Political Science and Political Economy Working Paper

Department of Government

London School of Economics

No. 8/2012

Deliberation on Monetary Policy in Times of Crisis in the UK and US – or, How the British and Americans Came to Different Understandings of the Financial Crisis

Cheryl Schonhardt-Bailey (LSE)

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Deliberation on Monetary Policy in Times of Crisis in the UK and US—or, How the British and Americans Came to Different Understandings of the Financial Crisis

Cheryl Schonhardt-Bailey

London School of Economics and Political Science

http://personal.lse.ac.uk/schonhar/

c.m.schonhardt-bailey@lse.ac.uk

Prepared for delivery at the 2012 Annual Meeting of the
American Political Science Association, August 30-September 2, 2012.

I. Introduction

As political theatre, clashes between politicians and central bankers in legislative oversight hearings on monetary policy are not quite on par with Prime Minister's Question Time, but nonetheless are generally considered worthy of headline news coverage. With the onset of the financial crisis of 2007-09 (and continuing to date, with the LIBOR scandal), these hearings have at times taken centre stage as politicians, the media, policymakers and the public all seek better to understand what went wrong with the banking system and why—and what this means for monetary policy. Officials of *independent* central banks—who are themselves not elected but appointed—are held accountable for their decisions in respect of their objectives towards monetary policy and financial stability to elected representatives in legislative bodies. Oversight hearings are the formal venue for this accountability: politicians are expected to demand explanations and reasons for the decisions of central banks, and central bank officials are expected to provide these. Importantly, both sets of actors are fully aware that the publicised hearings are further scrutinized by audiences outside the committee meeting rooms. And, ostensibly, reasoned argument is central to the purpose and focus of the hearings—that is, they are intended as a deliberative forum.

Although deliberation is at the heart of decision making within public policy, its contribution remains inherently hard to measure and assess within a systematic framework. For some observers, deliberation is no more than ritualistic hot air, while for others it appears to serve a real purpose in influencing the behaviour and decisions of policymakers and political actors. The difficulty in reaching clear answers lies in finding where and how deliberation matters (or not)—and for this, we require the means to measure and evaluate deliberation empirically.

This paper contributes to the growing empirical work on deliberation by focusing on monetary policy oversight in two country cases—the US and the UK—during the period of the recent financial crisis. Both cases are similar in many respects, particularly in experiencing many of the same conditions of, and effects from the financial crisis. Yet the two country cases also embody fundamental differences in their approaches to legislative oversight of monetary policy—in part, the product of their presidential and parliamentary systems. While these similarities and differences will be explored below, the question at the heart of this paper is, to what extent did members of the US Congress and the British Parliament acquire different understandings of the financial crisis at least in part because of differences in the deliberations of their respective legislative oversight committees?

While "deliberation" is a term that requires careful definition,[1] I employ it more informally here to refer primarily to *reasoned argument*, and the *process* of deliberation to refer to *how views are reached and decisions taken*. There is, of course, a vast literature which seeks to explain the *end product* of monetary policy—that is, the policy outcome itself. The task here is to take one step back from the policy outcome to explore the *means* by which policymakers and politicians think about monetary policy in order to arrive at judgments on the possible policy alternatives—hence, the focus is on analysing the *process* of conceptualizing, arguing, discussing, and *deliberating* on monetary policy by central bankers and politicians.

Inasmuch as the focus of this paper is the committee hearings, the data consist of the verbatim transcripts from these oversight hearings, beginning in later 2006 and extending through early 2009. Textual analysis software is then employed to analyse these data in their entirety.

The next section of the paper provides an overview of the institutional context for each country case, including fundamental similarities and differences in how each set of oversight committees approaches and conducts their hearings on monetary policy. Section III outlines the data and methodology of the paper; Section IV presents the results of the textual analysis of the hearing transcripts; and Section V concludes.

II. Institutional Norms and Practices for Conducting Oversight of Monetary Policy

a. Similarities

Monetary policy is an example of decision making in a committee setting by a group of appointed rather than elected officials. Both the Federal Open Market Committee (FOMC) of the Federal Reserve and the Monetary Policy Committee (MPC) of the Bank of England meet regularly to deliberate on their respective country's monetary policy. The decisions of both committees are then subject to oversight by elected representatives—that is, the appointed policymakers are held to account for their management of monetary policy in their respective countries. Within the House Financial Services Committee and the Senate Banking Committee, American legislators use the hearings on the semi-annual Monetary Policy Report of the Federal Reserve to say many things, but the bottom line is that they offer reasons for their views on the performance of the Fed and its chairman; that is, they deliberate. In the UK, it is the House of Commons Treasury Select Committee that deliberates in hearings on the Bank of England's Quarterly Inflation Report.[2]

Both in the US and the UK, then, representatives of the central bank's policy committee are required to regularly testify before the legislative oversight committee(s) on their monetary policy decisions. The country cases are also similar in that both the US and the UK legislative committee members do not vote on or produce a subsequent report following on from these oversight hearings—hence, from a research perspective, the only tangible and systematic data from these hearings are the transcripts themselves.

Both the Federal Reserve and the Bank of England are also "independent" with respect to monetary policy. To be clear, no central bank has *absolute* independence, in the sense that it is independent of the will of the people and thus elected representatives. The objective of monetary policy at a high level is laid down in statute and can only be changed by amending that legislation. In the US, the relevant statue is the 1978 Balanced Growth and Full

Employment Act, while in the UK it is the 1998 Bank of England Act. As suggested by the title of the US legislation, price stability and high employment are on an equal footing, while in the case of the Bank of England, the priority is price stability and "subject to that", the legislation mandates the Bank to support growth and employment. The Bank is further constrained by an inflation target (currently 2%) which is set by the government, while the Fed has no defined target beyond its dual objective. Importantly, then, the assessment of the respective central bank officials should reflect the slightly different emphases placed on the balance between inflation and employment, as well as defined target for the Bank of England. Nonetheless, both the Fed and the Bank are independent with respect to the instruments chosen to achieve the objective of low inflation, without direct interference from political actors. That is, both central banks may set the level of whatever variable they deem necessary to control inflation (usually a short-term interest rate, but in recent past, quantitative easing).

One final parallel in both cases is the recent financial crisis. We need not detain ourselves here with a discussion of the causes and consequences of the financial crisis (a topic which far exceeds the remit of this paper). However, it is safe to say that both the United States and the United Kingdom have faced a number of similarities with respect to the financial crisis—e.g., severe stress in their banking sectors; closure of funding markets; and a requirement for public authorities to take large and unusual actions with respect to the financial system.

b. Differences

The institutional framework of legislative oversight committees clearly matters because it constrains how committee members interact with one another and with witnesses who appear to testify before the committee. But the purpose of this paper lies in gauging just how institutional rules and norms shape the interpretations of political actors with respect to (a) the causes of the financial crisis, and (b) the role of the central bank in managing monetary policy in the midst of the worst financial crisis since the Great Depression.

In contrast with the extensive literature on US congressional committees, very little empirical research has been done on select committees in the British Parliament. In part this is because the modern select committee system dates back to just 1979. While select committees may be traced to the nineteenth century, the present departmental system was created in 1979 and was designed to be more comprehensive in its scrutiny of government policy and performance. The newer system covers all government departments, agencies and public bodies, and is intended to be non-partisan—that is, enabling MPs an institutional forum through which they "might exercise their parliamentary, rather than party, muscles by engaging in scrutiny activity geared towards better holding government to account"(Kelso 2012: 5). Since its establishment, the select committee system has acquired widespread regard and respect—and even more so with recent high profile inquiries (e.g., into phone-hacking and banking practices) (Russell and Benton 2011).

Members of select committees reflect the proportional partisan balance in the House of Commons, so that a government majority will translate into a majority of members on each of the select committees. Unlike the congressional system (where all committees of a chamber are chaired by a member of the majority party), the committee chairmanships are allocated among the three main parties (Conservative, Labour, Liberal Democrat), in proportion to the partisan balance in the House. (By convention, the Public Accounts Committee is chaired by the opposition party while the Treasury Committee is chaired by the party in government.) However, even this element of potential partisan influence is less noteworthy than one might anticipate, since the cross-party ethos of the system yields the general view among participants that the party affiliation of the committee chair makes "little difference to the functioning of the committees"(Russell and Benton 2011: 41).

A further difference between US congressional committees and British select committees is that the latter does not explicitly consider legislation. Whereas congressional committees scrutinize legislation *and* conduct oversight, select committees perform only the latter activity, leaving the normal committee stage of the legislative process to temporary and non-specialist "public bill committees" (Russell and Benton 2011: 11). This specialist function of select committees lends itself to something of a parallel with US congressional committees—i.e., a degree of formal independence from the executive. While select committee chairs cooperate with government ministers, too close a relationship is considered "inappropriate", as select committees (whose members are all backbench MPs) strive not to become "incorporated" (Russell and Benton 2011: 42). Because, for example, government ministers may be summoned to testify before select committees (although the committees may not compel such attendance), there is a formal frontbench/backbench divide between select committees and the government, in spite of existing within a parliamentary system. Reforms enacted from 2010 onwards (2009) have further solidified this independence of select committees (Russell and Benton 2011; Gordon and Street 2012; Kelso 2012).

Thus far, the discussion has focused on system-wide differences between congressional committees and parliamentary select committees. Turning specifically to contrasts between the US House Financial Services Committee (HFSC) and the Senate Banking Committee (SBC), and the UK Treasury Select Committee (TSC), there are three that deal with the practical operations of the committees and two that are based on differences in norms.

First, in terms of practicalities, most British MPs are highly cognizant of their meagre committee staff resources relative to their American counterparts. To exemplify, in 2008, the HFSC and SBC had, respectively, 75 and 55 paid staffers.[3] Even with the Cook Reforms of 2002, which expanded committee staffing for select committees to between four to six staff members each, the TSC remains woefully under-resourced relative to the two congressional committees.[4]

Second, just as with staff members, actual committee members of the TSC comprise a smaller number than their American counterparts: in the HFSC and SBC, there are, respectively, about 70 and between 21 to 24 members, while the TSC has just around a dozen members.[5] A third practical difference is that in the US hearings, *only* the Fed chairman testifies on the Monetary Policy Report, while in the UK, a rotation of members of the Monetary Policy Committee appear to testify on the Inflation Report (though it always includes the Governor).

Aside from staff and committee numbers, the actual norms that prevail in the congressional committees and the TSC vary considerably. First, there is a long-established practice in the US oversight hearings that both the committee members and the Fed chairman read out (or have entered into the Record) prepared statements. In the UK, members of the Bank's Monetary Policy Committee are strongly discouraged from reading out any statements (as it is assumed that committee members have access to these in advance and have read them) and committee members themselves virtually never read prepared statements. Second, in congressional committees, members arrive and leave at their own discretion, so that it is rare for a member (other than the chair and perhaps ranking member) to stay for the entirety of the hearing. In select committees, members are expected to arrive on time and remain for the duration of the hearing. (Part of the 2010 reform package include penalties for non-attendance by MPs. (2009).)

In the end, then, what might be the ramifications of these differences for deliberation in monetary policy oversight hearings? Key differences and expectations for their effect on committee deliberations may be summarized as follows:

- *Committee independence*: The US formal separation of legislative and executive branches should yield more strident challenge from the congressional committees. However, the more informal separation of frontbench from backbench MPs in the UK system may also yield challenging oversight. Expected findings on the relative challenge from the US and UK committees are unclear.
- *Partisanship*: Partisan influence in the US should exhibit a prominent influence on committee deliberations, whereas the unambiguous non-partisan ethos of the parliamentary select committees should negate this. The actual translation of these influences into issue areas on monetary policy is, however, uncertain.
- *Committee staff resources and numbers of members*: The assumption among many parliamentarians is that congressional committees are gifted with more staff resources and so are presumably better able to conduct research and carry out their oversight activities. And yet, members of Congress face tremendous constraints on their time (campaign finance activities, multiple committee assignments, constituency service) and so (as we found in previous work (Schonhardt-Bailey and Bailey 2013 (forthcoming))) few are willing and/or able to invest the time in acquiring the technical expertise in the area of monetary policy. Consequently, they rely heavily on committee staff in preparing for hearings. (One conspicuous effect of this reliance that requires no analysis other than watching a few hearings is the frequent inability of members of Congress to offer follow-up questions in any given line of inquiry.) Moreover, the large numbers of members in the congressional banking committees relative to the TSC mean that there is an implicit free rider problem, whereas the very small number of members in the TSC mean that there is less scope for being ill-prepared or lacking in knowledge. Indeed, this onus of responsibility on the TSC has created something of an interrogative culture among committee members.[6] The implication of both staff resources and committee membership on deliberation is that—contrary to the

assumption of many parliamentarians—members of the TSC are predicted to exhibit more detailed knowledge of and expertise in monetary policy than their American counterparts. (This excludes, however, the committee chairs.)

- *Committee norms*: In the HFSC and the SBC, it is accepted practice to read out prepared statements whereas in the TSC the norm is for members to engage in rapid-fire questions, along the lines of an interrogation. The congressional committees also allow a "revolving door" approach to committee hearings, with members coming and going throughout the hearing—whereas, the expectation is for TSC members to arrive on time and remain throughout the hearing. Both sets of norms lead us to expect a more challenging line of questioning in the UK, with no allowance for "droning on"[7] and with members picking up on, and exploiting omissions from previous questioners.
- *One versus many*: Whereas the Fed chairman is the single spokesperson before Congress on the Fed's Monetary Policy Report, the presence of multiple members of the Bank's Monetary Policy Committee before the TSC necessarily changes the dynamics of the deliberation. The precise nature of how the "one versus many" contrast may affect committee deliberations is not clear *a priori* but is open to empirical investigation.

III. Data and Methodology

a. Data

As noted in the introduction, the data consist of the transcripts from the semi-annual Monetary Policy Report hearings of the House Financial Services Committee and the Senate Banking Committee. These are taken from the period of mid-2006 to early 2009, thus comprising twelve hearings in total.[8] Two of the twelve hearings (in both chambers in 2006) were chaired by Republicans (Representative Mike Oxley and Senator Richard Shelby) while the remaining ten hearings between 2007 to 2009 were chaired by Democrats (Representative Barney Frank and Senator Christopher Dodd). During the same time period of mid-2006 to early 2009, the Treasury Select Committee held ten oversight hearings on the Bank's Quarterly Inflation Report.[9] As the party in government for the entire period, Labour's John McFall held the chair. As noted previously, it is the Treasury Select Committee that oversees the policy and administration of the Bank of England (as well as HM Treasury, HM Revenue and Customs and other associated public bodies, such as the Financial Services Authority).

Unlike the US Senate, the House of Lords does not conduct formal oversight of monetary policy, although it does have an investigative select committee for economic affairs (aptly named the Economic Affairs Committee--EAC), which does conduct "occasional" hearings on monetary policy. During the time period of this study, this Lords committee held two "occasional" hearings—one in which it sought oral evidence for a report on "The Current State of Monetary Policy" and one for which oral evidence was sought from the Bank's MPC on the country's "Economic Outlook".[10] These two hearings are included in the early stages of the analysis, in order to provide a broader perspective for the parliamentary case study.

Because the contingent of MPC members varies across the hearings, Appendix 1 provides a full list of those MPC members who gave oral evidence in each committee hearing (both for the Treasury Select Committee and the Economic Affairs Committee), along with the committee members.

The data are structured into four text files, comprised of all the hearings for each committee (the two congressional and the two parliamentary committees). The text files are structured so that each speech or remark constitutes a "case", and each is identified (or "tagged") with identifying characteristics—the name of the speaker, his or her party affiliation (or "no party" for central bank officials), the speaker's role (committee chair, committee member, Fed chairman, MPC internal member [the Governor, two deputy governors, the Bank's Chief Economist and the Bank's Executive Director for Markets], MPC external member [four individuals]), and the date of the hearing. All the hearing transcripts are analysed in their entirety.

b. Methodology: Computer-Assisted Content Analysis

The use of text-mining or text analysis software has proliferated in recent years, not least of which in the academic literature. A survey of these software lies outside the scope of this paper; here, the discussion is confined to computer-assisted content analysis.

One form of automated content analysis is topic modelling, where the task is automatically to classify the contents of documents into "topics". Each topic is understood to comprise a distribution over a fixed vocabulary of words or terms, and each document exhibits any number of topics in different proportions (Blei and Lafferty 2009). The basic idea is that words are indicative of topical content, and the task is to map the words into topics using a specified parametric form. These models are useful for exploring and cataloguing vast digital libraries (Blei and Lafferty 2006; Blei and Lafferty 2009), or for categorizing a large number of speeches on a variety of subjects, where very little substantive knowledge of the subjects themselves is required (Quinn, Monroe et al. 2010).

A topic model is not adopted here, since the approach assumes that speakers or authors of textual data convey meaning in a more thematic fashion, and so it is not just the words that help to classify content but also the context in which the words appear. Rather than conceptualizing words in a univariate distributional pattern (e.g., as in topic modelling), a thematic approach examines the bivariate associations between words and sets of words in order to map out so-called "lexical worlds" (or concept clouds—i.e., concepts in which a given set of words *co-occur*), and the relationships between lexical worlds within a single corpus. Hence, the methodology adopted here allows us to capture the context and meaning of themes because it does not simply classify the contents of documents into "topics" based upon a univariate distributional pattern (for an illustration and further exposition, see (Schonhardt-Bailey, Yager et al. 2012). Instead, I assume that speakers convey meaning in a more thematic fashion, and so it is not just the words that help to classify content, but also the *context* in which the words.

The software (Alceste) considers the text as a large matrix of co-occurrences between lexical forms, and processes it with multivariate techniques. A key feature of Alceste is that it can be used to identify the speakers' tendency to articulate particular ideas and arguments—ideas and arguments which can then be correlated with characteristics of the speaker (e.g., in political texts—the name of speaker, party affiliation, constituency characteristics and so on).

Elsewhere I present in detail the algorithms and their rationale (Schonhardt-Bailey, Yager et al. 2012; Schonhardt-Bailey and Bailey 2013 (forthcoming)) and provide an in-depth analysis of its internal robustness and validation ((Schonhardt-Bailey 2012). In brief, Alceste operates in four steps: it parses the vocabulary (step A); it transforms the corpus into a sequence of Elementary Context Units (ECUs) containing words (or more exactly stemmed words or "lexemes") and operates a descending classification which produce stable classes of these ECUs, leaving what does not fit in these classes "unclassified" (step B); it operates a series of statistical characterizations of the classes (typical words, typical sentences, crossing variables, providing χ^2 values, etc.) (step C), which enable the analyst to operate interpretation (step D).The interpretation consists in attributing meaning to the "lexical world" that is latent in each class based on these statistical results. The software provides a number of tools for the researcher to interpret each class, and two tools are particularly useful—the characteristic words and the characteristic phrases.[11] Both are ranked in order of χ^2 significance, to allow a clearer understanding of the terms and phrases which predominate in each class.

Key terms for these hearings (e.g., the Fed, GDP, interest rate, and so on) are identified and controlled through the lemmatization process, in order to improve the robustness of the results. Appendix 2 details the specific list of terms that required lemmatization supervision prior to analysis.

IV. Analysis

a. Identifying the Themes

[Table 1, about here]

Table 1 provides summaries of the basic statistics from Alceste for each of the four sets of hearings. As can be seen from the word count for the congressional committees and the TSC, the size of each of these three text files is roughly similar—whereas the size of the EAC is far smaller[12] (not surprisingly, given the "occasional" nature of its hearings). The passive variables[13] (or tags) define characteristics of each speech or "case", and these include the speaker's name, role, and so on, as outlined above. Each speech within each corpus constitutes a sampling unit and is called an Initial Context Unit (ICU) by the software. These ICUs are cut into Elementary Context Units (ECUs), which are the basic elements of the classification process. As a measure of goodness-of-fit, we observe that 4102 ECUs are classified for the HFSC, giving an overall classification rate of 78%. Both the two parliamentary committees exhibit roughly this same level of classification (80-81%)—however, the Senate Banking Committee attains a lower classification rate of 69%. Broadly speaking, then, we are marginally more confident in our results from the HFSC, the TSC and the Economic Affairs Committee than the SBC, as there is less unexplained content remaining from the analysis of the transcripts data.

The bottom two rows in Table 1 indicate the number of classes identified and the size of each class (as measured by the percentage of the total ECUs classified within each). Interestingly, the TSC exhibits the smallest number of thematic classes and the highest overall classification rate, which may suggest a more focused (less diverse) discussion in the hearings as well as more confidence in the classification of the discussion into the four themes of (1) *Real Economy,* (2) *Costs, Productivity and Labour Markets and Earnings,* (3) *Monetary Policy Framework and Operation,* and (4) *Bank of England Lending to Banking System.*

[Figures 1 through 6, about here]

While the assigned class labels may seem straightforward, it is important to clarify that these are not automatically given by the program. The output provides the researcher with a number of different tools for conceptualizing the content of classes. As noted earlier, of the many tools, two are particularly useful—characteristic words and characteristic ECUs.[14] The most characteristic function words for each class (ranked in terms of their χ^2 statistical significance, with the minimum χ^2 value for selection set at 13.7, 11.2, 12.3, and 2.0 for each respective set of hearings, with one df [15]) provide an indication of the theme or frame of argument that unifies a class. The most characteristic words for each class are those with the highest rankings. The lists of characteristic words for the classes in the hearings for the HFSC, SBC and TSC are presented in Figures 1, 3 and 5. Figures 2, 4 and 6 illustrate the degree of co-occurrence between the top characteristic word in each class and other characteristic words for that class. For instance, in the House Financial Services Committee hearings, Class 1 is labelled *Wages and Incomes.* The top several words (or lemmas) for this class are wage, income, increase, job, and population (Figure 1). However, from their close proximity in Figure 2, we can see that most often, speakers discussed wages as "real wages" (that is, adjusted for inflation), and "wage increases". Moreover, a list of the actual instances of each of the (lemmatized) characteristic words is given as follows:

> up(91), class+(17), compensat+(27), corporate(27), earn+(21), famil+(30), gain+(25), hour+(15), income+(73), increase+(113), job+(70), labor+(37), living(24), low+(51), middle(20), minimum(23), percent+(98), population(27), product+(67), profit+(29), real+(110), saving+(44), tax(44), trend+(32), unemployment+(30), wage+(132), wealth+(28), mean(35), see(75), lagg+(9), nominal(12), statistic+(14), cost.(54), pay.(32), american+(40), average+(21), care(12), chart+(10), compare+(10), decade+(17), fact+(35), gas(10), impact+(32), inequality(17), last+(61), manufactur+(12), medi+(9), outsourcing(7), people+(80), poor+(12), poverty(11),

keep(29), baby(4), bush(6), end+(25), field+(6), margin+(7), million+(16), power+(17), skill+(17), suffer+(7), workforce+(8), past(25), cut(13), lose(18), show(17), tell(17), adjust+(17), aging(4), apparent+(6), college+(9), concentr+(10), country+(27), cycle+(8), demographic+(4), distribution(6), district+(10), double+(5);

Finally, the characteristic *phrases*, or ECUs, for each class are also provided. For this *Wages and Incomes* class, the top ECUs (where the # signifies a characteristic word for the class) are:

> it has nearly #doubled from 8.5 #percent to 14.4 #percent, so #real #wages have #dropped in the #last #couple of years. #Labor's #share of the national #income has #dropped from 66 #percent to 63 #percent, and #corporate #profits have gone way #up.
>
> and we have not even #increased the #minimum #wage to #keep #up with the inflation and the #cost of #living. #Therefore, it #impacts us. Is that correct or not?
>
> But the situation is going to get a #lot #worse as we have #retirements of the #baby #boomers and so on and #medical #care #costs go #up.
>
> 5 #percent, the #people in the bottom quintile, the bottom 20 #percent, 4 #percent, and those in the #top quintile had gone #up 34 #percent, that the #share of after #tax #income for the #top 1 #percent had almost #doubled as a #percentage of all #wages,
>
> and so with that, with #wages having #lagged significantly for years, with a very #small #percentage of the #population having gotten any #real #increase in the #last 5 years, with inflation #predicted to be #stable,

From this output, each class is interpreted and assigned the labels indicated. A cursory scan of the class labels across the four committees suggests substantive and relevant issue content within the oversight hearings. There are, however, some initial observations worthy of note.

First, whereas both congressional committees focused extensively on financial regulation, the TSC did not. Adding together representatives' assessments of financial regulation together with conduct of regulation, the HFSC hearings discourse on this issue comprised a weight of 46%. Combining both conduct of regulation and financial regulation more broadly together, the SBC hearings discourse on regulation was 48%. In stark contrast, TSC obtains *no* class on regulation, while the EAC (with just two hearings) obtains a weight of 20% for financial regulation. Before any interpretation, it is important to note that *both* the congressional and parliamentary committees held *other* hearings on financial regulation and other aspects of the financial crisis. So, here, we are capturing the extent to which financial regulation spilled over into—or even overwhelmed—the discussion of monetary policy oversight. (Although the hearings are focused on monetary policy in both countries, legislators are not immune to the temptation to latch onto the news of the day in these hearings.)

One initial interpretation of this finding may be that the focus of American legislators on the so-called Dodd-Frank financial regulatory package[16] during 2009 lent greater focus to the topic of financial regulation in the US. Reforms introduced by the Obama Administration in summer 2009 received extensive attention as the legislation wound its way through the legislative process, eventually emerging in statute in summer 2010. In the UK, an equivalent financial reform bill[17] is not anticipated to be completed until mid-2013. While the contrast in the timing and nature of the American and British financial reform bills constitutes its own fascinating story, it is clear that the extensive discourse on financial regulation in the two congressional committees reflects a clear divergence with the discourse in the parliamentary oversight committee.

Second, if the TSC members were not talking extensively about financial regulation, what were they talking about in hearings on monetary policy oversight? Interestingly enough, nearly a third (i.e., 29%) of the committee discussion in these hearings was on the framework and operation of monetary policy per se. It is important to remember that both the congressional committees and the TSC hold *other* hearings during which evidence is heard from central bank officials on topics of importance, but it is the oversight hearings on monetary policy that are explicit to this topic. It would appear that members of the TSC tended better to retain the primary focus of the hearing.

Third, the HFSC is conspicuous in the 16% weight given to *Process and Pleasantries*. These generally include introductions, requests on time allocation, and other formalities. Occasionally, it is useful to delete these prior to the analysis of the text, but in a comparative study such as this one, retaining them allows some insight into the time spent on what might be called non-substantive issue content. For the HFSC, this appears to be a fair bit.

Fourth, about the same weight (16%) spent on *Process and Pleasantries* in the HFSC is given to discussions of *Inflation Projections* in the Senate Banking Committee. Yet, as we will see below in the discussion of Table 2, the one person dominating this discussion is the Fed chairman himself—Ben Bernanke. During the period of 2006-09, inflation in the US was around three percent, but dropped to -0.4% in 2009.[18] Hence, deflation was certainly a concern. In the UK, inflation hovered over the two percent mark in 2006, 2007 and 2009, but was 3.6% in 2008. The key difference between the two cases is Bernanke himself, who chose to focus his attention on a discussion of inflation.

Fifth, there is a direct contrast between discussions in the SBC on the federal government's equity injections into US banks (about 13% weight), and the large amount of discussion in the TSC (35%) on lending to the banking system by the Bank of England. The SBC discussion of equity injections relates to solvency support while the TSC discussion of lending refers to central bank liquidity support. The former is a more direct use of taxpayer money and puts it more at risk. The latter is done through the central bank, which takes security against the loan exposure. Additionally, solvency support is much more directly public ownership, with the political connotations associated with that.

Finally, the two congressional committees appear to devote marginally more attention to labour markets and earnings (broadly construed). The HFSC devotes about 15% to this theme (Class 1) and the SBC devotes about 22% (Class 1). While the TSC exhibits the same 15% share as the HFSC, this is part of a larger discussion concerning productivity and costs. For the Lords EAC, the share is just 9%.

b. Partisanship and Personalities

[Table 2, about here]

Table 2 presents the statistically significant tagged indicators for each thematic class in each committee corpus. Significance is interpreted as the χ^2 value, with one degree of freedom, where:

Statistical Significance (df = 1)	χ^2 value
N.S.	< 2.71
10 %	< 3.84
5 % (*)	< 6.63
1 % (**)	< 10.80
< 1 % (***)	≥ 10.80

χ^2 values below 10 are less robust but are nonetheless noteworthy. Very high values (e.g., over 50) are, on the other hand, highly robust. Interpretation does not rely on or adhere rigidly to the specific intervals of these values (e.g. 200 as exactly ten times the significance of 20), but rather to a more relative standard in levels of categories, and particularly the designation of highly robust values (e.g., $\chi^2 \geq 50$).

To begin, the first row provides a clear indication of the numbers of committee members in each committee, as well as the actual numbers attending the hearings—with the exception of the Senate Banking Committee, which does not provide a list of attending senators. As noted above, it is important to recognize that for the congressional committees, members generally come and go throughout the hearing, while the parliamentary members usually attend for the duration of the hearing.

The remaining rows list each of the thematic classes for each of the four corpora, prefaced in brackets by the percentage weight of the class. Each cell then lists first, the number of committee members whose name tag obtained statistical significance of at least 5%, followed by the role tags (committee chair, member, party affiliations, type of MPC member) and where relevant, the names of significant central bank officials. The results may be summarized as follows:

Congressional Committees

- Partisan tags are significant for three of the six classes identified for the HSFC, and three of the five classes for the SBC.
- In both congressional committees, both the Democrat and Republican tags are significant for the labour markets theme (including jobs, earnings, and so on).
- For the two classes on financial regulation in the HFSC (assessing regulation [Class 2], and conduct regulation [Class 4]), several committee members and Chairman Bernanke are both significant, which suggests a dialogue on this theme. In the SBC, discussion of financial regulation more broadly (Class 3) is dominated by Democrat members and the committee chairman (Senator Dodd);[19] while Bernanke is not significant for this class. On the regulation of the firms' conduct of their business, however, (Class 5) Bernanke is highly significant (χ^2 = 137) and while four committee members also acquire significance, none of these obtain a χ^2 above 14. Hence, Bernanke's discourse focuses on conduct regulation (here he was focused on the retail side of banking, including the terms of mortgage lending) whereas Democrat committee members discuss regulation more broadly. The Republican party tag does not acquire significance for either form of regulation.
- In the SBC, it is the Republicans who focus on the federal government's equity injections into banks, which suggests a greater concern for the implications of state "ownership" of banks. In the HFSC, Republicans appear to focus more on trade and the current account.
- In each set of congressional hearings, one class focuses on the details of monetary policy—*Real Economy and Outlook* in the HSFC and *Inflation Projections* in the SBC. For both these classes, Bernanke overwhelmingly dominates the discourse (χ^2 = 327 and 149, respectively) whereas the single committee member with significance for each of these classes obtains χ^2 = 21 and 8, respectively. Clearly there is little dialogue on the details of monetary policy. It is not surprising to find Bernanke dominating for the inflation class, as he has been more of an advocate of inflation targeting in monetary policy than the Fed's official position would suggest.
- As noted earlier, the HFSC is conspicuous in devoting a fair amount of verbal weight (16%) to *Process and Pleasantries.* Moreover, it appears that participation for this class is reasonably well distributed throughout all the committee members, as the statistically significant tags include both parties, the committee chair and members, as well as 21 individual members.

Parliamentary Committees

- In striking contrast to the congressional committees, partisan tags acquire far less statistical significance, with only three instances. The Liberal Democrat (third party) tag is significant for the *Costs, Productivity and Labour Markets, and Earnings* class in the TSC, and the Labour party tag is significant for the parallel theme in the EAC (Class 5),[20] as well as for the *Bank of England Lending to the Banking System* (Class 4) in the TSC. The Conservative tag is not significant for any class, suggesting that as a party group, Conservative members did not converge on any particular theme.

- For both the labour markets classes in each committee, the External MPC member tag obtains significance (dominated by Kate Barker in the TSC and David Blanchflower in the EAC), but not the Internal MPC member tag.
- The Internal MPC tag acquires significance elsewhere—namely for the *Real Economy* in the TSC and *Macroprudential Policy* in the Economic Affairs Committee. Moreover, individual tags for Internal MPC members obtain significance for *Monetary Policy Framework and Operation* and *Bank of England Lending to the Banking System.* Taking these two findings together, there appears to be a natural split in the discourse between the External and Internal MPC members, with the former speaking more to labour market issues and the latter focusing more on the monetary policy framework, operations of the central bank during the financial crisis, and prudential regulation. The lack of attention to these latter two subjects for the Internal members is consistent with the External MPC members having no role in the Bank's activities beyond monetary policy.
- Relative to the congressional committees, there appears to be relatively more participation by committee members in what might be described as discussions of the "guts" of monetary policy—namely, the real economy, interest rates and monetary policy framework (Classes 1 and 3 in the TSC and Classes 1 and 3 in the EAC).
- Different Deputy Governors of the Bank of England appear to speak to particular subject areas—Charlie Bean on the real economy (Class 1, TSC), Rachel Lomax on monetary policy framework, operation and interest rates (Class 3, TSC, and Class 3 EAC), Paul Tucker on central bank lending and macroprudential policy (Class 4, TSC, and Class 4, EAC), and John Gieve on asset prices and interest rates (Class 3, EAC).
- The Governor, Mervyn King, obtains clear statistical significance for just one class (albeit a very large class)-- *Bank of England Lending to the Banking System* (Class 4, TSC). This is consistent with the attention given to whether the Bank of England acted promptly to provide liquidity insurance to the UK banking system, an issue that continues to attract intense debate.

[Table 3, about here]

To delve deeper, I use the *Tri-Croisé* or Cross-Data analysis in Alceste, which crosses a tag (name of speaker, etc.) or a single word with the entire corpus and identifies the strongest statistical associations between the specified tag or word, and other words and phrases in the text.[21] (Simply put, this holds constant the specified tag or term, allowing all else to vary.) For the three oversight committees (HFSC, SBC, and TSC), Table 3 presents just the preliminary findings for this analysis; further work is needed to fully unpack these findings. The percentage for the central bank representatives in the first portion of the table provide an indication of the portion of the hearings taken up by the Fed's Ben Bernanke and the Bank's Monetary Policy Committee members. In the HFSC, Bernanke's discourse accounts for 46% of the total classified text; and in the SBC, this is about half (50.5%). Strikingly, the MPC members, together, account for about 72% of the classified text in the TSC—and Governor Mervyn King alone accounts for about 50%.[22] What might we glean from this? A first impression is that in the congressional committees, members talk relatively more than their counterparts in the parliamentary committee, at least relative to representatives from the central bank. Recalling the committee norm in the US which allows both the Fed chairman and committee members to read out prepared statements, it may be that these statements of the committee members inflates their relative levels of discourse participation. Or, it may be that simply having more central bank officials appear to testify before the committee shifts the overall weight of discourse to these officials. Further investigation is required here.

The next several rows control for party affiliation, thereby giving an impression of the partisan breakdown of the discourse. The findings are intriguing. Bearing in mind that for both congressional committees, the Democrats held the chairmanships for all but the first hearing (in 2006), there is nonetheless a stark difference in the participation weight of the members: in the HFSC, the Democrats and Republicans are about equally weighted (28.2% to 25.4%), whereas in the SBC, the majority party Democrats are weighted 31.4% while the minority Republicans are only 18.1% of the classified text. For the parliamentary committee, the partisan imbalance is even greater—17.5% for Labour, 7.5% for Conservatives and 2.8% for Liberal Democrats (with each party's representation in the Commons as 37%, 33%, and 22%). The unusual committee in this regard is the House Financial Services Committee, whose party majority does not appear to unduly skew the weights of participation in discourse in the monetary policy oversight hearings. (There are a number of partisan stories to be investigated from these findings in later work.)

V. (Preliminary) Conclusions

There is more work to be done on this paper, but some initial conclusions may be offered. The key differences between the monetary policy oversight committees in Congress and the Treasury Select Committee in Parliament included *committee independence, partisanship, committee staff resources and numbers of committee members, committee norms,* and the *one versus many* feature (i.e., the appearance of just the Fed chairman versus that of several MPC members).

Whereas the formal separation of legislative and executive branches in the US should yield a more strident challenge from the congressional banking committees, it was noted that the UK informal separation of frontbench from backbench MPs (along with an ethos that seeks to preserve independence) may effectively yield a similar level of challenge. Yet, the "challenge" is further constrained by the difference in objectives and targets of the central bank with respect to monetary policy (namely, the dual objective with no inflation target for the US and the single mandate and explicit target for the UK). In both the congressional committees and the TSC (as well as the EAC, in its occasional hearings), legislators challenged central bank officials on labour market issues. This is not surprising for the American case (as growth is part of the objective); however, if one follows the logic of the single mandate for the UK, MPs might be assumed to offer less of a challenge in this regard—but this is not the case. However, turning to core features of monetary policy (real economy, interest rates, monetary policy framework), the participation of committee members (gauged as a share of committee members acquiring significance in Classes 1 and 3 of the TSC) in these technical issues is marginally greater than for the congressional committees. This may reflect the focus of the single mandate and/or greater expertise (or familiarity) with monetary policy discussions. This will require unpacking through an in-depth analysis of the actual phrases and context of the discussion.

Second, the congressional committees were expected to exhibit more partisanship in their discussions, and this is certainly evident from the partisan tags in Table 2. Both Democrats and Republicans sought to draw Bernanke on the issue of the labour market, and on this point, a detailed examination of the context is required to ascertain whether the nature of this challenge varied between the two parties. However, on state ownership of banks and on trade and current account issues, clearly Republicans were more vocal. Interestingly, Table 3 revealed a difference between the chambers in that the HFSC appears to better balance the participation of both Democrats and Republicans, whereas the SBC appears to weigh this more in favour of the majority (Democratic) party members.

Third, it was predicted that fewer staff resources combined with fewer committee members for the TSC would actually help to facilitate a better quality of expertise and challenge on monetary policy oversight. Here the challenge is in clearly defining "quality". Once again, this will require more detailed analysis; however, one initial finding from Table 1 is that the TSC obtains fewer thematic classes than the congressional committees and a higher classification rate for the transcripts data. Fewer themes and better classification suggest a more focused, more cohesive discussion—which may well be indicative of a better quality of expertise and challenge. Investigation of the phrases and arguments in context should help to shed light on this.

Finally, the *one versus many* contrast between the committees is an important one, as it invariably changes the dynamic of the oversight dialogue. One initial finding (from Table 2) is that MPC members tended to differentiate themselves by topic or issue area. It was also clear that this helped to share the "heavy lifting" among the central bank representatives—although it is also clear from Table 3 that Governor Mervyn King was still the one dominant individual in the hearings, with a discourse weight of about 50% (which is roughly the same as for Chairman Bernanke in the congressional hearings). Overall, the added participation of the MPC members (beyond the Governor) increases the discourse weight by about 22% in favour of the central bank. What is the effect here on the quality of deliberation? Does this greater participation mean more information, or more opportunity for obfuscation? Or, is the real story that members of Congress simply use the hearings for purposes other than oversight (a finding that accords with our larger project (Schonhardt-Bailey and Bailey 2013 (forthcoming))) and so their relative greater weight vis-à-vis the Fed chairman just reflects their attempts to send messages to constituents via the media of the television cameras? The reader will no doubt anticipate the answer—more detailed examination of the results are required to shed light on these questions.

In the end, this paper may well have raised more questions than it has answered. Nonetheless, it offers a first cut into a tangle of intersecting and overlapping effects—of institutional norms, ideational interpretations of economic causes and effects, motivations of elected officials, and all operating within an environment of crisis and stress.

(2009). Reform of the House of Commons Select Committee **-** First Report Rebuilding the House. London, House of Commons.

Bicquelet, A. (2009). On Referendums: A Comparison of French and English Parliamentary Debates Using Computer-assisted Textual Analysis. Government Department. Wivenhoe, University of Essex. **Ph.D.**

Blei, D. M. and J. D. Lafferty (2006). Dynamic Topic Models. 23rd International Conference on Machine Learning. Pittsburgh, PA.

Blei, D. M. and J. D. Lafferty (2009). Topic Models. Text Mining: Classification, Clustering, and Applications. A. Srivastava and M. Sahami. Boca Raton, FL, CRC Press**:** 71-94.

D'Arcy, M. (2012) Who's who? BBC News (bbc.co.uk/news/uk-politics-18704686)

Gordon, R. and A. Street (2012). Select Committees and Coercive Powers. London, The Constitution Society.

Kelso, A. (2012). Development and Reform in the UK House of Commons Departmental Select Committee System: The Leadership Role of Chairs and the Impact of Government/Opposition Status. ECPR Standing Group on Parliaments General Conference. Dublin**:** 51.

Lahlou, S. (1995b). Vers une théorie de l'interprétation en analyse des données textuelles (Towards a theory of interpretation in text mining). 3rd International Conference on Statistical Analysis of Textual Data. S. Bolasco, L. Lebart and A. Salem. Rome: CISU, JADT 1995. **1:** 221-228.

Quinn, K. M., B. L. Monroe, et al. (2010). "How to Analyze Political Attention with Minimal Assumptions and Costs." AMerican Journal of Political Science **54**(1): 209-228.

Russell, M. and M. Benton (2011). Selective Influence: The Policy Impact of House of Commons Select Committees. London, The Constitution Unit, University College London**:** 103 pages.

Schonhardt-Bailey, C. (2012). Looking at Congressional Committee Deliberations from Different Perspectives: Is the Added Effort Worth It? 5th ESRC Research Methods Festival. St Catherine's College, Oxford (2nd – 5th July 2012).

Schonhardt-Bailey, C. and A. Bailey (2013 (forthcoming)). Deliberating Monetary Policy. Cambridge, MIT Press.

Schonhardt-Bailey, C., E. Yager, et al. (2012). "Yes, Ronald Reagan's Rhetoric was Unique—But Statistically, How Unique?" Presidential Studies Quarterly(September).

[1] Elsewhere, I explore and develop this definition more comprehensively (see (Schonhardt-Bailey and Bailey 2013 (forthcoming))).
[2] The Bank of England publishes the Inflation Report quarterly (February, May, August and November). The Treasury Select Committee does not necessarily hold hearings on each of the reports (for example, in 2006 and 2007, hearings were held on three of the four Reports).
[3] As noted in the database of congressional staff salaries from Legistorm.com.
[4] In August 2012, the TSC listed on its website eight staff members.
[5] Table 2 (below) gives more precise figures both for committee members and for those attending.
[6] At the time of this writing (summer 2012), the BBC Parliamentary correspondent compiled a "Who's Who?" of TSC committee members, which includes somewhat intimidating profiles of current members including: for Pat McFadden ("he is least likely to be baffled by the intricate technicalities of City trading"); John Mann ("a Labour maverick who once asked a witness at the Treasury Committee to explain why it was easier for a camel to pass through the eye of a needle than for a rich man to enter the kingdom of heaven. He specialises trying to destabilise witnesses with completely unexpected lines of questioning, often delivered with aggression or derision, or both."); Michael Fallon ("one of the committee's toughest interrogators"); Andrea Leadsom (whose experience in the City includes 10 years at an investment bank subsidiary and work with the former Bank of England Governor, Eddie George, gives her "detailed expertise"); and other members with extensive work experience in the City (Jesse Norman and Mark Garnier) (D'Arcy 2012).
[7] An anecdote from Don Kohn to the author is of relevance here. Kohn was vice chairman of the FOMC and is currently a member of the Bank of England's Financial Stability Committee. His appointments for each position required confirmation hearings before the Senate Banking Committee and the Treasury Select Committee. For the former, he read out a lengthy prepared statement, which in his view, tended to dull the subsequent discourse. For the TSC, he similarly prepared a statement to read at the beginning of the hearing, but was halted from doing so, as the committee intended to begin its questioning with immediate effect.
[8] For the House committee, these are the hearings of: 20 July 2006; 15-16 February 2007; 17-18 July 2007; 26-27 February 2008; 16 July 2008; and 25 February 2009. For the Senate committee, these are the hearings of: 19 July 2006; 14 February 2007; 19 July 2007; 28 February 2008; 15 July 2008; and 24 February 2009.
[9] The TSC held hearings on most, though not all, of the Bank's Quarterly Inflation Reports. The ten hearings were on the following dates: 29 June 2006; 30 November 2006; 27 March 2007; 28 June 2007; 29 November 2007; 26 March 2008; 26 June 2008; 11 September 2008; 25 November 2008; and 24 March 2009.
[10] These hearings were on 31 October 2006 and 24 November 2009, respectively. While the latter hearing falls slightly outside the time frame of this study, it is included in order to maximize the available data for the Lords' committee.
[11] See (Lahlou 1995b) for a detailed description of the interpretation procedure and its theoretical basis.

[12] Plurals and conjugation endings are reduced to a single form and nonce words are eliminated from the analysis. This leaves a smaller word count which is analyzed by the program.
[13] These are deemed "passive" as they do not contribute to either the calculation of the word classes or the factors in the correspondence analysis.
[14] The standard report lists the top 20 ECUs for each class, ranked by chi square association. However, a separate file is produced that lists all the ECUs for each class, where the default cut-off for selection is zero.
[15] This minimum value for word selection within Alceste varies from 2.0 to 20, with smaller text files tending toward the lower threshold and larger ones toward the high threshold. The basic rule of thumb with Alceste is (as with any statistical analysis)—the more data, the easier it is to attain statistical significance (hence larger text files have to attain a higher threshold to be statistically significant).
[16] Formally titled the Dodd–Frank Wall Street Reform and Consumer Protection Act.
[17] Financial Services Bill.
[18] CPI from the Bureau of Labor Statistics.
[19] Senator Shelby was committee chair for the hearing in 2006, but does not acquire significance for this class.
[20] This Labour tag results from Lord Layard, who takes the Labour Whip in the House of Lords, and is also a well-known labour market economist.
[21] For a good example of this technique applied to parliamentary debates see (Bicquelet 2009).
[22] This high percentage for King requires further investigation at a more detailed level, given his statistical significance for just one thematic class.

Table 1: Basic Statistics for US and UK Legislative Oversight Hearings on Monetary Policy, 2006-09

	US House Financial Services Committee	**US Senate Banking Committee**	**UK Treasury Select Committee (Commons)**	**UK Economic Affairs Committee (Lords)**
Total Word Count	182,331	165,936	154,056	20,614
Unique Words Analyzed (occurrences with frequency > 3)	77,018	69,801	59,052	7563
Passive Variables (Tagged Indicators)	82	43	52	40
I.C.U.s (= number of speeches / comments)	1429	1399	1642	161
Classified E.C.U.s	4102 (= 78%)	3359 (= 69%)	3685 (= 81%)	442 (= 80%)
Lexical Classes	6	5	4	6
Distribution of Classes (%)	1 **(15)** *Wages & Incomes* 2 **(29)** *Financial Regulation (assessing and judging)* 3 **(16)** *Process & Pleasantries* 4 **(17)** *Financial Regulation (conduct)* 5 **(16)** *Real Economy & Outlook (FOMC forecasts on inflation & growth)* 6 **(7)** *Trade & Current Account (rest of the world)*	1 **(22)** *Labour Market / Earnings* 2 **(16)** *Inflation - Projections* 3 **(19)** *Regulation (broadly)* 4 **(13)** *Equity Injections into Banks by Government* 5 **(29)** *Regulation (conduct)*	1 **(22)** *Real Economy* 2 **(15)** *Costs, Productivity & Labour Markets & Earnings* 3 **(29)** *Monetary Policy Framework and Operation* 4 **(35)** *Bank of England Lending to Banking System*	1 **(30)** *Orientation of Monetary Policy* 2 **(20)** *Financial Regulation & the Crisis* 3 **(19)** *Asset Prices & Real Interest Rates* 4 **(14)** *Macroprudential Policy* 5 **(9)** *Labour Market* 6 **(7)** *Real Earnings – terms of trade*

Table 2: Significant Tags for Thematic Classes in Committee Hearings*

House Financial Services **(N=69 to 70; attending at some point = 39 to 50)**	**Senate Banking** **(N=21 to 24; no attendance list)**	**Treasury Select** **(N= 11 to 13; attending = 7 to 13)[@]**	**Economic Affairs** **(N = 11-12; attending = 10-12)**
1 **(15)** *Wages & Incomes* 18 members significant at 5% Democrat tag (84) Republican tag (24) Chair tag (12) Member tag (113)	**1** **(22)** *Labour Market / Earnings* 12 members significant at 5% Democrat tag (73) Republican tag (19) Member tag (138)	**1** **(22)** *Real Economy* 2 members significant at 5% External MPC tag (20) Internal MPC tag (24) Bean tag (111)	**1 (30)** *Orientation of Monetary Policy* 1 member significant at 5% Chair tag (10)
2 **(29)** *Financial Regulation (assessing and judging)* 4 members significant at 5% Bernanke tag (13)	2 **(16)** *Inflation - Projections* 1 member significant at 5% Bernanke tag (149)	**2** **(15)** *Costs, Productivity & Labour Markets & Earnings* 4 members significant at 5% Liberal Democrat tag (8) External MPC tag (29)	2 **(20)** *Financial Regulation & the Crisis* [no tag statistically significant at 5%]
3 **(16)** *Process & Pleasantries* 21 members significant at 5% Democrat tag (202) Republican tag (118) Chair tag (105) Member tag (281)	**3** **(19)** *Regulation (broadly)* 6 members significant at 5% Democrat tag (172) Chair tag (148) Member tag (10)	**3** **(29)** *Monetary Policy Framework and Operation* 3 members significant at 5% External MPC tag (21) Lomax tag (13)	3 **(19)** *Asset Prices & Real Interest Rates* 2 members significant at 5% Gieve tag (10) Lomax tag (22)
4 **(17)** *Financial Regulation (conduct)* 6 members significant at 5% Bernanke tag (125)	4 **(13)** *Equity Injections into Banks by Government* 5 members significant at 5% Republican tag (15) Member tag (15)	*4* **(35)** *Bank of England Lending to Banking System* 3 members significant at 5% Labour tag (8) Governor (BoE) tag (56) Chair tag (38) Tucker tag (46)	4 **(14)** *Macroprudential Policy* 1 member significant at 5% Internal MPC tag (15) Tucker tag (34)
5 **(16)** *Real Economy & Outlook (FOMC forecasts on inflation & growth)* 1 member significant at 5% Bernanke tag (327)	*5* **(29)** *Regulation (conduct)* 4 members significant at 5% Bernanke tag (137)		5 **(9)** *Labour Market* 1 member significant at 5% Labour tag (14) External MPC tag (15)
6 **(7)** *Trade & Current Account (rest of the world)* 9 members significant at 5% Republican tag (8)			6 **(7)** *Real Earnings – terms of trade* [no tag statistically significant at 5%; Governor (BoE) tag significant at 10%]

* χ^2 for tags given in brackets, where 6.6 is threshold for 5%; 10.8 is threshold for 1%; @ List of committee hearing attendees given in Appendix

Table 3: Summary of Cross Data Analysis, by Role and Party Affiliation

Share of ECUs		House Financial Services	Senate Banking	Treasury Select
Central Bank Spokesperson(s)				
	Bernanke	46.4%	50.5%	
	MPC			72.2%
	(o/w King)			(50.2%)
Legislative Committee Members		53.7%	49.5%	27.8%
	(Democrat)	(28.2%)	(31.4%)	
	(Republican)	(25.4%)	(18.1%)	
	(Labour)			(17.5%)
	(Conservative)			(7.5%)
	(Liberal Democrat)			(2.8%)
Statistically Significant Committee Members, within each party group				
Democrats		**Frank**, Waters, B. Miller	**Dodd**, Menendez, Reed, Schumer, Bayh	
Republicans		Paul, Bachus, Garrett	Shelby, Bunning, Corker, Bennett	
Labour				**McFall**, Todd, Love, Cousins
Conservative				Fallon, Brady, Viggers
Liberal Democrat				Thurso, Breed

Figure 1: Oversight hearings of House Financial Services Committee (2006-09): Characteristic Words in each Thematic Class

Classe 1 (621 u.c.e.)

Formes	Khi2	uce
wage+	609	132
income+	196	73
increase+	137	113
job+	134	70
population	132	27
*yr_Jul06	131	200
real+	120	110
percent+	115	98
*r_member	113	389
*yr_Jul07	102	176
low+	99	51
year+	96	132
labor+	95	37
minimum	94	23
living	90	24
product+	89	67
famil+	88	30
tax	87	44
unemployment	85	30
*p_D	84	253
earn+	83	21
profit+	83	29
hour+	77	15
up	73	91
trend+	71	32
compensat+	69	27
gain+	68	25
*n_Baca	66	16
saving+	66	44
wealth+	66	28
middle	62	20
*n_Hodes	62	11
corporate	62	27
growth	56	74

Wages & Incomes

Classe 6 (291 u.c.e.)

Formes	Khi2	uce
china+	559	50
dollar+	417	81
export+	361	37
deficit+	351	42
oil	292	51
unit+	250	72
demand+	218	45
domestic	193	26
surplus	184	14
barrel+	184	16
world+	170	33
india+	158	12
budget_deficit+	132	12
state+	118	73
trade+	114	35
produc+	109	11
foreign+	102	24
supply+	99	22
trade_deficit+	96	10
trillion+	90	16
trad+	81	13
abroad	80	12
yuan	79	7
drill+	79	6
oil_price+	77	16
reli+	75	10
chinese	70	11
south	66	6
bill+	65	28
total+	63	13
goods	55	13
material+	54	9
large+	50	24
consumption	50	14

Trade & Current Account (rest of the world)

Classe 5 (640 u.c.e.)

Formes	Khi2	uce
inflation+	577	197
price+	520	203
*p_NoP	327	531
*r_FedRes	327	531
*n_Bernanke	327	531
expect+	304	97
pace	272	59
quarter+	256	63
core	252	51
energ+	242	89
F_O_M_C	208	51
growth	190	109
commodit+	189	50
remain+	187	61
project+	186	52
decline+	180	56
outlook	175	41
rise.	167	76
condition+	160	62
overall	153	53
forecast.	148	34
like+	144	53
slow+	137	47
year+	136	148
sharp+	132	30
moderate+	128	33
sale+	127	27
food	126	36
construct+	117	40
tend+	109	31
pressure+	106	46
inventor+	105	23
residential	105	25
expenditure+	102	20

Real Economy & Outlook

Classe 2 (1184 u.c.e.)

Formes	Khi2	uce
think.	249	337
system+	127	111
make.	103	193
sure+	83	80
do	77	242
we	75	509
way+	73	112
problem+	65	104
there	64	253
I	62	531
thing+	58	100
hedge	52	31
is	49	633
approach+	48	40
capital+	44	90
private+	44	51
it	41	379
try	41	50
need	41	85
right+	41	52
regulator+	41	74
be	40	323
trying	40	43
that	39	784
solution+	39	19
prime	38	24
sub	37	22
very	37	167
role+	37	31
play+	36	25
position+	35	28
people+	34	128
are	33	413
them	33	70

Financial Regulation: Assessing & Judging

Classe 3 (659 u.c.e.)

Formes	Khi2	uce
thank+	310	79
*r_member	281	480
I	236	408
question+	228	109
chairman_berna	228	62
*p_D	202	317
you	182	308
ask	149	48
chairman+	149	53
committee+	145	59
chairman_frank	132	31
hear.	129	58
*p_R	118	267
fannie_mae	118	25
freddie_mac	112	25
let.	108	52
want+	106	80
*r_chair	105	104
*n_Frank	103	111
your	102	106
*n_Garrett	101	49
me	94	74
members+	94	31
my	83	98
read.	83	27
senate	78	23
guess+	70	25
democrat+	61	13
gentleman+	57	20
send.	56	14
vote+	56	12
member	56	14
talk+	52	60
comment+	51	42

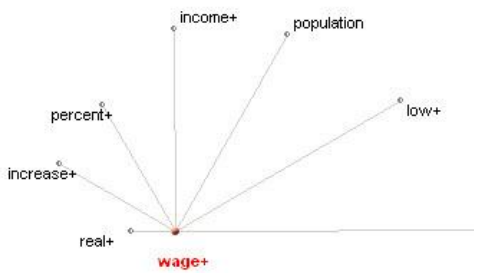
Process & Pleasantries

Classe 4 (707 u.c.e.)

Formes	Khi2	uce
rule+	305	90
credit+	287	156
lend.	270	105
practice+	234	65
card+	231	67
disclosure+	220	61
agencies+	197	49
bank+	185	137
consumer+	185	106
unfair+	146	34
review+	135	38
mortgage+	134	98
board+	132	45
include+	132	41
institution+	132	69
propose+	130	37
provide+	128	65
deceptive	126	26
*p_NoP	125	490
*r_FedRes	125	490
*n_Bernanke	125	490
loan+	119	74
federal_reserve	105	126
program+	102	55
facilit+	102	27
prohibit+	101	21
purchase+	91	34
author+	89	37
require+	82	37
establish+	79	23
under	77	50
rating+	75	18
Z	74	20
sheet+	72	24

Financial Regulation: Conduct

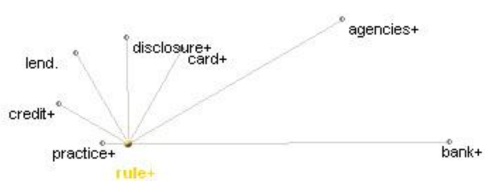
Figure 2: Keywords and co-occurrence for Classes in House Financial Services Committee hearings



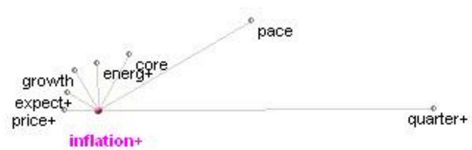
Class 1

Class 2

Class 3



Class 4



Class 5

Class 6

Figure 3: Oversight hearings of Senate Banking Committee (2006-09): Characteristic Words in each Thematic Class

Classe 1 (755 u.c.e.)

Formes	Khi2	uce
year+	163	165
saving+	151	54
percent+	145	115
job+	143	67
*r_member	138	415
*yr_Jul06	130	215
manufactur+	126	39
deficit+	117	45
middle	109	38
growth	105	103
average+	96	42
famil+	93	41
econom+	92	196
gain+	91	33
wage+	90	40
*n_Allard	80	38
*yr_Feb07	76	205
*p_D	73	311
last+	71	88
record+	70	29
income+	68	45
class+	62	31
housing	61	72
*n_Menendez	61	56
american+	59	47
over	55	88
recession+	54	22
labor	53	36
number+	53	55
product+	51	69
*n_Bennett	50	44
negative+	49	25
high+	47	89
*n_Sarbanes	47	33

Labour Market / Earnings

Classe 2 (538 u.c.e.)

Formes	Khi2	uce
inflation+	1075	250
price+	741	211
expect+	414	116
energy	330	100
commodit+	274	62
core	200	47
food+	190	47
F_O_M_C	184	52
moderate+	176	37
oil	174	53
pace	156	42
*p_NoP	149	413
*r_FedRes	149	413
*n_Bernanke	149	413
outlook	148	35
press+	130	49
project+	117	40
rise.	103	57
growth	101	82
forecast.	94	33
monetary_polic	87	42
econom+	86	151
sustain+	77	31
increase+	77	77
resource+	75	23
expenditure+	72	15
goods	71	18
demand+	71	29
high+	70	78
remain+	68	38
upside	67	14
utiliz+	67	18
anticip+	67	26
moderat+	66	16

Inflation - Projections

Classe 3 (650 u.c.e.)

Formes	Khi2	uce
I	243	390
issue+	177	121
*p_D	172	323
*n_Dodd	162	153
*r_chair	148	154
here	127	78
question+	117	95
hope+	97	37
you	89	258
sub	72	22
think.	72	165
committee+	61	45
your	59	86
want+	59	61
this	58	193
chairman	58	24
prime+	54	23
congress+	51	38
legislat+	51	22
idea+	50	21
ask	49	28
just	49	79
talk+	49	51
*yr_Feb07	47	167
us	45	51
my	45	70
obvious+	42	31
advice	38	9
literacy	38	9
senator_schum	38	9
F_H_A	36	11
progress+	36	12
am	35	56
look+	35	77

Regulation (broadly)

Classe 4 (452 u.c.e.)

Formes	Khi2	uce
*n_Corker	253	57
*yr_Feb09	146	230
go.	129	119
private+	108	44
test+	79	23
stress	79	23
get	75	48
bad	74	20
put.	66	35
guess	66	18
partner+	64	14
them	63	52
public+	63	39
think.	62	122
are	61	207
essence	57	12
right+	56	32
what	54	94
attract+	50	9
we	49	215
sheet+	48	19
sort+	47	15
do	46	114
buy.	46	16
sell.	46	13
scenario+	46	11
not	45	159
they	45	95
insolvent	45	7
sure	44	36
make.	44	81
that	40	332
take.	40	59
invest+	39	35

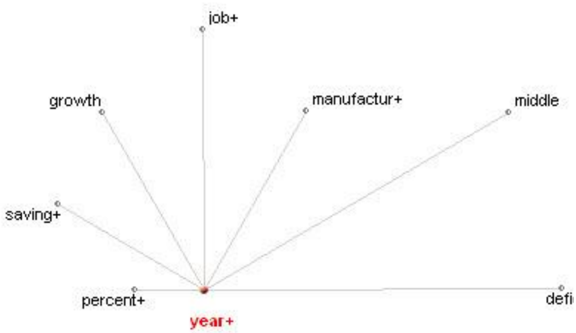
Equity Injections into Banks by Government

Classe 5 (964 u.c.e.)

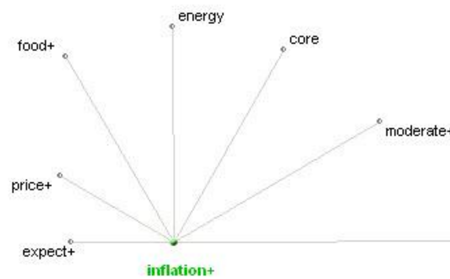
Formes	Khi2	uce
*yr_Feb09	286	461
bank+	260	247
credit+	221	160
system+	206	124
risk+	161	171
rule+	157	85
institution+	155	117
financial+	154	161
*p_NoP	137	661
*r_FedRes	137	661
*n_Bernanke	137	661
agencies	122	62
mortgage+	121	93
lend.	120	69
basel+	116	61
provide+	113	73
loan+	109	93
facilit+	104	48
II	101	48
securit+	99	76
practice+	99	54
standard+	99	70
card+	91	38
program+	90	67
protect+	89	56
regul+	87	99
rating+	82	36
supervisor+	81	37
liquid+	78	51
require+	78	50
fail+	70	51
manage+	65	41
approach+	65	42
safe+	63	39

Regulation (conduct)

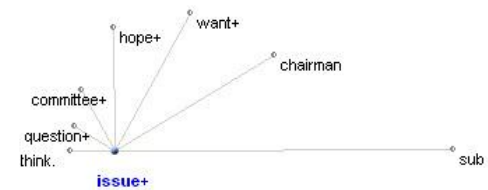
Figure 4: Keywords and co-occurrence for Classes in Senate Banking Committee hearings



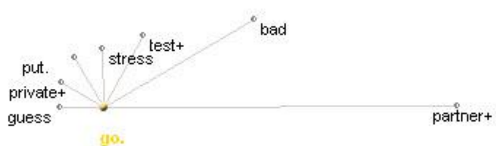
Class 1



Class 2



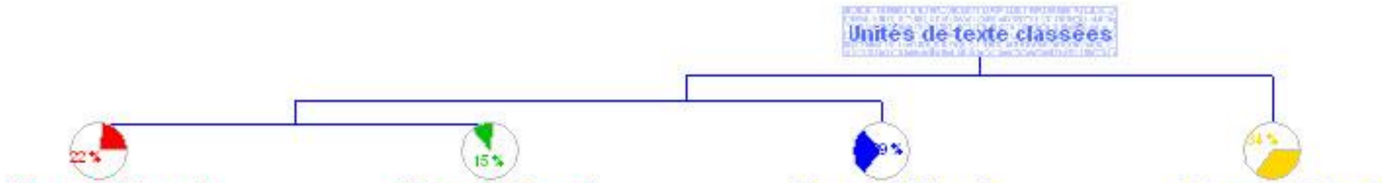
Class 3



Class 4

Class 5

Figure 5: Oversight hearings of Treasury Select Committee (2006-09): Characteristic Words in each Thematic Class



Classe 1 (804 u.c.e.)

Formes	Khi2	uce
growth+	229	152
invest+	188	98
recover+	171	54
econom+	150	193
see.	145	186
slow+	133	77
united_states	128	77
trade+	118	44
strong+	115	52
*n_Bean	111	83
rebalancing	110	32
consumer_sper	108	46
export+	102	35
business	94	60
quarter+	94	39
data	88	66
sterling	87	37
euro_area	87	27
exchange_rate-	87	39
net	76	24
grow.	75	37
past	73	65
output+	70	46
pick+	66	46
survey+	66	43
year+	64	104
decline+	60	27
world+	57	78
sign+	52	31
deficit+	48	16
trend+	47	22
*yr_Nov06	47	113
sharp+	46	38
*yr_Nov07	46	113

Real Economy

Classe 2 (535 u.c.e.)

Formes	Khi2	uce
price+	477	178
supply+	192	58
food	191	39
pay.	189	54
commodit+	186	35
rise.	173	84
household+	170	49
increase+	169	83
energy	162	32
labour+	156	31
income+	150	41
high+	129	79
wage+	118	40
oil_prices	105	24
house+	99	42
disposable	86	17
oil	85	29
energy_prices	83	29
home+	82	27
living	70	22
cost.	67	39
workers+	66	17
standard+	64	22
goods	63	13
unemployment-	62	21
real+	56	76
employ+	55	24
side+	54	31
particip+	53	16
labour_market+	52	26
impact+	49	51
reduction+	46	17
squeeze+	45	13
service+	45	15

Costs, Productivity & Labour Markets / Earnings

Classe 3 (1071 u.c.e.)

Formes	Khi2	uce
inflation+	472	334
target+	260	141
interest_rate+	152	130
medium	116	52
vote+	107	45
term	104	102
*yr_Jun08	84	198
letter+	80	36
fiscal	75	45
meet.	73	52
keep.	62	46
cred+	61	28
view+	59	101
committee+	52	74
judgment+	51	58
framework+	51	32
path+	50	40
respond+	46	25
set.	43	60
month+	42	103
anchor+	42	19
stimulus	42	23
ahead	38	25
tell.	38	39
write.	33	29
monetary_polic	33	42
M_P_C	31	47
expect+	31	112
bring.	30	44
curve	29	12
budget	29	15
explain+	29	34
*yr_Mar07	29	151
disagree+	29	12

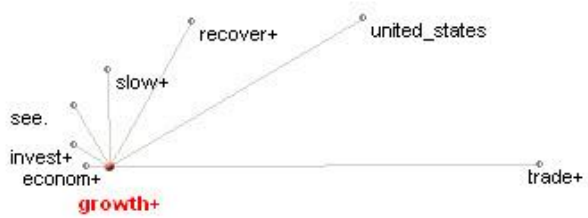
Monetary Policy Framework & Operation

Classe 4 (1275 u.c.e.)

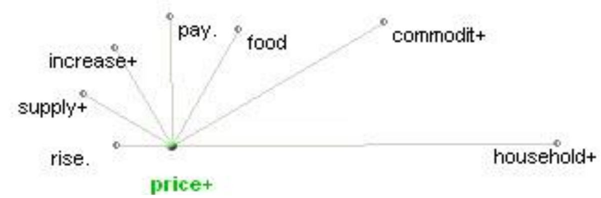
Formes	Khi2	uce
bank+	542	355
lend.	291	171
liquid+	181	99
sheet+	155	88
fund+	147	78
market+	142	171
financial+	130	104
banking_syster	124	79
scheme+	116	64
*yr_Mar09	107	234
system+	96	56
capital+	89	62
institution+	80	44
asset+	78	83
mortgage+	78	77
*yr_Nov08	75	213
instrument+	73	38
money	69	81
balance+	65	102
operation+	61	36
*n_King	56	765
*r_Governor	56	765
government+	56	64
provide+	55	54
finance+	53	41
lenders+	51	27
*yr_Sep08	50	256
facilit+	49	26
purchase+	48	25
*n_Tucker	46	74
their	45	126
loan+	44	27
will+	41	27
taxpayer	40	25

Bank of England Lending to Banking System

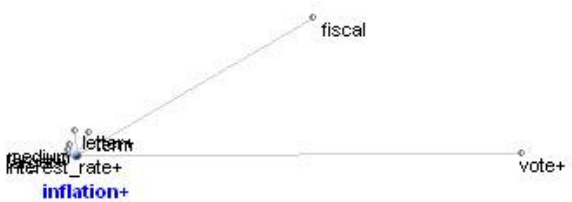
Figure 6: Keywords and co-occurrence for Classes in Treasury Select Committee hearings



Class 1



Class 2



Class 3

Class 4

Appendix 1: Details and personnel attending

Parliamentary hearings

House of Commons, 29 June 2006

John McFall (Chairman): *Labour*
Angela Eagle: *Labour*
Michael Fallon: *Conservative*
David Gauke: *Conservative*
Sally Keeble: *Labour*
Andrew Love: *Labour*
Kerry McCarthy: *Labour*
Brooks Newmark: *Conservative*
John Thurso: *Liberal Democrat*
Mark Todd: *Labour*
Peter Viggers: *Conservative*

Witnesses
Mr Mervyn King, *Governor of the Bank of England and MPC member*
Mr Paul Tucker, *Executive Director (Markets), Bank of England, and MPC member*
Mr Charles Bean, *Executive Director, Bank of England, and MPC member*
Ms Kate Barker, *external member of the MPC*

House of Lords Select Committee on Economic Affairs, 31 October 2006

Lord Wakeham (Chairman): *Conservative*

Lord Kingsdown: *Cross Bencher*
Lord Lamont of Lerwick: *Conservative*
Lord Lawson of Blaby: *Conservative*
Lord Layard: *Labour*
Lord Macdonald of Tradeston: *Labour*
Lord Oakeshott of Seagrove Bay: *Liberal Democrat*
Lord Paul: *Cross Bencher*
Lord Powell of Bayswater: *Cross Bencher*
Lord Sheldon: *Labour*
Lord Skidelsky: *Cross Bencher*
Lord Vallance of Tummel: *Liberal Democrat*

Mervyn King, *Governor of the Bank of England*
Rachel Lomax, *Deputy Governor of the Bank of England*
Sir John Gieve, *Deputy Governor of the Bank of England*
Kate Barker, *External Member of MPC*
David Blanchflower, *External Member of MPC*

House of Commons, Treasury Committee, 30 November 2006

John McFall (Chairman): *Labour*
Colin Breed: *Liberal Democrat*
Jim Cousins: *Labour*
Angela Eagle : *Labour*
Michael Fallon: *Conservative*
David Gauke : *Conservative*
Andrew Love: *Labour*
Kerry McCarthy: *Labour*
Mark Todd: *Labour*
Peter Viggers: *Conservative*

Mr Mervyn King, *Governor of the Bank of England*
Sir John Gieve, *Deputy Governor of the Bank of England and member of the Monetary Policy Committee*
Mr Charlie Bean, *Chief Economist and Executive Director of the Bank of England and member of the Monetary Policy Committee*
Professor Tim Besley, *member of the Monetary Policy Committee*
Professor David Blanchflower, *member of the Monetary Policy Committee*

House of Commons, Treasury Committee, 27 March 2007

John McFall (Chairman): *Labour*
Colin Breed: *Liberal Democrat*
Michael Fallon: *Conservative*
David Gauke: *Conservative*
Andrew Love: *Labour*
Brooks Newmark: *Conservative*
John Thurso: *Liberal Democrat*

Mr Mervyn King, *Governor of the Bank of England*
Ms Rachael Lomax, *Deputy Governor responsible for monetary policy*
Sir John Gieve, *Deputy Governor responsible for financial stability*
Ms Kate Barker, *External member of the Monetary Policy Committee*
Dr Andrew Sentance, *External member of the Monetary Policy Committee*

House of Commons, Treasury Committee, 28 June 2007

John McFall (Chairman): *Labour*
Jim Cousins: *Labour*
Angela Eagle: *Labour*
Michael Fallon: *Conservative*
Sally Keeble: *Labour*
Andrew Love: *Labour*
Sion Simon: *Labour*
John Thurso: *Liberal Democrat*
Mark Todd: *Labour*
Peter Viggers: *Conservative*

Mr Mervyn King, *Governor of the Bank of England*
Ms Rachel Lomax, *Deputy Governor of the Bank of England*
Mr Paul Tucker, *Executive Director for Markets, Bank of England*
Professor Tim Besley, *External Member of the Monetary Policy Committee*
Professor David Blanchflower, *External Member of the Monetary Policy Committee*

House of Commons, Treasury Committee, 29 November 2007

John McFall (Chairman): *Labour*
Nick Ainger: *Labour*
Graham Brady: *Conservative*
Colin Breed: *Liberal Democrat*
Jim Cousins: *Labour*
Philip Dunne: *Conservative*
Michael Fallon: *Conservative*
Andrew Love: *Labour*

Mark Todd: *Labour*
Peter Viggers: *Conservative*

Mr Mervyn King, *Governor of the Bank of England*
Ms Rachel Lomax, *Deputy Governor of the Bank of England (Monetary Analysis)*
Mr Charles Bean, *Executive Director and Chief Economist*
Professor Tim Besley and Professor David Blanchflower, *External Members of the Monetary Policy Committee*

House of Commons, Treasury Committee, 26 March 2008

John McFall (Chairman): *Labour*
Nick Ainger: *Labour*
Graham Brady: *Conservative*
Colin Breed: *Liberal Democrat*
Jim Cousins: *Labour*
Philip Dunne: *Conservative*
Michael Fallon: *Conservative*
Sally Keeble: *Labour*
Andrew Love: *Labour*
John Thurso: *Liberal Democrat*
Mark Todd: *Labour*
Peter Viggers: *Conservative*

Mr Mervyn King, *Governor of the Bank of England*
Ms Rachel Lomax, *Deputy Governor of the Bank of England (Monetary analysis)*
Professor Charles Bean, *Chief Economist, Bank of England*
Dr Andrew Sentance, *External Member of the Monetary Policy Committee*
Professor David Blanchflower, *External Member of the Monetary Policy Committee*

House of Commons, Treasury Committee, 26 June 2008

John McFall (Chairman): *Labour*
Graham Brady: Conservative
Jim Cousins: *Labour*
Philip Dunne: Conservative
Michael Fallon: *Conservative*
Andrew Love: *Labour*
Mark Todd: *Labour*
John Thurso: *Liberal Democrat*

Mr Mervyn King, *Governor, Bank of England*
Sir John Gieve, *Deputy Governor, Bank of England*
Mr Paul Tucker, *Executive Director, Bank of England*
Professor Tim Besley, *External Member, Monetary Policy Committee*
Ms Kate Barker, *External Member, Monetary Policy Committee*

House of Commons, Treasury Committee, 11 September 2008

John McFall (Chairman): *Labour*
Graham Brady: *Conservative*
Jim Cousins: *Labour*
Philip Dunne: *Conservative*
Michael Fallon: *Conservative*
Sally Keeble: *Labour*
Andrew Love: *Labour*
George Mudie: *Labour*
Sion Simon: *Labour*
Mark Todd: *Labour*
Peter Viggers: *Conservative*

Mr Mervyn King, *Governor of the Bank of England*
Mr Charlie Bean, *Deputy Governor of the Bank of England*
Mr Paul Tucker, *Executive Director of the Bank of England*
Professor David Blanchflower, *External Member of the Monetary Policy Committee*
Dr Andrew Sentance, *External Member of the Monetary Policy Committee*

House of Commons, Treasury Committee, 25 November 2008

John McFall (Chairman): *Labour*
Nick Ainger: *Labour*
Graham Brady: *Conservative*
Colin Breed: *Liberal Democrat*
Michael Fallon: *Conservative*
Andrew Love: *Labour*
John Thurso: *Liberal Democrat*
Mark Todd: *Labour*
Peter Viggers: *Conservative*

Mr Mervyn King, *Governor of the Bank of England*
Mr Charles Bean, *Deputy Governor of the Bank of England (Monetary Policy)*
Sir John Gieve KGB, *Deputy Governor of the Bank of England (Financial Stability)*
Dr Andrew Sentance, *External Member of the Monetary Policy Committee*
Ms Kate Barker, *External Member of the Monetary Policy Committee*

<u>House of Commons, Treasury Committee, 24 March 2009</u>

John McFall (Chairman): *Labour*
Nick Ainger: *Labour*
Graham Brady: *Conservative*
Jim Cousins: *Labour*
Michael Fallon: *Conservative*
Sally Keeble: *Labour*
Andrew Love: *Labour*
John Mann: *Labour*
George Mudie: *Labour*
John Thurso: *Liberal Democrat*
Mark Todd: *Labour*
Andrew Tyrie: *Conservative*
Peter Viggers: *Conservative*

Mr Mervyn King, *Governor*
Mr Paul Tucker, *Deputy Governor*
Mr Spencer Dale, *Executive Director*
Professor Tim Besley and Professor David Blanchflower, *External Members of the Monetary Policy Committee, Bank of England*

<u>House of Lords, Economic Affairs Committee, 24 November 2009</u>

Lord Vallance of Tummel (Chairman): *Liberal Democrat*

Lord Best: *Cross-Bench*
Lord Eatwell: *Labour*
Lord Forsyth of Drumlean: *Conservative*
Baroness Hamwee: *Liberal Democrat*
Baroness Kingsmill: *Labour*
Lord Levene of Portsoken: *Cross-Bench*
Lord MacGregor of Pulham Market: *Conservative*
Lord Paul: *Cross-Bench*
Lord Tugendhat: *Conservative*

Mr Mervyn King, *Governor of the Bank of England*
Mr Paul Tucker, *Deputy Governor*
Mr Paul Fisher, *Executive Director*
Mr Andrew Sentance, *External MPC Member*

Appendix 2: Supervised Lemmatization

In Alceste, a capital letter followed by a lower case letter is automatically changed to a lower case letter; however, a word constituted by capital letters only (as an acronym) remains unchanged. So, for instance, the word "Fed" (as in Federal Reserve) would be changed to "fed" and thus read by the software as the past tense of "feed". (Aside from the obvious distortion of its meaning, the word would be treated as a verb rather than a noun.) To avoid this and other potential distortions in the lemmatization process, it is necessary to make the necessary substitutions prior to analysis (e.g., "Fed" would become "Federal Reserve").

Moreover, a hyphen is not recognised as a liaison link by the software, so for instance "Y-2-K" would be read as the separate letters "Y 2 K" rather than as a single phrase. In these cases, the hyphen is replaced with an underscore ("Y_2_K").

Hence, as a means to avoid distortions from the lemmatization process, the congressional hearing transcripts are edited as follows:

- All names are joined with hyphens ("Christopher_Dodd").
- Countries, regions, states are similarly joined, as needed (Southeast_Asia, United_Kingdom).
- Key institutions and phrases are changed as follows:

New York Federal Reserve (New_York_Federal_Reserve)
Fed or Federal Reserve (Federal_Reserve)
Bank of Japan (Bank_of_Japan)
Domestic Open Market Operations (Domestic_Open_Market_Operations)
Fannie Mae (changed to Fannie_Mae)
Freddie Mac (Freddie_Mac)
G5 (G_5)
G7 (G_7)
Capital investment (capital_investment)
M1 (M_1)
M2 (M_2)
M3 (M_3)
Home Loan Bank/s (Home_Loan_Banks/s)
Federal Open Market Committee/FOMC (F_O_M_C)
Consumer Price Index/CPI (C_P_I)
European Central Bank/ECB (E_C_B)
Y-2-K (Y_2_K)
GDP (G_D_P)
Latin America/Latin American (Latin_America/n)

UK/United Kingdom/Britain (United_Kingdom)
Bank of England (Bank_of_England)
Brazilian Central Bank (Brazilian_Central_Bank)
NASDAQ (N_A_S_D_A_Q)
European Union (European_Union)
Exchange rate/s (exchange_rate; or exchange_rates)
Interest rate/s (interest_rate; interest_rates)
Inflation/inflation rate (inflation_rate; inflation_rates)
Monetary policy (monetary_policy)
Unemployment/unemployment rate (unemployment_rate; unemployment_rates)
Labor market (labor_market)
Manufacturing sector (manufacturing_sector)
Bond market (bond_market)
NAIRU (N_A_I_R_U)
Federal funds rate (Fed_Funds_Rate)
Federal Reserve Act (Federal_Reserve_Act)
Oil prices (oil_prices)
OPEC (O_P_E_C)
Philips curve (Philips_curve)
Taylor rule (Taylor_rule)
Humphrey-Hawkins (Humphrey_Hawkins)
Salomon Brothers (Salomon_Brothers)
Foreign Currency Operations (Foreign_Currency_Operations)
National economy (national_economy)
Financial markets (financial_markets)
Hong Kong Shanghai Bank (Hong_Kong_Shanghai_Bank)
Senate Banking Committee (Senate_Banking_Committee)
House Banking Committee (House_Banking_Committee)
System Open Market Account (System_Open Market_Account)
Budget deficit/s (budget_deficit)
Federal deficit/s (federal_deficit)
Federal spending (federal_spending)
sub-prime mortgage (sub_prime_mortgate)
sub-prime lending (sub_prime_lending)
sub-prime market (sub_prime_market)
credit crunch (credit_crunch)
Northern Rock (Northern_Rock)
Sarbanes-Oxley (Sarbanes_Oxley)
Lehman Brothers (Lehman_Brothers)
Quantitative easing (quantitative_easing)
Bear Stearn (Bear_Stearns)
Bond market (bond_market)
Consumer spending (consumer_spending)

Lemmas Imposed on parliamentary hearings

Same as for congressional hearings, with the addition of the following: Bank of England, CBI, Eastern Europe, Energy costs, Euro area, Energy prices, ECB, ERM, European Union/EU, Fiscal deficit/deficits, FTSE, Housing market, HSBC, IMF/International Monetary Fund, Inflation Report, Labour market, LIBOR, Migrant workers, Monetary Policy

Committee, National income, Northern Rock, ONS, Private sector, Public expenditure, Public sector, RPI/retail price index, TUC