Understanding the Policy Process Over Time: Linking Debates to Decisions Through Digital Sources

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1 Abstract

What is the relationship between policy debates and government policy decisions? There is much that we still do not understand about how discussion ultimately leads to policy change (or does not). In order to understand how policy decisions unfold we need a much stronger grasp of what happens over multiple points in time, rather than at a single decision point, and how they are driven by varying debates and potentially changing groups of supporters. How can large digital sources of pertinent data be used to understand the link between debates and policy decisions over time?

Emerging developments from computer science, particularly natural language processing, topic analysis and sentiment analysis, allow us to build large, inter-temporal data sets using numerous sources of information on policy debates, which can be analysed in relation to particular decision points. We can use these to track debates on a policy area over multiple decision (and non-decision) points, so that changes in how the problem is being framed, who is supporting particular solutions and what they are supporting, and the ultimate decisions taken (or suspended until later) can all be observed.

This paper will develop and empirically test part of a new framework for analysing the relationship between policy framing and debates and policy decisions over time, using digital sources. This approach has several major advances over previous work on the policy process. First, because we are able to harness data with computational approaches, the volume of data that can be analysed is increased enormously. Second, related to the use of data searching, extraction and collation by computer algorithms, we can also take an inter-temporal approach, tracking issues over time. Third, in addition to tracking what is reported in various publicly available datasets over time, we can map the changes we observe onto numerous critical policy decisions. Fourth, we can analyse how different policy decisions unfold in regard to the length of time taken to reach decisions and the sources and level of support required.

We will empirically test some of this framework with a case study of austerity (public expenditure restraint) in Australia, ending with the 2014 federal budget which was largely not enacted. Although the most recent global financial crisis has brought austerity to the fore, it has been sporadically discussed in many nations following the end of the steady public expenditure expansion that followed World War II and the oil crisis of the mid-1970s. Successive Australian governments have tried to curb spending, with varying levels of success. In this paper, we use Prime Ministers speeches as the single source. We extracted and analysed references to austerity (and a range of related terms) using natural language processing, topic analysis and sentiment analysis. We also searched for the supporters and opponents of particular framing of the issue and proposals for change. This is the first step in a larger study that would examine a broader range of sources and examine the entire framework.

2 Background

How are political debates linked to government policy decisions (if at all)? John Kingdon's (1995) seminal work on the policy process argued that problems, solutions, and politics are largely un-coupled from each other, only coming together at critical moments when a policy choice is made. His explanation of how some issues survive the "policy primeval soup", ultimately becoming policy decisions (legislation, budget allocations, policy statements and so on), has been widely applied. But there is still a major gap in our understanding of the mechanics of political debates and the link from debates to decisions. Further, significant recent changes in politics and society are likely to be substantially affecting debates and decisions. The explosion of digital sources of information and developments in computational approaches for harvesting data on these relationships provides major new opportunities for researching this topic.

Since the early days of the policy sciences, there have been a variety of approaches to understanding the policy-making process. Some models cast policy decisions and the actions taken by politicians and public administrators as the outcomes of a rational search for value-maximising alternatives (see: Allison 1971). This model has been extensively criticised, since the reality is that policy-making is much more about political bargaining and human emotions. Beyond the bounded rationality and sequencing of stages found in Herbert Simon's seminal contributions on behaviour and rational choice (Simon 1947), and discussions of policy stages or the policy cycle (Howlett and Ramesh 2003), there is a variety of alternative explanatory frameworks. Of particular interest here are garbage can models (Cohen et al 1972; Kingdon 1995); punctuated equilibrium (Baumgartner and Jones 1993); the advocacy coalition framework (Sabatier and Jenkins-Smith 1988) and other sub-system (network) models (e.g. Marsh and Rhodes 1992); and discursive approaches (Fischer and Forester 1993). In addition, examining policy-making over time shows that decisions can veer from several years of stability to sharp periods of rapid change, corresponding to elections, economic and social changes, and major reframing of policy issues (True et al 2007). This temporal aspect is crucial: We cannot hope to understand the puzzle of this relationship by examining an instance at a single point in time.

The theoretical framework for this proposal builds on the previous work of a number of policy scholars. Garbage can models of the policy process (Cohen et al 1972; Kingdon 1995) are our launching point. These models are appealing, because problems and solutions (policies) enjoy separate discursive lives (streams), only combining at certain crucial times. Actual policy-making involves the coupling of problems with solutions, which occurs when a "window of opportunity" opens due to exogenous or political circumstances, and policy entrepreneurs exploit these opportunities by making problem-solution couplings. Kingdon's third stream of politics is the contextual background to this activity. His framework has been applied widely by scholars, and provides one of the most convincing and enduring descriptions of the politics of the policy process.

Rein and Schn's (1996) "frame-critical" analysis provides a useful addition, by focusing on contests between alternative ways of framing a policy issue. Analysis proceeds through identifying the public issue terrain (naming), the competing frames present in the discourse (framing), and the forums in which the discourse happens. Forums consist of actors able to participate in debates about any particular issue. Debates can have multiple framings of problems and multiple framings of solutions. Hence, what is salient to different policy actors may be just a particular problem or a particular solution. In turn, a decision made at a point in time represents a coupling of one particular problem with one particular solution (a problem-solution set) that effectively wins out over alternatives. Further, there are parallel discourses occurring within forums and between them (Weingart et al 2000).

Related to the notion of the forum, Sabatier and Jenkins-Smith's (1988) advocacy coalition framework is helpful in further explicating the debate space. Policy decisions involve actors. Some issues involve highly politicized disputes between many actors, while others are treated as technical and processed routinely (largely by experts), out of the public spotlight. The policy sub-systems that different issues are located within have an important impact on how open/closed these forums are for a range of actors and their issues. These networks/communities vary between policy sectors (Marsh and Rhodes 1992), and their structures are crucial in shaping which actors have access, to what forums, the language used to define an issue, and the problems and solutions that are discussed.

Some recent studies provide further useful directions in using digital approaches: Soroka (2002) has researched the degree to which public policy agenda-setting follows or leads public opinion by combining mass media analysis with public opinion research and studies of the policymaking process. His study examines the agenda setting process of policy, and this work

is both longitudinal and deliberately focused on disparate issues to examine varying dynamics. He examined three political issues in Canada's "inflation, the environment and debt/deficit" using multiple digital data sources over a 10-year period (1985-1995).

Along with Baumgartner and Jones (1993), Soroka's is one of the few studies that extends the use of digital approaches out of media analysis into policy research. Nowlin (2015) used big data to examine issue definitions using topic modelling of witness testimony taken from US Congressional hearings on the issue of used nuclear fuel. He estimated distinct dimensions of the debate and checked these against two major policy changes. Fawcett et al (2017) have been using big data to study the problem stream of Kingdon's model in detail in relation to coal seam gas extraction. Each of these are steps towards our approach, but our conceptual model is unique in addressing the internal mechanics of the debate and the link from this to decisions.

Drawing on previous theory and recent developments, we conceive of policy debates as consisting of three interrelated components: 1) the actors involved; 2) their framing of problems and solutions; and 3) the forums in which discussion occurs. Understanding the debate on a specific issue requires mapping and analysing each of these components of the debate, and their interactions. The link from this debate to a policy decision also requires detailed examination. We define policy decisions as points in time where the multitude of available problem and solution possibilities and combinations are reduced to single decisions, and announced in some form.

The final component of our framework (below) is that policy-making always occurs within particular institutional contexts and sets of contemporary challenges. The Australian institutional system (a bicameral parliamentary system, two major political parties with strong internal discipline, compulsory voting) shapes Australia's policy debates and decisions. This background of public opinion, issue salience, parliamentary elections and changes in government, crisis events, policy feedback, and general economic and social trends is what Kingdon (1995) refers to as the political stream. This is common to all the cases within the same national systems in some aspects and different in others, and changing over time.

The framework for this project can be visualised for each issue as debates linked (temporally) to policy decisions, set against a common context and a set of changing trends and triggers. This can be depicted as in Figure 1. These occur at multiple points in time for each issue, and each decision point has an influence on the next debate and subsequent decision: Debate1 → Policy Decision 1. . . Debate 2 → Policy Decision 2 . . . Debate 3 → Policy Decision 3 . . . In this paper we concentrate only the debate aspect of the framework, using a single source of data.

3   Methods

In this pilot work we are investigating the features of public discourse leading up to the Australian federal budget 2014 in an effort to explain why that budget was unsuccessful as a piece of legislation. This budget was described generally in the media as "a tough budget which features welfare cuts, tax increases and cuts to health and education."[1] While it had all the hallmarks of "austerity", most of its recommendations were not enacted in legislation.
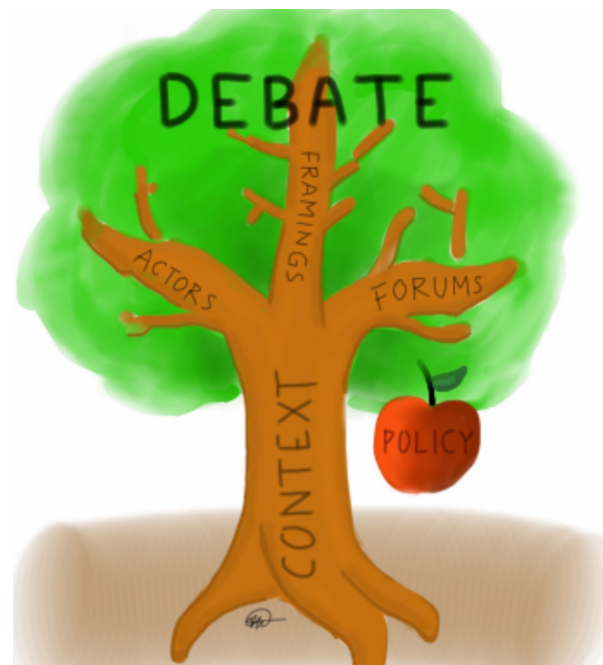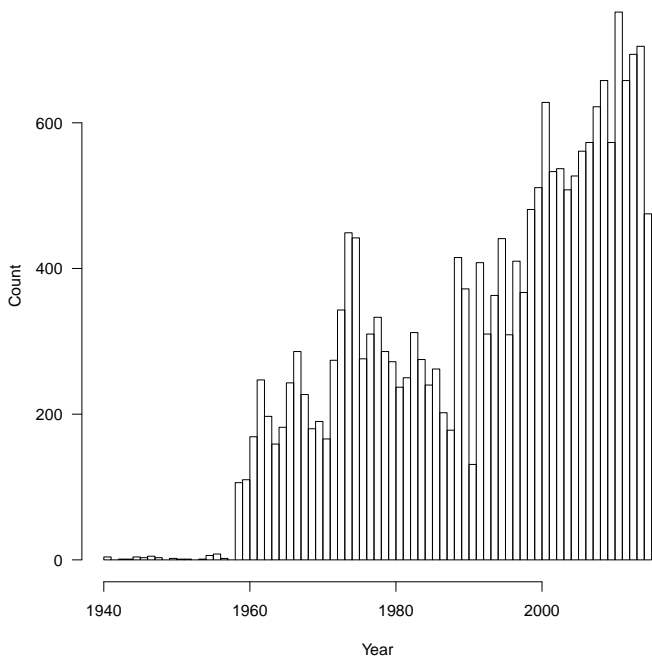

Figure 1: A schematic representation of our proposed framework for examining factors affecting political decisions.

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[1] http://www.abc.net.au/news/story-streams/federal-budget-2014/ accessed June 2017

Category	Count
Media Release	8123
Interview	5316
Speech	4921
Press Conference	745
Transcript	622
Statement in Parliament	342
Video Transcript	233
Correspondence	131
Broadcast	111
Message	57

Figure 2: Distribution of documents by year and the Top 10 categories in the PMTranscripts database.

Descriptor-1	Modifier	Thing	Descriptor-2
prudent	government	economic	prudence
reduce	public	economy	reduction
excessive		budget	constraint
		budgetary	contraction
		fiscal	stabilisation
		spend/ing	retrenchment
		expenditure	austerity
		outlay/s	

Table 1: Target phrases indicating a discussion of austerity in a transcript. Phrases were constructed as either "`Thing Descriptor-2`", or "`Descriptor-1 [Modifier] Thing`" where `Modifier` was optional.

We are interested in looking at the *actors*, *forums*, *context* and *framing* of the issue of "austerity" leading up to the 2014 Federal budget. In this paper we report on pilot work using a database of 20967 transcripts of speeches and interviews of Australian Prime Ministers obtained from the Australian Government web site `https://pmtranscripts.pmc.gov.au/`. Of these transcripts, 14404 are in the years 1985 to 2015 inclusive, with Figure 2 showing details of the collection. As such, the actors are restricted to Prime Ministers. We discuss each of forums, context and framing in the following subsections.

In order to extract transcripts which reference "austerity", we looked for phrases constructed as in Table 1. For example, "prudent outlay", "reduced public spending", and "expenditure stabilisation" would all be valid phrases. Note that for the search, all words were stripped of their suffixes (a process know as stemming) so that words such as "spend", "spends", and "spending" would all be treated as "spend".

Using this process, we identified 354 transcripts that contained these phrases, 233 of which were in the period 1985 to 2015.

3.1 Framing

We use three ways of attempting to measure how an issue is framed:

1. temporal; certain time periods may be more popular for discussion of issues;

2. sentiment analysis of the sentence containing the key phrase; and

3. topic decomposition of the transcript containing the key phrase.

For sentiment analysis we use the default operation of CoreNLP (Manningi et al, 2014) which reports a sentence as either Very Positive, Positive, Neutral, Negative, or Very Negative. This approach attempts to take into account both sentence structure, and the positive/negative categorisations of words in the sentence (Socher et al. 2013).

For topic modelling we use the Mallet toolkit (McCallum 2002). We use the Latent Dirichlet Allocation approach, which attempts to describe a collection of documents as being probabilistically generated from a set of topics. A "topic" in this case is simply a collection of words; the Appendix shows the 20 topics discovered by Mallet in our collection. Some are obviously interpretable in the sense of what a human would think of as a "topic", while others are a little more mysterious. The process simply looks at word counts and co-occurrences, and is not guided by any semantic notion of what a human might consider a topic. Each transcript in the collection could be thought of as being randomly generated by sampling words from different topics (and then assembling those words into grammatically correct prose). For example, a speech on climate change and its relations to the distribution of water for irrigation amongst the states might be labelled as having 20% of Topic 16, 10% of Topic 8 and several other topics.

3.2 Forums

Our hypothesis is that the forums in which actors choose to discuss an issue has a bearing on whether the issue eventually becomes part of a successful decision (for example, enacted in legislation). In this pilot, we examine two different types of forums:

1. transcript type; perhaps discussion of austerity in scripted and unscripted (Interviews) forums influences decisions;

2. audience; the target audience of discussions may be an important factor in effecting decisions.

Determining the target audience of a transcript is more difficult. Here we relied on the manually coded category of each transcript (as depicted in the table of Figure 2).

3.3 Context

It would seem likely the success or otherwise of an agenda leading to a decision is also sensitive to context. In this pilot we examine the context of elections, supposing that the timing of elections may influence decisions.

4 Results

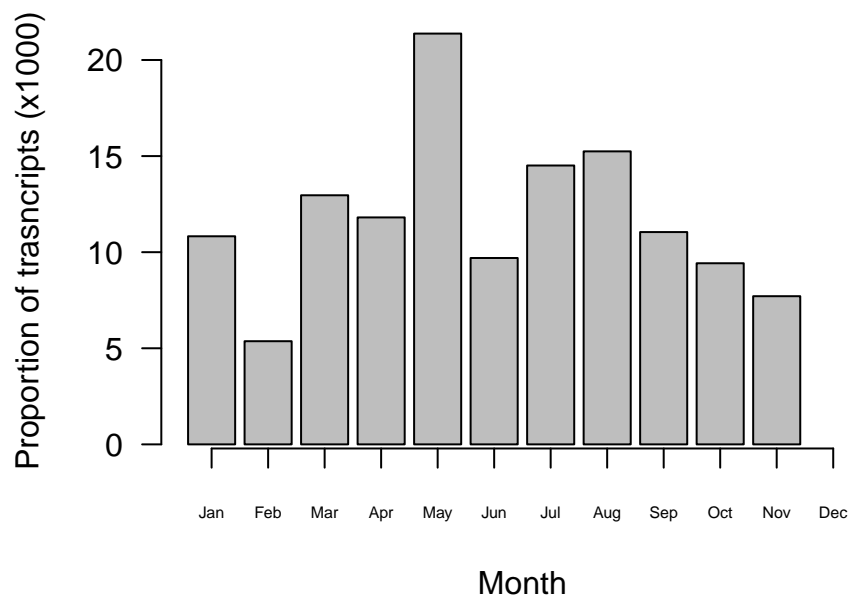## 4.1 Frequency counts

From Figure 3 we can see that

Figure 3: The proportion of transcripts that contain austerity phrases aggregated by month (1985-2015). May is budget month in the Australian Federal Parliament.
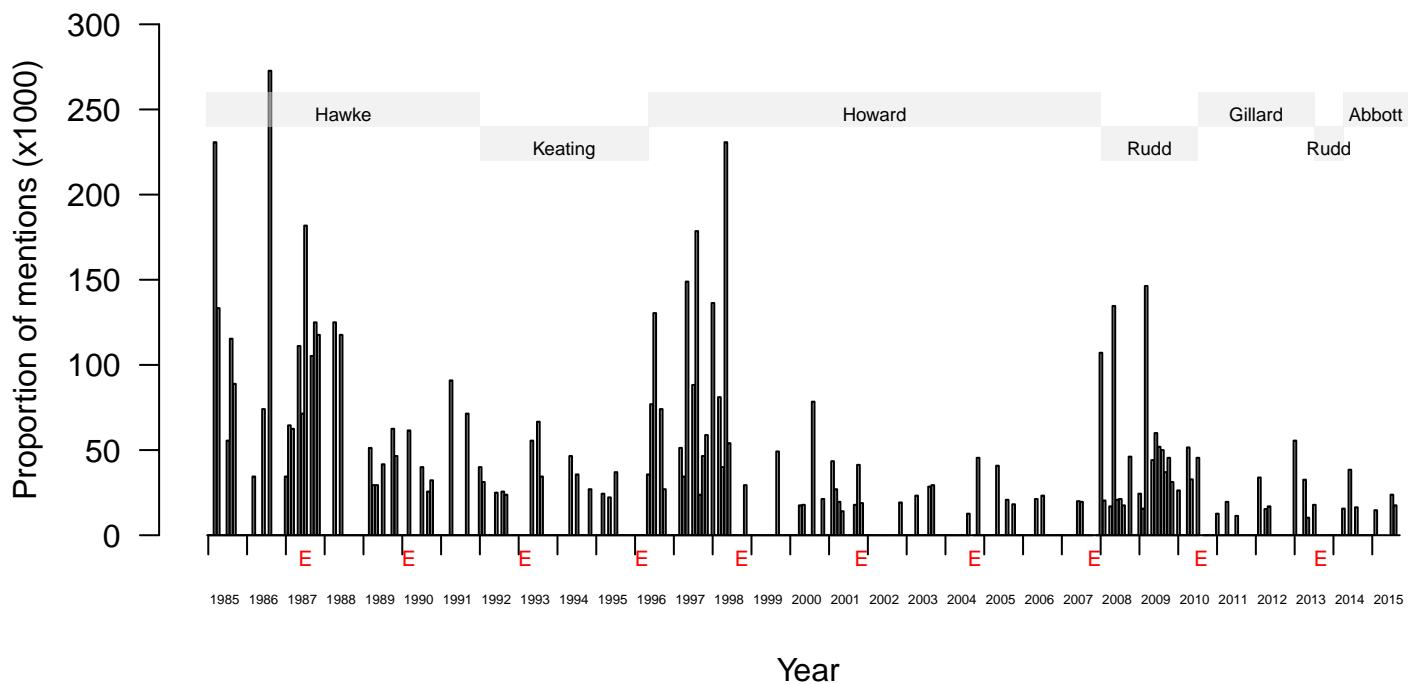

Figure 4: The proportion of transcripts containing austerity phrases aggregated by each month of the years 1985-2015. "E" on the x-axis indicates an election, and names in grey boxes are the Prime Minister of the time.
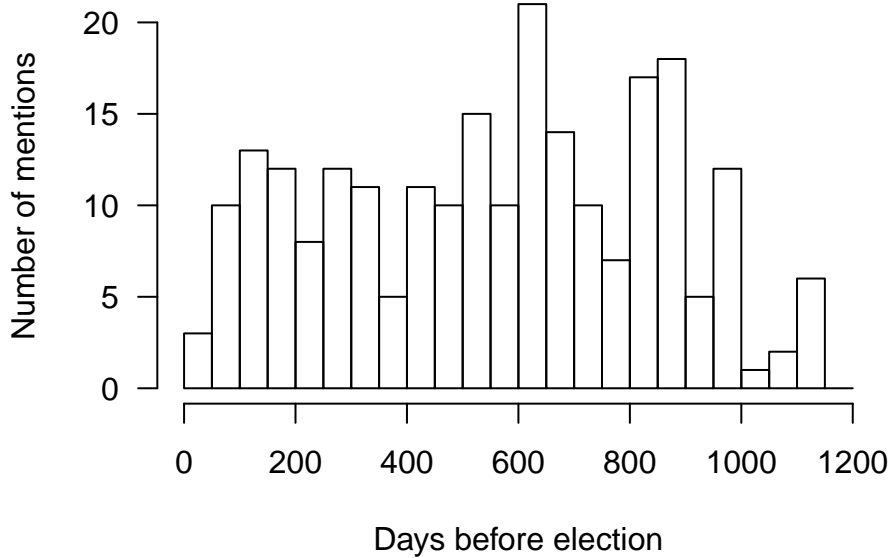
Figure 5: The number of days from the mention of an austerity phrases to the closest election.

1. austerity is not discussed by Prime Ministers in December;

2. austerity is discussed more in May (the month of the federal budget);

and from Figure 4 we can see

1. there was an increased discussion of austerity in 1997/98, and 2008/9; and

2. there is no obvious pattern of mentions of austerity around elections. This is confirmed in Figure 5, which shows a histogram of the number of days between each mention of austerity and the election following.

4.2 Topics

The stand-out in Figure 6 is the heavy use of Topic 5 by Kevin Rudd around 2009. He also used Topic 20 more than his predecessor. This hints at a party bias: Topic 20 seems to be a left-issue, both Howard and Abbot (conservatives) avoided it, but Howard and Abbot liked Topic 18. Figure 7, therefore, plots the difference in mean proportion of topic attributed to documents containing austerity phrases. Indeed, we can see that Topics 3 5 and 20 are predominately used by Labor to frame their austerity discussions, while the Liberals (conservatives) preferred Topics 6 and 18 over Labor.

4.3 Sentiment

Figure 8 shows the frequency of sentiments of sentences containing austerity phrases. As can be seen, almost all the sentences are negative. The two Very Positive sentences are:
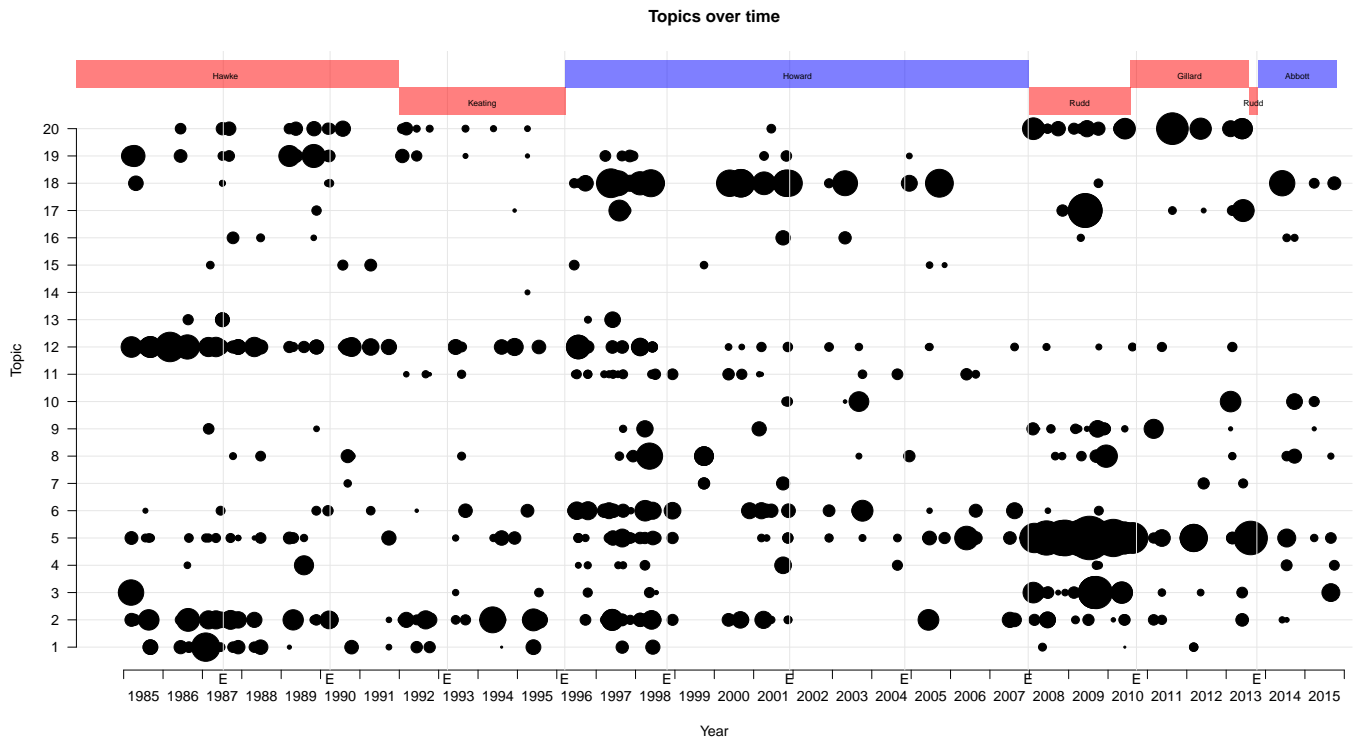
7

Figure 6: The proportion of topics used in transcripts containing austerity phrases over the years 1985-2015. "E" on the x-axis indicates an election, and names in grey boxes are the Prime Minister of the time. Only topics that contributed at least 10% to a document are shown.
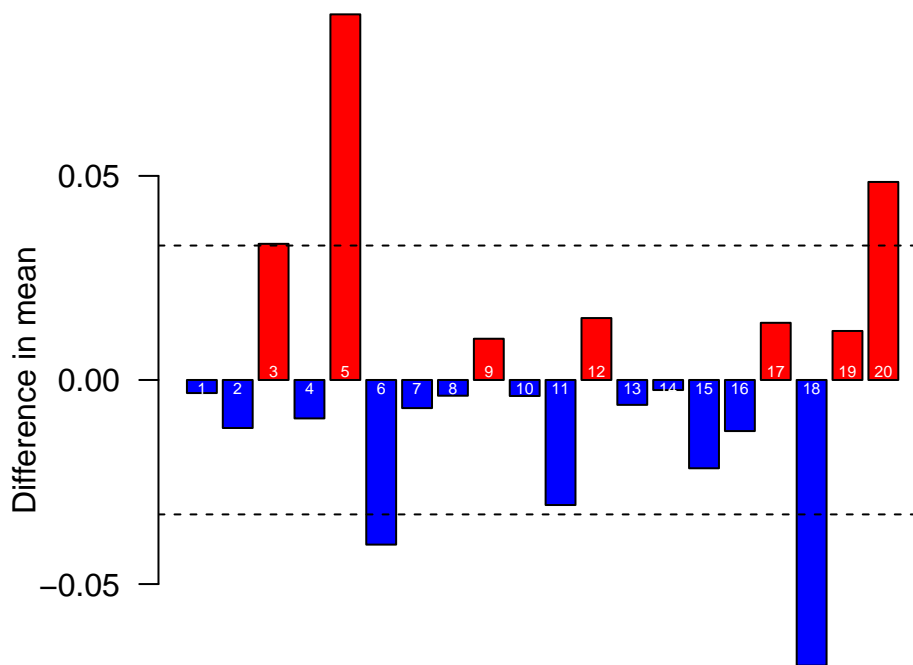

Figure 7: The difference in mean proportion used of each topic between the Labor and Liberal (conservative) parties. Dashed lines show one standard deviation of the means over the 20 topics. Blue indicates Liberal dominance, red Labor.
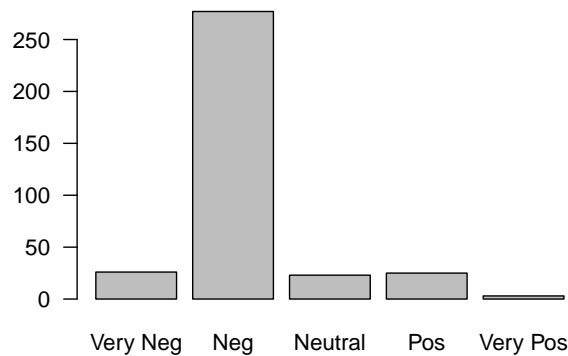
Figure 8: The frequency of each sentiment of each sentence containing an austerity phrase in the collection.

I think of myself rather as an economic realist: realistic about economic prudence and necessity, realistic about economic reform, realistic about the limits of economics, realistic about the proper ends of economic policy. John Howard, 28 January 1998.

We are very confident that we are going to be able to work in concert with the other major economies to stabilise the financial system. President Obama, 24 March 2009 (Joint Press Conference with Kevin Rudd).

5 Conclusions

In attempt to measure how the issue of "austerity" is framed, and in what forums and contexts it is discussed, we have introduced a variety of automated techniques for mining political discourse, testing and refining them on a set of 20,968 transcripts from Australian Prime Ministers speeches, interviews and the like. From this data we can see

1. timing is important: austerity is discussed more heavily in May, the federal budget month in Australia, and never in December (perhaps to not dampen Christmas retail spending);

2. elections, however, seem unimportant, with not obvious pattern of increased or decreased talk of austerity before or after elections;

3. these actors do not seem that important, with both conservative and Labor politicians discussing austerity at various times in their careers;

4. there is a clear difference in the way austerity is framed between the two sides of politics, with conservatives preferring its use to attack the opposition and "play politics" (Topic 6), and Labor using it in the context of economic management (Topics 3 and 5); and

5. finally, the overwhelming use of austerity is in a negative context.

   This paper has used a single digital source of political statements by sitting Prime Ministers in Australia over almost 30 years, to test extraction and analysis techniques for use in understanding the political debate. As a single source, it paints only a small part of the total picture of the debate, which in a more comprehensive examination would include sources like Hansard (political theatre), social media (public discussion), and mass media (journalism). This only

constitutes one part of the overall framework that we ultimately hope to test, which would require the addition of public opinion and sentiment analysis data available from surveys (to understand the context) and information on policy decisions that were enacted in reqard to a specific topic. Further work is needed to determine what useful analyses can be done on these data and other large digital datasets, using natural languaage processing. Our hope is that, by examining the same issue at multiple points over time, as well as a range of different issues, we would be able to identify patterns in the debate that are linked to policy decisions being made (or not), and also to uncover whether certain debate patterns are linked to specific types of policy decisions.

Acknowledgements

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Appendix - List of Topics

Topic	Words comprising the topic
1	industry australia australian trade industries market export investment world companies exports overseas prices development manufacturing production years markets year
2	tax budget year cent rates income government rate inflation people interest years increase pay system billion unemployment economy wage
3	health education school government schools care services people system women children funding training national community young work support year
4	australia australian australians great people nation world country years life community today history year day contribution women war society
5	economy australia economic business government future world australian reform global growth jobs term financial long strong investment nation time
6	party labor government election australian people australia liberal opposition political senate federal parliament years state leader campaign vote country
7	minister prime australian defence australia canberra mr sir visit general house war south service statement air guinea press force
8	australia countries region trade china prime relationship asia pacific minister economic japan president meeting zealand world leaders visit important
9	government state south local queensland million premier federal commonwealth project assistance water wales tasmania victoria western today areas road
10	people australian minister security australia government prime police terrorism afghanistan australians defence today force work country question indonesia iraq
11	people great country time things good years world thing don long man australia kind fact find ago make thought
12	government economic community policy social policies problems national important approach years greater australia areas area role make society governments
13	tel thc ii al er st tho te de nt ion ar ha ti en ing pr es le
14	mr minister public prime department government service senator council cabinet committee general affairs dr australian secretary hon office commission
15	commonwealth government states state commission legislation act agreement made report bill court law arrangements aboriginal general committee parliament premiers
16	united states world nations australia countries president international south war nuclear security peace east iraq military american support soviet
17	energy australia national government research climate change development environment technology australian science support future emissions environmental including work carbon
18	prime minister ve don people good ll lot mitchell things morning time howard thing relation issue make country back
19	journalist mr question made don matter position point make view decision fact put government issue policy situation clear discussion
20	pm ve people ll work make time minister good today journalist things host thing back don inaudible future big