship between, first, co-equal legislators (in the legislative state of nature and under weak parties), and later, party leaders and backbenchers (under strong parties).

Under this framework, this chapter seeks to move the debate on procedural design beyond the focus on parties as unitary actors to the intra-party delegation mechanisms that enable the progression from a legislative state of nature to inequalitarian—and more efficient—rules for the conduct of debate. Seeing plenary debate through the lens of filibustering provides theoretical leverage on the question of how and why MPs use speeches to advance their policy agenda. Unless we focus on the ability of legislators to set the parameters of debate, and take the notion of procedural endogeneity seriously, it is hard to understand why MPs vote to implement restrictions at all. In particular, my theory allows us to understand how MPs balance the need for efficiency with their desire to maintain policy influence.

The theory advanced here provides a new understanding of the emergence of party institutions that links together a number of important theories. In so doing, it builds on, challenges, and complements the conventional wisdom of institutional choice in the UK House of Commons. First, the framework incorporates theories that link a rise in workload to reform (e.g. Cox 1987, 2006; Polsby 1968). In so doing, however, it disputes the existence of a direct causal link between time pressure (or rather: workload) and the end of unlimited debate. Efficiency gains may have been a consequence of such reforms, but I challenge the simplistic assumption that the move away from unlimited debate is costless. My theoretical framework instead emphasises a range of individual-level factors that inform institutional choice, including the costs of pursuing debate and alternative strategies as a means to influence legislation, and intra-party ideological dynamics.

As such, the theory laid out in this chapter is a more structured account of the way in which the transition to an electorate-centred parliament provides the context in which a democratic institution and the parties that operated in it can

emerge. Building on models of repeated interaction and informal cooperation, the chapter provides a handle on the relationship between larger, secular trends, and individual-level behaviour.

Second, in line with the “weak parties” model, ideology has structuring power and is the fundamental basis of partisan behaviour (Diermeier and Vlaicu 2011; Krehbiel 2004). Such partisan behaviour, in turn, paves the way for reform on a procedural level as MPs are able to maintain their policy powers in spite of an abdication of procedural rights. In addition, I explore how the emergence of party institutions subsequently interacts with the ideal points within parties.

Third, the theory shares elements in common with the conditional party government perspective in terms of its incorporation of party strength (Aldrich 1995; Aldrich and Rohde 2009; Binder 1996, 1997). In these accounts, procedural choice is about *conflict*: the majority enacts restrictive agenda rules when it is far removed—in ideological terms—from the opposition. The account here builds on that logic but instead focuses on how party strength affects individual-level considerations with regards to procedural rights; and, how party effects translate from the individual to the aggregate, parliamentary level.

Finally, my theory suggests that reform was not necessarily path-dependent (cf. Binder 1996, 1997). Rather, a focus on the utility of individuals with respect to filibustering should lead us to investigate specific instances during which members were particularly comfortable giving up procedural rights, as a function of the constellation of ideal points in parliament.

The following two chapters lay out the data and measurement of the main independent and dependent variables. Chapter 5 presents a test of H1, and Chapter 6 empirically tests H2 and H3.

PART II

**Measuring Polarisation and Procedural
Choice**

Measuring Polarisation with Text Analysis

Evidence from the UK House of Commons, 1811–2015

This chapter is concerned with developing the main independent variable of my analysis: polarisation. It builds on the text-as-data tradition to explore new ways of measuring political preferences on the basis of speeches.¹ The main purpose of the chapter is to show that a new, machine-learning based approach offers a measure that maps clearly onto our concept of polarisation as well as our historical knowledge of ideological conflict in the UK House of Commons.

Parliamentary debates offer a promising avenue for analysing MP preferences in the Commons. Especially since roll call-based approaches—the traditional method of gauging political preferences—do not travel well in parliamentary systems such as the UK (Hix and Noury August 2010, unpublished paper; Spirling and McLean 2007). Here, voting is driven by career incentives and gov-

¹All algorithms outlined in this chapter were implemented on the Harvard-MIT Data Center (HMDc) Research Computing Environment (RCE).

ernment allegiance rather than by preferences on particular bills (Benedetto and Hix 2007; Kam 2009). Voting against the party, then, must be seen as the “nuclear option” (Proksch and Slapin 2015). Further, roll call votes are informed by parliamentary institutions, expectations from others, party coordination and logrolling (cf. Shepsle and Weingast 1994, pp. 173–174; Rohde 1994, p. 346; Londregan and Snyder 1994, p. 234).

Conversely, the rules of debate of the House of Commons—contained in the Standing Orders—grant MPs significant freedom to participate in debates. Legislators use plenary discussions to express their concerns, debate proposals, and communicate their stance on issues. We cannot expect speeches to be entirely free of “selection effects”. On the one hand, the party leadership is able to impose constraints on speech-making to protect the party brand (cf. Proksch and Slapin 2012, 2015). On the other, research has shown that legislators in the UK may self-select into speaking.²

Yet, speech-making may be seen as less endogenous to the parliamentary context than voting: as long as MPs vote with the party line, legislative speeches remain relatively unconstrained (see also Schwarz, Traber, and Benoit 2015). In this chapter, I make use of this variation in expressed views, and develop several text-based measures of polarisation using 6.2 million records of parliamentary speeches from the UK House of Commons (1811–2015).³ I identify and address three major challenges of measuring polarisation with text data: i) the high-dimensional nature of speech data; ii) power dynamics of plenary debate and their impact on estimates; and iii) the lack of commonly agreed standards for evaluating the performance of text-as-data measures.

²Herzog and Benoit (2015) for example find that MPs from constituencies that face economic hardship are more likely to use partisan speech to challenge austerity. And in the US context, Grimmer (2013) shows that legislators with extreme preferences are more likely to speak in policy debates while moderates stick to credit claiming, artificially boosting levels of polarisation.

³Following the theory presented in Chapter 2, polarisation is defined as the degree to which MPs are ideologically proximate to one another. Polarisation can therefore be seen as a measure of how consistently MPs fall within their respective parties across policy issues (Krehbiel 2004). In the context of this chapter, “policy issues” are represented as the proposals (bills and/or amendments) that are subject to debate.

By analysing and addressing these challenges, the chapter finds that the best measure of polarisation is obtained using a novel machine-learning approach (cf. Peterson and Spirling 2018). This method fits a classifier to a sample of MP speeches, uses the trained model to predict the party label of a held-out sample, and subsequently takes the classifier’s accuracy as a measure of polarisation. The estimates produced with this approach correspond well to our historical knowledge of ideological conflict in the House and pass a number of construct validity benchmarks.

This chapter makes two key contributions to the “text-as-data” literature. First, it presents a coherent framework for evaluating the performance of text-based measures of polarisation, taking the work beyond the dominant strategy that we should at least pursue “some form” of validation. Second, the chapter applies one of the most commonly used text scaling models—**Wordfish**—as well as new machine learning approaches and provides a comparative evaluation of their applicability to speech data.⁴ In so doing, it provides a comprehensive overview of the choices and pitfalls that researchers face when they apply text analysis tools to parliamentary speeches.

The relevance of the work presented in this chapter extends beyond the text analysis field: the disaggregated data place British MPs in a common ideological space, and do so for over 200 years. Given the large volume of research on institutional design that incorporates some element of polarisation in its theoretical models (e.g. Diermeier and Vlaicu 2011; Schickler 2000), the measure presented here should enable researchers to evaluate a range of hypotheses from various institutional literatures. As such, it may advance the nascent field of British Political Development (BPD) (Eggers and Spirling 2014b; Kam 2014; Moser and Reeves 2014).

⁴One might note that the two methods in this chapter are fundamentally different. **Wordfish** is unsupervised while the machine learning approach applied in this chapter is supervised. However, because **Wordfish** is a popular and highly cited method for analysing text, and machine learning approaches are relatively less common in political science, it is the natural tool that applied researchers would reach for. Therefore, **Wordfish** is the relevant benchmark for comparison.

The rest of the chapter proceeds as follows. Section 3.1 provides a brief overview of existing approaches to computational text analysis. It is followed by Section 3.2, which identifies two important problems of text-as-data approaches as applied to the parliamentary context: the high-dimensional nature of speeches, and power dynamics in legislative debates. Section 3.3 presents the evaluation framework. Section 3.4 discusses why my text-based measurement strategy is appropriate for the UK context. Section 3.5 gives a brief overview of the dataset and data gathering strategy. The models, implementations, and aggregate results are discussed in Sections 3.6 and 3.7. Section 3.8 applies the evaluation framework to pinpoint the most appropriate estimation strategy, after which Section 3.9 summarises and concludes the chapter.

3.1 Measuring Preferences Using Speech Data

Measuring the preferences of legislators is one of the core efforts of the political science discipline. Having traditionally relied on expert judgements (Castles and Mair 1984; Huber and Inglehart 1995), the earliest *text-based* approaches apply manual coding of manifestos (Budge et al. 2001; Gabel and Huber 2000). Recent innovations and the application of computational text analysis have significantly reduced the costs of measuring party ideology, allowing us to score and scale larger sets of documents. These approaches may be divided into supervised and unsupervised techniques.

Supervised approaches build on Laver and Garry’s (2000) dictionary approach. Laver, Benoit, and Garry’s *Wordscores* (2003) for example uses relative frequencies of words to compare the position of “virgin texts” to a set of reference texts of which the position is known, combining the power of expert judgements (of a subset of articles) with computer algorithms to “scale up” the analysis. By contrast, when employing unsupervised techniques, the researcher does not need to make a judgement about the “score” of a document prior to the estimation. Like item response theory (IRT) models, these algorithms construct a dimension in which texts are placed in such a way that the word frequency optimally reflects

the distance between the term and the document (e.g. Monroe and Maeda 2004; Slapin and Proksch 2008). Such techniques have led to important advances in the use of texts in political research.

Until recently, however, such approaches have focused on a narrow set of texts (usually manifestos) in order to estimate political positions (e.g. Laver, Benoit, and Garry 2003; Slapin and Proksch 2008). Usually, they are applied to locate parties in a one-dimensional policy space. Recent advances in the processing of text data, the digitalisation of records, and the development of new algorithms, have enabled researchers to look at different kinds of texts. Slapin and Proksch have for example applied *Wordfish* to uncover the dominant dimensions along which parliamentary speeches are made in the European Parliament (EP) (Proksch and Slapin 2010). Others have used these techniques to study, for example, the impact of lobbying on EU policy making (Klüver 2009).

The ability to move down one level and study the preferences of individual legislators on the basis of their speeches is an important new application in the text analysis field.⁵ As pointed out earlier, the conventional roll call-based approach to measuring ideal points does not travel well in the parliamentary context. The estimates from these methods are affected by party discipline, and by the fact that the decision to have a roll call vote is often strategically inspired (cf. Carrubba, Gabel, and Hug 2008; Carrubba, Gabel, Murrah, et al. 2006; Hug 2010; Schwarz, Traber, and Benoit 2015; Vandoren 1990). Moreover, although ideal point estimation models such as NOMINATE are claimed to measure partisanship over time, they generally fail to account for temporal shifts in the *policy agenda*. Focusing on civil rights legislation in the US House of Representatives during the period 1877–2011, Bateman, Clinton, and Lapinski (2017) for example show that estimates of elite ideological disagreement look considerably different when we account for the policies that are voted on, as well as the iterative nature of lawmaking.

⁵For a comprehensive overview of the use of computational text analysis in legislative studies see Proksch and Slapin (2014).

There is also a more conceptual issue at stake (cf. Bateman, Clinton, and Lapinski 2017, pp. 4–5). Ideal-point estimators such as NOMINATE iteratively fit high-dimensional models to the residual variation of the preceding, lower dimension. We are therefore measuring levels of conflict rather than (dis)agreement on policy content. In addition, we often interpret the recovered dimensions as a reflection of ideological divergence, whereas in practice they might not be related to ideology at all. Statistically, in any form of correspondence or factor analysis the recovered dimensions can produce several different and potentially uncorrelated estimates based on arbitrary rotation. This means that the estimates produced by NOMINATE do not bear a relationship to a stable ideological space. And, if a party’s position shifts, it is difficult to translate the shift in voting coalition into a meaningful measure of ideology.

Authors have proposed a range of alternative methods to gauge ideology that could overcome this problem, but few seem applicable to the UK context. Bonica (2014) for example uses campaign finance data from 100 million contribution records to measure the ideology of candidates in US elections.⁶ However, because in the UK the Electoral Commission only holds records from 2006 on such donations, this approach is not viable for the UK case.⁷ In turn, Kellermann’s approach (2012) using Early Day Motions (EDM) would be prohibitively time-consuming given the data gathering it would involve. Moreover, EDMs may reveal some latent ideological preferences; but speech data is by its very nature intended to reveal a stance.

Instead, I use *speeches* to infer the ideological standpoint of legislators. This approach has two main advantages (cf. Proksch and Slapin 2015, p. 7). First, speeches are less subject to partisan control than votes. As voting is the primary vehicle to generate policy, they are subject to greater control by the party, which

⁶Bonica (2014) refers to his measure as “common-space campaign finance scores” (CFs-cores).

⁷See <http://search.electoralcommission.org.uk>. Also note that, although there is no limit on the amount that can be donated to a political party, there are legal limits on campaign spending in UK general elections, which may reduce incentives for interest groups to donate on a politico-ideological basis.

wishes to safeguard its programme. Defection is the ultimate act of defiance. By comparison, speeches give MPs the opportunity to express dissent in a way that is less likely to harm their party’s position. Second, even if partisan control is not exercised, votes do not provide a granular measure of a member’s position on a bill. “Preferences” can be expressed in one of three ways: vote in favour, against, or abstain. A considerable amount of information gets lost in the process. Through speeches, MPs can express their views in a more nuanced way.

This chapter employs a text-based analysis of ideal points in the UK legislature, thereby taking advantage of the relative freedom that MPs enjoy to express their views in the plenary.

3.2 Challenges of Measuring Preferences with Text

Yet, the use of text to measure political preferences certainly does not come without problems. To obtain meaningful information from the complex data structure that is speech, we need to be mindful of two issues: i) dimensionality; and ii) power dynamics in debates. As will become clear in the succeeding sections, the algorithms applied in this chapter deal with these issues with varying degrees of success.

3.2.1 *High-Dimensional Data*

First, researchers need to account for the high-dimensional nature of speech data, i.e. the possibility that language use is not exclusively related to the dimension of political conflict that we seek to measure. Dimensionality of the political space has long been a concern of the Congressional literature on ideal point estimation (Monroe, Colaresi, and Quinn 2008).⁸ Traditionally, Poisson scaling algorithms such as *Wordfish* or its least-squares proximate and precursor, correspondence analysis (Greenacre 2016), were applied to structured texts: election manifestos. Political actors spend a considerable amount time editing such documents to ensure that the topic of each part of the text as well as the message that it

⁸Although note that Poole (2005) suggests that one dimension is sufficient to account for variation in roll call votes.

carries are beyond doubt. Researchers can therefore easily identify sections from different party manifestos that pertain to a similar topic, such as the economy, welfare, or foreign policy.

However, the world of debate and speech is much messier. In contrast to manifestos, speeches are not exclusively a function of the section title (or analogously, of the item on the agenda) that precedes them. Rather, they are also the product of different topics that are discussed between several debates, and of multiple messages contained within a single speech. Within speeches, the choice of language relates to individual idiosyncrasies (i.e. style) as well as the variety of issues that the speaker in question wants to address. Moreover, in most applications (e.g. Lauderdale and Herzog 2016; Schwarz, Traber, and Benoit 2015), speeches are aggregated by actor at an appropriate level (e.g. for each debate), thus compounding this problem as the texts that we treat as an indication of a legislator's stance can potentially cover an even wider range of issues.

Dimensionality becomes particularly problematic when applying Poisson scaling models like **Wordfish**, which recover only one dimension. Answering the question of whether that dimension—i.e. the axis that explains the largest degree of variation in relative word frequencies—is of substantive interest to the kind of political conflict that we seek to measure, imposes significant post-hoc validation costs on the researcher. For each estimated model, we have to evaluate the validity of the recovered dimension by, for example, considering based on word weights which terms discriminate most strongly between different texts (or rather: MPs). With 200 years of data, and at least as many models, the validation costs become prohibitive.

Moreover, the nature of debates and the use of specific terms in the context of those discussions undergo significant alterations over a 200-year time period. For example, the word “welfare” implied something very different in the 1800s than in the 1950s, when the welfare state as we know it today was in the process of being constructed. The approaches advanced in this chapter have a distinct

advantage over scaling strategies that only use one text per actor for each year and estimate a longitudinal model: the meaning of any one particular word is less likely to vary within a year (as implemented in dimension-level scaling), and even less within one debate.

3.2.2 *Power Dynamics in Parliamentary Debate*

A second problem associated with text analysis is that it generally does not take account of *parliamentary dynamics*. Even a lay observer of debates in the House of Commons—or any parliament for that matter—will conclude the following: i) some individuals make long and others short speeches; ii) some members have a more distinct style; iii) some MPs speak more often than others; and iv) some parties dominate the debate at the expense of others. The first two of these problems are amply addressed in the literature. Scaling approaches for example use *relative word frequencies* rather than absolute counts, converting texts to word frequency matrices (WFM). Additionally, the application of the term frequency–inverse document frequency (TF-IDF) transformation (more on this below) mitigates the problem of the use of rare terms, addressing the potential effect of stylistic differences between individuals.

However, the second set of issues remains un-addressed. Again using *Wordfish* as an example: most applications simply aggregate all speeches by an MP within a debate prior to estimation (e.g. Lauderdale and Herzog 2016). Information about how often someone speaks gets lost in the process. Moreover, when we scale speeches using this algorithm we do not account for how often members of one political party take the floor compared to other groups.

Such dynamics *matter* when we are trying to get at the concept of polarisation. If party leaders are the main drivers behind variation in the degree of conflict, it is important for students of politics to know. If, alternatively, party dominance affects our results, we should incorporate this in our estimation strategy, or at least, in our evaluation and appreciation of its results. This chapter

engages with such issues and outlines a number of simple estimation strategies that allow researchers to identify and overcome these issues.

3.3 Evaluating Text Analysis Measures: A Common Framework for Assessing Validity

A third challenge of the text analysis field is that of validation. Unsupervised methods come with significant post-hoc validation costs, as the researcher ‘must combine experimental, substantive, and statistical evidence to demonstrate that the measures are as conceptually valid as measures from an equivalent supervised model’ (Grimmer and Stewart 2013, p. 5). Thus far, however, there is no consistent framework for evaluating speech-based measures of polarisation other than that we should avoid ‘the blind use of any method without a validation step’ (Grimmer and Stewart 2013, p. 5). This is problematic because, as researchers, we want to be able to compare the performance of several different methods against common standards. In this section, I aim to develop a simple and widely applicable framework to do just that. This framework is summarised in Table 3.1.

Such a framework needs to combine rigour with speed and ease: when evaluating a speech-based measure over a long time period (in this case, over 200 years), the post-hoc validation needs to give us confidence in the results. It should also keep the costs of the validation exercise low to allow us to reap the benefits (i.e. speed) of using an unsupervised method. The validation scheme I develop below is divided into three types of validity (face, convergent, and construct), and includes several tests for each type.

3.3.1 Face Validity

First, we consider face validity, which includes both a general and a detailed benchmark. The general test is a quick and simple impression of the *distribution* of the estimates over time:

1.1 General test: The level of variability between sessions within the same parliament should be at a reasonable level: although we may

expect some variation from session to session, we should not observe an at-random pattern of switches between high and low polarisation from year to year, and especially within one parliamentary term.

Table 3.1: Evaluation Scheme for Speech-Based Measures of Polarisation

Test	Key question	Test
1. Face validity		
1.1 General	Is there a reasonable level of stability of estimates from session to session within parliamentary terms?	Visual
1.2 Detailed	Do the estimates correspond with a priori expectations of levels of polarisation?	Visual
2. Convergent validity		
2.1 Session-level	Do the session-level estimates of polarisation correspond with a comparable exogenous measure?	Correlation
2.2 Individual-level	Do the individual-level estimates correspond with self-placement of MPs?	Correlation
3. Construct validity		
3.1 Between-session consistency	Are the individual-level estimates consistent from session to session?	Correlation of MP positions from t to $t + 1$
3.2 Individual-level distribution	Does the distribution of individual-level estimates show a reasonable degree of separation by party?	Visual
3.3 Explanatory power of the party label	Does the observed variation in individual-level estimates explain a reasonable proportion of the variation in party labels?	R^2 from regressing party label on individual estimates

Second, any measure of polarisation should pass the “historical test”. In other words: it should comport well with what we know historically about the parliament that we are evaluating. Such a detailed test requires the researcher

to define a number of a priori expectations about the levels of polarisation based on secondary literature:

1.2 Detailed test: Outliers in our estimates should reflect what we know historically about polarisation in the parliament.

3.3.2 *Convergent Validity*

Second, we need to consider how well our estimates converge with results obtained from supervised methods, at two levels. First, at the aggregate level (here defined as the yearly parliamentary session), the estimates that we obtain should correlate well with measures produced by other researchers:

2.1 Session-level test: The level of polarisation in sessions should correspond well with exogenously defined measures of polarisation.

The second level considers MP-level estimates:

2.2 Individual-level test: The positions of MPs should correlate with their own left-right placement from an exogenous dataset.

As speeches are a direct reflection of the political preferences of legislators (and to some degree of political constraints), we should observe a relatively high correlation between self-placement and our estimates.

3.3.3 *Construct Validity: Consistency and Party-Based Variation*

Third, we consider three measures of consistency. First, we evaluate the variation in the position of MPs from session to session. We may expect the ideal point of legislators on a one-dimensional scale to vary somewhat because the agenda will include different items for each session. However, legislators should otherwise remain relatively consistent in their overall position across the issues discussed over the course of consecutive parliamentary sessions:

3.1 Between-session consistency: the positions of MPs should correlate at a reasonable level between session s and session $s - 1$ for each session $s \in 1, 2, \dots, N$.

Second, a visual test at the level of individual-level scores can give some indication of the performance of a measure:

3.2 Individual-level distribution: The Empirical Cumulative Distribution Function (ECDF) of individual-level estimates should show a reasonable separation of parties *and* key individuals should be placed as expected.

In this context, “reasonable” primarily refers to: i) a separation where individuals from the left-wing party are not found to the right of the right-most member of the right-wing party on the political spectrum; ii) individuals do not drastically change position from one session to the next.

Third, the individual-level estimates should account for a reasonable proportion of the variation in party labels:

3.3 Explanatory power of the party label: the variation in individual-level estimates should be a good predictor of the party label for each session $s \in 1, 2, \dots, N$.

We can assess this third test by regressing individual estimates on the party label and taking the R^2 from the model. We want this proportion to reflect some degree of party control: i.e., the individual estimates should not be assigned at random. At the same time, some unexplained variation should remain as, for reasons elucidated above, the party should not structure speech completely.

3.3.4 Applying the Evaluation Scheme

The evaluation scheme has two applications—both of which will be used in this chapter. First, it may be used to evaluate, comparatively, the merits of two or several different approaches to measuring polarisation based on text. Second, it can be applied to establish whether or not a measure is “valid enough” to be used in other, more substantive applications.

When can we safely assume that a measure that we have generated with our text analysis algorithm has produced a “valid” measure? This is largely

dependent on the time frame. For the application in this chapter, the “threshold” is as follows:

Threshold: The measure should pass *all* tests of the evaluation scheme, but not for all sessions included in the analysis.

For a measure that spans 200 years, the general paucity of comparable measures of polarisation means that some of the tests can only be conducted across a smaller time scale. The assumption made here is that, if the test performs well for any session s , it should also perform satisfactorily for any other randomly sampled s . This is, most likely, a wrong assumption; but it will be made for practical purposes. It should also be noted that “pass” does not mean a correspondence of 100 per cent with the expected pattern. Rather, it should be seen as satisfying a minimum level *and* performing better *in comparison with other measures*.

3.4 Case Selection: The UK Parliament

The UK Parliament provides a promising institutional setting to develop text-based measures of polarisation. Its legislative process affords MPs ample opportunity to voice policy-related opinions—the kind of statements that we expect to reveal ideological preferences.

Today, the legislative process for public bills in the Commons consists of three readings, but may perhaps be more accurately seen as consisting of six distinct stages. After presentation (stage 1: first reading), each bill is subject to a general debate (stage 2: second reading), and after a committee stage (stage 3), a detailed debate (“report stage”, stage 4) during which MPs discuss the committee’s amended bill and may propose amendments, followed by a final third reading (stage 5) at which the final version of the bill may again be debated (but no amendments may be proposed) (see Standing Orders of the House of Commons - Public Business 2016, Arts. 57-83).

At the end of the third reading, a vote is taken on whether to approve the bill. This vote is followed by a similar set of readings in the House of Lords.

After the third reading in the Lords, the bill is sent back to the Commons, giving the latter the opportunity to debate and review the Lords' amendments, and to propose their own (stage 6). After this stage, the bill may receive "royal assent" bringing it into effect. There thus are no less than *four* opportunities for legislators to engage in plenary debate on a bill (stages 2, 4, 5, and 6).

Over the entire period studied in this chapter, members of parliament remain relatively free to engage in debate, thereby avoiding the problems of non-voting and selection that undermines roll-call based analyses. Most changes to curb the speaking rights of MPs were, over the time period studied, introduced at the macro-level of agenda rights or the timetable (see Chapter 4).⁹ For an MP to speak, it suffices for them to rise from their chair, after which the Speaker may give them the floor. Therefore, it is the Speaker—by all intents and purposes a neutral institution—who decides who speaks; not the party. Moreover, members may submit amendments freely at the report stage, giving them ample opportunity to put forward their views.

The (informal) selection effects that may occur in relation to speeches are more likely to favour the representation of a wider variety of ideological viewpoints, as the party label is less crucial for re-election in the UK case. Because of the majoritarian first-past-the-post nature of the electoral system, the individual member's reputation is crucial to the party's re-election prospects. Party leaders are therefore more likely to condone ideological deviations in speeches (cf. Proksch and Slapin 2012, pp. 525–527), as long as in the end MPs toe the party line when it comes to a vote on legislation.

⁹These include the introduction of a lottery system for tabling bills (early 1800s), the creation of the closure rule (1882) and its reform (1887), as well as Balfour's railway timetable reforms (1902), intended to streamline the agenda and limit speaking time. Even the time of individual members' speeches is largely beyond party control, as the only formal limit was introduced in 1988, and relates to an explanatory speech upon a motion to move the adjournment for the purpose of discussing a matter of urgency (see Art. 10(1) of Standing Orders 1988-89(1)).

3.5 Data: 6.2 Million Parliamentary Speeches

To implement the text algorithms that I shall outline below, I use newly collected data from the UK House of Commons *Hansard* archives. The dataset includes 6,224,352 speeches from between 1811 and 2015, spanning 231 parliamentary sessions from the 5th session of the 4th Parliament, up until and including the final session of the 55th Parliament.¹⁰ Details of the data gathering process, pre-processing decisions, and the procedure for matching of party labels are provided in Section A.1 in Appendix A. I will however discuss a novel procedure for removing procedural language here.

3.5.1 Pre-processing and Dealing with Procedural Language

Excluding procedural phrases from individual speeches is an important pre-processing step for text-scaling models. It is particularly relevant for implementations that only estimate one dimension of conflict (such as *Wordfish*) because the first axis that is recovered is often of a procedural nature. Previous approaches have removed such contributions based on their listed topic such as the agenda, prayers, and tributes (Lauderdale and Herzog 2016, pp. 379–380); or by removing speeches that consist of at least thirty per cent of procedural phrases (Gentzkow, Shapiro, and Taddy 2016). The disadvantage of taking such a broad sweep at excluding speeches is that members may often combine (some) procedural phrases with substantive statements.

Arnold, Doyle, and Wiesehomeier (2015) offer a more subtle solution, using a hill-climbing algorithm to identify passages within speeches that are of a substantive nature (in their case, parts of speeches that pertain to the economy). Their approach uses a dictionary and subsequently optimises the number of words that should be selected on each side of a key term to identify relevant passages. Yet, this approach imposes a significant cost: that of creating a tailor-made dictionary. The usefulness of a dictionary is of course dependent on its context, or

¹⁰This figure includes all speech acts, i.e. questions, interpellations, and speeches.

in the words of Grimmer and Stewart (2013, p. 8): ‘when dictionaries are created in one substantive area and then applied to another, serious errors can occur.’

For my data, the costs of manually creating dictionaries to identify relevant parts of speeches is prohibitive: they comprise debates that span 200 years, with vocabulary that is time-variant and topics that range from foreign policy to welfare, and from the economy to health care. Moreover, the computational costs of implementing a hill-climbing algorithm to over six million speeches are non-trivial.

Therefore, I use a much-simplified version of the approach adopted by Arnold, Doyle, and Wiesehomeier (2015): I remove procedural language using a local dictionary approach that generates relevant n-grams (ranging between three and four) directly from the Standing Orders over this period (1811–2015). The local dictionary includes terms that uniquely identify a procedure. Details of this dictionary construction approach may be found in Chapter 4.

Using these dictionaries, in a first instance, my “exclusion algorithm” considers sentences, defined as parts of the speech separated by a full stop. Sentences that consist of thirty per cent or more of such “procedural phrases” are stripped from the text. If this condition is not met, the same procedure is applied to sub-clauses (defined as parts of sentences, separated by commas). If neither criterion is fulfilled, only the procedural n-gram is removed from the speech.¹¹ In all, at least one procedural phrase is removed from 329,448 speeches.¹² Table A2 in Appendix A contains a randomly selected sample of sentences that were removed on the basis of this algorithm.

Combined with the selection criterion that only speeches that consist of at least fifty words are retained for the analysis, my approach automatically removes speeches that are predominantly of a procedural nature while maintaining contri-

¹¹This “soft criterion” is applied to ensure that sentences that include one procedural phrase but are otherwise substantive are not excluded. For example, the n-gram “table of the House” is included in many speeches, as it is the standard procedural phrase to refer to a proposal that has just been tabled for discussion. Yet, in most cases, any statement that follows relates to the *substance* of that proposal.

¹²Prior to removal of procedural phrases, the dataset consists of 3,219,914 observations.

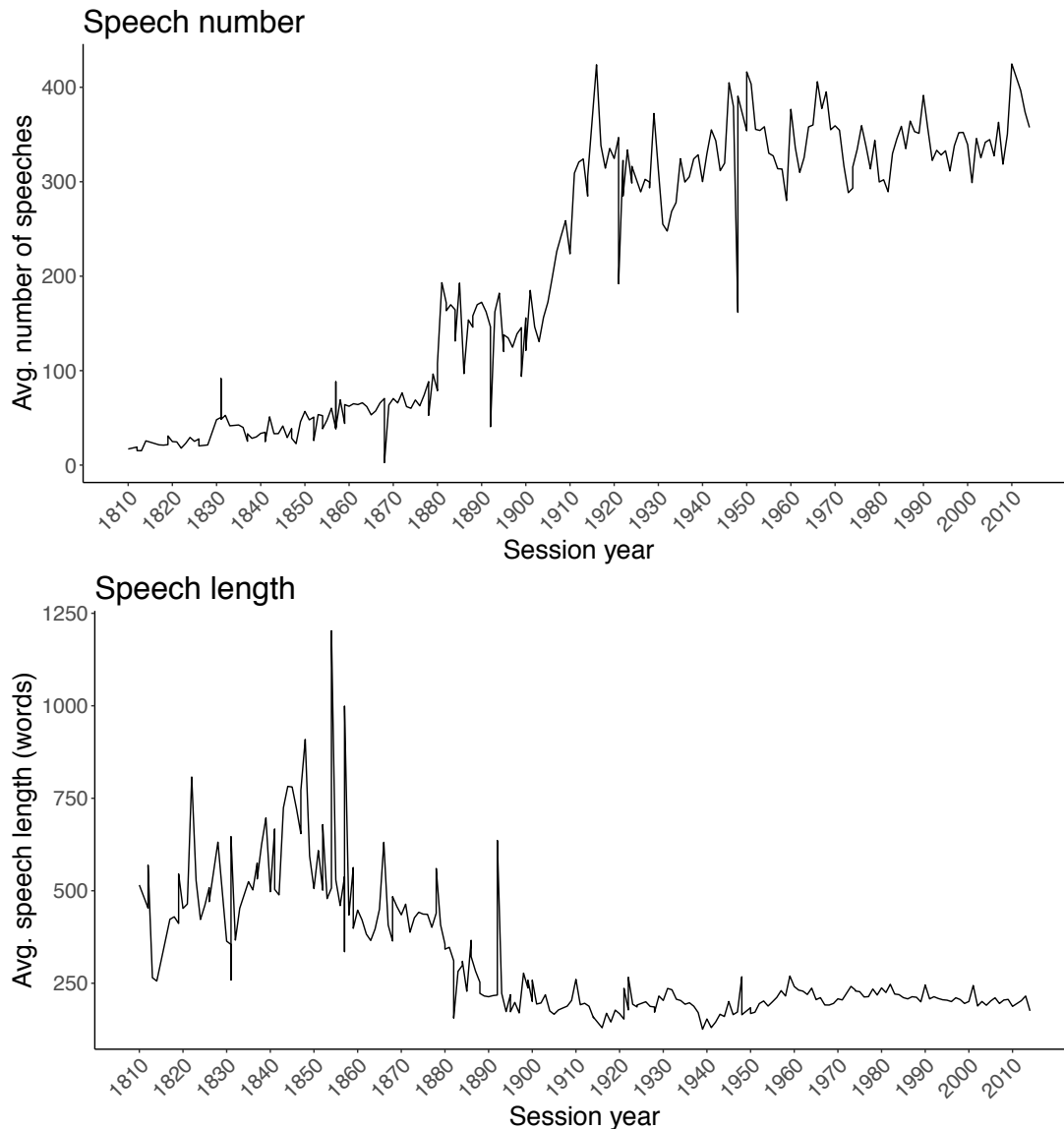


Figure 3.1: Patterns of Speech-making in the Commons, 1811–2015

Notes: The top panel shows the average number of speeches made *per session day* for a yearly session. The lower panel shows the average speech length for a session of the mean daily speech length. The x-axis labels refer to parliamentary sessions.^a

^aThe low score for speech number in 1868 reflects the 1st session of the 20th Parliament, during which there are very few sitting days due to its extreme brevity (10–29 December 1868).

butions that are chiefly substantive.¹³ The advantage of this approach is that the dictionary is specific to the context of the parliament to which it is applied—in

¹³81,209 observations are dropped in the process.

fact, it is an endogenous product of that assembly—and is therefore highly appropriate for our data. After all pre-processing steps, the data include 3,138,705 speeches.¹⁴ For every implementation, Appendix A discusses the data and results if procedural phrases *are included*.¹⁵

Figure 3.1 plots the number of speeches and their length over time. The data bear witness to the dominance of the Tory/Conservative and Labour parties in British politics. The former accounts for nearly 44.4 per cent of all speeches; whereas the latter accounts for approximately 35.6 per cent. Meanwhile, the Liberals/Whigs account for 10.1 per cent.¹⁶ Members gave an average of 387 speeches during their parliamentary career. The sample is skewed however, with MPs taking the floor only 189 times during their tenure prior to the end of WWI, and post-WWI MPs more than twice as often, some 474 times. After WWII, this figure rises to 540.¹⁷ The average speech length (measured as the number of words) rises up until the 1850s, after which we see a steady drop until the 1930s, after which it stabilises.

Having presented the dataset in some detail, we now move on to a discussion of the first class of models used in this chapter: Poisson scaling.

3.6 Poisson Scaling Approaches

The first two models applied in this chapter rely on adapted forms of the standard **Wordfish** algorithm. This Poisson scaling model is the most appropriate model for our purposes, for a number of reasons. First, recent applications have successfully applied the model to the study of ideal points in legislatures, when

¹⁴For the models, independents are excluded, bringing the total number of observations down to 3,125,641.

¹⁵Results with procedural phrases included are only implemented for those algorithms that pass a minimum threshold of performance (see Appendix A, Section A.8).

¹⁶All estimates based on the dataset after matching of party labels, but *before* removing procedural speeches and contributions shorter than fifty words (approach described in text).

¹⁷For these calculations, I exclude members who made fewer than five speeches over the course of their career. If these are included, the numbers are 263 (full sample), 133 (until end of WWI), 316 (post-WWI), and 372 (post-WWII).

applied at the *debate-level*.¹⁸ Second, in practice, the **Wordfish** model is more robust to outliers in word use (Lauderdale and Herzog 2016) than its least-squares sibling correspondence analysis (CA) (Greenacre 2016), which some have argued is a more appropriate technique that should be seen as the canonical approach to text scaling (Lowe 2013).

Scaling models suffer from another problem that needs to be addressed: because of the variation in dimensionality, or, rather, in the topics that MPs put forward and the variation of bills within any one political dimension, there is also a great deal of discrepancy in individual word use. To deal with this issue, we typically limit the WFM to words that appear in at least twenty per cent of the texts. However, the matrix that results from applying this cut-off may become so small that too few words remain for the estimation. As Proksch and Slapin (2009) point out, **Wordfish** performs best with about twenty documents and 300 unique terms in the sense that this produces “acceptable” error terms.

One, albeit partial, solution to this problem is to remove interventions by members from “fringe parties”.¹⁹ In the following estimations I impose such a limit, defining top parties as those that account for at least twenty per cent of speeches in a discussion. The two estimation strategies outlined below are therefore implemented with a dataset of speeches where: i) procedural phrases have been removed; ii) only discussions with five speakers or longer are included; iii) speeches are fifty words long at a minimum; and iv) debates only include speeches by those parties that account for at least one fifth of speeches made in the discussion.

¹⁸Schwarz, Traber, and Benoit (2015) for example find in a study of the Swiss legislature based on an energy policy debate (2002—2003) that speech-based estimates reveal larger differences of ideology within parties than roll call-based measures. In turn, Lowe and Benoit (2013) find a high correspondence between human coding of texts from the austerity budget debate in the Irish legislature (2009) and **Wordfish** estimates.

¹⁹The fact that the number of unique words in the WFM drops below the 300 cut-off may be due to the fact that certain members that are included in the model get to speak very little on bills within a specific dimension, for example on the economy. When aggregating their contributions over the year within that policy area we thus end up with a very short text. I found that their inclusion means that the subsequent removal of sparse terms reduces the matrix to too few words to produce reliable estimates. To avoid this problem, we can instead include a certain threshold of “top parties” for each debate.

3.6.1 *The Challenge of Dimensionality in Poisson Scaling Models*

Before turning to a detailed description of the models, I will first provide a brief methodological justification. Both algorithms used in this chapter go beyond the standard **Wordfish** algorithm to (attempt to) address a long-standing and pertinent problem of Poisson scaling: the high-dimensional nature of speech data. Unlike manifestos or press releases, speeches do not always follow a structured format that allows for easy comparison and scaling. Moreover, **Wordfish** assumes that word meaning remains relatively stable over time. Yet, the world of debate corresponds with neither assumption. In this section, I shall briefly address these issues from a theoretical standpoint. An empirical assessment of the “dimensionality” problems of my models is provided in Section 3.6.4.

We can conduct a simple test to show that word meaning indeed changes significantly over time. If this is the case, we should observe that at different levels of sparsity reduction of our Word Frequency Matrix (WFM), we obtain considerably different estimates. “Sparsity reduction” refers to the removal of words that only occur rarely across a corpus of texts. It is a pre-processing step that limits the impact of idiosyncratic speeches, but also serves to ease comparison over time as it ensures that comparable words are used in the estimation. I implemented the following strategy. First, I randomly select a year and create a five-year time period by extending it by two to either side of that year. Second, I randomly sample twenty legislators from this dataset, and concatenate their speeches over this period. Finally, I estimate a **Wordfish** model. I do so while retaining all terms, and subsequently with only those terms that appear in at least 20, 30, 40, and 50 per cent of the texts respectively.²⁰ In total I estimate five different **Wordfish** models.

The distribution of the ω estimates—which represent the position of texts in the **Wordfish** model (see detailed description of the model’s functional form in Appendix A.3)—are shown in Figure 3.2. The darkest dots represent the

²⁰In the estimation of the **Wordfish**-based models in next sections, following established convention, I will retain only those terms that appear in at least twenty per cent of the texts.

results from a model estimated on a matrix with zero sparsity reduction (this means that we retain all terms, regardless of how rare they are); and the dots become gradually lighter as we move to greater levels of sparsity reduction. It appears that the approach that combines member speeches per session instead of per individual debate produces inconsistent estimates: the ω s are far from concentrated around the original estimates.

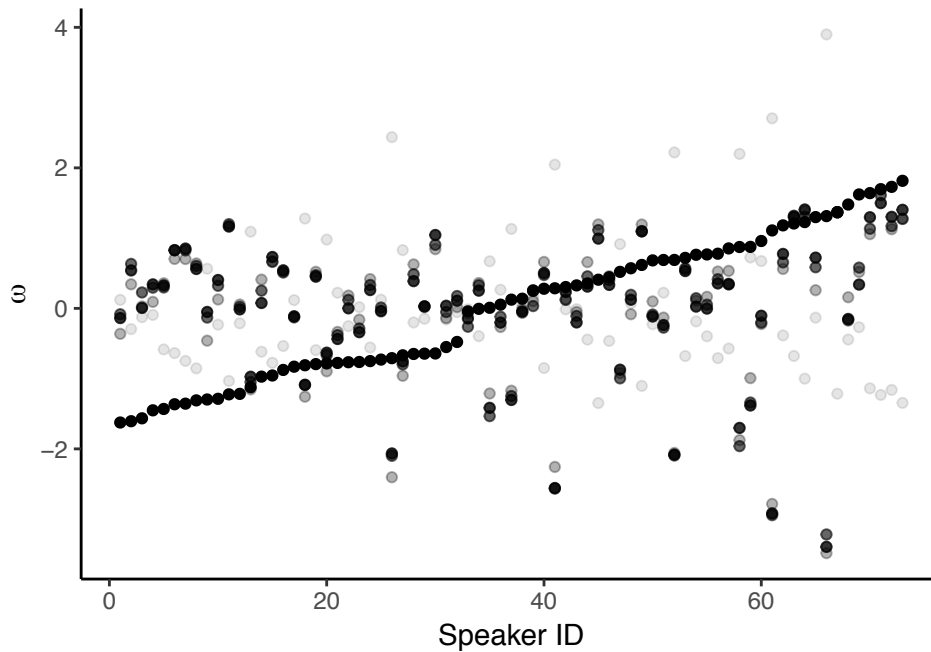


Figure 3.2: The Effect of Sparsity Reduction, Aggregation by Session

Notes: Estimates for a sample of twenty randomly selected speakers 1960–1964 (approach described in text). Levels of sparsity reduction are 0.20, 0.30, 0.40, and 0.50 respectively; the higher the level, the more transparent the bullets in the graph. The correlation of these levels with a fully sparse matrix is 0.024, 0.010, 0.062, and 1.4e-4 respectively (polarity reversed for the estimates of the 4th model).

Moreover, the number of meaningful dimensions recovered represents a problem. Using correspondence analysis (CA), we can obtain estimates for the remaining dimensions in addition to the first one that *Wordfish* recovers (Lowe 2013). We can subsequently look at the ratios of the eigenvalues associated with any axis relative to the trace. These ratios represent the share of the inertia

that the axis accounts for, and allows us to determine how many dimensions are appropriate for our density matrix.²¹ In the approach outlined above, there are 72 “relevant” dimensions. The first and most important dimension only accounts for around *three* per cent of variation. This finding has two implications: i) the percentage of variation accounted for by the dimension that *Wordfish* recovers is limited; and ii) we are faced with significant extra costs of verifying what dimensions are of substantive significance or not.

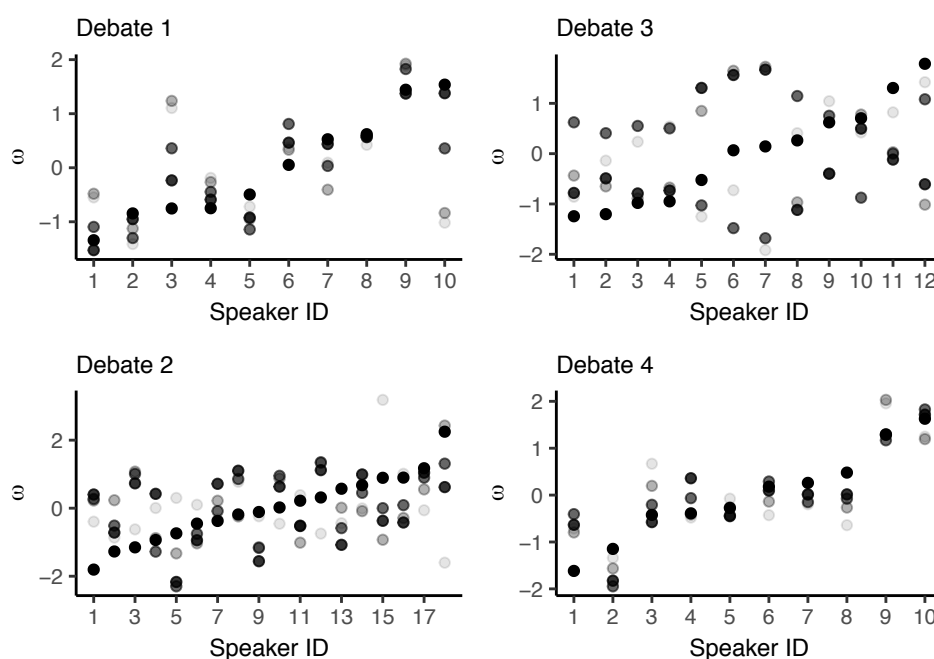


Figure 3.3: The Effect of Sparsity Reduction, Aggregation by Debate

Notes: ω estimates for four randomly selected debates, at different levels of sparsity reduction (approach described in text).

Conversely, if we estimate the model for individual debates we get a different picture. Here, I consider four randomly selected debates with at least twenty speakers each. First, as one would expect, the estimates become more consistent

²¹For example, if we have ten speakers and the columns and rows are completely independent, the average percentage of inertia that an axis should account for is $100/(10 - 1) = 11.1$. Any axis that accounts for a greater percentage of the inertia may be seen as a significant and should be retained.

between the different levels of sparsity reduction (Figure 3.3). This is to be expected: the WFMs will contain considerably fewer unique terms (as the texts per MP are shorter and come from a smaller selection of debates), and the estimation will therefore be less sensitive to which words are removed from the frequency matrices. In addition, removing rare terms is only helpful to a limited degree if we already reduce the dimension to the debate-level: rare terms are more likely to be related to a particular ideological stance on the issue under discussion, for the simple fact that we limit the temporal dimension.

Second, and more importantly, the appropriate number of dimensions *is* significantly reduced. It now ranges between three and seventeen with a median of nine; a large reduction compared to the approach outlined above. Furthermore, this first dimension explains an average of twenty per cent of the variation in the data, with a range of [8.9;34.9]. Our aim with Poisson models should therefore be to limit the temporal range across which we aggregate speeches prior to estimation. I will now turn to discussing a number of strategies to do so.

3.6.2 1. *Dimension-level Scaling*

The first strategy applied in this chapter consists of dictionary, classification, and scaling steps. In the last step, it applies **Wordfish** to recover estimates for the position of legislators on a specific policy dimension within a parliamentary session. This approach is the closest approximation—in theoretical terms—to the Comparative Manifesto Project (CMP, Volkens et al. 2016), and to that of Slapin and Proksch (2008). A collection of an individual’s speeches on a dimension in effect represents a personal “manifesto”, that can subsequently be scaled. Here, I demonstrate this approach for one political dimension—the economy.

At the first stage of the estimation procedure, potential dimensions of political conflict have to be established. As legislators may speak on different topics that are only tendentially related to the bill, simply looking at the titles as recorded in *Hansard* will not yield the desired result. Instead, I use a dictionary and a machine learning classification step before I apply the standard **Wordfish**

model. I first select speeches that clearly fall within this substantive policy area. I do so on the basis of a dictionary derived from the CMP manifesto dataset, complemented with a number of terms specific to the UK context (see Appendix A.4, Appendix A). Subsequently, I train a stochastic gradient descent (SGD) classifier to these data, and use the trained model to sort all speeches into the economic and non-economic categories. Appendix A contains details of the selection and classification procedure.

After obtaining a dataset with economy-related statements, I concatenate speeches by legislator for each session, and run the standard **Wordfish** model at the sessional level.

3.6.3 2. *Debate-level Scaling: Wordshoal*

A second solution to the dimensionality problem is to estimate legislator positions at a more granular level (i.e. within debates) and devise an appropriate way to aggregate estimates across different axes of conflict. This is the approach offered by Lauderdale and Herzog’s “**Wordshoal**”. Here, we first use the standard unidimensional Poisson scaling model **Wordfish** (Slapin and Proksch 2008) to estimate debate-specific legislator positions, and subsequently apply Bayesian factor analysis on the sparse matrix of debate-specific estimates to recover the latent position of each MP across all the discussions that they participated in.²² Details of the model’s functional form are provided in Appendix A.3.

²²To provide an intuitive example of the second stage of the estimation procedure, imagine a set of three legislators (A , B , and C) who speak in three debates (D_1 , D_2 , D_3). In D_1 , the **Wordfish** estimation places the legislators at: $A = 0.8$, $B = 0.5$, and $C = -0.3$. For D_2 , the polarity is inverted, with $A = -0.8$, $B = 0.5$, and $C = 0.3$. This may happen because the debate level scales could run left-right or right-left (because the model does not fix the polarity). The factor analysis will identify that the order of the three legislators is generally the same across the debates, and infer that the β coefficient relating the debate-scale to the general scale is $+1$ (for example) in the former cases and -1 in the latter cases. Now imagine D_3 , with the following scores: $A = 0.6$, $B = -0.3$, and $C = 0.1$. This debate is not very well correlated with the others. If most debates look more like D_1 and D_2 , the factor analysis will estimate a weak loading (β) on that debate (i.e. it will contribute less to the *overall* latent dimension estimated from the debates). Conversely, if most debates look like D_3 , the general dimension will look like this debate, and D_1 and D_2 will have small β s.

At the first stage of the estimation, we have to establish what constitutes a debate. Lauderdale and Herzog (2016, p. 14) define a debate as set of contributions that share the same title, that were made on the same day, including a minimum of five speakers. Here I depart from their model, and apply an extra step prior to the **Wordfish** stage to reduce data loss and maintain a reduction in dimensionality. Like the authors, I first identify individual debates on the basis of their titles and dates in the records. But I subsequently collapse speeches per such debate into a single document and estimate cosine similarity (with TF-IDF transformation) between these debate-documents to combine discussions on similar topics. Any two debates between which the cosine distance is less than 0.25 and falls within the fifth percentile are combined into one debate. For the estimation, speeches are concatenated per speaker for each debate, leaving us with 883,397 texts across 77,564 debates.

3.6.4 *A Comparative Assessment of Dimensionality*

Like all text scaling models (or even simple cluster analyses or multi-dimensional scaling techniques), **Wordfish** tries to estimate a lower-dimensional, and simpler representation of the text data. The algorithm, however, estimates only one dimension. We have to be able to reasonably assume that this particular axis represents the main angle of “conflict” between actors. In addition, we have to assume that the variation in word use is associated with the underlying latent dimension rather than with simple topic variance. When this is not the case, the estimated level of polarisation does not reflect ideology-related divergence; instead, it only shows variation in the topic on which legislators speak. Rather than one, the debates involve multiple axes of conflict. The advantage of the two approaches outlined above is their ability to limit such topic-related variation, i.e. to keep the dimensionality of the texts that form the basis of the estimation procedure within reasonable bounds.

We can analyse the problem of dimensionality using correspondence analysis (CA), which allows us to recover multiple dimensions and estimate the percent-

age of variation accounted for by the first axis (Lowe 2013). This statistic is summarised for all approaches in Figure 3.4.

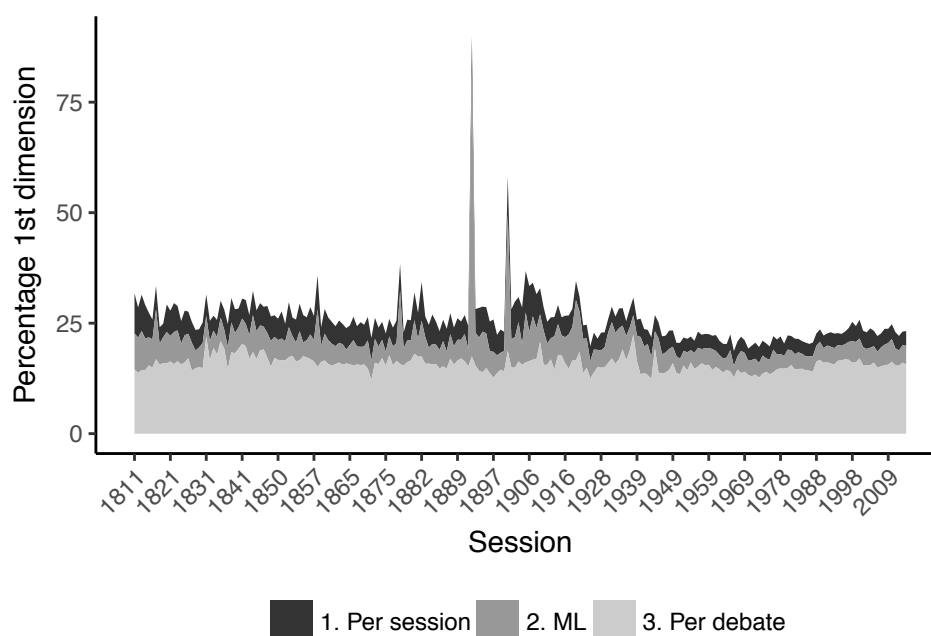


Figure 3.4: Number of Dimensions in the Estimation

Notes: Graphs show stacked distributions of the percentage of variation explained by the first axis recovered by Correspondence Analysis (approach described in text). Implementations: “1. Per session” = speeches aggregated per session for each legislator; “2. ML” = dimension-related speeches pre-selected using machine learning and subsequently aggregated for each speaker for each session; “3 Per debate”: speeches are aggregated by legislator for each debate and the model is estimated at the debate-level.

In the first approach, which simply combines speeches for each legislator across all debates within sessions, the principal axis of variation explains 4.7 per cent on average.²³ The second strategy—which involves pre-selecting speeches based on a dictionary and machine learning step—shows significant improvement. When we only retain speeches that have a 75 per cent or higher probability of falling in the economy category, this approach produces models where the first

²³The average correlation across the sessions between the first-dimension CA estimates and the *Wordfish* estimates is 0.95.

dimension explains 5.57 per cent.²⁴ When we increase the threshold to 99 per cent, this explained variation rises to 8.10 per cent.²⁵

When we reduce dimensionality further, by scaling legislators within debates (i.e. the **Wordfish** estimates from the first stage of **Wordshoal**, prior to factor analysis), we see a significant improvement. The variation explained by the first axis rises to 15.85 per cent on average.^{26,27}

3.6.5 From Ideal Points to Polarisation

From the preceding analysis, it is apparent that we have to estimate our models at the debate level if we want to make substantive claims about political opinions on the basis of variation in language use. Consequently, it stands to reason that **Wordshoal** is best able to recover a substantive dimension of conflict. I will now turn to devising a measure of polarisation based on the estimates from this algorithm. As the estimates are standardised within fixed bounds at the extremes of the political spectrum, we are unable to compare the distance between the distributions of ideal points of parties from session to session: these measures will not meaningfully reflect temporal changes. Instead, we have to develop a measure that “dummies out” the changes and that reflects the relative position of legislators and how they change between sessions.

To this end, I consider the degree of division between legislators on either side of the political spectrum across issues: I measure polarisation as *the number of legislators of the rightmost party that fall within the range of the distribution of legislator ideal points of the leftmost party, as a proportion of all members of parliament*. To evaluate and reduce the effect of outliers, I also implement this measure while only retaining legislators for the leftmost party whose position

²⁴Here, the average correlation with the CA estimates is 0.93.

²⁵Here, the average correlation with the CA estimates is 0.85.

²⁶Here, the average correlation with the CA estimates is 0.95.

²⁷Note that, from the graphs, another property of the debate-level scaling approach becomes apparent: there is markedly less variability in the number of appropriate dimensions and the percentage explained by the first axis. This is not surprising, as we may expect some upward, secular trend over time in the number of issues that parliament needs to legislate on and therefore discuss. This is especially the case after WWII, with the introduction and rolling out of the welfare state.

falls below the 95th percentile; and for the right those that fall above the 5th percentile. In both cases, I compute the polarisation score by subtracting the proportion obtained from one. Figure 3.5 plots the results.²⁸

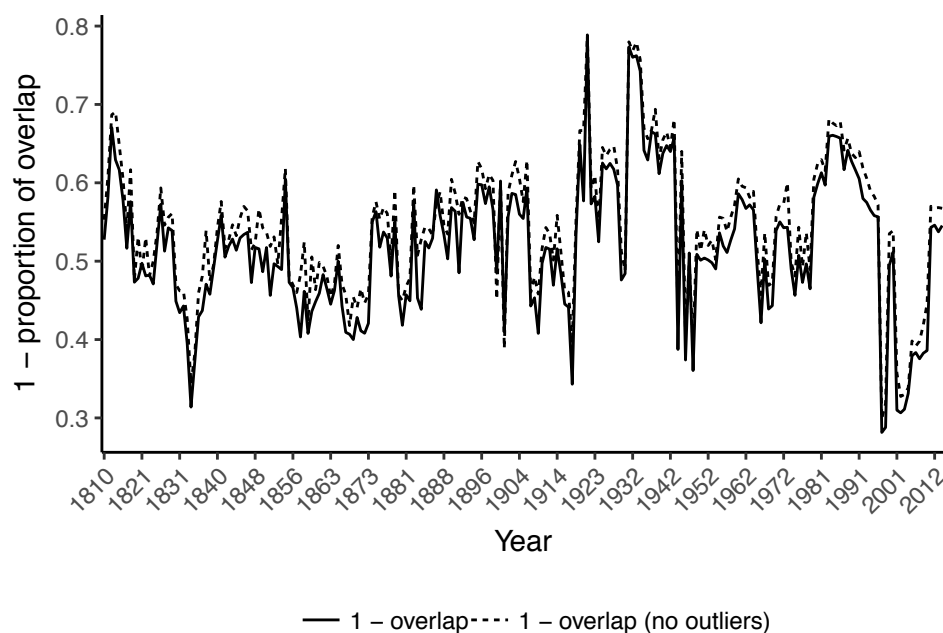


Figure 3.5: Wordshoal Estimates, 1811–2015

Notes: Measures based on θ estimates obtained with **Wordshoal** (approach described in text). The graph shows one minus the proportion of legislators of the rightmost party that fall within the range of the distribution of legislator ideal points of the leftmost party, and that same measure with outliers excluded (approach described in text).

This measure thus captures the consistency with which MPs *fall within their party label across multiple policy issues*. A score of “1” represents perfect polarisation, with zero overlap between the main parties on the right and left of the political spectrum. The correlations between the two measures is 0.97, showing that the effect of outliers seems to be relatively limited.

²⁸Here, I retain only Tories and Whigs prior to November 1922, and Conservatives and Labour thereafter.

3.6.6 Persistent Problems: Dimensionality and Error in *Wordshoal*

Reducing the number of dimensions when estimating ideological positions with the *Wordfish* model leads to another problem: an increase in error.²⁹ As we seek to limit dimensionality, the number of documents (or in this case: speakers) that are included in each model drops. In *Wordshoal*, it may drop as low as five at the first stage of the estimation. This drop is reflected in the error terms, as shown in Figure 3.6.

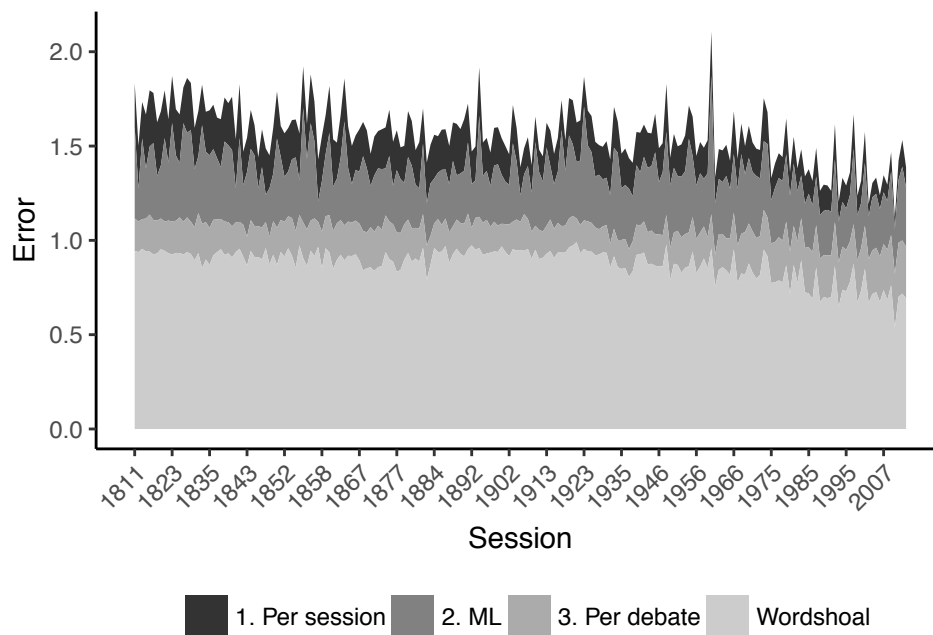


Figure 3.6: Stacked Distribution of Error Terms for Scaling Estimates

Notes: The figure plots the stacked distribution of error terms for individual scores for three different estimation procedures: i) includes all debates, aggregated per session for each legislator; ii) speeches selected on one dimension, and aggregated per MP; and iii) scaling of speakers within debates. The fourth part of the stacked distribution represents the aggregate-level error terms of the *Wordshoal* approach (details described in text).

Whereas implementation 1 (all debates, aggregated per session) has a mean error of 0.19 across the sessions, this increases to 0.32 in implementation 2

²⁹As pointed out above, the algorithm performs well with a minimum of twenty documents and 300 unique words (Proksch and Slapin 2009, p. 328).

(dimension-scaling), and lower again at 0.18 for approach 3 (which scales speakers within debates *prior* to the stage where we implement Bayesian factor analysis).

Lauderdale and Herzog (2016, p. 383) argue that the error terms for the ω s from **Wordfish** are not substantively interesting as re-sampling of individual words does not constitute an appropriate counter-factual of any sample of parliamentary speeches. Instead, they claim, we need to sample at the speech- and debate levels; not at the level of words. Uncertainty in **Wordshoal** is related to the debates that a legislator participates in, the similarity between legislators in different debates, and the consistency of how legislator positions are ordered across the debates in which they participate.

However, the average error related to the **Wordshoal** estimates, *after* factor analysis is 0.88. This number is considerable when considering that the range across the entire set of estimates is $[-1.97, 1.94]$. Dimension-level scaling therefore inevitably fails to reconcile a triad of considerations that are essential to producing sound estimates of legislator ideology: i) the needed reduction in term sparsity to ensure that certain words used uniquely by only one actor do not adversely affect the estimation of the underlying latent dimension and text placement; ii) achieving the smallest possible error terms so that the true value of an estimated position does not fall within the confidence interval of another; iii) producing estimates for *each* yearly parliamentary session.

3.7 Machine Learning: Dealing with High-Dimensional Data and Parliamentary Dynamics

We will now move beyond the shortcomings of traditional scaling approaches. Here, I outline a novel machine learning-based approach proposed by Peterson and Spirling (2018) that is better able to deal with high-dimensional data, and allows researchers to account for the dynamics of parliamentary debate. In simple terms, we fit a machine learning classifier to a randomly selected sample of speeches (i.e. the “training set”) to identify what words and phrases are associated with a particular “class” (here: the party label). The trained model is subsequently

used to predict the party label of a second sample of test data from that same year. The degree to which language can accurately predict the party label is taken to be a measure of polarisation.

3.7.1 *Polarisation as Partisan Language*

The machine learning approach of measuring polarisation is based on a simple assumption of how language is generated, not unlike that of **Wordfish**. Political parties differentiate themselves from one another through communication; their members use distinct terms to define and discuss one and the same political issue. That language use reveals partisanship is perhaps most evident in the US Congress, where Republicans will refer to “death taxes” and “illegal aliens”, while Democrats will speak of the same issues using phrases such as “estate taxes” and “undocumented workers” (cf. Gentzkow, Shapiro, and Taddy 2016). In the UK, Conservatives might refer to a cut in benefits as “reducing dependence”, while Labour may characterise it as a “benefits squeeze”.

A key difference between **Wordfish** and the machine learning approach is that we introduce extra information—the party label—and therefore no longer have to show that certain words are “right-wing” or “left-wing” when interpreting the dimension. Instead, the trained model “knows” how members of party A typically speak—it has “learned” the features of that party’s language—and estimates the probability of an individual belonging to that party A for each speech that we “ask” it to predict.³⁰ As a basic intuition, a polarised parliament consists of groups that choose to use very distinct language, and an unpolarised legislature includes MPs who are linguistically proximate to members of their own party. Style, sub-topic, and other semantic differences are used strategically by legislators to make a point. The level to which these differences in language

³⁰In contrast to the **Wordfish** model, the placement of an individual legislator is thus not solely determined by word weights that are a function of the relative frequency with which terms are used within a debate; rather, the degree to which a word “loads” on (or: is predictive of) an MP’s placement is a function of how likely that term is to be used by the party in general, across the session.

use accord with a particular “party label” as predicted by a trained model reveals the degree of partisanship of the member.

The machine learning approach is particularly well-suited to high-dimensional data because we avoid the problem of issue space altogether. Disagreement is instead reduced to one dimension: language use. Admittedly, this broadens the concept of “ideology” as it is usually defined in the literature (see also Gentzkow, Shapiro, and Taddy 2016; Peterson and Spirling 2018). But, it can be seen as an efficient and appropriate approach if we accept the assumption that all—or at least a majority—of an MP’s linguistic choices are informed by political considerations.

3.7.2 *Machine Learning*

To measure legislator preferences and parliament-level polarisation, I apply the stochastic gradient descent machine learning algorithm with a log loss function and l2 regularisation (Bottou 2004).³¹ Like Peterson and Spirling (2018), I use k -fold stratified sampling from each dataset of yearly speeches. Each year is randomly partitioned into twenty folds of equal size while retaining the balance of party labels.³² Subsequently, one of the k sub-samples is reserved for testing and the remaining $k-1$ folds for training. By cross-validating twenty-fold, I obtain individual level partisan scores for each legislator using probability estimates for each label. In other words: for each speech, the probability that it belongs to a “class” represents a legislator’s “partyiness” for that speech. The mean probability of belonging to their party across all the individual’s speeches for a time period t represents that legislator’s partyiness for that period t .

To account for differences in the length of speeches, important and common words, I apply the TF-IDF transformation to the WFMs. This transformation

³¹To evaluate the impact of the chosen classifier on our estimates, I also use a multinomial Naive Bayes (NB) algorithm (Maron and Kuhns 1960). The SGD algorithm will serve as the main application. Details of the functional form of both algorithms, and results for the NB classifier are reported in Appendix A.7.

³²I considered implementing the algorithm with 100 folds to subsequently obtain a better measure of uncertainty related to the split of the folds (see below), but this imposed prohibitive computational costs when combined with the grid search as outlined in footnote 37.

up-weights words proportional to the number of times they appear in the document, and is offset by the frequency of the term across the corpus (Manning, Raghavan, and Schütze 2008). Further, I also include a measure of uncertainty of the predictions across the folds.³³ Here, I use a bootstrap procedure (with $n = 10,000$) to generate confidence intervals for the aggregate score per year.³⁴

In contrast to Peterson and Spirling (2018), I include *all* parties in the estimation, rather than the Conservatives and Liberals/Labour alone.³⁵ As the model’s predictions depend on the data on which it is trained the inclusion of other, smaller parties is bound to affect the estimates, especially since different parties are more invested in some debates than in others. For example, between 2013 and 2014, Scottish independence featured prominently on the House’s agenda.^{36,37}

³³As this split is random, the accuracy of the fitted model depends on the composition of the test sample. We can therefore take a distribution of accuracies across the folds that we can subsequently use to construct a measure of confidence of our estimate.

³⁴Both the bootstrapping process used here or the “simple 95 per cent confidence interval” approach generate confidence intervals that are anti-conservative relative to the data generating process: for the former we cannot bootstrap the full parliamentary process; and for the latter, we would be treating the observations as if they were independent samples from some independent and identically distributed process. The confidence bands should be read with this reservation in mind.

³⁵I do maintain a “hard” lower limit that excludes parties that contributed less than 100 speeches in a session. The reason for using an absolute rather than a relative (i.e. percentage) cut-off is the extreme dominance of the largest two parties (Liberals and Tories prior to 1922, and Labour and Tories thereafter).

³⁶These include the debate on the Scottish Independence Referendum Bill, passed by the Parliament on 14 November 2013 (Royal Assent on 17 December 2013), and discussions on the Devolution Bill in light of the September 2014 independence referendum, as well as the poll itself. Excluding the Scottish National Party (SNP) from the model would bias the results for these discussions, and fail to include information on the degree to which legislators from the mainstream parties share the views of their SNP colleagues. Similarly, one can imagine that a model would produce biased results if it excludes the Irish Home Rulers in the 1880s, or fails to include *both* Liberals and Labour at a time when these two parties vied for the position of the main “second party” in the early 1900s.

³⁷A second difference between my approach and that of Peterson and Spirling is that I conduct a “rough” grid search to tune the α hyper-parameter, varying the α between $1e-4$ and $1e-24$, and selecting different levels for this parameter based on model performance evaluated by the classifier’s accuracy. In practice, the value of α depends on the kinds of sample weights that are used (see next section).

Accounting for Parliamentary Dynamics

An important advantage of the machine learning approach is that we can account for parliamentary dynamics in the estimation procedure. Above, I outlined two outstanding issues in the literature: i) some legislators have more opportunities to speak than their colleagues; ii) some parties get more floor time than others. Based on these two conventional “wisdoms” of legislative debate, we can add a third problem: what if these two dynamics interact? In other words: how can we account for a situation where there is both an imbalance in the number of speeches per party *and* the breakdown of such debate participation per party member?

In Table 3.2, I define a number of weights that we can apply to account for such dynamics of parliamentary debate (cf Goet and Goplerud 2017). The first row defines class weights that balance estimates on the *party*. Speeches from the party that has the lowest total number of contributions are up-weighted. The second row in the table shows sample weights that balance speeches on MP; those with lower speech counts receive higher weights, effectively balancing them with their more prolific colleagues. This implementation favours people that take the stage extremely rarely. The final sample weight accounts for the interactive effect of members within a particular party speaking more often than others, balancing speakers both within party and across parties, and again using truncated weights.

Although these weights solve one problem, they raise the prospect of another: legislators that are not vocal—and therefore perhaps do not play an important role in their party—now have a considerable effect on the estimates. We can get around this problem by truncating the weights at a cut-off. Here, all legislators in the fifth percentile of number of speeches made, receive uniform weights: for the weighting procedure, these legislators and their contributions are treated as belonging to one actor but are subsequently included in the estimation separately.

These weights are not only important from the perspective of obtaining accurate estimates; they also allow us to engage with substantively different ques-

Table 3.2: A Weighting System to Account for Debate Dynamics

Balanced on	Weights	Ref.
Party	$\frac{n_{total}}{p*n_p}$, where n_{total} is the total number of speeches, p is the number of unique parties, and n_p = number of speeches of party p .	2
MP	$\frac{1}{s*n_k}$, where s is the number of unique speakers, and n_k = number of speeches of MP k . ^a	3
MP in party	$\frac{1}{(p*s_{pk}*n_k)}$, i.e. one divided by the product of the number of unique parties p , the number of unique speakers in the party of legislator k (s_{pk}) and the total number of speeches of legislator k (n_k). ^a	4

^aWeights truncated at fifth percentile of number of speeches made. Legislators in this part of the distribution receive uniform weights.

tions. The ability to estimate the class probability of legislators—a measure of their partisanship—raises both the question of what drives the predictive model and of what our model is measuring. First, the weighting system allows us to evaluate which class of actors (parties, party leaders, or individual MPs) have the strongest “leverage” on the fitted model. For example, if party leaders disproportionately take the floor and we only include class weights to balance between different political groups, our estimates for individuals will represent how strongly their language corresponds to that of party leaders. After all, the fitted model will more closely correspond to actors that are better represented in the training set.

This feature of the approach also raises the question of whose “partyness” we care about. In a setting where every MP is a veto player, regardless of how vocal they are, we will want to balance on MPs. In other contexts, we can apply weights that balance parties if we believe that they only matter as relatively homogeneous units. Finally, if power is divided on two levels—between and within parties—we can balance on both levels. Here, the most important use of the weights is to

reveal what drives our estimates. As will become clear below, the aggregate-level classifier accuracy is not strongly affected, whereas the individual-level estimates are more sensitive to the sample weights.

3.7.3 Implementation and Results

For the estimation, I again use the cleaned-up data outlined above, which contains only speeches longer than fifty words, limited to entries with successful party label matches, and excluding procedural phrases. Figure 3.7 shows the first two implementations: SGD without any weighting (panel 1), and SGD with class weights to balance between parties (panel 2). Figure 3.8 shows the latter two.

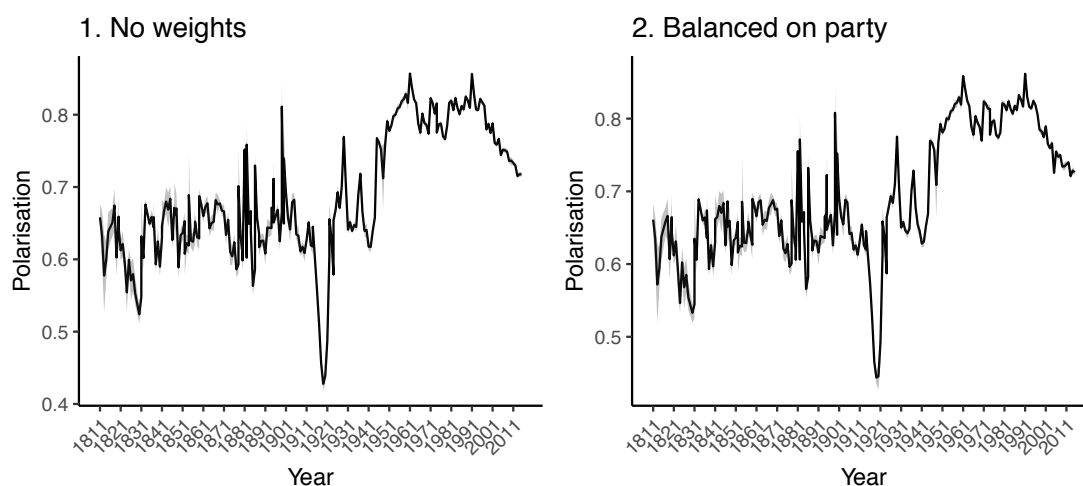


Figure 3.7: Polarisation, 1811–2015 (SGD Impl. 1 & 2)

Notes: Measure based on the accuracy of the SGD classifier. Grey ribbon represents bootstrapped 95 per cent confidence intervals associated with the predictive accuracy of the folds (approach described in text).

The correlations between the different implementations are shown in Table 3.3. As is clear from the figures, there is little difference between the implementation with and without party class weights at the aggregate level (i.e. the classifier level). Most likely, this is a function of the fact that the parties are already pretty well balanced in the sample.³⁸ The difference remains low at

³⁸Until November 1922, the Tories make approximately 46 per cent of speeches in the sample; whereas the Whigs account for the remaining 54 per cent. From 1922 until 2015, the discrepancy is even lower, with the Conservatives at 52 per cent, and Labour at 48.

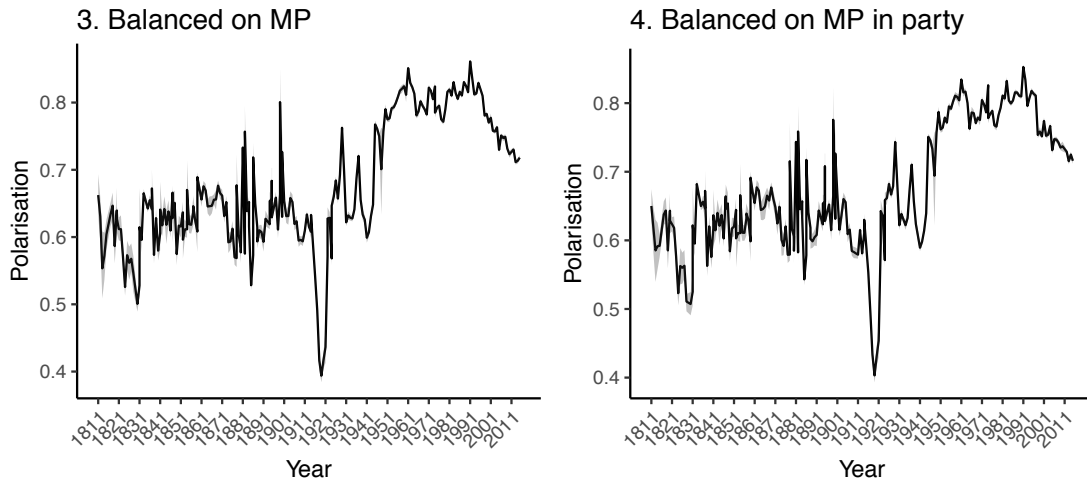


Figure 3.8: Polarisation, 1811–2015 (SGD Impl. 3 & 4)

Notes: Measure based on the accuracy of the SGD classifier. Grey ribbon represents bootstrapped 95 per cent confidence intervals associated with the predictive accuracy of the folds (approach described in text).

the aggregate level when we consider the MP-, party-, and MP-in-party weights. The classification accuracy drops slightly (see Figure 3.8), but still shows a similar trend. The estimates do reveal some interesting changes when we look at the individual-level distributions. In particular, when considering the empirical cumulative distribution function of these estimates for key session years (see Appendix A.6), we can see, for example, that the MP weights (3) show a distribution that corresponds more closely with our expectations of parliament as a whole; whereas the distribution with the MP-in-party weights (4) does not. In all, it seems that polarisation estimates at the aggregate level are relatively robust to “equalising” members who speak less often to their more prolific colleagues. The machine learning implementation, then, seems to deal well with parliamentary dynamics.

What then, drives our estimates? As we are fitting a predictive model, a reasonable assumption would be that those individuals that speak more have higher leverage on our predictions. We can verify this claim by considering the association between frontbencher status and the degree to which MPs are partisan—i.e. the probability of their party label. If this association turns out to

Table 3.3: Correlation Matrix for SGD Implementations

<i>Type of weights</i>	No weights (1)	Party (2)	MP (3)
	<i>R/R_{indv.-level}</i>	<i>R/R_{indv.-level}</i>	<i>R/R_{indv.-level}</i>
No weights (1)			
Party (2)	1.00/0.92		
MP (3)	0.99/0.90	0.99/0.94	
MP in party	0.99/0.84	0.99/0.91	0.99/0.94

Notes: Pearson correlation coefficients. Statistical significance for all correlations at $p < 0.001$.

be strong, we know that here estimated partisanship is primarily driven by party frontbenchers, and by how closely MPs' speeches correspond to the language used by their respective leaders. Here, I take a sample of the individual-level estimates for each session of that party that is in office ($n = 114,670$) and run a binary logistic regression to regress individual-level positions on a dichotomous response variable that captures government status (government = 1; non-government = 0).³⁹ This model produces a log odds of 0.52 ($p < 0.001$). A (one-sided) t-test also shows that there is a statistically significant difference in mean polarisation between the sample of government and non-government MPs, with the former being higher (at $p < 0.001$).⁴⁰ Our estimates appear to reflect the proximity of a party's members to their ministerial team.

As expected, government status exercises less of an effect on the implementations that include weights (2) and (3), with the log odds for these implemen-

³⁹The focus on members of the incumbent party is motivated by two limitations of the data. First, the raw data provided by Political Mashup only includes information on government status from the second session of the 37th Parliament onwards, starting on 3 November 1936. Second, the labels included in the data exclusively indicate members of the government; they do not mark MPs as being in the shadow Cabinet or not. I can therefore not run the same test for the opposition party in the same model. However, we can still have confidence in these results given that there is alternation in government status between parties and no reason to assume that party leaders would systematically shift position after switching from Shadow Cabinet to incumbency status.

⁴⁰Government MPs show about 24 per cent higher probability of being in their party.

tations at 0.49 and 0.35 respectively.⁴¹ The weights are therefore effective at mitigating the effect of party leaders in the estimation. Researchers interested in evaluating individual-level estimates may benefit from employing the weighting system to evaluate the position of individual legislators.

3.8 Validation Exercise

From the analysis above, we have two measures that satisfy a minimum standard for inclusion in a more comprehensive validation exercise. These include: i) the set difference between parties' ideal points (with outliers removed) from the `Wordshoal` estimates; and ii) the accuracy from the SGD classifier with weights to balance parties. Table 3.4 shows the performance of these estimates in accordance with the evaluation scheme developed in Section 3.3.

Table 3.4: Validation Scores for `Wordshoal` and Machine Learning Implementations

Validity	Mach. Learning	Wordshoal
1. Face validity		
1.1 General test	✓	✓/✗
1.2 Detailed test	✓	✗
2. Convergent validity		
2.1 Session-level estimates	✓	✓
2.2 Individual estimates	✓	✗
3. Construct validity		
3.1 Between-session consistency	✓	✗
3.2 Individual-level distribution	✓	✗
3.3 Explanatory power of party	✓	✗

The estimates from these approaches do not correspond closely, making a validation exercise even more pertinent.⁴² In the first part of this section, I

⁴¹Both significant at $p < 0.001$. One-tailed means-difference tests are significant with $t = 50.12$, $df = 47269$, $p < 2.2e - 16$ and $t = 47.49$, $df = 48901$, $p < 2.2e - 16$ respectively.

⁴²The correlation between the two measures is not statistically significant, with $r = 0.00$.

consider face and convergent validity. In the second part, I discuss the substantive meaning of the ideology scores obtained with the estimation procedure.

3.8.1 Face Validity

Test 1.1: General Test

The general test considers the stability of estimates within parliaments. One element of immediate concern is the implausibly high level of variability shown in the estimates within parliament for the **Wordshoal**-based measure (Figure 3.5). The changes are dramatic from session to session. The measures derived from the machine learning yield more stable results (Figure 3.7, right panel, and Figure 3.9).

Test 1.2: Detailed Test

The detailed test considers the correspondence of estimates with important historically identifiable outliers in polarisation. For the UK, these include:

- Polarisation levels at times of national coalition or war: we should observe lower levels of polarisation during WWI (1914–1918) and WWII (1939–1945), when MPs are obliged to collaborate in the national interest due to extraneous circumstances;
- Polarisation during coalition governments: levels should be lower in the 1924 Ramsay MacDonald Labour Government that governed with support from Asquith’s Liberal party, as well as during the Conservative-Liberal Democrat coalition (2010–2015);
- Different levels of polarisation during specific session years:
 - 1832: This year was marked by conflict over the Great Reform Act, which sought to extend the vote and disenfranchise “rotten boroughs”;
 - The years 1815 and 1846: The Corn Law of 1815 introduced regulations that protected domestic corn producers, at the expense of

consumers. It sparked a period of polarisation as tensions between government and opposition rose. In 1846, Sir Robert Peel proposed to repeal the Corn Laws, which happened later that year, marking a return to normality and lower levels of conflict (McLean and Bustani 1999);

- The period around 1880: At this time, Irish obstruction and Irish affairs began to dominate the parliament’s agenda, sparking fierce conflict between political parties;
 - 1885–1886: The Parliament again became more polarised because of the conflict over the first Irish Home Rule Bill that Prime Minister Gladstone tried to pass during these years, only to resign when Parliament failed to do so;
 - 1906: The start of the Liberal welfare reforms under David Lloyd George started a period of increased polarisation between government and opposition MPs;
 - 1979–1990: The Thatcher Ministries again sparked greater tensions between the opposition and government parties, this time over the Prime Minister’s liberalisation agenda.
- General trend: we should observe an upward trend in the levels of conflict over time, and especially after the 1880s as party organisation takes hold.

The machine learning measure corresponds well with the expectations outlined above (see Figure 3.9). As one would expect, the level of polarisation grows after the introduction of the Order Days (1811), and in the wake of the Corn Laws, and is generally higher in the period after 1880. The formation of the Liberal Unionist party in 1886 appears to mark the start of a period during which members did not fall consistently within their party label, which explains the

rather dramatic drop in that year. Although they generally agreed with the Conservatives on Ireland, they were still classed as “Liberals” (at least for part of the time), which makes aggregate polarisation look very low.

After 1906, at the start of the Liberal Welfare Reforms, we see greater polarisation over these “controversial” new policies. As one would expect, we also see less conflict between members of different parties during WWI and WWII, and during the 1924 MacDonald Ministry, with levels picking up after the 1945 landslide Labour election victory. The taking office of the Brown government (2001) and of the Conservative-Liberal Democrat coalition (2010) mark a decline in polarisation. The downward outlier of 1948 is a consequence of the fact that this was a short session (14 September—25 October 1948) with a correspondingly low number of substantive debates over which there could be a division of opinion.⁴³

The results also challenge the presence of a post-War consensus on policy observed by some authors (Addison 1994; Fraser 2000; Kavanagh and Morris 1994): polarisation on the *aggregate* level has grown over time, but has largely remained stable after WWII.

3.8.2 Convergent Validity

Test 2.1: Session-level Estimates

Unfortunately, given the difficulties of measuring polarisation in the House of Commons, we do not have clear benchmarks against which we can evaluate our measures across the entire period studied here. For the post-1945 era, we can analyse the convergent validity (Ray 2007) of our estimates with the **rile** score (Laver and Budge 1992) of the parties based on the Comparative Manifesto Project (CMP, Volkens et al. 2016) data. I take the absolute difference between the Labour Party’s and the Conservatives’ **rile** score divided by 100 as a measure of polarisation. Unfortunately, the data are only available for every *election*,

⁴³Consequently, the SGD algorithm will have more trouble predicting party labels on the basis of speech, as it should in this context.

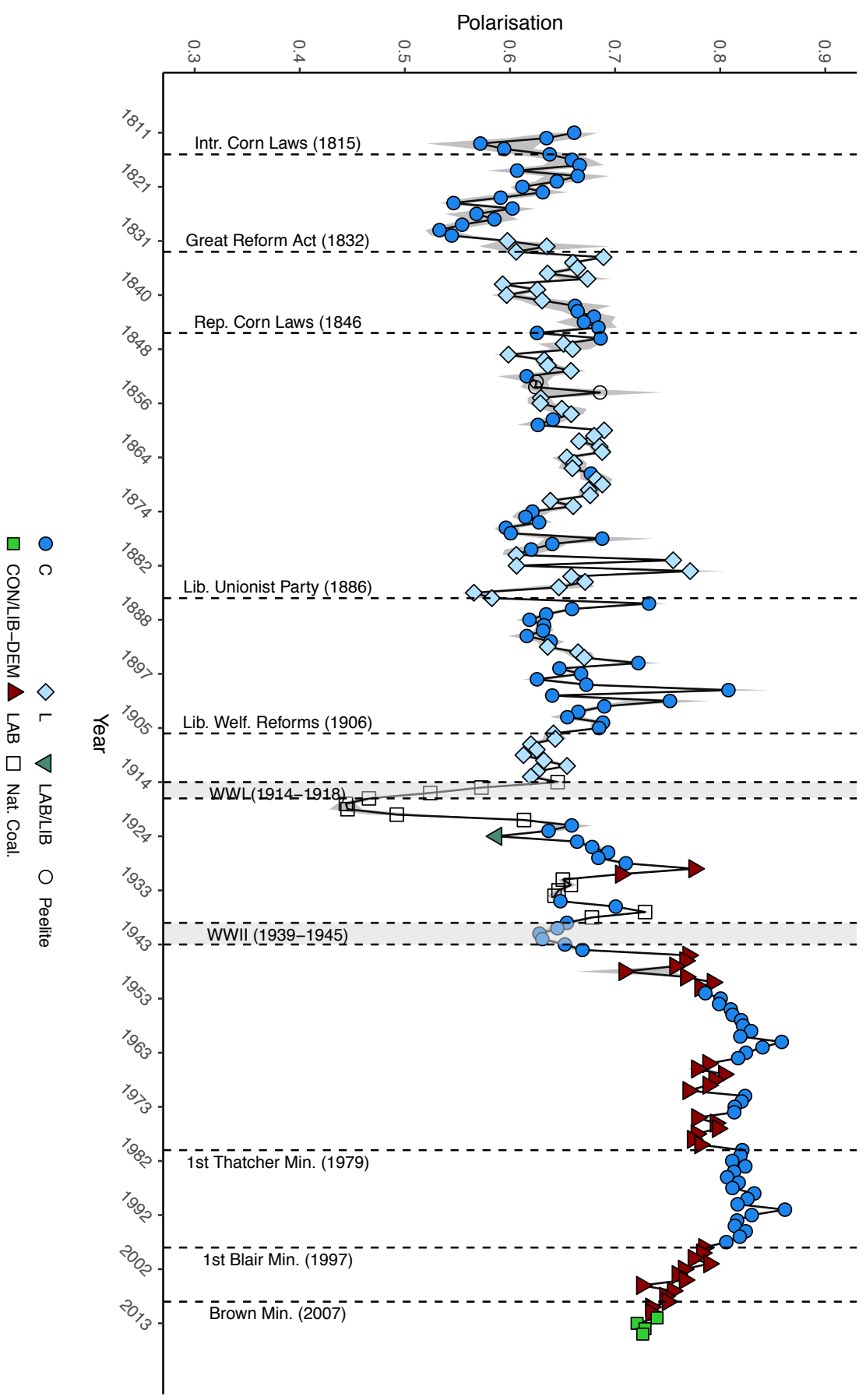


Figure 3.9: SGD Estimates, Illustrated 1811–2015

Notes: Graph plots the accuracy of the SGD classifier (with party weights) for each session (details described in text). The implementation is the same as shown in the right panel of Figure 3.7.

and not for each session. As such, we have too little data to consider correlations or other similarity measures.

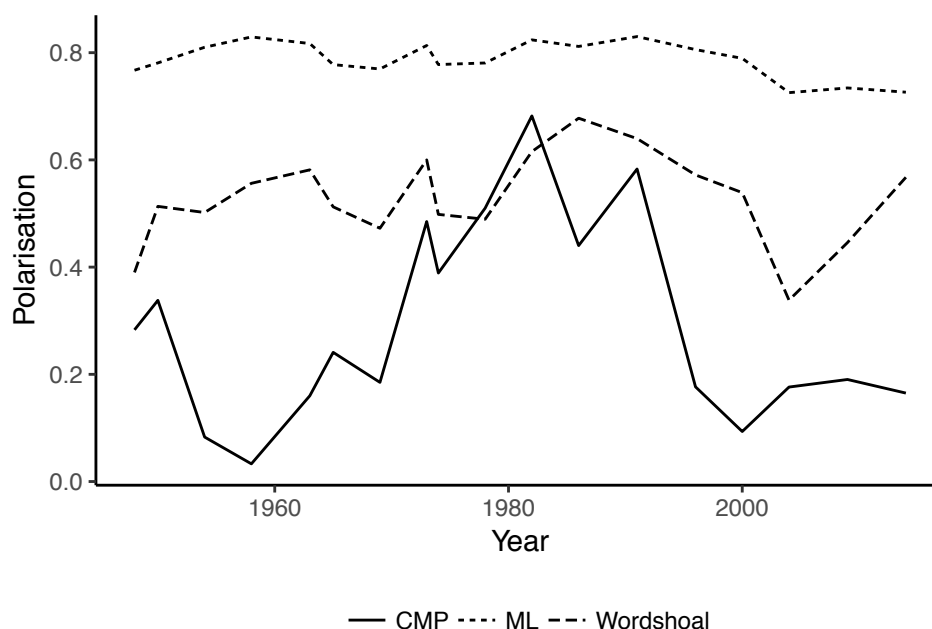


Figure 3.10: Comparison with Comparative Manifesto Project *rile* Scores

Notes: The lines in this graph represent the two different measures of polarisation based on **Wordshoal** and the SGD classifier respectively (approach described in text) for the session years that correspond with the election years covered by the CMP data. The solid line plots the absolute distance between the *rile* scores of the Labour party and the Conservative party.

Figure 3.10 presents a quick visual comparison. Here, the sessional score for the year *preceding* the election year is matched with the CMP scores.⁴⁴ This figure yields mixed results. Both the machine learning and the **Wordshoal** estimates bear a reasonable resemblance to the *rile*-based score (with the exception of 1960). The machine learning estimates however show lower levels of variation over time, suggesting greater stability in ideological conflict than either the **Wordshoal** or the CMP scores seem to suggest.

⁴⁴This choice is made to ensure that we do not include legislators elected in the new parliament in our comparison.

Test 2.2: Individual Estimates

A more promising level for comparison is that of individual estimates. Here, I compare the estimates from the different models to the 1992 wave of the British Candidate Survey (BCS) (Norris and Lovenduski 1995).⁴⁵ The BCS asks respondents to rank themselves on a seven-point ordinal left-to-right scale. I match these records from the 1992 wave—the availability of which is, of course, limited by response rates—with my own MP-level estimates. I do so for the first session of the 1992–1997 parliament, as this is closest to when MPs responded to the survey (i.e. in 1991).

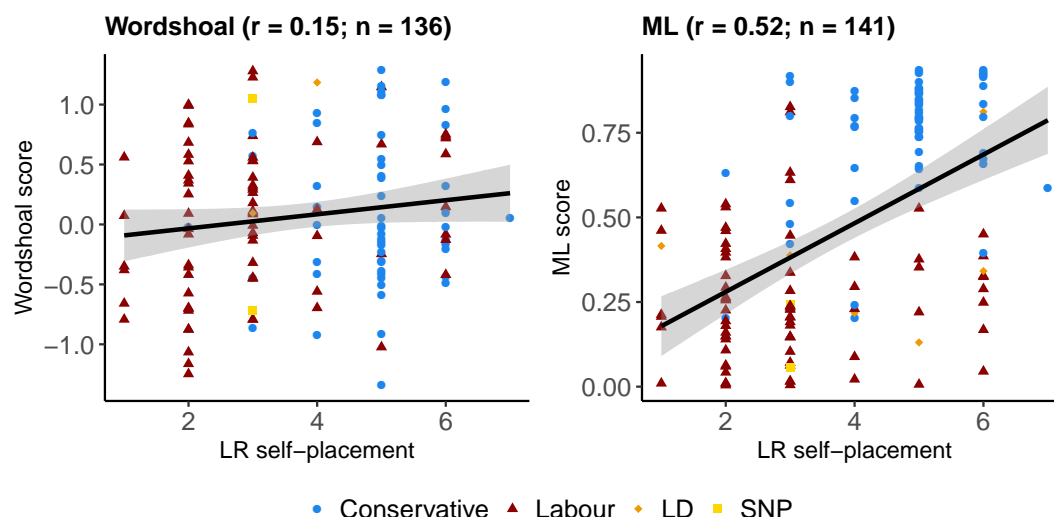


Figure 3.11: Correlation with British Candidate Survey Data

Notes: The two panels show scatter-plots and regression lines for the association between the Left-Right self-placement of surveyed members of parliament in the 1992 wave of the British Candidate Survey (Norris and Lovenduski 1995) and the individual-level estimates of the *Wordshoal* and SGD implementations respectively.

The results—illustrated in Figure 3.11—show that the convergent validity of the estimates obtained with machine learning are the highest, with a correlation of 0.56 that falls into the category of “large association” (Cohen 1988). Naturally,

⁴⁵Since 1997, data such as constituency references were taken out to ensure anonymity, so I am unable to use later iterations for comparison.

we cannot extrapolate to the full sample from the convergence between estimates from only one year, but these results are nevertheless encouraging.

3.8.3 Construct Validity

Test 3.1: Between-session Consistency

We can provide some indication of what the measures capture by considering the stability of the estimates over time: do the estimated positions reflect long-held political views of legislators, or do they represent issue-specific divergences? One way of assessing this question is to consider the correlation from one session to the next for legislators in each parliament, as shown in Figure 3.12.

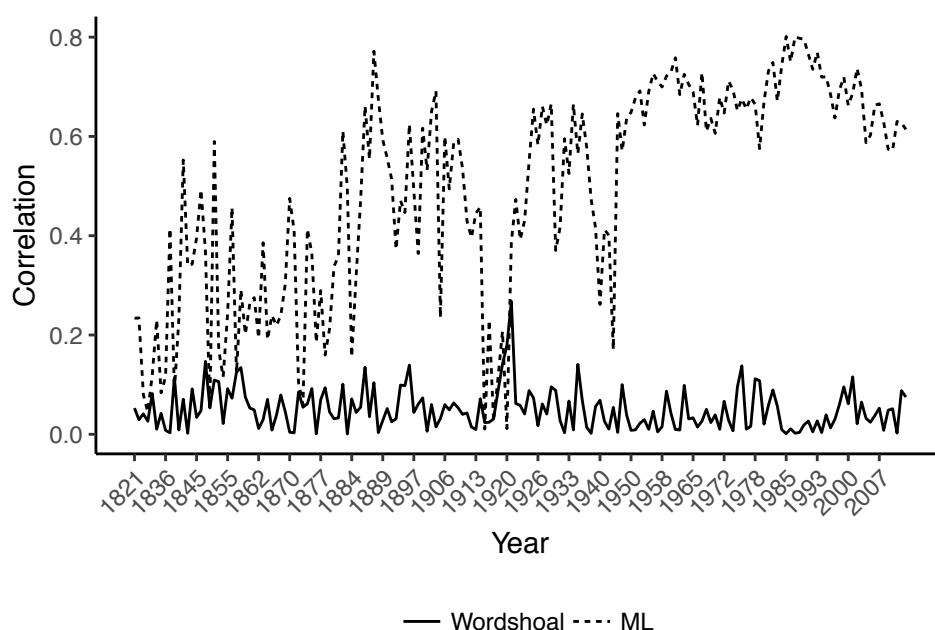


Figure 3.12: Correlation of Individual-level Estimates Between Sessions, 1811–2015

Notes: Plot of the correlation of legislators’ individual estimated position between session t and session $t + 1$.

For the SGD estimates, the average correlation between successive sessions across the sample is 0.49, and there is a steadily upward trend, with the highest level of session-to-session consistency in the 1980s. The correlations for

`Wordshoal` have mean of only 0.05, and range between $6.50\text{e-}4$ and 0.27. These results present yet another challenge to the latter measure’s validity.

Test 3.2: Individual-level Distribution

The empirical cumulative distribution function (ECDF) of individual-level estimates shows how key legislators are placed along this distribution. Here, I consider the 49th Parliament under the second ministry of Margaret Thatcher (1983–1987), and Tony Blair’s government of 2001–2005 (53rd Parliament). Figures 3.13 and 3.14 plot the ECDFs of the individual-level estimates of the machine learning approach for each session (four for each parliament). An “individual” estimate is the mean accuracy of all speeches an MP made in a session. Figures 3.15 and 3.16 plot the cumulative function of the legislator-level estimates obtained with `Wordshoal`. Here, the unit of observation is the factor score across all debates in which an MP participated, as described earlier in this chapter.

An important “visual” test of the plausibility of the two measures is whether the ECDF clearly classifies members as belonging to one party. We should not expect perfect separation in every parliament—after all, we know that polarisation varies over time—but a complete overlap of parties seems equally implausible. The machine learning estimates are clearly divided between the two major parties (Figures 3.13 and 3.14). And, key politicians in the Shadow Cabinet and the Cabinet are placed further out in the tails, as one would expect. For example, from 1983 until 1987, PM Margaret Thatcher and Chancellor of the Exchequer Nigel Lawson (as well as other key figures) are clearly out in the tails (Figure 3.13). Conversely, their counterparts for the 2001–2005 parliament, Tony Blair and Gordon Brown, are placed towards the left extreme on the spectrum (Figure 3.14).

The position of Jeremy Corbyn in these plots is also revealing of what the individual-level estimates of the machine learning approach is capturing. A priori, we would expect him to be out on the extreme left of the distribution, but he is not. Instead, the placement of Mr Corbyn vis-à-vis his respective party leaders

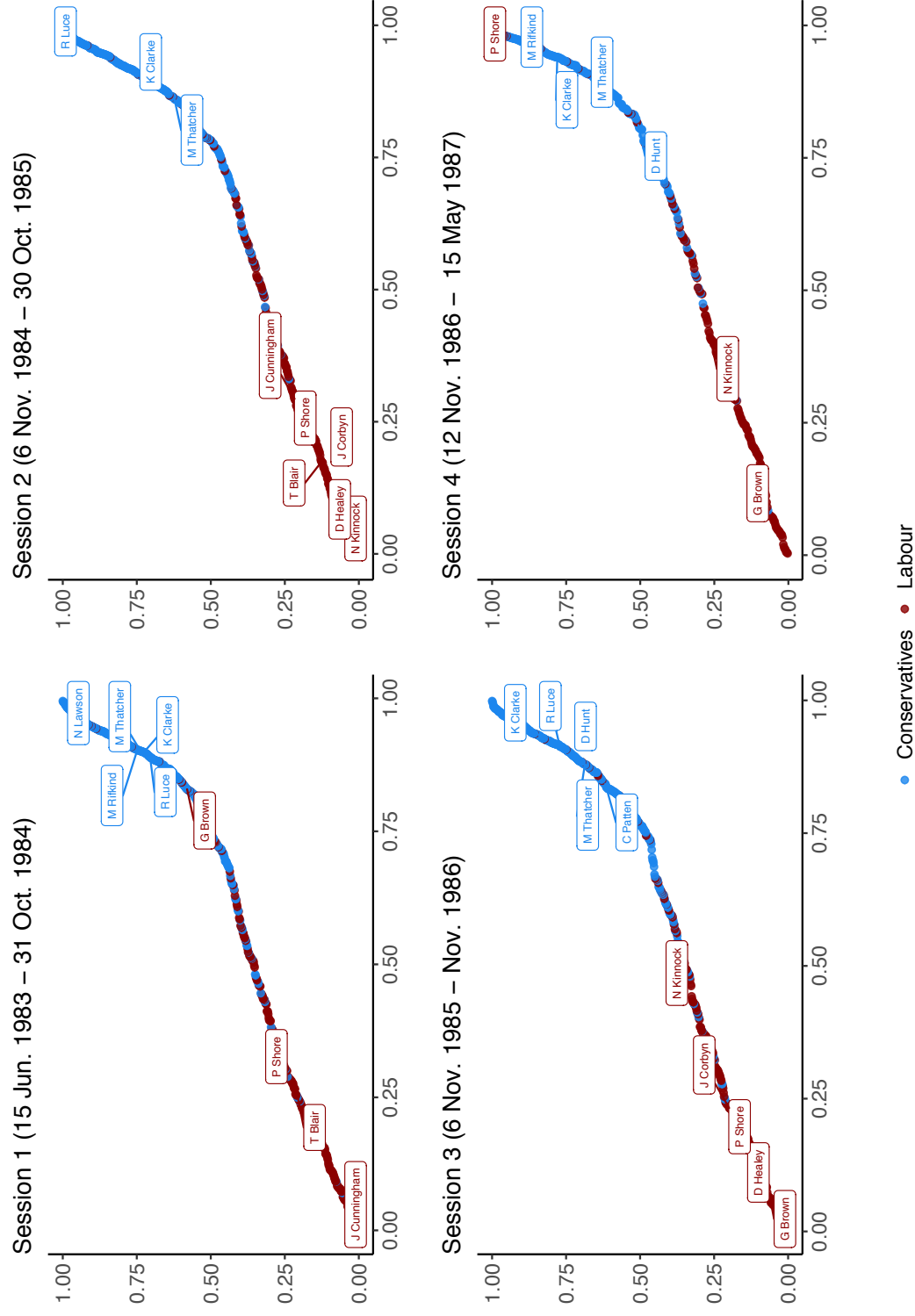


Figure 3.13: ECDF, 1983–1987 (Machine Learning)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the SGD classifier for all sessions of the 1983–1987 parliamentary term.

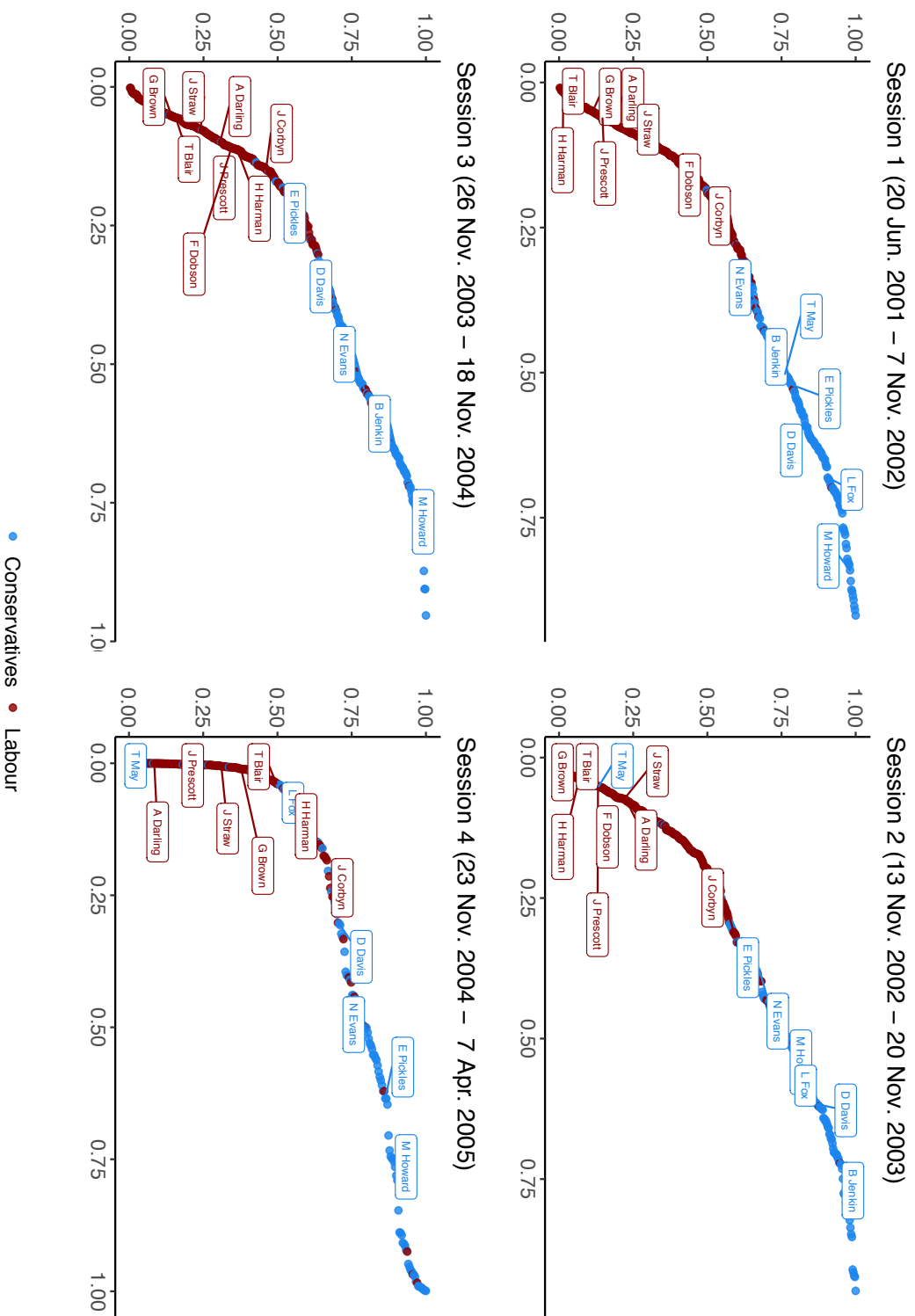


Figure 3.14: ECDF, 2001–2005 (Machine Learning)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the SGD classifier for all sessions of the 2001–2005 parliamentary term.

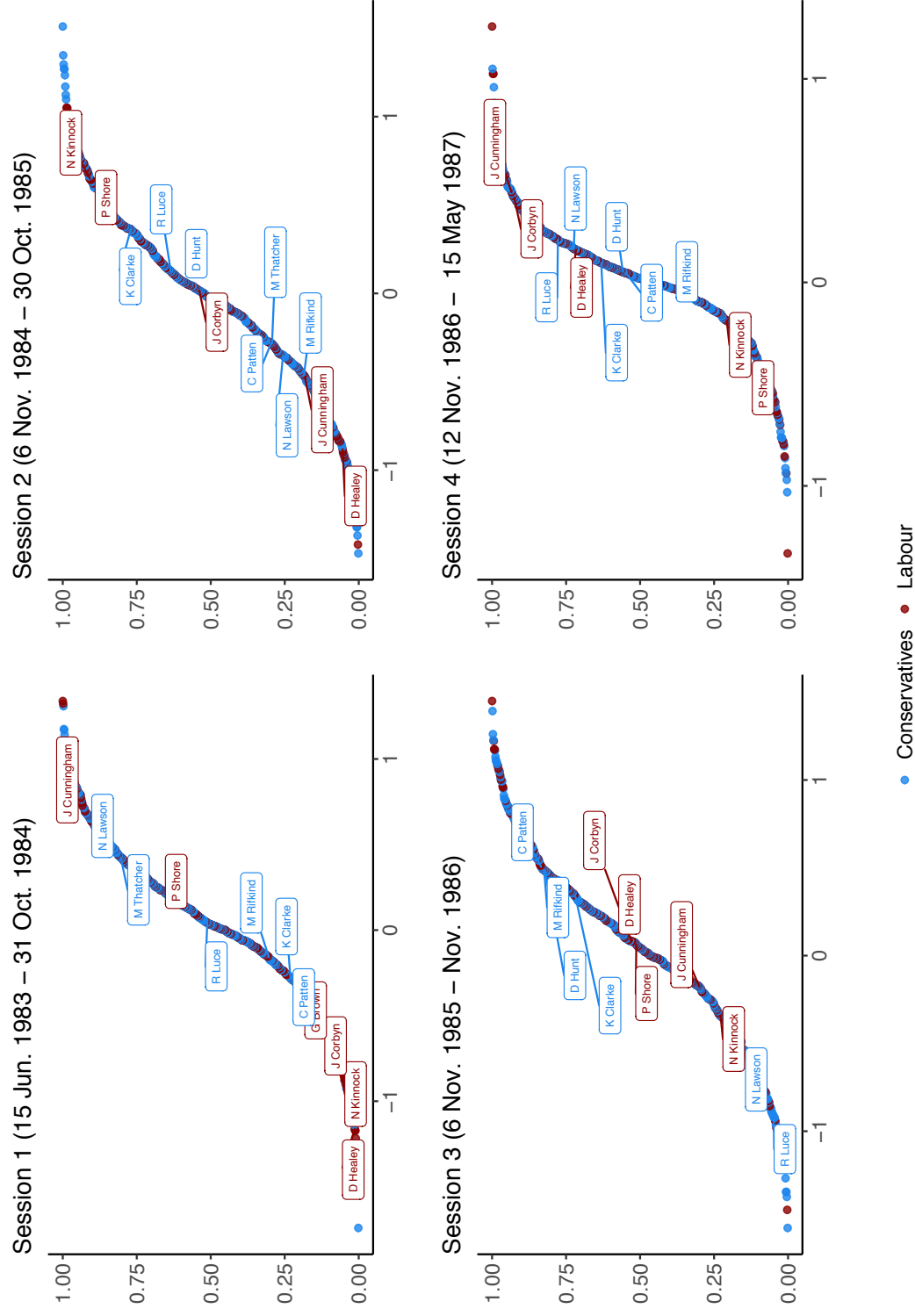


Figure 3.15: ECDF, 1983–1987 (Wordshoal)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the Wordshoal algorithm for all sessions of the 1983–1987 parliamentary term.

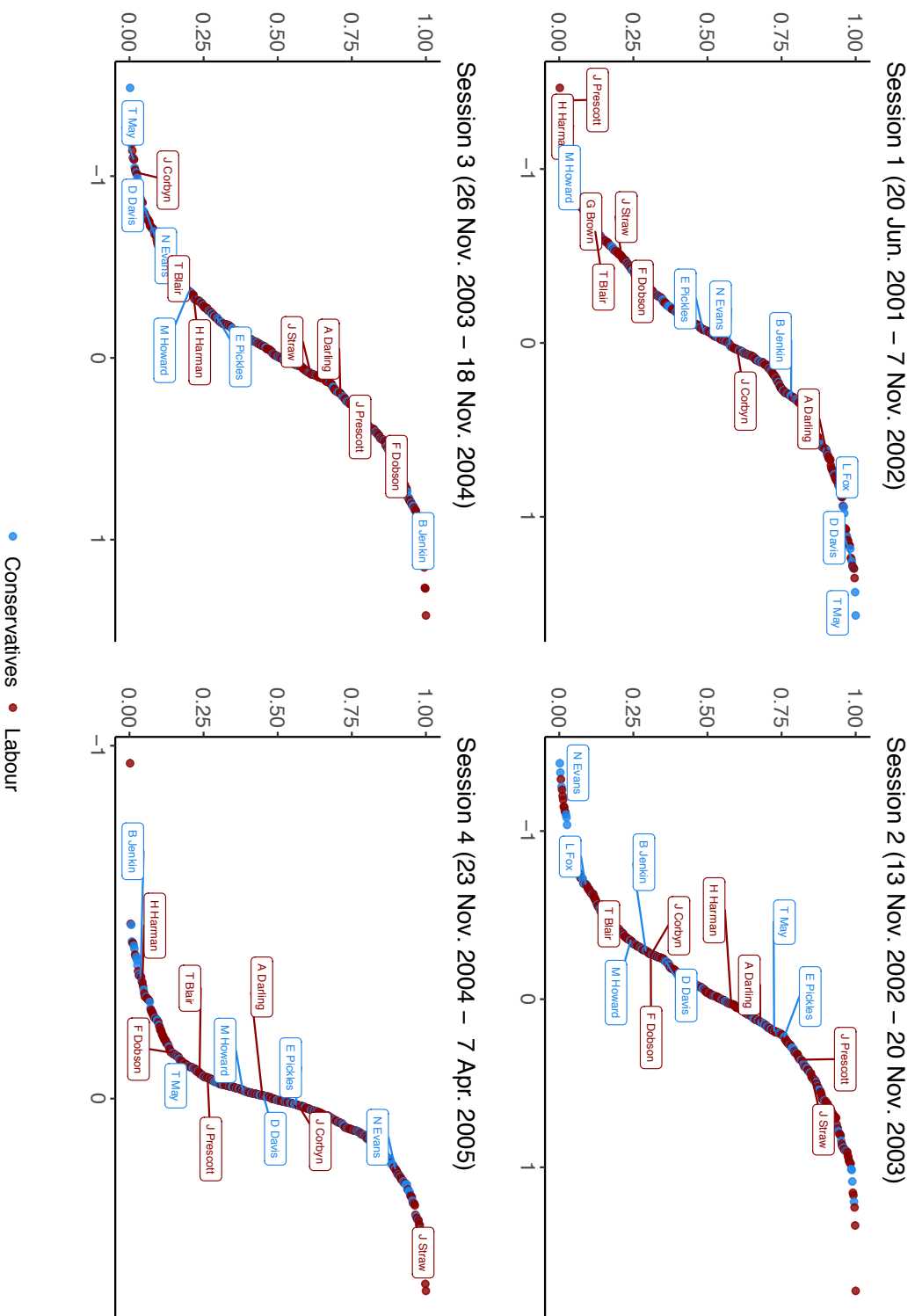


Figure 3.16: ECDF, 2001–2005 (Wordshoal)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the Wordshoal algorithm for all sessions of the 2001–2005 parliamentary term.

Neil Kinnock and Tony Blair is the opposite of what one would intuitively expect. Kinnock had his own battles with the “militant left” in his party and sought to push the party to a more centrist position after his 1983 electoral defeat to Mrs Thatcher. Subsequently, Corbyn moved closer to the centre and further away from Tony Blair’s New Labour through 2001–2005.

Corbyn’s position on this spectrum is a nice illustration of the fact that the party leadership influences our estimates: party frontbenchers are the “anchors” on the left and right of the political spectrum, and those at the extremes of their parties are pushed towards the centre. As discussed earlier in this chapter, party leaders—by virtue of their verbosity—are strong drivers of individual estimates as they exercise greater leverage on the model. The measure therefore appears to capture the consistency with which members’ views correspond with that of their party leadership.

Second, the `Wordshoal`-based estimates inspire less confidence in their validity compared to the machine learning results. Figures 3.15 and 3.16 show that key government figures drastically swap position between sessions, and that there is considerable overlap between the parties. Although I have no a priori expectations as to how concentrated the parties should be, one would at the very least expect some clustering of party members, and the separation should certainly outperform an “at-random” distribution of estimates.

Test 3.3: Explanatory Power of Party

Do these text-based approaches capture anything beyond simple government-opposition dynamics? To address this question, we can take a simple linear model for each session where we regress individual scores on their party’s mean position. These measures are plotted in Figure 3.17.

It is clear that the SGD algorithm—considering the implementation with party weights—is not simply capturing party affiliation. There is a relatively strong correspondence between party position and label, but the levels of the R^2

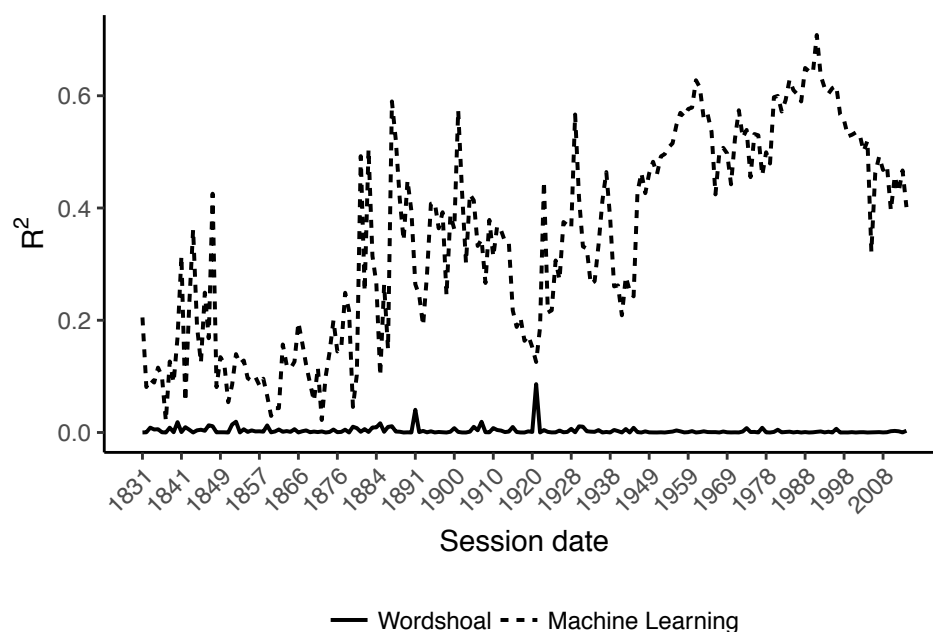


Figure 3.17: R^2 of MP-level Estimate Regressions on Mean Party Positions

Notes: Plot of the R^2 of a regression of legislators' individual estimated position on the mean position of their party in each session.

show that some unexplained variation remains. It has a mean of 0.35 across the sample, and a minimum and maximum of 0.02 and 0.72 respectively.⁴⁶

We obtain different results for the **Wordshoal** estimates. Here the range is $[4.08\text{e-}8, 0.09]$ with a mean of $3.65\text{e-}3$. These figures are implausibly low and reaffirm our finding above that the division between parties in this approach seems to be at-random rather than reflecting a clear political affiliation.

Overall, my structured comparison of the most appropriate Poisson scaling application—**Wordshoal** and the machine learning approach suggests that the latter produces the most valid measure of polarisation in the UK House of Commons over a prolonged period of time.

⁴⁶When limiting the sample to Tories/Conservatives, Liberals, and Labour, these figures are 0.32, 0.72, and 0.02 respectively. Figure 3.17 shows the estimates for the sample that includes all parties.

3.9 Conclusions

In this chapter, I have constructed the main independent variable for the empirical analysis in Chapter 6. In so doing, I have addressed key challenges that relate to the use of text-as-data to measure the historical development of polarisation in the UK House of Commons. How do we ensure that we are measuring what we want to measure? How can we validate our estimates? And, how do we deal with the high-dimensional nature of speech data? I have set out a number of strategies to address these issues. Using over 6.2 million speech records from the UK House of Commons, the findings in this chapter suggest that there are significant gains to be made by more closely considering strategies for reducing dimensionality in scaling approaches. It concludes that superior estimates are achieved employing a simple machine learning strategy that focuses on partisan language rather than latent positions and scaling methods.

My analysis suggests that *Wordfish* does not do as well because it tries to extract the first dimension of variation in language use, and there is no guarantee that this axis corresponds to the main dimension of party politics. The strength (and weakness) of the machine learning approach is that we can pin down the target that we want to capture. In many cases, we have information on that target—the party label—and we should therefore rely on this new approach to measuring polarisation.

In general terms, researchers should think more carefully about limiting the lexicon to which they apply scaling techniques to the area of substantive interest (or “dimension”) that they seek to analyse. I have suggested two strategies to do so. First, in the parliamentary context one can sift out procedural terms using an “endogenous” dictionary approach, i.e. using records of a parliament’s own procedures. Second, we can reduce the dimensionality of the semantic space by: i) lowering the level of analysis to individual debates rather than at the session level; and ii) employing a two-step dictionary approach that uses theory-informed

collections of key policy-related terms and semantic classifier algorithms to select relevant speeches.

The analysis in this chapter encounters a number of limitations. A first challenge relates to the data. Records of speeches are verbatim since 1909, and some may argue that, as a consequence, the records do not fully reflect what legislators said. This may not present major problems for the analysis, however. First, my impression from reading the non-verbatim records is that there is considerable variation in the kind of language used between speech records. Second, even if such a bias exists, it is not certain that it would adversely affect the estimates: the fact that speeches are summarised to some degree actually aids estimation rather than harms it, as irrelevant sentences and repetitions introduce noise in the estimates. However, future research should consider this challenge in greater depth.

A second criticism that may be levelled against the analysis from a data perspective is that records that have not been included in *Hansard* in the earlier period are not missing completely at random (MCAR). For example, from 1803 to 1830 debate records were reconstructed on the basis of newspaper articles, pamphlets, and other written sources. My guess is that reporters focused on speeches from all parties that had greater significance (i.e. “news value”). However, if anything, such a bias would produce more consistent estimates as it excludes irrelevant speeches that would introduce noise. Moreover, in the period after 1909, the estimation is based on speeches that we can reasonably expect to have involved a certain degree of preparation: the analysis only includes speeches longer than fifty words, and on substantive topics. The professionalisation of politics and greater media consciousness in the post-1909 political arena would induce speakers to trim down their speeches to their key message.

A more substantive limitation concerns the nature of what we are measuring. This chapter finds that using language to try and predict a speaker’s party affiliation is a superior strategy. Its strength lies in circumventing issues of dimensionality. In so doing however, we sacrifice our ability to make substantive

claims about the drivers of conflict. When we say that the House of Commons is polarised based on this measure, what is the axis of disagreement? Do MPs primarily disagree on the economy, security issues, or, perhaps, foreign policy? A solution to this issue is to first pre-select speeches on specific dimensions of interest—for example by using the two-step dictionary and classification approach I outline in Section 3.6.2—and subsequently apply the classifier. This procedure would allow researchers to analyse political disagreement on a more granular level. I leave such improvements for future work.

UK Standing Orders

Reform, 1797–2015

A New Dataset¹

Having developed the main independent variable—polarisation—in the previous chapter, I now turn to the dependent variable: anti-dilatory reform. The current chapter presents a unique new dataset that consists of *all* consolidated versions of the Standing Orders of the UK House of Commons from 1797 to 2015, reconstructed on the basis of historical records collected for this dissertation. These data allow us to, for the first time, trace at a granular level how the Commons’ procedures changed over time. Building on these data, I introduce a new hand coding scheme that analyses how amendments to the House’s rules affect the dilatory power of MPs, which is subsequently used in the empirical analysis in Chapters 5 and 6. I demonstrate several applications of my dataset, including the ability to trace the “life” of articles over time, to identify striking patterns of continuity and change, and to trace reform in specific dimensions of interest,

¹Parts of this chapter (Sections 4.1 and 4.2) have been used (in adapted form) in a working paper that I presented at the 4th Conference of the ECPR Standing Group on Parliaments, 29th June – 1st July 2017, University of Basel (Goet and Zubek 2017).

such as committee power, amendment rights, or the prerogatives of the Speaker of the House.

Working from my new dataset of 444 consolidated versions of the Standing Orders, I demonstrate several strategies to trace procedural reform, starting at the macro-level (e.g. measuring rates of changes) to the more granular level (i.e. measuring the scope of regulation). In so doing, the chapter presents a strategy for automated key feature extraction that can be used to validate results from hand coding. Using a simple text-as-data strategy that relies on the identification of key terms that discriminate between different procedures over time, I create a “local time-series dictionary” that enables me to use a much-simplified measurement strategy to identify and trace changes in key (sub)dimensions of parliamentary rules. Ultimately, I conclude that given the complexity of parliamentary rules, researchers should rely on a combination of automated measurement and human coding.

The research project is, as previous chapters have indicated, interested in the scope of restrictions faced by MPs when they engage in legislative debate. The purpose—and outcome—of this chapter is a widely applicable strategy for measuring the scope of such changes in debate regulation. Its contribution extends beyond debate rules, as the method developed here can be applied to specific areas that are pertinent to a researcher’s interests, such as committee power, government precedence, or, in this particular case, rules of debate. The chapter’s wider contribution therefore lies in advancing the use of text-as-data to investigate institutional change, the relevance of which extends to, for example, legislation, international organisations, and judicial rulings.

The rest of this chapter is structured as follows. Section 4.1 discusses the data gathering process and gives an overview of the structure of the Standing Orders dataset. Section 4.2 applies a number of simple measures to show how the UK’s Standing Orders have changed over time. Subsequently, Section 4.3 develops and applies a manual coding scheme, and presents its results. Section 4.4 develops an automated strategy to measure *substantive* changes. Throughout the

chapter, the results from the automated measurement strategies are mobilised to cross-validate the hand coding.

4.1 A New Dataset of Standing Orders and Procedural Reform, 1797–2015

The House of Commons' business has traditionally been governed by two sets of Standing Orders: ones that relate to private business and those that pertain to public matters. The former concerns the deliberation and passage of bills and other measures that apply only to specific individuals or organisations, and are beyond the scope of this study. Here, the focus is primarily on the Standing Orders that govern public business, i.e. all matters, including legislation, as they apply to the general public.²

The dataset that forms the basis of this chapter, and the further analysis in Chapter 6, consists of 444 consolidated versions of the UK House of Commons Standing Orders (henceforth: HCSOs), starting from 17 November 1797 up until 28 October 2015.³ It includes the full texts of all articles as well as resolutions and temporary orders relevant to the procedures of the House. To my knowledge, this is the first complete dataset of Standing Order reform in the UK parliament, covering 219 years of the House of Commons' history, and comprising consolidated versions for each amendment date.

My HCSO dataset includes a new version for each date on which the orders were amended, as well as for each official print of the parliamentary rules. The date of a consolidated version is defined as the date on which the amendment was

²For the purposes of the development of the dependent variable, rules pertaining to private matters are also included in the scoring for the period 1811–1880. This choice is inspired by the fact that for a large part of this period, the House's prime occupation was private business, and therefore this was the area where most rules to curb individual freedoms were first passed. In my dataset, consolidated versions on Standing Orders on private matters are not included beyond 1945; and the figures and statistics reported in Section 4.2 are based on the consolidated texts of the HCSOs for public business only.

³Data on Standing Orders goes back to 1606; see in particular the overview provided by Cobbett (1801, cols. 965–968). The current research however only includes the *written* records rather than conventions and/or informally agreed-upon rules of conduct.

passed, rather than on which it came into effect.⁴ This is because this dissertation is first and foremost interested in the factors that influence individual and collective choices about parliamentary procedures. The amendment date corresponds more closely to the dynamics at play at the time that a decision of this kind is made, and, in particular in light of my argument, to the ideological position of legislators at that point in time.

The dataset consists of two main parts. The first is a “procedural time line”—an overview in the form of a document-article matrix that marks all changes in bold and all deletions with “XXX”. The procedural time-line is organised in accordance with the different chapters of the Standing Orders (e.g. “Member’s Places”, or “Public Money”). Each row contains one (sub)article, and each column corresponds to an amendment date, i.e. the date on which a change or several changes were adopted by parliament. The overview is continuous, allowing for a comparison across the entire period, but it is split into three to accommodate the renumbering of the considerable overhauls in 1882 and in 1945.⁵ The second part of the dataset comprises the consolidated versions in Extensible Markup Language (XML) format. The major advantage of these data is that they allow researchers to automate the measurement of changes over time—a feature I make use of in this chapter.

The dataset was constructed as follows. In a first step, I compiled a list of all changes made to the HCSOs since 1797. For the period before 1902, I relied on information obtained from the House of Commons Parliamentary Papers (HCPP) website.⁶ For the period after 1902, I resorted to the summaries of amendments attached to the official printed versions. The decision as to whether a change constituted an amendment or a new article was made on the basis of these registers, on information provided by the parliamentary archives, or qualitatively if neither was available. I have included the texts of the Standing

⁴There is sometimes, but not in most cases, a discrepancy between the two.

⁵In 1882 and in 1945, the HCSO were re-organised and re-numbered in an attempt to streamline the documents and make them more efficient and accessible.

⁶<http://parlipapers.proquest.com>.

Root	17 Nov. 1797	22 Feb. 1821	22 June 1831
1	1 <input type="checkbox"/>	1 <input type="checkbox" value="A"/>	1 <input type="checkbox" value="A"/>
2	2 <input type="checkbox"/>	<input type="checkbox" value="X"/>	—
3	3 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox" value="A"/>
4		3 <input type="checkbox" value="N"/>	<input type="checkbox" value="X"/>
5		4 <input type="checkbox" value="N"/>	3 <input type="checkbox"/>
6			4 <input type="checkbox" value="N"/>
7			5 <input type="checkbox" value="N"/>
8			6 <input type="checkbox" value="N"/>

Figure 4.1: Illustration of the Construction of the HCSO Dataset

Notes: N = addition of a new sub-article; A = amendment of an existing sub-article; X = deletion of a sub-article.

Orders that were printed at the end of sessions as to ensure that the data also cover minor editorial changes that were not included in amendments. In total, the dataset consists of 444 unique texts between 1797 and 2015.

In a second step, I constructed consolidated versions of the HCSOs after each amendment, starting with the version from 17 November 1797. My work was aided by *ProQuest*'s provision of the machine-readable versions of the Standing Orders from 1843 to 2004. However, because of the abundance of Optical Character Recognition (OCR) errors, the process still mostly involved typing over the scanned PDF versions of the originals.

The construction of consolidated versions proceeded as follows (see Figure 4.1). Each sub-article in the baseline version of 17 November 1797 was assigned a unique root number. These SOs were for the first time amended on 22 February 1821. I examined the changes made on that date to identify whether any of the existing sub-articles have been amended (A) or deleted (X); in addition, I checked if any new sub-articles (N) were added and, if so, such new clauses were

assigned with new unique root numbers. This process continued for each subsequent amendment date. The structure of the final dataset is shown in Figure 4.2.

Root 1	{Date 1: {1: "Text"}}
	{Date 2: {1: "Amended text"}}
	{Date 3: {1: "Text"}}
Root 2	{Date 1: {1: "Text"}}
	{Date 2: {NA: None}}
	{Date 3: {NA: None}}
Root 3	{Date 1: {3: "Text"}}
	{Date 2: {2: "Text"}}
	{Date 3: {2: "Amended text"}}

Figure 4.2: Structure of the HCSO Dataset

4.2 Patterns and Trends

My dataset makes it possible, for the first time, to systematically examine patterns of procedural reforms in the UK House of Commons over a period spanning more than 200 years.

Table 4.1 shows how the number of amendments to the HCSOs varies by decade since the 1660s. It reveals that while there are few changes to the HCSOs before 1840s, the period from the 1840s to the 1910s includes numerous amendments to the House's internal rules of procedure. On average, one and a half amendments are passed every year during that time. The frequency of amendments is particularly high in the 1880s and 1900s. The inter-war period and the years after WWII witness a relative decline in amendment activity, while from the 1960s, there is an unprecedented increase in the frequency of procedural reforms in House. On average, almost four amendments to the HCSOs are adopted per year, with the House experiencing an especially high rate of amendment in the last two decades.

Table 4.1: HCSO Amendments, 1660–2015

Decade	Amend.	Perc.	Cum. perc.
1660	1	0.23	0.23
1700	1	0.23	0.45
1710	2	0.45	0.90
1770	1	0.23	1.13
1790	1	0.23	1.35
1820	1	0.23	1.58
1830	3	0.68	2.25
1840	11	2.48	4.73
1850	12	2.70	7.43
1860	16	3.60	11.04
1870	15	3.38	14.41
1880	26	5.86	20.27
1890	13	2.93	23.2
1900	28	6.31	29.5
1910	14	3.15	32.66
1920	14	3.15	35.81
1930	10	2.25	38.06
1940	15	3.38	41.44
1950	13	2.93	44.37
1960	26	5.86	50.23
1970	45	10.14	60.36
1980	26	5.86	66.22
1990	52	11.71	77.93
2000	61	13.74	91.67
2010	37 ^a	8.33	100

^aHalf the expected number as this includes data for 2010–2015 only.

Similar patterns are revealed when we look at the number of consolidated versions passed in each session over time. Figure 4.3 shows that Parliament adopted a greater number of new versions of the Standing Orders in each session after WWII. This similarly demonstrates a pattern of growing rates of change, particularly after the 1960s, and again in the 1990s. We observe some interesting spikes in the 1880s and the early 1900s, as one would expect given the adoption of the closure procedure (amongst other rules) and the Balfour railway timetable rules respectively (more on this below). The development of the Welfare State

(1950s), as well as the as well as the Thatcher years (1979–1990) also seem to have come with a comparatively larger number of changes.

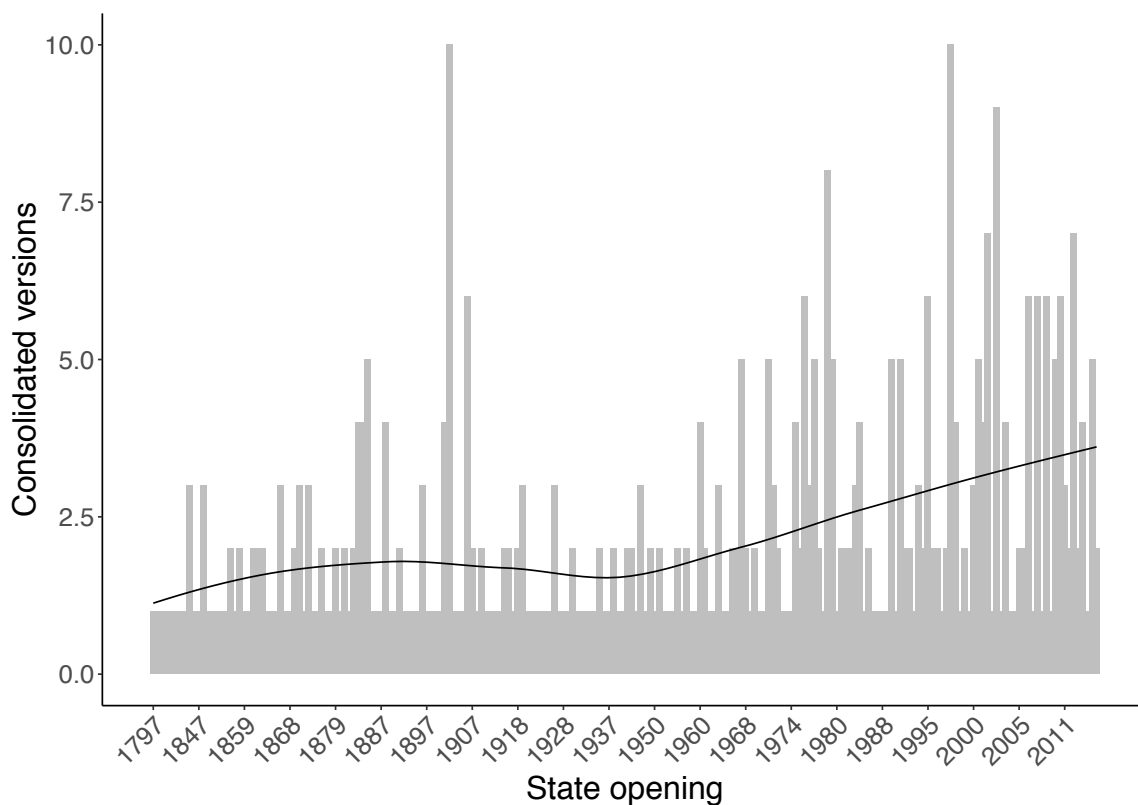


Figure 4.3: Number of Consolidated Versions of the Standing Orders Adopted, 1811–2015

Notes: Vertical grey lines represent the number of consolidated versions of the Standing Orders adopted within a session; the black line plots the Loess curve across these values.

These important transformations can be seen in a number of statistics. First, Figure 4.4 shows how the number of words and sub-clauses in the HCSOs varied between 1797 and 2015. One can observe a significant growth in text length over this period. The HCSOs contained only 256 words in 1797, but as many as 60,000 in 2015. The cross-temporal patterns of changes in word count and sub-clauses map closely onto the data in Table 4.1. Two periods of high growth can be distinguished (see Figure 4.4): the first, relatively smaller, from the mid-nineteenth century to the early 1900s; and the other, much larger, starting at

the end of the 1940s and progressing at a particularly steep rate from the 1990s onwards.

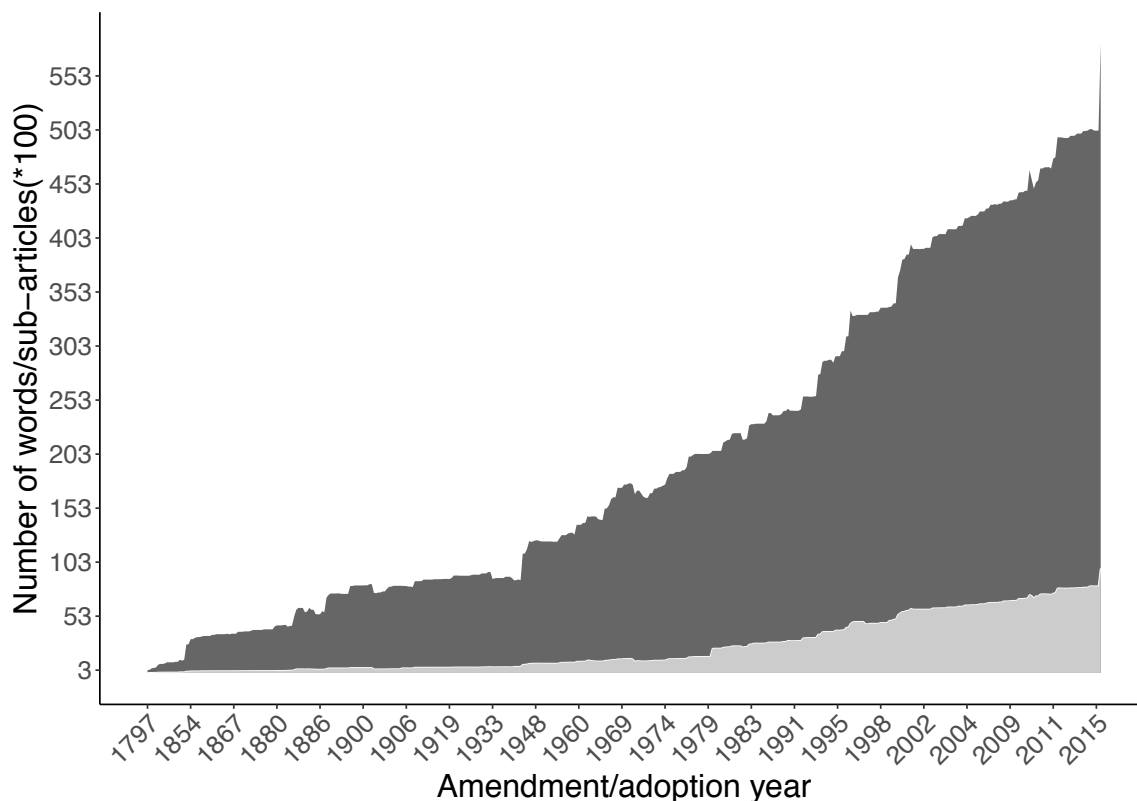


Figure 4.4: Increase in Volume of the Standing Orders, 1797–2015

Notes: The light grey area represents the number of sub-articles of the Standing Orders at session s . The dark grey area shows the total number of words.

Second, Figure 4.5 shows a measure of textual dissimilarity of each consolidated HCSO document compared to its immediate predecessor over the period 1797–2015. The measure indicates how different texts are, based on changes to letter sequences.⁷ Cases where the dissimilarity lies three standard deviations

⁷The scores are computed using the `diffli` library in `Python`, which allows the user to compute a congruence score between texts on the basis of letter sequences. The algorithm is an improved version of the standard gestalt pattern matching of Ratcliff and Metzner (1988), as it removes junk elements prior to matching. The definition of “junk” here is as follows: we take the count of occurrences of each individual item i in the sequence s . If $\sum i - 1$ accounts for more than one per cent of s , and s is longer than 200 items, i is excluded from matching (see <https://docs.python.org/2/library/difflib.html>). Here, I report the sequence similarity ratio, which is represented by the formula $\frac{2.0 * M}{T}$, where M denotes the total number of matched elements between documents t and $t - 1$, and T the total number of elements in both sequences (i.e. documents).

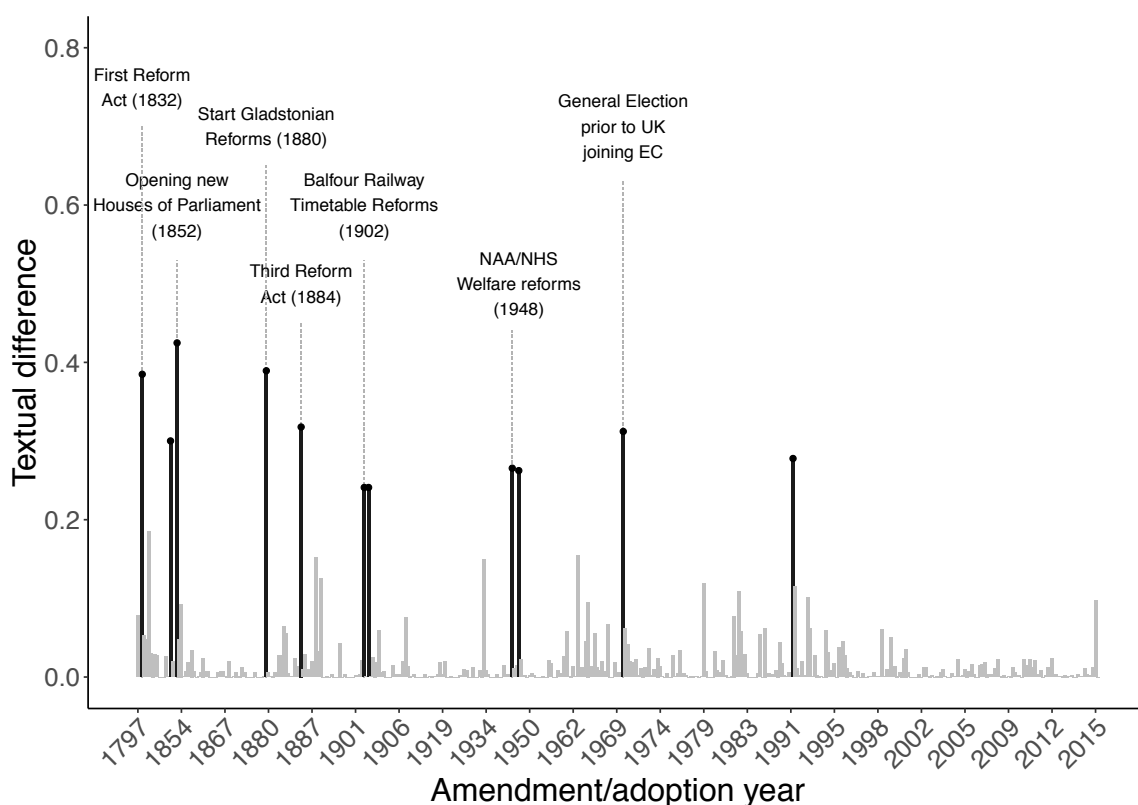


Figure 4.5: Textual Changes to the Standing Orders, 1797–2015

Notes: Vertical lines represent the degree of dissimilarity between the texts of session s and session $s-1$ for the entire sample, based on the `difflib` implementation of the Ratcliff and Metzener (1988) algorithm (approach described in text). Dissimilarity scores that exceed two standard deviations above the mean are marked in black.

above the mean in this period are marked in black; other estimates are shown in light grey. This difference score identifies a number of important episodes in the House’s history. These include the First Reform Act (1832), the introduction of the 1882 Closure Rule, and the Balfour “railway timetable” reforms of 1902 (see page 28 for a short description of these reforms). In 1948, we witness significant alterations to the Standing Orders following the welfare reforms brought by the National Assistance Act (NAA) and the introduction of the National Health Service (NHS), which brought in a range of new areas that the Commons had to legislate on. Finally, the period around the UK’s joining of the European Communities shows another spike in measured textual difference.

4.2.1 *Tracing the “Life” of an Article*

A significant feature of my dataset is that we can trace the “life” of an article over its entire existence, including its introduction, any amendments, and its deletion, if applicable. To give an example, Figure 4.6 shows one such Order—pertaining to the allocation of public money—introduced on 11th June 1713, and amended in 1852, 1866, 1966, and 1971. We can see how the scope of the article was progressively extended, but left unchanged for large periods of time (1867–1965; and 1972–2015).

We can also identify articles that show great continuity over time. The following article on trade bills—one of the earliest to be formalised by the House—was for example introduced on 29th March 1703, and survived unaltered for nearly 265 years until it was finally removed on 24th October 1967:

That this House will not proceed upon any Petition, Motion
or Bill, for granting any Money, or for releasing or
compounding any Sum of Money owing to The Crown, but in
a Committee of the whole House.

Further, the prohibition on introducing amendments at the third reading, introduced as Order 18 on 21st July 1856 has persisted throughout the years, currently present as Standing Order 77(1)⁸:

No Amendments, being merely verbal, shall be made to any
Bill on the Third Reading.

My dataset allows researchers to trace all rules in the House of Commons over a period of over 200 years at a highly granular level. I believe this to be an important contribution to the study of the House’s institutional history.

⁸The only amendment over this time period is the removal of the word “That” at the start of the order as part of a larger overhaul of the Orders on 11 February 1902.

11 June 1713	That this House will receive no Petition for any Sum of Money, Public Money relating to Public Service, but what is recommended from The Crown.				
25 June 1852	That this House will receive no Petition for any Sum of Money, Public Money relating to Public Service or proceed upon any Motion for granting any money , but what is recommended from The Crown.				
20 March 1866	That this House will receive no Petition for any Sum relating to the Public Service XXX , or proceed upon any Motion for a Grant or Charge upon the Public Revenue, whether payable out of the Consolidated Fund or out of Monies to be provided by Parliament, XXX unless recommended from The Crown.				
14 December 1966	This ^a house will receive no petition for any sum relating to the public service or proceed upon any motion for a grant or charge upon the public revenue, whether payable out of the consolidated fund or out of monies to be provided by parliament or for releasing or for compounding any sum owing to the Crown , unless recommended from the Crown.				
8 March 1971	This house will receive no petition for any sum relating to the public service or proceed upon any motion for a grant or charge upon the public revenue, whether payable out of the Consolidated Fund or the National Loans Fund or out of money to be provided by Parliament or for releasing or for compounding any sum owing to the Crown, unless recommended from the Crown.				

Figure 4.6: Tracing the “Life” of an Article (Public Money)

^aThe word “That” at the start of the order is removed on 11 February 1902.

4.3 A New Coding Scheme for Measuring Anti-dilatory Reform

In the preceding section, I have shown how my new dataset allows us to trace the life of a procedure over time, and to analyse long-term trends such as the length of documents and their textual dissimilarity. Now, the question presents itself of how we can make sense of changes at a more substantive level, i.e. in a way that in the following chapters allows us to assess the behavioural puzzle that forms the basis of this thesis: *why do members of parliament accept restrictions to their freedom in debates?* In this section, I present a new hand coding scheme that allows researchers to evaluate whether a reform enhances the dilatory power of MPs (i.e. extends their ability to stall legislative debates), or whether an alteration is anti-dilatory (i.e. reduces opportunities for extending debate). Beyond serving as a dependent variable for the empirical tests in Chapter 6, the discussion below provides some structure to the analysis and lays down in detail the kinds of rules of debate that my research focuses on. The substantive coding is in a subsequent step validated against an automated measure in Section 4.4.

4.3.1 A Typology of Dilatory Rules

For this part of the analysis, I develop a theory-informed coding scheme. The institutional rules that a parliament adopts should promote efficient and effective government. Restrictive agenda rules may have this effect (Döring 2001; Krehbiel 1991; Shepsle 1979; Shepsle and Weingast 1982), but rules that counter filibustering may also promote greater efficiency in the use of plenary time, which is a crucial resource to create legislation. Here, we are interested in the ability of the individual MP to engage in dilatory behaviour. This means we are first and foremost concerned with rules that allow MPs to extend debate, i.e. the *dilatory power* of the House's members.

The typology outlined below creates a dimension that ranges from high to low dilatory power. A useful vantage point for this part of the analysis is to think in terms of two ideal-type regulatory environments. As the term implies, a high-dilatory-power situation is one where MPs are better able to delay proceedings on

legislation. In contrast, a low-dilatory-power scenario is defined as one in which legislators do not enjoy the freedom to use debate to block the discussion and/or passage of bills. Three specific categories are formulated with a set of rules each. These include: *initiative* (**A**), *debate duration* (**B**), and *member speech* (**C**).

Table 4.2 provides a simplified version of the coding scheme. Table 4.3 includes a more detailed overview, which specifies an exhaustive list of changes that constitute an anti-dilatory reform, accompanied by a reference code that will be used throughout the dissertation, and in particular in the detailed coding overview in Table B1 in Appendix B. Table 4.3 also includes examples of reforms that correspond with the typology (rightmost column), which are drawn from Table B1.

Initiative (A)

First, the *initiative* (**A**) category looks at the ability of the MP to submit motions, resolutions or proposals that compete with the Cabinet programme for the attention of the House. Such documents provide the basis for discussion in the plenary and may be of a dilatory nature as parliament will need to spend time to either discuss the proposals, or at the very least to vote them down. This leads us to inquire into three rules that affect the delaying power of MPs: i) whether debate may be initiated freely or requires the presence of a minimum number of attendees (**A1.quorum**); ii) whether the MP can submit a certain type of bill that they wish to discuss in the first place during that specific sitting (**A2.precedence**); and finally iii) whether there subsequently are any restrictions on the tabling of that motion or bill for discussion (**A3.tabling**).

Duration (B)

Second, after the debate has started, a set of rules determine the overall *duration* (**B**) of the discussions. Again, there is scope for MPs to delay legislative business: if they can control the sitting schedule and there is a lack of firm time limits, the debate may continue indefinitely, allowing MPs to extract concessions from the

Table 4.2: A Typology of Rules of Debate (Simplified)

Dimension	Code	High Dilatory Power	Low Dilatory Power
A. Initiative	A1	<ul style="list-style-type: none"> • Quorum: Debate on a bill can proceed regardless of the number of MPs present. 	<ul style="list-style-type: none"> • Quorum: A minimum number of MPs has to be present before debate on a bill may proceed.
	A2	<ul style="list-style-type: none"> • Precedence: Any type of bill may be tabled at any sitting. 	<ul style="list-style-type: none"> • Precedence: Government bills have precedence during certain sittings.
	A3	<ul style="list-style-type: none"> • Tabling: MPs are free to propose a bill, without any restrictions. Bills are discussed in the order in which they are proposed. 	<ul style="list-style-type: none"> • Tabling: MPs may not introduce bills freely.
B. Debate duration	B1	<ul style="list-style-type: none"> • Schedule: Members can debate whenever they wish to do so. 	<ul style="list-style-type: none"> • Schedule: The floor may decide to hold a debate at a different time, or <i>ex ante</i> time frames exist at which the House convenes.
	B2	<ul style="list-style-type: none"> • Closure: Members can discuss a bill for as long as they want. 	<ul style="list-style-type: none"> • Closure: Debate can be ended through closure.
	B3	<ul style="list-style-type: none"> • Interruption: The floor cannot adjourn or otherwise postpone the debate on a bill. 	<ul style="list-style-type: none"> • Interruption: The floor can decide to interrupt a legislative debate when it wishes, upon a vote.
	B4	<ul style="list-style-type: none"> • Committee Assignment: The entire debate on the bill is held in the plenary, including debate on the general principles as well as the details. 	<ul style="list-style-type: none"> • Committee Assignment: The bill is assigned to a committee, which discusses the bill.
C. Member speech	C1	<ul style="list-style-type: none"> • Number/length: MPs may speak on any one issue as often as they wish, and for as long as they wish. 	<ul style="list-style-type: none"> • Number/length: MPs may only take the floor a set number of times, and their speeches are subject to time limits.
	C2	<ul style="list-style-type: none"> • Content: MPs are allowed to discuss any matter during discussions on a bill. 	<ul style="list-style-type: none"> • Content: Restrictions are in place as concerns the content of MP speeches.
	C3	<ul style="list-style-type: none"> • Explanatory statements: MPs who introduce a bill are free to make a statement on the proposal. 	<ul style="list-style-type: none"> • Explanatory statements: MPs may not make an explanatory statement when introducing a bill.
	C4	<ul style="list-style-type: none"> • Penalties: MPs cannot be penalised for certain types of behaviour during debates on a bill. 	<ul style="list-style-type: none"> • Penalties: MPs can be suspended if they obstruct the work of the House.

Cabinet and colleagues in return for their cooperation. Four key rules may undermine the ability of MPs to do so: i) the existence of *ex ante* time limits and a sitting schedule for conducting the business of the House (**B1.schedule**); ii) a procedure to end the debate on a specific matter on an *ad hoc* basis (**B2.closure**), iii)

the ability to interrupt debate temporarily and reschedule the discussion to a later session, allowing the chamber to continue with other business (**B3**.*adjournment*); and finally, when the debate has started iv) whether the discussion may be assigned to a committee instead of to the plenary (**B4**.*committee assignment*).

Number/Length (C)

Third, at the micro-level, there are procedures to manage the floor time of MPs themselves, and their ability to compete with the Cabinet (**C**.*member speech*). Here, we look at how rules may restrict the dilatory power of MPs directly by constraining the speeches that they make. This may be done through: i) limiting the number or length of speeches (**C1**.*number/length*); ii) restricting the content of speeches, for example by prohibiting repetition or anticipation, i.e. the discussion of matters that are already tabled for a later time (**C2**.*content*); iii) disallowing or limiting explanatory statements upon the tabling of a legislative proposal (**C3**.*explanatory statements*), and iv) removing an individual MP from the debating chamber altogether due to obstructive behaviour (**C4**.*penalties*).

4.3.2 Measuring Anti-dilatory Reform

Having developed and discussed the coding scheme used to analyse the raw HCSO data, I now turn to a discussion of its application in practice. To construct a measure of institutional change, I analyse all changes to the Standing Orders adopted between 1811 and 2015. A comprehensive overview of all anti-dilatory changes to the Standing Orders is provided in Table B1 in Appendix B, including the short-codes of the coding scheme as shown in Table 4.3.

The House of Commons adopts new rules for each yearly session—with some exceptions.⁹ I score each observed relevant change to the HCSOs using the coding scheme, comparing each successive version of the rules of each session against the immediately preceding version. The measure constructed here is a count of the reforms in the three categories developed above. The count reflects the difference

⁹No new Standing Orders were adopted in 1848, 1857, 1878, 1916, 1917, 1923, 1930, 1939–1941, and 1943–1944.

between the number of *restrictive* changes and the number of alterations that enhanced MPs' dilatory power for each session of the House of Commons.

Table 4.3: A Typology of Rules of Debate (Detailed)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
A Initiative	<i>Can a member of parliament start a legislative debate whenever they want?</i>		
A1. Quorum: Debate on a bill can proceed regardless of the number of MPs present.	A1. Quorum: A minimum number of MPs has to be present before debate on a bill may proceed.	A1.1 A quorum rule is introduced.	1902: At least 40 members need to be present for evening sittings to proceed.
	A2. Precedence: Government bills have precedence during certain sittings.	A2.1 A precedence rule is introduced.	1835: Mondays and Fridays become days on which government business has precedence.
A2. Precedence: Any type of bill may be tabled at any sitting.	A2.2 The number of sitting days on which/number of hours during which only a specific type of bills may be discussed increases.	A2.3: Private members' business is explicitly given lower priority.	2002: Not more than six Thursdays are appointed in each session on which only debates on select committees reports chosen by the Liaison Committee may be held.
			1855: The first reading (introduction of new bills) is relegated to the lowest place on the precedence list of private bill debates.

Table 4.3: A Typology of Rules of Debate (Detailed) (Continued)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
A3. Tabling: MPs are free to propose a bill or amendment, without any restrictions. Bills are discussed in the order in which they are proposed.	A3. Tabling: MPs may not introduce bills or amendments freely. The order of debate is determined by the floor/Speaker/a Minister.	A3.1: Notice has to be given, a fee paid, leave granted by the House or the Speaker, an explanation given, or seconded, before a bill or amendment may be tabled.	1967: Consent from the Speaker has to be obtained before a motion to adjourn for an emergency debate may be made.
		A3.2: The time limit, or timetable, for tabling a bill/amendment is introduced and/or reduced.	1867: Petitions against bills on provisional orders or certificates now have to be submitted within seven instead of ten days.
		A3.3: A certain type of bill or amendment may no longer be tabled altogether.	1842: The right to start a debate upon a petition is banned.
		A3.4: The Speaker/a Minister gains the power to determine the order in which items tabled may be discussed.	1888: On days on which government business has precedence, it may decide the order in which proposals are discussed.
B Debate duration <i>Can a member of parliament make a legislative debate last for as long as they want?</i>			
B1. Schedule: Members can debate whenever they wish to do so, and there is no timetable for bills.	B1. Schedule: The floor may decide to hold a debate at a different time, or <i>ex ante</i> time frames exist at which the House convenes.	B1.1: A time limit is set for the discussion of specific (types of) bills.	1980: The liaison committee gets the power to recommend specific allocations of time for consideration by the House of estimates; and these recommendations have the status of Standing Orders if approved by the House.

Table 4.3: A Typology of Rules of Debate (Detailed) (Continued)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
B2. Closure: Members can discuss a bill for as long as they want.	B2. Closure: Debate can be ended through closure.	B1.2 Less time is reserved for (specific types of) bills, or for specific sittings.	1927: The time for Wednesday sittings is reduced.
		B1.3 The government may attach a timetable to a bill.	1927: A Minister may make a motion for allocation of time for consideration of a bill, which has to be voted on within three hours after it has been made.
		B1.4: The floor has the power to impose a different schedule for debate.	1852: The floor majority may decide to have an evening session at a different time than stipulated in the Standing Orders.
		B2.1 A closure rules is introduced.	1882: A closure rule is adopted, which is passed with the support of 200 members or more/less than 40 members against and 100 or more in favour.
		B2.2 Rules are amended so that one member can propose a motion for closure.	1887: Individual MPs may now propose closure. The Speaker rules whether the motion is acceptable under the House Rules, or constitutes an infringement of minority rights.
		B2.3 Rules are amended so that a Minister can propose a motion for closure.	1968: A motion to close a debate may now be proposed by a Minister.
		B2.4 The relative number of votes necessary to close a debate decreases.	1888: The threshold for closure is reduced from 200 to 100 members.

Table 4.3: A Typology of Rules of Debate (Detailed) (Continued)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
B3. Interruption: The floor cannot adjourn or otherwise postpone the debate on a bill.	B3. Interruption: The floor can decide to interrupt a legislative debate when it wishes, upon a vote.	B3.1: A rule is introduced that allows for the postponement or interruption of legislative debate.	1980: The Speaker may now, on Friday sittings reserved for private business, motions and petitions, from 11 a.m. interrupt proceedings in order to allow for urgent questions, Ministers' statements, or personal explanations.
		B3.2 An existing rule for postponement or interruption of legislative debate is extended to pertain to more classes of bills/amendments.	1953: The rule to suspend debate in case of opposition to commencing the second or third reading on a private member's bill is extended to amended bills after the committee stage.
		B3.3 Rules are amended so that a Minister can propose a motion for interruption/postponement.	1947: If a Minister proposes a motion that proceedings on a bill are exempted from the provisions of the Standing Orders on sittings of the House, such business may not be interrupted.
		B3.4 An interruption/postponement rule may be invoked earlier and/or more often than previously.	1906: The time at which the Speaker has to adjourn the House under Art. 1 is changed from midnight to 11 p.m..

Table 4.3: A Typology of Rules of Debate (Detailed) (Continued)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
B4. Committee Assignment: The entire debate on the bill is held in the plenary, including debate on the general principles as well as the details.	B4. Committee Assignment: The bill is assigned to a committee, which discusses the bill. Assignment happens automatically, or is proposed by the Speaker or a Minister.	B4.1 A new committee for the consideration of specific business is created, <i>unless</i> it is specifically intended to promote Private members' or backbench business.	1975: A standing committee for Regional Affairs is created.
		B4.2: A specific type of business (e.g. report, bill, amendment) that would otherwise stand part of the plenary proceedings on legislation is referred to a committee.	1870: Petitions against bills on provisional orders or certificates are now also referred to committees.
		B4.3: A time limit is imposed on the committee stage.	1847: The time between the second reading and the committee stage for any bill is increased from seven to fourteen days
		B4.4 A Minister may participate in the deliberations in a committee.	1995: A minister may henceforth participate in the business of the Scottish Grand Committee, albeit without a vote.

Table 4.3: A Typology of Rules of Debate (Detailed) (Continued)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
		B4.5 A Minister/MPs is/are given the power to propose a motion to assign a bill to a committee.	1995: A member may propose a motion to re-assign a bill to the Scottish Grand Committee, after a report has been given, in the case of a private bill; so can the government in case of a public bill.
		B4.6 A committee may be discharged from considering a legislative proposal.	1948: The committee of supply may be discharged from considering the estimates in the debate on supply bills that fall under the remit of the Secretary of State for Scotland.
		B4.7 Government bills have precedence at the committee stage.	1983: If committees are charged with considering bills relating to Scotland, government bills have precedence in one of these standing committees.
C Member speech			
<i>Can a member of parliament speak as long as they want, without any topical limitations?</i>			
C1. Number/length: MPs may speak on any one issue as often as they wish, and for as long as they wish.	C1. Number/length: MPs may only take the floor a set number of times, and their speeches are subject to time limits.	C1.1 A rule is introduced that imposes limits on the number of speeches/length of speeches per member.	2014: The limit on the number of motions for amendments allowed to be debated in the final two days of the debate on the Queen's Speech is increased from two to four
		C1.2 The allowed length of members' speeches is (temporarily or permanently) reduced.	1998: When the Speaker imposes time limits on speeches, the minimum is eight minutes (instead of ten previously).

Table 4.3: A Typology of Rules of Debate (Detailed) (Continued)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
		C1.3 The number of speeches allowed per member is reduced.	1948: If a bill has been committed to a standing committee, members who are in charge of the bill, or those who have proposed an amendment or new clause, counter to the general rule, may speak more than once in the debate. ^b
		C1.4 The Speaker gains the discretionary right to set time/number limits.	1988: The Speaker may, if a large number of MPs registered to speak, impose a time limit of ten minutes on members' speeches.
C2. Content: MPs are allowed to discuss any matter during discussions on a bill.	C2. Content: Restrictions are in place as concerns the content of MP speeches.	C2.1 A rule is introduced that imposes a limit on the substance of members' speeches (e.g. matters currently under review in court, anticipation, or unparliamentary language).	1914: The Speaker has the discretionary right to rule out a discussion on the grounds of anticipation.
C3. Explanatory statements: MPs who introduce a bill are free to make a statement on the proposal.	C3. Explanatory statements: MPs may not make an explanatory statement when introducing a bill.	C3.1 A rule is introduced that disallows speakers from making an explanatory statement when introducing a bill or amendment.	1888: In case a motion to bring in a bill for discussion is opposed, the Speaker may allow brief explanatory statements from both the person opposing and the proposing member. ^b
		C3.2 The Speaker gains the right to refuse explanatory statements on an ad hoc basis.	1919: The Speaker may select a submitted amendment or clause to a bill under discussion, upon which the proposing member may give an explanatory statement. ^b

Table 4.3: A Typology of Rules of Debate (Detailed) (Continued)

High Dilatory Power	Low Dilatory Power	Anti-dilatory reforms	Example ^a
C4. Penalties: MPs cannot be penalised for certain types of behaviour during debates on a bill.	C4. Penalties: MPs can be suspended if they obstruct the work of the House.	C4.1 A suspension rule is introduced.	1880: The Speaker may propose a motion—to be decided upon by the floor—to suspend a member who ‘persistently and wilfully’ obstructs the work of the House.
		C4.2 The suspension rules (or penalties related thereto) are made more stringent (e.g. the length of the suspension period is increased; or salary is withheld for the duration of the suspension).	1998: The salary of a member who is suspended is withheld for the duration of the suspension.

Notes: ^aDetails of these reforms are provided in Table B1 in Appendix B.

^bMP-empowering reform; no anti-dilatory reform of this specific nature occurred over the time period studied.

To create the measure, I score each reform using the following marking grid¹⁰:

- +1, for each alteration to the Standing Orders that on balance *strengthens* the dilatory power of MPs in legislative debate;
- −1, for each change to the Standing Orders that on balance *weakens* members’ dilatory power in legislative debate;
- 0, for each transformation that on balance neither reinforces nor weakens dilatory power of MPs in legislative debate.

To determine the final score for each session, I analyse changes in a number of sub-dimensions for each year (Table 4.3). Subsequently, I sum across the dimensions.

4.3.3 Examples: The Gladstonian and Salisbury Reforms of 1882–1887 and Balfour’s 1902 “Railway Timetable”

Before providing some descriptive statistics of the scope of anti-dilatory reform in different sessions and across time periods, I demonstrate two applications of the coding scheme. I turn to two well-known examples of procedural reform in the House of Commons: Gladstone’s 1882 closure rule and Salisbury’s 1887 reform thereof, and Balfour’s “railway timetable” reforms of 1902.

First, the Gladstonian reforms derive from two sessions: the 4th session of the 22nd Parliament (7 February 1882–18 August 1882), and the 1887 session of the 24th Parliament (27 January 1887–16 September 1887). Based on the coding scheme, the former session has a score of −2. This is based on four reforms, in two dimensions: the closure rule is introduced (short-code **B2.1**, score = −1), a procedure for motions to adjourn debate is created (**B3.1**, score = −1), a rule is introduced that allows the Speaker to revoke floor access of a member who makes irrelevant remarks or engages in tedious repetition (**C2.1**, score = −1), and a new rule prescribes that normally only one MP may be suspended at a time (**C4.2**,

¹⁰This scoring approach follows earlier work by Schickler (2000) on the US Congress.

score = +1). Details of the reforms and coding decisions are shown in Table B1 in Appendix B.

The latter session receives a final score of -1 , as the only change consists of an amendment to the closure rule, the most important innovation of which is to allow individual MPs to propose the motion (**B2.2**). The Speaker, in turn, now has to rule whether such a motion is acceptable under the House Rules, or constitutes an infringement of minority rights. The amended procedure also precludes debate on the proposal, and allows members to make a second motion for closure on a question already proposed to the Chair.¹¹

During the 1902 session, the coding scheme identifies eight relevant reforms, six of which are anti-dilatory. These include: i) the introduction of a quorum of forty members for evening sittings (**A1.1**); ii) an extension of government business precedence (**A2.2**); iii) a restriction on scheduling business standing over from previous sittings (**A3.3**); iv) a twenty-day cap on discussions on the budget bill (**B1.1**); v) a reduction of the time for afternoon and evening sittings (**B1.2**); and vi) more frequent interruption of business (**B3.4**).

This is partially offset by two alterations that enhance the dilatory power of House members: i) MPs are now free to present a bill without an order from the House (**A3.1**); and ii) when the floor decides to interrupt business, the proceedings now automatically stand over to the evening session of the same day (**A3.4**).

The coding scheme thus allows us to evaluate the effect of procedural changes at a granular level, producing an overall score that balances MP-empowering with MP-weakening alterations.

¹¹It is important to note that it may seem that we are under-representing the scope of reform here of what is widely seen to be a significant procedural innovation in the House's procedure (see in particular Koß 2015). However, the 1887 changes were part of a larger reform agenda under the Salisbury Administration, which passed many more alterations in the 1888 session, which, scores highly on the coding scheme with a final mark of -7 . Moreover, in the empirical analysis, I turn to a binary operationalisation to address such issues.

4.3.4 Results

The dataset that I construct on the basis of this coding scheme comprises 231 observations (or: sessions) over a period of 205 years, and a total of 693 instances of change (or a lack thereof) to the rules for legislative debate in the plenary. Table 4.4 summarises the number of changes for each of the three dimensions: initiative, debate duration, and member speech. The first part of the table (“session level”) shows summations of rules that increase the freedom of MPs (+1) and those that restrict the rights of legislators (−1) for each dimension *within sessions*. In other words: the numbers reflect the total count of sessions which, when summing the positives and negatives of all within-dimension reforms, saw a decline (− column) or increase (+ column) in individual power. For example, for the initiative category, there are six sessions during which reforms made debate less restrictive; and 21 sessions that did the opposite. The second part of the table (“reform level”) provides an overview of the total number of changes on each dimension across all sessions in the sample.

A number of observations may be made with regards to Table 4.4. First, it seems that the macro-level tool of capping the duration of debate is the predominant strategy pursued by MPs witness its percentage share of both session-level (49 per cent) and reform-level changes (59 per cent). Within this dimension, most anti-dilatory changes occur through more stringent committee assignment procedures (**B4**), followed by interruption (**B3**) and schedule (**B1**) constraints.

Second, duration is followed by reforms in the initiative dimension (29 per cent of all reform-level changes). Here, most restrictions derive from tabling (**A3**) and precedence (**A2**) reforms. In contrast to the first dimension however, we see an almost equal number of empowerments to counter-act such changes. Here, reform appears to occur in both directions and is more temporally contingent.

Finally, we witness the lowest number of reforms in the “member speech” dimension (12 per cent), which comprises limitations on the number or length of speeches (**C1**), their content (**C2**), possibilities for explanatory statements (**C3**),

Table 4.4: Manual Coding Summary Statistics

Dimension	+	–	Total
Session level			
Initiative	6	21	27
Debate duration	3	34	37
Member speech	6	5	11
<i>Total</i>	<i>15</i>	<i>60</i>	<i>75</i>
Reform level			
Initiative	10	30	40
	A1: 0	A1: 2	A1: 2
	A2: 3	A2: 12	A2: 15
	A3: 7	A3: 16	A3: 23
Debate duration	8	74	82
	B1: 0	B1: 15	B1: 15
	B2: 0	B2: 7	B2: 7
	B3: 6	B3: 17	B3: 23
	B4: 2	B4: 35	B4: 37
Member speech	9	8	17
	C1: 3	C1: 4	C1: 7
	C2: 1	C2: 2	C2: 3
	C3: 4	C3: 0	C3: 4
	C4: 1	C4: 2	C4: 3
<i>Total</i>	<i>27</i>	<i>112</i>	<i>139</i>

Notes: + refers to the sum of freedom-enhancing reforms; – indicates total of anti-dilatory reforms. The short-codes (i.e. **A#**, **B#**, and **C#**) correspond to the codes included in Table 4.3 on page 172.

as well as individual-level punishment mechanisms (**C4**). Although most changes appear to centre on the number/length category, such reforms occur in both an empowerment and disempowerment sense. In contrast, the main vehicle for enhancing individual prerogatives appears to be an extension of the opportunity to use explanatory statements.

The distribution of reforms over time also produces some noteworthy results. The bubble plot (Figure 4.7) shows the size of restrictive change along all three dimensions over time summed within sessions. The scores have been reshaped

by $(-value) + \text{abs}(\min(-value))$ so that the session $s_{max(+)}$ with the highest number of freedom-enhancing changes is at 0 (and is therefore represented by the smallest bubble); and the session with the most restrictive changes $s_{max(-)}$ has the highest value (represented by the largest bubble).

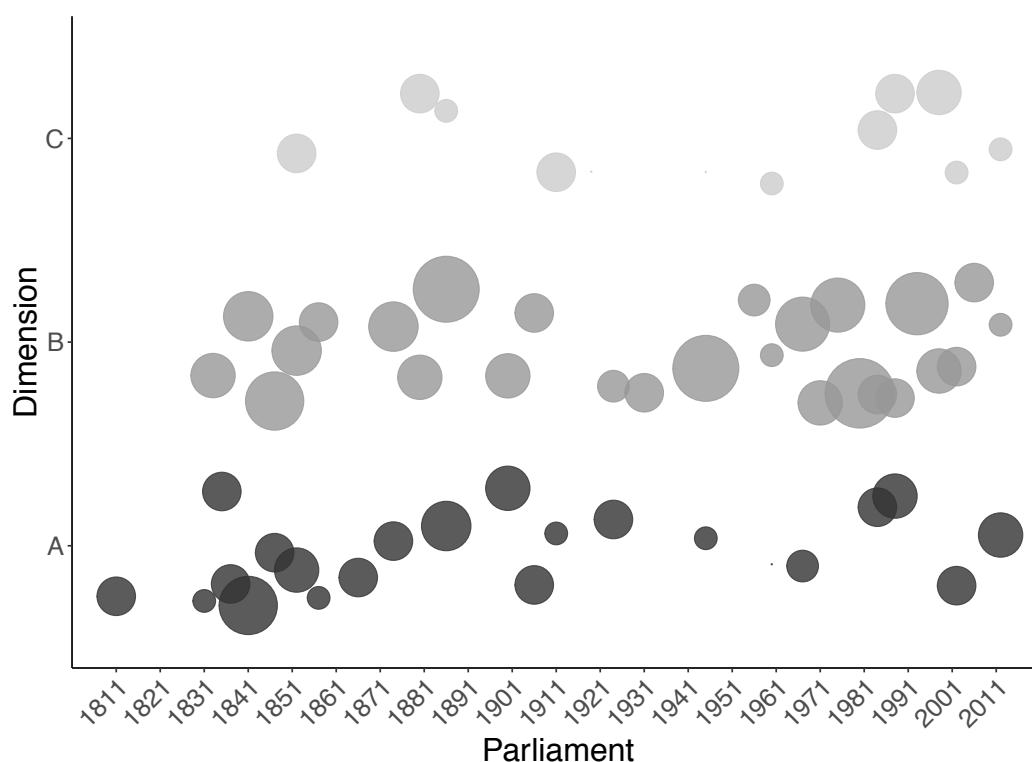


Figure 4.7: Bubble Plot of Manual Coding Results, 1811–2015

Notes: Bubbles reflect the scope of restrictive change, where the session with the most freedom-enhancing reform is set at zero, and that with the most restrictive changes at the maximum positive integer. The bubbles are jittered vertically to aid readability. The short-codes (i.e. **A**, **B**, and **C**) correspond to the codes included in Table 4.3 on page 172. The x-axis labels correspond to parliament numbers (e.g. 50 = 50th Parliament (1987–1992)), as also listed in Table A1.

Figure 4.7 reveals a number of patterns. First, there is interesting variation over the entire time period: we observe both clusters of larger reforms, intermittent smaller changes, and short periods of procedural stasis. Judging from the concentration of bubbles, there is a flurry of activity at the start of the mid-nineteenth century, driven by reforms in the initiative (**A**) and debate duration (**B**) categories. The procedural changes of the late-nineteenth century

are followed by a short period of relative calm, succeeded by major alterations in the 1970s, 1980s, and 1990s. Second, the plot clarifies that serious reforms only began at the time of the Great Reform Act, at the start of the tenth Parliament (1831–1832), and prior to that period were limited to the initiative dimension: we see in the plot that prior to 1831 the only reforms occurred in that category, witness the single bubble in the bottom row labelled “**A**”.¹²

Having identified substantive reforms on the basis of a close reading of procedures, in the following sections I move to (semi)automated measurement of procedural reforms as part of a cross-validation exercise to validate the manual coding.

4.4 Automated Cross-Validation: Lessons and Challenges

Hand coding of texts presents two challenges (e.g. Krippendorff 2004; Neuendorf 2002; Weber 1990). First, it is difficult to develop a theory-informed coding scheme that is comprehensive yet parsimonious. It often either requires (over-)simplification of key concepts, or the creation of coding rules that are too granular to produce comparable results across different contexts. This is especially the case when evaluating parliamentary rules, which are both highly detailed and complex. Second, there are significant costs associated with the coding process itself: it is time consuming, requires multiple coders, and often produces results with low inter-coder reliability.

Automated measurement of changes to some extent solves these issues, but raises new ones (for a helpful discussion of these problems, see Grimmer and Stewart 2013). As has also been made apparent in the previous chapter, the use of text-as-data presents us with a low signal-to-noise ratio, and considerable post-hoc validation costs. Moreover, the human brain is able to judge textual changes in a more substantive way, by considering associations, synonyms, as well as the consequences of choosing one particular term over another. Conversely, computerised measurement of differences between texts is usually limited to estimating

¹²This chimes with work by Cox (1987), who shows that early nineteenth-century changes in the House related to precedence for the government, tabling, and similar procedures.

similarity scores to matrix representations of word frequencies. Important variation gets lost in the process.

How then, can we move to a more accurate representation of “change” when using text-as-data? Here, I propose a semi-automated feature extraction strategy that relies on the Standing Orders texts that we seek to analyse that can be used to cross-validate manual coding. In simple terms, the strategy includes two steps: i) the automated construction of an “endogenous local time series” dictionary that includes procedural terms; and ii) an assessment of changes to the composition of the dictionary over time.

In so doing, I combine traditional dictionary approaches with insights from natural language processing (NLP). In simple terms, I apply a term frequency-inverse document frequency (TF-IDF) transformation to a term-document frequency matrix of linguistically meaningful n-grams and subsequently extract phrases that have a high TF-IDF weight. The ranked dictionary is subsequently used in combination with a much-simplified manually constructed dictionary that corresponds to the main dimensions of the manual coding scheme to assess what new procedures are added and/or what existing rules change and/or disappear.

4.4.1 Stage 1: Automated Local Dictionary Construction

A first challenge that a researcher faces when investigating institutional change on the basis of a dictionary is term selection, or “feature extraction”. Which words should we include and/or exclude to ensure that, when we apply the dictionary to a sample of texts, we measure the phenomenon of interest? If we are interested in studying only one or a few years of parliamentary rules—or any type of regulation for that matter—a close reading of the documents in question would suffice to formulate a collection of key terms. When, however, we are faced with documents that span over two centuries, this task becomes a little less manageable. The use of procedural language is historically contingent, and we would therefore have to construct multiple dictionaries.

Here, I propose an automated method to create a tailor-made, time-variant dictionary. The main challenge addressed in this section is that of how to extract *meaningful* phrases. For example, “**the House**” is a phrase that finds general use among across procedures, but also in, for example, parliamentary debates. It is not specific to what we might call the “procedural corpus” of terms; and, more importantly, not to a particular procedure within the Standing Orders. Instead “**adjournment of the House**” is definitively a procedural expression, as it invokes both a specific parliamentary rule, and one that imposes a constraint on further proceedings in the House.

Addressing this broader challenge of identification involves two criteria. First, we need to make sure that the terms we include *uniquely identify core procedures from the Standing Orders*. In other words: the terms that we include should be strong indicators of specific parliamentary rules, such that their use is indicative of one particular procedure and not of another. Second, because we use the top-ranked phrases to subsequently assess compositional changes to the dictionaries, such n-grams need to be meaningful from a linguistic point of view *prior* to identifying terms that are indicative of specific procedures. The following two subsections set out a dictionary construction strategy that meets both criteria effectively,

4.4.2 Endogenous Term Selection

First, within the Standing Orders, we are interested in terms that distinguish uniquely between individual orders. We need to minimise the rate of false positives, and establish terms that with a high degree of probability are an indicator of a particular procedure. In other words: we need to establish a probability of the degree to which, in case of a match of our dictionary term with a speech, the phrase (defined as a sentence) is actually related to the topic that the n-gram represents.

An intuitive way to think about this is in terms of mixture or parametric cluster models for the identification of topic membership (e.g. McLachlan and Peel

2000). In contrast to more recent mixed-membership models such as LDA (Blei, Ng, and Jordan 2003), a mixture model assigns a text to its highest probable topic rather than generate a probability distribution across topics. The binary topic allocation in mixture models is thus based on the topic membership of the word. With this in mind, at the first stage, I attempt to pin down terms that uniquely identify a specific rule, here defined as a sub-article.

First, I create n-grams based on the consolidated versions of the Standing Orders from my dataset. Here, I include tri- and four-grams. Most applications of text analysis models in the social sciences use uni-gram bag-of-words (BoW) representations of texts when analysing text corpora (e.g. Monroe, Colaresi, and Quinn 2008; Quinn et al. 2010; Slapin and Proksch 2008). We know, however, that phrases lose their meaning when used in isolation. For example, the word “aliens” has very different connotations from the phrase “illegal aliens”. Moreover, the use of pluri-grams ensures that more commonly used phrases that are not necessarily procedural are excluded.

Subsequently, I consider the discriminatory power of our n-grams between articles of the HCSO as a criterion for their inclusion. For each consolidated version, I apply a `Python` script to convert the text to n-gram-frequency matrices. I establish this by applying a count vectoriser with TF-IDF transformation, and selecting those n-grams that have the highest weights (for a description of the TF-IDF weighting procedure, see page 129 of Chapter 3).¹³ In other words: we treat the dictionary D as a distribution of terms, where each term k is weighted by how strongly it discriminates between articles. In the code, the top two n-grams are retained, ranked according to their TF-IDF weights in descending order.

4.4.3 N-gram Pre-processing: Effective Noun-phrase Extraction

Prior to running the TF-IDF transformation, we need to ensure that the terms we include are substantively meaningful phrases, defined in terms of their grammatical construct. I take a natural language processing (NLP) approach to iden-

¹³For an alternative approach, see Monroe, Colaresi, and Quinn (2008), who identify key discriminatory terms on the basis of a z-score ranking procedure.

tify relevant terms on the basis of the grammatical composition of sentences using **phrasemachine** (Handler et al. 2016). **Phrasemachine** applies an advanced pattern-based extraction algorithm that includes PoS tagging that is implementable in **Python**. It allows for coarse pattern matching of phrases to a pattern-based grammar criterion.

This part of the process consists of, after extraction of the terms, a term-covariate ranking of the n-grams based on Part-of-Speech (PoS) tagging (c.f. Justeson and Katz 1995; for practical applications, see e.g. Bamman and Smith 2014; Chuang, Manning, and Heer 2012). This process is based on a set of three parameters (c.f. Handler et al. 2016): (G, K, M) where G = grammar, K = the maximum length of the phrase, and M = the matching strategy. Here, I use the standard version of the **SimpleNP** grammar, which is designed to identify noun-phrases only (cf. Handler et al. 2016, p. 2):

$$(A|N) * N(PD * (A|N) * N) * \quad (4.1)$$

The **SimpleNP** grammar allows for noun-phrase extraction. It is defined over a coarse tag set (Petrov, Das, and McDonald 2011) that includes: adjectives (A), nouns (N , both common and proper), prepositions (P), and determiners (D). Here, $K = 4$, as we extract n-gram phrases ranging from $n = 3$ to $n = 4$. The matching strategy M relies on the **FilterFSA** method: this algorithm compiles G such that there is a finite-state-automaton (FSA), and subsequently, it matches n-grams against the “state”. Examples of n-grams that are included and their corresponding PoS patterns are provided in Table 4.5.

After the application of **phrasemachine**, the rest of the algorithm is implemented. Overlaps between n-grams are also addressed: longer representations are retained as we wish to retain as much information as possible. Table 4.6 provides examples of two dictionaries, both prior to and after the application of **phrasemachine**.

Table 4.5: N-Gram Selection - Examples of PoS Patterns

Pattern	Abbrev.	Examples
Noun-preposition-noun	(NPN)	“closure of debate”; “notices of motions”, “interruption of business”
Noun-preposition-article-noun	(NP*N)	“suspension from the House”, ‘adjournment of the house’; “orders of the day”
Proposition-article-noun-preposition	(P*NP)	“under the provisions of”, “on the motion of”
Preposition-noun-preposition-noun	(PNPN)	“without amendment or debate”

4.4.4 The Dictionary Generation Algorithm in Practice

What does the process look like in practice? Table 4.7 provides an example of how we get from the raw data to a dictionary on the basis of two articles from the version of the Standing Orders from 12 August 1850. The articles are as follows:

Art. 1: That no Notice shall be given beyond the period which shall include the Four Days next following on which Notices are entitled to precedence; due allowance being made for any intervening **adjournment of the House**, and the period being in that case so far extended as to include **Four Notice Days** falling during the **sitting of The House**.

Art. 2: That the **Committees of supply** and Ways and Means shall be fixed for Monday, Wednesday, and Friday, and for any other day on which **Orders of the Day** shall have **precedence of [Notices] Notices of Motions**, of which Notice shall have been given on the preceeding Friday.

Key phrases extracted by the script are marked in bold and red. These were obtained while accepting n-grams within the range [3,4] and by applying `phrasemachine` prior to vectorisation. Table 4.7 shows the distinct steps in the dictionary-generating process. The first column includes the terms that are generated by comparing n-grams between the two articles and ranking terms by their

Table 4.6: Dictionary Examples (Ranked)*

Date	Terms
1850-08-12	<p>Without phrasemachine</p> <p>immediate remedy the, imposing tax or, in any part, in breach of, in distinct clause, in it and, in relation to, in such petition, in that case, in the case, if any motion, house not being, house or any, house or committee, house shall think, house to entertain, house while the, house will receive, include four notice, it and of, it and to, it comes of, it may be, it ought to, law be expressed, lie on the, made for any, is sitting and, is from the, into custody be, include the four, into any other, into any part, into discussion on, into his custody, into this house, house for any, house do presume, friday and for, from the crown, from time to, from whom it, further day as, gallery shall misconduct, give to the, given beyond the, given on the, four notice days, for any public, for any sum</p> <p>With phrasemachine</p> <p>stranger into any part, notices of motions, table by the direction, privileges of this house, committees of supply, relation to such petition, vote of the house, number of signatures, clerk at the table, direction of the speaker, hour of prayers, seat in the house, four notice days, directions to the doorkeepers, bill before the house, charge upon the people, day as the house, address to the crown, such further day, case of such petition, motion for an address, sitting of the house, time to time, discussion on the presentation, prayer of such petition, precedence of notices</p>
1950-12-07	<p>Without phrasemachine</p> <p>yet to be laid, if not shall, if not previously, if no have, if mr speaker, if motion to, if motion made, if motion been, if member or, if leave is, if on an, if such be, if standing committee, if so directed, if so desired, if received not, if proper to, if parliament be, if or if, if on the, if on division, if on day, if it had, if after any, hundred in the, hundred as the, however in the, how much the, house within reasonable, house with whereby, house with the, house will receive, house will not receive, house will not insist, house while the, house which reference, if agreed to, if during the existence, if in his, if his opinion, if he it, if he is satisfied, if he is not, if he fit call, if given by, if during the consideration, if any member be, if division place, if at any sitting, if any such petition</p> <p>With phrasemachine</p> <p>petitions against any resolution, the proceedings on bill, suspension from the service, the government business, all standing committees, voce in the house, proceedings on that business, house of the power, hour after that motion, proceedings on the reports, business in the case, ground of public accounting, respect to each resolution, such navy army, business if the consideration, witness under examination, order considerations of lords, pursuance of this order, deliberations of the committee, day as the house, arrangement of business, committee of lords, question that the question, opinion to the house, members to the provisions, members from time, consideration of such bill, house for specified period, two last days, close of the proceedings, end of the bill, business under discussion, money except the committee, words of the clause, committee during the consideration, absence to members, amendment to any clause, house within reasonable time, government for the conveyance, business whether orders, relates to the committee, reports from the committee, call upon any member, issue of money, prevention of offences, progress in committee, third readings considerations, consideration of the clauses, consideration at ten, business petitions orders</p>

*Capped if $n > 50$.

TF-IDF weights without `phrasemachine`. It includes all terms that would have been included without such pre-processing, as well as the terms that would be retained were this to be a substantive application of the dictionary-generating process. Excluded terms are marked with strike-through font.

The rightmost column shows the dictionary that we obtain, with n-grams ranked by article. When we compare this with the original two articles above, we see that the script has identified what a human coder might consider key phrases relating to the procedures. The first article sets the rules as to giving notice. The script identifies the restrictions of this rule quite well, including n-grams that mention adjournment and orders of the day for the first article. Similarly, the second article is identified on the basis of phrases relating to precedence, and notices of motions—which both appear to be key aspects of the rule.

Table 4.7: Dictionary Construction (Examples)

Phrasemachine application	Final (ranked)
<p>which shall include the, four days next following, for monday-wednesday and, for any other day, for any intervening adjournment, following on which notices, fixed for monday-wednesday, far extended as to, falling during the sitting, extended as to include, entitled to precedence due, four notice days falling, friday and for any, monday-wednesday and friday, means shall be fixed, made for any intervening, intervening adjournment of the, include the four days, include four notice days, in that case so, house and the period, have precedence of notices, have been given on, given on the preceeding, given beyond the period, during the sitting of, due allowance being made, as to include four, are entitled to precedence, any other day on, any intervening adjournment of, and ways and means, and the period being, and means shall be, and friday and for, and for any other, allowance being made for, adjournment of the house, days next following on, days falling during the, day shall have precedence, day on which orders, committees of supply and, case so far extended, beyond the period which, being made for any, being in that case, been given on the, the four days next, the day shall have, the committees of supply, that the committees of, that no notice shall, that case so far, supply and ways and, so far extended as, sitting of the house, shall include the four, shall have precedence of, shall have been given, motions of which notice, which orders of the, which notices are entitled, which notice shall have, wednesday and friday and, ways and means shall, to precedence due allowance, to include four notice, the sitting of the, the period which shall, the period being in, shall be given beyond, shall be fixed for, of supply and ways, of notices of motions, of motions of which, notices of motions of, notices are entitled to, notice shall have been, notice shall be given, notice days falling during, no notice shall be, next following on which, other day on which, precedence of notices of, precedence due allowance being, period which shall include, period being in that, orders of the day, on which orders of, on which notices are, on the preceeding friday</p>	<p>Art. 1:</p> <ol style="list-style-type: none">1. adjournment of the house2. orders of the day3. four notice days4. sitting of the house <p>Art. 2</p> <ol style="list-style-type: none">1. precedence of notices2. notices of motions3. committees of supply

Terms in strike-through font removed by `phrasemachine`; **red** terms derive from the endogenous part of the dictionary-generating process.

4.4.5 Step 3: Automated Measurement of the Restrictiveness of Regulation

The usefulness of a dictionary is of course dependent on its context, or in the words of Grimmer and Stewart (2013, p. 8): ‘when dictionaries are created in one substantive area and then applied to another, serious errors can occur.’ My dictionary has two major advantages over often-used exogenous dictionaries. First, the terms included are endogenous to the institution to which it is applied: parliament. Parliamentarians formulate and adopt the Standing Orders, and they relate directly to the level at which we measure regulation. Second, the dictionary evolves over time just as the House of Commons develops and institutionalises. For each (part of a) parliamentary session, we have a dictionary that applies to it temporally. Consequently, we have collections of terms that are directly applicable to the analysis.

To establish the level of procedural constraints over time, we consider the composition of the dictionary extracted by the algorithm. First, we establish a very simple and therefore easily replicable dictionary of terms that relate to each dimension included in the manual coding scheme (see Table 4.8). Second, we sort the n-grams into these dimensions based on their inclusion of these terms, and count the occurrence of dimension-related n-grams over time for each dimension separately. The idea behind this process is that when an important new procedure is introduced, the TF-IDF weight value will identify a new key term, as it will first make its entry as a new *article* or as an (important or not) addition to an existing clause.

Table 4.8 constructs three sets of key terms that relate to each dimension. To ensure that the results are replicable and remain—as far as possible—unbiased as regards term selection, I use the terms that describes the sub-dimensions identified in the manual coding scheme **unless** such terms are highly unlikely to be used in procedures.

Table 4.8: Identification Dictionaries for Procedural Change

Dimension	Sub-dimension dictionary
Initiative	A1: quorum A2: precedence, government business, government on {monday, tuesday, wednesday, thursday, friday} A3: table, tabling, notice*
Debate duration	B1: schedule*, day*, hour*, clock, discussion at, noon B2: close, closure B3: interrupt*, adjourn* B4: consideration in committee, assignment to
Member speech	C1: number of speakers, {one,thirty} minute* C2: irrelevance, repetition C3: explanatory statement* C4: suspended from, suspension, disorderly, conduct

Notes: If a word ends with “*”, it is included both in singular and plural form. Words included in curly brackets indicate the combinations used (e.g. government on monday, government on tuesday, etc.); in the case of numbers, the used combinations include all number within the range (e.g. one minute, two minutes, three minutes on, etc.).

Feature selection is often arbitrary (e.g. King, Lam, and Roberts 2017). The advantage of my two-step approach is that, after automated identification of key features (i.e. the dictionary extraction step), the identification strategy can rely on much shorter, simpler, and therefore more replicable collections of key terms, while throwing out many terms that are not meaningful and would therefore produce false positives.¹⁴

¹⁴The rules of dictionary construction of course still apply, meaning that the researcher needs to be knowledgeable of the context in which it is applied. For example, the inclusion of **penalty** or **penalties** in **C4** (Table 4.8) would generate false positive only, as these terms are used to refer to cases where a bill imposes a fine (i.e. pecuniary penalties/pecuniary penalty).

4.4.6 Results: Cross-Validation with Manual Coding

Before turning to the results, let us summarise the approach. We obtained the estimates that follow below through four simple steps for each consolidated version of the Standing Orders: i) the application of **phrasemachine** to extract meaningful terms from the document; ii) the vectorisation of these meaningful terms using the TF-IDF transformation treating each sub-article as a document; iii) selecting the top-two most discriminatory terms for each sub-article and the construction of a local dictionary of these n-grams; iv) counting the occurrence of dimension-related terms in this dictionary.

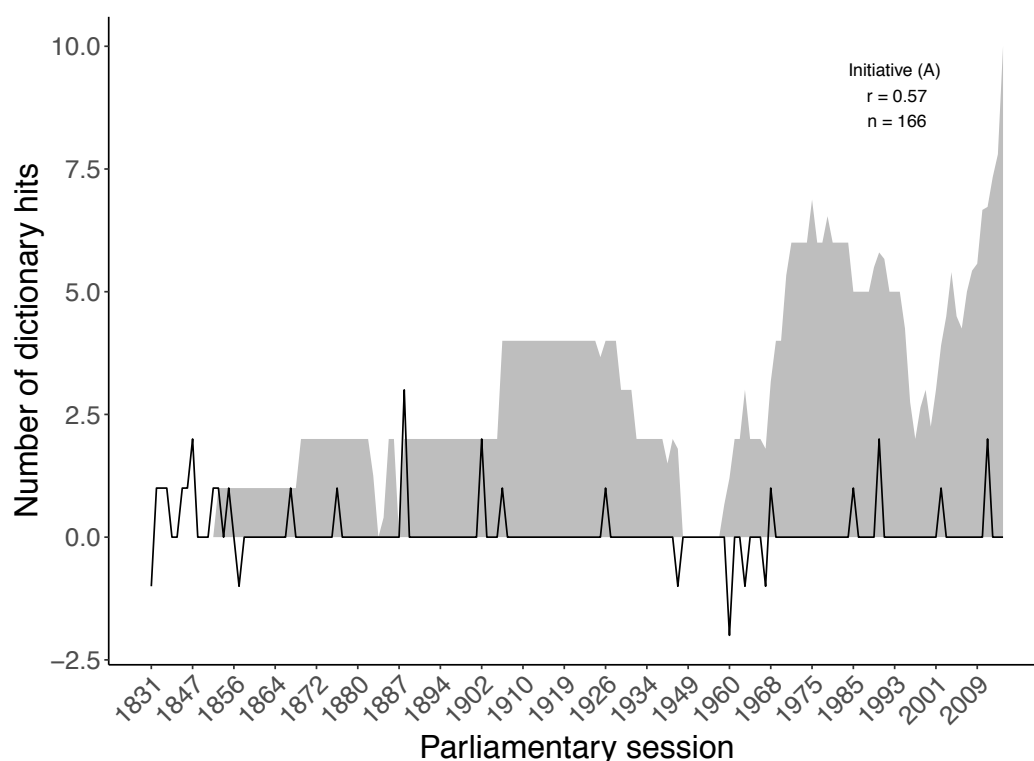


Figure 4.8: Automated vs. Manual Coding (Initiative), 1811–2015

Notes: The grey area represents the count of hits from the dictionary associated with the initiative dimension (see Table 4.8) in the corresponding sessional dictionary of procedural terms for each session over the period 1811–2015 (approach described in text). The black line represents the balance of freedom-enhancing and anti-dilatory reform for each session, multiplied by -1 (approach described in text).

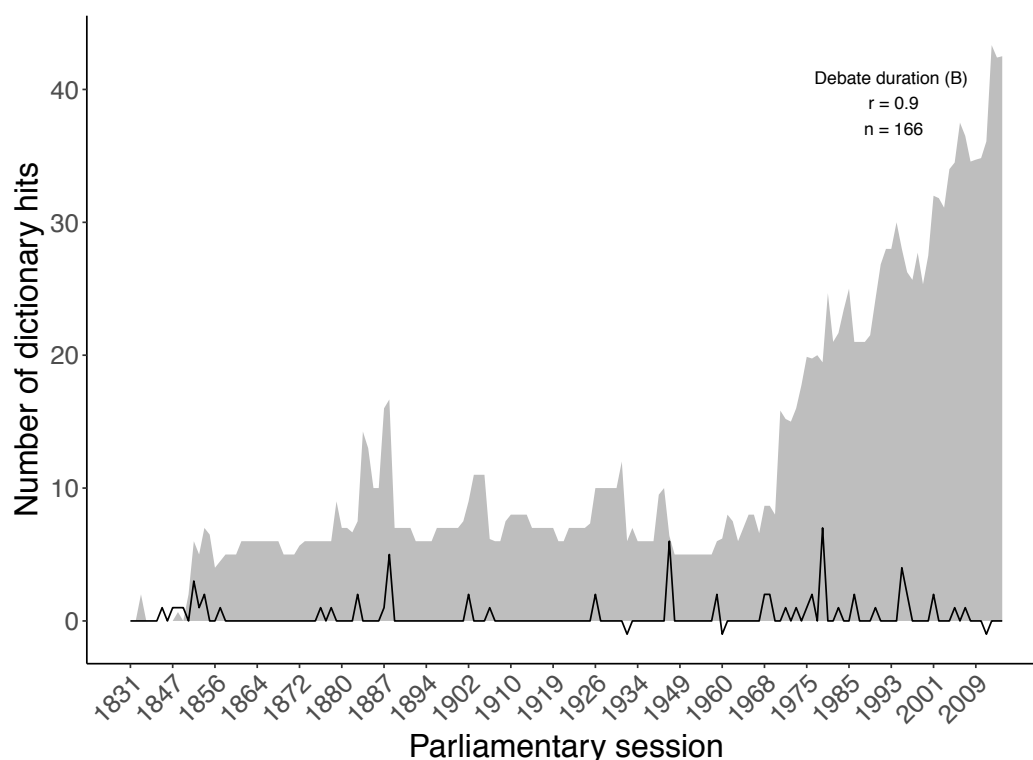


Figure 4.9: Automated vs. Manual Coding (Debate Duration), 1811–2015

Notes: The grey area represents the count of hits from the dictionary associated with the debate duration dimension (see Table 4.8) in the corresponding sessional dictionary of procedural terms for each session over the period 1811–2015. The black line represents the balance of freedom-enhancing and anti-dilatory reform for each session, multiplied by -1 (approach described in text).

Subsequently, to get a measure of how restrictive a parliament is during any one session on one of the three dimensions (initiative, duration, member speech), we take the mean number of mentions across the documents that fall within the session. As a cross-validation measure, the automated results should satisfy two criteria. First, we should observe that the distribution of “hits” of n-grams “jumps” to a higher level when my hand coding identifies a spike in the number of restrictive rules that are introduced. Second, the cumulative sum of the score generated from my hand-coded data for each dimension should correlate well with these automated measures.¹⁵

¹⁵After all, if we add all preceding (restrictive and freedom-enhancing) reforms up to point t , we should have some measure of how restrictive parliament is at that time t .

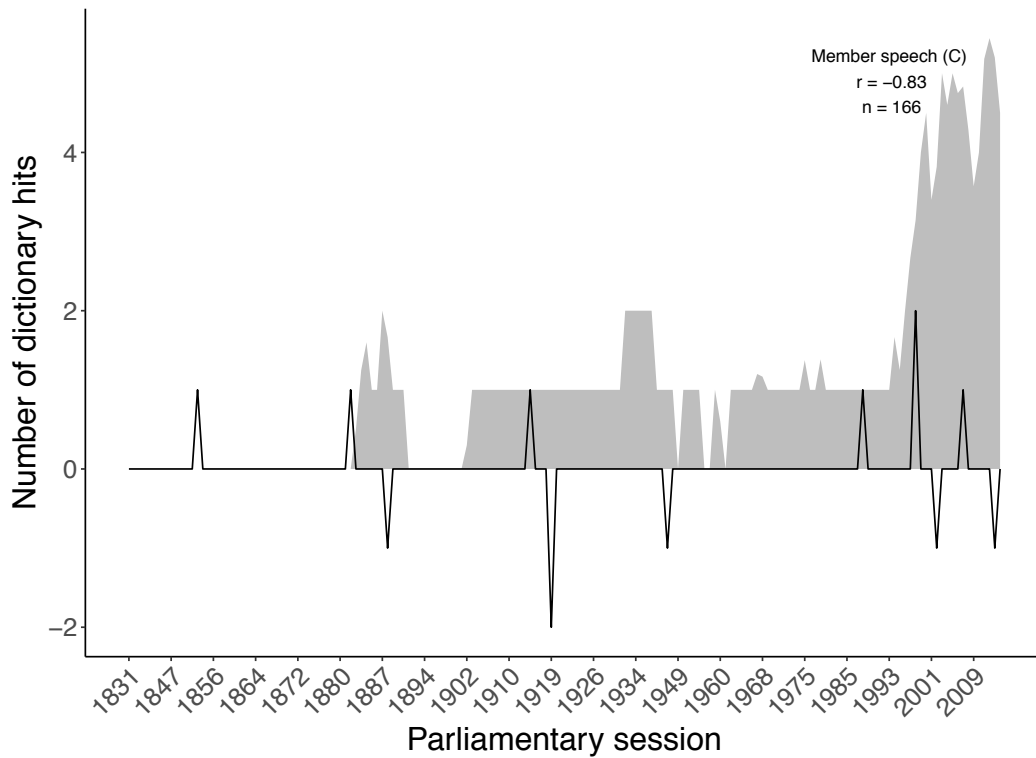


Figure 4.10: Automated vs. Manual Coding (Member Speech), 1811–2015

Notes: The grey area represents the count of hits from the dictionary associated with the member speech dimension (see Table 4.8) in the corresponding sessional dictionary of procedural terms for each session over the period 1811–2015 (approach described in text). The black line represents the balance of freedom-enhancing and anti-dilatory reform for each session, multiplied by -1 (approach described in text).

The degree to which the automated coding conforms to the criteria for each dimension is shown in Figures 4.8, 4.9, and 4.10.¹⁶ For this comparison, the manual coding scores for each session (represented by the black lines in the plots) is defined as the difference between the number of freedom-enhancing (+1) and the number of anti-dilatory (-1) reforms respectively in that session, as outlined earlier in this chapter. To ease comparison, however, the score is inverted (i.e. multiplied by -1), to allow us to see if there is a spike in dimension-related terms in the HCSO when the scope of anti-dilatory reform is high.

¹⁶Note that the graphs start at 1831, as the algorithm did not identify any phrases that matched the criteria of length and of the `phrasemachine` grammar specified prior to 1831.

We see that for both initiative (**A**) and duration (**B**), most spikes in reforms coincide with jumps in the number of hits in our local dictionaries; and vice versa. The correlations between the manual and automated coding are also encouraging, at 0.57 and 0.90 respectively.¹⁷ The results are less impressive for member speech (**C**), where the correlation coefficient is -0.83 ($p < 0.001$). A possible explanation for this latter finding is that the nature of change in this dimension is slightly more idiosyncratic than in the other two and therefore harder to measure. For example, individual time limits can change from, say four to ten minutes, denoting a decrease in restriction. Yet, this would be picked up as a negative score in the manual coding; whereas the automated script would simply pick up the same number of n-gram hits.

The approach taken here builds on new insights in text analysis that argue that preprocessing decisions (and feature selection) should be theory-informed, as they can have an impact on our empirical results (Denny and Spirling 2017). In this case, the goal was to identify unique phrases that pertain to particular procedures. The decision to use n-grams that range between three and four is informed by this goal, as uni-grams or bi-grams are simpler, and therefore less unique (collections of) words. Going beyond bi-grams introduces more “context”—a prime goal of our identification strategy. Similarly, the choice to apply the `simpleNP` grammar of `phrasemachine` is inspired by the fact that we seek to identify phrases that are substantively meaningful. To prove that the results presented above are not a function of arbitrary pre-processing decisions of the texts, I conduct a comprehensive sensitivity analysis, which shows that the findings are robust to pursuing different pre-processing configurations (see Appendix B, Section B.1).

4.5 Conclusions

In this chapter, I set out to build the dependent variable for the empirical analysis in the following chapters. The result is a unique new dataset of all UK House of

¹⁷Both at $p < 0.001$.

Commons Standing Orders that allows researchers to trace important procedural changes over a period that spans from the late-eighteenth to the twenty-first century (1797–2015). This HCSO dataset includes a hand-coded overview of amendments, a theory-informed scoring of such alterations, as well as machine-readable consolidated versions of the HCSOs. I have shown how the parliament’s “procedural corpus” has expanded and changed over time, using both simple counts and similarity scores. These results show important and interesting temporal variation in the levels of debate regulation in the Commons.

In addition to this empirical contribution, I have presented a new, ideal-type based coding scheme to identify the imposition (or removal) of restrictions on MPs during legislative debates. I have argued that the ability of MPs to delay legislative debate plays out along three dimensions. First, the ability to start a debate (e.g. to table a bill or discussion), influences whether a legislator can lay a claim on time (**A**.*initiative*). Second, once a debate has started, a different set of parameters influence whether a parliamentarian can “play for time”. These include the overall time reserved for debate, as well as the existence of ad hoc means to end discussions (**B**.*duration*). Finally, a final class of restrictions pertains directly to MPs and includes, for example, numerical caps on speeches and penalties (**C**.*member speech*). All consolidated versions of the Standing Orders were evaluated against these dimensions, and each relevant amendment was scored (+1 for enhancement of dilatory power; −1 for anti-dilatory reform), generating a score for each session.

Furthermore, I have shown that these results correspond well with a new, automated cross-validation method that builds on insights from NLP and computerised text analysis. My time series local dictionary approach is, in most cases, able to pin down higher levels of restrictions that appear to correspond with my manual coding results. The exercise also points to the importance of maintaining a human element to the coding of procedures, given their complexity. The strength of the automated method, then, lies primarily in pinpointing key areas

in which substantive changes occur, which subsequently require more in-depth study.

The chapter makes two important contributions. First, the detailed data gathered and processed in this chapter will benefit the study of British Political Development (BPD) (e.g. Eggers and Spirling 2014a,b; Moser and Reeves 2014). The consolidated versions of the Standing Orders as well as the detailed overview of changes over time allow researchers to develop new measures of important procedural and institutional changes in the nineteenth-, twentieth-, and twenty-first century UK House of Commons. Indeed, the ability to trace the life of individual articles over this entire time-frame enables researchers to extend their horizons to the study of, for example, committee power, rules of debate, and the power of the Speaker over a long historical trajectory.

Second, beyond its empirical contribution, the automated strategy to investigate key changes to texts using local dictionaries can be used in different contexts to validate hand coding, or to investigate reforms along dimensions that are pertinent to the operation of the UK House of Commons as well as other legislative assemblies.

In Chapter 6, the hand-coded measure of reform will, in adapted form, serve as the dependent variable for an analysis of the determinants of procedural choice.

PART III

Empirical Analysis

The End of “Gentlemanly Debate”

Electoral Reform and the Road to Obstruction

In 1882, Prime Minister William Gladstone proposed the adoption of a “closure rule”—a new procedure that would allow a majority of MPs to end a debate on an ad hoc basis. In defence of this innovation to the House of Commons’ procedures, Gladstone points to the impact of the Great Reform Act of 1832 on the role and behaviour of members of parliament:

The fundamental change which has occurred is owing to the passing of the first great Reform Bill. From that moment forward the position of the House was fundamentally altered. At once, from 1833, the pressure and calls upon the House were felt to be painful and almost intolerable (HC Deb, 20 February 1882, vol. 266, cols. 1129-1130).

In a painstakingly long speech¹, Gladstone pays ample attention to the creation of an “electoral link”—a product of enfranchisement under the First Reform Act—and its deleterious effects on the House. The Prime Minister qualifies the pressures caused by the reforms as ‘intolerable’, and claims that, as a consequence, ‘the House positively retired from the labour put before it’ (HC Deb, 20 February 1882, vol. 266, cols. 1129-30, 1131-32).

Rather than live up to its new responsibility, the time constraints imposed by a busy agenda undermined the ability of Parliament to *legislate* at the start of the nineteenth century. With so many proposals, the collective scramble to claim a portion of the scarce plenary time available harmed the ability of the House to pass the bills brought before it. Here lies the core of the procedural dilemma that MPs faced: on the one hand, there were increasing pressures to cede procedural rights to a smaller, privileged set of actors within their parties (i.e. frontbenchers); on the other, to do so would require an abdication of individual power.

Why did this procedural conundrum emerge when it did? As will be argued in this chapter, the answer lies in the progressive democratisation of Britain. The chapter emphasises the crucial transition effected by the Great Reform Act of 1832, which for the first time introduced an “electoral connection”. Its psychological effect on the members of the House was tangible: time scarcity rose, group composition changed, and informal cooperation broke down. This engendered a competitive environment that created a necessary, but not sufficient condition for reform: it changed norms relating to the use of filibustering, creating a pretext for the imposition of restrictions. Enfranchisement, then, set the scene for the ground-breaking institutional changes to plenary debate that developed over the course of the nineteenth, twentieth, and twenty-first centuries.

The purpose of this chapter is to provide an empirical basis for the narrative outlined above. In so doing, it presents a test of the first hypothesis (H1),

¹Gladstone’s intervention totalled 11,343 words; compared to an average of 155 words for that day, see HC Deb, 20 February 1882, vol. 266, cols. 1124-52.

which was stated as follows in Chapter 2 (see p. 71): *increases in the size of the electorate lead to greater time scarcity, compositional changes to the group of legislators that are active in parliament, and a weakening of informal rules.* This analysis provides individual-level and legislature-level evidence for the theoretical mechanism by building on a rich collection of primary and secondary sources, anecdotes, key quotes, parametric and non-parametric tests, and Bayesian and frequentist analyses. Methodologically, the analysis applies a natural experiment framework that incorporates elements of a differences-in-differences (DiD) identification strategy (Angrist and Pischke 2008) to leverage the abrupt, and, as will be argued, exogenously imposed changes introduced by the reform acts.

Beyond providing an empirical foundation for the first hypothesis of this dissertation's theory, the contribution of this chapter is twofold. First, it employs new data and tests to provide a more comprehensive and systematic account of behavioural responses of MPs to the creation of an electoral connection in nineteenth-century Britain. In so doing, it builds on important work by, among others, Rush (2001) and Cox (1987). Second, it sets out in some detail the procedural dilemma that legislators faced at the beginning of the nineteenth century, which forms the basis for the second and third hypotheses of the theory, and the empirical tests in the following chapter.

The chapter is structured as follows. First, I discuss the data and methods used (Section 5.1). Then, Section 5.2 sets out the procedural status quo of the early nineteenth century prior to electoral reform. Subsequently, I turn to the significant social transformation of the early nineteenth century—the extension of the franchise (Section 5.3). The chapter then proceeds to analyse the effect of enfranchisement on the main predictors of a change in norms relating to over-exploitation of plenary time. Section 5.4 analyses the predictors of time scarcity; and Section 5.5 discusses the effect of electoral reform on the effective size of Parliament (i.e. participation rates) and its socio-economic composition. Finally, I link these developments to changes in norms and behaviour relating to obstruction in Section 5.7.

5.1 Data and Methods

The analysis in this chapter relies on a combination of large-N quantitative tests, and anecdotal, qualitative evidence. The dependent variable varies across the different tests, but is, in most cases, taken or estimated from my dataset of parliamentary debates (see Section 3.5 of Chapter 3 for details). Many of the other covariates, such as district size and vote share are taken from Eggers and Spirling (2014a). Given the variety of tests and data used, detailed methodological choices are set out in the individual sections.

5.1.1 *Measuring a Change in Norms: Benchmarks*

Before proceeding to the analysis, we need to set some benchmarks for the tests that follow. A key part of the exercise is to demonstrate that norms relating to filibustering changed in the early nineteenth century. Specifically, our goal is to show that informal conventions have less power in enforcing cooperative behaviour, and that the “speech-as-filibuster” becomes an acceptable means to influence policy. “Norms” are a latent concept, and measuring such rules of behaviour directly is difficult. We therefore have to settle with the following two strategies: i) measuring the observable implications of norms—i.e. behaviour; ii) providing contextualising information such as qualitative evidence from statements made by MPs who were in the House at the time of the reforms. On this basis, I present a range of correlational and probabilistic tests that are subsequently put in a wider context. Although not conclusive, the findings yield support for the narrative set out in the theory.

For these reasons, I set out a number of clear steps and tests (or “benchmarks”) that the analysis needs to meet. First, we need to establish the parameters of unlimited debate at the start of the nineteenth century and identify what norms were prevalent. In a second step, we need to discuss the changes in *MP behaviour* effected by the Reform Acts in some detail as it relates to three key variables identified by the theory: i) time scarcity; ii) group composition; and iii) enforcement mechanisms. I will show, consecutively, that the reform acts can be

credibly related to an increase in the number of speeches made (time scarcity), greater participation rates by a more diverse set of actors at the parliament- and MP-levels, and to a more diverse demographic composition of the House.

Finally, we need to credibly relate these two developments to a change in norms *after* electoral reforms. This is done by: i) demonstrating a greater use of obstruction (observable, behavioural implication of a change in norms); and ii) showing the presence of a perception among MPs that norms have changed based on evidence from parliamentary debates and secondary literature. It is important to note that the observed change should relate to informal constraints that legislators abide by, i.e. what is considered “parliamentary behaviour”, or informal agreements. We should observe that after the First Reform Act such norms and conventions are challenged.

5.1.2 *A Pseudo-Differences-in-Differences Framework*

The nature of the changes studied in this chapter presents us with scope for empirical tests that are, in many ways, similar to a natural experiment. Specifically, I rely on the logic behind the differences-in-differences identification strategy. This design is premised on the ability to control for unobserved time-varying confounders using a time or cohort dimension, and is particularly suitable for an identification problem where we are interested in group-level variables. When the treatment of interest varies at the group level, we can use the DiD set-up to gauge individual-level effects using aggregate data (Angrist and Pischke 2008, Chapter 5). The DiD strategy relies on the logic of comparing the differences pre- and post-treatment in the outcome of a treatment and a control group.

In our particular case, we have data prior to electoral reforms and after, and samples that include the same legislators before and after these transformations. Moreover, structural conditions (such as the size of the electorate at the aggregate level, and of individual district size) increase precisely at the time of the introduction of a Reform Act², and are largely exogenously imposed. The

²Or more specifically, at the first election held under the new electoral system as introduced by said Reform Act. In practice, the two are usually broadly the same.

structural changes associated with the electoral reforms can therefore be seen as part of a natural experiment, and the MPs prior to and after the reform as the pre- and post-treatment group. Therefore, the data allow us to isolate the effect of an increase in the size of the electorate, which is a proxy for the “electoral connection”.

The DiD identification strategy relies on the presence of a control ($G_{control}$) and a treatment group ($G_{treatment}$) at the pre-treatment (0) and post-treatment (1) stages (Angrist and Pischke 2008, pp. 228-229). We assume that, absent the treatment, the behaviour of both groups develops in tandem (i.e. the parallel trend assumption). Given this assumption, we can isolate the effect of our predictor of interest as $(G_{treatment1} - G_{treatment0}) - (G_{control1} - G_{control0})$. In other words: we observe the difference between the differences in behaviour between the treatment and the control group. For example, the identification of the effect of constituency size on MP behaviour in Section 5.4.3 relies on this logic: the group of MPs at time t_0 (pre-reform act) and t_1 (post-reform act) includes subjects whose constituency size has increased (the treatment group), and others who have not undergone the treatment (the control group). The expectation then is that the former experiences an extra increase in speech activity above any trend between t_0 and t_1 .

In other cases, we cannot rely on the presence of “parallel” treatment and control groups. Here, we are simply interested in removing the correlation between the observed explanatory variable and the unobserved fixed effects. For example, when considering the change in average speaking behaviour among MPs before and after the Reform Acts (Section 5.4.3), I analyse the difference in the mean level of floor activity before and after these key periods. Here, we simply consider the difference between the pre- and post-treatment behaviour of the same group, where the assumption is that the behavioural observables remain constant, absent an effect of the main predictor.

The logic of the DiD design will be leveraged across several empirical tests, by investigating short time periods (“pseudo-panels”) around the nineteenth-

century Reform Acts (1832, 1867, 1882), with the implementation of the reforms acting as the treatment.

Conditions

Some limitations of the pseudo-DiD approach apply.³ First, in the context of electoral reform we may be worried that legislators are able to manipulate or even control the treatment. However, although MPs decide collectively on the implementation of electoral reform, its consequences are not uniformly distributed across actors. When criteria are set for enfranchisement of certain groups (for example based on income levels, or sex), the population demographics in particular constituencies determine the size of the treatment effect (as explained earlier, “treatment” here is the degree of electoral pressure). Legislators cannot self-select into the constituency for which they stand; it is either (historically) assigned to them by inheritance, or by the party that fields the candidate.⁴ In addition, the franchise reforms affected the size of the constituency more in some areas than in others. For example, the 1867 Reform Act, passed under Disraeli, increased the voting population in counties by 45 per cent, whereas in boroughs that figure was at 145 per cent (Acemoglu and Robinson 2000).⁵

A second problem may be that there are unobservable factors that are not continuously related to the treatment. In more formal terms: we may be worried that the case studied in this chapter does not satisfy the condition that the predictors are strictly exogenous (conditional on the unobserved effect), i.e. the requirement that the unobserved effects (speaking behaviour) be uncorrelated with the observed regressors (Wooldridge 2002, p. 253). In a parliament, time-varying confounders such as changes in seniority or political affiliation may raise

³It must be noted at this point that the pseudo-DiD approach adopted here comes a significant limitation: I have no true “parallel” control group to enhance internal validity, as all legislators are to some extent exposed to the treatment, albeit differentially (e.g. some MPs face greater increases in electoral pressure than others). Any results derived from the tests in this chapter thus have to be read with this important reservation in mind.

⁴In a stricter interpretation: it is not possible to change seats after an election has taken place.

⁵This is of course also the reason why the Conservatives, whose support was largely concentrated in the rural areas, went on to lose the 1868 election.

problems for our analysis. These covariates should not change as a function of the treatment because they may affect the outcome of interest, confounding the impact of the main predictor. It is unlikely, however, that other systemic factors change to a large extent close to the treatment, for two reasons. First, in all three cases (1832, 1867, 1884), electoral reform was not accompanied by other constitutional (and potentially confounding) changes.⁶ Second, the effects of franchise reform were largely unanticipated. In 1867, for example, during a debate on the Third Reading of the reform bill, Lord Derby famously stated that ‘No doubt we are making a great experiment and “taking a leap in the dark”’ (HL Deb, 6 August 1867, vol. 189, cols. 951-952). It stands to reason that MPs at the time did not possess access to the kind of data and tools that would be required to estimate the full effect of the reforms they adopted.

As we can, to a reasonable extent, assume the absence of manipulation of the treatment by the subjects and relative stability of other co-variates, the effects that we observe may be seen as related to the treatment. As pointed out above, I do not leverage the DiD design explicitly here; rather, I adopt this set-up as a heuristic device to assess the empirical evidence in a more structured way.

5.2 Repeated Interaction and Informal Cooperation: Norms of Debate in the Early 1800s

What did the institution of parliamentary debate look like in the early 1800s? As pointed out in Chapter 2, there were no formal procedural limits on debate at the start of the nineteenth century. The Standing Orders in force at the time dated from 17 November 1797, and consisted of only *five* rules imposing limited restrictions on the tabling of public bills relating to religion, trade, and proposals with financial implications. It was only in 1820 that a new consolidated version of the orders for public business was adopted.

⁶At least not directly. There were, of course, important innovations preceding or following these acts, such as the Secret Ballot Act of 1872. In addition, where other reforms were introduced in combination with the Reform Acts, they are part and parcel of the larger reform, such as the Corrupt and Illegal Practices (Prevention) Act of 1883, which had a similar “democratising” effect.

The only important innovation preceding the 1832 Reform Act was the introduction of “Order Days” in 1811—days on which business on the order paper was to be given priority. This procedural alteration benefited the government, which mostly introduced its business in this form. Besides this precedence rule, the following thirty years or so can be characterised as a period of “unlimited” debate.

What informal norms were prevalent relating to obstruction at the time? It is noteworthy that the tactic of “parliamentary obstruction” did not even have an official name in the eighteenth century (Rutherford 1914). This is not to say that it was not used. Even the influential Irish-Anglo politician and political thinker Edmund Burke himself employed this manoeuvre in 1771 to challenge a proposal that would allow newspapers to publish accounts of Commons debates, forcing twenty-three divisions over the proceedings on this bill (Redlich 1908, pp. 138–139, cited in Rush 2001, pp. 66–67).

Pre-1832 Debate: A “Gentlemanly Business”

Yet, prior to 1832 members did not seem concerned about obstructive tactics. Obstruction did occur (some examples of which I have provided in Chapter 2), but it did not spark the kinds of fierce discussions that the behaviour of Irish obstructionists elicited in the 1880–1885 Parliament. A short analysis of all mentions of the terms “obstruct” and “obstruction” in Commons debates since 1800 shows *one* hit for the period preceding the First Reform Act that is actually related to normative contention over the parliamentary tactic.⁷ On a motion to go into a committee of supply in 1811, MP Frederick Ponsonby (Galway Borough) states:

[T]he charge of delaying or obstructing public business, could not justly be applied to that side of the House. Who had the power of terminating the session? Who the power of calling Parliament together? The minister did all this, and it was therefore idle to impute any accidental inconvenience

⁷I define “normative contention” as disagreement over the appropriateness of the use of obstructive tactics.

of a want of time for the due consideration of important questions to any individual members of the House (HC Deb, 6 March 1811, vol. 19, cols. 248-249).

Such charges were however rare, and did not assume the character that they did after 1832. Obstruction then, was thin on the ground—a claim I shall revisit and substantiate empirically in Section 5.6. Prior to the Great Reform Act, debate was still very much an affair where decorum was observed. And little had changed at the start of the nineteenth century. Debate was still a “gentlemanly business”. Rutherford (1914, pp. 171–172) aptly describes the late-eighteenth century House of Commons as follows:

Only “gentlemen” were members of the House of Commons. Gentlemanly debates, gentlemanly parliamentary procedure were the vogue. Obstruction was used occasionally, but it had not yet become a menace.

This tradition of “gentlemanly debates” was just the quiet before the storm. In what follows, we turn to the exogenous shock of the 1832 Electoral Reform, and its impact on legislator behaviour.

5.3 Exogenous Shocks: The Nineteenth-Century Reform Acts

At the start of the nineteenth century, the three parameters of the model outlined in Chapter 2 are such that the common-pool resource—plenary time—is used in a responsible way: i) time is available in abundance; ii) the number of legislators that participate in debates is small and drawn from a relatively homogeneous demographic; and iii) although there is a lack of formal authority, informal modes of cooperation impose constraints on behaviour.

This constellation of variables has much to do with the fact that, prior to the nineteenth century, the House of Commons operated in an electoral vacuum. The relationship between voter and legislator was largely one of patronage (Hanham 1959): tenants voted in accordance with the preferences of their landlords, often because of coercion. The institutional equilibrium within Parliament was stacked

against change; there were no exogenous pressures that forced the Commons to *legislate* or required MPs to showcase their ability as representatives. And, therefore, the existence of unlimited debate did not require a procedural answer.

The democratisation of Britain over the course of the nineteenth century changed this gentlemanly state of affairs, as the Great Reform Act (1832), and to a lesser degree the Second Reform Act (1867) and the Third Reform Act (1884), dramatically transformed the relationship between legislators and voters. The process is inevitably tied to the progressive extension of the franchise, and the development of an “electoral connection” between voter and MP. Slowly but surely, we witness the creation of a “trustee” relationship between the electorate and their representatives in Parliament. In Victorian Britain (1837–1901), elections took place under a first-past-the-post system that is still in effect today. Constituencies could consist of single-, or, more often, two-member districts, and in some cases constituencies sent as many as three or four representatives to Parliament.

5.3.1 *The Great Reform Act (1832)*

The Great Reform Act of 1832 was the first instalment in an array of franchise reforms that would, in the words of Rush, transform members of the UK Parliament ‘from gentlemen to players.’ It addressed the issue of malapportionment, by improving representation in the industrialised cities, disenfranchising “rotten boroughs” (proprietary constituencies with small voting populations), and extending male suffrage.

At this time, there was a remarkable growth in the number of eligible voters. Table 5.1 shows the average number of electors in constituencies and the percentage of uncontested seats for the period 1807–1900. It paints a stark picture of the effect of the reform at the local level: the First Reform Act increased the average size of constituencies in absolute terms, from 1,206 to 2,117—an increase of 43 per cent. An important component of the act was re-districting: large, previously unrepresented boroughs such as Birmingham, Leeds, Manchester, and Sheffield

were enfranchised at the expense of many smaller boroughs. The voting population grew by some 80 per cent, to approximately 650,000 (Cox 1987, pp. 55–56; Cannon 1977).

Table 5.1: Constituency Size and Contested Elections, 1807–1900

Parliament	Election year	Uncontested (perc.)	Electors (avg.)
4th	1807	29.2	1,361
5th	1813	23.5	728
6th	1819	38.3	1,369
7th	1820	30.0	1,312
8th	1827	36.2	774
9th	1831	34.1	1,206
11th	1833	28.7	2,117
12th	1835	41.8	2,157
13th	1837	35.9	2,510
14th	1841	51.2	2,524
15th	1847	51.2	2,757
16th	1852	39.0	2,928
17th	1857	50.2	3,143
18th	1859	58.0	3,237
19th	1866	46.0	3,361
20th	1868	32.2	5,858
21th	1874	28.7	6,608
22th	1880	16.7	7,277
23th	1885	6.4	8,870
24th	1886	33.4	8,583
25th	1892	9.4	9,656
26th	1895	28.2	9,655
27th	1900	36.3	10,300

Notes: Own compilation on the basis of Rallings and Thrasher 2012, Table 2.15 (for perc. uncontested seats), and Eggers and Spirling (2014a) (for number of electors).

5.3.2 *The Second Reform Act (1867)*

The Representation of the Peoples Act, or “Second Reform Act” in short, was adopted on 15th August 1867.⁸ It proved to be transformative, amending some of the shortcomings of the 1832 Act (Cox 1987): the smallest boroughs were disenfranchised with representation being granted to other boroughs and counties, the property and income requirements for male suffrage were lowered, and voting rights were extended to all householders in boroughs. More than a million electors were enfranchised—an increase of 97 per cent on previous figures. Whereas in 1865, there had been 1,136,801 individuals on the electoral roll, by the election of 1868, this figure had risen to 2,239,129 (Craig 1975).

5.3.3 *The Third Reform Act (1884)*

The Third Reform Act of 1884 again increased the size of the electorate, expanding the eligible voting population to four million in English and Welsh constituencies—an increase of 76 per cent (Berlinski and Dewan 2011). Re-districting further tackled smaller, less competitive constituencies.⁹ Additionally, as part of this comprehensive re-districting exercise, a majority of constituencies moved from multi- to single-member representation. Before the Act’s implementation in 1885, 57 per cent of constituencies in England and Wales returned two members (down from seventy per cent before 1867). After 1885, this figure dropped to eight per cent. Finally, the bill addressed the under-representation of the Northern industrial counties and London (Berlinski and Dewan 2011).

In Chapter 2, I argued—building on the common-pool resource literature—that the reform acts affected three variables that are key to inducing cooperative behaviour: i) scarcity of plenary time; ii) effective group size and cohesion; and iii) enforcement mechanisms. Here, the breakdown of informal modes of co-operation as a means to induce cooperative behaviour is a function of the changes

⁸The reform was introduced for England and Wales in 1867. Reform acts for Scotland were implemented in 1868. Ireland similarly had a reform act in 1868, but this had little effect on the number of registered voters.

⁹79 constituencies were disenfranchised; 36 were partially disenfranchised.

in group homogeneity. In what follows, I shall address these three developments in turn.

5.4 Scarcity of Plenary Time

First, do we witness a change in the speech-making behaviour of MPs? Do claims on plenary time increase? Anecdotal evidence seems to suggest this is what happened after the 1832 Reform Act. On this matter, Spencer Walpole—the well-known British historian and politician—is worth quoting at length:

The reformed House of Commons was largely recruited by a class of persons who had found no place in the unreformed House. The fashionable young gentlemen, who had been nominated as the members of rotten boroughs, had been replaced by earnest men chosen by the populous places enfranchised by the Reform Act. Representing not a class, but a people, they brought the House into harmony with the nation. They insisted on receiving a public hearing for their own views; and on obtaining comprehensive information on the many subjects in which they, and those who had sent them to Parliament, were interested. Their determination in these respects produced two results. Parliamentary debates were lengthened to an enormous and, as some people thought, to an inordinate degree; parliamentary papers were multiplied to an extent which probably no one, who had not had occasion to consult them regularly, had realised (Walpole 1905, 340—341).

Evidently, the reform act had brought into the House a new group of men who were keenly aware of the electorate that they were supposed to serve, and who used plenary debate to fulfil their duties as representatives (see also Redlich 1908; Rush 2001; Rutherford 1914).

5.4.1 Macro-level Patterns: *Speech Rates in the House*

This new “electoral connection” had an effect on patterns of speech-making. Figure 5.1 shows the number of speeches made per session day from 1810 to 2015.

It is evident that in the 1830s legislators began to make use of their prerogative to speak more frequently. When we look at the patterns of speech-making over time, there is a sharp rise in activity in the years prior to the adoption of the Great Reform Act (1832), with levels staying comparatively higher in the period that follows. This corresponds to the serious effort by Earl Grey's government to pass the reform, which began in 1830. The change is perhaps most strongly visible when it comes to the average length of speeches (Figure 5.1, bottom panel), which witnesses a sharp increase around the introduction of the reform.

In the early 1840s, the number of speeches per session day appears to have been relatively stable (< 100), and only increases drastically in the 1880s, after the introduction of the Third Reform Act. Importantly, there appears to only be a short-lived decline in activity after the changes over the period that Cox (1987) marks as the rise of Cabinet government (1830s–1846). This finding suggests that the nature of debate did not change to the benefit of the government in response to the introduction of mass suffrage and competitive elections (on this point, see also Redlich (1908), who characterises the years 1832–1872 as a period of “conservatism”). This is not surprising in light of my theory, which expects backbenchers (and even frontbenchers) to wish to at the very least retain the freedom to delay bills, because the ability to do so became crucial to secure policy benefits. Figure 5.1 shows a mild increase in the number of speeches close to the 1832 Act, accompanied by a relatively large increase in their average length. This pattern confirms that MPs did seem to begin to claim larger portions of plenary time, as my theory suggests.

It is evident that the procedural reforms studied in this thesis occurred in a context of increasing time scarcity. This conclusion is only strengthened by the fact that the length of the average sitting time did not increase substantially over this time period. Prior to 1832, the average sitting day lasted seven and a half hours. Between the First (1832) and Second (1867) Reform Act, House sitting days lasted an average eight hours. After 1868 and until 1906, hours increased to between eight and nine, only to fall back to eight after 1906, and up again

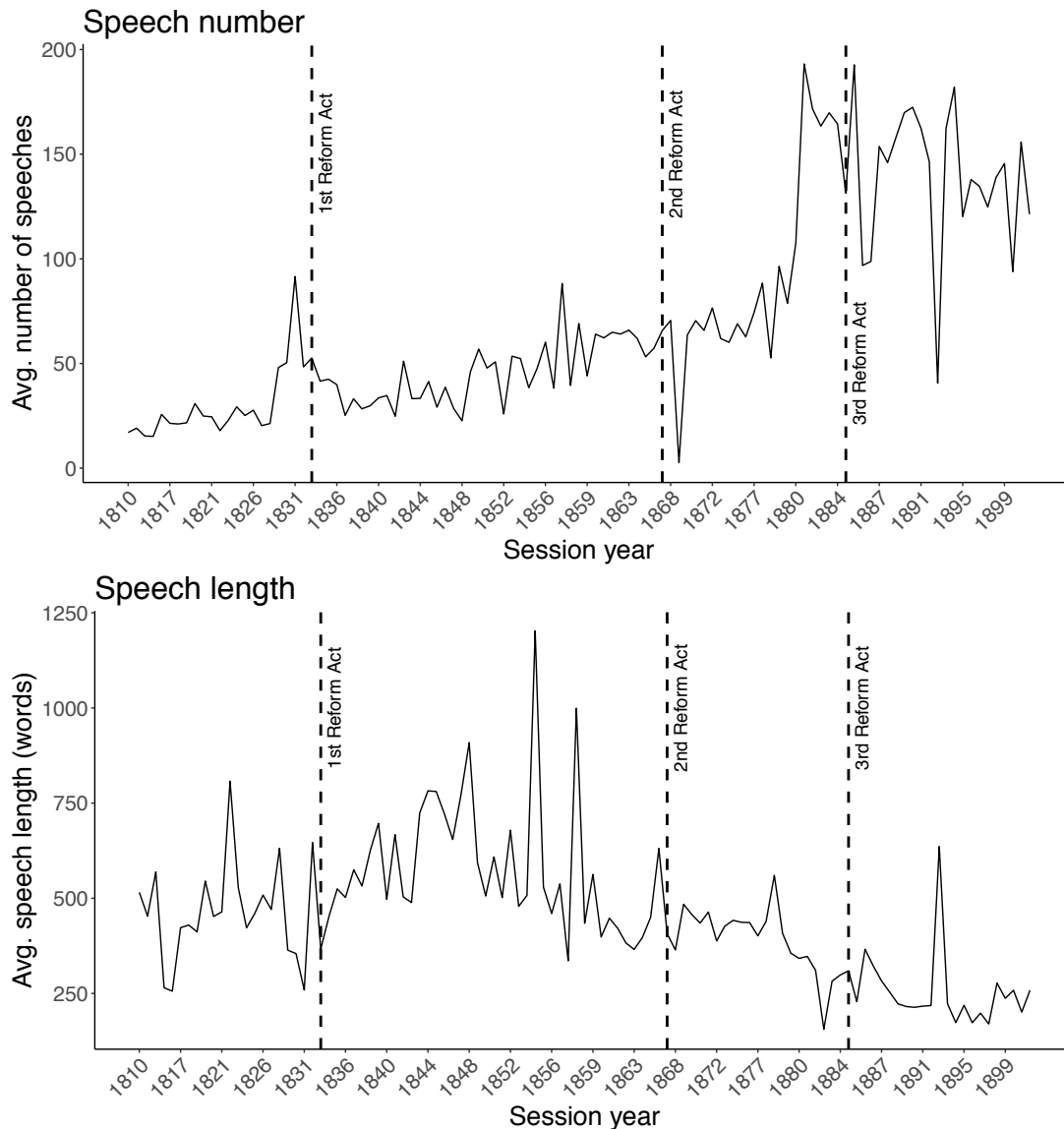


Figure 5.1: Patterns of Speech-making in the Commons, 1811–1900

Notes: The top panel shows the average number of speeches made *per session day* for a yearly session. The lower panel shows the average speech length for a session of the mean daily speech length. The x-axis labels refer to parliamentary sessions.^a Dashed vertical lines indicate sessions during which the Reform Acts were adopted.

^aThe low score for speech number in 1868 reflects the 1st session of the 20th Parliament, during which there are very few sitting days due to its extreme brevity (10–29 December 1868).

between eight and nine after WWII. In other words: very little of the increase in legislator activity could be absorbed by increasing the time for sitting days.¹⁰

Was the growth in time pressure a direct consequence of the extension of the suffrage? I now turn to an evaluation of this question at two levels: i) the macro-, parliament-level, investigating the association between the overall size of the electorate and parliamentary speaking behaviour; and ii) the individual-, MP-level, considering changes in the conduct of legislators around the Reform Acts.

5.4.2 Parliament-level Tests of the Effect of Suffrage Extension

First, at the parliament-level, I run a linear regression that estimates the effect of various determinants on legislator behaviour. In the models in Table 5.2, the dependent variable consists of the mean number of speeches per session day for each year from 1811 to 2015. The measure of electoral pressure consists of the size of the electorate (cf. Rallings and Thrasher 2012, Table 4.01).¹¹ In the second model, I control for election years, the number of years before election, the number of general public acts¹², and a variable that captures the complexity of legislation. Finally, the third model includes a control for the number of anti-dilatory rules in place.

The complexity variable is constructed by taking the average length of legislative acts per year. The data include all full texts of UK General Public Acts ($n = 3,603$), Statutory Instruments ($n = 50,239$), and Local Acts ($n = 173$), amounting to a total of 54,015 legislative texts.¹³ For some years, the government archives do not hold the full records of the public acts that were adopted. To

¹⁰Data taken from History of Parliament Online <http://www.historyofparliamentonline.org> (for 4th–8th Parliament), Cook and Keith (1975, pp. 100–103) (for 9th–26th Parliament), Butler and Butler (2000, pp. 190–193) (for 27th–52nd Parliament, 2nd session), and (for 52nd Parliament and onwards), and from the Parliament website (House of Commons Library 1 July 2015) for sessions since 2000.

¹¹For years in which there were two elections (1910 and 1974), the average of the two figures is taken. For 2015, the data are taken from <http://www.electoralcommission.org.uk/our-work/our-research/electoral-data>.

¹²This information is taken from <http://www.legislation.gov.uk/ukpga>.

¹³Versions as enacted. Available at: <http://leggovuk.s3-website-eu-west-1.amazonaws.com/texts/enacted-epublished/optxt/index.htm>.

account for this, I re-estimate the final model using a technique called simulation-extrapolation (SIMEX) (Cook and Stefanski 1994). This method jackknifes the complexity measure, and adds measurement error to the model using simulations to verify the existence of a trend in the bias. It subsequently reduces the effect of this measurement error. Moreover, to account for the possibility that complexity, the number of bills, or the number of rules have increased over time due to a “secular” trend, these variables are de-trended in the models.¹⁴

The results shown in Table 5.2 suggest that the size of the electorate does have a statistically significant effect on the level of legislator activity, and thus, indirectly on time pressure in Parliament. An increase in the number of voters by 100,000 produces a rise in the daily speech rate of 0.96 (taking model 4 as a basis). This effect appears to be substantively limited at first examination. However, it is quite substantial when we consider the increase in the size of the electorate over the course of the nineteenth century. Between 1811 and 1945, the number of electors grew from approximately 500,000 to 33 million, which would amount to an increase of 312 in the daily speech rate¹⁵—by all means a considerable number.

Robustness

The model appears to be robust. First, the results hold up when removing outliers (see Table C2 in Appendix C). Second, the variance inflation factor (VIF) reveals no problems of multi-collinearity for models 2 and 3.¹⁶ Further, I estimate the second model with robust standard errors to address serial auto-correlation of the residuals, as a Durbin-Watson test (DWT) reveals this is a problem for these models. Models 2 and 3 thus have Newey-West robust standard errors. Finally, I also estimated a series of count models (see Appendix C, Table C2).¹⁷ Because

¹⁴To this end, I use the `pracma` package in R, which ‘computes the least-squares fit of a straight line [...] to the data and subtracts the resulting function from the data.’ (Borchers n.d.).

¹⁵ $\frac{33,000,000 - 500,000}{100,000} * 0.96$

¹⁶I.e., for all the variables $\sqrt{VIF} < 2$.

¹⁷For this purpose, I rounded off the values of the dependent variable to their nearest integer values.

Table 5.2: Time Scarcity - Regression Results

Dependent variable:	OLS			SIMEX
	(1)	(2)	(3)	(3b)
<i>Mean number of speeches</i>	Coef. (SE)	Coef. (RSE)	Coef. (RSE)	Coef. (SIMEX)
ELECTORATE SIZE (*100,000)	0.68*** (0.03)	0.84*** (0.03)	0.97*** (0.03)	0.96*** (0.03)
Controls				
LEGISLATIVE COMPLEXITY <i>De-trended, *1,000</i>			-0.16 (0.80)	-0.48 (0.84)
YEARS BEFORE ELECTION		2.33 (2.33)	1.81 (2.30)	4.03* (2.27)
BILLS ENACTED <i>De-trended</i>		-0.06*** (0.01)	-0.10*** (0.01)	-0.11*** (0.01)
ANTI-DILATORY RULES <i>De-trended</i>			7.72*** (0.90)	8.61*** (0.86)
Constant	103.07*** (7.72)	73.31*** (10.73)	66.87*** (7.56)	73.19*** (9.42)
Observations	203	203	203	203
Adjusted R ²	0.72	0.85	0.88	0.84

Notes:

*p<0.05; **p<0.01; ***p<0.001

OLS models: model 1, standard errors are provided in parentheses; for models 2 and 3, robust Newey-West standard errors are reported. SIMEX models: SIMEX standard errors based on jackknife estimation reported in parentheses. Quasi-Poisson models: standard errors are provided in parentheses.

of the relatively large discrepancy between the variance (= 19,827.63) and the mean (= 234.08) of the dependent variable, I use quasi-Poisson models. This class of models leaves the dispersion parameter unrestricted, and can therefore better deal with over-dispersed data (Zeileis, Kleiber, and Jackman 2008, p. 5). These results are broadly consistent with the ones reported here.

Finally, I re-estimate all above-mentioned models, substituting the dependent variable for a regressor that captures the interaction between the number of speeches and their average length. As with the other robustness checks, these models (see Tables C3 and C4 in Appendix C) yield similar results.

5.4.3 MP-level Behavioural Changes

Collectively, the results outlined above suggest that, at the macro-level, there is an association between electoral pressure and time scarcity, measured as the number of speeches made on a typical session day. However, because of the long-term intensification of time scarcity over the period 1811–2015, we have to be careful in drawing any strong conclusions from this finding. If both the size of the electorate and the use of speaking rights grow over time, we may measure an effect, but the relationship may still be spurious. Instead, we should observe a similar effect at the individual level. In other words: did the extension of voting rights to previously disenfranchised citizens have an effect on the behaviour of MPs in the House?

Floor Time

Cox (1987, see Chapter 6, and tables 6.1–6.5 in particular) has already shown conclusively that participation rates in debates and divisions rose in the early nineteenth century, providing some evidence that intra-parliamentary dynamics were changing. Such increases in participation are however not synonymous with time pressure. Time pressure is a function of the totality of business that has to be dealt with on the floor, rather than how many legislators spoke or voted at least once during a session. Here, I consider the average number of speeches and their length as an indication of floor time available to individual legislators. We should observe that individual floor time declined in practice for the same legislators after the reform acts. If, as suggested by the theory, the initial creation of an “electoral connection” is crucial we should see that the effect is largely confined to the 1832 Reform Act.

Here, we start off with two simple tests to provide some indication of the mechanism at work: i) a cross-temporal means difference test between a sample running from $t - 2$ to $t + 2$ around year t for the same set of legislators; and ii) a cross-sectional OLS regression that includes speaking behaviour as a DV and district size of individual legislators as the main IV. I consider three distinct four-year periods around the reform acts:

- The Great Reform Act (Royal Assent on 7 June 1832): from the state opening of the first (and only) session of the ninth Parliament on 3 February 1831 up to the end of the second session of the twelfth Parliament on 10 September 1835¹⁸;
- The Second Reform Act (Royal Assent on 15 August 1867): from the opening of the first session of the nineteenth Parliament on 1 February 1866 up to the dissolution of the end of the second session of the twentieth Parliament on 11 August 1869;
- The Third Reform Act (Royal Assent on 6 December 1884): from the start of the fifth session of the twenty-second Parliament on 15 February 1883 until the end of the first session of the twenty-fourth Parliament on 25 September 1886;

I select these relatively short periods to minimise the impact of other co-variates such as seniority, the election cycle, and ministerial promotion. For the first test (means difference), I split the sample into two periods (prior to, and after the adoption date). Subsequently, I calculate the average number of speeches per day for each MP in each of the two periods respectively.¹⁹ Finally, I conduct a paired Welch two-sample t-test. The results are reported in Table 5.3. The table lists the change to the size of the electorate both in percentage and in absolute terms, and the difference in the mean level of floor activity before and after a

¹⁸There was no parliamentary session in 1834.

¹⁹I exclude marginal MPs from the sample, defined as those that speak less than ten times.

reform in the periods outlined above. A negative sign indicates an *increase* from t to $t + 1$). The table also reports key statistics related to the test.

Table 5.3: Paired Means Difference Tests of Debate Participation Before and After Reform Acts

Reform Act	Δ electorate size Perc. (number)	Mean diff.	t	df	n
1832	+39% (+320,238)	-23.99*	-1.85	188	189
1867	+46% (+1,134,309)	64.49****	8.16	290	291
1884	+47% (+2,667,980)	66.74****	3.62	233	234
Notes:		*p<0.01; **p<0.05; ***p<0.01; ****p<0.001			

The patterns observed in the macro-level analysis (cf. Figure 5.1 and Table 5.2) conform with the results of Table 5.3. The negative sign on the means difference reported in the first row suggests that individual claims on floor time were *lower* prior to than after the Reform Act of 1832, with floor time being defined as the interaction between the average number of speeches and speech length per session day. In the year leading up to the act, the average claim on floor time by an individual MP was 110.7; whereas it rose to 132.7 after the Act was passed. This rise provides some indication of the increase in the competitive nature of parliamentary debate close to the very first creation of an “electoral connection”, as well as some direct evidence that individual claims on plenary time (and therefore time scarcity) increased.

This conclusion is strengthened by the fact that, for the other reform acts, we observe the opposite effect, i.e. a *decrease* in the mean level of speech-based activity among legislators. To take one example from the 1867 Reform Act: Lord Claud Hamilton. He entered the House on 11 July 1865, and remained a member for various constituencies, including Kensington South, Liverpool, West Derby, King’s Lynn, and Londonderry Borough, until he left the Commons on 25 November 1918. Hamilton spoke once every ten session days up to the reform act; and only one in twenty session days in the two years following. His speeches

had an average length of 387 and 594 words respectively before and after the reform—an increase of more than 34 per cent.

District Size and Time Scarcity

We can also exploit constituency-level variation in order to isolate the effect of electoral reform. If speaking behaviour is indeed impacted by electoral pressure, we should also observe that, at the individual level, increases in legislator activity should be dictated by the size of the constituency in which they run. The logic here is that candidates representing a larger constituency potentially tap into a greater set of interests (see also Cox 1987).

We may expect legislators to be particularly responsive to a greater set of interests when either: i) they are first faced with incentives to compete; or ii) when the increase in the size of the electorate is such that the number of electors in some constituencies changes dramatically. In both cases, there is a structural break that should particularly affect MPs who can count less on personal relations—i.e. those running in large constituencies. We should therefore witness such effects in particular in 1832—when elections were first made more competitive as elucidated above—and in 1867, when the voting population more than doubled.

Here, we can apply the logic of the DiD design, which leverages changes to individuals pre- and post-treatment to investigate the group-level effects of the electoral reform. The data offer us a setting where the sample is divided into a control and treatment group, and contains individuals whose constituency size did not increase (or to a very limited extent) and those who faced a much more greater voting population in their district post-reform. We create a number of temporal cut-offs at the first election run after each reform act to isolate the effect of the variable of interest. These breaks constitute the “treatment” and allow us to investigate the effect of electoral reform on legislator behaviour. The analysis includes four distinct periods:

- 1811–1831: the period prior to the First Reform Act;

- 1832–1868: the time from the first general election after the First Reform Act until the first ballot under the Second Reform Act;
- 1869–1885: the period from the first election under the Second Reform Act until the first election under the Third Reform Act;
- 1886–1918: all parliaments elected under the Third Reform Act.

To gauge the effect of constituency size, I estimate a Bayesian linear model with Markov Chain Monte Carlo (MCMC) simulation with Gibbs sampling.²⁰ The outcome variable is `DEBATE PARTICIPATION`, defined as the number of times that a legislator is recorded as having spoken, as estimated on the basis of the speeches dataset developed in Chapter 3. To aid convergence, the variable is mean-centred and divided by $2 \times \text{SD}$. The main predictor is the number of electors in the constituency from which the legislator was elected (`ELECTORS`), which is considered a proxy for the number of interests that the MP has to represent. The variable is reshaped into deciles to address extreme outliers. Control variables include `VOTE SHARE`²¹ (votes cast divided by `ELECTORS`), and `SENIORITY`.²² Data on constituency size and vote share are taken from Eggers and Spirling (2014a), and matched to my dataset (see Section 3.5 in Chapter 3).²³

Figure 5.2 plots the credible intervals (CIs) and the means of the posterior distributions from the estimation.²⁴ We can see from the CIs that electoral considerations already have an effect after the 1832 reform: the credible interval includes zero, but is mildly statistically distinguishable from zero at $\Pr(\beta \neq 0) = 92\%$. The variable continues to exercise a positive and statistically significant

²⁰100,000 iterations; discarding 50,000 as a burn-in period; and summarising the remaining 50,000 iterations. Priors are uninformative, uniform normal ($U(-10, 10)$)

²¹This variable is included as previous research shows that the marginality of a legislator’s seat impacts speaking behaviour (cf. Eggers and Spirling 2014a).

²²`SENIORITY` is measured as the number of years between the first appearance in the parliamentary records of the legislator and the year for which we have an observation.

²³See the *election_returns.csv* and *elections.csv* spreadsheets, http://andy.egge.rs/data/csv_archive_20141024.zip.

²⁴A more detailed discussion of the advantages of Bayesian estimation over frequentist statistics is given in Chapter 6.

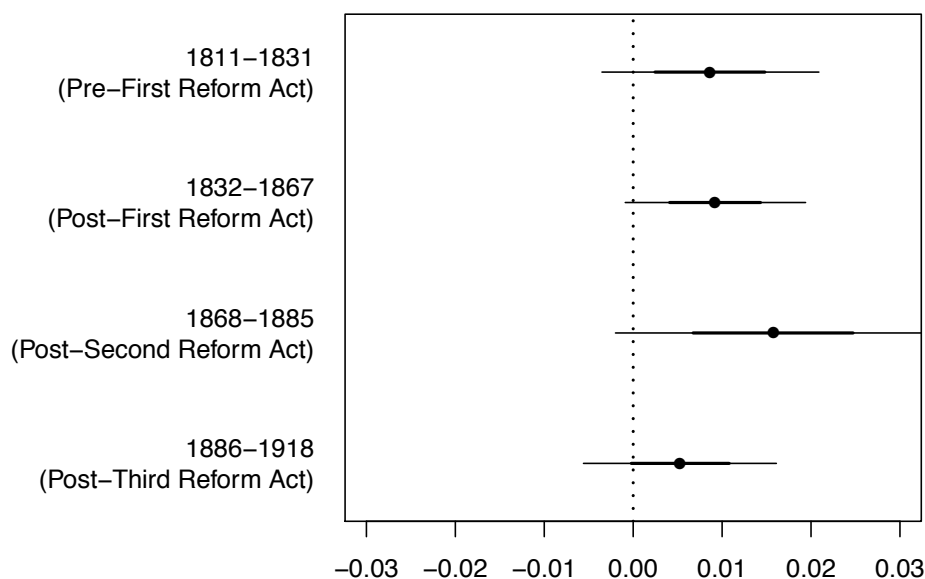


Figure 5.2: Credible Intervals Debate Participation, 1811–2015

Notes: Black dots represent the posterior means; the shorter, thicker lines are the 68% credible intervals; and the longer, thinner lines represent the 95% credible intervals of the predictors of debate participation (1811–2015). Estimates based on models as reported in Tables C5–C8 in Appendix C.

effect in the period after the Second Reform Act²⁵, but ceases to do so after 1885. These findings suggest that MPs were responsive to the number of interests they needed to represent in these two periods, and by extension, that legislators already felt such pressures directly following the introduction of the First Reform Act. The progressive development of an electoral connection between voters and legislators post-1832 led to a situation where time became a desirable resource over which MPs competed in the plenary.

Robustness

All models reported in Appendix C (Tables C5–C8) pass common standards of convergence as measured by the Gelman-Rubin and Geweke Z-score diagnostics (results not reported). Plots of the posterior predictive distributions (PPDs) of the simulated means compared to the empirical mean are provided as a measure of model fit. The logic behind these plots is to evaluate how well we are able to

²⁵ $CI_{95} = [0.01, 0.005]$; $\Pr(\beta \neq 0) = 96\%$

reproduce the observed data through the model. All models show good fit, as the inferred means are close to the mean as observed in the sample (Gelman and Hill 2007) (see Section C.3, Appendix C). I further re-ran the estimation while dividing the distribution of constituency size into pentiles, and while including fixed effects for party affiliation. The conclusions shown here remain unchanged in these specifications (results not reported).

5.5 Group Size and Cohesion: Undermining the Prerequisites for Informal Cooperation

Having established that the electoral reforms plausibly induced time scarcity, we now move on to the second variable of interest identified by the theory: group composition. Here, I point to important changes that undermine patterns of informal cooperation, both resulting from the exogenous shock of electoral reform: i) an increase in the effective size of the group that collaborated in Parliament; and ii) a decrease in the socio-economic homogeneity of the House’s membership.

5.5.1 *Effective Size: Greater Participation*

Did the reforms lead to a greater effective size of the group of actors in Parliament, i.e. in participation levels? To come back to the theory: we are interested in observing an increase in the *effective size* of the group that participated in plenary debates. It is important to emphasise the distinction here between *time scarcity* and participation. Whereas the former is a function of the overall scope of activities of MPs—whether it be voting, speaking, or otherwise—and its claim on plenary time, the latter refers to the *size of the set of unique actors that participate in parliamentary business on a regular basis*. The expectation is that the electoral reforms led to the inclusion of a more diverse set of actors. As explained in Chapter 2, their inclusion is assumed to heighten information asymmetries and therefore undermine the costs of defection, which in turn opens up a window of opportunity for obstruction. We can investigate effective size through two proxies:

i) the number of MPs that participate in debates; ii) participation in divisions on bills.

Debate Participation

First, we consider participation by looking at the number of unique actors who spoke in a parliamentary session, and trace how this changes over time.²⁶ Table 5.4 shows this statistic for all parliaments from 1807 to 1900. For each parliamentary term, the table includes information on the average number of MPs who spoke during that period, the percentage share of the total membership of the Parliament that these participants represent, and the mean and median number of session days on which the House sat. Two observations stand out with regards to these data: i) a relatively high variability between terms; and ii) an up-going trend over time.²⁷

It is important to note that the House of Commons' membership was never small (it grew from 558 to 658 members in 1801 after the Union with Ireland). It was certainly not as sparsely occupied as the US Senate, which at the start of the nineteenth century counted little over thirty senators. However, attendance and participation were considerably lower prior to the Great Reform Act of 1832, and it grew steadily over the course of the 1900s (cf. Cox 1987, Table 6.1, p. 53). In 1820 only 201 MPs (30.5 per cent) were listed in the sessional index of the Hansard records as having spoken. By 1828, this number had risen to 241 (36.6 per cent), but in 1833, one year after the passing of the Great Reform Act, it surged to 395 (60 per cent).

Again, the changes after the Great Reform Act of 1832 are striking, showing a jump in participation rates from forty per cent in the 10th Parliament (starting in 1831) to sixty per cent in the years immediately following the reform (from 1833, 11th Parliament). Participation in debates subsequently declines for a short

²⁶Here I take a cut-off of at least five speeches for a speaker to be included, to exclude, for example, non-legislators giving evidence. (Please note that different spellings of MP names are addressed using fuzzy set matching.

²⁷These results correspond well with Cox (1987), who provides data on the number of unique MPs listed in the sessional index of Hansard (Cox 1987, Table 6.1, p. 53).

period until it stabilises again in the run-up to the 1867 Act (to 54 per cent). No critical juncture may be observed in 1867, but there is a spike after the Third Reform Act: in 1886 participation levels increase to 75 per cent, from 56 per cent in 1880. This finding again underlines the crucial change effected by the First Act.

Table 5.4: Participation in Debates, 1807–1900

Parliament	Election year	Unique speakers		Sitting days	
		<i>average</i>	<i>perc.</i>	<i>average</i>	<i>median</i>
4th	1807	161	24	93	72
5th	1813	160	24	147	73
6th	1819	199	30	161	67
7th	1820	209	32	146	83
8th	1827	255	39	144	97
9th	1831	234	36	183	50
10th	1831	262	40	72	93
11th	1833	392	60	63	136
12th	1835	378	57	67	124
13th	1837	275	42	80	102
14th	1841	289	44	97	119
15th	1847	281	43	50	91
16th	1852	276	42	76	103
17th	1857	277	42	136	52
18th	1859	352	54	155	91
19th	1866	377	57	89	81
20th	1868	353	54	99	112
21th	1874	365	56	82	96
22th	1880	362	56	76	60
23th	1886	501	75	54	81
24th	1886	462	69	92	87
25th	1892	425	63	94	74
26th	1895	475	71	95	82
27th	1900	447	67	83	63

Notes: Own compilation on the basis of my speeches dataset (see Chapter 3).

Divisions

A second indicator of effective size is the number of unique actors that engage in divisions on bills. The changed nature of the House's work after the First Reform Act is evidenced by its increased legislative role. For example, whereas the Parliament adopted 24 General Public Acts in the period 1810–1819, by 1820–1829 this had risen to 33, to 63 between 1829 and 1839, and to 90 for 1840–1849. This trend continued over the course of the second half of the nineteenth century (see Table 5.5).

Table 5.5: UK Public General Acts, 1810–2015

Years	Number of acts adopted
1810 - 1819	24
1820 - 1829	33
1830 - 1839	63
1840 - 1849	90
1850 - 1859	96
1860 - 1869	131
1870 - 1879	115
1880 - 1889	105
1890 - 1899	112
1900 - 1909	67
1910 - 1919	95
1920 - 1929	126
1930 - 1939	130
1940 - 1949	170
1950 - 1959	217
1960 - 1969	386
1970 - 1979	482
1980 - 1989	542
1990 - 1999	539
2000 - 2009	367
2010 - 2015	189

Notes: Own compilation on the basis of *The National Archives*, available at: www.legislation.gov.uk/ukpga.

An important question remains whether these bills were also voted on by a greater set of actors after the Reform Acts, whose varied interests needed to be taken into account. In *The Efficient Secret* (1987, pp. 58-59), Cox shows that debate participation is positively correlated with constituency size in the periods 1841–1847 and 1852–1857.²⁸ It is however of interest to consider participation rates in a broader time frame, to assess patterns prior to and after the Reform Acts.

Table 5.6: Participation in Divisions, 1835–1910

Parl.	(month/year)	Avg. participants	Perc. of MPs	Divisions
12th	(Feb. 1835-Jul. 1837)	151	22.26	368
13th	(Nov. 1837-Jun. 1841)	161	21.66	905
14th	(Aug. 1841-Jul. 1847)	163	19.68	1,039
15th	(Nov. 1847-Jul. 1852)	178	23.59	1,170
16th	(Nov. 1852-Mar. 1857)	185	24.13	915
17th	(Apr. 1857-Apr. 1859)	215	30.87	388
18th	(May 1859-Jul. 1865)	163	20.40	1,174
19th	(Feb. 1866-Jul. 1868)	210	29.06	410
20th	(Dec. 1868-Aug. 1873)	217	28.81	1,179
21th	(Mar. 1874-Mar. 1880)	211	27.11	1,519
22th	(Apr. 1880-Aug. 1885)	197	25.82	1,803
23th	(Jan. 1886-Jun. 1886)	247	36.33	139
24th	(Aug. 1886-Jun. 1892)	262	32.73	2,114
25th	(Aug. 1892-Jul. 1895)	333	46.96	833
26th	(Aug. 1895-Aug. 1900)	255	33.77	1,787
27th	(Dec. 1900-Aug. 1905)	305	40.19	2,112
28th	(Feb. 1906-Dec. 1909)	299	39.83	2,248
29th	(Feb. 1910-Nov. 1910)	353	52.15	159

Notes: Own compilation on the basis of Eggers and Spirling (2014a).

Table 5.6 shows the number of divisions and several statistics of participation for the period 1835–1910 (12th-29th Parliament). Participation is defined as the mean percentage of legislators who voted across all divisions held in the

²⁸Cox (1987) bases his assessment on data from Aydelotte (1954) and Bylsma (1968).

Parliament over the period. Unfortunately, our dataset does not pre-date the First Reform Act (1832). We can still, however, observe a number of interesting patterns. First, while we only witness a mild increase in the percentage of division participants (with the greatest hike after the Third Reform Act of 1884, from 26 to 36 per cent), the absolute number of participants *does* increase steadily over the period. While in 1832, only 151 legislators regularly participated in divisions, by 1857 that figure had risen to 215, only to grow further to 305 at the start of the twentieth century.

Table 5.7: Participation in Divisions by Constituency Size, 1835–1910

Parl.	(month/year)	Participation					
		5th perc.		25th-75th perc.		95th perc.	
12th	(Feb. 1835-Jul. 1837)	21.27	(217)	23.53	(1,653)	30.27	(11,550)
13th	(Nov. 1837-Jun. 1841)	17.93	(242)	23.00	(1,821)	27.78	(13,901)
14th	(Aug. 1841-Jul. 1847)	20.12	(241)	21.96	(1,769)	26.23	(14,792)
15th	(Nov. 1847-Jul. 1852)	25.43	(241)	25.05	(1,769)	29.45	(14,792)
16th	(Nov. 1852-Mar. 1857)	25.01	(262)	25.43	(1,878)	31.85	(17,296)
17th	(Apr. 1857-Apr. 1859)	29.85	(217)	31.11	(2,347)	38.00	(18,895)
18th	(May 1859-Jul. 1865)	18.50	(229)	21.49	(2,556)	28.49	(19,795)
19th	(Feb. 1866-Jul. 1868)	31.79	(307)	28.82	(3,068)	35.77	(11,762)
20th	(Dec. 1868-Aug. 1873)	19.96	(442)	29.86	(5,025)	45.56	(34,626)
21th	(Mar. 1874-Mar. 1880)	25.00	(464)	27.48	(5,299)	33.25	(42,128)
22th	(Apr. 1880-Aug. 1885)	22.81	(545)	28.24	(7,033)	30.17	(43,163)
23th	(Jan. 1886-Jun. 1886)	27.99	(3,030)	40.27	(8,630)	37.07	(18,130)
24th	(Aug. 1886-Jun. 1892)	27.61	(2,670)	35.24	(8,746)	34.03	(18,147)
25th	(Aug. 1892-Jul. 1895)	44.30	(3,064)	47.63	(9,760)	47.07	(20,724)
26th	(Aug. 1895-Aug. 1900)	38.62	(3,099)	35.25	(9,857)	30.59	(21,352)
27th	(Dec. 1900-Aug. 1905)	46.35	(3,148)	40.31	(10,117)	36.23	(22,550)
28th	(Feb. 1906-Dec. 1909)	39.43	(3,293)	42.63	(10,713)	36.01	(27,428)
29th	(Feb. 1910-Nov. 1910)	50.68	(3,445)	54.21	(11,200)	52.75	(30,140)

Notes: Own compilation on the basis of Eggers and Spirling (2014a).

Table 5.7 shows how participation breaks down by constituency size. The table includes the same data reported in Table 5.6, but now divided into three

classes of constituency size: small, medium, and large. The small category includes all districts that fall in the 5th percentile; the medium class includes the part of the distribution that runs from the 25th to the 75th percentile; and the large class includes voting areas that belong in the 95th percentile.

We again see an upward trend in levels of responsiveness both within parliaments (i.e. as a function of constituency size), and across time (i.e. an increase in all categories cross-temporally). For example, in the 1835–1837 parliament, average participation of MPs representing smaller constituencies was only 21 per cent; compared with 30 per cent for legislators holding seats in the larger districts. By the nineteenth Parliament (1866–1868), this former group has an average participation of about 31 per cent, whereas the latter has grown to 36; while by the 29th Parliament, these figures are 51 and 53 per cent respectively.

5.5.2 *Changes to the House’s Socio-Economic Composition*

Finally, we turn to the homogeneity of the group of legislators in the Parliament. Prior to 1832, MPs constituted a largely homogeneous demographic of landed aristocracy. Without a wage—MP salaries were introduced in 1911—and absent a cap on campaign expenditure, the road to Parliament was open exclusively to the wealthy. In *The Unreformed House of Commons*, Porritt estimates that in the period 1760 to 1832, nearly fifty per cent of Commons members were returned from “nomination boroughs”, i.e. constituencies controlled by a patron (also known as “rotten” or “proprietary” boroughs) (see also Hanham 1959). In Ireland, some seventeen boroughs were under the control of patrons; and Scottish constituencies were largely controlled by landed interests (Butler 1914, p. 175).²⁹

This uniformity of Parliament’s demography changed after the 1832 Reform Act, which engendered significant changes to the socio-economic composition of the House’s membership.³⁰ The Act was accompanied by a range of reforms that progressively removed restrictions on who was eligible to be elected member of the

²⁹Also note that the Irish statesman and writer J. W. Croker estimated in 1827 that some 276 MPs were returned from “nomination” boroughs.

³⁰This subsection is largely based on Rush (Chapter 4 2001).

House of Commons. These include religious restrictions (with the exception of Catholics until 1828 and orthodox Jews until 1858), and the property qualification (abolished in 1858).³¹

The changed socio-economic composition of the House is most clearly illustrated by the decline in the representation of the “landed interests”, shown in Table 5.8. The table includes data on the percentage of legislators sourced from key economic areas, including: i) landed interests; ii) the industrial sector; and iii) commercial and financial interests; iv) professional interests; and v) workers’ representatives. The data show that the share of legislators that are vested in landed interests declines from over fifty per cent in 1832, to little over a third in 1858, and to less than one in seven by 1900. This trend is most pronounced among the Whigs and Liberals (who account for the largest proportion of legislators over this period), where the percentage of landed interests is more than halved between 1832 and 1868. The drop in landed aristocracy in the 1880s is inevitably impacted by the agricultural depression of the 1880s, which disproportionately affected those whose wealth was tied up in land. However, so was the 1884 Reform Act, which enfranchised agricultural labourers, putting counties on an equal footing with towns (Rush 2001, p. 98).

Most of this vacuum is filled by industrial, commercial, and financial interests, which increase their share of seats from 27.3 (1832), to 43.1 (1868), and 52.2 per cent (1900). This is not altogether surprising, as the increased competitiveness of elections, coupled with the need for financial resources to bankroll campaigns, made industrialists likely prospective candidates.

The picture that emerges is one of a House of Commons whose membership is sourced from a more diverse demographic. MPs were still drawn from the upper echelons of society, but represented a greater variety of interests. Until the introduction of spending limits by the Corrupt and Illegal Practices (Prevention) Act of 1883 (e.g. Pugh 1999, p. 25), campaigns remained a costly affair only affordable to the lucky few.

³¹The ban on women MPs was lifted in 1918.

The under-presentation of Labour interests is striking in this context (Table 5.8). These developments were, as witnessed by these figures, largely confined to the period after 1900. Yet, we should not discount the influence of Chartism, which had strong links to the labour interest through trade unions and pressure groups such as the Reform League (35-37 Pugh 1999). Such links were fostered in the wake of the struggle over the Corn Laws and parliamentary reform prior to 1832, which brought together political leaders from the working class and middle-class radicals such as John Bright, and Richard Cobden. In spite of its diminished influence after 1848, Radicals in Parliament continued to defend Chartist ideas (universal male suffrage, the secret ballot—which would finally be adopted in 1872, and the remuneration of MPs).

Chartist support of Bright and Gladstone gave the movement a bridge into Parliament. The Trades Union Congress—established in the 1860s—finally managed to obtain legal status for unions through Gladstone's 1871 legislation. The right to picket in support of strikes was secured by unions under the 1875 Disraeli Cabinet. Both developments made the unions a formidable pressure group, which exercised indirect influence in Parliament. The working-class interest as such was largely represented through the Liberal Party, sealed by a deal in 1874 that allowed two trades unionist officials to run for Parliament without Liberal opposition, entering the House as Lib-Lab candidates. By the 1880s, about a dozen such candidates had secured a seat.³² Therefore, it stands to reason that labour interests were represented more strongly—albeit indirectly—than the figures in Table 5.8 might reveal.

³²In the 1880s and 1890s ideological opposition to capitalism, evidenced by high levels of unemployment and poverty, declining confidence in the ability of Gladstone's government to deliver, as well as the drastic increase in trade union membership, caused a rift between Liberals and working-class representatives. This spurred the development of a movement for independent labour representation.

Table 5.8: Economic Interests in the House of Commons, 1832, 1868, 1900

Economic interests	1832			1868			1900		
	All MPs	Tory/Con.	Whig/Lib.	All MPs	Tory/Con.	Whig/Lib.	All MPs	Tory/Con.	Whig/Lib.
Landed interests	52.4	58.3	52.8	34.0	47.3	26.7	15.5	21.2	9.0
Industrial, comm. & finan. interests	27.3	22.3	27.6	43.1	30.9	49.6	52.2	50.4	57.2
Professional interests	20.3	19.4	19.6	22.9	21.7	23.7	29.4	28.4	31.9
Workers' representatives	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	1.8
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0
Total	100.0	100.0	100.0	100	99.9	100.0	99.9	100.0	99.9
N	934	211	608	1,224	391	738	1,319	707	332

Notes: Reproduced from Rush (2001, Table 4.4); Original data from Thomas (1909, Section 1, Tables 1–5 and Section 2, Tables 1–6).

Overall, these figures paint the picture of a House whose membership after 1832 includes a more diverse set of actors, sourced from a more varied demographic than had previously been the case.

5.6 The End of the “Gentleman’s Agreement”: Changes to Norms and the Rise of Obstruction

The empirical evidence presented thus far suggests that 1832 proved a crucial turning point in the conduct of debate in the House of Commons. Whereas previously MPs recognised the same norms and standards that marked the boundaries of what is considered “appropriate” behaviour, they now find themselves at odds with incentives produced by exogenous pressures. Previously, filibustering presented significant personal costs that outstripped any potential benefit. Now it had become a crucial tool for MPs to maintain their policy influence. Specifically, electoral reform had created an environment where they had to be strategic and compete over plenary time among each other, which had become a highly desirable resource.

The breakdown of a relational, informal mode of cooperation meant that the House was left without an arbitration mechanism for the allocation of plenary time. Additionally, it had at this stage yet to establish a centralised mechanism to take its place. Over-exploitation of debate—effectively a depletion of the common-pool resource of plenary time—became the *modus operandi*. Such over-exploitation manifested itself as *filibustering*, which legislators needed to retain policy influence in an increasingly competitive plenary arena.

As early as in 1833, Mr Robert Steur recognises the change in incentives faced by MPs:

[I] must, however, protest against the noble Lord’s (Stormont) doctrine, that Members were not responsible to their constituents—that was, perhaps, the doctrine in the old Parliament, but it would not do in a Reformed Parliament (HC Deb, 21 February 1833, vol. 15, col. 1087).

These transformed incentives changed patterns of interaction among MPs as they had to operate in a larger group of active colleagues of a more diverse background, and defend a more varied set of interests. This development, in turn, upset the norms that had previously made cooperation without institutionalised rules possible. Anecdotal evidence seems to suggest that the proper conduct of debate—avoiding over-exploitation of plenary time—was subject to the prevalence of certain norms of conduct. Procedure in the pre-Reform Parliament is accurately summarised by Fraser (1960, p. 450, emphasis added):

The bias of the rules favoured minorities: they made for decision by consensus rather than by majority: they armed minorities with powers that freed them from coercion and promoted compromise. *A procedure of this kind could only work if all parties great and small were prepared to abide by the gentlemanly conventions which, much more than any written rules, determined what was permissible.*

Debate prior to 1832 was managed in a consensual way, founded on a common understanding between Ministers and opposition members that the former would divide plenary time on an equitable basis (Fraser 1960, p. 451). This view was widely shared and ingrained among MPs. For example, speaking on the Church Reform Bill in 1832, Lord Sandon (Tory, member for Liverpool) intimates:

It had always been the practice of the old Parliament to give the minority fair play—to allow them time to examine and state their objections to every measure that was proposed. He trusted that this good habit would be continued in the Reformed Parliament (HC Deb, 11 March 1833, vol. 16, col. 485).

As theorised in Chapter 2, the changed composition of the house (i.e. in terms of effective size and demography—demonstrated in this chapter) produced a breakdown in long-standing conventions that stipulated the boundaries of “acceptable” behaviour in the House. “Gentlemanly conventions” of debate disintegrated. Signs of a change would become apparent in the first decade after

the First Reform Act. It was no longer possible to divide time on the basis of "fair" and "equitable" division of time. Indeed, some members began to challenge long-standing conventions in the House.

5.6.1 *Challenging Conventions: "I Do Not Choose To Do As Other Members Have Done"*

This willingness to go against long-standing norms and practices is perhaps best illustrated by several interventions by Charles Shaw-Lefevre, who served as Speaker of the House from 1839 to 1857. The following episode from 1839, where the Speaker is challenged by the Radical Joseph Hume who seeks to table a bill on the extension of the franchise, stands out:

On Wednesday, Mr Hume rose to give notice, that on Tuesday the 12th of March—

Speaker: You can't do that.

Hume: Oh! but I can, Sir. (*A laugh, and cries of "Order!"*) There is no rule made on the subject.

Speaker: There may be no rule; but the question is, whether the honourable member will do as other members have done.

Hume: I do not choose to do as other members have done.[...]

Speaker: [...] if any individual member chooses to depart from a general understanding, it will be impossible to preserve order (*The Spectator* of 1839, also cited in Fraser (1960, p. 451)).

In this specific case, Hume, who first entered Parliament in 1812 for the Weymouth constituency in Dorset, made use of the right to raise a debate on the presentation of petition, which had by an informal agreement³³ between the front-benches fallen into disuse. It is striking how Hume explicitly departs from standing conventions in the House and in doing so resorts to the fact that there 'is no rule made on the subject.' The recognition of a lack of formal enforcement mechanisms is explicit. It is equally important to see how the Speaker is weary of

³³I.e. it had not been enforced via a resolution.

the adverse consequences of such individual decisions not to respect informal rules, noting that ‘it will be impossible to maintain order.’ In other words: it became clear at the time that informal conventions no longer had as much structuring power and that this could raise serious problems.

Another example of this tension between formal rules and what was considered “parliamentary conduct” may be found in 1840. Lord Stanley—the Conservative politician who was to serve as Prime Minister from 1866 to 1868—defends his choice to move a private bill instead of the Orders of the Day:

Lord John Russell: [...] he [Lord John Russell] considered, that it was a useful mode of transacting public business, that on certain days of the week, the measures of Government, on the proposition of some Member of Government, generally of the Member who occupied the station which he had then the honour to occupy, should be taken into consideration previously to any other; and he knew from experience that that mode was generally acquiesced in by all parties in the House. [...]

Lord Stanley: [...] So far, then, from this course of mine being either violent, unparliamentary, or unconstitutional, I assert that it is the course expressly pointed out by the orders of the House, as the only course which any hon. Member, unconnected with the Government, has of bringing measures fairly under the consideration of the House, when supported in opposition to the Government, by a considerable majority (HC Deb, 15 June 1840, vol. 54, cols. 1169-75).

Again, a long-standing rule—that Orders of the Day are moved first, is challenged. Lord Stanley also points to the need for backbenchers (‘any hon. Member, unconnected with the Government’) to employ such tactics to make their opinion heard (‘bringing measures fairly under the consideration of the House’). This willingness to challenge conventions was a crucial part of the transformation that was taking place in the Commons after the 1832 Reform Act. While these anecdotes constitute only two episodes, and we cannot conclusively demonstrate that the *norms* relating to obstruction changed, they do provide some indication

that there was contention over the norms of behaviour that had previously been dominant.

5.6.2 Increased Use of the “Speech-as-Filibuster”

Importantly, the tension between norms and conventions on the one hand, and members that seek to contravene them on the other, coincides with changes in *behaviour*. It is after 1832 that we see the first widespread use of obstruction in the House of Commons. Figure 5.3 shows the use of obstructive tactics in the House for the period 1811–1900. The degree of obstruction is measured on the basis of the occurrence of the word stem “obstruct*” in combination with the word “bill” or “business” in House of Commons Debates. The measure counts the number of speeches in a session that fulfil these criteria, and is normalised by dividing the count over the total speeches made in that session. The assumption, then, is that when members are accused of obstruction, the term will be used explicitly by their colleagues who challenge that behaviour, allowing us to pin down its usage.³⁴

The data in Figure 5.3 point to two grand periods of obstruction in the nineteenth-century House of Commons: i) the period right after the Great Reform Act (1830s–1850s); and ii) the period around Irish obstruction in the 1880s. This finding suggests that obstruction first became part of the standard repertoire of parliamentary tactics right after the First Reform Act, as the theory predicts.³⁵ As such, there is evidence to suggest that the final step of the theory—increased use of obstructive behaviour—correlated with important changes to time scarcity, group homogeneity, and the lack of formal enforcement mechanisms in the House.

³⁴Naturally, these data include a number of false positives (e.g. “obstruction of justice”). However, the added requirement of the word “bill” or “business” also occurring addresses this to some degree. In addition, it does not seem that the term obstruction is used in a substantively different way across the time period, which means that the false positive (or false negative) rate should not vary systematically over time.

³⁵It is also the first time that calls were made for the codification of rather far-reaching procedures to tackle the use of obstructive tactics. For example, as noted by Rush (2001, p. 72), talks on the need for a closure procedure were expressed as early as 1848, when then Speaker Charles Shaw Lefevre urged for its adoption—a plea he would repeat before the Procedure Committee in 1854.

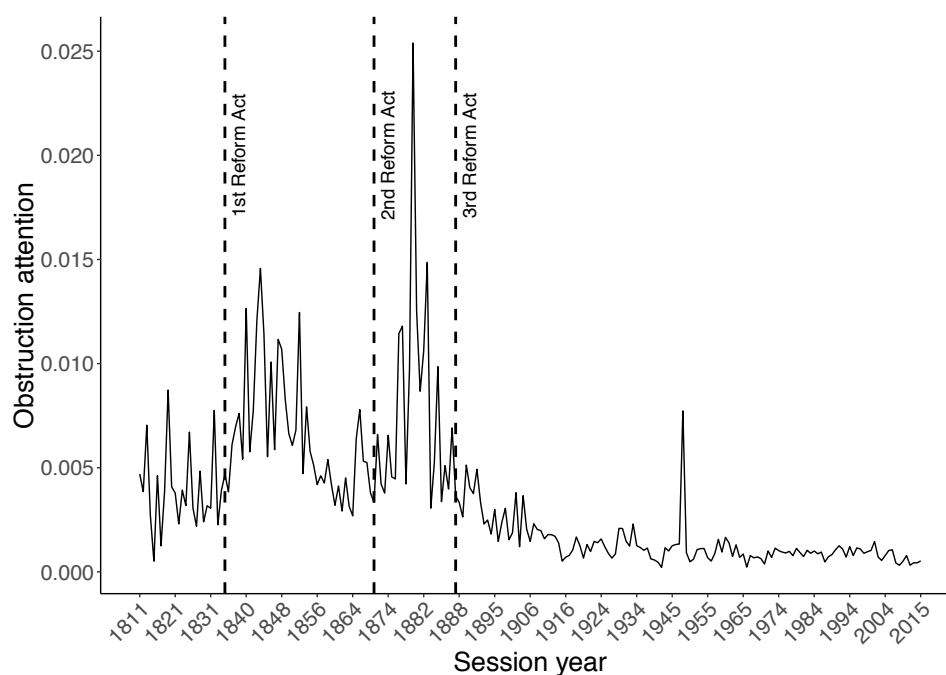


Figure 5.3: Obstruction Attention, 1811–1900

Notes: Graph shows the sessional average mention of the word stem “obstruction” in conjunction with the word “bill” or “business”. Dashed vertical lines indicate sessions during which the Reform Acts were adopted.

5.7 Conclusions

This chapter has provided an empirical basis for the first hypothesis of the theory, which links electoral reform to the creation of a procedural dilemma. In summary, I have shown the following. Electoral reform at the start of the nineteenth century caused a common resource problem to emerge. The extension of the vote to previously disenfranchised groups as well as the creation of an electoral connection engendered a breakdown of informal modes of cooperation in the House of Commons. Legislators sought to use the plenary to promote their standing among their constituents and demonstrate their fitness for office. Over this period, parliamentarians truly became *representatives*. Whereas the period before the early nineteenth century was one of procedural stasis, the Great Reform Bill of 1832 heralded a new era where MPs had to compete over time with a more

diverse set of colleagues, defending a wider set of interests, and in the context of a “procedural state of nature”.

The growth in the size of the electorate can be credibly related to increases in time scarcity, both at the parliamentary and the individual level. Parliaments elected under a larger electorate were found to face a higher number of speeches of greater length. Individual-level tests show that this effect was most pronounced for representatives of larger constituencies. In all cases, it is found that strongest behavioural changes occurred by virtue of the 1832 reforms.

Subsequently, this chapter finds that the First Reform Act changed the effective size and homogeneity of the House’s membership. Participation rates in both divisions and debates grew in the period after the Great Reform Act. Meanwhile, the newly elected members represented a more diverse set of interests as the dominance of landed affairs declined. While behavioural incentives for MPs changed, no external arbiter existed yet to enforce cooperative behaviour. The conditions at the start of the nineteenth-century House of Commons—large group size, ideological heterogeneity, and the absence of enforcement mechanisms—united to undermine pre-existing boundaries on legislator behaviour. A breakdown of informal rules and standards ensued, which led to over-exploitation of the common-pool resource of plenary time. Filibustering (or: obstruction) became a crucial tool for MPs to exercise policy influence.

To demonstrate this last step, this chapter has employed data on the use of obstructive tactics. Their use was found to have increased after 1832 in a context in which informal conventions were challenged. Whereas prior to 1832 MPs recognise the same norms and standards that mark the boundaries of what is considered “appropriate” behaviour, they now find themselves at odds with incentives produced by external events. Specifically, the increase in prolixity of members creates an environment in which MPs have to be strategic and compete over plenary time among each other, and with “privileged” members of the House (i.e. the front-benches).

As Parliament moved away from conventions, the codification of rules became part and parcel of the wider political game, with serious policy consequences. At the start of the nineteenth century MPs are faced with a parliament where there is no central authority, and over-exploitation of plenary time (i.e. obstruction) is rife. MPs face the dilemma of sacrificing individual power in the interest of the institution of Parliament as a whole, by adopting more restrictive rules. The next chapter tests the hypothesised mechanism by which members are able to extricate themselves from this “procedural dilemma”. Here, I will show that polarisation allows MPs to return to a new equilibrium—one that requires institutionalised rules to operate.

Preferences, Obstruction, and Unlimited Debate

Procedural Choice in the House of Commons, 1811–2015

This chapter examines the determinants of procedural choice in the UK House of Commons from 1811 to 2015, presenting a broad test of the impact of polarisation, obstruction, and party strength on the institutions that guide parliamentary debate. In so doing, it provides empirical tests of H2 and H3. These hypotheses respectively propose that: i) polarisation is positively related to the likelihood of procedural reform; and ii) its effect is contingent on the presence of obstruction under conditions of strongly institutionalised parties.

In investigating these theoretical propositions, the current chapter engages directly with the behavioural question that lies at the core of the thesis: *why do members of parliament accept limits to their rights?* My analysis provides concrete evidence to suggest that variation in the constellation of political preferences among legislators within parties is the main explanation for the occurrence

of anti-dilatory reform. As such, this chapter presents, to my knowledge, the first systematic and comprehensive attempt to analyse the predictors of changes to the House of Commons' internal rules over an extended time frame, and sheds a new light on institution-building in Parliament.

My hypotheses are confirmed by empirical analysis. I demonstrate that under conditions of high party strength, sessions that are marked by obstruction *and* polarisation—i.e. concentration of similar preferences within parties—are more likely to witness the adoption of rules that provide fewer opportunities for unlimited debate. In turn, in the earlier periods of the development of the House, polarisation is both a necessary and sufficient condition for the adoption of more restrictive rules. I draw these conclusions on the basis of a series of Bayesian logistic regression models that estimate the effect of key predictors on a dependent variable that captures whether, on balance, a parliamentary session introduced greater restrictions on legislative debate, or not. These findings are robust to the inclusion of key other predictors, as well as the selection of priors and the exclusion of outliers in a variety of model specifications.

The remainder of the chapter is structured as follows. First, Section 6.1 outlines the data and measures used in the models. Particular attention is paid to the measurement of party strength, which, for a lack of consistent time-variant data, is gauged by dividing our data into three key periods of varying degrees of party institutionalisation. Subsequently, Section 6.2 proceeds to the estimation and results, while Section 6.3 tests the impact of party institutionalisation on procedural choice. Finally, Section 6.4 discusses the findings and concludes this chapter.

6.1 Data and Measures

The unit of analysis in this chapter is the *parliamentary session*, i.e. the (normally) yearly period during which the House meets to discuss legislative business, from the State Opening until the prorogation of Parliament. The quantitative measures are, therefore, defined at the sessional level. In this section, I discuss

the dependent variable (anti-dilatory reform), the determinants outlined in the theory chapter (ideological polarisation and obstruction), as well as a number of control variables. I first introduce my measure of institutional change; after which I consider the data and measurement of the independent variables and controls.

6.1.1 *Dependent Variable: Anti-dilatory Reform*

To test the theory developed in Chapter 2, I rely on the manually scored measure of institutional change as developed in Chapter 4, Section 4.3. To reiterate, this score reflects the scale of anti-dilatory change in a session by evaluating each amendment against a coding scheme. This scoring framework relies on two ideal-type constellations of rules across the *initiative*, *duration*, and *member speech* dimensions, with one constituting low and the other high dilatory power for the individual MP (Table 4.2). The original score is continuous and captures the balance of anti-dilatory (–) and dilatory power-enhancing (+) reforms.

In this chapter, the analysis focuses on historical instances of anti-dilatory reform, i.e. changes to the ability of individual MPs to stall legislative debates. The unit of analysis is the *presence* of anti-dilatory reform in every session of Parliament since 1811, i.e. whether the ability of MPs to delay legislative debate increases, on the whole. As such, the dependent is dichotomous, and represents whether a session was an “anti-dilatory reform session” (DV= 1), or not (DV= 0). To construct the outcome variable, I recode the manual scores from Chapter 4. If the overall sum is *negative*, reflecting a decrease in dilatory power, the session receives a score of “1”; otherwise, it is coded “0”. The dependent variable thus reflects the (non)occurrence of dilatory power for each session of the House of Commons over a period of 205 years (1811–2015). In total, the dataset includes this outcome variable for 231 sessions. Details of the reforms and coding decisions are shown in Table B1 in Appendix B.

6.1.2 Independent Variables

In this subsection, I describe the measurement of the independent variables. Table 6.1 provides descriptive statistics of the determinants for the full sample, the cases of change, and the cases of no change or pro-MP alterations to the House's rules of debate.

Table 6.1: Summary Statistics for Independent Variables

Variable	FULL SAMPLE		CHANGE		NO CHANGE	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Independent variables						
POLARISATION	0.69	0.08	0.72	0.08	0.68	0.09
OBSTRUCTION	4.98e-3	0.02	0.04	0.03	0.03	0.02
Controls						
WORKLOAD	0.81	0.44	0.78	0.44	0.82	0.43
MAJORITY SIZE	0.15	0.15	0.13	0.14	0.15	0.15
DAYS UNTIL ELECTION	775.74	654.43	866.77	547.77	752.50	678.37
PARTY SWITCH	0.14	0.35	0.09	0.28	0.15	0.36
EXISTING RESTRICTIONS	36.47	22.15	40.43	24.64	35.46	21.43
DAYS SINCE LAST REFORM	1,602.86	1,453.73	1,290.51	1,247.18	1,682.64	1,494.53
<i>N</i>	231		47		184	

Notes: Summary statistics based on the original variables, prior to transformations as used in the models.

The summary table already reveals a number of noteworthy patterns. First, although the difference is small, POLARISATION is higher in the sub-sample in which anti-dilatory change occurs than for sessions in which no such reform takes place (0.72 vs. 0.68). This may also be observed for OBSTRUCTION (0.04 vs.

0.03) and for EXISTING RESTRICTIONS. The opposite is true for all other variables, including, surprisingly, for WORKLOAD. Intuitively, we expect increased pressures on the Parliament’s agenda to induce legislators to introduce restrictions, as previous research has consistently found (see in particular Cooper and Young 1989; Cox 1987, 2006; Jenkins 1998). Without prejudicing the empirical analysis below, the summary statistics are, thus far, not incongruous with the hypotheses.

6.1.3 *Polarisation*

The main independent variable of interest, POLARISATION, is developed and validated in detail in Chapter 3. To reiterate: polarisation is measured as the predictive accuracy of a machine learning classifier model that seeks to categorise speeches into party labels on the basis of language use. The measure thus captures the degree to which members are linguistically (and, by assumption, also ideologically) proximate to their party colleagues.¹

In the models, I employ a more complex operationalisation of the polarisation variable: I take the average of the current and the preceding session, weighted by the number of sitting days. This choice is inspired by the fact that—as set out in the theory chapter—legislators need to build up some experience of sharing views on policy with their party colleagues over time *and* be able to rely on the continued presence of such shared views. To provide an example of how the variable is defined, let us assume the following:

- At session s polarisation is 0.8 and the number of sitting days 200;

¹Here, I take the implementation that balances parties as it most strongly approximates the concept of “proximity to party” that lies at the base of the theory (ref. 2 in Table 3.2). As shown in Chapter 3, in this implementation, the estimates are most strongly driven by the front-benches (i.e. the party leaders). Hence, they are an accurate reflection of the degree to which the views of members correspond to the privileged set of actors that are empowered when an anti-dilatory reform is adopted. Note, however, that the estimates from the implementations correlate strongly at the aggregate level (Table 3.3). Therefore, there is no reason to suspect that the results shown in this chapter would be substantively different had I used one of the other machine-learning-based measures.

- At the following session $s + 1$, polarisation is 0.7 and the number of sitting days is 120.

In this case, polarisation for session s is defined as: $0.8 * \frac{200}{200+120} + 0.7 * \frac{120}{200+120} = 0.76$. The idea behind this definition is that we have the most accurate representation of the levels of polarisation that legislators have experienced in session s . The test for the second hypothesis then becomes whether the presence of ideological proximity within parties over a longer time frame produces incentives for the adoption of anti-dilatory reform.

6.1.4 Obstruction

To measure the use of obstructive tactics in the House, I construct a new variable based on three indicators of obstruction. First, I consider the number of speakers that have engaged in speech-as-filibuster-type obstruction at least once in a session as a share of the total number of speakers during this session. I take this approach to account for relative changes in participation levels over time. As we are interested in behaviour at the very extreme of the spectrum, speech-as-filibuster behaviour is defined as the act of making a speech the length of which falls in the 99.9th percentile of a session. OBSTRUCTION thus is a direct reflection of the use of the plenary to stall legislative business.

Second, I analyse debates on adjournment motions. Similar to the US Congress (Binder 1996, p. 12), motions to adjourn were used in an obstructive fashion—indeed, Rutherford (1914, p. 169) describes it as ‘probably one of the most effective weapons used by obstructors.’² The variable is defined as the

²There is also ample evidence from the debates in the commons that the motion to adjourn was considered as such. For example, as early as in 1852, an exchange on the floor between the Speaker and members suggests this was common practice (HC Deb, 27 February 1852, vol. 119, col. 932):

‘[Mr Chisholm Anstey] begged to ask if the hon. Member was in order in bringing forward the question of the grant to Maynooth, on the Motion that the House should adjourn till the 12th of March?’

‘[The speaker] said, it was “in order” and usual for any hon. Member to address the House on a Motion for adjournment.’

number of speeches per session that mention adjournment-related terms, divided by the total number of speeches given in that session.³

Third, I consider mentions of the word stem “obstruct” in conjunction with the words “bill” or “business” (see also Chapter 5, page 243). This measure should reflect the degree to which legislators are concerned by the employment of obstructive tactics. In other words: when obstruction is mentioned, it stands to reason that it is done because of contention over its use.

The OBSTRUCTION measure used in the estimation is obtained by applying factor analysis to these three indicators, taking the first recovered dimension.

6.1.5 Party Strength

PARTY STRENGTH (or rather: institutionalisation) is arguably the most challenging variable to capture. The notion of “party strength” in common usage is a function of multiple factors, including the number of seats and discipline. Here, however, it denotes the presence of centralised party-level institutions, i.e. the degree to which parties are *institutionalised*. Such organisational capacity allows political parties to provide, in line with the theory, a more structured platform for exchanging views, logrolling, and building coalitions, as well as a strong party leadership that can attach costs to obstruction.

Capturing this variable over an extended period would require, for example, data on party funding, the size of administrative staff, the power of the party whips, or the availability of meeting premises. As such data are not available, I take an alternative strategy: I truncate my sample into three distinct periods that

‘[Mr Spooner] said, that the adjournment was often moved by hon. Members for the sake of addressing the House, and by no one had such a Motion been oftener taken advantage of than by the hon. and learned Member for Youghal.’

³Search terms: `adjourn`; `adjourned`; `adjournment`.

can be characterised as eras of low, medium, and high party institutionalisation. This allows me to isolate the effect of party institutionalisation to some degree.

Period 1: 1810–1880 (low party strength)⁴: Party institutions were in flux during the period 1810–1880. Party organisation slowly began to emerge over the first half of the nineteenth century (Cox 1987).⁵ For much of this time, the House was marked by loose factions of independently operating legislators (McLean 2001, p. 61). Three minority governments ruled Britain over this period. These include the First and Second ministries of the Conservative Derby government (1852 and 1858), and the Third Derby and First Disraeli Ministries of 1866 and 1868.⁶ These conditions were not conducive to the establishment of party-level institutions to facilitate cooperation and party disciplinary mechanisms.

Period 2: 1880–1945 (medium party strength)⁷: The early 1880s marked a structural break in terms of party strength. A number of developments stand out. First, the Irish Home Rule crisis of 1886 split the (Gladstonian) Liberal Party that had finally consolidated by the late 1880s (Pugh 1982) and undermined its support in Parliament. For two decades, the Unionists were to dominate the House (with a brief exception of a minority Liberal Government of 1892–1895, supported by the Irish Nationalists). In other words: the political forces that

⁴Includes the period starting from the 5th session of the 4th Parliament (1st November 1810) until the end of the 8th session of the 21st Parliament on 24th March 1880.

⁵While party strength continued to build over the period 1832–1846, conflicts over the Maynooth Grant of 1845—i.e. the provision of public funding to a Catholic seminary in Maynooth, Ireland—and the Repeal of the Corn Laws of 1846 blew it apart (McLean 2001, Chapter 2). During this period, Sir Robert Peel’s Tory administration (1840–1846) lost the support of key Cabinet figures. For much of the period from 1846 until the 1880s, the Tory party remained in a state of recovery, opening up Parliament for many—and less organised—parties, such as the Peelites (McLean 2001, Chapter 3).

⁶The only exceptions are 1857, when Palmerston’s Whigs managed to secure a clear majority, which soon crumbled, and 1868, when Gladstone secured victory over Disraeli’s Tory party.

⁷From the start of the 1st session of the 22nd Parliament (29th April 1880) until the end of the 10th session of the 37th Parliament (15th June 1945).

dominated Westminster shifted to new entrants that had to establish institutions of their own while the organisation of established parties slowly broke down.

Second, there was a structural shift in the basis of *local* political support as groups defending labour interests began to make their mark on politics (see Clarke 2004, Chapter 1, and in particular pp. 28–39).⁸ For myriad reasons, then, the period 1880–1945 is marked by progressive institutionalisation of parties—both at the parliament and the local level.⁹

Moreover, the Liberal party in particular started to develop a national-level organisation towards the end of the 1870s (Pugh 1999, p. 28). On the liberal side, local caucuses sprang up in support of the radical cause in Parliament. The National Liberal Foundation (NLF), founded in 1877, effectively incorporated many such groups into a national party structure, including the National Education League, the Reform League, and the UK Alliance. On the Tory side, the National Union of Conservative Associations was established in 1867. In 1870, it was complemented by a Conservative Central Office under direct control of the party leader Disraeli. However, the activities of both central party

⁸Prime among these new organisations was the Trades Union Congress (TUC), which successfully lobbied the government on labour legislation. By the start of the twentieth century, Britain numbered over 1,300 trade unions with a collective membership of over two million. Their numbers were strengthened when the Third Reform Act of 1884–5 added the miner demographic to the Liberal-Labour coalition. Early attempts failed to secure national representation through the Independent Labour Party (ILP). The 1900 Labour Representation Committee (LRC) proved more effective, bringing together a number of affiliated trade unions. As these organisations rose and began to make their mark on politics and British life, they remained under challenge in the Courts, where several rulings made them liable for damages incurred by employers suffered as a consequence of trade disputes. The emergence of “organised labour” during this period put Labour—in spite of a Progressive entente between socialist leader and later first Labour PM Ramsay MacDonald and Liberal chief whip Herbert Gladstone—at odds with Liberals, which continued to prioritise free trade principles over labour protections. The parties continued to vie for the progressive vote over the first three decades of the twentieth century, as Labour slowly overtook the Liberals throughout the 1920s until 1929.

⁹This is perhaps most accurately described in Martin Pugh’s *State & Society* (1982, p. 21, emphasis added):

From the 1870s onwards, Victorian politics revolved increasingly around two coherent political parties. The traditional character of politics became anachronistic, both because of the polarization between Gladstone and Disraeli *and because of the steady evolution of two elaborate party machines equipped with the professional organisation, local branches, large membership, annual conferences, and the official party policies that characterize modern parties.*

organisations—for Whigs *and* Tories—were initially largely confined to the *local* level (although they arguably did exercise some influence on national-level policy making).

The Representation of the People Act of 1918 served to incentivise the creation of local party branches for the nascent Labour Party (Pugh 1999, pp. 199–200). The reform act increased the size of the electorate to 21 million. A large proportion were working class voters, allowing the party to tap into a new membership of 3.5 million fee-paying trade union members. Local party associations were increasingly incorporated at the national level, with headquarters affiliations increasing to 626 in 1924, up from only 397 in 1918.

The above paints the picture of party organisation in its infancy as we enter the 1880s. The continued and successive competition for dominance between Liberals and Unionists, Labour and Liberals, and other, smaller factions, meant that, to a large degree, party institutions were largely in flux and remained in a developmental phase.¹⁰ Yet it is also clear that the years 1880–1945 marked an era during which party institutions were constructed, albeit at the local level. We see the creation of mass suffrage parties, but not yet the transition to “catch-all” parties in the Kirchheimian sense (Kirchheimer 1966).

Period 3: 1945–2015 (high party strength)¹¹: It is only after WWII that we see the consolidation of party institutions, marking the advent of a period that we may characterise as one of “high party strength”. In 1945, Labour consolidated its position as the second major party in British politics, winning 400 parliamentary seats in the election of 26th July 1945, leaving the Conservatives behind at little over 200. Labour’s victory coincided with important social post-war transformations that would mark the rise of the “catch-all party” (Kirchheimer 1966), as traditional societal divisions broke down.

¹⁰Gladstone’s reluctant acceptance of the NLF, headed by Chamberlain, is a case in point.

¹¹From the opening of the 38th Parliament (1 Aug. 1945) until the end of the 55th Parliament on 26th March 2015.

The decline in focus on individual membership and the increasing professionalisation of the political parties placed the heart of institutionalisation at the national rather than the local level. This development is perhaps most starkly illustrated by the decline in individual membership over the post-WWII period (Table 6.2), and by the percentage share of total campaign spending accounted for by the central party in general elections (Table 6.3).

Table 6.2: Labour and Conservative Party Membership, 1960–1992

Year	Labour	Conservatives
1960	790,192	2,800,000
1974	691,889	1,500,000
1983	295,344	1,200,000
1987	288,829	1,000,000
1992	279,530	500,000

Notes: Table entries show the party membership numbers for a number of selected years for the Labour party and the Conservatives. Data taken from Webb (1994, p. 113, Table 5.2).

Table 6.3: Labour and Conservative Central Party Spending, 1964–1992

Year	Perc. (spending in £'000)	
	Labour	Conservatives
1964	42.1 (350)	30.3 (451.6)
1966	51.4 (630)	50.4 (517.5)
1970	46.1 (680)	38.5 (702.1)
1974 Feb.	56.0 (950)	42.0 (724.5)
1974 Oct.	63.1 (2,333)	57.0 (1,181.8)
1983	64.4 (3,800)	54.9 (1,852.8)
1987	76.4 (9,000)	63.0 (2,468.7)
1992	79.1 (14,290)	70.3 (3,227.1)

Notes: Table entries show the percentage of campaign spending during election years by Labour and Conservative headquarters. Data taken from Webb (1994, p. 112, Table 5.1)

We can see a clear shift of resources to the party level. The two main political parties have become less reliant on individual membership, declining by over half a million for Labour¹², and over 2.1 million for the Conservatives over the period 1964–1992. Concurrently, the portion of campaign spending under centralised control has also increased drastically, almost twofold for the Labour Party, and more than twice for the Tories. We see the development of the professional party in the post-WWII period, from the advent of the “catch-all party” (Kirchheimer 1966), and, over the course of the twentieth century, the creation of centralised party machineries that were no longer dependent on individual members for preference aggregation as envisioned by Panebianco (1988).

Concerns with Truncating the Sample

One concern with the approach outlined here is that these cut-offs could represent some dynamic different from party strength. It is possible that there are temporal confounders that we are capturing by splitting our sample. First, we may be representing increased procedural complexity over time. However, if this split simply represented an accumulation of procedures, we would—assuming we want to pin down three distinct periods—divide our sample at different times. Table 4.1 in Chapter 4 shows that around a third of amendments had been passed by 1910; two thirds by 1980, and the remaining third of changes were passed between 1980 and 2015. The greatest degree of procedural complexity was achieved in the twentieth century. Our sample split(s) would thus lie at different points in time if we were to take the volume of rules as our variable of interest.

Another possible confounder is the rise and expansion of the press over this period, which may have increased pressures for more parliamentary behaviour among legislators, and therefore eased the adoption of procedural restrictions. The most important growth in, for example, the number of newspapers, occurred in the period 1830–1850 after the relaxation and removal of several taxes such

¹²The steep drop in individual membership post-1980 for Labour is to a large degree caused by a change in party rules, which required local organisations to have at least 1,000 members to become affiliated (Webb 1994, p. 114).

as the advertisement duty (1833), and the abolishment of the paper duty and the stamp duty (1836) (Cox 1987, Table 2.1, p. 13). Meanwhile, the British Broadcasting Company (BBC) began to send out daily radio transmissions in 1922, representing another important advance in political reporting. The first forays into television were made by the BBC in the early 1930s. Other significant media-related changes occurred much later in the twentieth century, with the invention of the Internet by English scientist Tim Berners-Lee in 1989, and the growth of social media in the twenty-first century. If we were to split the sample to capture these dynamics, we would thus likely focus on the years 1830, 1922, and 1989.

In spite of possible alternative dynamics and time-varying confounders associated with the three periods outlined above, the cut-offs chosen are likely to accurately represent—or to correlate strongly with—important features related to the changing nature of political parties in the UK system.

6.1.6 Control Variables

I control for a number of predictors in the models that have in previous research been shown to impact procedural choice.

WORKLOAD: According to the efficiency account of legislative organisation—set out in greater detail in the introduction to this dissertation—a parliament adopts restrictive rules in order to deal with the pressures imposed by a busy agenda (e.g. Cooper and Young 1989; Jenkins 1998). In a legislative state of nature every representative enjoys equal access to the floor. As all bills require formal assent, a rise in demands on the plenary agenda produces a plenary bottleneck that legislators need to deal with by implementing restrictive rules. To account for this (potentially) confounding explanation, I control for workload.

As a measure of workload, I consider the average number of speeches made per session day, interacted with their average length (measured as the number of words). These numbers are calculated on the basis of my dataset of Commons

speeches (the data gathering process is described in Chapter 3 and Appendix A). Here, I take a direct measure of the time pressure experienced by MPs as a consequence of their colleagues' behaviour. It captures what MPs may experience in the plenary, and is an indicator of the challenges they will face when navigating their bill through the House.

However, there are disparities in the way in which the data is recorded in the parliamentary archives. Prior to 1909 outside reporters published records of the debates. The most comprehensive effort at the time was made by William Cobbett, who relied on newspaper items and members to produce the first semi-official records of parliamentary speeches. Cobbett's work was and is widely regarded as the most authoritative and authentic record of parliamentary speeches of this time period. The quality of Hansard improved further in the late nineteenth century, when it started receiving subsidies. After 1909, parliamentary staff began to produce verbatim records of the members' speeches in accordance with a structured format.

We may expect that the length of speeches varies as a function of the procedure by which it was recorded. To address this issue, I smooth the variable in five periods: from 1811 up until the end of the first series of Hansard in February 1820, the second, third, and fourth Hansard series (April 1820–July 1830; Oct 1830–August 1891; February 1892–December 1908), and a fifth period that runs from the start of the first series when Parliament took charge of the records itself (1909–2015). To allow for temporal comparison, I weight each period by dividing the length of each individual speech by two standard deviations. This weighted variable constitutes the measure of length that is interacted with the number of speeches made to constitute *WORKLOAD*.

MAJORITY SIZE: (Binder 1996, 1997) argues that the size of the majority party is a predictor of reform. Majority size is measured as the number of seats held by the government minus those held by opposition parties, divided by the total number of available seats in the House during the session in question. Data for

the period between 1832 and 2015 are taken from Rallings and Thrasher (2012), and from *History of Parliament Online* for the period 1811–1832.¹³

PARTY SWITCH: I control for changes in party control to account for the possibility that parties respond to an anticipated loss of power by “stacking the deck” against their successors (e.g. Cox and McCubbins 1993, 1997). A parliamentary session that is followed by a change in the governing party is scored as “1”; all other sessions are coded “0”.

DAYS UNTIL ELECTION: Because previous work suggests that imminent elections may motivate the ruling party to expedite reforms (e.g. Huber 1992), I include the square root of the number of days until election.^{14,15}

EXISTING RESTRICTIONS: I control for the number of anti-dilatory rules in place. This number is established on the basis of the same typology as used for the dependent variable (see Table 4.3), and is set to zero for the year 1811. It therefore

¹³I was unable to verify the size of the Conservative majority between 1826 and 1830. Secondary literature suggests the Conservatives did retain an advantage, and that their seat share grew, but no specific number is provided. For the dataset, I decided—rather arbitrarily so—to increase the absolute seat share from 20 in the previous to 30 in this parliament.

¹⁴The variable counts the number of days between that day and the first day of the election (if it spans multiple days) or simply the day itself if it only comprised one. Session dates are taken from Cook and Keith (1975) and historyofparliamentonline.org for sessions prior to 1900, and from Butler and Butler (2000, pp. 192–193) for 1900–1999, and from the Parliament website for 2000–2014 (parliament.uk/about/faqs/house-of-commons-faqs/business-faq-page/recess-dates/recess/). If there was no reform, the distance between the session end date and the election is calculated (new Standing Orders are in a majority of cases adopted at the end of a parliamentary session). In case of multiple reforms in a session, I calculate the distance between the *average* adoption date and the date of the upcoming election date.

¹⁵The reason for taking the square root is to address non-normality (the data are strongly right-skewed); the transformation addresses this by inflating smaller values and stabilising larger ones.

captures the range of procedures in place at any one time that may be used to counter delaying tactics employed by MPs.

DAYS SINCE LAST REFORM: Finally, I include a continuous variable that counts the number of days that have lapsed since the last reform occurred. This accounts for the possibility that there is some deterministic, regular pattern of reform.¹⁶

6.2 Results

In what follows, I show the results of four sets of models. The first set consists of the estimates for the full sample, i.e. including all sessions between 1811 and 2015, after which I turn to the outcomes for low (1811–1880), medium (1880–1945), and high party strength (1945–2015) respectively. I shall however first discuss the model specification and estimation.

6.2.1 Model Specification and Estimation

Given the binary nature of the dependent variable, I use logit regression models to evaluate the impact of the determinants on the probability of institutional change. The models are fit with Bayesian estimation, using Markov Chain Monte Carlo simulation with Gibbs sampling. The advantage of using a Bayesian approach is that it allows us to obtain distributions for the parameters of interest (i.e. the coefficients), rather than estimating fixed values that are obtained with frequentist methods. The use of such distributions allows for a much more intuitive interpretation of statistical significance (see for example Gill 2014, Chapter 1, and in particular pp. 1-8).

Each estimation is run with 500,000 iterations and four chains, discarding 400,000 iterations as a burn-in period, and summarising the remaining 100,000

¹⁶In case of multiple amendments in one session, I take the average of the distances in days between each amendment date and the previous reform.

iterations (without thinning).¹⁷ Priors on the coefficients are non-informative multivariate normal ($N \sim (0, 0.01)$). Missing data is imputed in the models by specifying informed priors, based on the distribution of the available data.¹⁸ As advised by Gelman and Hill (2007, p. 56), and to speed up convergence of the Markov chains, I centre and rescale all independent variables by subtracting the mean from the predictors and dividing them by $2 * SD$ before using them in the models.

Moreover, to account for the possibility that the level of EXISTING RESTRICTIONS has increased over time due to a “secular” trend, this variable has been de-trended in the models.¹⁹ Finally, I verified the presence of potential multicollinearity between the predictors; all correlations were significantly below the critical threshold of 0.70.

Bayesian separation plots are provided as an indication of model fit (Greenhill, Ward, and Sacks 2011). The models show no signs of non-convergence according to the Gelman-Rubin diagnostic and the Geweke Z-score diagnostic (see Appendix D). To verify that the results are not driven by the selection of priors, I re-estimate the models using uniform priors (see Appendix D). This produces virtually identical results.

In what follows, I estimate four sets of models, one for the full sample; and another three for the periods of low (1811–1880), medium (1880–1945), and high (1945–2015) party strength.

¹⁷This applies to the full models that include all predictors; the bivariate and simple models reported in Appendix C are estimated with 200,000 iterations, discarding 100,000. Note that although earlier contributions in Bayesian analysis have claimed that thinning is necessary to address serial auto-correlation, the emerging consensus today is that this procedure is purely a *computational* convenience (see in particular Gelman and Shirley 2011, p. 171; but also Link and Eaton 2012, who claim that thinning ‘is often unnecessary and always inefficient, reducing the precision with which features of the Markov chain are summarised’). In practice, I found that using thinning did not have a noticeable effect on the estimates (results not reported).

¹⁸Some data are missing for the polarisation variable as some sessions were too short to use the SGD algorithm outlined in Chapter 3.

¹⁹To this end, I use the `pracma` package in R, which ‘computes the least-squares fit of a straight line [...] to the data and subtracts the resulting function from the data’ (Borchers n.d.)

6.2.2 Polarisation and Procedural Choice, 1811–2015 (H2)

According to my theory, sessions that experience high levels of polarisation at $t - 1$ and at t lead legislators to vote in favour of anti-dilatory reform. This expectation was formulated in Chapter 2 (page 87):

Polarisation (H2): Parliament is *more* likely to adopt anti-dilatory reforms in a given session when it is polarised, i.e. when there is a high concentration of shared preferences within the political parties in the House.

Let us first consider this expectation in the full sample. Figure 6.1 plots the credible intervals and the means of the posterior distributions from a model that includes the data for all sessions from 1811 to 2015. Table 6.4 reports detailed results, including the coefficients (posterior means) from the full Bayesian logit model, the posterior standard deviation, and the 95 per cent CIs.

The results are consistent with my main argument: POLARISATION has a positive effect on the likelihood of ANTI-DILATORY REFORM.²⁰ The credible interval of the posterior mean estimate ($CI_{95} = [0.41, 2.65]$) does not include zero, and is significant at $\Pr(\beta \neq 0) = 100\%$. Moreover, in the full sample, the effect of POLARISATION is not conditional on OBSTRUCTION. The latter variable has a negative, and mildly statistically significant effect ($CI_{95} = [-2.04, 0.29]$) as 92 per cent of the posterior distribution falls to the left of zero. The interaction with POLARISATION ($CI_{95} = [-0.38, 4.00]$) has a slightly larger effect: the mean of the posterior is 1.74 ($\Pr(\beta \neq 0) = 95\%$).

The substantive effect of POLARISATION is considerable (Figure 6.2). A one-unit increase in the predictor (from 0 to 1, which here represents moving two standard deviations away from the mean) produces an increase in the predicted probability of reform from about 0.18 to about 0.48. As values in this range are

²⁰This relationship also holds in a bivariate model, and models with fewer controls; see Tables D9–D11.

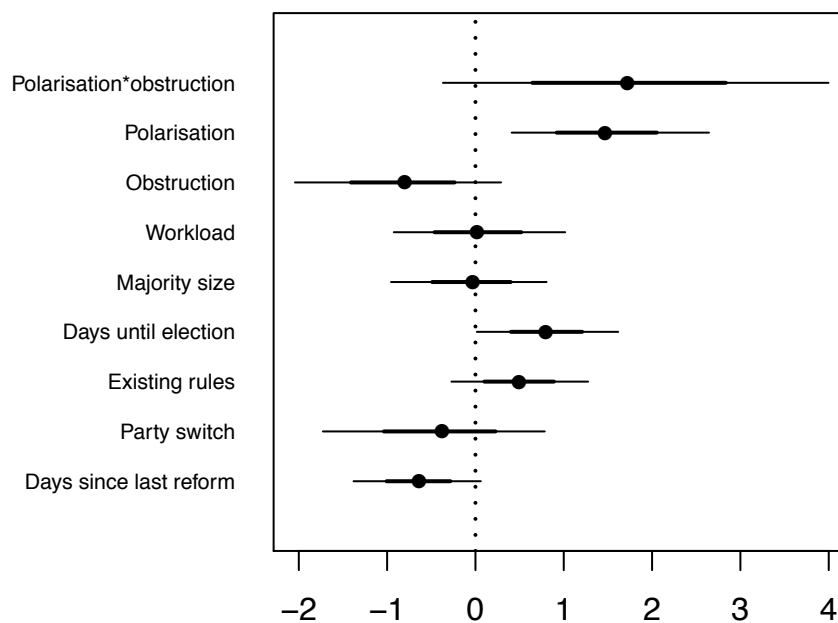


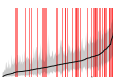
Figure 6.1: Credible Intervals (Full Sample, 1811–2015)

Notes: Black dots represent the posterior means; the shorter, thicker lines are the 68% credible intervals; and the longer, thinner lines represent the 95% credible intervals of the predictors of anti-dilatory reform. Estimates based on model as reported in Table 6.4.

frequent given the distribution of the variable (see the vertical lines on the x-axis, Figure 6.2), the increase in probability in this area is substantively significant.

We also witness variation in the effect of POLARISATION across the low, medium, and high party strength periods. Figure 6.3 plots the credible intervals and means of the posterior distributions of the POLARISATION parameter across these three different periods, as well as for the pooled analysis. The effect is clearly driven by the earlier two eras of reform (1811–1880 and 1880–1945). Although the 95 per cent CI does include the zero line in the low party strength era (second from the top, labelled “LPS”), this does not present a major challenge for my model, for two reasons. First, 89 per cent of the posterior distribution lies to the right of zero; in other words, there is an 89 per cent probability that this determinant exercises a positive effect on the likelihood of reform. This is a strong result given the number of predictors included (nine in total) and the number of observations ($n = 83$)

Table 6.4: Institutional Reform in the UK House of Commons (1811–2015), Bayesian Binary Logit Analysis

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	1.74	1.11	[−0.38, 4.00]	0.95
POLARISATION	1.49	0.57	[0.41, 2.65]	1.00
OBSTRUCTION	−0.82	0.59	[−2.04, 0.29]	0.92
Controls				
WORKLOAD <i>Logged</i>	0.03	0.49	[−0.92, 1.02]	0.52
MAJORITY SIZE	−0.04	0.45	[−0.95, 0.80]	0.53
DAYS UNTIL ELECTION <i>Square root</i>	0.80	0.41	[0.01, 1.62]	0.98
EXISTING RULES <i>De-trended</i>	0.49	0.40	[−0.27, 1.27]	0.90
PARTY SWITCH	−0.40	0.64	[−1.73, 0.79]	0.73
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.65	0.37	[−1.38, 0.06]	0.96
Constant	−1.81	0.27	[−2.37, −1.31]	1.00
N			231	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (Geweke plots are shown in Appendix D).

Model fit: AUROC = 0.62.

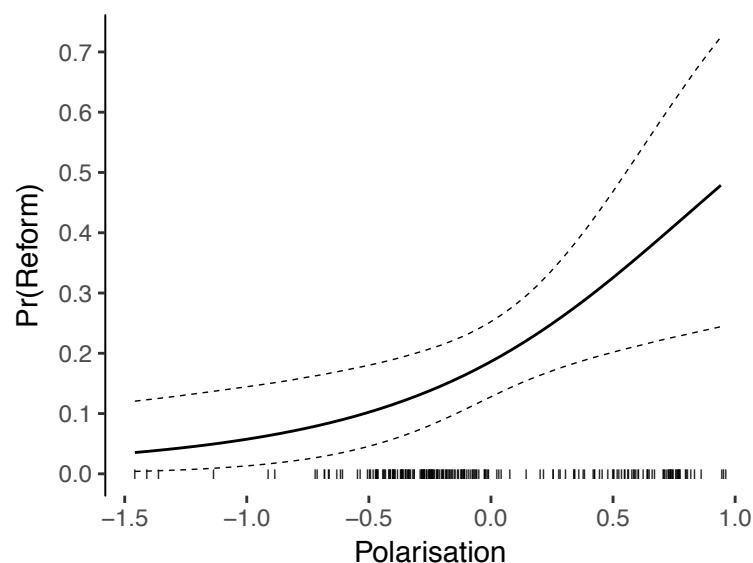


Figure 6.2: The Effect of Polarisation on Reform, Full Sample

Notes: Black line represents posterior distribution means of (simulated) predicted probabilities of reform at different levels of POLARISATION. Dashed lines represent the 95% credible intervals. Estimates based on the model as shown in Table 6.4.

Second, the posterior distribution of POLARISATION from a more parsimonious model that excludes some of the inefficient predictors (Table D15) shows a 96 probability of a positive effect given our data.

Finally, it is encouraging that a majority of anti-dilatory reform parliaments (55 per cent) are concentrated in the low and medium party strength era²¹—including the most influential ones such as the introduction of the Order Days (1811) and the closure rule (1882 & 1887). The explanatory power of POLARISATION in these key periods of reform, then, yields further support for the central hypothesis.

6.2.3 Control Variables and Model Fit

Figure 6.1 plots the posterior means and 95 per cent credible intervals of the simulated values for all parameters, based on the model reported in Table 6.4. The findings contest extant literature. Some results stand out. First, we do not

²¹Note that if we had considered a non-binary measure of reform, that figure would be much higher.

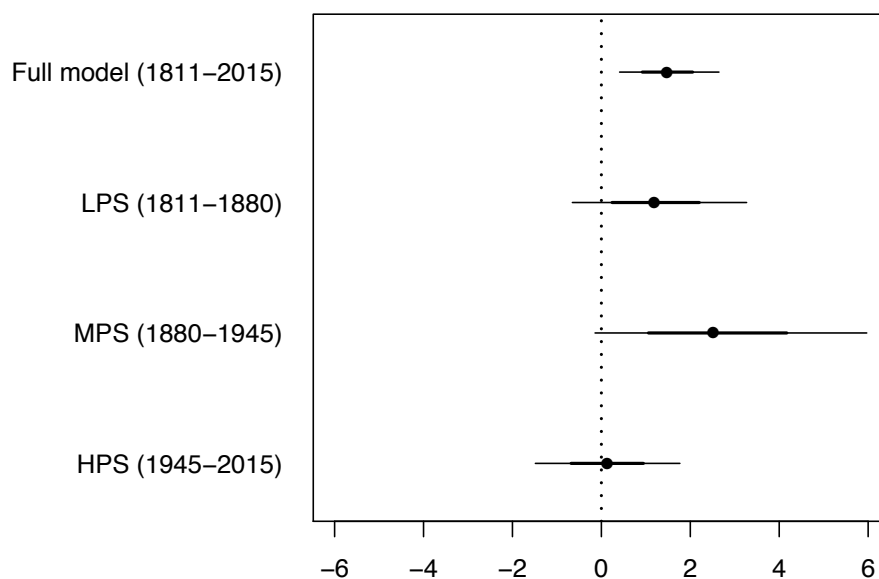


Figure 6.3: Credible Intervals for Polarisation

Notes: Black dots represent the posterior means; the shorter, thicker lines are the 68% credible intervals; and the longer, thinner lines represent the 95% credible intervals of the predictors of anti-dilatory reform in the full sample (1811–2015), low (1811–1880), medium (1880–1945), and high party strength (1945–2015). Estimates based on model as reported in Tables 6.4, 6.5, 6.6, and 6.7. Abbreviations: LPS = low party strength; MPS = medium party strength; HPS = high party strength.

observe the effect of *WORKLOAD* claimed by proponents of the efficiency narrative. The posterior estimates for this variable are nearly evenly distributed around zero ($CI_{95} = [-0.76, 1.16]$). In other words: reform in the House of Commons was not primarily driven by a concern for efficiency, to tackle a “plenary bottleneck”.

The findings thus far also largely contradict the conditional party government thesis. First, the posterior distribution of *MAJORITY* is almost equally divided between both sides of the zero-line ($CI_{95} = [-0.95, 0.80]$). For this variable, there is some disagreement between Binder (1996) and Dion (1997). Whereas the former argues that larger parties possess the strength to pass reforms; the latter posits that smaller majorities are more cohesive and therefore more likely to be able to pass reforms. Here, I find support for neither perspective, as 52 per cent of the posterior distribution lies to the left of the zero-line.

The estimated effects of the control variables provide further support for the notion that Standing Orders reform is not a matter of political expedience. An anticipated change in party control (PARTY SWITCH) makes Parliament *less* likely to adopt restrictive rules ($CI_{95} = [-1.73, 0.79]$ and $\Pr(\beta \neq 0) = 73\%$). And, witness the positive coefficient reform is more probable the further we are out from election day (DAYS BEFORE ELECTION). This finding is further evidence in favour of my preference polarisation model: it shows less short termism on behalf of MPs than the literature on institutional change in parliaments suggests (see also Binder 1996, on the US House of Representatives).

Model performance is acceptable for the pooled analysis, when we consider its ability to correctly classify the binary outcome variable. First, the area under the Receiver Operator Characteristic curve (AUROC)—a measure of accuracy, based on a plot of the true positive rate (sensitivity) against the false positive rate (1 - specificity)—is 0.62. Second, the Bayesian separation plot shows that the model predicts 0 and 1 cases well. The red bars represent instances where reform occurred; the black line represents the probability of reform; and the dark grey lines represent the variance. We see that high-probability predictions are matched by red lines (actual observations where change actually occurred). As the red vertical bars are predominantly on the right, the model appears to separate both possible outcomes relatively well.

6.3 Procedural Choice and Party Strength

Over time, agenda control in the UK House of Commons has increasingly shifted to the party leadership. Public Bills—proposed by government Ministers—and Private Members Bills²²—introduced by other MPs—have shifted to the realm of the front-benches. Yet, members remained free to propose amendments (at the report stage and at the final reading). An important question in relation to procedural choice (theorised in Section 2.4 of Chapter 2) is how political parties

²²Not to be confused with “Private Bills”, which are brought by private entities and local authorities, with the aim to change the law only as applicable specifically to the organisations in question.

relate to the general trends described above. In Chapter 2, I argued that the presence of party institutions should reduce the effect of POLARISATION, the impact of which now is contingent on the presence of OBSTRUCTION.

Instead of being motivated by simple agreement within political parties, the presence of party institutions that facilitate logrolling, coalition-forming, and other key policy-influencing mechanisms, means that MPs are generally more prone to empower the party and are less affected by shared preferences. However, if that party institution is threatened by obstruction from the other party *and* there are high levels of policy agreement within the party, legislators support anti-dilatory reform. The argument is summarised as the following proposition in Chapter 2 (page 90):

Polarisation and party strength (H3): Under strongly institution-alised political parties, the positive effect of polarisation on the likelihood of anti-dilatory reform is dependent on the presence of obstruction.

The rise of the professional political party and its changing organisational nature in the twentieth century, and the associated development in party-level institutions raises the question of to what extent MPs were able to capitalise on the opportunities that polarisation presents: ideological proximity to their colleagues and the policy power that it brings. We can investigate the effect of party institutionalisation by splitting the sample into the three periods identified above and running three separate models.

I again estimate Bayesian binary logistic regressions. The results are reported in Tables 6.5, 6.6, and 6.7 and are shown visually as credible intervals and posterior means in Figures 6.6, 6.7, and 6.8. The Bayesian separation plots as well as the AUROC (0.74, 0.78, and 0.71 respectively) suggest that the models perform well. I again obtain almost identical results when I run the models with uniform priors (Section D.3, Appendix D).

6.3.1 The Effect of POLARISATION*OBSTRUCTION

The main results in relation to H3 are summarised in Figure 6.4, which plots the posterior mean and credible interval of the effect of the interaction term between POLARISATION and OBSTRUCTION for all three periods, from the models that include all controls.

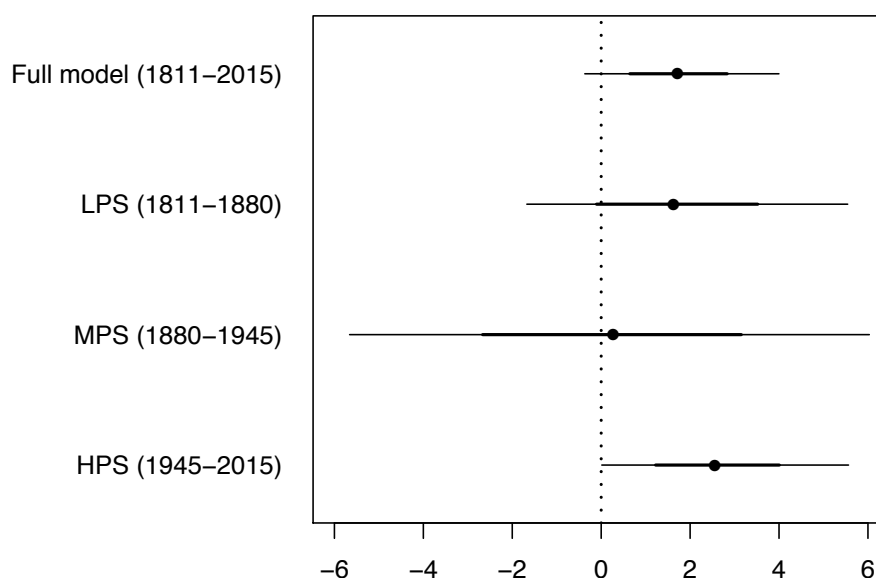


Figure 6.4: Credible Intervals for Polarisation*Obstruction

Notes: Black dots represent the posterior means; the shorter, thicker lines are the 68% credible intervals; and the longer, thinner lines represent the 95% credible intervals of the predictors of anti-dilatory reform in the full sample (1811–2015), low (1811–1880), medium (1880–1945), and high party strength (1945–2015). Estimates based on model as reported in Tables 6.5, 6.5, 6.6, and 6.7. Abbreviations: LPS = low party strength; MPS = medium party strength; HPS = high party strength.

The figure points to three conclusions. First POLARISATION *conditioned* by OBSTRUCTION does have the expected effect in the full sample. Figure 6.5 further demonstrates this finding: it plots three lines that show the probability of reform across the range of polarisation in the sample at three different levels of obstruction: the values that cut the distribution at the 5th, 50th, and 95th percentile respectively. Obstruction exercises the strongest effect at the higher end (95th percentile) of the distribution. However, as indicated in the preceding

section, the interaction only produces a slightly larger effect than POLARISATION on its own.

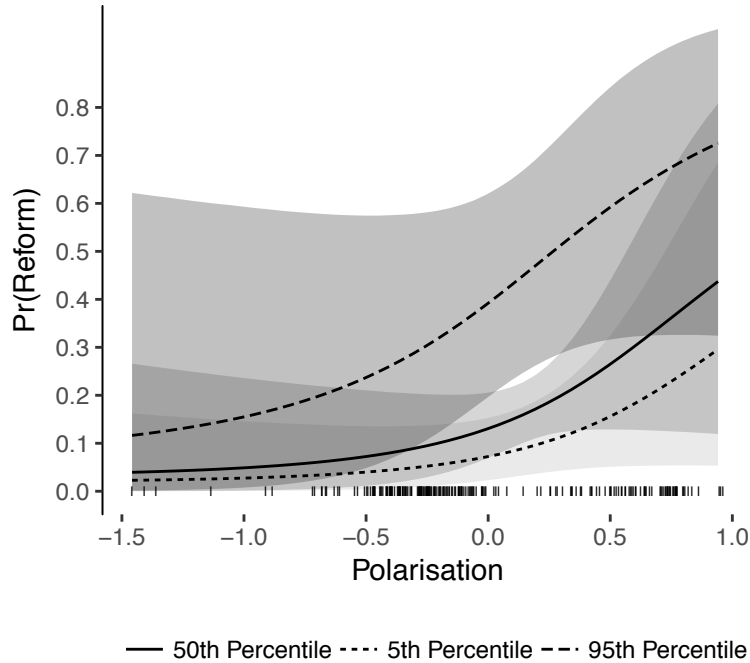


Figure 6.5: Effect of Polarisation*Obstruction, Full Sample

Notes: The lines represent the posterior distribution means of (simulated) predicted probabilities of reform at different levels of OBSTRUCTION (these include the 5th, 50th, and 95th percentiles). The grey ribbons represent the 95% credible intervals. Estimates based on the model as shown in Table 6.4.

Second, the interactive effect between POLARISATION and OBSTRUCTION seems to be conditional on the presence of strong party institutions as present post-WWII, confirming H3. In this model, 94 per cent of the CI lies to the left of zero ($CI_{95} = [-0.52, 4.75]$). Prior to including controls—with a 95 per cent credible interval of $[0.00, 5.07]$, and $\Pr(\beta \neq 0) = 100\%$ (Table D23). This conclusion is strengthened by the fact that the effect of either variable in isolation is not statistically distinguishable from zero.

Third, as becomes clear from Figure 6.3, there is no such observable effect in periods of low, or medium party strength. These results hold up in the full models as well as in the more basic specifications that only include the POLARISATION,

OBSTRUCTION, and the interaction between the two (see Tables D15 and D19 respectively).

In what follows, I highlight key results for each period of party institutionalisation, after which I turn to a discussion of the outcomes in light of the theory advanced in this dissertation.

6.3.2 *Low Party Strength (1811–1880)*

The model estimates for 1811–1880—shown in Figure 6.6 and Table 6.5—yield some interesting insights. First, it now seems that *WORKLOAD* *does* have a positive effect on the adoption of dilatory reform ($CI_{95} = [-0.53, 4.19]$), as does *OBSTRUCTION* ($CI_{95} = [-0.11, 3.86]$). The posterior distributions for both parameters lie largely to the right of the zero-line (93 and 97 per cent respectively). *OBSTRUCTION*, however, does not exercise a statistically significant effect in a bivariate specification and in a model that includes fewer predictors (see Section D.1, Appendix D).²³ This latter finding challenges other accounts of the House’s early development, which emphasise the impact of time scarcity and obstructive behaviour, in particular by the Irish Home Rulers (Cox 1987; Fraser 1960; Rutherford 1914).

Second, *POLARISATION* continues to exercise a positive effect ($CI_{95} = [-0.65, 3.27]$), as does the interaction term *POLARISATION*OBSTRUCTION*. The effect of the former is, however, not contingent on *OBSTRUCTION*. In addition, while over 80 per cent of the posterior distribution of *POLARISATION*OBSTRUCTION* falls to the right of zero, its effect is less statistically significant than that of either variable alone, and smaller than that of *OBSTRUCTION*. I therefore find that, in line with H2, *POLARISATION* independently exercises a positive effect on the likelihood of anti-dilatory reform in the low party strength era.

²³Also note that the bivariate specification yields an AUROC of 0.50, indicating that the model is unable to distinguish between 0 and 1 DV cases (i.e. between cases of anti-dilatory reform and of no reform).

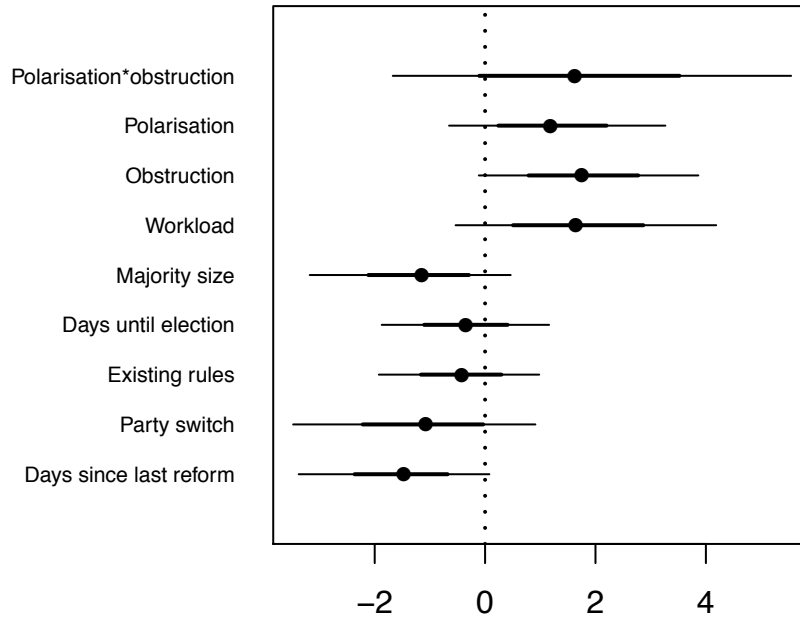


Figure 6.6: Credible Intervals (Low Party Strength, 1811–1880)

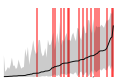
Notes: Black dots represent the posterior means; the shorter, thicker lines are the 68% credible intervals; and the longer, thinner lines represent the 95% credible intervals of the predictors of anti-dilatory reform under low party strength (1811–1880). Estimates based on model as reported in Table 6.5.

Finally, the variables that we might classify as “political expedience”-related either have a negative effect (i.e. MAJORITY and PARTY SWITCH at $\Pr(\beta \neq 0) = 91\%$ and $\Pr(\beta \neq 0) = 85\%$ respectively) or, in the case of DAYS BEFORE ELECTION, no statistically significant effect at all ($\Pr(\beta \neq 0) = 68\%$). Collectively, these findings suggest that on the whole reform during the low party strength era was largely a function of two separate dynamics: i) needs-driven incentives, where anti-dilatory rules were adopted in response to time scarcity; and ii) political-ideological incentives where procedures were made more restrictive when parties were more homogeneous

6.3.3 Medium Party Strength (1880–1945)

As we enter the era of medium party strength, after 1880, POLARISATION continues to have a positive impact on the likelihood of anti-dilatory reform (Figure 6.7

Table 6.5: Institutional Reform in the UK House of Commons (Low Party Strength, 1811–1880), Bayesian Binary Logit Analysis

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	1.71	1.84	[−1.67, 5.54]	0.82
POLARISATION	1.22	1.00	[−0.65, 3.27]	0.89
OBSTRUCTION	1.78	1.01	[−0.11, 3.86]	0.97
Controls				
WORKLOAD <i>Logged</i>	1.69	1.20	[−0.53, 4.19]	0.93
MAJORITY SIZE	−1.20	0.93	[−3.18, 0.46]	0.91
DAYS UNTIL ELECTION <i>Square root</i>	−0.35	0.77	[−1.87, 1.16]	0.68
EXISTING RULES <i>De-trended</i>	−0.43	0.74	[−1.92, 0.98]	0.72
PARTY SWITCH	−1.13	1.12	[−3.48, 0.91]	0.85
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−1.52	0.87	[−3.38, 0.08]	0.97
Constant	−2.00	0.46	[−2.97, −1.19]	1.00
N			83	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session ($x=1$), or not ($x=0$)?

Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (Geweke plots are shown in Appendix D).

Model fit: AUROC = 0.74.

and Table 6.6). We again find support for H2, witness the position of the 95 per cent CI for this parameter, which lies entirely to the right of the zero-line. In fact, $\Pr(\beta \neq 0) = 97\%$, making for a highly statistically significant effect. In addition, as in the LPS model, its effect is not amplified by OBSTRUCTION, which now exercises a negative effect at $\Pr(\beta \neq 0) = 98\%$ and $CI_{95} = [-6.06, -0.23]$, while, in interaction, no statistically significant effect may be observed witness the CI. Again, these conclusions hold up both in a full and in a simplified model (see Section D.1, Appendix D

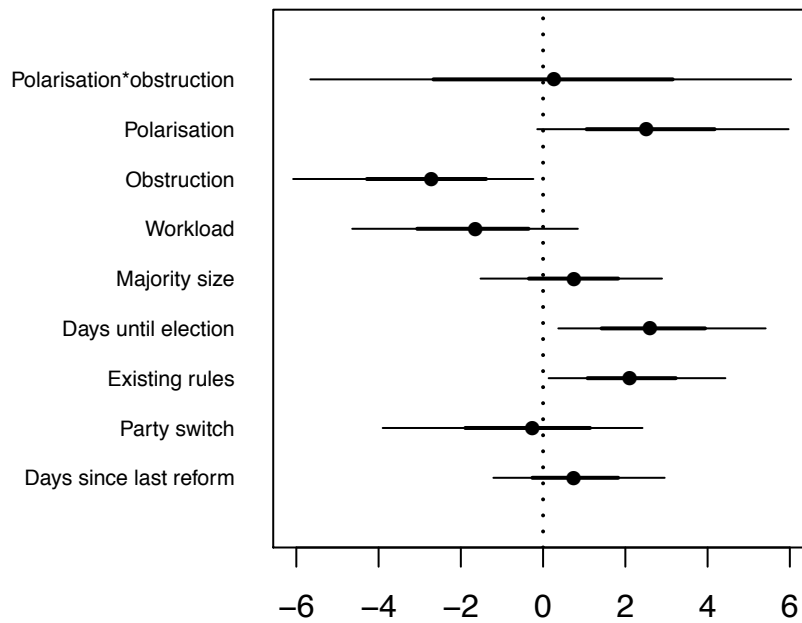
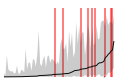


Figure 6.7: Credible Intervals (Medium Party Strength, 1880–1945)

Notes: Black dots represent the posterior means; the shorter, thicker lines are the 68% credible intervals; and the longer, thinner lines represent the 95% credible intervals of the predictors of anti-dilatory reform under medium party strength (1880–1945). Estimates based on model as reported in Table 6.6.

Interestingly, anti-dilatory reform no longer appears to be driven by issues of time scarcity—WORKLOAD exercises a *negative* effect—but rather exclusively by concerns over ideology. Whereas in the early period, time pressure was sufficient to produce anti-dilatory reform, we now see that Parliament moves away from such practical concerns, and that procedural change is a function of the

Table 6.6: Institutional Reform in the UK House of Commons (Medium Party Strength, 1880–1945), Bayesian Binary Logit Analysis

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	0.23	2.97	[−5.68, 6.04]	0.53
POLARISATION	2.62	1.57	[−0.14, 5.96]	0.97
OBSTRUCTION	−2.83	1.49	[−6.06, −0.23]	0.98
Controls				
WORKLOAD <i>Logged</i>	−1.71	1.39	[−4.63, 0.86]	0.90
MAJORITY SIZE	0.74	1.11	[−1.50, 2.89]	0.76
DAYS UNTIL ELECTION <i>Square root</i>	2.68	1.29	[0.38, 5.42]	0.99
EXISTING RULES <i>De-trended</i>	2.15	1.09	[0.14, 4.42]	0.98
PARTY SWITCH	−0.38	1.59	[−3.86, 2.40]	0.57
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	0.78	1.06	[−1.21, 2.94]	0.77
Constant	−3.54	0.79	[−5.30, −2.21]	1.00
N			77	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session ($x=1$), or not ($x=0$)?

Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (Geweke plots are shown in Appendix D).

Model fit: AUROC = 0.78.

constellation of policy preferences among members. In addition, other political considerations such as DAYS BEFORE ELECTION and MAJORITY SIZE now have a positive effect (with the former statistically significant at conventional standards at $\Pr(\beta \neq 0) = 99\%$).²⁴

6.3.4 High Party Strength (1945–2015)

In the high party strength era, our findings conform fully with H3. Table 6.7 reports the results from the Bayesian estimation, and Figure 6.8 shows these estimates visually as CI plots.

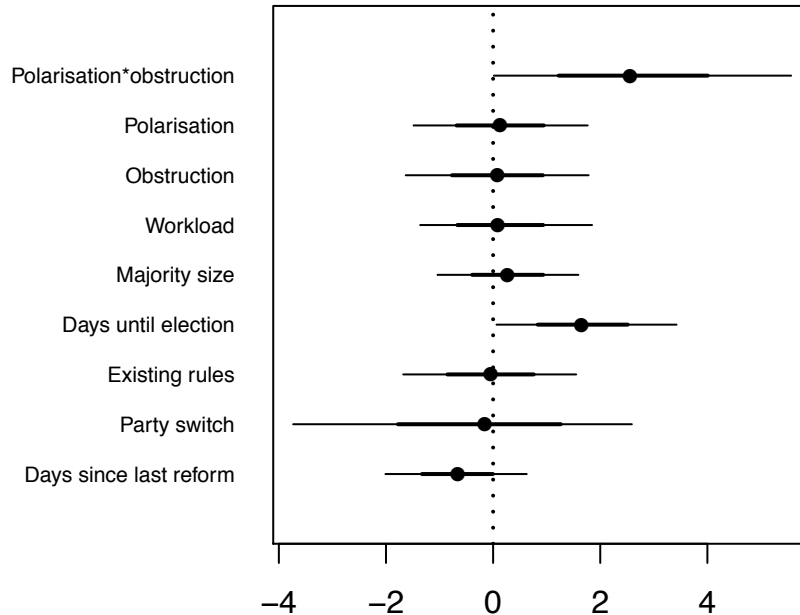


Figure 6.8: Credible Intervals (High Party Strength, 1945–2015)

Notes: Black dots represent the posterior means; the shorter, thicker lines are the 68% credible intervals; and the longer, thinner lines represent the 95% credible intervals of the predictors of anti-dilatory reform under high party strength (1945–2015). Estimates based on model as reported in Table 6.7.

Neither POLARISATION nor OBSTRUCTION exercise a statistically significant effect independent of one another. Yet, as pointed out above, in interaction they

²⁴For MAJORITY, $\Pr(\beta \neq 0) = 76\%$; although insignificant at conventional levels, this latter finding does seem to support Binder (1996) (see also above).

have an impact that is statistically distinguishable from zero, at $\Pr(\beta \neq 0) = 98\%$, with $CI_{95} = [0.01, 5.56]$. The result is also substantively significant. As Figure 6.9 shows, the probability of anti-dilatory reform rises from 0.09 to almost 0.30 as we move up one unit (i.e. two standard deviations from the mean) in the value of POLARISATION*OBSTRUCTION. It is important to note that this effect also holds up when removing outliers, which seem evident from the distribution of the data as shown on the x-axis in the figure (see discussion below).

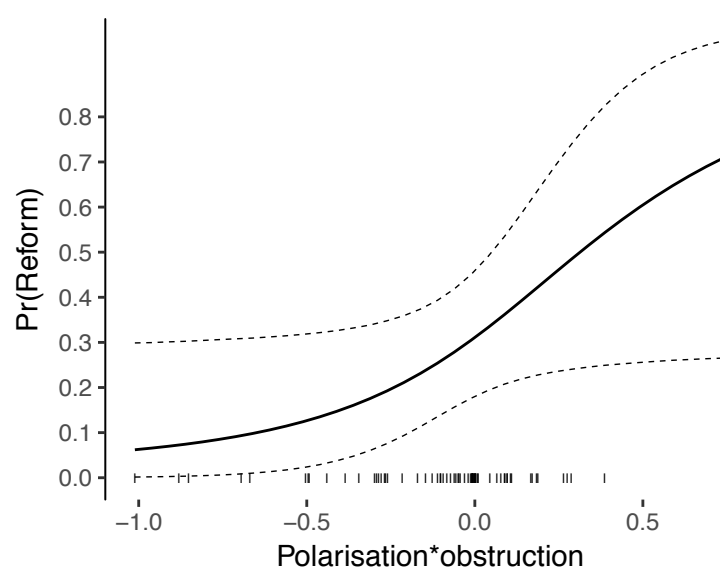
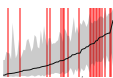


Figure 6.9: Effect of Polarisation Conditional on Obstruction (High Party Strength, 1945–2015)

Notes: Black line represents posterior distribution means of (simulated) predicted probabilities of reform at different levels of POLARISATION*OBSTRUCTION. Dashed lines represent the 95% credible intervals. Estimates based on the model as shown in Table 6.7.

Further, the determinants that were characterised as relating to “political expedience” in preceding sections produce mixed results. PARTY SWITCH no longer appears to matter; whereas DAYS BEFORE ELECTION *does* have an effect that is statistically distinguishable from zero. Given the way that this latter determinant is defined, this means that reforms are more likely to be adopted the further we are removed from a ballot. Finally, as in the medium party strength era, we find no evidence that efficiency concerns (i.e. WORKLOAD) are positively

Table 6.7: Institutional reform in the UK House of Commons (High Party Strength, 1945–2015), Bayesian Binary Logit Analysis

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	2.62	1.41	[0.01, 5.56]	0.98
POLARISATION	0.13	0.83	[-1.48, 1.77]	0.56
OBSTRUCTION	0.08	0.87	[-1.63, 1.78]	0.54
Controls				
WORKLOAD <i>Logged</i>	0.13	0.82	[-1.36, 1.85]	0.54
MAJORITY SIZE	0.27	0.67	[-1.04, 1.59]	0.66
DAYS UNTIL ELECTION <i>Square root</i>	1.67	0.85	[0.06, 3.42]	0.98
EXISTING RULES <i>De-trended</i>	−0.05	0.82	[-1.68, 1.55]	0.52
PARTY SWITCH	−0.26	1.60	[-3.73, 2.59]	0.54
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.67	0.67	[-2.01, 0.63]	0.84
Constant	−1.00	0.37	[-1.76, -0.32]	1.00
N			71	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (Geweke plots are shown in Appendix D).

Model fit: AUROC = 0.71.

related to the likelihood of anti-dilatory reform: the credible interval appears to be evenly distributed around the zero line.

6.3.5 *Robustness*

The results reported above are robust to different model specifications. An implementation where polarisation is measured as the level of the actual session, without accounting for its length or polarisation in the preceding session produces nearly identical estimates.²⁵ Linear model specifications that take the total count of anti-dilatory reform as the dependent variable also lead to similar conclusions.²⁶ These results, in my view, strengthen the theoretical perspective put forward in this dissertation. Apparently, one session is enough to produce a perception among legislators that they can safely cede procedural rights to their party colleagues.

For this and all subsequent models, the estimation was also run while excluding observations exceeding 1.5 times the Interquartile Range (IQR) as outliers (see Appendix D, Section D.4). The parameter estimates from these models are very much in line with the ones reported here. For example, the main result for H2, i.e. the effect of POLARISATION on the likelihood of anti-dilatory reform remains positive with a 77 and 99 per cent probability respectively in the low and medium party strength eras (Tables D30 and D31). Further, in the full model for high party strength (Table D32), 93 per cent of the posterior distribution of the POLARISATION*OBSTRUCTION parameter remains to the right of the zero line, again yielding support for H3. Finally, models that include all control variables but *exclude* the interaction term POLARISATION*OBSTRUCTION confirm the results shown in this chapter (full sample: Table D12; LPS: Table D16; MPS: Table D20; HPS: Table D24).

²⁵Here, the Bayesian p-value for the interactive term under high party strength is 0.94; results not reported.

²⁶Results not reported. Note that the question that we would seek to answer with a linear specification is different to the one investigated here; such an approach would be well-suited to test the hypothesis that polarisation is positively related to the *extent* of anti-dilatory reform. Here, the goal is to theorise and empirically investigate the *occurrence* of such procedural changes.

One issue that needs to be addressed here is the potential feedback loop between obstruction and polarisation. The theory developed in this dissertation posits that when MPs derive low utility from filibustering against their own party, they are willing to give up procedural rights. I argued that, *under strong parties*, this is a *latent* realisation that members of parliament act upon when the time is right, i.e. when they have had time to build up consistent expectations of being on the same side of policy issues as colleagues within their party, and they are faced with obstruction. Therefore, it should be the case that there is no direct relationship between obstruction on the one hand, and polarisation on the other. I find a moderate, positive correlation between the two variables²⁷; and a small, negative correlation after the transformation of both variables and as used in the estimation.²⁸ These results give me confidence that polarisation should not be seen as an intervening variable, with obstruction being the main predictor.

Finally, I choose deliberately not to lag obstruction in the models. We are not interested here in the timing of a proposal; nor of its creation. Rather, we are interested in the *timing of adoption*. Many studies, in my view, mistakenly assume that by lagging obstruction by as session or two, they can capture the long-term dynamic by which institutional changes are made (e.g. Binder 1996, p. 12). This assumption seems implausible, not least because members need to adapt to the new behavioural incentives that such obstruction offers. Rather, we should view the source of procedural change as a latent desire among parliament's members to effect a change, which only comes to the fore when conditions are suited to its adoption.

To take one example: then-Speaker Charles Shaw Lefevre urged the adoption of a closure rule as early as 1848 Rush (2001, p. 72). But, it was only in 1882 under a united Gladstonian Liberal party, that the procedure was implemented. It is hard to argue that the rule in and of itself emerged from thin air. A more

²⁷Prior to any transformations, the correlation is: $p = 0.46$, $t = 7.58$, $df = 218$, $p\text{-value} = 9.75e-13$. The polarisation measure as used in the models (see subSection 6.1.3), and before transforming OBSTRUCTION: $p = 0.48$, $t = 7.81$, $df = 204$, $p\text{-value} = 3.04e-13$.

²⁸ $r = 0.50$, $t = 8.31$, $df = 203$, $p\text{-value} = 1.37e-14$.

plausible version of the story would be that, over time, a latent desire for such a procedure had built up among MPs. When they were subsequently faced with a situation where the costs of giving up obstructive powers were minimal (i.e. party ideological homogeneity), opinion converged and scope for the adoption of the rule emerged.²⁹

6.4 Conclusions

This chapter has investigated the conditions under which anti-dilatory reform is likely to occur, providing an empirical test of the second and third hypotheses set out in the theory in Chapter 2. In terms of the occurrence of such procedural changes, the analysis found support for the notions that: a) polarisation has a positive impact on the likelihood of procedural change (H2); and b) this effect is dependent on obstruction (H3) under strong party institutions (1945–2015). Conversely, institutional change under low (1810–1880) and medium (1880–1945) party institutionalisation appears to be dictated by policy considerations, i.e. ideological congruence between colleagues within parties.

The results shown above—spanning periods of low, medium, and strong party strength—reveal a number of patterns. First, polarisation appears to be a sufficient condition to produce anti-dilatory reform under conditions of low- and medium party institutionalisation; but not when parties are strong, confirming H2. Second, the interactive effect between polarisation and obstruction is as expected (H3) under conditions of *high* party power. Neither the presence of obstructive MPs nor the concentration of preferences within parties can independently explain the adoption of restrictive rules of debate.

Further, during the first two periods studied, polarisation exercises a positive effect on the likelihood of anti-dilatory change that is not conditional on obstruction. This finding provides a new perspective on the early development

²⁹This claim is only further substantiated by the fact that lagging the obstruction variables in the models by one or two sessions produces similar outcomes, and did not change the sign on the coefficient in any of the models (results not reported).

of the UK House of Commons. It suggests that the introduction of new procedures and changes to old rules in the Parliament were not inspired by “efficiency” concerns alone, even in the procedural state of nature. Active attempts of some legislators to undermine the House by employing obstructive tactics were not found to have a positive effect on the likelihood of anti-dilatory reform. While legislators in the House faced strong pressures to tackle obstruction (see also Chapter 5), it is clear that the incentive of polarisation (i.e. the presence of shared preferences) increases the scope for anti-dilatory reform.

This conclusion is only strengthened by the finding that the use of obstructive tactics does not independently exercise a positive effect on the probability of anti-dilatory reform in *any* of the periods studied. I take this to be further support for a model that emphasises the role of individual policy preferences of legislators rather than exogenous pressures. Obstruction only comes to play a role in combination with polarisation after WWII, when parties exercised strong “structuring power”. Polarisation is still a motivating factor for MPs, but only when they have to defend their party’s programme against a clear and calculated attack, i.e. obstruction. In the era of strong parties, as present after 1945, it is therefore the combination of obstruction and polarisation that increases the likelihood of reform.

The next, concluding chapter revisits these arguments in the wider perspective of the dissertation. It considers how my results fit in with other theories of institutional design, how my research informs our understanding of procedural choice at different stages of the House of Commons’ development, and considers the applicability of the theoretical speech-as-filibuster model to different contexts.

Conclusion

From “Grand Inquest of the Nation” to Parliamentary Machine

In 1873, the influential journalist, economist, and political analyst Walter Bagehot (1873/2011, p. 111) wrote that ‘[t]he dignified aspect of the House of Commons is altogether secondary to its efficient use.’ Bagehot’s observation certainly applied to debates in the UK’s lower house in the early nineteenth century, where plenary discussions were a “gentlemanly” affair premised on a clear set of informal rules and conventions. Since 1832, however, the House’s “dignified aspect” has given way to competition over plenary time and a greater use of obstructive tactics. The “private MP” who governed in his own name to defend his personal interests has slowly been replaced by a new class of representatives who represented the people. In this period, Parliament began to create a more efficient and institutionalised system for the conduct of legislative debate.

As Britain democratised, the face of the UK House of Commons changed dramatically. My research has approached this historical trajectory from the perspective of one of the core and often overlooked institutions of Westminster

democracy: rules of debate. It is within these parameters that legislators operate and communicate their views to the electorate, and it is the vehicle through which policy is made. In this light, my research project focused on the pertinent question of why this procedural transformation took place, and, theoretically, of *why legislators abdicate procedural power in debates*.

In engaging with these empirical and theoretical puzzles, my study has presented and tested a new theory of institutional design that hinges on the often-complex relationship that legislators have with the formal rules of debate that constrain their behaviour. In contrast to previous accounts, I have argued that MPs only abdicate procedural rights when they are presented with an alternative means to influence policy: polarisation. Higher concentrations of preferences within parties increase the likelihood that similar policies will be defended by party colleagues even after restrictive rules are adopted. The democratisation of Britain, then, is inextricably linked with the broad-sweeping reforms studied in this dissertation.

In a broader perspective, this study sheds light on the important question of how a parliament develops from a procedurally neutral setting in which party discipline is absent, to one that is guided by a coherent set of rules, contributing to a newly emerging research agenda that focuses on British Political Development (BPD) (Eggers and Spirling 2014b, 2016; Kam 2014; Moser and Reeves 2014). Working from a novel dataset of reforms to the Standing Orders—the formal rules of the House—collected for this project, as well as 6.2 million parliamentary speeches that cover the period from 1811 to 2015, the evidence presented here suggests that this development was not part of a larger, secular trend. Instead, the policy considerations of individual members of parliament provide the key explanatory mechanism for reform. The analysis provides robust evidence to suggest that polarisation—in combination with obstruction under conditions of high party institutionalisation—has a positive and statistically significant effect on the likelihood that the House adopts anti-dilatory reforms.

In this chapter, I recapitulate the main findings of this thesis and examine their implications for the literature on procedural choice. I further discuss the generalisability of the theory and its results, and give directions for future research.

7.1 Findings: Evidence for the “Speech-as-Filibuster” Model

My “speech-as-filibuster” model of procedural choice views rules of debate as a function of internal dissent within parties. I theorised that by default MPs hold on to the right to obstruct as a key device to influence policy in a context of time scarcity. The 1832 Reform Act created a procedural dilemma for legislators as obstruction became an accepted—and commonly used—tool in legislative debates. MPs were strained between the speech-as-filibuster’s strength as a means to shape bills, and its deleterious effect on their own proposals and on Parliament as a whole.

This theory builds on the common-pool resource literature and frames obstruction as a problem of over-exploitation. The procedural dilemma emerged at the start of the nineteenth century because of a combination of three factors: i) a rise in time scarcity as legislators began to make greater use of opportunities for debate; ii) changed demographics of the membership of the House; and iii) a lack of enforcement mechanisms (i.e. party discipline) to ensure responsible use of plenary time. The combination of these three developments created a context where over-exploitation of plenary time—obstruction—became a dominant strategy.

An escape from this dilemma is possible when polarisation increases, i.e. when legislators within parties grow increasingly likely to share the same views on bills. Under these conditions, the utility of the tool of obstruction against one’s own party diminishes, while patience with obstructive tactics used by those from the other side of the aisle declines. I argued that the effect of polarisation is conditional on the presence of obstruction when there are strongly institutionalised parties, where party organisations provide structured arenas for exchange and

building coalitions on key proposals. Here, the costs of filibustering are higher, party leaders are able to manipulate the agenda, and alternative strategies such as building within-party coalitions to support bills are more likely to be successful.

The empirical results yield support for this model's main predictions. Polarisation consistently exercises a substantively and statistically significant effect on the likelihood of anti-dilatory reform in the periods of low (1811–1880) and medium (1880–1945) party strength. In these eras, its effect is not contingent on obstruction, confirming H2 and H3. Obstructive behaviour, in turn, only has a positive (but not statistically significant) effect in the first period, and has a negative impact in the era of medium party institutionalisation (1880–1945), and no effect in the most recent period of strong party institutions (1945–2015). In this last period, the effect of polarisation is conditional on the presence of obstruction (as H3 predicts). It is encouraging that, in addition to finding robust evidence to suggest that the variables related to the hypotheses have the expected effect, “short-termist” and party-level predictors such as the number of days until election and the size of the majority do not appear to have an impact on reform.

In what follows, I revisit these findings in some details, and contextualise them on the basis of primary and secondary sources.

7.1.1 Procedural Choice in the Legislative State of Nature

The empirical analysis in this thesis suggests that procedural choice under low party strength (1811–1880), in the legislative nature, is driven by efficiency concerns *and* ideology. Workload and polarisation were found to have a statistically significant and substantively important effect on the likelihood of reform. It seems that in the context of a procedural vacuum, as well as weakly institutionalised political groups, legislators nevertheless manage to prioritise safeguarding the institution of parliament.

My findings correspond well with Cox's “legislative state of nature” argument (1987; 2006), which centres on the presence of a plenary bottleneck (i.e. workload). The effect of polarisation speaks to the work by Diermeier and Vlaicu

(2011): legislators *can* collaborate to implement restrictive rules when opinions within parties on legislation are shared consistently. Further, the lack of effect of obstruction on procedural choice challenges earlier accounts of House development (Fraser 1960; Rutherford 1914).

The presence of these two dynamics—workload and polarisation—raises some interesting complements to the theory. First, it suggests that sometimes the sheer scope of the House’s agenda is enough to produce anti-dilatory reform. As shown in Chapter 5, the post-1832 era was the first time that the House was faced with unprecedented levels of workload, which, although not as high as later in the century, presented a somewhat unique challenge. It is not unlikely that in the face of such novel and exacting circumstances, a consensus emerged to at least implement a rudimentary set of procedural constraints (see also Koß 2015).

Second, it seems reasonable to assume that norms about parliamentary behaviour and even about the sanctity of the institution of Parliament itself continued to exist for some time after the 1832 reforms. Even though the composition of Parliament and the incentives structures for individual MPs changed, it could very well be that parliamentarians were sufficiently concerned about maintaining and protecting Parliament to “front-load” some of the reforms. While polarisation equally acted as an incentive for legislators to accept reforms, the sheer scale of claims on plenary time combined with still prevalent—albeit weakened—norms, also had a positive effect.

7.1.2 Reform in the Party Construction Era

As parties begin to develop some independent strength in the 1880s, the adoption of restrictions is dictated by *polarisation*, showing a clear positive effect that is both statistically and substantively significant. This is not altogether surprising, however, as some procedures had already been put in place at this stage—most notably the closure procedures of 1882 and 1887—and the prime challenge to the individual policy power of MPs no longer came from obstruction. Now, the progressive transfer of prerogatives to the party and its leaders inspires reluctance

among legislators. Here, the choice to adopt an anti-dilatory rule—which would limit access to debate and in part empower the front-benches—is dictated by the presence of shared policy interests.

In this context, obstruction only marks periods during which there is a complete breakdown of cooperation, where legislators become relatively intransigent about maintaining their prerogative to obstruct. We should also not forget that the nature of obstruction during this period was largely, although not completely, confined to a small group of legislators that sought to undermine Parliament as a whole: the Irish Home Rulers (Fraser 1960; Koß 2015; Rutherford 1914). It stands to reason that obstruction continued among this group across the period. The positive effect of polarisation applies to the rest of parliament, which had to collaborate to counter the obstructive tactics of this smaller group.

7.1.3 Procedures Under Strong Parties

Third, when parties are strongly institutionalised at the national level, their members' decision to support their own disempowerment is a function of both the need for limiting debate and protecting the party against outside threats (i.e. obstruction by the opposing party), and the degree to which they share their party colleagues' views on policy (i.e. polarisation). These findings correspond with the theory I developed. In this sense, the process of reform in the UK House of Commons mirrors that of the US House of Representatives (Binder 1996, 1997), where the adoption and removal of minority rights was similarly dictated by partisan obstruction and strength.

Yet, in my framework such party strength does not exclusively relate to the ability of the party to enforce discipline. Nor does it derive from an exogenous institution such as the party caucus (Cox and McCubbins 1994, p. 218). Rather, my theory shifts the attention decidedly to the motivations of individual legislators and considers how party institutions affect their calculations. Defecting on (i.e. obstructing) bills is commensurate with a lower pay-off under strong parties. Here, the party leader is able to put forward proposals that satisfy the prefer-

ences of a majority of legislators, making it less likely that obstruction needs to be used. Further, party institutions facilitate consensus-building and logrolling within parties. Fluctuations in the degree to which opinions on legislation are shared have less of an impact, as some of its effect is subsumed by the “party factor”.

In turn, the ability of members to restrain the rank and file in their obstructive behaviour by employing those party institutions reduces the effect of obstruction. The most important tool available to the leadership is the ability to block front-bench promotion. However, when legislators share similar preferences on legislation *and* the party is threatened by obstruction, MPs support anti-dilatory reform.

7.2 The Debate on Procedural Choice

A considerable body of work in political science engages with the question of why parliaments adopt a specific set of rules. In various forms, students of legislative institutions have studied the effects of obstruction (Binder 1996, 1997; Fraser 1960; Rutherford 1914), the strength of the majority party (Aldrich 1995; Aldrich and Rohde 2009; Binder 1996, 1997; Dion 1997), and the distribution of preferences within political parties (Diermeier, Prato, and Vlaicu 2015; Diermeier and Vlaicu 2011; Schickler 2000). This project contributes to the literature and our understanding of procedural choice in multiple ways.

First, my research provides greater insight into the character of the legislative state of nature, and the institutional equilibrium that allows it to operate in the absence of party discipline. I have drawn from the literature on collective action dilemmas to provide an understanding of the mechanisms of collaboration when there is no enforcement of such behaviour. I have set out in detail the parameters of informal ways of managing plenary time responsibly. This is an important contribution because a common assumption in extant literature is the presence of party discipline (see in particular Aldrich 1995; Aldrich and Rohde 2009). Such a premise seems reasonable for the period that these authors study,

where political parties have gained some foothold. It is more problematic in the procedural state of nature where legislators are co-equal.

By providing this understanding of how MPs cooperate in the absence of enforcement we also gain a better grasp of the reasons why the need for formal procedures emerges. Here, I have built on earlier work by Cox (1987) and others to show how exogenous events—electoral reform—can produce incentives for legislators to renege on norms and conventions. We gain greater insight into the costs and benefits of restricting access to the floor by conceptualising plenary time as a common-pool resource.

Even as we move to periods of greater party strength we stand to gain from challenging researchers' over-reliance on party discipline. The unitary actor assumption is not always justified when it comes to party agency; and legislators might defect under certain conditions (e.g. Kam 2009). My perspective unites the impact of parties (e.g. higher costs of defection and lower costs of supporting proposals made by the party leader) with the policy incentives of MPs. Polarisation matters less under strong parties as the "speech-as-filibuster" is a less viable strategy, but in combination with the need to protect the party against external attacks (obstruction) it produces the conditions necessary for reform. My model, then, acts as a bridge between perspectives that emphasise party strength (e.g. Binder 1996, 1997; Dion 1997) and other research that emphasises ideological considerations (Diermeier, Prato, and Vlaicu 2015; Diermeier and Vlaicu 2011; Schickler 2000).

Second, this study provides a new perspective on the rationale behind the adoption of restrictive procedures, showing instead how they emerge in response to tensions *within* political parties. MPs gain an advantage when they empower their party leaders as these actors can subsequently propose bills that lie closer to their preferences than to those of the other party. This is the logic behind procedural cartel theory (Cox and McCubbins 1994, 1997). On the other hand, however, the delegation of power to a "privileged" set of actors presents a risk as it gives them the opportunity to renege on the implicit understanding that they

act in the interest of those that gave them such prerogatives. My model theorises this relationship as an intra-party delegation problem. Therefore, it starts where PCT left off, and yields insight into the strategic considerations of MPs when they are faced with a proposal for a rule that would limit their freedom.

Third, this research project alters our understanding of the party-rules nexus in the UK context. Previous accounts argue that political parties formed in response to the creation of neutral agenda offices (cf. Cox 1997, 2006; Cox and McCubbins 1997, 2005, 2011). The evidence presented here puts into question the sequential nature of institutional design and party groups. The rules and procedures that were created were not neutral or de-politicised—far from it. They had a distinct anti-dilatory character from the start and were the product of ideological divergences in the House and the degree to which such divisions placed members consistently on the same side of the ideological spectrum. In other words: the development of rules and parties is *non-sequential*; rather, it is an iterative and interactive process driven by the preferences of individual actors, and temporal variation in the extent to which they were “partisan”.

Finally, by providing a coding scheme and a detailed historical assessment of rules of debate, this study contributes to our understanding of the parameters within which legislators operate. The historical evolution of the UK House of Commons studied in this research project shows how opportunities to delay legislative debate have slowly dwindled, which rules were introduced to counter the use of dilatory tactics, and why they were adopted. Similarly, the findings illustrate how the speech-as-filibuster became a less viable tool to shape policy, and, at least in theory, how it was slowly supplanted by the party as a legislation-generating machine.

7.3 Generalisability

Can we extend the model and findings in this dissertation beyond the UK context? The UK is marked by strong parties and a powerful government-opposition dynamic. Therefore, it presents a “hard test” of the speech-as-filibuster perspec-

tive. I expect my model's predictive power to fare better in some, and worse in other contexts beyond Westminster.

7.3.1 The “Speech-as-Filibuster” Model Beyond Westminster

First, the UK House of Commons never developed a committee system like the US or France did in the 1830s (Cox 1987, pp. 64–65). The absence of committees, in part, would explain why workload remains a strong predictor of reform in the early Parliament. Legislative assemblies such as the US House of Representatives or the French *Assemblée nationale*, which do have this escape valve, should be more subject to the effect of polarisation alone when it comes to their rules of debate. In contrast, obstruction should have less of an effect in later years as much of the over-exploitation of plenary time has been more or less successfully delegated to committees.

Polarisation, then, would likely be a stronger predictor of reform in the US, where House members enjoy even greater procedural freedom. Further, we can expect convergence of political opinions within parties to be even more strongly related to procedural choice, as representatives are required to represent local interests and must overcome greater ideological barriers before they can collaborate to restrict their own rights.¹

The variation in committee systems across different legislatures brings me to an important scope condition of the “speech-as-filibuster” perspective on procedural choice: the plenary should be the main—or at least an important—vehicle for policy making. If strong committee systems with gate-keeping rights exist, there is no need for rules of debate. The tradition of unlimited debate—persistent in the US Senate—is a good example of this (Wawro and Schickler 2006). Beyond Westminster the speech-as-filibuster model would only serve to explain a limited range of procedures, such as amendment rights that are exclusively related to

¹It is therefore not surprising that a considerable part of the literature on institutional design in the US Congress is rooted in the “weak parties” tradition (Krehbiel 2004), which also forms the basis of the analysis in this dissertation.

plenary proceedings, for which obstructive tactics cannot be circumvented by empowering committees.

My model could be extended to other Westminster systems where debate is front and centre in the policy-making process. Canada and New Zealand in particular come to mind, where the initial set of rules of debate—for historical reasons—reflect the institutional setting of the UK House.

7.4 Text-as-Data: Measuring Polarisation with Speeches

Beyond its contributions to the debate on procedural choice, my research project advances the use and development of new computerised text analysis tools. The text-as-data field is a fast-moving enterprise. Yet, the application of easy-to-use tools to real-life measurement problems presents researchers with a number of specific challenges that are often ignored. I have evaluated some of these issues in this dissertation. A number of conclusions stand out from this exercise. First, I would caution against the use of off-the-shelf tools such as *Wordfish* to produce aggregate measures of political ideology. Chapter 3 has demonstrated that scaling methods may work well for individual debates. However, when we aggregate across discussions over a time period we obtain estimates that do not map clearly onto concepts that we can grasp or care about.

It is not evident that we can obtain session- or parliament-level measures of polarisation from individual debates using text scaling methods. One of the long-standing problems of algorithms to scale texts is the multiplicity of dimensions that may occur in debates, or even in individual speeches. We cannot simply export models that were designed to deal with clean and structured manifesto data to the messy world of speeches. Here, we are faced with the challenge of pinning down the dimension of interest. Even the most sophisticated methods currently available to aggregate across debates (e.g. Lauderdale and Herzog 2016) seem unable to get around this problem, and cannot produce estimates that are meaningful or accurate. The challenge, then, is to pre-select speeches in a way that can limit the dimensional variation. A possible solution would be to adopt

a three-pronged combination of semi-supervised dictionary construction, speech selection, and scaling. The “dimensional scaling” approach outlined in Chapter 3 presents an early attempt to do so, yet lacks the kind of granularity that we would need in order to apply an off-the-shelf algorithm such as **Wordfish**.

Greater accuracy in speech selection will require more advanced algorithms. Arnold, Doyle, and Wiesehomeier’s hill-climbing algorithm—which relies on a standard dictionary of terms from *The Economist* and an algorithm that optimises the number of words selected around key words—comes to mind, as does King, Lam, and Roberts’s recently released **eDiscovery** (2017). This software is a semi-automated dictionary-generation tool that produces key search terms automatically from a text corpus, and subsequently allows the user to update such search terms iteratively. Such approaches—combining semi-supervised dimension selection and automated scaling—will go a long way to tackling some of the problems discussed in this study.

Second, if we do wish to look at aggregate levels of polarisation, we need to shift our focus to an approach that centres on distinctive use of language alone, and leaves dimensional assumptions to one side. Building on recent work by Peterson and Spirling (2018), I have shown that the classification accuracy of a model that is fitted to a subset of speeches, and predicts the party label of a held-out sample, produces estimates that clearly map onto an intuitive understanding of what polarisation is. The measurement of polarisation, then, requires us to make some simplifying assumptions about what this concept entails, for example, degrees of conflict as demonstrated by similarity in the use of language. Simplifying our definition of polarisation arguably means that we are less able to pin down the axis of contention. However, the estimates from such an approach are valid, in the sense that they satisfy a wide range of criteria, including a good reflection of our historical knowledge of the House of Commons, as well as capturing party affiliation to a high degree.

Finally, while we have a good appreciation of how roll call votes are affected by institutional dynamics (Hix and Noury August 2010, unpublished paper; Spir-

ling and McLean 2007), we do not have comparable in-depth studies of the impact of such dynamics on text-based estimation. I have argued that institutional constraints should be less of a concern in debates than on votes—not least because defection on votes is a “nuclear option” (Proksch and Slapin 2015). The study has evaluated the impact of party strength and front-bench speakers on the estimates by means of a new weighting system, and has shown that the results are relatively robust to such dynamics. Yet, many determinants of legislator behaviour remain that we can, and should, incorporate in our machine learning models.

Other studies have found both cross- and within-country variation in the degree to which legislators engage in debate. For example, Proksch and Slapin (2012; 2015) show that party leaders are more likely to grant speaking rights to constituency MPs in a first-past-the-post electoral system, where legislators rely on personal reputation to secure re-election. Speaking behaviour is also impacted by electoral vulnerability (Eggers and Spirling 2014a); and, at the individual level, authors have pointed to the effect of, for example, career incentives and government allegiance on legislator behaviour (e.g. Benedetto and Hix 2007; Kam 2009).

Our models can, and should, incorporate individual measures of such incentives in the estimation of the preferences of political actors. The literature on personal vote incentives, and studies of MP characteristics may provide us with such measures (e.g. Carey and Shugart 1995; Deschouwer and Depauw 2014; Johnson and Wallack 2012; Norton 1980). Future work should focus on developing a comprehensive machine learning approach that can distinguish appropriate weights for such individual-level characteristics and for electoral system incentives. It should equally incorporate features to control for cross-temporal dynamics such as the safety of the MP’s seat or exogenous shocks.

7.5 Directions for Future Research

The discussion above has already hinted at some avenues for future research. In particular, researchers should explore the study of procedural reform along four broad dimensions.

First, students of British Political Development should take a qualitative, case study approach to tease out some of the causal mechanisms laid out in this study. I have taken a decidedly quantitative, large-N approach to studying historical institutional changes. I therefore have to exercise some caution in terms of the causal claims I can make. Using these particular methods, I have only been able to provide probabilistic and indirect evidence of the motivations of legislators. Consequently, these results only provide some indication of the validity of the hypothesised mechanism that links polarisation to anti-dilatory reform. Significant scope remains for an in-depth process tracing study of key episodes of institutional reform to analyse and test the key predictions of the causal mechanism proposed in this thesis (George and Bennett 2005). Such research is likely to yield further evidence for the speech-as-filibuster polarisation model advanced here.

For example, much is made of Irish obstruction and its role in the creation of the closure procedure. However, ideologically, the conflict played out *within* parties, which were divided over the Home Rule issue. When the closure procedure was first adopted in 1882, the Liberal party was still ideologically united. In 1886 however, the party divided over the Home Rule Bill proposed by Prime Minister Gladstone, prompting the departure of 94 MPs, who formed the Liberal Unionists (Kosß 2015). It was the united Conservative government under Lord Salisbury, in coalition with the Liberal Unionists, that subsequently managed to introduce the amended version of the closure rule in 1887, after winning the election that Gladstone had called in 1886. This variation in polarisation in a key episode of procedural reform in the House of Commons could provide some leverage on the causal mechanism proposed in this dissertation.

Second, individual-level tests would be a natural complement to the study presented here. As we now have individual-level estimates of political preferences over time (and even in individual debates), there is scope for a study that links such positions to votes on procedural reforms. An assessment of the relationship of individual-level votes and ideological positions may yield more empirical evidence to evaluate the hypotheses advanced in this thesis.

A within-system approach that focuses on individual-level tests would also allow us to investigate the precise constellation of the coalition of MPs that supports procedural change. As explained above, legislators’ desire to support restrictive procedures is affected by the degree to which the party holds sway over them through career promotion. Future researchers can employ variation in the characteristics of legislators to investigate who is particularly likely to support rules changes, and under what conditions. We can then relinquish the rather strong assumption that legislators are only motivated by policy (Fenno 1978; Krehbiel 1998), and focus on the individual-level constellation of policy, office, and vote incentives of MPs (Müller and Strøm 1999), or other, normative considerations relating to the duty to represent (Campbell and Lovenduski 2015; Norton 1994). For example, it stands to reason that legislators who have a greater interest in progressing on the party ladder are more susceptible to such incentives than career politicians, who pursue value-based politics from a personal conviction (see also Heuwieser forthcoming).

Future studies should also explore the strategic interaction between rules and MP-level speaking behaviour in greater detail. Research on these two topics have largely operated in isolation. For example, when Proksch and Slapin (2015) speak of “institutions”, they are first and foremost interested in the mechanics of the electoral system; not in the process of codification of formal regulations. As such, the interaction between procedures and the question of what motivates legislators to speak in the plenary remains unclear. Such procedures set the parameters of conduct and therefore cannot be reviewed without a proper understanding of individual-level motivations, and vice versa.

Third, within-system tests should be combined with an assessment of between-system variation. For example, Proksch and Slapin (2015) have related the value of the party brand—as determined by the party system—to speaking behaviour. We can leverage a similar research design to explore how system-level incentives determine patterns of formalisation of rules of debate.

Finally, students of procedural design should shift their focus to include other avenues for policy making and influence. For example, the ease with which legislators can in the twenty-first century exercise pressure via (social) media outlets should affect the utility of intra-parliamentary tactics such as obstruction. Today, many indirect ways exist for MPs to influence legislation, not least by mobilising extra-parliamentary groups to pressure the government to shift policy one way or another. Similarly, the government’s devolution agenda—devolving policy-making powers to the Welsh and Scottish assemblies and to local municipalities—has again changed the legislative role of parliament. Incorporating these new modes of policy-making—indirect influence, citizen participation, and devolved powers—should generate important new insights in how the changing role and capabilities of legislators interacts with their decisions on rules of debate. I leave these and other improvements for future work.

7.6 Concluding Observations

In the conclusion to their recent work *The Politics of Parliamentary Debate*, Proksch and Slapin (2015, p. 174) make the following observation:

‘Parliamentary speech rarely has persuasive effects on policy-making. MPs do not normally take the floor with the intention of actually convincing their colleagues of the Virtue of their position, nor do they expect their speech to alert fellow members to new policy options.’

Yet, political debate in the House of Commons is a function of more than a desire to seek re-election or to manage intra-party tensions alone. Instead, the current research has emphasised over-exploitation of speech, i.e. obstruction,

as a key device to influence policy. The “speech-as-filibuster” model shows how legislators leverage opportunity costs, enabling them to extract concessions from their colleagues and the front benches. The institution of debate, then, revolves around the management of a common good.

The Honourable the Commons of the United Kingdom of Great Britain and Northern Ireland in Parliament assembled—or in short, the House of Commons—is only one among many institutions of the British polity that underwent fundamental change in the nineteenth century. Here, the history of political reform is told through the lens of Parliament. In so doing I have theorised about the nature and rise of democratic institutions in a procedural vacuum. By focusing on legislators, their motivations, and their behaviour, I have shown how exogenous events have shaped both the institution of debate, its rules, and political parties themselves.

The continuing ability of the Parliament to protect the common-pool resource of plenary time was not only crucial to its ability to legislate, but also to its very survival. The House survived sustained attempts at over-exploitation to undermine the institution itself, in particular in the 1880s. Polarisation, independently and later in combination with obstruction, allowed the British lower house to overcome these challenges and to progressively create an appropriate set of rules to ensure responsible use of floor time. Its ability to manage time successfully ensured that the UK House of Commons evolved from the “grand inquest of the nation” to a true parliamentary machine whose prime focus is policy-making.

The politics of procedural choice, then, are one of the core foundations of the UK’s modern democracy. It is my hope that this study, with its empirical and theoretical contributions, can serve as a stepping stone for further investigation of the development and functioning of the Westminster system and beyond.

Bibliography

- Abreu, Dilip (1998). “On the Theory of Infinitely Repeated Games with Discounting”. *Econometrica* 56 (2), pp. 383–396.
- Abreu, Dilip, Paul Milgrom, and David Pearce (1991). “Information and Timing in Repeated Partnerships”. *Econometrica* 59 (6), pp. 1713–1733.
- Acemoglu, Daron and James A. Robinson (2000). “Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective”. *The Quarterly Journal of Economics* 115 (4), pp. 1167–1199.
- Addison, Paul (1994). *The Road to 1945: British Politics and the Second World War*. Revised edition. London: Pimlico.
- Akirav, Osnat, Gary W. Cox, and Mathew D. McCubbins (2010). “Agenda Control in the Israeli Knesset during Ariel Sharon’s Second Government”. *The Journal of Legislative Studies* 16 (2), pp. 251–267.
- Aldrich, John H. (1995). *Why Parties? The Origin and Transformation of Political Parties in America*. Chicago and London: The University of Chicago Press.
- Aldrich, John H. and David W. Rohde (2009). “Congressional Committees in a Continuing Partisan Era”. *Congress Reconsidered*. Ed. by Lawrence C. Dodd and Bruce I. Oppenheimer. 9th ed. Washington, DC: CQ Press, pp. 217–240.
- Angrist, Joshua D. and Jörn-Steffen Pischke (2008). *Mostly Harmless Econometrics*. Princeton: Princeton University Press.

- Arnold, Christian, David Doyle, and Nina Wiesehomeier (2015). "How Presidents Follow the Call of International Capital" (Working Paper).
- Austen-Smith, David (1990). "Information Transmission in Debate". *American Journal of Political Science* 34 (1), pp. 124–152.
- Austen-Smith, David and William H. Riker (1987). "Asymmetric Information and the Coherence of Legislation". *The American Political Science Review* 81 (3), pp. 897–918.
- Axelrod, Robert M. (1984). *The Evolution of Cooperation*. New York: Basic Books.
- Aydelotte, William O. (1954). *British House of Commons roll Call Data, 1841-1947*. Compiled by William O. Aydelotte, University of Iowa, Dept. of History. ICPSR ed. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [producer and distributor]. <https://doi.org/10.3886/ICPSR07384.v1>.
- Bagehot, Walter (1873/2011). *The English Constitution*. URL: <http://socserv2.socsci.mcmaster.ca/econ/ugcm/3113/bagehot/constitution.pdf>.
- Baker, George, Robert Gibbons, and Kevin J. Murphy (2002). "Relational Contracts and the Theory of the Firm". *The Quarterly Journal of Economics* 117 (1), pp. 39–84.
- Bamman, David and Noah A. Smith (2014). "Unsupervised Discovery of Biographical Structure from Text". *Transactions of the Association for Computational Linguistics* 2 (October), pp. 363–376.
- Banks, Jeffrey S. (1991). *Signaling Games in Political Science*. London and New York: Routledge.
- Baron, David P. and John A. Ferejohn (1989). "Bargaining in Legislatures". *American Political Science Review* 83 (4), pp. 1181–1206.
- Bateman, David A., Joshua D. Clinton, and John S. Lapinski (2017). "A House Divided? Roll Calls, Polarization, and Policy Differences in the U.S. House, 1877–2011". *American Journal of Political Science* 61 (3), pp. 698–714.

- Beeman, Richard R. (1968). "Unlimited Debate in the Senate: The First Phase". *Political Science Quarterly* 83 (3), pp. 419–434.
- Benedetto, Giacomo and Simon Hix (2007). "The Rejected, the Ejected, and the Dejected: Explaining Government Rebels in the 2001-2005 British House of Commons". *Comparative Political Studies* 40 (7), pp. 755–781.
- Berlinski, Samuel and Torun Dewan (2011). "The Political Consequences of Franchise Extension: Evidence from the Second Reform Act". *Quarterly Journal of Political Science* 6 (3–4), pp. 329–376.
- Binder, Sarah A. (1996). "The Partisan Basis of Procedural Choice: Allocating Parliamentary Rights in the House, 1789-1990". *The American Political Science Review* 90 (1), pp. 8–20.
- (1997). *Minority Rights and Majority Rule: Partisanship and the Development of Congress*. Cambridge: Cambridge University Press.
- Blackburn, Robert, Andrew Kennon, and Sir Michael Wheeler-Booth (2003). *Griffith and Ryle on Parliament: Functions, Practice and Procedures*. 2nd ed. London: Sweet & Maxwell.
- Blei, David M., Andrew Y. Ng, and Michael I. Jordan (2003). "Latent Dirichlet Allocation". *The Journal of Machine Learning Research* 3 (March), pp. 993–1022.
- Bonica, Adam (2014). "Mapping the Ideological Marketplace". *American Journal of Political Science* 58 (2), pp. 367–386.
- Borchers, Hans Werner. *pracma: Practical Numerical Math Functions*. URL: <https://cran.r-project.org/web/packages/pracma/index.html>.
- Bottou, Léon (2004). "Stochastic Learning". *Advanced Lectures on Machine Learning*. Ed. by Olivier Bousquet, Ulrike von Luxburg, and Gunnar Rätsch. 3176. Berlin and Heidelberg: Springer, pp. 146–168.
- Bruce I., Oppenheimer (1985). "Changing Time Constraints on Congress: Historical Perspectives on the Use of Cloture". *Congress Reconsidered*. Ed. by Lawrence C. Dodd and Bruce I. Oppenheimer. 3rd ed. Washington, DC: CQ Press, pp. 393–413.

- Bryce, James (1921). *Modern Democracies*. New York: The Macmillan Company.
- Budge, Ian et al. (2001). *Mapping Policy Preferences: Estimates for Parties, Electors, and Governments 1945-1998*. Oxford: Oxford University Press.
- Butler, David E. and Gareth Butler (2000). *Twentieth-Century British Political Facts, 1900-2000*. 8th ed. Basingstoke, United Kingdom: The Macmillan Press Ltd.
- Butler, James Ramsay Montagu (1914). *The Passing of the Great Reform Bill*. London: Longmans, Green and Co.
- Bylsma, John R. (1968). "Political Issues and Party Unity in the House of Commons 1852-1857: A Scalogram Analysis". PhD thesis. University of Iowa.
- Calvert, Randall L. (1995). "Rational Actors, Equilibrium, and Social Institutions". *Explaining Social Institutions*. Ed. by Jack Knight and Itai Sened. Ann Arbor, MI: University of Michigan Press, pp. 57-93.
- Campbell, Rosie and Joni Lovenduski (2015). "What Should MPs Do? Public and Parliamentarians' Views Compared". *Parliamentary Affairs* 68 (4), p. 690.
- Cannon, Clarence (1882). *Appletons' Annual Cyclopaedia and Register of Important Events*. Vol. 22. New York: D. Appleton & Company.
- Cannon, John (1977). *Parliamentary Reform 1640-1832*. Cambridge: Cambridge University Press.
- Carey, John M. and Matthew Soberg Shugart (1995). "Incentives to Cultivate a Personal Vote: A Rank Ordering of Electoral Formulas". *Electoral Studies* 14 (4), pp. 417-439.
- Carroll, Royce, Gary W. Cox, and Mónica Páchon (2006). "How Parties Create Electoral Democracy, Chapter 2". *Legislative Studies Quarterly* 31 (2), pp. 153-174.
- Carrubba, Clifford J., Matthew Gabel, and Simon Hug (2008). "Legislative Voting Behavior, Seen and Unseen: A Theory of Roll-Call Vote Selection". *Legislative Studies Quarterly* 33 (4), pp. 543-572.

- Carrubba, Clifford J., Matthew Gabel, Lacey Murrah, et al. (2006). "Off the Record: Unrecorded Legislative Votes, Selection Bias and Roll-Call Vote Analysis". *British Journal of Political Science* 36 (4), pp. 691–704.
- Castles, Francis G. and Peter Mair (1984). "Left-right Political Scales: Some 'Expert' Judgements". *European Journal of Political Research* 12 (1), pp. 73–88.
- Chandler, William, Gary W. Cox, and Mathew D. McCubbins (2006). "Agenda Control in the German Bundestag, 1980-2002". *German Politics* 15 (1), pp. 89–111.
- Chuang, Jason, Christopher D. Manning, and Jeffrey Heer (2012). "'Without the Clutter of Unimportant Words': Descriptive Keyphrases for Text Visualization". *ACM Transactions on Computer-Human Interaction* 19 (3), pp. 1–29.
- Clark, Colin W. (1980). "Restricted Access to Common-Property Fishery Resources: A Game-Theoretic Analysis". *Dynamic Optimization and Mathematical Economics*. Ed. by Pan-Tai Liu. Boston, MA: Springer US, pp. 117–132.
- (2010). *Mathematical Bioeconomics: The Mathematics of Conservation*. 3rd ed. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Clarke, Peter (2004). *Hope and Glory: Britain 1900-2000*. 2nd ed. London: Penguin Books Ltd.
- Cobbett, William (1801). *The Parliamentary History of England, From the Earliest Period to the Year 1803*. London: T.C. Hansard.
- Cohen, Jacob (1988). *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, New Jersey Hove and London: Lawrence Erlbaum Associates, Publishers.
- Cook, Chris and Brendan Keith (1975). *British Historical Facts 1830-1900*. London and Basingstoke: The Macmillan Press Ltd.
- Cook, J. R. and L. A. Stefanski (1994). "Simulation-Extrapolation Estimation in Parametric Measurement Error Models". *Journal of the American Statistical Association* 89 (428), pp. 1314–1328.

- Cooper, Joseph and Cheryl D. Young (1989). "Bill Introduction in the Nineteenth Century: A Study of Institutional Change". *Legislative Studies Quarterly* 14 (1), pp. 67–105.
- Cox, Gary W. (1987). *The Efficient Secret: The Cabinet and the Development of Political Parties*. Cambridge: Cambridge University Press.
- (1997). *Making Votes Count: Strategic Coordination in the World's Electoral Systems*. Cambridge: Cambridge University Press.
- (2006). "The Organisation of Democratic Legislatures". *The Oxford Handbook of Political Economy*. Ed. by Barry Weingast and Donald Wittman. Oxford: Oxford University Press, pp. 141–161.
- Cox, Gary W., William B. Heller, and Mathew D. McCubbins (2008). "Agenda Power in the Italian Chamber of Deputies, 1988–2000". *Legislative Studies Quarterly* 33 (2), pp. 171–198.
- Cox, Gary W. and Mathew D. McCubbins (1993). *Legislative Leviathan: Party Government in the House*. Cambridge: Cambridge University Press.
- (1994). "Bonding, Structure, and the Stability of Political Parties: Party Government in the House". *Legislative Studies Quarterly* 19 (2), pp. 215–231.
- (1997). "Toward a Theory of Legislative Rules Changes: Assessing Schickler and Rich's Evidence". *American Journal of Political Science* 41 (4),
- (2005). *Setting the Agenda: Responsible Party Government in the U.S. House of Representatives*. New York: Cambridge University Press.
- (2011). "Legislative Leviathan: Party Government in the House". *The Oxford Handbook of the American Congress*. Ed. by George C. Edwards, Frances E. Lee, and Eric Schickler. Oxford: Oxford University Press.
- Craig, Frederick Walter Scott (1975). *The Most Gracious Speeches to Parliament 1900-1974: Statements of Government Policy and Achievements*. London and Basingstoke: The Macmillan Press Ltd.
- Crombez, Christophe, Tim Groseclose, and Keith Krehbiel (2006). "Gatekeeping". *Journal of Politics* 68 (2), pp. 322–334.

- Dal Bó, Pedro (2005). "Cooperation under the Shadow of the Future: Experimental Evidence from Infinitely Repeated Games". *The American Economic Review* 95 (5), pp. 1591–1604.
- Dales, John Harkness (1968). *Pollution, Property and Prices: An Essay in Policy-making and Economics*. Toronto: University of Toronto Press.
- Dasgupta, Partha S. and (1979). *Economic Theory and Exhaustible Resources*. Cambridge: Cambridge University Press.
- Dawes, Robyn M. (1975). "Formal Models of Dilemmas in Social Decision Making". *Human Judgment and Decision Processes: Formal and Mathematical Approaches*. Ed. by Martin F. Kaplan and Steven Schwartz. New York: Academic Press, pp. 87–108.
- Denny, Matthew J. and Arthur Spirling (2017). *Text Preprocessing For Unsupervised Learning: Why It Matters, When It Misleads, And What To Do About It*. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2849145.
- Denzau, Arthur T. and Robert J. Mackay (1983). "Gatekeeping and Monopoly Power of Committees: An Analysis of Sincere and Sophisticated Behavior". *American Journal of Political Science* 27 (4), pp. 740–761.
- Deschouwer, Kris and Sam Depauw (2014). *Representing the People: A Survey Among Members of Statewide and Substate Parliaments*. Oxford: Oxford University Press.
- Dewan, Torun and Arthur Spirling (2011). "Strategic Opposition and Government Cohesion in Westminster Democracies". *American Political Science Review* 105 (2), pp. 337–358.
- Diermeier, Daniel, Carlo Prato, and Razvan Vlaicu (2015). "Procedural Choice in Majoritarian Organizations". *American Journal of Political Science* 59 (4), pp. 866–879.
- Diermeier, Daniel and Razvan Vlaicu (2011). "Parties, Coalitions, and the Internal Organization of Legislatures". *American Political Science Review* 105 (2), pp. 359–380.

- Dion, Douglas (1997). *Turning the Legislative Thumbscrew: Minority Rights and Procedural Change in Legislative Politics*. Ann Arbor: The University of Michigan Press.
- Dixit, Avinash K (2004). *Lawlessness and Economics: Alternative Modes of Governance*. Princeton: Princeton University Press.
- Döring, Herbert (2001). "Parliamentary Agenda Control and Legislative Outcomes in Western Europe". *Legislative Studies Quarterly* 26 (1), pp. 145–165.
- (2003). "Party Discipline and Government Imposition of Restrictive Rules". *The Journal of Legislative Studies* 9 (4), pp. 147–163.
- Duffy, John and Jack Ochs (2009). "Cooperative behavior and the frequency of social interaction". *Games and Economic Behavior* 66 (2), pp. 785–812.
- Eggers, Andrew C. and Arthur Spirling (2014a). "Electoral Security as a Determinant of Legislator Activity, 1832–1918: New Data and Methods for Analyzing British Political Development". *Legislative Studies Quarterly* 39 (4), pp. 593–620.
- (2014b). "Ministerial Responsiveness in Westminster Systems: Institutional Choices and House of Commons Debate, 1832–1915". *American Journal of Political Science* 58 (4), pp. 873–887.
- (2016). "The Shadow Cabinet in Westminster Systems: Modeling Opposition Agenda Setting in the House of Commons, 1832–1915". *British Journal of Political Science*, pp. 1–25.
- Fenno, Richard F. (1978). *Home Style: House Members in Their Districts*. Boston, Massachusetts: Little, Brown.
- Fraser, Duncan (2000). "The Postwar Consensus: A Debate Not Long Enough?" *Parliamentary Affairs* 53 (2), pp. 347–362.
- Fraser, Peter (1960). "The Growth of Ministerial Control in the Nineteenth-Century House of Commons". *The English Historical Review* 75 (296), pp. 444–463.
- (1983). "Party Voting in the House of Commons, 1812–1827". *The English Historical Review* 98 (389), pp. 763–784.

- Gabel, Matthew J. and John D. Huber (2000). "Putting Parties in Their Place: Inferring Party Left-Right Ideological Positions from Party Manifestos Data". *American Journal of Political Science* 44 (1), pp. 94–103.
- Gelman, Andrew and Jennifer Hill (2007). *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge: Cambridge University Press.
- Gelman, Andrew and Kenneth Shirley (2011). "Inference from Simulations and Monitoring Convergence". *Handbook of Monte Carlo Methods*. Ed. by Steve Brooks et al. 4th ed. Boca Raton, FL: Chapman Hall, pp. 163–174.
- Gentzkow, Matthew, Jesse M. Shapiro, and Matt Taddy (2016). "Measuring Polarization in High-Dimensional Data: Method and Application to Congressional Speech" (Working Paper).
- George, Alexander L. and Andrew Bennett (2005). *Case Studies and Theory Development in the Social Sciences*. Cambridge, Massachusetts: MIT Press.
- Geweke, John (1992). "Evaluating the Accuracy of Sampling-Based Approaches to the Calculation of Posterior Moments". *Bayesian Statistics*. Ed. by J.M Bernardo et al. 4th ed. Oxford: Oxford University Press, pp. 169–193.
- Gill, Jeff (2014). *Bayesian Methods: A Social and Behavioral Sciences Approach*. 3rd ed. London: CRC Press.
- Goet, Niels D. and Max Goplerud (2017). "Parliamentary Dynamics of Speech-making: Pitfalls in Measuring Polarisation with Machine Learning" (Working Paper).
- Goet, Niels and Radoslaw Zubek (2017). "Regulating Parliament: Measuring Procedural Attention in the UK House of Commons Debates, 1811-2015" (Working Paper).
- Greenacre, Michael (2016). *Correspondence Analysis in Practice*. 3rd ed. Boca Raton, FL: Chapman & Hall/CRC Press.
- Greenhill, Brian D., Michael D. Ward, and Audrey Sacks (2011). "The Separation Plot: A New Visual Method for Evaluating the Fit of Binary Models". *American Journal of Political Science* 55 (4), pp. 991–1002.

- Greif, Avner and David D. Laitin (2004). "A Theory of Endogenous Institutional Change". *American Political Science Review* 98 (4), pp. 633–652.
- Grimmer, Justin (2013). *Representational Style in Congress: What Legislators Say and Why It Matters*. Cambridge: Cambridge University Press.
- Grimmer, Justin and Brandon M. Stewart (2013). "Text as Data: The Promise and Pitfalls of Automatic Content Analysis Methods for Political Texts". *Political Analysis* 21 (3), pp. 267–297.
- Handler, Abram et al. (2016). "Bag of what? Simple Noun Phrase Extraction for Corpus Analysis". *NLP+CSS Workshop at EMNLP 2016*.
- Hanham, H. J. (1959). *Elections and Party Management: Politics in the Time of Disraeli and Gladstone*. London: Longmans, Green and Co Ltd.
- Hardin, Garrett (1968). "The Tragedy of the Commons". *Science* 162 (3859), pp. 1243–1248.
- Herzog, Alexander and Kenneth Benoit (2015). "The Most Unkindest Cuts: Speaker Selection and Expressed Government Dissent during Economic Crisis". *The Journal of Politics* 77 (4), pp. 1157–1175.
- Heuwieser, Raphael J. (forthcoming). "Submissive Lobby Fodder or Assertive Political Actors? Party Loyalty of Career Politicians in the UK House of Commons, 2005–2015". *Legislative Studies Quarterly*.
- Hix, Simon and Abdul Noury (2016). "Government-Opposition or Left-Right? The Institutional Determinants of Voting in Legislatures". *Political Science Research and Methods* 4 (2), pp. 249–273.
- (August 2010, unpublished paper). "Scaling the Commons: Using MPs' Left-Right Self-Placement and Voting Divisions to Map the British Parliament, 1997–2005". URL: http://personal.lse.ac.uk/hix/Working_Papers/Hix-Noury-UK-26Aug2010-APSA.pdf.
- House of Commons Library (1 July 2015). *House of Commons: Hours Sat & Late Sittings*. Briefing Paper 02226. URL: <http://researchbriefings.files.parliament.uk/documents/SN02226/SN02226.pdf>.

- Huber, John D. (1992). "Restrictive Legislative Procedures in France and the United States". *The American Political Science Review* 86 (3), pp. 675–687.
- (1996a). *Rationalizing Parliament: Legislative Institutions and Party Politics in France*. Cambridge: Cambridge University Press.
- (1996b). "The Vote of Confidence in Parliamentary Democracies". *The American Political Science Review* 90 (2), pp. 269–282.
- Huber, John and Ronald Inglehart (1995). "Expert Interpretations of Party Space and Party Locations in 42 Societies". *Party Politics* 1 (1), pp. 73–111.
- Hug, Simon (2010). "Selection Effects in Roll Call Votes". *British Journal of Political Science* 40 (1), pp. 225–235.
- Jenkins, Jeffery A. (1998). "Property Rights and the Emergence of Standing Committee Dominance in the Nineteenth-Century House". *Legislative Studies Quarterly* 23.4, pp. 493–519. URL: <http://www.jstor.org/stable/440237>.
- Jenny, Marcelo and Wolfgang C. Müller (1995). "Presidents of Parliament: Neutral Chairmen or Assets of the Majority?" *Parliaments and Majority Rule in Western Europe*. Ed. by Herbert Döring. New York: St. Martin's Press, pp. 326–364.
- Johnson, Joel W. and Jessica S. Wallack (2012). *Electoral Systems and the Personal Vote*. URL: <http://hdl.handle.net/1902.1/17901>.
- Justeson, John S. and Slava M. Katz (1995). *Technical Terminology: Some Linguistic Properties and an Algorithm for Identification in Text*. Vol. 1, pp. 9–27.
- Kam, Christopher (2009). *Party Discipline and Parliamentary Politics*. Cambridge: Cambridge University Press.
- (2014). "Enfranchisement, Malapportionment, and Institutional Change in Great Britain, 1832–1868". *Legislative Studies Quarterly* 39 (4), pp. 503–530.
- Kavanagh, Dennis and Peter Morris (1994). *Consensus Politics: From Atlee to Major*. 2nd ed. Hoboken: Wiley Blackwell.

- Kellermann, Michael (2012). "Estimating Ideal Points in the British House of Commons Using Early Day Motions". *American Journal of Political Science* 56 (3), pp. 757–771.
- Kiewiet, D. Roderick and Matthew McCubbins (1991). *The Logic of Delegation: Congressional Parties and the Appropriations Process*. Chicago: University of Chicago Press.
- King, Gary, Patrick Lam, and Margaret E. Roberts (2017). "Computer-Assisted Keyword and Document Set Discovery from Unstructured Text". *American Journal of Political Science* 61.4, pp. 971–988.
- Kirchheimer, Otto (1966). "The Transformation of West European Party Systems". *Political Parties and Political Development*. Ed. by Joseph LaPalombara and Myron Weiner. Princeton, NJ: Princeton University Press, pp. 177–200.
- Klüver, Heike (2009). "Measuring Interest Group Influence Using Quantitative Text Analysis". *European Union Politics* 10 (4), pp. 535–549.
- Knight, Jack (1992). *Institutions and Social Conflict*. Cambridge: Cambridge University Press.
- Koß, Michael (2015). "The Origins of Parliamentary Agenda Control: A Comparative Process Tracing Analysis". *West European Politics* 5 (38), pp. 1062–1085.
- Krehbiel, Keith (1991). *Information and Legislative Organization*. Ann Arbor: University of Michigan Press.
- (1998). *Pivotal Politics: A Theory of US Lawmaking*. Chicago: University of Chicago Press.
- (2004). "Legislative Organization". *The Journal of Economic Perspectives* 18 (1), pp. 113–128.
- Kreppel, Amie (2014). "Typologies and Classifications". *The Oxford Handbook of Legislative Studies*. Ed. by Shane Martin, Thomas Saalfeld, and Kaare Strøm. Oxford: Oxford University Press, pp. 82–100.

- Krippendorff, Klaus (2004). *Content Analysis: An Introduction to Its Methodology*. New York: Sage.
- Lauderdale, Benjamin E. and Alexander Herzog (2016). “Measuring Political Positions from Legislative Speech”. *Political Analysis* 24 (3), pp. 374–394.
- Laver, Michael, Kenneth Benoit, and John Garry (2003). “Extracting Policy Positions from Political Texts Using Words as Data”. *American Political Science Review* 97 (2), pp. 311–331.
- Laver, Michael and Ian Budge (1992). “Measuring Policy Distances and Modelling Coalition Formation”. *Party Policy and Government Coalitions*. Ed. by Michael Laver and Ian Budge. Basingstoke: Macmillan, pp. 15–40.
- Laver, Michael and John Garry (2000). “Estimating Policy Positions from Political Texts”. *American Journal of Political Science* 44 (3), pp. 619–634.
- Link, William A. and Mitchell J. Eaton (2012). “On Thinning of Chains in MCMC”. *Methods in Ecology and Evolution* 3 (1), pp. 112–115.
- Londregan, John and Jr. Snyder James M. (1994). “Comparing Committee and Floor Preferences”. *Legislative Studies Quarterly* 19 (2), pp. 233–266.
- Lowe, William E. M. (2013). “There’s (Basically) Only One Way To Do It: Some Unifying Theory For Text Scaling Models” (Paper prepared for the American Political Science Association meeting September 2013, Chicago).
- Lowe, William E. M. and Kenneth Benoit (2013). “Validating Estimates of Latent Traits from Textual Data Using Human Judgment as a Benchmark”. *Political Analysis* 21 (3), pp. 298–313.
- Macaulay, Stewart (1963). “Non-Contractual Relations in Business: A Preliminary Study”. *American Sociological Review* 28 (1), pp. 55–67.
- Maltzman, Forrest and Lee Sigelman (1996). “The Politics of Talk: Unconstrained Floor Time in the U.S. House of Representatives”. *The Journal of Politics* 58 (3), pp. 819–830.
- Manning, Christopher D., Prabhakar Raghavan, and Hinrich Schütze (2008). *Introduction to Information Retrieval*. Cambridge: Cambridge University Press.

- Maron, Melvin E. and John L. Kuhns (1960). "On Relevance, Probabilistic Indexing and Information Retrieval". *Journal of the ACM* 7 (3), pp. 216–244.
- Martin, Lanny W. and Georg Vanberg (2005). "Coalition Policymaking and Legislative Review". *American Political Science Review* 99 (1), pp. 93–106.
- Martin, Shane (2011). "Using Parliamentary Questions to Measure Constituency Focus: An Application to the Irish Case". *Political Studies* 59 (2), pp. 472–488.
- Mattson, Ingvar (1995). "Private Members' Initiatives and Amendments". *Parliaments and Majority Rule in Western Europe*. Ed. by Herbert Döring. New York: St. Martin's Press, pp. 448–487.
- Mayhew, David (1974). *Congress: The Electoral Connection*. New Haven, CT: Yale University Press.
- McCarty, Nolan (2000). "Proposal Rights, Veto Rights, and Political Bargaining". *American Journal of Political Science* 44 (3), pp. 506–522.
- McLachlan, Geoffrey and David Peel (2000). *Finite Mixture Models*. 1st ed. Wiley Series in Probability and Statistics. New York: John Wiley & Sons (Wiley-Interscience).
- McLean, Iain (2001). *Rational Choice & British Politics: An Analysis of Rhetoric and Manipulation From Peel to Blair*. Oxford: Oxford University Press.
- McLean, Iain and Camilla Bustani (1999). "Irish Potatoes and British Politics: Interests, Ideology, Heresthetic and the Repeal of the Corn Laws". *Political Studies* 47 (5), pp. 817–836.
- Mitchell, Austin, ed. (1967). *The Whigs in Opposition, 1815-1830*. Oxford: Oxford University Press.
- Mnookin, Robert H. and Lewis Kornhauser (1979). "Bargaining in the Shadow of the Law: The Case of Divorce". *The Yale Law Journal* 88 (5), pp. 950–997.
- Monroe, Burt L., Michael P. Colaresi, and Kevin M. Quinn (2008). "Fightin' Words: Lexical Feature Selection and Evaluation for Identifying the Content of Political Conflict". *Political Analysis* 16 (4), pp. 372–403.

- Monroe, Burt L. and Ko Maeda (2004). "Talk's Cheap: Text-based Estimation of Rhetorical Ideal-Points". *Annual Meeting of the Society for Political Methodology*, pp. 29–31.
- Morley, John (1903). *The Life of William Ewart Gladstone*. New York: The MacMillan Company.
- Morris, Jonathan S. (2001). "Reexamining the Politics of Talk: Partisan Rhetoric in the 104th House". *Legislative Studies Quarterly* 26 (1), pp. 101–121.
- Moser, Scott and Andrew Reeves (2014). "Taking the Leap: Voting, Rhetoric, and the Determinants of Electoral Reform". *Legislative Studies Quarterly* 39 (4), pp. 467–502.
- Müller, Wolfgang C. and Kaare Strøm (1999). *Policy, Office, or Votes? How Political Parties in Western Europe Make Hard Decisions*. Cambridge: Cambridge University Press.
- Neuendorf, Kimberly A. (2002). *The Content Analysis Guidebook*. London: Sage.
- Norris, Pippa and Joni Lovenduski (1995). *Political Recruitment: Gender, Race and Class in the British Parliament*. Cambridge: Cambridge University Press.
- North, Douglas C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
- Norton, Philip (1980). "The Changing Face of the British House of Commons in the 1970s". English. *Legislative Studies Quarterly* 5 (3),
- (1994). "The Growth of the Constituency Role of the MP". *Parliamentary Affairs* 47 (4), p. 705.
- Noury, Abdul G. (2004). "Abstention in Daylight: Strategic Calculus of Voting in the European Parliament". *Public Choice* 121 (1/2), pp. 179–211.
- O'Byrne, Robert H. (1848). *The Representative History of Great Britain and Ireland, Comprising Biographical and Genealogical Notices of the Members of Parliament from 1 Edward VI., 1547, to 10 Victoria, 1847*. London: John Ollivier.
- O'Gorman, Frank and Peter Fraser (1986). "Party Politics in the Early Nineteenth Century (1812-32)". *The English Historical Review* 102 (402), pp. 63–88.

- Olson, Mancur (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.
- O’Neil, Cathy and Rachel Schutt (2014). *Institutions, Institutional Change and Economic Performance*. Sebastopol, CA: O’Reilly Media, Inc.
- Ophuls, William (1973). “Leviathan or Oblivion”. *Toward a Steady State Economy*. Ed. by Herman E. Daly. 9th ed. San Francisco: Freeman, pp. 215–230.
- Ostrom, Elinor (1990). *Governing the Commons: The Evolution of Institutions of Collective Action*. Cambridge: Cambridge University Press.
- Ostrom, Elinor, Roy Gardner, and James Walker (1994). *Rules, Games & Common-Pool Resources*. Ann Arbor: The University of Michigan Press.
- Panebianco, Angelo (1988). *Political Parties: Organization and Power*. Cambridge: Cambridge University.
- Patty, John W. (2016). “Signaling through Obstruction”. *American Journal of Political Science* 60 (1), pp. 175–189.
- Peterson, Andrew and Arthur Spirling (2018). “Classification Accuracy as a Substantive Quantity of Interest: Measuring Polarization in Westminster Systems”. *Political Analysis* 26 (1).
- Petrov, Slav, Dipanjan Das, and Ryan T. McDonald (2011). “A Universal Part-of-Speech Tagset”. *CoRR* abs/1104.2086. URL: <http://arxiv.org/abs/1104.2086>.
- Pierson, Paul (2004). *Politics in Time: History, Institutions, and Social Analysis*. Princeton, N.J.: Princeton University Press.
- Polsby, Nelson W. (1968). “The Institutionalization of the U.S. House of Representatives”. *American Political Science Review* 62 (1), pp. 144–168.
- Poole, Keith T. (2005). *Spatial Models of Parliamentary Voting*. Cambridge, New York: Cambridge University Press.
- Porritt, Edward (1909). *The Unreformed House of Commons: Parliamentary Representation Before 1832*. Vol. 1. Cambridge: Cambridge University Press.

- Proksch, Sven-Oliver and Jonathan B. Slapin (2009). "How to Avoid Pitfalls in Statistical Analysis of Political Texts: The Case of Germany". *German Politics* 18 (3), pp. 323–344.
- (2010). "Position Taking in European Parliament Speeches". *British Journal of Political Science* 40 (3), pp. 587–611.
- (2012). "Institutional Foundations of Legislative Speech". *American Journal of Political Science* 56 (3), pp. 520–537.
- (2014). "Words as Data: Content Analysis in Legislative Studies". *The Oxford Handbook of Legislative Studies*. Ed. by Shane Martin, Thomas Saalfeld, and Kaare Strøm. Oxford: Oxford University Press, pp. 126–144.
- (2015). *The Politics of Parliamentary Debate: Parties, Rebels and Representation*. Cambridge: Cambridge University Press.
- Pugh, Martin (1982). *The Making of Modern British Politics, 1867-1939*. Oxford: Basil Blackwell Publisher Limited.
- (1999). *State & Society: A Social and political History of Britain 1870-1999*. 2nd ed. New York: Oxford University Press.
- Quinn, Kevin M. et al. (2010). "How to Analyze Political Attention with Minimal Assumptions and Costs". *American Journal of Political Science* 54 (1), pp. 209–228.
- Rallings, Colin and Michael Thrasher (2012). *British Electoral Facts 1832-2012*. London: Biteback Publishing Ltd.
- Ratcliff, John W. and David E. Metzener (1988). "Pattern Matching: The Gestalt Approach". *Dr. Dobb's Journal* 13 (7), p. 46.
- Ray, Leonard (2007). "Validity of Measured Party Positions on European Integration: Assumptions, Approaches, and a Comparison of Alternative Measures". *Electoral Studies* 26 (1), pp. 11–22.
- Redlich, Josef (1908). *The Procedure of the House of Commons: A Study of Its History and Present Form*. Vol. 1. Translated from German by A. Ernest Steinthal. London: Archibald Constable & Co. Ltd.

- Riker, William H. (1980). "Implications from the Disequilibrium of Majority Rule for the Study of Institutions". *The American Political Science Review* 74 (2), pp. 432–446.
- (1996). *The Strategy of Rhetoric*. New Haven, CT: Yale University Press.
- Rohde, David W. (1994). "Parties and Committees in the House: Member Motivations, Issues, and Institutional Arrangements". *Legislative Studies Quarterly* 19 (3), pp. 341–359.
- Romer, Thomas and Howard Rosenthal (1978). "Political Resource Allocation, Controlled Agendas, and the Status Quo". *Public Choice* 33 (4), pp. 27–43.
- Rosas, Guillermo and Yael Shomer (2008). "Models of Nonresponse in Legislative Politics". *Legislative Studies Quarterly* 33 (4), pp. 573–601.
- Rose, Richard (1983). "Elections and Electoral Systems: Choices and Alternatives". *Democracy and Elections: Electoral Systems and Their Political Consequences*. Ed. by Vernon Bogdanor and David Butler. Cambridge: Cambridge University Press, pp. 20–45.
- Rush, Michael (2001). *The Role of the Member of Parliament Since 1868: From Gentlemen to Players*. New York: Oxford University Press.
- Rutherford, Geddes W. (1914). "Some Aspects of Parliamentary Obstruction". *The Sewanee Review* 22 (2), pp. 166–180.
- Saalfeld, Thomas (2000). "Members of Parliament and Governments in Western Europe: Agency Relations and Problems of Oversight". *European Journal of Political Research* 37 (3), pp. 353–376.
- Schickler, Eric (2000). "Institutional Change in the House of Representatives, 1867–1998: A Test of Partisan and Ideological Power Balance Models". *The American Political Science Review* 2 (94), pp. 269–288.
- (2001). *Disjointed Pluralism: Institutional Innovation and the Development of the US Congress*. Princeton: Princeton University Press.
- Schickler, Eric and Andrew Rich (1997). "Controlling the Floor: Parties as Procedural Coalitions in the House". *American Journal of Political Science* 4 (41), pp. 1340–1375.

- Schwarz, Daniel, Denise Traber, and Kenneth Benoit (2015). "Estimating Intra-Party Preferences: Comparing Speeches to Votes". *Political Science Research and Methods* 5 (2), pp. 379–396.
- Shepsle, Kenneth A. (1979). "Institutional Arrangements and Equilibrium in Multidimensional Voting Models". *American Journal of Political Science* 23 (1), pp. 27–59.
- (1986). "Institutional Equilibrium and Equilibrium Institutions". *Political Science: The Science of Politics*. Ed. by Herbert F. Weisberg. New York: Agathon Press, Inc., pp. 51–81.
- Shepsle, Kenneth A. and Barry R. Weingast (1982). "Institutionalizing Majority Rules: A Social Choice Theory with Policy Implications". *American Economic Review* 72 (2), pp. 367–371.
- (1994). "Positive Theories of Congressional Institutions". *Legislative Studies Quarterly* 19 (2), pp. 149–179.
- Sieberer, Ulrich (2006). "Party Unity in Parliamentary Democracies: A Comparative Analysis". *The Journal of Legislative Studies* 12 (2), pp. 150–178.
- Sieberer, Ulrich, Peter Meißner, et al. (2016). "Mapping and Explaining Parliamentary Rule Changes in Europe: A Research Program". *Legislative Studies Quarterly* 41 (1), pp. 61–88.
- Sieberer, Ulrich, Wolfgang C. Müller, and Maiko Isabelle Heller (2011). "Reforming the Rules of the Parliamentary Game: Measuring and Explaining Changes in Parliamentary Rules in Austria, Germany, and Switzerland, 1945–2010". *West European Politics* 34 (5), pp. 948–975.
- Slagter, Tracy Hoffmann and Gerhard Loewenberg (2009). "Path Dependence as an Explanation of the Institutional Stability of the German Parliament". *German Politics* 18 (4), pp. 469–484.
- Slapin, Jonathan B. and Sven-Oliver Proksch (2008). "A Scaling Model for Estimating Time-Series Party Positions from Texts". *American Journal of Political Science* 52 (3), pp. 705–722.

- Smith, Henry Stooks (1850). *The Parliaments of England, from 1st George I., to the Present Time*. Vol. III, The Disenfranchised Boroughs, Ireland, Scotland, c. London: Simpkin, Marshall, Co.
- (1973). *The Parliaments of England from 1715 to 1847*. Ed. by F.W.S. Craig. 2nd ed. Old Woking, Surrey: Unwin Brothers Limited, The Gresham Press.
- Spirling, Arthur (2012). “U.S. Treaty Making with American Indians: Institutional Change and Relative Power, 1784–1911”. *American Journal of Political Science* 56 (1), pp. 84–97.
- (2014). “British Political Development: A Research Agenda”. *Legislative Studies Quarterly* 39 (4), pp. 435–437.
- Spirling, Arthur and Iain McLean (2007). “UK OC OK? Interpreting Optimal Classification Scores for the U.K. House of Commons”. *Political Analysis* 15 (1), pp. 85–96.
- The Spectator (1839). Vol. 12. London: Joseph Clayton.
- Thomas, John A. (1909). *The House of Commons, 1832–1901: A Study of its Economic and Functional Character*. Vol. 1. Cardiff: University of Wales Press.
- Thornley, David (1960). “The Irish Home Rule Party and Parliamentary Obstruction, 1874–87”. *Irish Historical Studies* 12 (45), pp. 38–57.
- Tsebelis, George (1990). *Nested Games. Rational Choice in Comparative Politics*. Berkeley, CA: University of California Press.
- Vandoren, Peter M. (1990). “Can We Learn the Causes of Congressional Decisions from Roll-Call Data?” *Legislative Studies Quarterly* 15 (3), pp. 311–340.
- Vermeule, Adrian (2007). “Absolute Majority Rules”. *British Journal of Political Science* 37 (4), pp. 643–658.
- Volgens, Andrea et al. (2016). *The Manifesto Data Collection. Manifesto Project (MRG/CMP/MARPOR). Version 2016a*. with Werner, Annika. Berlin: Wissenschaftszentrum Berlin für Sozialforschung.
- Walpole, Sir Spencer (1905). *A History of England from the Conclusion of the Great War in 1815*. London: Longmans, Green and Company.

- Wawro, Gregory J. and Eric Schickler (2006). *Filibuster: Obstruction and Law-making in the U.S. Senate*. Princeton and Oxford: Princeton University Press.
- (2010). “Legislative Obstructionism”. *Annual Review of Political Science* 13 (1), pp. 297–319.
- Webb, Paul D. (1994). “Party Organizational Change in Britain: The Iron Law of Centralization?” *How Parties Organize: Change and Adaptation in Party Organizations in Western Democracies*. Ed. by Richard S. Katz and Peter Mair. London: Sage Publications, pp. 109–133.
- Weber, Robert Philip (1990). *Basic Content Analysis*. Quantitative Applications in the Social Sciences. Newbury Park, CA: Sage.
- Weingast, Barry R. (2002). “Rational Choice Institutionalism”. *Political Science: State of the Discipline*. Ed. by Ira Katznelson and Helen V. Milner. New York: W. W. Norton, pp. 660–692.
- Weingast, Barry R. and William J. Marshall (1988). “The Industrial Organization of Congress; or, Why Legislatures, Like Firms, Are Not Organized as Markets”. *Journal of Political Economy* 96 (1), pp. 132–163.
- Wheare, Kenneth C. (1963). *Legislatures*. London and New York: Oxford University Press.
- Williamson, Oliver E. (1996). *The Mechanisms of Governance*. New York and Oxford: Oxford University Press.
- Wilson, James Q., ed. (1980). *The Politics of Regulation*. New York: Basic Books.
- Wolfinger, Raymond E. (1971). “Filibusters: Majority Rule, Presidential Leadership, and Senate Norms”. *Readings on Congress*. Ed. by Raymond E. Wolfinger. Englewood Cliffs: Prentice Hall, pp. 286–305.
- Wooldridge, Jeffrey M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.
- Zeileis, Achim, Christian Kleiber, and Simon Jackman (2008). “Regression Models for Count Data in R”. *Journal of Statistical Software* 27 (8), pp. 1–25.

- Zubek, Radoslaw (2011). "Negative Agenda Control and Executive-Legislative Relations in East Central Europe, 1997-2008". *The Journal of Legislative Studies* 17 (2), pp. 172–192.
- (2015). "Legislative Organisation and its Determinants in European Parliamentary Democracies". *West European Politics* 38 (5), pp. 933–939.
- Zucchini, Francesco (2011). "Government Alternation and Legislative Agenda Setting". *European Journal of Political Research* 50 (6), pp. 749–774.

Appendices

Appendix A SUPPORTING MATERIALS FOR CHAPTER 3

Table A1: House of Commons Sessions, 1810–2015

State opening			Prorogation			Parliament	N ^a (processed ^b)	
1	Nov.	1810	24	Jul.	1811	4th (5)	1277	(740)
7	Jan.	1812	30	Jul.	1812	4th (6)	1,299	(773)
24	Nov.	1812	22	Jul.	1813	5th (1)	568	(372)
4	Nov.	1813	30	Jul.	1814	5th (2)	1,109	(668)
8	Nov.	1814	12	Jul.	1815	5th (3)	1,951	(1,135)
1	Feb.	1816	2	Jul.	1816	5th (4)	0	(0)
28	Jan.	1817	12	Jul.	1817	5th (5)	1,948	(1,380)
27	Jan.	1818	10	Jun.	1818	5th (6)	802	(614)
14	Jan.	1819	13	Jul.	1819	6th (1)	2,338	(1,680)
23	Nov.	1819	28	Feb.	1820	6th (2)	802	(576)
21	Apr.	1820	23	Nov.	1820	7th (1)	1,469	(1,077)
23	Jan.	1821	11	Jul.	1821	7th (2)	2,379	(1,628)
5	Feb.	1822	6	Aug.	1822	7th (3)	1,737	(1,268)
4	Feb.	1823	19	Jul.	1823	7th (4)	2,039	(1,359)
3	Feb.	1824	25	Jun.	1824	7th (5)	2,198	(1,516)
3	Feb.	1825	6	Jul.	1825	7th (6)	2,086	(1,433)
2	Feb.	1826	31	May	1826	7th (7)	1,635	(1,237)
14	Nov.	1826	2	Jul.	1827	8th (1)	1,828	(1,395)
29	Jan.	1828	28	Jul.	1828	8th (2)	2,068	(1,515)
5	Feb.	1829	24	Jun.	1829	8th (3)	0	(0)
26	Oct.	1830	24	Dec.	1830	8th (4)	4,996	(3,395)
3	Feb.	1831	22	Apr.	1831	9th (1)	2,521	(1,695)
14	Jun.	1831	20	Oct.	1831	10th (1)	8,516	(5,414)
6	Dec.	1831	18	Dec.	1831	10th (2)	387	(273)
17	Jan.	1832	16	Aug.	1832	10th (3)	6,632	(4,529)
29	Jan.	1833	29	Aug.	1833	11th (1)	5,652	(4,205)
19	Feb.	1835	10	Sep.	1835	12th (1)	10,026	(7,347)
4	Feb.	1836	20	Aug.	1836	12th (2)	4,945	(3,410)
31	Jan.	1837	17	Jul.	1837	12th (3)	2,621	(1,915)
15	Nov.	1837	23	Dec.	1837	13th (1)	862	(661)
16	Jan.	1838	16	Aug.	1838	13th (2)	2,891	(2,146)
5	Feb.	1839	27	Aug.	1839	13th (3)	3,698	(2,722)
16	Jan.	1840	11	Aug.	1840	13th (4)	3,557	(2,466)
26	Jan.	1841	22	Jun.	1841	13th (5)	2,949	(1,939)
19	Aug.	1841	7	Oct.	1841	14th (1)	644	(443)
3	Feb.	1842	12	Aug.	1842	14th (2)	6,134	(4,342)
2	Feb.	1843	24	Aug.	1843	14th (3)	4,117	(3,011)
1	Feb.	1844	5	Sep.	1844	14th (4)	1,667	(1,331)
4	Feb.	1845	9	Aug.	1845	14th (5)	4,884	(3,651)
22	Jan.	1846	28	Aug.	1846	14th (6)	3,871	(3,225)
19	Jan.	1847	23	Jul.	1847	14th (7)	4,602	(3,552)
18	Nov.	1847	20	Dec.	1847	15th (1)	627	(477)
3	Feb.	1848	5	Sep.	1848	15th (2)	2,714	(2,291)
1	Feb.	1849	1	Aug.	1849	15th (3)	4,594	(3,215)
31	Jan.	1850	15	Aug.	1850	15th (4)	6,028	(4,092)
4	Feb.	1851	8	Aug.	1851	15th (5)	2,965	(2,121)
3	Feb.	1852	1	Jul.	1852	15th (6)	4,115	(2,953)
4	Nov.	1852	31	Dec.	1852	16th (1)	803	(628)
10	Feb.	1853	20	Aug.	1853	16th (2)	5,510	(3,827)
31	Jan.	1854	12	Aug.	1854	16th (3)	6,438	(4,752)

Table A1: House of Commons Sessions, 1810–2015 (Continued)

State opening			Prorogation			Parliament (session)	N ^a (processed ^b)	
12	Dec.	1854	23	Dec.	1854	16th (4)	346	(263)
23	Jan.	1855	14	Aug.	1855	16th (5)	5,860	(4,154)
31	Jan.	1856	29	Jul.	1856	16th (6)	6,443	(4,371)
3	Feb.	1857	21	Mar.	1857	16th (7)	1,300	(939)
20	Apr.	1857	28	Aug.	1857	17th (1)	6,793	(4,383)
3	Dec.	1857	12	Dec.	1857	17th (2)	316	(226)
4	Feb.	1858	2	Aug.	1858	17th (3)	7,048	(4,690)
3	Feb.	1859	19	Apr.	1859	17th (4)	1,190	(825)
31	May	1859	13	Aug.	1859	18th (1)	2,817	(1,830)
24	Jan.	1860	28	Aug.	1860	18th (2)	7,035	(4,720)
5	Feb.	1861	6	Aug.	1861	18th (3)	7,534	(5,008)
6	Feb.	1862	7	Aug.	1862	18th (4)	5,766	(3,520)
5	Feb.	1863	28	Jul.	1863	18th (5)	6,992	(4,323)
4	Feb.	1864	29	Jul.	1864	18th (6)	5,206	(3,289)
7	Feb.	1865	6	Jul.	1865	18th (7)	4,839	(3,322)
1	Feb.	1866	10	Aug.	1866	19th (1)	4,237	(2,856)
5	Feb.	1867	21	Aug.	1867	19th (2)	8,283	(5,613)
19	Nov.	1867	7	Dec.	1867	19th (3)	0	(0)
13	Feb.	1868	31	Jul.	1868	19th (4)	5,715	(3,725)
10	Dec.	1868	29	Dec.	1868	20th (1)	8	(8)
16	Feb.	1869	11	Aug.	1869	20th (2)	7,122	(4,979)
8	Feb.	1870	10	Aug.	1870	20th (3)	8,386	(5,734)
9	Feb.	1871	21	Aug.	1871	20th (4)	8,491	(5,667)
6	Feb.	1872	10	Aug.	1872	20th (5)	7,117	(4,726)
6	Feb.	1873	5	Aug.	1873	20th (6)	6,874	(4,487)
5	Mar.	1874	7	Aug.	1874	21st (1)	4,268	(2,801)
5	Feb.	1875	13	Aug.	1875	21st (2)	8,343	(5,303)
8	Feb.	1876	15	Aug.	1876	21st (3)	7,843	(5,148)
8	Feb.	1877	14	Aug.	1877	21st (4)	7,954	(5,252)
17	Jan.	1878	16	Aug.	1878	21st (5)	10,254	(7,210)
5	Dec.	1878	17	Dec.	1878	21st (6)	474	(305)
13	Feb.	1879	15	Aug.	1879	21st (7)	8,196	(5,775)
5	Feb.	1880	24	Mar.	1880	21st (8)	2,599	(1,909)
29	Apr.	1880	7	Sep.	1880	22nd (1)	5,590	(4,020)
6	Jan.	1881	27	Aug.	1881	22nd (2)	14,871	(10,387)
7	Feb.	1882	18	Aug.	1882	22nd (3)	10,642	(6,841)
24	Oct.	1882	2	Dec.	1882	22nd (4)	1,144	(648)
15	Feb.	1883	25	Aug.	1883	22nd (5)	21,902	(13,938)
5	Feb.	1884	14	Aug.	1884	22nd (6)	10,853	(6,652)
23	Oct.	1884	6	Dec.	1884	22nd (7)	2,233	(1,321)
19	Feb.	1885	14	Aug.	1885	22nd (8)	10,984	(6,703)
28	Jan.	1886	25	Jun.	1886	23rd (1)	7,843	(4,991)
5	Aug.	1886	25	Sep.	1886	24th (1)	2,765	(1,755)
27	Jan.	1887	16	Sep.	1887	24th (2)	22,136	(12,633)
9	Feb.	1888	13	Aug.	1888	24th (3)	15,619	(8,587)
6	Nov.	1888	24	Dec.	1888	24th (4)	6,003	(3,255)
21	Feb.	1889	30	Aug.	1889	24th (5)	17,835	(9,601)
11	Feb.	1890	18	Aug.	1890	24th (6)	19,309	(10,013)
25	Nov.	1890	9	Dec.	1890	24th (7)	0	(0)
22	Jan.	1891	5	Aug.	1891	24th (8)	4,709	(2,659)
9	Feb.	1892	28	Jun.	1892	24th (9)	10,099	(5,475)
4	Aug.	1892	18	Aug.	1892	25th (1)	203	(114)
31	Jan.	1893	5	Mar.	1894	25th (2)	14,930	(7,773)
12	Mar.	1894	25	Aug.	1894	25th (3)	10,013	(5,389)

Table A1: House of Commons Sessions, 1810–2015 (Continued)

State opening			Prorogation			Parliament (session)	N ^a (processed ^b)	
5	Feb.	1895	6	Jul.	1895	25th (4)	11,659	(6,528)
12	Aug.	1895	5	Sep.	1895	26th (1)	2,758	(1,495)
11	Feb.	1896	14	Aug.	1896	26th (2)	16,700	(9,509)
19	Jan.	1897	6	Aug.	1897	26th (3)	13,725	(7,827)
8	Feb.	1898	12	Aug.	1898	26th (4)	11,391	(6,849)
7	Feb.	1899	9	Aug.	1899	26th (5)	10,478	(6,373)
17	Oct.	1899	27	Oct.	1899	26th (6)	845	(456)
30	Jan.	1900	8	Aug.	1900	26th (7)	15,581	(8,288)
3	Dec.	1900	15	Dec.	1900	27th (1)	1,092	(555)
23	Jan.	1901	17	Aug.	1901	27th (2)	13,874	(6,667)
16	Jan.	1902	18	Dec.	1902	27th (3)	24,736	(12,835)
17	Feb.	1903	14	Aug.	1903	27th (4)	7,452	(4,040)
2	Feb.	1904	15	Aug.	1904	27th (5)	9,845	(5,092)
14	Feb.	1905	11	Aug.	1905	27th (6)	10,698	(5,179)
13	Feb.	1906	21	Dec.	1906	28th (1)	17,114	(9,688)
12	Feb.	1907	28	Aug.	1907	28th (2)	14,700	(7,760)
29	Jan.	1908	21	Dec.	1908	28th (3)	20,150	(10,403)
16	Feb.	1909	3	Dec.	1909	28th (4)	30,278	(13,904)
15	Feb.	1910	28	Nov.	1910	29th (1)	16,998	(7,624)
31	Jan.	1911	16	Dec.	1911	30th (1)	52,543	(24,193)
14	Feb.	1912	7	Mar.	1913	30th (2)	51,006	(22,127)
10	Mar.	1913	15	Aug.	1913	30th (3)	27,551	(12,650)
10	Feb.	1914	18	Sep.	1914	30th (4)	16,515	(7,192)
11	Nov.	1914	27	Jan.	1916	30th (5)	27,154	(12,585)
15	Feb.	1916	22	Dec.	1916	30th (6)	19,921	(8,513)
7	Feb.	1917	6	Feb.	1918	30th (7)	29,106	(11,877)
12	Feb.	1918	21	Nov.	1918	30th (8)	20,746	(8,617)
4	Feb.	1919	23	Dec.	1919	31st (1)	32,859	(13,958)
10	Feb.	1920	23	Dec.	1920	31st (2)	8,764	(3,571)
15	Feb.	1921	10	Nov.	1921	31st (3)	4,509	(1,869)
14	Dec.	1921	19	Dec.	1921	31st (4)	768	(286)
7	Feb.	1922	04	Aug.	1922	31st (5)	19,030	(8,551)
20	Nov.	1922	15	Dec.	1922	32nd (1)	5,128	(2,290)
13	Feb.	1923	16	Nov.	1923	32nd (2)	13,011	(5,545)
8	Jan.	1924	09	Oct.	1924	33rd (1)	20,005	(8,266)
2	Dec.	1924	22	Dec.	1925	34th (1)	25,943	(10,650)
2	Feb.	1926	15	Dec.	1926	34th (2)	24,005	(9,830)
8	Feb.	1927	22	Dec.	1927	34th (3)	34,795	(13,231)
7	Feb.	1928	3	Aug.	1928	34th (4)	25,769	(10,177)
6	Nov.	1928	10	May	1929	34th (5)	29,057	(11,272)
25	Jun.	1929	1	Aug.	1930	35th (1)	55,098	(22,727)
28	Oct.	1930	7	Oct.	1931	35th (2)	52,815	(19,664)
3	Nov.	1931	17	Nov.	1932	36th (1)	41,328	(16,752)
22	Nov.	1932	17	Nov.	1933	36th (2)	35,678	(14,785)
21	Nov.	1933	16	Nov.	1934	36th (3)	41,355	(18,393)
20	Nov.	1934	25	Oct.	1935	36th (4)	35,018	(15,576)
26	Nov.	1935	30	Oct.	1936	37th (1)	37,631	(15,076)
3	Nov.	1936	22	Oct.	1937	37th (2)	48,239	(18,854)
26	Oct.	1937	4	Nov.	1938	37th (3)	55,231	(20,763)
8	Nov.	1938	23	Nov.	1939	37th (4)	54,781	(20,773)
28	Nov.	1939	20	Nov.	1940	37th (5)	40,411	(14,969)
21	Nov.	1940	11	Nov.	1941	37th (6)	32,412	(12,373)
12	Nov.	1941	10	Nov.	1942	37th (7)	32,992	(11,723)
11	Nov.	1942	23	Nov.	1943	37th (8)	41,531	(15,526)

Table A1: House of Commons Sessions, 1810–2015 (Continued)

State opening			Prorogation			Parliament (session)	N ^a (processed ^b)	
24	Nov.	1943	28	Nov.	1944	37th (9)	51,848	(20,466)
29	Nov.	1944	15	Jun.	1945	37th (10)	22,753	(8,753)
1	Aug.	1945	6	Nov.	1946	38th (1)	53,387	(20,921)
12	Nov.	1946	20	Oct.	1947	38th (2)	57,891	(23,586)
21	Oct.	1947	13	Sep.	1948	38th (3)	55,407	(21,588)
14	Sep.	1948	25	Oct.	1948	38th (4)	647	(324)
26	Oct.	1948	16	Dec.	1949	38th (5)	79,676	(32,305)
1	Mar.	1950	26	Oct.	1950	39th (1)	37,157	(14,788)
31	Oct.	1950	4	Oct.	1951	39th (2)	59,528	(24,342)
31	Oct.	1951	30	Oct.	1952	40th (1)	62,939	(27,831)
4	Nov.	1952	29	Oct.	1953	40th (2)	57,226	(25,577)
3	Nov.	1953	25	Nov.	1954	40th (3)	56,331	(24,863)
30	Nov.	1954	6	May	1955	40th (4)	29,735	(13,237)
7	Jun.	1955	5	Nov.	1956	41st (1)	73,297	(34,572)
6	Nov.	1956	1	Nov.	1957	41st (2)	52,054	(24,651)
5	Nov.	1957	23	Oct.	1958	41st (3)	41,106	(20,246)
28	Oct.	1958	18	Sep.	1959	41st (4)	47,333	(23,358)
20	Oct.	1959	27	Oct.	1960	42nd (1)	11,481	(5,707)
1	Nov.	1960	24	Oct.	1961	42nd (2)	108,489	(56,551)
31	Oct.	1961	25	Oct.	1962	42nd (3)	53,768	(27,279)
30	Oct.	1962	8	Nov.	1963	42nd (4)	53,914	(27,363)
12	Nov.	1963	25	Sep.	1964	42nd (5)	45,929	(23,577)
27	Oct.	1964	8	Nov.	1965 [†]	43rd (1)	68,750	(34,860)
09	Nov.	1965	10	Mar.	1966 [†]	43rd (2)	17,642	(8,312)
18	Apr.	1966	27	Oct.	1967	44th (1)	99,855	(47,684)
31	Oct.	1967	25	Oct.	1968	44th (2)	66,818	(31,851)
30	Oct.	1968	22	Oct.	1969	44th (3)	65,592	(31,455)
28	Oct.	1969	29	May	1970	44th (4)	36,213	(17,359)
29	Jun.	1970	28	Oct.	1971	45th (1)	66,460	(32,398)
2	Nov.	1971	26	Oct.	1972	45th (2)	63,819	(34,139)
31	Oct.	1972	25	Oct.	1973	45th (3)	52,259	(29,257)
30	Oct.	1973	8	Feb.	1974	45th (4)	16,730	(9,082)
6	Mar.	1974	20	Sep.	1974	46th (1)	22,573	(12,843)
22	Oct.	1974	12	Nov.	1975	47th (1)	62,169	(36,929)
19	Nov.	1975	22	Nov.	1976	47th (2)	62,824	(36,207)
24	Nov.	1976	26	Oct.	1977	47th (3)	51,756	(31,303)
3	Nov.	1977	24	Oct.	1978	47th (4)	56,718	(34,355)
31	Oct.	1978	7	Apr.	1979	47th (5)	26,653	(16,272)
9	May	1979	13	Nov.	1980	48th (1)	85,260	(48,878)
20	Nov.	1980	30	Oct.	1981	48th (2)	46,161	(27,677)
4	Nov.	1981	28	Oct.	1982	48th (3)	52,264	(30,165)
3	Nov.	1982	13	May	1983	48th (4)	33,568	(18,933)
15	Jun.	1983	31	Oct.	1984	49th (1)	69,926	(39,817)
6	Nov.	1984	30	Oct.	1985	49th (2)	58,773	(34,788)
6	Nov.	1985	7	Nov.	1986	49th (3)	66,353	(39,541)
12	Nov.	1986	15	May	1987	49th (4)	31,488	(18,678)
17	Jun.	1987	15	Nov.	1988	50th (1)	81,589	(49,347)
22	Nov.	1988	16	Nov.	1989	50th (2)	62,491	(38,285)
21	Nov.	1989	1	Nov.	1990	50th (3)	62,176	(37,873)
7	Nov.	1990	22	Oct.	1991	50th (4)	55,986	(36,698)
31	Oct.	1991	16	Mar.	1992	50th (5)	25,623	(15,987)
6	May	1992	5	Nov.	1993	51st (1)	79,978	(51,222)
18	Nov.	1993	3	Nov.	1994	51st (2)	51,997	(32,198)

Table A1: House of Commons Sessions, 1810–2015 (Continued)

State opening			Prorogation			Parliament (session)	N ^a (processed ^b)	
16	Nov.	1994	8	Nov.	1995	51st (3)	52,201	(33,009)
15	Nov.	1995	17	Oct.	1996	51st (4)	46,916	(29,920)
23	Oct.	1996	21	Mar.	1997	51st (5)	24,598	(16,029)
7	May	1997	19	Nov.	1998	52nd (1)	83,168	(55,896)
24	Nov.	1998	11	Nov.	1999	52nd (2)	53,840	(36,629)
24	Nov.	1999	30	Nov.	2000	52nd (3)	56,356	(38,095)
6	Dec.	2000	3	May	2001	52nd (4)	28,163	(19,508)
20	Jun.	2001	7	Nov.	2002	53rd (1)	63,093	(44,755)
13	Nov.	2002	20	Nov.	2003	53rd (2)	52,912	(37,193)
26	Nov.	2003	18	Nov.	2004	53rd (3)	52,059	(37,129)
23	Nov.	2004	7	Apr.	2005	53rd (4)	20,505	(14,653)
17	May	2005	8	Nov.	2006	54th (1)	74,436	(52,952)
15	Nov.	2006	30	Oct.	2007	54th (2)	44,533	(32,149)
6	Nov.	2007	26	Nov.	2008	54th (3)	59,884	(42,331)
3	Dec.	2008	12	Nov.	2009	54th (4)	45,237	(32,270)
18	Nov.	2009	8	Apr.	2010	54th (5)	21,723	(14,728)
25	May	2010	1	May	2012	55th (1)	128,268	(86,749)
9	May	2012	25	Apr.	2013	55th (2)	53,172	(36,273)
8	May	2013	14	May	2014	55th (3)	60,172	(41,724)
4	Jun.	2014	26	Mar.	2015	55th (4)	47,544	(34,585)

Notes: Own compilation on the basis of <http://www.historyofparliamentonline.org> (for 4th–8th Parliament), Cook and Keith (1975, pp. 100–103) (for 9th–26th Parliament), Butler and Butler (2000, pp. 190–193) (for 27th–52nd Parliament, 2nd session), and <http://www.parliament.uk/about/faqs/house-of-commons/faqs/business-faq-page/recess-dates/recess/> (for 52nd Parliament and onwards).

[†]Dates listed incorrectly in Butler and Butler (2000); corrected on the basis of Craig (1975, p. 217).

^aNumber of speeches after matching (procedure described in text).

^bNumber of speeches as used in algorithms (non-procedural phrases removed; independents removed).

A.1 Data Gathering and Processing

Machine-readable versions (.xml) of UK parliamentary speeches from the *Hansard* archives compiled by Political Mashup² were obtained using my own web scraper (coded in Python). I subsequently parsed these files with another Python script, organising the speeches according to year, date, and debate. As data are missing for the session 2014/2015, I scrape and parse additional .xml files from *They Work for You* that cover this period.³

²<http://politicalmashup.nl/>.

³<http://www.theyworkforyou.com/pwdata/scrapedxml/debates/>.

Matching Party Labels

Unfortunately, the data do not consistently include party labels for the entire period studied. Therefore, I proceed to match in party affiliation on the basis of MP names.

From 1930 to 1936, some party labels are recorded in the archives; whereas others are not. After 1936, full records exist. For 1832–1936, I rely on party label data from the Eggers and Spirling (2014a) database.⁴ For 1810–1831⁵, I hand-code MPs—5,793 session-level MP observations—based primarily on the ticket that the candidate ran on, or alternatively their level of support for a particular party in the Commons, based on secondary literature. To this end, I consult and triangulate a variety of sources, including, primarily, Smith (1850) and Smith (1973), but also O’Byrne (1848) and the Oxford Dictionary of National Biography (DNB).⁶ For this period, if MPs did not enter Parliament on behalf of a political group, they were given a party label when their biographic information clearly stated a certain leaning and/or tendency of supporting that party’s political cause.⁷ Other considerations in this process were whether the constituency and years in office matched, as well as the political legacy of the MP’s family. In case of uncertainty, I consulted multiple sources.

Prior to matching, I remove contributions by the Speaker, the Deputy Speakers, and the Chairpersons (177,354), and contributions marked as being by “hon. members” or “several members” (34,367), which usually include interpellations of a non-substantive nature.⁸ This leaves us with 6,012,631 observations.

⁴See the *election_returns.csv* spreadsheet, http://andy.egge.rs/data/csv_archive_20141024.zip.

⁵Note that there was some debate over whether we can actually speak of “parties” as such in the early nineteenth century. Whereas Mitchell (1967) finds little evidence of consistent groupings in his earlier work based on roll call votes, more recent contributions by Fraser (1983) and O’Gorman and Fraser (1986) point to the existence of political parties during this period.

⁶<http://www.oxforddnb.com>.

⁷Key phrases considered are, for example: “of/advocated [party name] principles” or “usually sided with the [party name]”.

⁸Such contributions are identified using the same Levenshtein algorithm as used for attributing party labels, as described in the text.

I match these records to speeches using a fuzzy set matching algorithm with the `fuzzywuzzy` library in `Python`. The code applies the Levenshtein distance (LDS) algorithm, which measures the distance between a source and target string based on the number of deletions, insertions, or substitutions required to turn one into the other. Prior to matching, I remove all (honorary) titles (e.g. “Mr”, “Viscount”, “Earl”, etc.), reduce first names to the first letter, and strip punctuation. To further maximise accuracy each year of parliamentary speech records is matched only against those MPs who sat in the House during that particular year. Matches of at least 75 per cent are retained as spot checks shows that this maximises accuracy without sacrificing too much data.⁹

Other Pre-Processing Steps

Before applying the estimation procedures outlined in Chapter 4, I undertook a number of further pre-processing steps. Following Lauderdale and Herzog (2016), I removed all speeches shorter than fifty words (which are usually interpellations). In addition, I remove any MP names mentioned in speeches, a list of simple stop words¹⁰, punctuation, and stem the words.

Procedural Phrases Removal - Examples

Table A2 shows a randomly selected sample of twenty procedural phrases that were removed from the data (approach described in text).

⁹The algorithm implements a two-step matching procedure, where first a match is calculated on the bases of tokenized, sorted names with a 75 per cent cut-off. If no match exceeding that threshold is found, the algorithm proceeds to match only on surnames, with a 90 per cent match requirement.

¹⁰Here, I remove 25 semantically non-selective terms that are common in Reuters-RCV1 (Manning, Raghavan, and Schütze 2008, Figure 2.5). Removed stop words include: “a”, “an”, “and”, “are”, “as”, “at”, “be”, “by”, “for”, “from”, “to”, “was”, “were”, “will”, “with”.

Table A2: Examples of Removed Procedural Phrases

Date	Member	Party	Procedural phrase
1852-04-06	R. Milnes	C	friend the chancellor of the exchequer a question with respect to what he mr
1854-07-31	G. Grey	LIB	with regard to the increase in the number of members , no difference of opinion existed, he believed, on that point
1909-10-27	W. Long	C	the very policy of the government is to expose those places to two alternatives
1915-03-02	J. A. Simon	LIB	friends in calling attention to the fact that there have been delays
1924-06-26	Gosling	LAB	the following amendment stood on the order paper in the name of mr
1930-03-06	F. A. Macquisten	C	this is the same sum of money as that included under appropriations in aid
1938-03-14	R. A. Butler	C	friend the prime minister on the 2st december last in regard to the policy of the government
1939-07-10	H. K. Wood	C	the provisional contracts for the acquisition of the two undertakings are set out in the schedule to the bill
1948-01-28	T. Dugdale	C	friends to vote in favour of this amendment
1948-04-28	Westwood	LAB	there are the questions of school accommodation, staffing of schools, feeding of schoolchildren, all requiring time for consideration
1950-05-18	Clarke	C	that takes a considerable amount of time
1967-04-24	Shore	LAB	friend the chancellor of the exchequer made clear, we are watching the situation closely
1972-05-22	Ellis	C	growth referred to by the chancellor of the exchequer in his budget speech
1974-04-30	J. Gilbert	LAB	members who were present in the house at that time well knew it
1992-03-09	S. Hughes	LD	they are listed in the schedule to the bill
1996-06-18	O. Heald	C	opposition members are relying heavily on the select committee report tonight
1996-11-21	D. Heathcoat Amory	C	as leader of the house , my right hon
1998-07-14	I. C. Bruce	C	I tabled a series of questions some months ago, and received answers from all the different departments
2005-12-02	A. Dismore	LAB	the director of public prosecutions made it clear on 12 january that prosecution would be considered only in those extreme circumstances
2014-05-08	M. Vickers	C	will the leader of the house assure me that there will be a statement at that point

Notes: Length of procedural phrases limited to number of words ≤ 20 for random sampling. Words marked in **red** are the phrases on which the sentence was selected as “procedural”.

A.2 Wordfish Validation

Wordfish—which lies at the first, and most important stage of the estimation procedure used in Chapter 3—relies on a number of key assumptions and challenges that need to be addressed. I tackle these one-by-one below.

Pre-estimation considerations: **Wordfish** performs well with a minimum of twenty documents and 300 unique words (Proksch and Slapin 2009, p. 328); here, the matrix consists of an average 374 unique words and about eleven texts (or: MPs).¹¹ There is a slightly downward sloping trend for the average number of unique words in our WFM as we progress to the twentieth century, but the average remains well above 200 (Figure A1).

I had to exclude short speeches from the analysis in order to ensure that the model is not influenced by irrelevant statements. The trade-off here is between potentially truncating the ideological space, and having enough words to estimate the **Wordfish** models. I considered a number of different cut-offs but in the end follow previous approaches that take fifty words as lower limit. This allows me to retain as many speakers as possible while still allowing for enough words in the word frequency matrices to run the models.¹²

Temporal change in political language: For this method to work, the texts have to be comparable (Proksch and Slapin 2009). Here, we have a temporal and a topical problem: both the language that MPs use and the nature of political issues can be expected to have changed dramatically between 1811 and 2015. Two elements mitigate these problems. First, the speeches as recorded in *Hansard* are highly similar in structure across the period. Between the early nineteenth

¹¹A problem with the independent variable is that debate in the Commons usually follows a response dynamic. Thus, speakers may simply be repeating what is said before them. However, as we are interested in the *distance* between the parties, assuming that this is a consistent pattern the measure should still be an accurate reflection of polarisation in the House.

¹²The kind of statements that are removed using the 50-word threshold are usually of a procedural nature, and do not seem to have any ideological meaning. They include statements such as ‘seconded the motion’, ‘brought up the report’, and ‘objected to the clause’.

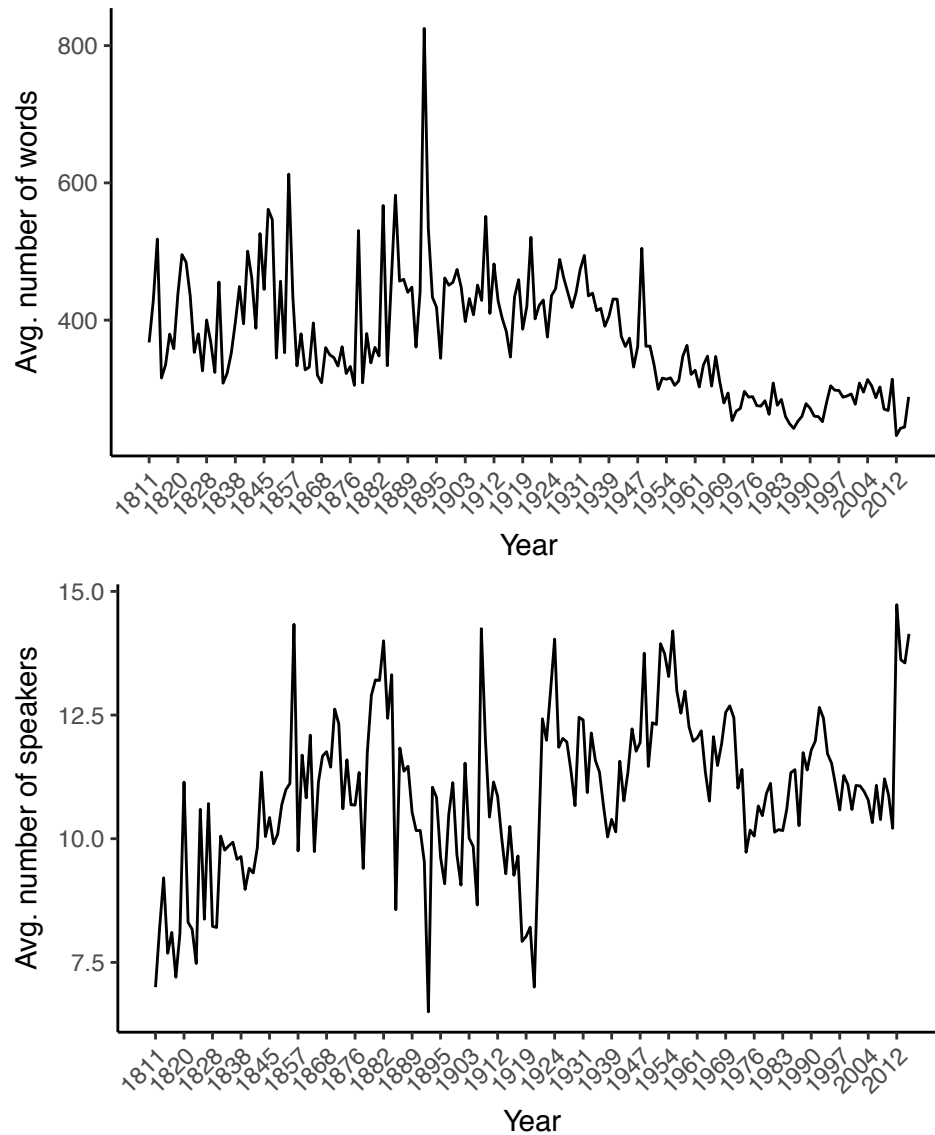


Figure A1: WFM Size Over Time

Notes: Plot of the average number of unique words in the word frequency matrices per debate for each session (top panel), and the average number of speakers per debate per session (bottom panel).

century and 1909 outside reporters published records of the debates, and after 1909, parliamentary staff paraphrased the members' speeches in accordance with

a structured format. Second, I run the models for each *session*, not as a time series, which should diminish the issue of agenda effects.

The Bag-of-Words Assumption: Another assumption of **Wordfish** relates to the data gathering process. It is a bag-of-words (or: “naive Bayes”) model, where language is assumed to be generated through a Poisson process—meaning that each word is sampled independently from a “bag” of individual words, and that the chance of sampling one term is independent of the one that is taken from the bag before or afterwards (Slapin and Proksch 2008). This falls in the category of a wrong, but useful model of how language is created. To verify whether this assumption influences our findings, I follow Spirling (2012) in applying string kernel Principal Components Analysis (PCA). String kernel PCA scales text using sub-strings rather than full words. The correlation between these estimates and the **Wordfish** scores is about 0.47 across the sample, which falls between the moderate ($= 0.30$) and large ($= 0.50$) categories of association (Cohen 1988). Neither does there seem to be an up- or downward overall trend in how well the two sets of estimates correlate (Figure A2).¹³

We may expect the convergent validity between **Wordfish** and string kernel PCA estimates to vary as a function of the number of dimensionality. If this is the case, there would be systematic bias in our estimates (and the comparison presented above) as a function of dimensionality. However, I only find a mild improvement when we limit the sample to lower-dimensional debates—for example, $r = 0.49$ at five dimensions, and $r = 0.58$ at one dimension (note that the mean number of dimensions across all debates is approximately 5).

¹³To construct Figure A2, I estimate correlations within debates, and subsequently take the average across all debates in the sample. I take the absolute correlation coefficient, as the polarity of **Wordfish** estimates is a (random) feature of the model.

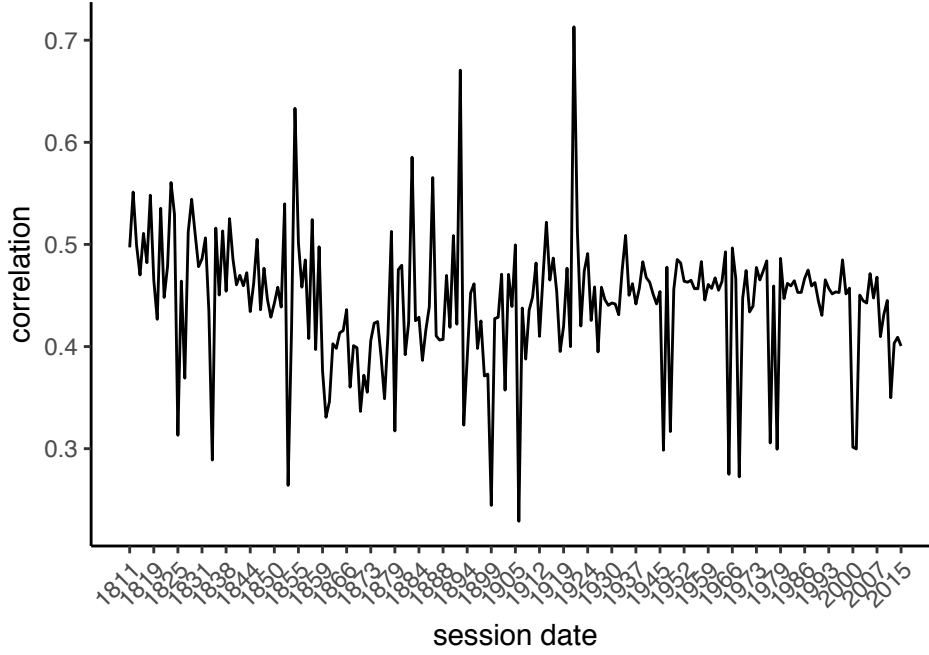


Figure A2: Correlation Wordfish and String Kernel PCA over time

Notes: Plot shows the average correlation between individual-level estimates of the Wordfish and string kernel PCA estimation across debates for each session.

A.3 Wordshoal

Assume we have a set of legislators $i \in 1, 2, \dots, N$, a set of debates $j \in k, 1, 2, \dots, N$, and a set of words for each legislator in each debate indexed $k, 1, 2, \dots, K$. The model takes the following functional form:

$$\omega_{ijk} \sim \mathcal{P}(\mu_{ijk}) \quad (1)$$

$$\mu_{ijk} = \exp(v_{ij} + \lambda_{jk} + \kappa_{jk} * \psi_{ij}) \quad (2)$$

Where ω_{ijk} represents the frequency that word k appears in a legislator i 's speech, in a debate j . ω_{ijk} depends on a member's fixed effects v_{ij} (i.e. the baseline usage of words for speaker i in debate j), the variation in frequency of use of certain words λ_{jk} , and the correlation between word usage κ_{jk} with the individual's debate-specific position ψ_{ij} .

In the second stage, **Wordshoal** applies fully Bayesian factor analysis on the sparse matrix that results from the debate-level **Wordfish** estimates. Here, each legislator's debate-specific position ψ_{ij} in debate j is aggregated into a single latent position θ_i . The authors adopt a fully Bayesian treatment of the linear factor model to recover θ_i , where the ψ_{ij} is treated as the data and the missing ψ_{ij} as missing at random. If members choose not to speak in a debate, we thus assume that they are missing at random, which Lauderdale and Herzog (2016, p. 377, footnote 5) recognise falls into the category of 'an obviously wrong, but nonetheless useful, assumption.' In essence, the estimated positions capture the position of a legislator i averaged over the debates j in which they decide to speak, relative to other MPs who choose to take the floor in those debates.

Wordshoal's assumptions thus imply a linear model of polarity ψ_{ij} that is a function of a single latent dimension θ_i , where the error terms are normally distributed:

$$\psi_{ij} \sim \mathcal{N}(\alpha_j + \beta_j \theta_i, \tau_i) \quad (3)$$

$$\theta_i \sim \mathcal{N}(0, 1) \quad (4)$$

$$\alpha_j, \beta_j \sim \mathcal{N}(0, (\frac{1}{2})^2) \quad (5)$$

$$\tau_i \sim \mathcal{G}(1, 1) \quad (6)$$

The degree to which the primary dimension of variation in word usage ψ is associated with the latent dimension θ across the debates can thus vary in strength. If there is a large common dimension of conflict, meaning that the word weights β_j are high, the model will attach greater weighting to them than if the word fixed-effects are more or less equal to zero. The common latent dimension of conflict across the debates remains on a normal scale, but the uninformed priors for θ_i and β_j means that the model is agnostic about the relative extent of conflict within individual debates.

A.4 Selection of Economy-related Speeches

For each speech, I calculate the proportion of the text that consists of terms related to the economy, based on the dictionary outlined below. For each session I take speeches that represent the lowest first percentile (which are labelled as “non-economic”) and the highest 99th percentile (which are classified as “economic”). This yields a training set of 69,915 speeches that I can subsequently use to implement a stochastic gradient descent (SGD) classifier (more on this algorithm below)¹⁴ to sort speeches into topics *probabilistically*. The classifier achieves a within-sample average classification accuracy of 91 per cent across the sessions, taking the mean of a ten-fold cross-validation for each session.

For this approach to produce the desired results, we need to make sure that the training set is not substantively different from the dataset to which it is applied. To take one pathological example: if one party would account for ninety per cent of the training dataset, the trained model would be biased towards identifying speeches of that particular political group. This does not seem to be the case—confirming that the dictionary we used does not introduce systemic bias: the number of speeches of the major parties are similar between the original dataset and the training set respectively (Con.: 44.2 vs. 44.5 per cent; Lib.: 10.3 vs. 10.4 per cent; Lab.: 35.7 vs. 35.5 per cent; LD: 2.7 vs. 2.2 per cent). A two-sided Kolmogorov-Smirnov test (KST) of difference between the two continuous distributions of proportions of speeches accounted for by each party does not yield statistical support for the notion that there is a difference ($D = 0.41, p = 0.11$). The data are also similarly distributed across sessions.¹⁵

The dictionary terms included for the approach described in subSection 3.6.2 are as follows:

¹⁴I use the `scikit learn` library in Python.

¹⁵A KST of difference yields support for this ($D = 0.03, p - value = 1.00$).

accommodation, age, ambulance, assist, benefit, care, carer*, child*, class, classes, clinics, collective*, contribution*, cooperative*, co-operative*, deprivation, disabilities, disadvantaged, educat*, elderly, equal*, establish, fair*, guarantee*, hardship, health*, homeless*, hospital*, hunger, inequal*, invest, investing, investment, means-test*, nurse*, patients, pension, poor, poorer, poorest, poverty, rehouse*, re-house*, school, teach*, transport, underfund*, unemploy*, vulnerable, widow*, accountant, accounting, accounts, advert*, airline*, airport*, audit*, bank*, bargaining, breadwinner*, budget*, buy*, cartel*, cash*, charge*, commerce*, compensat*, consum*, cost*, credit*, customer*, debt*, deficit*, dwelling*, earn*, econ*, electricity, estate*, export*, fee, fees, financ*, hous*, import, imports, industr*, jobs, lease*, loan*, manufactur*, mortgage*, negotiat*, opportunity, partnership*, passenger*, pay*, performance, port*, productivity, profession*, purchas*, railway*, rebate*, recession*, research*, revenue*, salar*, sell*, settlement, software, supplier*, supply, telecom*, telephon*, tenan*, touris*, trade, train*, wage*, welfare, work*, assets, autonomy, barrier*, bid, bidders, bidding, burden*, charit*, choice*, compet*, confidence, confiscatory, constrain*, contracting*, contractor*, controlled, controlling, controls, corporate, corporation*, deregulating, dismantl*, entrepreneur*expensive, flexib*, franchise*, fundhold*, fund-holding, homestead*, initiative, intrusive, investor*, liberali*, market*, monetary, money, own*, private, privately, privatisations, privatised, privatising, produce*, profitable, regulat*, retail*, risk, risks, savings, sell*, shares, simplif*, spend*, sponsorship, taxable, taxes, tax-free, thrift*, trading, value, volunt*, voucher*, abolition, allotment, allotments, bank, banking, banks, bankruptcy, budget, budgets, charges, commercial, company, companies, corporation, credit, custom, customs, debt, debts, duty, duties, economic, economy, estimates, expenditure, export, exports, exportation, factories, factory, fare, fares, finances, financial, fisheries, fund, holding, holdings, import, imports, importation, income, income-tax, incomes, labour, labourers, loan, loans, means, money, payment, poor, property, price, railway, railways, rate, rates, relief, repeal, revenue, revenues, tariff, tax, taxes, taxation, trade, union, unions, wages, ways, supply, workmen.

A.5 Results Without Truncation of Weights (Weights 3 & 4)

The correlations between the implementations with truncated and un-truncated weights are:

- At the aggregate level:

Balanced on MP: 0.97¹⁶;

Balanced on MP in party: 0.97¹⁷;

- At the individual level:

Balanced on MP: 0.93¹⁸;

Balanced on MP in party: 0.92¹⁹;

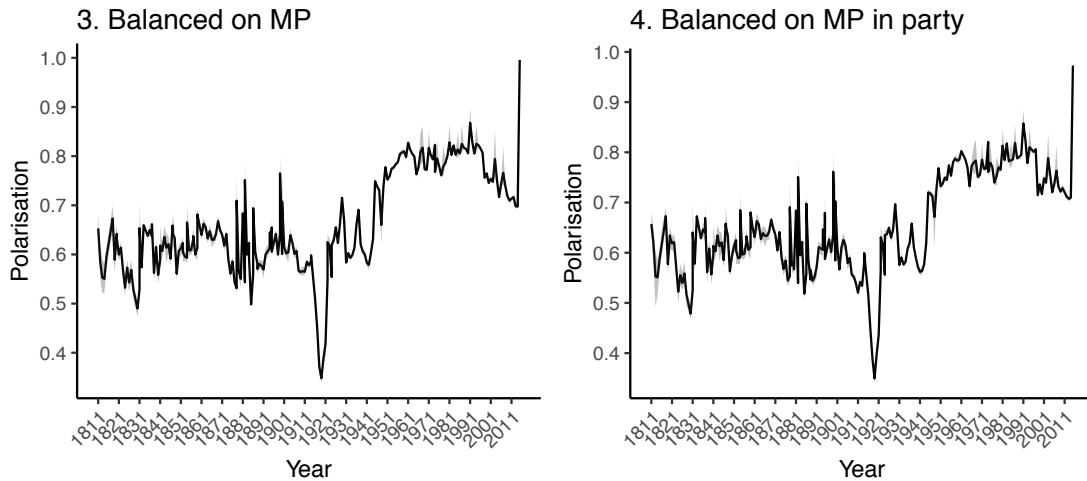


Figure A3: Polarisation in the UK House of Commons, 1811–2015 (Implementation 3 and 4; Weights not Truncated)

Notes: Measure based on the accuracy of the SGD classifier. Grey ribbon represents bootstrapped 95 per cent confidence intervals (approach described in text).

A.6 Individual-level Estimates for Weights 3 & 4

Figures A4–A7 show the ECDFs for the individual-level estimates where samples are balanced on MP and on MP within party respectively.

¹⁶t = 60.20, df = 221, p-value < 2.2e-16

¹⁷t = 55.28, df = 221, p-value < 2.2e-16

¹⁸t = 1021.90, df = 150,490, p-value < 2.2e-16

¹⁹t = 910.23, df = 150,490, p-value < 2.2e-16

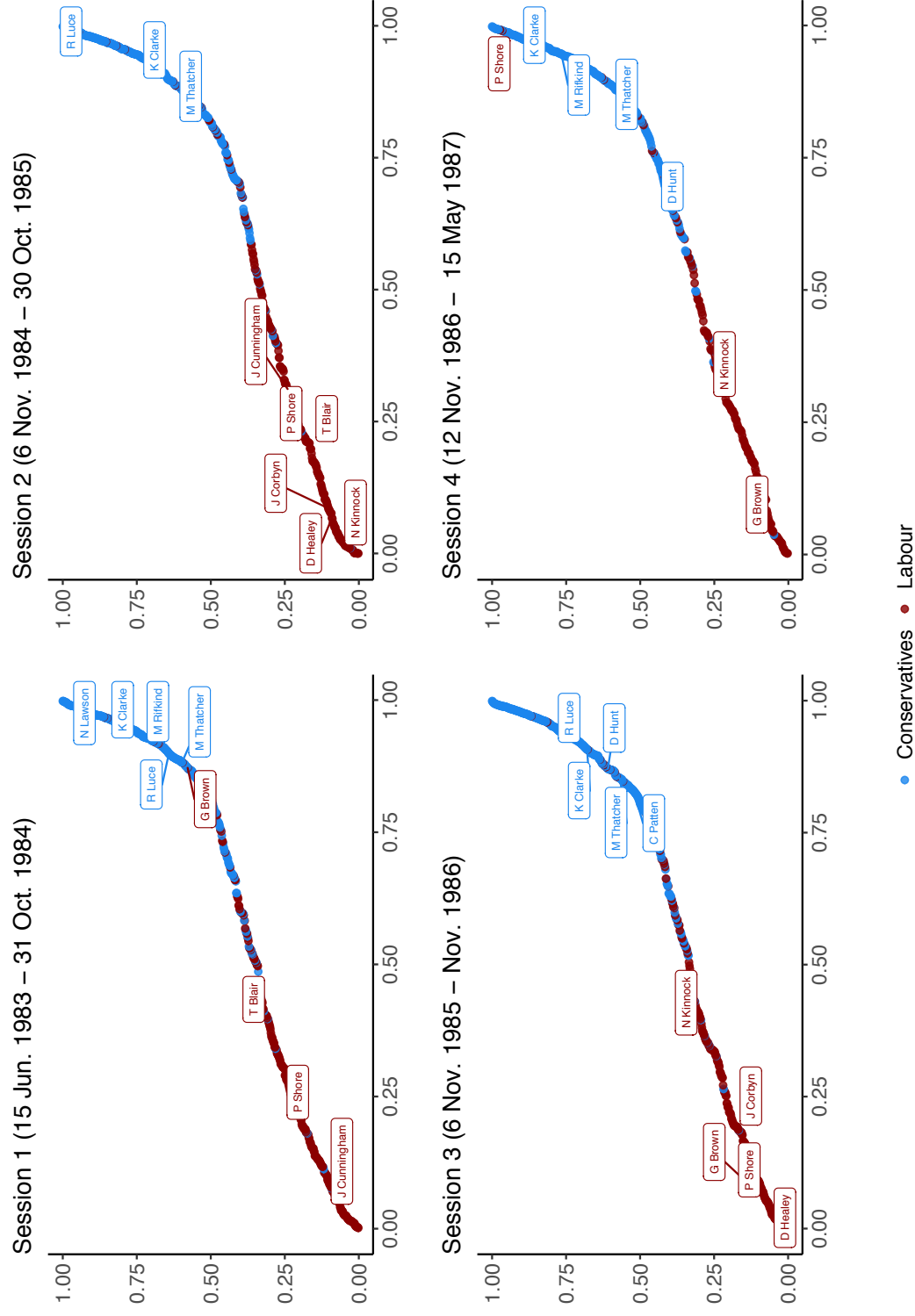


Figure A4: ECDF 1983–1987, Machine Learning (Balanced on MP, Weights Ref. 3)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the SGD classifier for all sessions of the 1983–1987 parliamentary term.

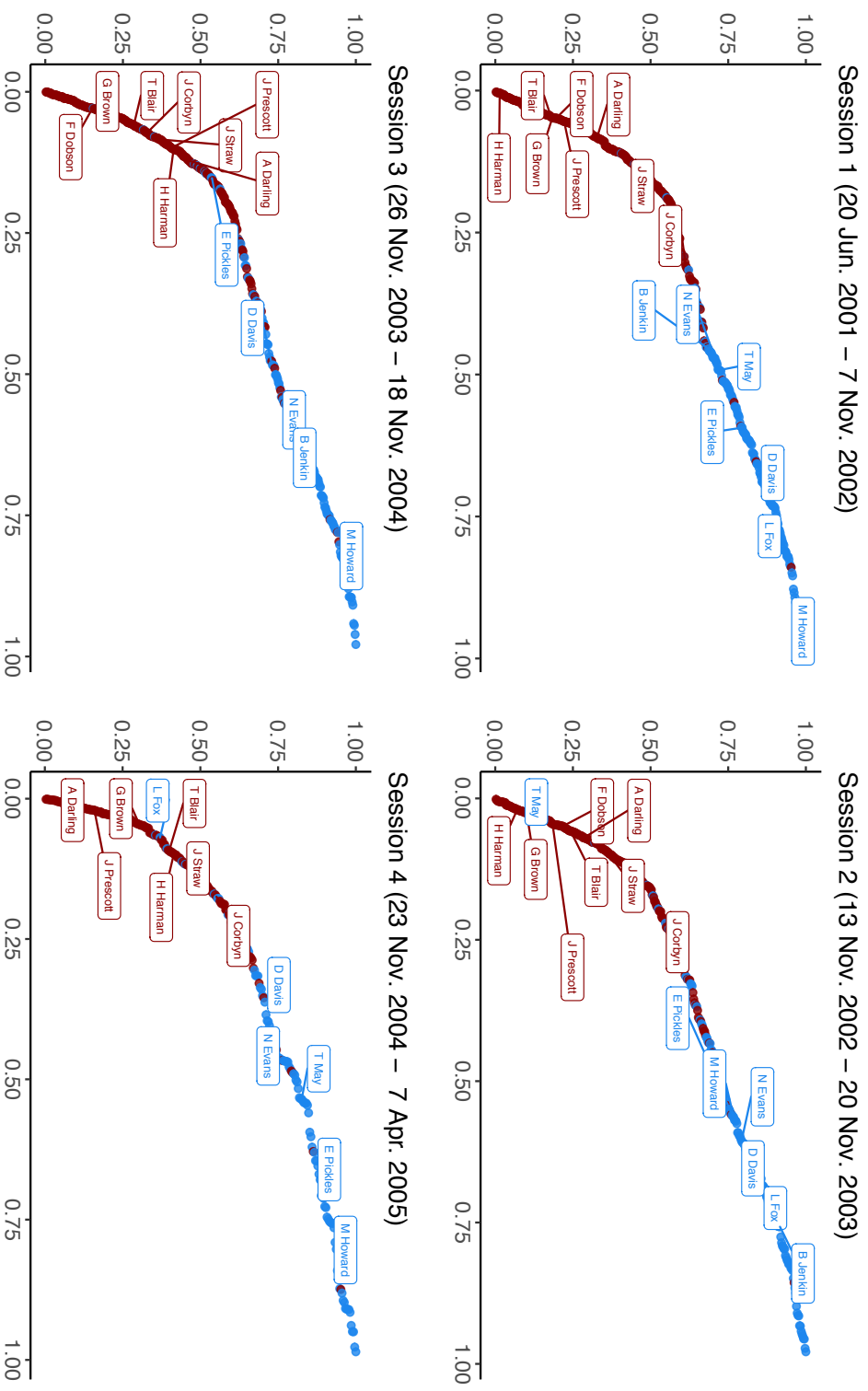


Figure A5: ECDF, 2001–2005, Machine Learning (Balanced on MP, Weights Ref. 3)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the SGD classifier for all sessions of the 2001–2005 parliamentary term.

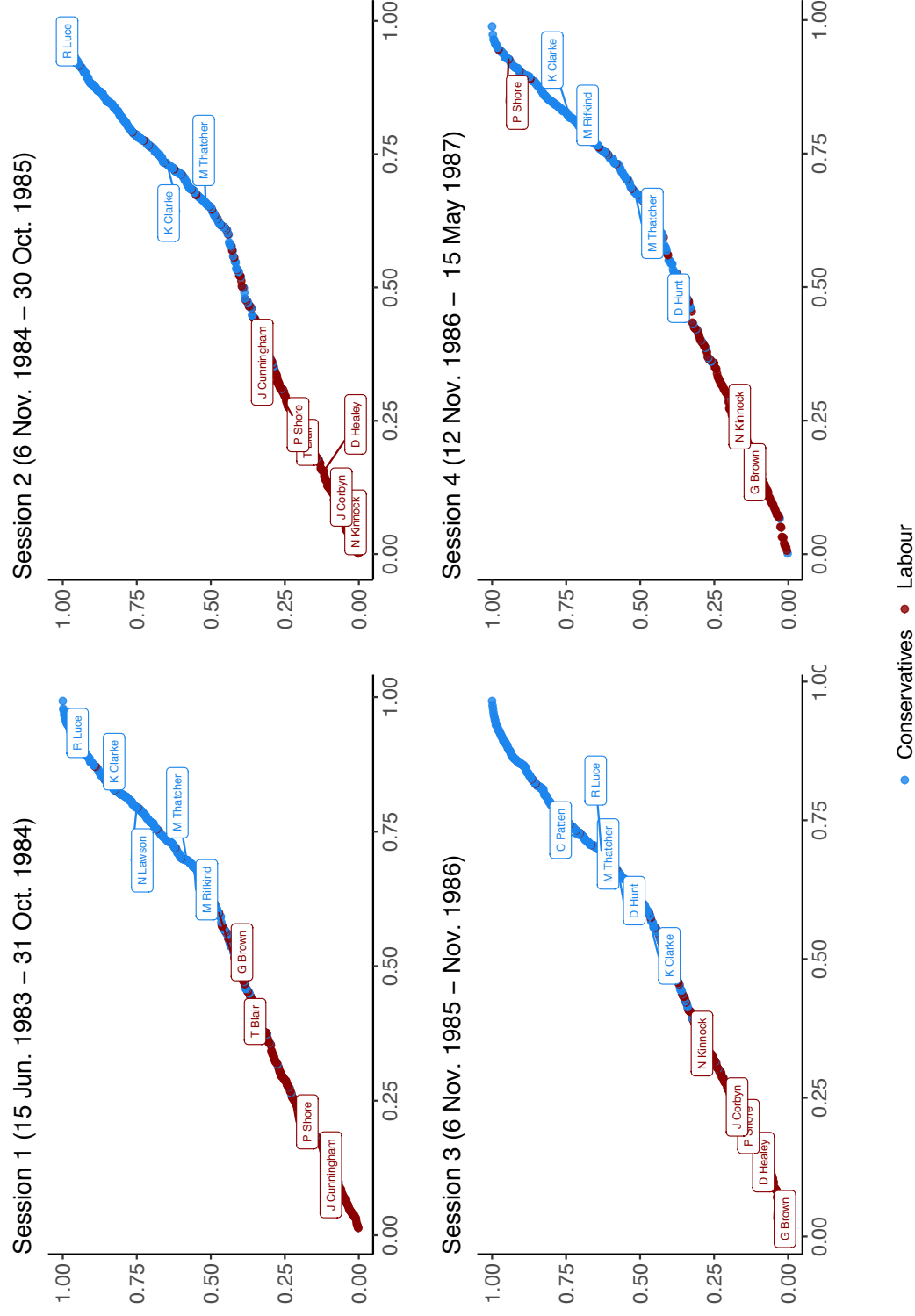


Figure A6: ECDF 1983–1987, Machine Learning (Balanced on MP within Party, Weights Ref. 4)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the SGD classifier for all sessions of the 1983–1987 parliamentary term.

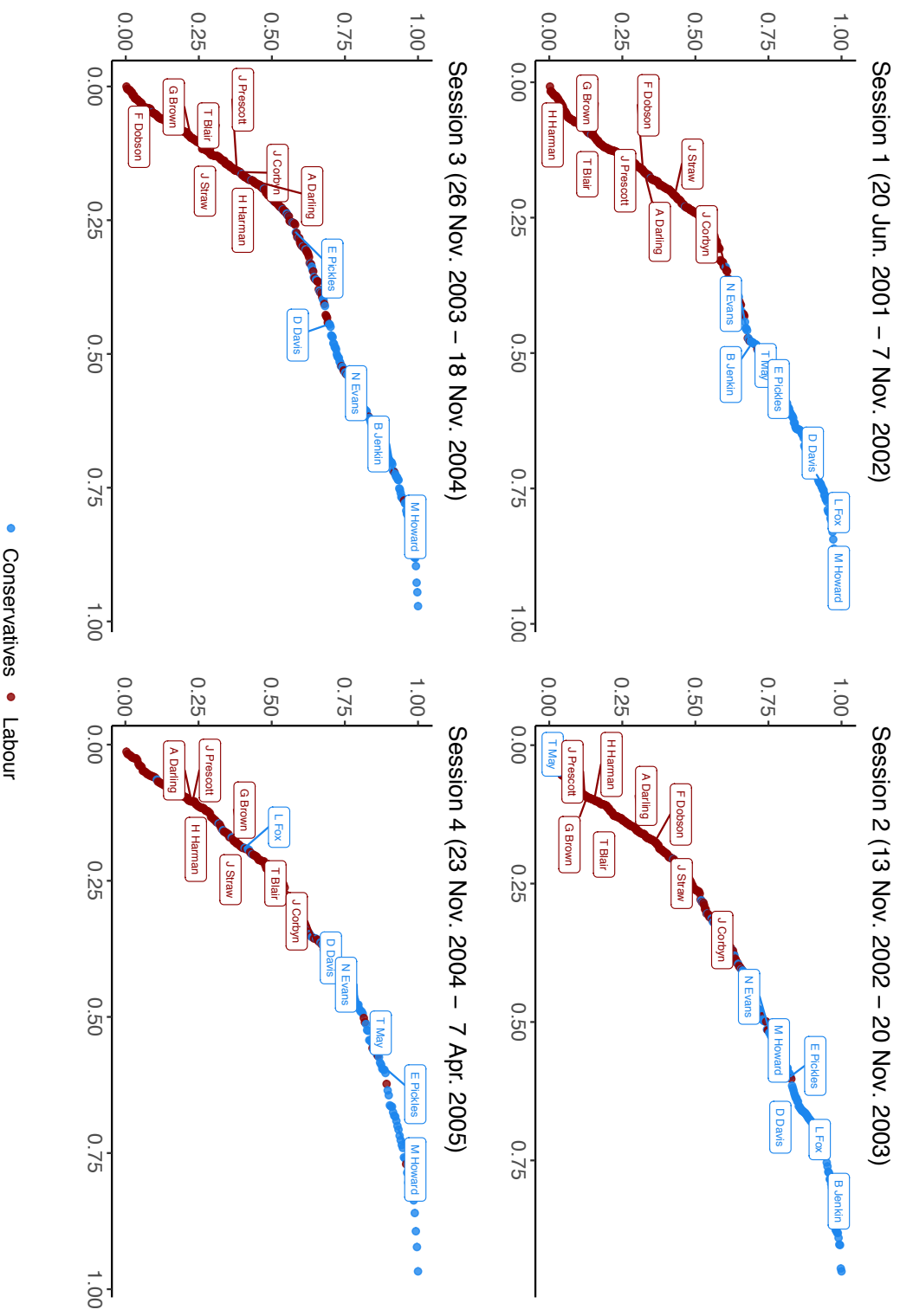


Figure A7: ECDF, 2001–2005, Machine Learning (Balanced on MP within Party, Weights Ref. 4)

Notes: Plots show the Empirical Cumulative Distribution Function of the individual-level class probabilities for legislators obtained with the SGD classifier for all sessions of the 2001–2005 parliamentary term.

A.7 The SGD Model and NB Classification Results

SGD has a cost function is defined as follows over m training samples:

$$J_{train}(\theta) = \frac{1}{m} \sum_{i=1}^m \text{cost}(\theta, (x^{(i)}, y^{(i)})) \quad (7)$$

The algorithm operates by randomly shuffling over the dataset (i.e. reordering the training samples randomly), and subsequently updating the cost function for each training sample m until convergence:

$$\text{Repeat}\{ \quad (8)$$

$$\text{for } i = 1, \dots, m \{ \quad (9)$$

$$\theta_j = \theta_j - \alpha(h_{\theta}(x^{(i)} - y^{(i)}) * x_k^{(i)} \quad (10)$$

$$\text{for } j = 0, \dots, n \quad (11)$$

$$\} \quad (12)$$

$$\} \quad (13)$$

For every training sample $x^{(i)}, y^{(i)}$, the parameters are modified to improve the fit for the next training sample, and so on, until it has looped through the entire training set and reached convergence.²⁰

The Naive Bayes classifier (NB) is represented by the following formula:

$$P(c|d) \propto P(c) \prod_{1 \leq k \leq n_d} P(t_k|c) \quad (14)$$

²⁰Note that for SGD, as opposed to *Batch* Gradient Descent, we do not actually reach the global minimum; rather, the algorithm “wanders” continuously around a region close to the global minimum.

Assume we have a set of documents d_i with $i \in 1, 2, \dots, N$. We can represent the (posterior) probability of document d_i belonging to class c_i as proportional to the prior probability of a document occurring in class c ($P(c)$) multiplied by the product of the number of tokens n_d in the document we use for classification and the evidence provided by a term t that the document belongs in class c ($P(t_k|c)$).

The correlation between the NB classifier output and the corresponding SGD approaches are as follows:

Table A3: Correlations Machine Learning Estimates
(NB vs. SGD)

Balanced on	Classifier-level	Individual-level
N/a	0.70	0.56
Party	0.72	0.59
MP	0.73	0.52
MP in party	0.69	0.47

These correlations are encouraging. I will however make the case for using the stochastic gradient descent estimates for the core of the analysis, for the following reason. Naive Bayes is often applied to classification problems because of its simplicity. However, it suffers from the non-invertible (over-fitting) matrix problem, and deals poorly with correlations between words (O’Neil and Schutt 2014, p. 94). It is for this reason that SGD has become a commonly-applied algorithm in discriminative learning problems in text classification and natural language processing.

A.8 Results with Inclusion of Procedural Phrases

Only detailed results of estimation with procedural phrases included are provided in case the algorithm's output is evaluated by means of the validation scheme; otherwise, only details of the size of the dataset prior to removal is provided.

Dimension Scaling (Subsection 3.6.2)

Data without removal of procedural phrases include 901,531 speeches spanning a total of 79,263 debates.

Wordshoal (Figure 3.5)

Figure A8 shows the results of the **Wordshoal** estimates where procedural language has been retained. Data included without removing procedural phrases include:

- Speeches: 901,531;
- Debates 79,263;
- Correlation: 0.99 (outliers included)²¹; 0.97 (outliers excluded)²².

Machine Learning (Figures 3.7 & 3.8)

Table A4: Correlations Machine Learning Estimates
(Procedural Removed vs. Not Removed)

Balanced on	Classifier-level	Individual-level
N/a	0.79	0.88
Party	0.83	0.88
MP	0.88	0.86
MP in party	0.88	0.85

²¹t = 109.59, df = 221, p-value < 2.2e-16

²²t = 59.147, df = 221, p-value < 2.2e-16

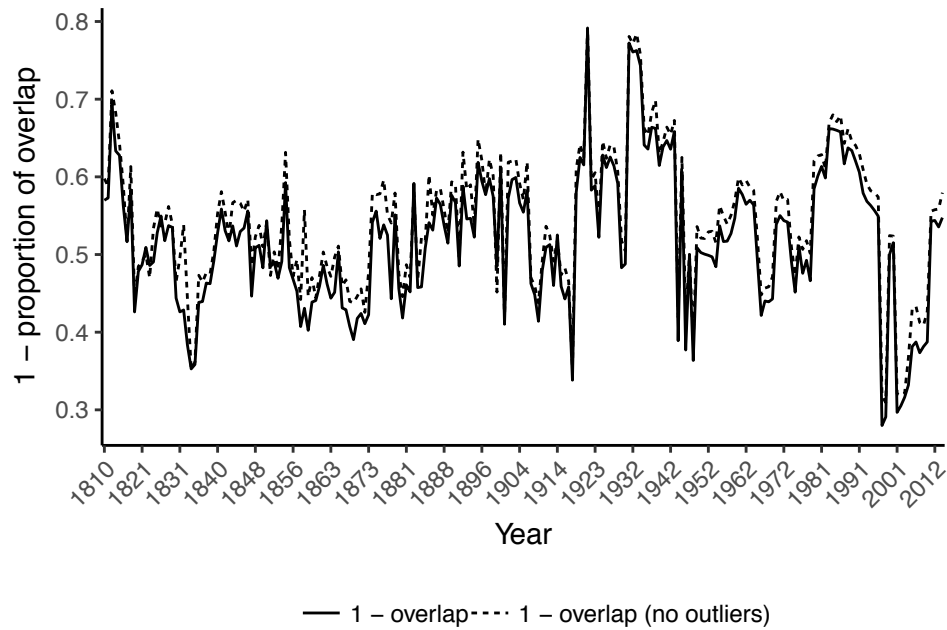


Figure A8: Wordshoal Estimates, 1811–2015 (Procedural Phrases Included)

Notes: Measures based on θ estimates obtained with Wordshoal (approach described in text). The graph shows one minus the proportion of legislators of the rightmost party that falls within the range of the distribution of legislator ideal points of the leftmost party, and that same measure with outliers excluded (approach described in text).

Appendix B SUPPORTING MATERIALS FOR CHAPTER 4

Table B1: Standing Orders Reform, 1811–2015

Amend. date	Parl.	Session	SO Ref.	Ordered to be Printed	Cabinet	Reform	Reform code	Score
5 Mar. 1811 ¹	4	5	1811 (248)	21 Jun. 1811	Spencer Perceval (Tory)	Initiative (precedence): The introduction of “Order Days” gives the discussion of legislation a distinct advantage on specific days. Before its introduction, the House first had to deal with notice of motions before proceeding to dealing with Orders of the Day. Now, the House could start immediately with Orders on certain days (Cox 1987, pp. 45–47).	A2.1	-1
13 Jul. 1831	10	1	1837 (515)	15 Aug. 1838	Duke of Wellington (Tory)	Initiative (precedence): Introduction of Wednesday Order Day, during which Orders were taken in regular rotation, giving a specific day on which no precedence was given to the government (Cox 1987, pp. 47–48) ² .	A2.1	Score session 4.5: -1 +1
1833	11	1	1837 (515)	15 Aug. 1838	Charles Grey, 2nd Earl Grey (Whig)	Duration (schedule): The hearing of petitions is confined to morning sittings, which gave private members the opportunity to raise a discussion (Fraser (1960, p. 452)).	B1.1	Score session 10.1: +1 -1
1833	11	1	1837 (515)	15 Aug. 1838	Charles Grey, 2nd Earl Grey (Whig)	Duration (committee Assignment): Committees are given the power to meet from 10 a.m. until 5 p.m. and to convene during sittings of the House (Redlich 1908, p. 77).	B4.1	-1
1835	12	1	1837 (515)	15 Aug. 1838	William Lamb, 2nd Viscount Melbourne (Lib.)	Initiative (precedence): Mondays and Fridays become days on which government business has precedence (Fraser 1960, p. 453).	A2.1	Score session 11.1: -2 -1
24 Nov. 1837	13	1	1837 (515)	15 Aug. 1838	William Lamb, 2nd Viscount Melbourne (Lib.)	Initiative (tabling): No notice for a debate is allowed to be placed in the order book after four notice days after which such notice was entered in the book, which amounts to a limit of fifteen/sixteen days (Redlich 1908, p. 80).	A3.2	Score session 12.1: -1 -1
14 Apr. 1842	14	2	1844 (588)	6 Aug. 1844	Sir Robert Peel (Con.)	Initiative (tabling): The right to start a debate upon a petition is banned altogether (this practice was introduced in 1839, but became an official Standing Order in 1842. See Redlich (1908, p. 77)).	A3.3	Score session 13.1: -1 -1
1844	14	4	1844 (588)	6 Aug. 1844	Sir Robert Peel (Con.)	Duration (committee Assignment): Any report by the board of trade on a railway bill is forwarded directly to a committee (Art. 117a).	B4.2	Score session 14.2: -1 -1
1845	14	5	1845 (586)	8 Aug. 1845	Sir Robert Peel (Con.)	Initiative (Tabling): Private member’s bills now have to be tabled within fourteen days (instead of twenty days previously) after the first Friday in every parliamentary session (Art. 102).	A3.2	Score session 14.4: -1 -1
1845	14	5	1845 (586)	8 Aug. 1845	Sir Robert Peel (Con.)	Duration (committee Assignment): for the 1846 session, the time between the second reading and the committee stage for private bills is shortened to three days, instead of the standard seven prescribed in Art. 127 (Art. 125a).	B4.3	-1
1846	14	6	1846 (684)	25 Aug. 1846	Lord Russell (Whig)	Initiative (tabling): The floor now determines the deadline by which all private petitions have to be presented to the House (14-day limit previously, Art. 113).	A3.3	Score session 14.5: -2 -1

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend. date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
1847	14	7	1847 (665)	15 Jul. 1847	Lord Russell (Whig)	Initiative (precedence): The rules now specify a clear list of priorities as to what is discussed first during private business (Lords' Amendments; Third Reading; Consideration of Report; Second Reading) (Art. 170). Initiative (tabling): Members no longer need to pay a fee in order to table a Private Member's Bill (Art. 125 is removed). Initiative (tabling): Petitions for leave to bring in a private bill have to be presented three days prior to the debate thereon in the first reading (Art. 145). Initiative (tabling): Private petitions have to be endorsed by an examiner before they may be tabled (Art. 144). Duration (committee Assignment): The time between the second reading and the committee stage for any bill is increased from seven to fourteen days (Art. 159).	A2.1	Score session 14.6: -1
1847	14	7	1847 (665)	15 Jul. 1847	Lord Russell (Whig)		A3.1	+1
1847	14	7	1847 (665)	15 Jul. 1847	Lord Russell (Whig)		A3.2	-1
1847	14	7	1847 (665)	15 Jul. 1847	Lord Russell (Whig)		A3.1	-1
1847	14	7	1847 (665)	15 Jul. 1847	Lord Russell (Whig)		B4.3	-1
1849	15	3	1849 (563)	1 Aug. 1849	Lord Russell (Whig)	Duration (committee assignment): Every petition against a private bill that is submitted within seven days after second reading is referred to the relevant committee (Art. 167). Interruption: If there is opposition to commencing the second or third reading on a private member's bill, the debate is postponed to the next sitting day (Art. 163).	B4.2 B3.1	Score session 14.7: -3 -1 Score session 15.3: -1
1852	15	6	1852 (526)	25 Jun. 1852	Lord Russell (Whig)	Initiative (tabling): Public Bills have to be discussed in the order in which they are recorded in the order paper. However, Ministers may decide the order in which public business is discussed on government order days (Art. 3). Duration (schedule): Creation of a schedule for evening, afternoon, and Wednesday sessions (Arts. 5, 9). Duration (schedule): The floor majority may decide to have an evening session at a different time than stipulated in the Standing Orders (Art. 9). Duration (interruption): The Speaker has to adjourn the debate at specific times. The House has no say in this matter (Arts. 6, 7, and 10).	A3.5 B1.1 B1.4 B3.1	Score session 15.4: -1 -1 -1 -1
1853	16	2	1853 (888)	5 Aug. 1853	Lord Aberdeen (Peelite)	Initiative (schedule): If a discussion is not concluded by 5.45 p.m. (was 6 p.m. under 1852 orders) on Wednesdays, it is adjourned to the next day (Art. 8). Duration (interruption): The rule that when there is opposition to commencing the second or third reading on a private member's bill, the debate is postponed to the next sitting day, now also applies to the amended bill after the committee stage (Art. 175). Member speech (committee Assignment): All committees are allowed to sit on Wednesday and morning sittings, except during prayers or adjournment (select committees, Art. 1).	A2.2 B3.2 C1.2	Score session 15.6: -4 -1 -1 -1
1854	16	3	1854 (388)	19 Jul. 1854	Lord Aberdeen (Peelite)	Duration (schedule): The Speaker is under an obligation to adjourn the House if business is not concluded before 3.50 p.m. (Art. 10). Duration (schedule): If the House convened before 2 p.m., it will again sit at 6 p.m. <i>unless</i> the House decides otherwise.	B3.1 B3.1	Score session 16.2: -4 -1 -1
1855	16	5	1855 (402)	18 Jul. 1855	Viscount Palmerston (Lib.)	Initiative (precedence): The first reading (introduction of new bills) is now explicitly relegated to the lowest place on the precedence list of private bill debates (Art. 190).	A2.3	Score session 16.3: -2 -1 Score session 16.5: -1

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend. date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
1858	17	3	1858 (476)	27 Jul. 1858	The Earl of Derby (Con.)	Initiative (tabling): The first reading on a private bill can now be initiated within one day after presentation of a petition for leave to bring in the bill (Art. 159). Duration (committee assignment): Reports from <i>any</i> public agency on a private bill are referred directly to the relevant committee (Art. 177).	A3.2	+1
1858	17	3	1858 (476)	27 Jul. 1858	The Earl of Derby (Con.)		B4.2	-1
Score session 17.3: -1								
1867	19	2	1867 (553)	16 Aug. 1867	The Earl of Derby (Con.)	Initiative (tabling): Petitions against a bill now have to be submitted within ten days instead of seven days previously, after which they shall be discussed in the relevant committee (Art. 201).	A3.2	-1
Score session 19.2: -1								
1870	20	3	1870 (429)	9 Aug. 1870	W. E. Gladstone (Lib.)	Duration (committee assignment): Petitions against bills on provisional orders or certificates are now also referred to committees (Art. 200).	B4.2	-1
Score session 20.3: -1								
1876	21	3	1876 (411)	10 Aug. 1876	Benjamin Disraeli (Con.)	Initiative (tabling): Petitions against bills on provisional orders or certificates now have to be submitted within seven instead of ten days (Art. 210).	A3.2	-1
1876	21	3	1876 (411)	10 Aug. 1876	Benjamin Disraeli (Con.)	Duration (committee assignment): All bills that are put forward by London authorities (Metropolitan Board of Workers; later: London County Council) that have financial implications have to be introduced as public bills, and after the second reading are referred to a select committee (Art. 194).	B4.2	-1
Score session 21.3: -2								
18 Feb. 1879	21	7	1879 (379)	13 Aug. 1879	Benjamin Disraeli (Con.)	Duration (schedule): With the exception of money bills, no new public bills may be discussed after 11.30 p.m. (Art. 5).	B1.2	-1
Score session 21.7: -1								
28 Feb. 1880 ³	22	3	1880(405)	3 Sep. 1880	W. E. Gladstone (Lib.)	Member speech (penalties): The Speaker may propose a motion to suspend a member who 'persistently and wilfully' obstructs the work of the House. The floor decides upon the motion (Art. 1).	C4.1	-1
Score session 22.3: -1								
27 Nov. 1882	22	4	1882 (429)	1 Dec. 1882	W. E. Gladstone (Lib.)	Duration (closure): The closure rule is introduced. The power to propose a motion to end the debate lies with the Speaker. It is passed with the support of 200 members or more/ <i>less</i> than 40 members against and 100 or more in favour (Art. XIV).	B2.1	-1
27 Nov. 1882	22	4	1882 (429)	1 Dec. 1882	W. E. Gladstone (Lib.)	Duration (interruption): The floor may decide to interrupt a debate before all matters on the order paper have been concluded. A motion for adjournment passes if forty or more people rise immediately, or if it is accepted upon a division (Art. IX).	B3.1	-1
27 Nov. 1882	22	4	1882 (429)	1 Dec. 1882	W. E. Gladstone (Lib.)	Member speech (content): The Speaker may stop the speech of a member who makes irrelevant remarks or engages in tedious repetition (Art. XIII).	C2.1	-1
22 Nov. 1882	22	4	1882 (429)	1 Dec. 1882	W. E. Gladstone (Lib.)	Member speech (penalties): Only one member may be suspended at a time, except when a group of members have jointly disregarded the Speaker's authority (Art. XII(4)).	C4.2	+1
Score session 22.4: -2								
1 Mar. 1887	24	2	1887 (294)	20 Aug. 1887	Marquess of Salisbury (Con.)	Duration (closure): Individual MPs may now propose closure. The Speaker has to rule whether the motion is acceptable under the House Rules, or constitutes an infringement of minority rights. The motion may not be debated. Members may also make a second motion for closure on a question already proposed to the chair (Art. XIVa(1-2)).	B2.2	-1
Score session 24.2: -1								
7 Mar. 1888	24	3	1888 (368)	11 Aug. 1888	Marquess of Salisbury (Con.)	Initiative (precedence): Sessions that start at 2 p.m. are limited to discussing certain types of motions, including Private Business (Art. 13(1)).	A2.1	-1
7 Mar. 1888	24	3	1888 (368)	11 Aug. 1888	Marquess of Salisbury (Con.)	Initiative (tabling): On days on which government business has precedence, it may decide the order in which proposals are discussed (Art. 15).	A3.4	-1

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend.	date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
7 Mar.	1888	24	3	1888 (368)	11 Aug. 1888	Marquess of Salisbury (Con.)	Initiative (tabling): New Art. 41: at the report stage of any bill no amendment may be proposed, which could not have been proposed in committee. Duration (schedule): A new schedule for House sittings is introduced, which now end at 7 p.m., while evening sittings start at 9 p.m. (Arts. 5 and 6). Any business under discussion at these times will be adjourned. Duration (closure): The Speaker loses the power to propose closure, which now lies exclusively with MPs (Art. XIV is deleted). However, the threshold for closure is reduced from 200 to 100 members (Art. 26). Duration (interruption): The Speaker is obliged to end any debate on a bill at 1 a.m., unless the debate has previously been interrupted (Art. 8.). Duration (interruption): Debate is interrupted on multiple occasions, i.e. at mid-night on Mondays, Tuesdays, Thursdays, and Fridays, and at 4.30 p.m. on Wednesdays (Art. 1(2)). Duration (committee assignment): Committees may now sit on any day (instead of only on Wednesdays and mornings previously), still with the exception of prayers and adjournment (Arts. 47 & 66). Member speech (explanatory statement): In case a motion to bring in a bill for discussion is opposed, the Speaker may allow brief explanatory statements from both the person opposing and the proposing member (Art. 16).	A3.3 B1.2 B2.4 B3.1 B3.4 B4.3 C3.1	-1 -1 -1 -1 -1 -1 +1
Score session 24.3: -7									
21 Jun.	1892	24	9	1892 (324)	21 Jun. 1892	Marquess of Salisbury (Con.)	Duration (interruption): The Speaker is no longer obliged to interrupt the debate at 1 a.m.; instead, it has to be interrupted at 5.30 p.m. (amendment to Art. 8, which now makes Wednesday sessions subject to the rules of Standing Order 1(2)).	B3.1	-1
Score session 24.9: -1									
1 May	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Initiative (quorum): A quorum of 40 members is needed at evening sittings before ten o'clock. Otherwise, the business is delayed to the next sitting (Art. 25).	A1.1	-1
11 Apr.	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Initiative (precedence): Government business has precedence on three sitting days per week (Tuesday, Wednesday, and Friday). Other proposals/motions may be discussed during the evening sittings of Tuesday and Wednesday only. It also has precedence during specific periods, such as after Easter (Art. 4).	A2.2	-1
17 Feb.	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Initiative (tabling): A member is free to present a bill without an order from the House for its introduction, after notice (Art. 31(2)).	A3.1	+1
2 May	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Initiative (tabling): The floor may no longer decide when to schedule business that stands over from a previous sitting (Art. 1(2)).	A3.3	-1
28 Apr.	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Duration (schedule): The House may only spend twenty days maximum to discuss the budget bill (Art. 15(2)).	B1.1	-1
2 May	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Duration (schedule): The times for afternoon and evening sessions are reduced (Art. 1(1)).	B1.2	-1
2 May	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Duration (Interruption): Debate is interrupted on two occasions instead of one (Art. 1(2)).	B3.4	-1
29 Apr.	1902	27	3	1902 (386)	1 Dec. 1902	Arthur James Balfour (Con.)	Duration (Interruption): The floor may now only interrupt the proceedings during the afternoon sitting, and those proceedings now automatically stand over to the evening session of the same day (Art. 10).	B3.4	+1
Score session 27.3: -4									
3 Apr.	1906	28	1	1906 (108,378)	3 Apr. 1906	David Lloyd George (Coalition)	Initiative (precedence): Government precedence is extended to more hours (Art. 4).	A2.2	-1
2/3	Apr. 1906	28	1	1906 (108, 378)	3 Apr. 1906	Sir H. Campbell-Bannerman (Lib.)	Duration (interruption): The final time at which the Speaker has to adjourn the House under Art. 1 is changed from midnight to 11 p.m. (Art. 1(3)).	B3.4	-1
Score session 28.1: -2									

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend. date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
5 May 1914	30	4	1914 (443)	10 Aug. 1914	H. H. Asquith (Lib.)	Member speech (content): The Speaker has the discretionary right to rule out a discussion on the grounds of anticipation (Art. 10A).	C2.1	-1
19 Feb. 1919	31	1	1919 (22,213)	21 Feb. 1919	D. Lloyd George (Nat. Coal.)	Member speech (number/length): If a motion to recommit a bill is opposed, the Speaker is obliged to give the floor to both the proposer and the opposer (Art. 40a).	C3.1	+1
20 Feb. 1919	31	1	1919 (22,213)	21 Feb. 1919	D. Lloyd George (Nat. Coal.)	Member speech (explanatory Statement): The Speaker may select a submitted amendment or clause to a bill under discussion, upon which the proposing member may give an explanatory statement (Art. 27a).	C3.2	+1
21 Dec. 1927	34	3	1927 (134)	21 Dec. 1927	Stanley Baldwin (Con.)	Initiative (quorum): Friday sittings are not proceeded with after 1 p.m. if fewer than 40 members are present (Art. 24a).	A1.1	-1
21 Dec. 1927	34	3	1927 (134)	21 Dec. 1927	Stanley Baldwin (Con.)	Duration (schedule): The time for Wednesday sittings is reduced (Art. 2).	B1.2	-1
21 Dec. 1927	34	3	1927 (134)	21 Dec. 1927	Stanley Baldwin (Con.)	Duration (interruption): Friday sittings are adjourned an hour earlier than before (Art. 1(3)).	B3.4	-1
14 Nov. 1933	36	3	1933 (172)	17 Nov. 1933	Ramsey MacDonald (Nat. Coal.)	Duration (interruption): Friday sittings are adjourned 3.5 hours later than before (Art. 1(3)).	B3.4	+1
4 Nov. 1947	38	3	1947 (6)	4 Nov. 1947	Clement Attlee (Lab.)	Initiative (precedence): New Art. 23a allows the government to propose to the Speaker to call the House to meet at a time when it is adjourned, to conduct government business if the “public interest” so requires.	A2.2	-1
28 Jul. 1948	38	3	1948 (211)	28 Jul. 1948	Clement Attlee (Lab.)	Initiative (labling): Members are free to propose new bills without requiring leave from the House, and they may appoint the day for the second reading of the Bill (new Art. 35).	A3.1	+1
4 Nov. 1947	38	3	1947 (6)	4 Nov. 1947	Clement Attlee (Lab.)	Initiative (labling): New Art. 33a holds that members may continue to submit amendments, new clauses, and schedules if the House is adjourned for more than one day.	A3.2	+1
4 Nov. 1947	38	3	1947 (6)	4 Nov. 1947	Clement Attlee (Lab.)	Debate duration (schedule): The procedure for discussing supply estimates (Art. 14) is changed so that outstanding votes must be taken before the lapse of 26 days (increased from 20). However, debate may no longer be extended.	B1.2	-1
4 Nov. 1947	38	3	1947 (6)	4 Nov. 1947	Clement Attlee (Lab.)	Debate duration (closure): In a debate on a bill in a Committee of the Whole House, the chairman may, if he thinks the principle of a clause has been sufficiently discussed, propose to the floor to close the debate on that clause and make it part of the bill (new Art. 45B).	B2.1	-1
28 Jul. 1948	38	3	1948 (211)	28 Jul. 1948	Clement Attlee (Lab.)	Duration (interruption): A new Art. 1(9) is inserted that limits the number of motions that a Minister may make that exempt a bill from the provisions of the Standing Orders on sittings on the House to one per sitting. This gives the government fewer means to expedite their proposals.	B3.1	-1
28 Jul. 1948	38	3	1948 (211)	28 Jul. 1948	Clement Attlee (Lab.)	Duration (interruption): A new Art. 10 allows a minister to make a motion for adjournment, upon which a bill in a committee is adjourned after 30 minutes, and decided upon after the lapse of those 30 minutes.	B3.3	-1
4 Nov. 1947	38	3	1947 (6)	4 Nov. 1947	Clement Attlee (Lab.)	Duration (interruption): Adjournment now requires a resolution by a member, instead of a simple speaker decision, increasing member control over adjournment (Art. 1(2)).	B3.3	+1
4 Nov. 1947	38	3	1947 (6)	4 Nov. 1947	Clement Attlee (Lab.)	Duration (committee assignment): If a Minister proposes a motion that proceedings on a bill are exempted from the provisions of the Standing Orders on sittings of the House, such business may not be interrupted (see new provision Art. 1(9)).	B3.3	-1
28 Jul. 1948	38	3	1948 (211)	28 Jul. 1948	Clement Attlee (Lab.)	Duration (committee assignment): By virtue of the new Art. 38, public bills are automatically referred to a standing committee after the second reading, unless the House decides otherwise.	B4.2	-1

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend. date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
28 Jul. 1948	38	3	1948 (211)	28 Jul. 1948	Clement Attlee (Lab.)	Duration (committee assignment): For estimates in the debate on supply bills that fall under the remit of the Secretary of State for Scotland, the committee of supply may be discharged from considering it, and be referred to the Scottish Standing Committee under a strict six-day deadline. Duration (committee assignment): The ability of members to stall bills in committees is diminished as every new bill now has to be accompanied by a set schedule for its consideration in committee (new Art. 48b). Member speech (number/length): If a bill has been committed to a standing committee, a new rule (Art. 52) provides that members who are in charge of the bill, or those who have proposed an amendment or new clause, counter to the general rule, may speak more than once in the debate. Member speech (explanatory statements): A new clause (Art. 38(4)) provides that when bills are committed in part to a standing committee, and in part to a committee of the Whole House, an opponent and proponent to the bill may make a brief explanatory statement.	B4.6	-1
4 Nov. 1947	38	3	1947 (6)	4 Nov. 1947	Clement Attlee (Lab.)		B4.3	-1
28 Jul. 1948	38	3	1948 (211)	28 Jul. 1948	Clement Attlee (Lab.)		C1.3	+1
28 Jul. 1948	38	3	1948(211)	28 Jul. 1948	Clement Attlee (Lab.)		C3.1	+1
Score session 38.3: -6								
6 Nov. 1957	41	3	1957 (42)	18 Dec. 1957	Harold Macmillan (Con.)	Duration (interruption): The new Art. 95a (which pertains to statutory instruments, or statutes) provides that after 11.30 pm, no new motion may be entered upon, and shall be adjourned if under discussion. Member speech (committee assignment): Unless ten members object, upon a motion by a Minister, a specific matter relating to Scotland may be referred to the Scottish Grand Committee, which subsequently may only spend two days to consider it in that session (see new Art. 61a).	B3.1	-1
18 Dec. 1957	41	3	1957 (42)	18 Dec. 1957	Harold Macmillan (Con.)		B4.5	-1
Score session 41.3: -2								
8 Feb. 1960	42	1	1960 (100)	10 Feb. 1960	Harold Macmillan (Con.)	Initiative (tabling): A motion or amendment does not need to be seconded before the question thereon may proposed from the chair (new Art. 11a).	A3.1	+1
25 Oct. 1960	42	1	1960 (2)	2 Nov. 1960	Harold Macmillan (Con.)	Duration (interruption): The power of a Minister to propose a motion that proceedings on a bill are exempted from the provisions of the Standing Orders on sitting of the House is removed; and thus such business may now be interrupted (Arts. 1(8) and 1(9) removed). Member speech (content): A new rule is introduced that provides an exemption to the rule that no reference may be made on a motion for adjournment relating to matters requiring legislative action: the Speaker may henceforth permit this in the interest of the discussion (new Art. 14a).	B3.1	+1
10 Feb. 1960	42	1	1960 (100)	10 Feb. 1960	Harold Macmillan (Con.)		C2.1	+1
Score session 42.1: +3								
1 Aug. 1963	42	4	1963 (341)	2 Aug. 1963	Harold Macmillan (Conservative)	Initiative (precedence): Private members' bills now have precedence on ten Fridays in each session, as appointed by the House (new clause 5(5)).	A2.3	+1
24 Oct. 1967	44	1	1967 (675)	26 Oct. 1967	Harold Wilson (Lab.)	Initiative (tabling): Art. 53 (originally introduced as Art. 41 in 1888) is amended so that the House can authorise amendments to be proposed at the reporting stage, in spite of the general rule that this is prohibited if such an amendment could have been proposed in committee.	A3.3	+1
Score session 44.1: +1								
14 Nov. 1967	44	2	1967-68 (16)	15 Nov. 1967	Harold Wilson (Lab.)	Initiative (tabling): The rule that allows members to adjourn the House to table the discussion of an urgent matter (Art. 9) is amended so that, prior to the floor vote, consent from the Speaker has to be obtained before such motion may be made.	A3.1	-1
12 Dec. 1967	44	2	1967 (53)	14 Dec. 1967	Harold Wilson (Lab.)	Duration (interruption): An amendment to art 2(1) provides that if the Speaker deems a debate important, they may interrupt and reschedule the debate instead of putting the question on that bill, thus providing an extra opportunity for extending debate.	B3.1	+1

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend. date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
24 Oct. 1968	44	2	1967-68 (452)	24 Oct. 1968	Harold Wilson (Lab.)	Duration (committee assignment): New Art. 64a establishes a Grand Committee for Welsh affairs.	B4.1	-1
6 Dec. 1967	44	2	1967 (53)	14 Dec. 1967	Harold Wilson (Lab.)	Member speech (committee assignment): A new Art. 43a stipulates that if a committee cannot reach agreement on the timetable for a bill, or that the agreement arrived at is deemed to be ineffective by a Minister, the latter may make a motion that the bill be reported on before a specified day, in which case the Business Committee puts forward a schedule for the processing of the bill. Duration (committee assignment): New Art. 64a stipulates that Ministers may make a motion to refer specific matters to this body.	B4.3 B4.5	-1 -1
24 Oct. 1968	44	2	1967-68 (452)	24 Oct. 1968	Harold Wilson (Lab.)	Duration (closure): The newly introduced Art. 1a allows a Minister to make a motion to suspend the debate on a day's sitting. This question is decided upon without debate or amendment, and if agreed to, a motion for adjournment may be made immediately thereafter, which has to be concluded within half an hour after its proposal. Duration (closure): The new closure procedure of Art. 1a may be proposed by a Minister.	B2.1	-1
12 Nov. 1968	44	3	1969 (160)	21 Feb. 1969	Harold Wilson (Lab.)	Duration (interruption): An amendment ensures that motions to adjourn may only be made until all questions for public business have been discussed (Art. 1(2)). Duration (committee assignment): A new select committee (Joint Committee on Consolidation, &c., Bills) is created to deal with special classes of bills (new at. 87a).	B2.3	-1
8 Mar. 1971	45	1	1971 (308)	7 Apr. 1971	Edward Heath (Con.)	Duration (schedule): The rule that allows the Minister to propose a timetable for a bill if the committee cannot agree on one (originally art 43a, introduced on 6 Dec. 1967; now: Art. 44) is changed so the Minister may make a motion for allocation of time for consideration of a bill without this first requirement, which has to be voted on within three hours after it has been made.	B3.4	+1
16 Jul. 1971	45	1	1971 (524)	21 Jul. 1971	Edward Heath (Con.)		B4.1	-1
16 Nov. 1971	45	2	1972 (126)	1 Feb. 1972	Edward Heath (Conservative)		B1.3	-1
28 Jan. 1974	45	4	1973/74 (142)	7 Feb. 1974	Edward Heath (Con.)	Duration (committee assignment): Standing committees are created for the consideration of statutory instruments (new Art. 73a).	B4.1	-1
15 Nov. 1974	47	1	1975 (154)	22 Jan. 1975 & 15 Feb. 1975	Harold Wilson (Lab.)	Duration (committee assignment): The rules for referring a Bill to the Grand Committee for Welsh Affairs (originally introduced as Art. 64a on 24 Oct. 1967; now: Art. 72) is amended so that the Minister moving it now has to give ten day's notice for the motion.	B4.5	+1
10 Feb. 1975	47	1	1975 (154)	22 Jan. 1975 & 15 Feb. 1975	Harold Wilson (Lab.)	Duration (committee assignment): A standing committee for Northern Ireland is created (new Art. 72a).	B4.1	-1
10 Feb. 1975	47	1	1975 (154)	22 Jan. 1975 & 15 Feb. 1975	Harold Wilson (Lab.)	Duration (committee assignment): Ministers have the right to refer matters to the new standing committee for Northern Ireland (new Art. 72a).	B4.5	-1
3 Dec. 1975	47	2	1976 (214)	25 Feb. 1976	Harold Wilson (Lab.)	Duration (committee assignment): A standing committee for Regional Affairs is created (new Art. 72b).	B4.1	-1
3 Dec. 1975	47	2	1976 (214)	25 Feb. 1976	Harold Wilson (Lab.)	Duration (committee assignment): Ministers have the right to refer matters to the new standing committee for Regional Affairs (new Art. 72b).	B4.5	-1
31 Jan. 1980	48	1	1980 (820)	31 Oct. 1980	Margaret Thatcher (Con.)	Duration (schedule): The liaison committee gets the power to recommend specific allocations of time for consideration by the House of estimates; and these recommendations have the status of Standing Orders if approved by the House (new Art. 86e).	B1.1	-1

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend. date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
17 Jan. 1980	48	1	1980 (820)	31 Oct. 1980	Margaret Thatcher (Con.)	Duration (interruption): The Speaker may now, on Friday sittings reserved for private business, motions and petitions, from 11 a.m. interrupt proceedings in order to allow for urgent questions, Ministers' statements, or personal explanations (new Art. 5(3a)).	B3.1	-1
25 Jun. 1979	48	1	1979 (266)	8 Nov. 1979	Margaret Thatcher (Con.)	Duration (committee assignment): Select committees are created to examine the expenditure, administration and policy of government departments (new Art. 86a).	B4.1	-1
26 Jun. 1979	48	1	1979 (266)	8 Nov. 1979	Margaret Thatcher (Con.)	Duration (committee assignment): A select committee is established to consider the expenditure, administration and policy of the Welsh Office and associated public bodies (new Art. 86b).	B4.1	-1
31 Oct. 1979	48	1	1979 (266)	8 Nov. 1979	Margaret Thatcher (Con.)	Duration (committee assignment): A select committee is established to consider the expenditure, administration and policy of the Scottish Office and associated public bodies (new Art. 86c).	B4.1	-1
31 Oct. 1979	48	1	1979 (266)	8 Nov. 1979	Margaret Thatcher (Con.)	Duration (committee assignment): Members in charge of a private bill may now make a motion to refer the bill to a second reading committee on days on which private members' bills or notices of motions have precedence (new Art. 66(1a)).	B4.5	-1
30 Oct. 1980	48	1	1980 (820)	31 Oct. 1980	Margaret Thatcher (Con.)	Duration (committee assignment): A standing committee on European Community documents is created, to consider EC-related business (new Art. 73b).	B4.1	-1
30 Mar. 1983	48	4	1983 (307)	31 Mar. 1983	Margaret Thatcher (Con.)	Duration (precedence): If committees are charged with considering bills relating to Scotland, government bills have precedence in one of these standing committees (new clause 72(2)).	B4.7	-1
23 May 1985	49	2	1985/86 (294)	14 Mar. 1986	Margaret Thatcher (Con.)	Duration (precedence): Opposition business gets precedence on a set number of days (Art. 6(2)).	A2.1	-1
27 Feb. 1986	49	3	1986 (1)	12 Nov. 1986	Margaret Thatcher (Con.)	Duration (closure): When a member is making a motion or amendment, another member may propose that the question be immediately put to a vote (new Art. 14a; n.b. Art. 28 in SO 1986 (1)).	B2.1	-1
27 Feb. 1986	49	3	1986 (1)	12 Nov. 1986	Margaret Thatcher (Con.)	Member speech (number/length): A time limit of three minutes is introduced in relation to an explanatory speech upon a motion to move the adjournment for the purpose of discussing a matter of urgency (amendment to Art. 10(1); n.b. Art. 28 in SO 1986 (1)).	C1.1	-1
13 Jul. 1988	50	1	1988 (1)	22 Nov. 1988	Margaret Thatcher (Con.)	Member speech (number/length): The Speaker may, if a large number of MPs registered to speak, impose a time limit of ten minutes on members' speeches (new Art. 45a).	C1.4	-1
1 Feb. 1990	50	3	1990 (271)	7 Mar. 1990	Margaret Thatcher (Con.)	Initiative (tabling): On a day on which the Chancellor of the Exchequer has declared his intention to open his budget, no notice for leave to bring in bills or to nominate select committees may be made at the start of public business (new Art. 19a).	A3.3	-1
21 Feb. 1990	50	3	1990 (271)	7 Mar. 1990	Margaret Thatcher (Con.)	Initiative (tabling): On normal sitting days, the kinds of private members' notices that may be received are severely restricted (for example, they are refused if they impinge on the rules of precedence, or would allocate any time to any proceedings, or would have the effect of amending a Standing Order) (new Art. 13a).	A3.3	-1
24 Oct. 1990	50	3	1990 (2)	28 Nov. 1990	Margaret Thatcher (Con.)	Duration (committee assignment): A select committee for the consideration of European legislation is created (Art. 127(1)).	B4.1	-1

Table B1: Standing Orders Reform, 1811–2015 (Continued)

[illegible]

Table B1: Standing Orders Reform, 1811–2015 (Continued)

Amend. date	Parl.	Session	SO Ref.	Ordered to be printed	Cabinet	Reform	Reform code	Score
15 Jun. 2010	55	1	Addendum of 23 Jun. 2010	23 Jun. 2010	David Cameron (Coal.)	Initiative (precedence): The number of days on which only select committee reports chosen by the Liaison Committee may be debated is extended from six to twenty days (amendment to Art. 10(13)). Initiative (labelling): A new select committee, the Backbench Business Committee is created to select the proposals that shall be discussed at the time for backbench business; no Minister, parliamentary private secretary (PPS) or a principal front-bench person may sit on this committee (new Art. 152j). Duration (committee assignment): Backbench business gets precedence on 35 days in each session (new Art. 14(3a)).	A 2.2 A 3.4	-1 -1
15 Jun. 2010	55	1	Addendum of 23 Jun. 2010	23 Jun. 2010	David Cameron (Coal.)		B 4.3	+1
8 May 2014	55	4	Addendum of 11 Jun. 2014	11 Jun. 2014	David Cameron (Coal.)	Member speech (Number/length): The limit on the number of motions for amendments allowed to be debated in the final two days of the debate on the Queen's Speech is increased from two to four (Art. 33).	C1.1	-1 +1
								Score session 55.1: -1 Score session 55.5: +1

Notes: Compiled on the basis of the yearly versions of the Standing Orders, available from the House of Commons Parliamentary Papers (HCPP), *parlipapers.chadwyck.co.uk*. Note that the numbering of the Standing Orders has changed substantially. In this overview, the articles mentioned reflect the numbering of the year in which the change occurred. See Table A1 for session dates.

^aSee Redlich 1908, p. 93.

^bHere, I follow Cox’s finding, who takes the moment of the creation of the rule; whereas Fraser (1960, p. 453) claims it was officially implemented in 1835.

^cSee Cannon (1882, p. 207).

^dThe new Art. 24A also allows the Speaker to impose time limits on speeches by virtue of Art. 47; however the latter article already allows the Speaker to do so in *any* debate. The inclusion of such a provision in Art. 24A (and later removal on 15 June 2010) thus is of no consequence.

B.1 Sensitivity to Pre-processing Decisions

The sensitivity analysis reported here was conducted using the new `preText` package in R (Denny and Spirling 2017).²³ This algorithm takes one possible combination of all pre-processing decisions (specification i), calculates the distance (here: cosine) between the individual document WFMs (i.e. columns) in the document-term matrix (DTM), and then ranks the texts according to their pair-wise distances (ranking k).

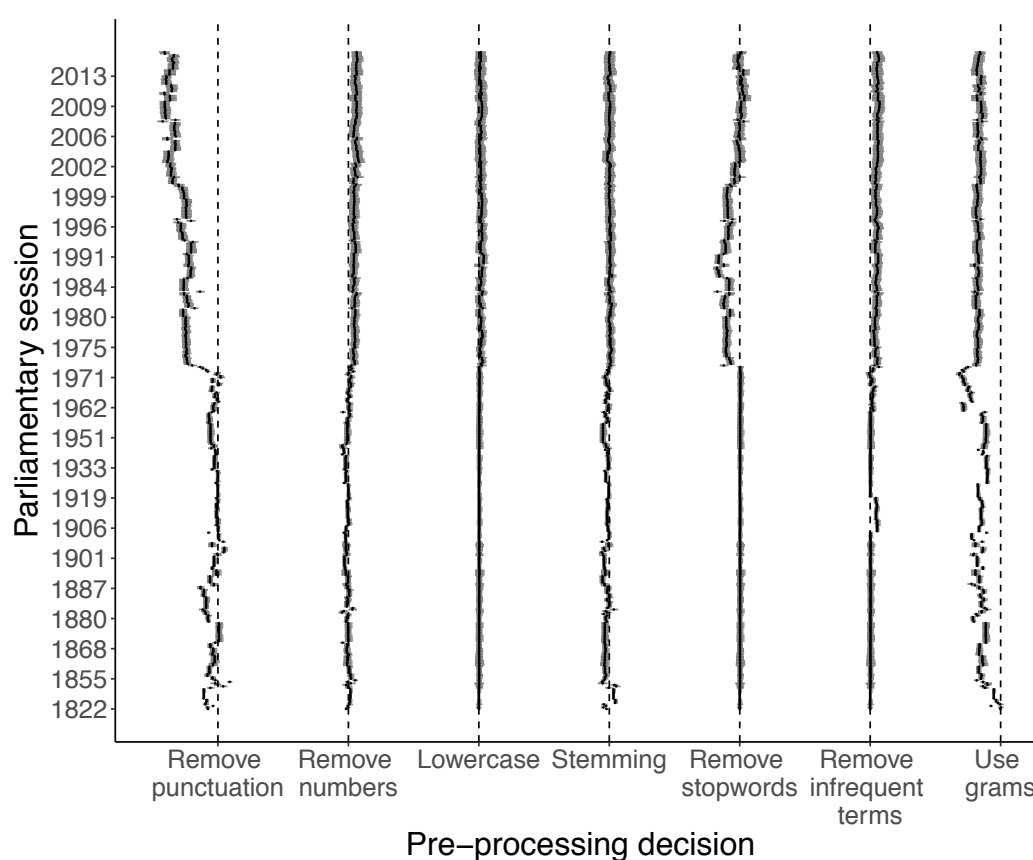


Figure B9: The Impact of Pre-processing Decisions on Automated Measurement, 1811–2015

Notes: Black dots represent the coefficients of the estimated effect of each pre-processing decision on the average pairwise difference in pairwise rank orderings of similarity, of the articles for each consolidated version of the HCSOs (see text for details); grey horizontal bars represent the associated 95 per cent confidence intervals; vertical dashed bars are zero-lines.

²³<https://github.com/matthewjdenny/preText>.

We take the average rank difference for the top- k distance pairs that change ranking the most across the specifications (here, k is set to 100, as advised by the authors).²⁴ Subsequently, we calculate the rank difference for pair k between a specification i and all other remaining specifications, and take the mean of these differences across all top pairs k .

As such, the algorithm calculates the average pairwise difference in pairwise rank orderings across 128 possible pre-processing combinations. This number is subsequently normalised by dividing it over the total possible rank order difference in the corpus. To get a measure of impact of a pre-processing decision, we can subsequently specify a linear regression model with dummies for all pre-processing steps and take the marginal effect for each (Denny and Spirling 2017, p. 29). Substantively, a negative coefficient for one of the dummies denotes little effect on the `preText` score. Conversely, a positive coefficient indicates that the pre-processing decision likely does influence the results.

Figure B9 plots the effect (i.e. coefficients) of all pre-processing decisions across all sessions, with 95 per cent confidence intervals. Negative coefficients indicate that the pre-processing decision is likely to reduce the “unusualness” of the results, and vice versa. In almost all cases, for all pre-processing decisions the confidence intervals associated with the coefficient estimate includes zero, or is in a majority of cases left of the zero-line. There is one exception: removing numbers. This also happens to be the one pre-processing step that we *have* to use: each sub-article is numbered, and as re-numbering occurs frequently between sessions, n-grams will be included that include a meaningless number. The `preText` results therefore give no ground to pursuing different combinations of pre-processing choices and re-running the analysis.

²⁴If the number of texts in the corpus (here: sub-articles) < 100 ; k = number of sub-articles.

Appendix C SUPPORTING MATERIALS FOR CHAPTER 5

This appendix contains the following supporting material for the analysis in Chapter 5:

- Robustness checks for the models that estimate the impact of electorate size on time scarcity in Parliament reported in Section 5.4 (Table C2);
- Models that estimate the effect of electorate size on a different operationalisation of the DV that considers the interaction between the mean number of speeches and the mean length (in words) (Tables C3–C4);
- Detailed regression results of the linear Bayesian models that estimate the effect of constituency size on speaking behaviour (for which coefficient plots are reported in Chapter 5, see Section 5.5) (Tables 5.4–5.4).

C.1 Robustness Checks: Time Scarcity

Table C2 reports the estimates of an OLS regression where outliers have been removed, as well as the results of the quasi-Poisson models.

C.2 Re-estimation of the Model in Table 5.2 with Workload DV

Tables C3 and C4 report the results of the models reported in Tables 5.2 and C2 with a dependent variable that interacts the number of speeches with average speech length. In the models reported below, the DV is divided by 100 to produce coefficients that are easily comparable to the models where I use the number of speeches as the main response variable (the average speech length in words is usually in the hundreds). A coefficient of one thus corresponds to a 100-unit increase in the response variable. Again, quasi-Poisson models are an appropriate additional test because of the discrepancy between the variance ($= 371.58$) and the mean ($= 42.49$) of the DV.

C.3 The Effect of Constituency Size on Participation (Bayesian Linear Estimates)

Tables C5–C8 report the results of linear bayesian models that estimate the effect of constituency size on debate participation in different periods around the nineteenth-century reform acts. In all cases, the following applies:

- **Continuous outcome variable:** The number of times that a legislator is recorded as having spoken in a session;
- **Cell entries:** Posterior means of Bayesian logit regression with uniform priors, with posterior standard deviations in parentheses;
- **Estimation:** Bayesian estimation with four MCMC chains at 100,000 iterations each; 50,000 discarded as burn-in period;
- **Convergence:** Convergence tests passed:
 - The scale reduction factor (SRF) of the Gelman-Rubin diagnostic test is below 1.1 for all parameters in all models;
 - A visual inspection of Geweke plots (not reported) shows that 95 per cent of the estimates from the Geweke Test simulations fall within the [-2,2] bound (for an explanation of this test, see subSection D.2).

Table C2: Time Scarcity - Regression Results (Robustness Checks)

Dependent variable:	OLS (no outliers)			SIMEX (no outliers)		Quasi-poisson		
	(1)	(2)	(3)	(3b)	(1)	(2)	(3)	
<i>Mean number of speeches</i>	Coef. (SE)	Coef. (RSE)	Coef. (RSE)	Coef. (SIMEX)	Coef. (SE)	Coef. (SE)	Coef. (SE)	
ELECTORATE SIZE (*100,000)	0.69*** (0.03)	0.86*** (0.04)	0.84*** (0.03)	0.96*** (0.03)	2.97e-03*** (1.84e-04)	3.41e-03*** (2.15e-04)	4.80e-03*** (2.43e-04)	
Controls								
LEGISLATIVE COMPLEXITY <i>De-trended, *1,000</i>			-0.18 (0.80)	-0.30 (0.78)			-0.024*** (0.003)	
YEARS BEFORE ELECTION		2.25 (2.24)	1.66 (2.28)	3.37 (2.12)		0.03 (0.02)	0.02 (0.01)	
BILLS ENACTED <i>De-trended^a</i>		-0.06*** (0.01)	-0.10*** (0.01)	-0.11*** (0.01)		-0.23*** (0.05)	-0.60*** (0.06)	
ANTI-DILATORY RULES <i>De-trended</i>			7.82*** (0.89)	8.20*** (0.80)			0.05*** (0.01)	
Constant	100.41*** (7.45)	72.41*** (10.89)	66.79*** (7.47)	71.01*** (8.76)	4.75***	4.68*** (0.06)	4.51*** (0.07)	
Observations	201	200	192	192	203	195	195	
Adjusted R ²	0.74	0.85	0.89	0.86	-	-	-	
Quasi-likelihood	-	-	-	-	231.04	224.55	241.77	

Notes:

*p<0.05; **p<0.01; ***p<0.001

OLS models: model 1, standard errors are provided in parentheses; for models 2 and 3, robust Newey-West standard errors are reported. SIMEX models: SIMEX standard errors based on jackknife estimation reported in parentheses. Quasi-Poisson models: standard errors are provided in parentheses. ^a*1,000 for quasi-Poisson models.

Table C3: Time Scarcity - Regression Results with Workload DV

Dependent variable:	OLS			SIMEX
	(1)	(2)	(3)	(3b)
<i>Mean number of speeches</i>	Coef. (SE)	Coef. (RSE)	Coef. (RSE)	Coef. (SIMEX)
ELECTORATE SIZE (*100,000)	0.98*** (0.04)	1.04*** (0.04)	1.17*** (0.04)	1.17*** (0.05)
Controls				
LEGISLATIVE COMPLEXITY <i>De-trended, *1,000</i>			-2.48* (1.15)	-2.43*** (1.15)
YEARS BEFORE ELECTION		1.44 (3.15)	1.44 (3.15)	4.39 (3.11)
BILLS ENACTED <i>De-trended</i>		-0.03*** (0.01)	-0.07*** (0.01)	-0.08*** (0.01)
ANTI-DILATORY RULES <i>De-trended</i>			5.99*** (1.26)	7.32*** (1.17)
Constant	237.27*** (9.13)	219.34*** (12.09)	220.80*** (10.57)	227.96*** (12.89)
Observations	203	203	195	195
Adjusted R ²	0.79	0.87	0.89	0.83

Notes:

*p<0.05; **p<0.01; ***p<0.001

OLS models: model 1, standard errors are provided in parentheses; for models 2 and 3, robust Newey-West standard errors are reported. SIMEX models: SIMEX standard errors based on jackknife estimation reported in parentheses.

Table C4: Time scarcity - Regression Results (Robustness Checks, Workload DV)

Dependent variable:	OLS (no outliers)			SIMEX (no outliers)	Quasi-poisson		
	(1)	(2)	(3)	(3b)	(1)	(2)	(3)
<i>Mean number of speeches</i>	Coef. (SE)	Coef. (RSE)	Coef. (RSE)	Coef. (SIMEX)	Coef. (SE)	Coef. (SE)	Coef. (SE)
ELECTORATE SIZE (*100,000)	0.99*** (0.03)	1.04*** (0.03)	1.17*** (0.03)	1.16*** (0.04)	2.30e-03*** (1.08e-04)	2.43e-03*** (1.29e-04)	3.02e-03*** (1.49e-04)
Controls							
LEGISLATIVE COMPLEXITY <i>De-trended, *1,000</i>			-2.49* (1.15)	-2.21* (1.08)			-0.01* (0.01)
YEARS BEFORE ELECTION		1.23 (2.93)	1.08 (2.93)	3.01 (2.93)		0.01 (0.01)	0.01 (0.01)
BILLS ENACTED ^a <i>De-trended</i>		-0.03*** (0.01)	-0.07*** (0.01)	-0.08*** (0.01)		-0.09** (0.03)	-0.27*** (0.04)
ANTI-DILATORY RULES <i>De-trended</i>			5.85*** (1.21)	7.19*** (1.11)			2.37e-02*** (3.69e-03)
Constant	234.77*** (8.97)	218.61*** (12.01)	220.25*** (10.17)	226.66*** (12.09)	5.53*** (0.03)	5.51*** (0.04)	5.48*** (0.04)
Observations	201	192	192	192	203	195	195
Adjusted R ²	0.80	0.87	0.89	0.85	-	-	-
Quasi-likelihood	-	-	-	-	256.27	250.76	260.18

Notes:

*p<0.05; **p<0.01; ***p<0.001

OLS models: model 1, standard errors are provided in parentheses; for models 2 and 3, robust Newey-West standard errors are reported. SIMEX models: SIMEX standard errors based on jackknife estimation reported in parentheses. Quasi-poisson models: standard errors are provided in parentheses. ^a*1,000 for quasi-Poisson models.

Table C5: Effect of Constituency Size on Participation, Bayesian Linear Estimates (1811–1831)

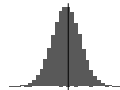
DV: Participation	Estimate	SD	95%CI	Pr($\beta \neq 0$)
ELECTORS	0.01	0.01	[0.00, 0.02]	0.92
Controls				
VOTE SHARE	0.21	0.16	[−0.11, 0.53]	0.91
OPPOSED	0.01	0.04	[−0.06, 0.08]	0.59
SENIORITY	0.35	0.03	[0.28, 0.41]	1.00
Constant	−0.16	0.09	[−0.34, 0.03]	0.95
<hr/>				
N	817			
Model fit				

Table C7: Effect of Constituency Size on Participation, Bayesian Linear Estimates (1869–1885)

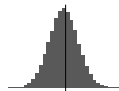
DV: Participation	Estimate	SD	95%CI	Pr($\beta \neq 0$)
ELECTORS	0.02	0.01	[0.00, 0.03]	0.96
Controls				
VOTE SHARE	0.72	0.31	[0.07, 1.27]	0.98
OPPOSED	0.03	0.06	[−0.08, 0.14]	0.71
SENIORITY	0.20	0.05	[0.11, 0.29]	1.00
Constant	−0.44	0.18	[−0.77, −0.07]	0.99
<hr/>				
N	466			
				
Model fit				

Table C6: Effect of Constituency Size on Participation, Bayesian Linear Estimates (1832–1868)


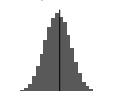
DV: Participation	Estimate	SD	95%CI	Pr($\beta \neq 0$)
ELECTORS	0.01	0.01	[0.00, 0.02]	0.96
Controls				
VOTE SHARE	−0.01	0.20	[−0.40, 0.39]	0.51
OPPOSED	0.03	0.03	[−0.03, 0.08]	0.82
SENIORITY	0.28	0.03	[0.22, 0.33]	1.00
Constant	−0.06	0.12	[−0.29, 0.16]	0.71
<hr/>				
N	1,355			
Model fit				

Table C8: Effect of Constituency Size on Participation, Bayesian Linear Estimates (1886–1918)

DV: Participation	Estimate	SD	95%CI	Pr($\beta \neq 0$)
ELECTORS	0.01	0.01	[0.00, 0.02]	0.83
Controls				
VOTE SHARE	−0.01	0.20	[−0.40, 0.39]	0.95
OPPOSED	0.03	0.03	[−0.03, 0.08]	0.86
SENIORITY	0.28	0.03	[0.22, 0.33]	1.00
Constant	−0.06	0.12	[−0.29, 0.16]	0.94
<hr/>				
N	1,361			
Model fit				

Appendix D SUPPORTING MATERIALS FOR CHAPTER 6

This appendix contains the following supporting material for the analysis in Chapter 6:

- Additional models that test binary associations, as well as models without controls, and without interaction terms (Section D.1);
- Convergence diagnostics for the estimation of the main results as reported in Tables 6.4, 6.5, 6.6, and 6.7 (Section D.2);
- A replication of the models reported in Tables 6.4, 6.5, 6.6, and 6.7 with uniform priors, to assess the sensitivity of the results to prior selection (Section D.3, Tables D25–D28);
- An outlier sensitivity analysis of the models as reported in Tables 6.4, 6.5, 6.6, and 6.7 (Section D.4, Tables D29–D32).

D.1 Simple Model Results

The tables included below show the estimation results of binary relationships and a number of simple models, for the full sample (subSection D.1), under low party strength (1811–1880, subSection D.1), as well as medium (1880–1945, subSection D.1) and high levels of party institutionalisation (1945–2015, subSection D.1). In all cases, the following applies:

- **Binary outcome variable:** Was, on balance, the number of anti-dilatory rules increased in the session ($x=1$), or not ($x=0$)?;
- **Cell entries:** Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses;
- **Estimation:** Bayesian estimation with four MCMC chains at 200,000 iterations each; 100,000 discarded as burn-in period for the bivariate models and the simple models that only include POLARISATION, OBSTRUCTION

and the interaction term POLARISATION*OBSTRUCTION. The full models are estimated with four MCMC chains at 500,000 iterations each, discarding 400,000 iterations as burn-in period;

- **Convergence:** Convergence tests passed:
 - Scale reduction factor (SRF) of the Gelman-Rubin diagnostic test is below 1.1 for all parameters in all models;
 - Visual inspection of Geweke plots (not reported) shows that 95 per cent of the estimates from the Geweke Test simulations fall within the [-2,2] bound (for an explanation of this test, see subSection D.2).

Full Sample

Table D9: The Effect of Polarisation (Full Sample)

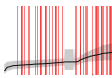
DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	0.90	0.352	[0.22, 1.60]	1.00
Constant	-1.44	0.17	[-1.79, -1.11]	1.00
<hr/>				
N	231			
Model fit				
<hr/>				
Model fit: AUROC = 0.55.				

Table D10: The Effect of Obstruction (Full Sample)

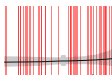
DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
OBSTRUCTION	0.19	0.33	$[-0.47, 0.83]$	0.72
Constant	-1.38	0.17	$[-1.71, -1.07]$	1.00
<hr/>				
N	231			
				
<hr/>				
Model fit				
<hr/>				
Model fit: AUROC = 0.81.				

Table D11: The Effect of Polarisation*Obstruction (Full Sample)

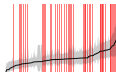
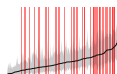
DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	1.92	1.01	[−0.01, 3.95]	0.97
POLARISATION	1.09	0.45	[0.22, 2.00]	0.99
OBSTRUCTION	−0.68	0.48	[−1.67, 0.21]	0.93
Constant	−1.72	0.24	[−2.22, −1.28]	1.00
N			231	
Model fit				
Model fit: AUROC = 0.52.				

Table D12: The Effect of Polarisation and Obstruction Without Interaction Terms (Full Sample)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	1.42	0.55	[0.39, 2.54]	1.00
OBSTRUCTION	−0.43	0.50	[−1.43, 0.53]	0.80
Controls				
WORKLOAD <i>Logged</i>	0.02	0.50	[−0.94, 1.02]	0.51
MAJORITY SIZE	−0.21	0.42	[−1.08, 0.58]	0.68
DAYS UNTIL ELECTION <i>Square root</i>	0.85	0.40	[0.07, 1.66]	0.98
EXISTING RULES <i>De-trended</i>	0.44	0.39	[−0.33, 1.23]	0.87
PARTY SWITCH	−0.45	0.64	[−1.78, 0.72]	0.76
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.72	0.37	[−1.48, −0.01]	0.98
Constant	−1.57	0.21	[−2.00, −1.18]	1.00
N	231			
Model fit				
Model fit: AUROC = 0.63.				

Low Party Strength (1810–1880)

Table D13: The Effect of Polarisation (Low Party Strength)

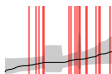
DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	1.16	0.70	[−0.14, 2.62]	0.96
Constant	−1.49	0.30	[−2.12, −0.93]	1.00
<hr/>				
N	83			
Model fit				
<hr/>				
Model fit: AUROC = 0.96.				

Table D14: The Effect of Obstruction (Low Party Strength)

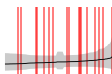
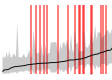
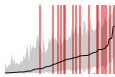
DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
OBSTRUCTION	0.34	0.55	[−0.76, 1.41]	0.73
Constant	−1.41	0.28	[−1.98, −0.88]	1.00
<hr/>				
N	83			
Model fit				
<hr/>				
Model fit: AUROC = 0.50.				

Table D15: The Effect of Polarisation*Obstruction (Low Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	0.06	1.37	[−2.51, 2.89]	0.50
POLARISATION	1.23	0.74	[−0.14, 2.77]	0.96
OBSTRUCTION	0.29	0.61	[−0.92, 1.46]	0.69
Constant	−1.55	0.32	[−2.21, −0.97]	1.00
N	83			
Model fit				

Model fit: AUROC = 0.98.

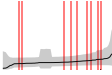
Table D16: The Effect of Polarisation and Obstruction Without Interaction Terms (Low Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	1.25	0.96	[−0.54, 3.24]	0.91
OBSTRUCTION	1.70	0.95	[−0.09, 3.66]	0.97
Controls				
WORKLOAD <i>Logged</i>	1.60	1.16	[−0.56, 4.01]	0.92
MAJORITY SIZE	−1.00	0.87	[−2.85, 0.58]	0.88
DAYS UNTIL ELECTION <i>Square root</i>	−0.37	0.74	[−1.84, 1.09]	0.69
EXISTING RULES <i>De-trended</i>	−0.24	0.70	[−1.63, 1.11]	0.63
PARTY SWITCH	−1.10	1.09	[−3.40, 0.90]	0.85
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−1.25	0.79	[−2.90, 0.23]	0.95
Constant	−1.89	0.43	[−2.82, −1.12]	1.00
N	83			
Model fit				

Model fit: AUROC = 0.77.

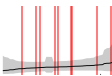
Medium Party Strength (1880–1945)

Table D17: The Effect of Polarisation (Medium Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	1.09	0.94	[−0.57, 3.11]	0.88
Constant	−2.20	0.40	[−3.04, −1.48]	1.00
N	77			
Model fit				

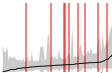
Model fit: AUROC = 0.71.

Table D18: The Effect of Obstruction (Medium Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
OBSTRUCTION	−0.64	0.79	[−2.27, 0.84]	0.79
Constant	−2.15	0.38	[−2.96, −1.46]	1.00
N	77			
Model fit				

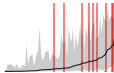
Model fit: AUROC = 0.88.

Table D19: The Effect of Polarisation*Obstruction (Medium Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	0.23	2.17	[−4.12, 4.46]	0.55
POLARISATION	1.35	1.02	[−0.44, 3.53]	0.92
OBSTRUCTION	−0.84	0.89	[−2.68, 0.82]	0.83
Constant	−2.37	0.44	[−3.31, −1.59]	1.00
N			77	
Model fit				

Model fit: AUROC = 0.70.

Table D20: The Effect of Polarisation and Obstruction Without Interaction Terms (Medium Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	2.41	1.54	[−0.29, 5.73]	0.96
OBSTRUCTION	−2.62	1.38	[−5.62, −0.19]	0.98
Controls				
WORKLOAD <i>Logged</i>	−1.65	1.35	[−4.47, 0.87]	0.90
MAJORITY SIZE	0.71	1.07	[−1.43, 2.79]	0.75
DAYS UNTIL ELECTION <i>Square root</i>	2.64	1.27	[0.35, 5.33]	0.99
EXISTING RULES <i>De-trended</i>	2.02	1.07	[0.05, 4.25]	0.98
PARTY SWITCH	−0.39	1.58	[−3.87, 2.37]	0.57
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	0.74	1.04	[−1.23, 2.88]	0.76
Constant	−3.43	0.77	[−5.12, −2.13]	1.00
N	77			
Model fit				
Model fit: AUROC = 0.79.				

High Party Strength (1945–2015)

Table D21: The Effect of Polarisation (High Party Strength)

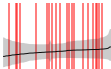
DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	0.35	0.55	[−0.71, 1.45]	0.73
Constant	−0.90	0.27	[−1.44, −0.40]	1.00
<hr/>				
N	71			
				
<hr/>				
Model fit				
<hr/>				
Model fit: AUROC = 0.72.				

Table D22: The Effect of Obstruction (High Party Strength)

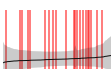
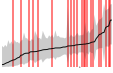
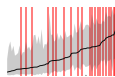
DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
OBSTRUCTION	0.24	0.55	[−0.83, 1.31]	0.67
Constant	−0.90	0.27	[−1.44, −0.39]	1.00
<hr/>				
N	71			
				
<hr/>				
Model fit				
<hr/>				
Model fit: AUROC = 0.50.				

Table D23: The Effect of Polarisation*Obstruction (High Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	2.95	1.325	[0.53, 5.72]	0.99
POLARISATION	0.57	0.671	[−0.71, 1.92]	0.80
OBSTRUCTION	0.87	0.695	[−0.45, 2.28]	0.90
Constant	−0.78	0.286	[−1.35, −0.23]	1.00
N	71			
Model fit				

Model fit: AUROC = 0.70.

Table D24: The Effect of Polarisation and Obstruction Without Interaction Terms (High Party Strength)

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION	0.04	0.76	[−1.45, 1.53]	0.52
OBSTRUCTION	−0.38	0.77	[−1.91, 1.11]	0.69
Controls				
WORKLOAD <i>Logged</i>	−0.24	0.70	[−1.58, 1.19]	0.65
MAJORITY SIZE	0.25	0.66	[−1.05, 1.56]	0.65
DAYS UNTIL ELECTION <i>Square root</i>	1.97	0.81	[0.46, 3.65]	1.00
EXISTING RULES <i>De-trended</i>	0.26	0.77	[−1.25, 1.79]	0.63
PARTY SWITCH	0.02	1.57	[−3.42, 2.79]	0.53
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.83	0.64	[−2.11, 0.41]	0.90
Constant	−1.18	0.35	[−1.90, −0.53]	1.00
N	71			
Model fit				
Model fit: AUROC = 0.74.				

D.2 Convergence Diagnostics

Gelman-Rubin Diagnostic Test

The scale reduction factor (SRF) of the Gelman-Rubin diagnostic test is below 1.1 for all parameters for all models, which means the chains have converged to an acceptable degree.

Geweke Z-score Test

Figures D10-D13 shows the Geweke Diagnostic Tests (Geweke 1992) for all four chains for all parameter estimates, for each model run in Chapter 6. This diagnostic test relies on a simulation of a large number of draws and comparing the mean (and variance) of the posterior distribution of a parameter of the first part of the chain to the mean (and variance) of the last part of the chain. 95 per cent of the values should fall within -2 and 2. This interval is indicated by the shadowed area in the plots.

D.3 Sensitivity to Priors

To verify that my results are not influenced by the priors used, I replicate the models of Chapter 6 using uninformative, uniform priors. The estimation results are reported in Tables D25–D28 below.

D.4 Sensitivity to Outliers

Tables D29–D32 re-estimate the models from Chapter 6 with outliers removed.

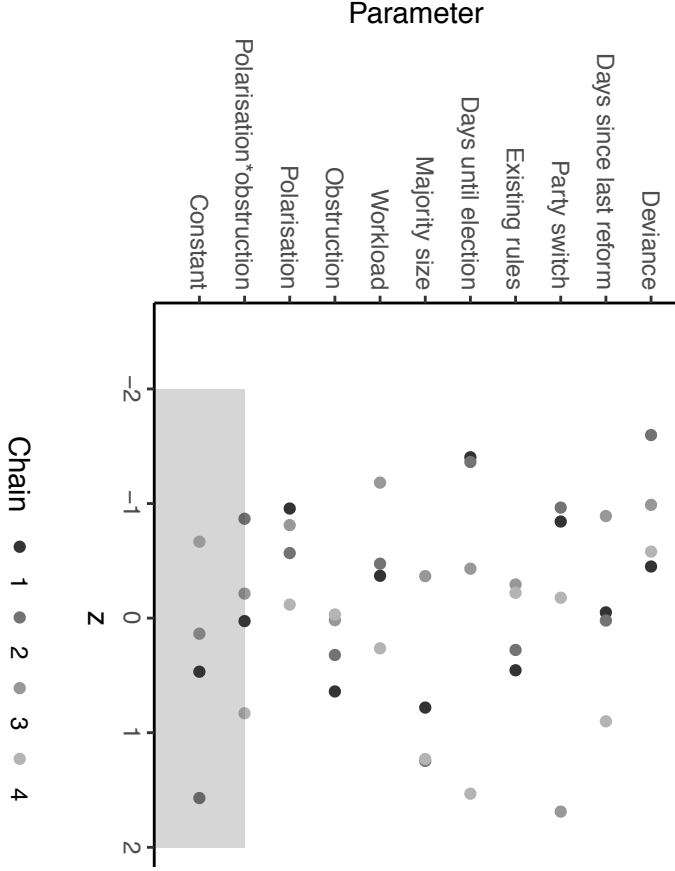


Figure D10: Geweke Diagnostics Full Sample (see Table 6.4)

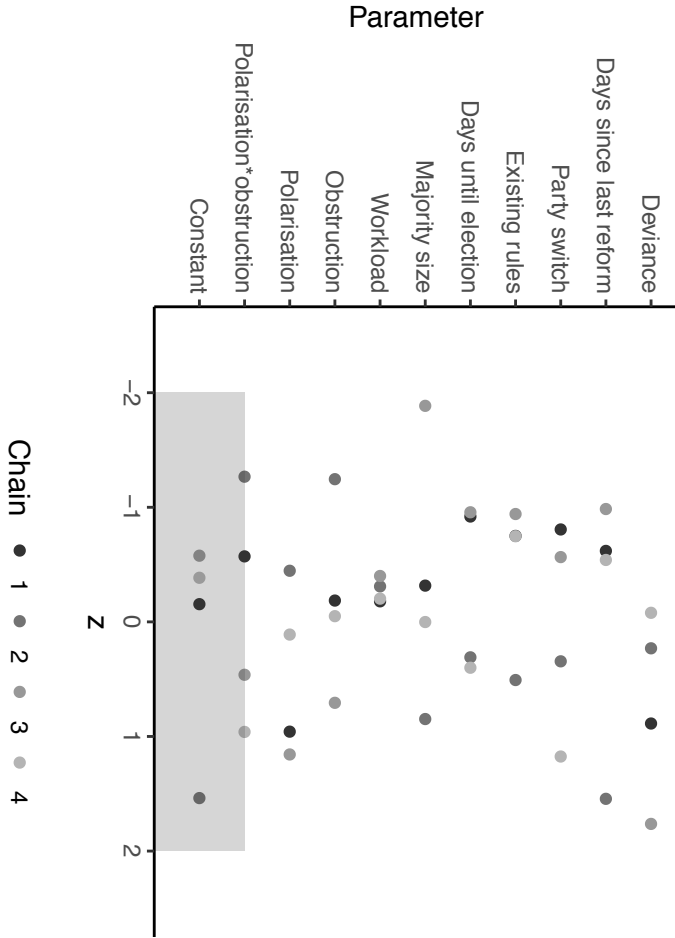


Figure D11: Geweke Diagnostics Low Party Strength (see Table 6.5)

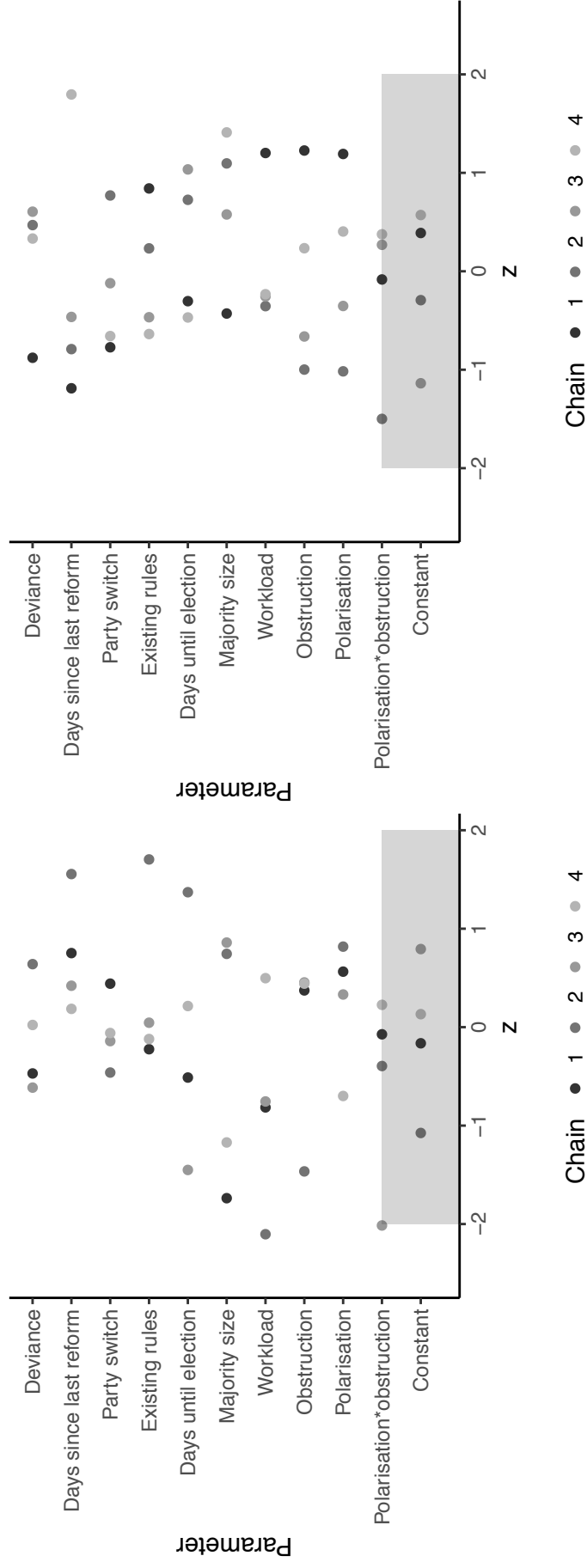
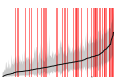


Figure D12: Geweke Diagnostics Medium Party Strength (see Table 6.6)

Figure D13: Geweke Diagnostics High Party Strength (see Table 6.7)

Table D25: Institutional Reform in the UK House of Commons (1811–2015), Uniform Priors

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	1.77	1.13	[−0.36, 4.05]	0.95
POLARISATION	1.49	0.57	[0.41, 2.67]	1.00
OBSTRUCTION	−0.84	0.60	[−2.07, 0.28]	0.92
Controls				
WORKLOAD <i>Logged</i>	0.03	0.50	[−0.92, 1.02]	0.51
MAJORITY SIZE	−0.04	0.45	[−0.96, 0.81]	0.52
DAYS UNTIL ELECTION <i>Square root</i>	0.80	0.41	[0.02, 1.62]	0.98
EXISTING RULES <i>De-trended</i>	0.50	0.40	[−0.27, 1.28]	0.90
PARTY SWITCH	−0.41	0.65	[−1.76, 0.78]	0.73
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.64	0.37	[−1.38, 0.06]	0.96
Constant	−1.82	0.27	[−2.38, −1.32]	1.00
N			231	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

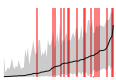
Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.62.

Table D26: Institutional Reform in the UK House of Commons (Low Party Strength, 1811–1880), Uniform Priors

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	1.80	1.90	[−1.66, 5.77]	0.83
POLARISATION	1.24	1.01	[−0.66, 3.32]	0.89
OBSTRUCTION	1.83	1.04	[−0.11, 3.97]	0.97
Controls				
WORKLOAD <i>Logged</i>	1.74	1.23	[−0.53, 4.29]	0.93
MAJORITY SIZE	−1.23	0.95	[−3.25, 0.46]	0.91
DAYS UNTIL ELECTION <i>Square root</i>	−0.36	0.78	[−1.90, 1.18]	0.68
EXISTING RULES <i>De-trended</i>	−0.45	0.75	[−1.96, 0.98]	0.72
PARTY SWITCH	−1.16	1.13	[−3.54, 0.91]	0.85
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−1.55	0.89	[−3.45, 0.06]	0.97
Constant	−2.02	0.47	[−3.02, −1.20]	1.00
N			83	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

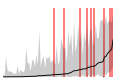
Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.78.

Table D27: Institutional Reform in the UK House of Commons (Medium Party Strength, 1880–1945), Uniform Priors

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	0.34	3.16	[−5.98, 6.55]	0.55
POLARISATION	2.82	1.66	[−0.08, 6.39]	0.97
OBSTRUCTION	−3.06	1.59	[−6.59, −0.34]	0.99
Controls				
WORKLOAD <i>Logged</i>	−1.86	1.46	[−4.97, 0.81]	0.91
MAJORITY SIZE	0.81	1.15	[−1.51, 3.05]	0.77
DAYS UNTIL ELECTION <i>Square root</i>	2.80	1.34	[0.40, 5.65]	0.99
EXISTING RULES <i>De-trended</i>	2.30	1.14	[0.21, 4.70]	0.99
PARTY SWITCH	−0.38	1.65	[−4.02, 2.49]	0.56
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	0.86	1.09	[−1.19, 3.11]	0.78
Constant	−3.67	0.84	[−5.55, −2.26]	1.00
N			77	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

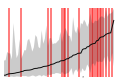
Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.78.

Table D28: Institutional Reform in the UK House of Commons (High Party Strength, 1945–2015), Uniform Priors

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	2.68	1.44	[0.04, 5.69]	0.98
POLARISATION	0.13	0.83	[−1.50, 1.77]	0.56
OBSTRUCTION	0.09	0.88	[−1.64, 1.81]	0.54
Controls				
WORKLOAD <i>Logged</i>	0.14	0.83	[−1.37, 1.89]	0.55
MAJORITY SIZE	0.27	0.67	[−1.04, 1.60]	0.66
DAYS UNTIL ELECTION <i>Square root</i>	1.68	0.87	[0.04, 3.45]	0.98
EXISTING RULES <i>De-trended</i>	−0.06	0.83	[−1.70, 1.55]	0.53
PARTY SWITCH	−0.27	1.63	[−3.83, 2.64]	0.54
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.67	0.68	[−2.02, 0.64]	0.84
Constant	−1.00	0.37	[−1.77, −0.31]	1.00
N			71	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

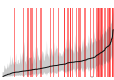
Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.71.

Table D29: Institutional Reform in the UK House of Commons (1811–2015), Outliers Removed

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	1.67	1.07	[−0.37, 3.84]	0.94
POLARISATION	1.45	0.58	[0.36, 2.62]	1.00
OBSTRUCTION	−0.45	0.57	[−1.62, 0.62]	0.78
Controls				
WORKLOAD <i>Logged</i>	0.32	0.52	[−0.66, 1.37]	0.73
MAJORITY SIZE	−0.31	0.44	[−1.19, 0.55]	0.76
DAYS UNTIL ELECTION <i>Square root</i>	0.85	0.41	[0.06, 1.67]	0.98
EXISTING RULES <i>De-trended</i>	0.42	0.39	[−0.33, 1.19]	0.86
PARTY SWITCH	−0.32	0.65	[−1.67, 0.88]	0.68
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.70	0.37	[−1.45, 0.02]	0.97
Constant	−1.82	0.27	[−2.37, −1.33]	1.00
N			231	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

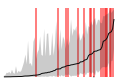
Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.66.

Table D30: Institutional reform in the UK House of Commons (Low Party Strength, 1811–1880), Outliers Removed

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	−1.00	2.18	[−5.37, 3.21]	0.67
POLARISATION	0.79	1.07	[−1.23, 2.97]	0.77
OBSTRUCTION	3.19	1.14	[1.14, 5.62]	1.00
Controls				
WORKLOAD <i>Logged</i>	4.07	1.37	[1.64, 7.00]	1.00
MAJORITY SIZE	−1.39	1.00	[−3.54, 0.41]	0.93
DAYS UNTIL ELECTION <i>Square root</i>	0.49	0.87	[−1.15, 2.25]	0.71
EXISTING RULES <i>De-trended</i>	0.21	0.75	[−1.27, 1.69]	0.61
PARTY SWITCH	−0.76	1.16	[−3.18, 1.40]	0.74
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−1.26	0.86	[−3.08, 0.34]	0.94
Constant	−2.41	0.58	[−3.68, −1.39]	1.00
N			71	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

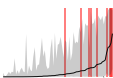
Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.86.

Table D31: Institutional reform in the UK House of Commons (Medium Party Strength, 1880–1945), Outliers Removed

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	2.57	3.67	[−4.10, 10.34]	0.75
POLARISATION	4.59	2.55	[0.60, 10.51]	0.99
OBSTRUCTION	0.16	1.55	[−2.94, 3.22]	0.54
Controls				
WORKLOAD <i>Logged</i>	0.12	1.61	[−3.15, 3.22]	0.54
MAJORITY SIZE	−3.30	2.40	[−8.71, 0.67]	0.94
DAYS UNTIL ELECTION <i>Square root</i>	3.80	1.74	[0.87, 7.67]	1.00
EXISTING RULES <i>De-trended</i>	−0.21	1.43	[−2.80, 2.95]	0.59
PARTY SWITCH	−0.68	1.82	[−4.65, 2.54]	0.63
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.39	1.24	[−2.75, 2.15]	0.64
Constant	−4.28	1.20	[−7.08, −2.42]	1.00
N			77	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

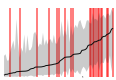
Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.89.

Table D32: Institutional reform in the UK House of Commons (High Party Strength, 1945–2015), Outliers Removed

DV: Anti-dilatory reform	Estimate	SD	95%CI	Pr($\beta \neq 0$)
POLARISATION*OBSTRUCTION	2.03	1.42	[−0.60, 4.96]	0.93
POLARISATION	0.42	0.84	[−1.22, 2.09]	0.69
OBSTRUCTION	0.36	0.86	[−1.31, 2.07]	0.66
Controls				
WORKLOAD <i>Logged</i>	0.08	0.85	[−1.50, 1.86]	0.52
MAJORITY SIZE	0.24	0.70	[−1.13, 1.62]	0.64
DAYS UNTIL ELECTION <i>Square root</i>	1.47	0.85	[−0.15, 3.20]	0.96
EXISTING RULES <i>De-trended</i>	−0.07	0.76	[−1.57, 1.42]	0.53
PARTY SWITCH	−0.14	1.60	[−3.63, 2.71]	0.51
DAYS SINCE LAST REFORM <i>Zero-inflated log</i>	−0.85	0.72	[−2.29, 0.56]	0.88
Constant	−1.10	0.37	[−1.87, −0.40]	1.00
N			71	
Model fit				

Binary outcome variable: Is the number of anti-dilatory rules increased in the session (x=1), or not (x=0)?

Cell entries: Posterior means of Bayesian logit regression with normal priors, with posterior standard deviations in parentheses.

Estimation: Bayesian estimation with four MCMC chains at 500,000 iterations each; 400,000 discarded as burn-in period (without thinning).

Convergence: Gelman-Rubin and Geweke tests for convergence passed (results not reported).

Model fit: AUROC = 0.75.

Index

- UK Alliance, 255
- Advertisement duty, reduction (1833), 259
- British Broadcasting Company (BBC), 259
- Computational text analysis
 - Pre-processing
 - TF-IDF, 186, 188, 192, 193, 195
 - FilterFSA, 189
 - SimpleNP, 189
 - noun-phrase extraction, 189
 - Scaling
 - Wordfish, xviii, 48, 101, 103–105, 112, 115–124, 126–128, 295, 296, 335, 337–339
 - Wordscores, 100
 - Wordshoal, 48, 150, 338
 - Topic models
 - LDA, 188
- Corn Laws, 138, 236, 254
- Corrupt and Illegal Practices (Prevention)
 - Act (1883), 210, 235
- Governments
 - Blair’s Second Ministry (2001–2005), 144
 - Conservative-Liberal Democrat coalition (2010–2015), 137
 - Derby’s First Ministry (1852), 254
 - Derby’s Second Ministry (1858), 254
 - Derby’s Third Ministry (1866), 254
 - Disraeli’s First Ministry (1868), 254
 - MacDonald’s First Ministry (1924), 137
 - Sir Robert Peel’s Second Ministry (1840–1846), 254
 - Thatcher years (1979–1990), 138, 162
 - Thatcher’s Second Ministry (1983–1987), 144
- Home Rule (Ireland), 254, 273
 - Maynooth Grant (1845), 254
- Identification strategies
 - Differences-in-Differences (DiD), 207–210, 225
- Labour Representation Committee (LRC), 255
- Legislation
 - 1857 Divorce Bill (Matrimonial Causes Act 1857), 61

- Compulsory Emergency First Aid Education (State-Funded Secondary Schools) Bill 2015, 62
- Criminal Law (Amendment) (Protection of Property) Bill 2005, 62
- Fluoridation Bill (1985), 62
- Tenancies (Reform) Bill, 62
- Legislatures
 - US Congress, 30, 38, 42–45, 60, 128, 252
 - House of Representatives, 101, 269, 290, 294
 - Senate, 60, 229, 294
 - Assemblée Nationale, France, 294
 - Bundestag, Germany, 39
- National Education League, 255
- National Liberal Foundation (NLF), 255
- National Union of Conservative Associations, 255
- Natural language processing (NLP)
 - Software
 - `phrasemachine`, 189–192, 195, 197, 198
 - `preText`, 362, 363
- New Labour, 149
- Paper duty, abolishment (1836), 259
- Parliamentary procedures
 - Closure rule (1882), 28
 - Filibuster, 60
 - Reform
 - “Order days” (1811), 27
 - Balfour railway timetable Reforms (1902), 28, 164, 180
 - Gladstone’s Closure Rule (1882), 28, 180, 289
 - Reform of the Closure Rule (1887), 28, 180, 289, 298
- Politicians
 - Conservative
 - Chope, Christopher, 62
 - Claud, Lord Hamilton, 224
 - Davies, Philip (Shipley), 62
 - Lawrence, Sir Ivan, 62
 - Lawson, Nigel, 144
 - Stanley, Lord, 241
 - Labour
 - Corbyn, Jeremy, 144
 - Dismore, Andrew (Hendon), 62
 - Kinnock, Neil, 149
 - MacDonald, Ramsay, 255
 - Liberal
 - Gladstone, Herbert (Chief Whip), 255
 - Radicals
 - Bright, John, 236
 - Cobden, Richard, 236
 - Hume, Joseph, 240
- Prime Ministers
 - Asquith, Herbert Henry, 137
 - Earl Grey, 217
 - George, David Lloyd, 138
 - Gladstone, William Ewart, 28, 61, 203, 236, 254, 256, 298
 - MacDonald, Ramsay, 255
 - Peel, Sir Robert, 61, 138, 254
 - Stanley, Lord, 241
 - Thatcher, Margaret, 138, 144
- Programming
 - `Python`, 163, 188, 189
 - `Python` libraries
 - `scikit learn`, 340

- `difflib`, 163
- Reform Acts
 - Fourth Reform Act (1918), 256
 - Great/First Reform Act (1832), 35, 61, 185, 203, 204, 207, 209, 211–213, 216, 217, 222–224, 229, 242, 287
 - Second Reform Act (1867), 209, 213, 215, 217, 223, 224
 - Third Reform Act (1884), 209, 213, 215, 217, 223, 255
- Reform League, 255
- Secret Ballot Act (1872), 210, 236
- Speaker of the House
 - Shaw-Lefevre, Charles, 240
- Stamp duty, abolishment (1836), 259
- Statistics
 - Bayesian
 - Bayesian separation plot, 263
 - Gelman-Rubin diagnostic, 227, 263, 365, 385
 - Geweke Z-score diagnostic, 227, 263, 365, 385
 - Gibbs sampling, 226, 262
 - Markov Chain Monte Carlo (MCMC) simulation, 226, 262, 365, 372
 - Durbin-Watson test (DWT), 220
 - Newey-West robust SEs, 220
 - Simulation-Extrapolation (SIMEX), 220
- Theories of procedural design
 - Conditional party government (CPG), 39, 88, 91, 94, 268
 - Procedural cartel theory (PCT), 39, 43, 88, 91
- Trades Union Congress (TUC), 255
- Walpole, Sir Spencer, 216