Forward Guidance as a New Idea: Changes in the MPC Discourse of the MPC under King and Carney

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In the course of policy making, the Bank of England's (BoE) Monetary Policy Committee (MPC) authors and disseminates a policy discourse. That discourse takes the form of monthly MPC meeting minutes, but also, this paper holds, the public remarks of its constituent members. This paper presents findings from exploratory text analysis that looks closely at two years of MPC's discourse, focusing particularly on the ideational shift to forward guidance in 2013 at the beginning of Mark Carney's governorship. We examine the minutes and speeches from the final year of the Mervyn King governorship and the first year of the Mark Carney governorship in order to probe three dimensions: (1) the changing substantive focus of the MPC, as it adopted the new idea of forward guidance; (2) the focal deviation from the MPC's minutes by members in their public remarks; and (3) the extent to which the new idea of forward guidance transformed the public discourse of internal and external MPC members.

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I.   Introduction

New central bank governors typically make headlines, but even more when significant changes in the conduct of monetary policy are expected. When Mark Carney began his governorship of the Bank of England on 1 July 2013, one fundamentally important change was anticipated—namely, the adoption of "forward guidance" as a monetary policy tool. Within a month of the new governor taking office, the Bank's Monetary Policy Committee (MPC) endorsed the new idea and, to date, forward guidance remains at the centre of the Bank's policy framework (though in an amended form). The novelty of this policy shift cannot be overstated, as such fundamentally new ideas are infrequent in monetary policy decision making.

Perhaps because of their rarity, fundamentally new ideas are not the typical focus of scholarly investigations of monetary policy making. In addition to warranting study due to its novelty, the case of forward guidance is particularly intriguing to us as it is predicated upon a kind of political action that takes the form of words (which we call discourse) that seek to shape the expectations of economic agents, in this case in a world of near zero interest rates. We thereby focus our investigation on the origins of forward guidance in the Bank of England—that is, the introduction of the new idea to the MPC. Quite simply, how did the new idea of forward guidance under Carney's governorship come to change the discourse of MPC members relative to that during the previous Mervyn King governorship?

Our study contends that, in the course of policymaking, the Monetary Policy Committee authors and disseminates a policy *discourse*. That discourse primarily takes the form of monthly MPC meeting minutes. But we hold that there is also a second form of discourse—namely, the public remarks of the MPC's constituent members. This paper presents findings from an exploratory text analysis that looks closely at two years of the MPC's discourse, focusing particularly on the ideational shift to forward guidance in 2013. We excavate the minutes and speeches from the final year of the Mervyn King governorship and the first year of the Mark Carney governorship in order to probe three dimensions: (1) the changing substantive focus of the MPC, as it adopted the new idea of forward guidance; (2) the focal deviation from the MPC's minutes by members in their public remarks; and (3) the extent to which the new idea of forward guidance transformed the public discourse of internal and external MPC members. In doing so, we identify significant discursive themes and their statistical associations with the MPC and its members, and thereby empirically capture both how the MPC speaks as a whole and as a set of individuals. We demonstrate novel methods of visualizing our findings, which help to clearly portray who speaks, how, when, and with what effect.

At the core of our findings is the depiction of the role of forward guidance as a fundamentally new idea in the formulation of monetary policy by the Bank of England. Using automated textual analysis, we employ a variety of tools to objectively map the MPC's policy discourse over the immediate period of its adoption and implementation. Section II sets out the conceptual premises of the new idea of forward guidance; Section III places the empirical investigation of new ideas in monetary policy decision making into the larger literature on monetary policy decision making; Section IV discusses the data and methodology employed; and Section V then explains the initial output from the text analysis. In Section VI we interpret the results and discuss their implication. Finally, Section VII concludes.

II.   A New Idea; A New Governor

While the idea of forward guidance enjoyed the backing of Chancellor George Osborne, Mark Carney nonetheless required the support of the Bank's Monetary Policy Committee—a committee reputed for independent thinking among its members. The new governor thus sought to move the MPC towards a practice that would in effect commit to retaining interest rates at a given level until some date or condition(s) were achieved. As Governor of the Bank of Canada, Carney gained experience with a form of forward guidance that, in 2009, promised not to raise rates until the middle of the following year. Just days after taking office, Carney's Bank of England announced a commitment to move toward a similar system of forward guidance, which the MPC adopted the following month.

In a world in which the Bank had exhausted its scope for lowering short-term interest rates, the core premise of forward guidance was to provide 'state-contingent' guidance—for example, saying that interest rates will remain unchanged until unemployment falls to X rate—as a way of persuading the markets that the Bank was committed to growing the economy: "If the markets and ordinary households all really believe this, they will act as if that recovery is going to happen, and so actually make it happen more quickly than it might have done otherwise" (Flanders 2013). Importantly, such an approach was meant to persuade the public that under Carney, the Bank would be "more 'flexible' in [its] interpretation of the inflation target" than under the governorship of Sir Mervyn King (Flanders 2013).

In August 2013, the Bank announced that it would retain the historically low interest rate of 0.5% until unemployment fell to a rate of 7% or lower. In accepting the idea of forward guidance as a commitment device (set out precisely in the Bank's August Inflation Report (2013: 7)), the Bank sought to explicitly provide the markets with greater clarity on three interrelated points:

1. the "trade-off between the speed with which it [the MPC] attempts to return inflation to the target and the support it is able to provide to [economic] activity" (2013: 6)
2. "the future path of monetary policy as the economy recovers" (2013: 6); and
3. "a robust framework within which the MPC can explore the scope for economic expansion without putting price stability and financial stability at risk" (2013: 6).

These three points are closely associated with the statutory objectives of the BoE. For instance, with respect to the trade-off (point 1), the Bank's statutory objective in respect to monetary policy is to maintain price stability and, as legislation stipulates, "to support the government's policy, including its objectives for growth and employment". Since 2012, the Bank has also had a set of statutory objectives related to financial stability, which underpin the third point. With respect to its statutory obligations, forward guidance functions to enhance the clarity and transparency that are required to ensure compliance with the Bank's mandate.

This is not to say, however, that the 2013 iteration of forward guidance was an undisputed success. Ironically, the unanticipated fall in the unemployment rate, absent signs of runaway inflation, led to an amendment of the original forward guidance framework in the February 2014 Inflation report that might be "forward guidance II" (2014: 8-9). The reasoning offered for the amendment was that unemployment "fell more sharply than expected". Nonetheless, spare capacity in the economy

continued and inflation was "expected to remain at, or a little below, the target for the next few years" (2014:7) . Specifically, the Bank noted that:

> "Essentially, the MPC will seek to close the spare capacity in the economy over the next two to three years while keeping inflation close to the target. To that end, it judges that there is scope for the economy to recover further before Bank Rate is raised and, even when Bank Rate does rise, it is expected to do so only gradually and to a level materially below its pre-crisis average of 5%". (2014: 7)

Broadly speaking, what made forward guidance (particularly Forward Guidance I) a novel idea was the nature of a more precise view and definitive stance on the future path of monetary policy, and importantly what might trigger changes in its policies in the future, than had been the case in the past. The aim of this new idea was to steer the expectations of economic agents and, thus, smooth the transition of monetary policy away from its unusual state (i.e., near zero interest rates coupled with quantitative easing). In contrast to the MPC's previous thinking on monetary policy, forward guidance is driven by a greater confidence on the state of knowledge of the evolution of the economy, and thus a willingness to use this framework without jeopardizing the overall credibility of monetary policy.

Put into a longer history of monetary policy making in advanced economies, forward guidance is a new idea that contrasts sharply with the thinking of central bankers during the era of high inflation. In the 1970s, amidst high inflation in the US, the Federal Reserve's Open Market Committee was so uncertain about the evolution of the economy and the impact of monetary policy—as well as public acceptance of the Fed's actions—that it adopted a policy which disguised the impact in terms of interest rate changes (Greider 1987; Volcker and Gyohten 1992; Bailey and Schonhardt-Bailey 2008; Meltzer 2009). As something of a parallel with Paul Volcker's "Revolution" in US monetary policy, Carney faced committee members who had expressed doubts about the new idea—most notably, Charlie Bean (Deputy Governor), Spencer Dale (Chief Economist), along with two external members, Martin Weale and Ben Broadbent (Jones 2013 (August 4)). This raises intriguing questions about potential conflicts within MPC deliberations. How did the new idea affect the positions of MPC members in the policy decision making space? To what extent was forward guidance used as framing device for the presentation of monetary policy to the outside world, both in the committee minutes and the public speeches of members? More broadly, how did the new idea of forward guidance under Carney's governorship change the discourse of MPC members, relative to that during the King governorship?

III.   Deliberation, Textual Analysis and the Bank of England's Monetary Policy Committee

As was noted earlier, new ideas are both rare and infrequently studied in the literature on monetary policy decision making. Instead, studies investigating the process of monetary policy decision making by the MPC have focused on the policy preferences of MPC members (expressed as votes) as shaped by political appointments (Hix, Høyland et al. 2010; Harris, Levine et al. 2011), or by their respective roles as either internal or external members (Besley, Meads et al. 2008; Gerlach-Kristen 2009; Harris, Levine et al. 2011; Hansen, McMahon et al. 2014a). The regularity of appointments to the MPC and the defining role-identities of its members are important for understanding their policy preferences.

However, a new idea like forward guidance may be thought of as an exogenous shock which impacts upon the deliberations of the MPC; in the end, shaping the policy preferences of MPC members themselves. Conceiving forward guidance as an "ideational shock" upon the deliberative process of the MPC thus requires a methodological shift away from voting behaviour to focusing instead on the actual ideas, arguments, and debates which comprise the fodder for the ultimate decision calculus of the MPC. It requires an analysis of the *words* that give rise to the votes of the members.

We are certainly not the first to take an interest in the textual data of central bankers. Over the past few years, a number of studies using various applications of textual analysis have examined the actual words, arguments and debates of monetary policy committees. Some of this has focused on the US Federal Reserve's Federal Open Market Committee transcripts (Bailey and Schonhardt-Bailey 2008; Schonhardt-Bailey 2013 ; Acosta 2014; Hansen, McMahon et al. 2014b), while other works have taken a more comparative approach to the speeches and minutes produced by central bankers (Siklos 2013; Bennani and Neuenkirch 2014). Scholars have also employed text analysis software to capture the sentiments expressed in financial text (Loughran and McDonald 2011; Kearney and Liu 2014), to understand (and predict) market behaviour (Nassirtoussi, Aghabozorgi et al. 2014), and to analyse the role of central banks' inflation reports in shaping financial markets (Buliř, Čihák et al. 2014). Within this newer literature, very little attention has been given to analysing systematically how new ideas shape committee deliberations, with the exceptions of Siklos (Siklos 2013), who uses the minutes of five central banks to analyse how the language of central bankers changed from the financial crisis onwards, and Bailey and Schonhardt-Bailey (Bailey and Schonhardt-Bailey 2008), who analyse the transcripts of the FOMC during the Volcker Revolution to gauge the influence and success of the new idea of "credible commitment". While other studies have sought to assess the role of individual central bank governors (Kuttner and Posen 2007; Apel, Claussen et al. 2013), these have not focused on new ideas per se, nor have they employed advanced textual analysis as a research methodology.

In short, the emergence of forward guidance as a new idea for monetary policy making under the new governorship of Mark Carney offers a unique opportunity to gauge the impact of such an exogenous shock on the thinking of MPC members. Moreover, the application of textual analysis to a domain that is discursive by nature provides a powerful toolkit to carry out a systematic analysis.

IV.   Methods and Data

The methodological crux of this paper lies in subjecting textual data representative of the process of monetary policy making by the MPC to an exploratory quantitative text analysis.[1] In doing so, our aim is to objectively trace patterns in the MPC's policy deliberations by empirically uncovering substantive patterns and associations in the terms of the MPC's monetary policy discourse.

a.   The Alceste Methodology

This study conducts its exploratory quantitative text analysis using a software platform called Alceste.[2] Since 1983, an increasingly interdisciplinary community of researchers and text analysts

have adopted Alceste as a text analysis methodology.[3] At its core, it operates with the view that textual data is comprised of *authored* content (not just random bags of words) and, in that light, it attempts to discern the various "lexical worlds" occupied by the contents of a corpus.[4] Rather than conceptualizing terms as occurring in a univariate distributional pattern, Alceste takes a thematic approach that examines the bivariate associations between words and phrases in order to map clouds of concepts—specifically, terms and phrases that co-occur in a statistically significant manner.

In tracing how content interrelates, Alceste aims to reveal the underlying patterns in textual data. By mapping out the statistical distribution of and relationships between terms, the method traces the contours of thematic patterns (rather than, say, the simple frequency of terms), which allows us to observe how terms, concepts, and ideas in a corpus occur significantly *in relation to each other*. The employment of co-occurrence analysis is rooted in the idea that frequency alone can only tell us so much about text data and recognizes that certain terms occur more frequently with some and less frequently with others. In that sense, Alceste attempts to establish stable classes of terms that are maximally associated within while being minimally associated without. In doing so, the boundaries between naturally occurring lexical worlds (classes) occupied by the contents of a corpus are brought to light in such a way that we can empirically delineate discursive themes.

Importantly, Alceste is blind to the substantive meanings of the terms it analyses and is best thought of as a reorganizer of data. The software performs a small number of semantic functions when it processes text data, but these steps do not involve any substantive interpretation of meaning. As such, Alceste is less a self-concluding methodology than a toolkit for revealing existing patterns in data that is often large, complex, and multidimensional. Akin to archaeology, Alceste uncovers structures in data that must later be analysed, interpreted, and named.

b. Data Preparation and Structure

The computational stages of Alceste's methodology are fixed, allowing for consistent replication of findings, but there are a handful of fundamental concepts and preconditions on data that must be addressed in advance of running an analysis that achieves reliable and valid findings. Broadly, these concerns have no bearing on the substantive content of the corpus and instead relate to the logistics of how data must be compiled and prepared in order to run a dataset through the program. That being said, they do have an important bearing on how corpus are structured and managed.

i. Conditions on Data Selection

While Alceste is meaning insensitive, two general preconditions must be met at the outset in order to reach worthwhile findings. First, the data must occupy an appropriate domain, in that the contents of a corpus should be coherently related to the research area or question. In other words, as we set out to examine monetary policy discourse, the text data ought to relate to monetary policy. Second, text data must be of an appropriate volume to achieve statistically sound results. In the case of Alceste, this requires the text contained in a corpus to total at least ten thousand words.

ii. Conditions on Data Formatting

Other than the two basic preconditions, three stylistic formatting requirements are imposed on the content of a corpus. First, asterisks and dollar signs must be replaced or removed from the corpus text as they serve a specific purpose in how Alceste reformats a corpus for analysis. Second, terms in uppercase are ignored and therefore must be changed to lowercase to be detected. Third, apostrophes or inverted commas, largely because of their particular function in some languages, must be converted to underscores (_). Generally, these formatting specifications can be applied easily with the *find* and *replace all* functions available in most word processors.[5]

Beyond these stylistic formatting changes, Alceste incorporates what can be thought of as its "coding" stage before an analysis is carried out. The coding that Alceste employs is very different from other approaches to content analysis in that it does *not* entail a classification of content into categories of meaning. Insofar as Alceste does incorporate coding, it allows researchers to define two related features of the corpus—namely, the *initial context units* (structural features) and *passive tag lines* (descriptive or characteristic features).

1. Initial Context Units (ICUs) and Passive Tag Lines

Initial context units (ICUs) are effectively what some other text analysis methods might refer to as "documents." These documents are the sampling units of content that correspond to specified divisions of the text. In order to designate an ICU, a *passive tag line* is inserted before the related content. These lines of "code" serve a dual purpose. First, they perform a formatting function by indicating where new ICUs begin. Second, they allow us to associate a variety of passive variables with the content contained within the corresponding ICUs. These variables can be cross-tabulated against the resulting classes in order to add colour to the revealed thematic patterns. As an example, particularly useful examples for policy speeches might include descriptors like name of the speaker, their institutional affiliations, the speaker's gender, the date of the speech, etc. In that way, the classes can be cut by any variable—name, institution, gender, date, etc.

The actual process of inserting a passive tag line is rather simple, though it knowingly becomes a more arduous task as the number of ICUs grows considerably. Tag lines are formatted as follows, where the set of four asterisks indicates the beginning of an ICU, lowercase words indicate the category, and uppercase words indicate tags:

**** *author_VALLES *gender_MALE *university_LSE

c. The Alceste Procedure

The actual computational procedure carried out by Alceste occurs in three stages: (1) the treatment of the text; (2) the analysis of the text; and, (3) the statistical and interactive output.

i.   Treatment of the Text

Alceste begins by creating a basic vocabulary dictionary containing all of the lexical forms in the corpus. This dictionary is used to exclude from the subsequent analysis certain types of words that are highly unlikely to contribute to the substantive meaning of the corpus. These include articles, prepositions, and conjunctions, which serve little purpose in determining thematic patterns given their neutral meanings. After the exclusion of non-content words, Alceste compiles a reduced and lemmatized dictionary of the lexical forms contained in the corpus. All verbs are converted to their infinitive forms, plural terms are reduced to their singular forms, and a limited set of variants of lexical forms is reduced to common roots.

The second step in treating the text involves cutting the text contained within the designated *initial context units* (ICUs) into *elemental context units* (ECUs), which are word strings that are best understood as approximations of statements contained in the corpus. In order to circumvent the debate about what constitutes a semantic unit, Alceste produces a mapping in the following stages that is *independent* of statement length. Rather than using one fixed length for word strings, Alceste uses two estimations of context units (which tend to be about twelve and eighteen active words each) that are concatenations of ECUs, which are later used to carry out two separate classifications of content. Alceste retains only those word classes that occur in *both* classifications, with the result being a stable set of classes reached independently of statement length.

ii.   Analysis of the Text

In the second stage of Alceste's method, a quantitative analysis is carried out on the corpus as treated in the first stage. First, Alceste makes the text data computationally accessible by transforming the distribution of terms into numerical data organized in a co-occurrence matrix of lexemes and ECUs. Second, Alceste carries out an algorithmic descending hierarchical classification in order to sort ECUs into partitions of significantly associated groupings.[6] Alceste begins by creating an initial matrix table that crosses all of the retained lexemes with all of the ECUs in the corpus. When lexemes are present or absent, a 0 or 1 is recorded, respectively. Alceste thereafter employs a recursive algorithm in order to partition the contents of the tables into two distinct classes. In doing so, the algorithm seeks *maximal homogeneity internally* and *maximal heterogeneity externally*. The underlying idea is that ECUs that contain similar lexemes are *more* likely to be topically related to one another. This sorting of ECUs into partitions is the very essence of how Alceste objectively extracts thematic patterns *without* needing to evaluate the substantive meaning of words.

To be sure, not all classification partitions are created equally. Some partitions are better than others, which are measured by chi-squared statistics for each lexeme and class. This is carried out on a second table that contains rows for each of two classes and columns for each lexeme. The algorithm follows a descending hierarchical classification method in order to maximize the chi-squared values by reiterating the partitioning process. This is continued as long as further partitions stably achieve higher chi-squared values, meaning a higher coherence within a given class. When no further stable classes can be partitioned, we gauge the goodness-of-fit of the mapping by the classification rate (the total number of ECUs classified into stable classes). Importantly, a descending classification provides a robustness control given that text data matrices are very sparse. In this way,

the computations of distributions is highly sensitive to data occurrences, with a descending classification, as such, helping us to avoid over-amplifying the impact of scarce entries by keeping partitioning local.

iii.   Interactive Statistical Output

Alceste offers a considerable amount of statistical output related to its mapping of corpus content. The most basic results are lists of words and phrases that are significantly associated with each class. The strength of the association between terms and their classes is reported in two measures— namely, *chi-squared values* and *phi coefficients*.[7] Principally speaking, the larger the chi-squared value or phi coefficient the more significantly associated a word or phrase is to the class in which it occurs. These word and phrase lists are the primary output used to interpret the meaning of classes.

Beyond ranked word and phrase lists, Alceste offers a wealth of other useful information. The most significant feature, however, is the presentation platform itself—a graphic user interface that allows for the interactive investigation and manipulation of data. Three formal reports are produced in varying lengths and specificity, which can be used to present findings. As a part of the comprehensive full report, Alceste produces a set of three correspondence analyses. These two dimensional plots are computed with matrixes that cross-tabulate classes, lemmatized terms, and tagged variables. This allows us to populate, examine, and present a spatial representation of the associational relationships between classes, classified words, and tags that reflects their degree of association by proximity. We show later how this is useful in interpreting the dimensionality of data related to monetary policy.

d.   Our Data Selection and Preparation

We take as our primary data sources (1) the minutes from the monthly MPC meetings and (2) the transcripts of public remarks made by individual MPC members, all of which are publicly available on the BoE's website.[8] We include in our study the entirety of the monthly MPC minutes and all of those public remarks made by MPC members related specifically to monetary policy during the final year of Mervyn King's governorship and the first year of Mark Carney's governorship.[9] These dates span a two-year period from July 2012 to June 2013 and July 2013 to June 2014, corresponding, respectively, to the contents of two corpora (KingMS and CarneyMS) that we compile and analyse.

The specific documents (in our case, the individual sets of minutes and transcripts of public remarks) included in each corpus are outlined in Table 1. The document manifest is ordered chronologically, as the documents are also ordered in each of the two corpora, with the shading of the table alternating to indicate the calendar month periods in which each document occurs. Each document is dated, and in the case of public remarks speaker's name and speech title are provided for reference.

In the construction of the two corpora, we use passive tag lines to demarcate ICUs at the break points between each set of minutes or transcript. A total of 81 ICUs, equal to the total number of documents included in each corpus, are indicated with passive tag lines that associate the name of

the speaker (or in the case of minutes, the MPC as a whole), whether they are an internal or external member of the MPC, whether they are a member of the Financial Policy Committee (FPC), the sitting governor at the time, and the document source (whether minutes or speeches). This allows for a wide array of data manipulation and cross-tabulation after the fact, which we delve into more in the following sections.

Importantly, the data examined in this study are both publicly available and readily accessible, meaning that the sourcing of data has proven to be a relatively affordable task. However, the process of converting the minutes and transcripts from PDF or web versions to plain text is a time consuming procedure in its own right. Embedded punctuation and text formatting can skew, even if mildly, the readability of plain text. As such, all of the text included in this corpus has been reviewed by hand to ensure that the formatting of the documents align with punctuation as recorded.

We impose only two sets of choices on our data. First, related to data sourcing, we elect *not* to include footnotes from the original data sources in the corpus. Partly, the footnotes are idiosyncratic to the documents in which they are found. In our view, the footnotes in question did not reflect core content and, especially in the case of public remarks, language that is prioritized in text or spoken aloud. In most cases, footnotes contained a higher proportion of quantitative information and data, which our method is, intentionally, less interested in than the mapping of qualitative text data.

Second, related to data formatting, we impose a manual lemmatization protocol onto the data in order to combine terms that are related to monetary policy discourse. Our manual lemmatization list can be found in Table 2, which lists the combined lemmatized terms and their original source terms, as well as the frequencies of each in total, in the minutes alone, and in the speeches alone. This list is based on the supervised lemmatization protocol outlined in Schonhardt-Bailey (2013), with additional content included that is particular to monetary policy discourse in the UK.

V.   Presentation of Output

Interpreting the contents of classes in order to discern their thematic meaning involves interactively reviewing the various characteristic terms and ECUs that are associated with each class. The following sections present the basic statistics for each of the two corpora analysed in this study. In order to demonstrate the process of interpreting the meaning of classes, these sections reference a series of tables that contain the characteristic terms and ECUs for each class that emerges. For each, the top twenty most characteristic terms are listed as well as several of the most characteristic ECUs in order to demonstrate the meanings as we interpret them.

a.   KingMS Corpus

The KingMS corpus contains the MPC monthly meeting minutes and transcripts of public remarks related to monetary policy made by MPC members during the final year of Mervyn King's governorship of the Bank of England (July 2012 to June 2013).

i. Basic Statistics

Table 3 presents a summary of the basic statistics related to the analysis of the KingMS corpus. In total, the corpus contains 166,639 words that were either included in the MPC's meeting minutes or spoken by MPC members in public remarks related to monetary policy. The corpus itself contains 41 ICUs (29 speeches and 12 sets of minutes), which are associated with a total of 30 passive variables and broken down into 4,092 ECUs. With a classification rate of 72%, the ECUs contained within the KingMS corpus were stably classified into four distinct classes numbered K1 through K4, with distributions of 41%, 29%, 14%, and 16% of the classified ECUs, respectively.

ii. Interpreting the Classes

Table 3 provides titles describing the substantive content for each of the four classes. Importantly, Alceste does not provide these titles. The meaning ascribed to any given class is discerned by interpreting the characteristic terms and ECUs of each class. Table A1 in our Appendix offers a more extensive accounting of these features by laying out the discursive evidence that contributes to our interpretations of the meaning of each class. The table itself is organized into columns of terms and phrases listed in rank order (with terms listing their respective phi coefficient, indicative of the strength of association of the relationship between the term and the class).

We interpret class K1 as representative of a theme related to the Real Economy (UK & International), K2 as representative of the BoE's Quantitative Easing, Liquidity Schemes & Supply of Credit, K3 to be Economic Modelling and Forecasting, and K4 to be the Framework of Monetary Policy. On the whole, we find these interpretations are specific enough to encapsulate the meaning of each class while drawing important distinctions between the classes themselves. Generally, we are confident that these findings are robust given a classification rate of 72% and given that the classes portray thematic classes that represent the reasonably expected institutional interests of the BoE and MPC.

b. CarneyMS Corpus

The CarneyMS corpus contains the MPC monthly meeting minutes and transcripts of public remarks related to monetary policy made by MPC members during the first year of Mark Carney's governorship of the Bank of England (July 2013 to June 2014).

i. Basic Statistics

Table 4 presents a summary of the basic statistics related to the analysis of the CarneyMS corpus. In total, the corpus contains 162,507 words that were either included in the MPC's meeting minutes or spoken by MPC members in public remarks related to monetary policy. The corpus itself contains 40 ICUs (28 speeches and 12 sets of minutes), which are associated with a total of 32 passive variables and broken down into 3,994 ECUs. With a classification rate of 84%, the ECUs contained within the

CarneyMS corpus were stably classified into five distinct classes numbered C1 through C5, with distributions of 27%, 24%, 24%, 12% and 13% of the classified ECUs, respectively.

ii.   Interpreting the Classes

Table 4 provides titles describing the substantive content for each of the five classes. Table A2 (Appendix) offers an extensive accounting of these features by laying out the discursive evidence that contributes to our interpretations of the meaning of each class.

We interpret the thematic content of each of the classes as follows: C1 – Forward Guidance and the Policy Decision;[10] C2 – Housing Finance, Mortgages and Broader Bank Balance Sheet Issues; C3 – Labour Market, Earnings and Productivity; C4 – Inflation and Financial Markets; C5 – Economic Growth, Real Economy and Data Releases. Like the King classes, we find these interpretations are specific enough to capture the meaning of each class while drawing distinctions between the classes themselves. Once again, the classification rate of 84% and the depiction of expected substantive themes related to the BoE and MPC lend confidence to the validity of our findings.

VI.   Interpretation and Discussion

We began this paper with the intent to explore three dimensions of the changing MPC discourse between the King and Carney governorships, focusing particularly on: (1) the changing substantive focus of the MPC, as it adopted the new idea of forward guidance; (2) the focal deviation from the MPC's minutes by members in their public remarks; and (3) the extent to which the new idea of forward guidance transformed the public discourse of internal versus external MPC members. Having set out our data in Section IV, it is worth noting that these data are necessarily only proxies for the actual internal deliberations that are part of the MPC decision making process, which of course would be preferable and found in verbatim meeting transcripts if they were made public. In years to come, the Bank of England has committed to providing transcripts for the second part of the MPC meetings,[11] but until that time, we are limited to the available data.

Nonetheless, using the MPC minutes and the speeches on monetary policy by its members, we have gained significant traction in mapping and exploring the empirical underpinnings of the forward guidance as it changed the public discourse of the MPC from Governor King to Governor Carney. To this end, we transform the statistical output that reflects the various associations between terms, variables, and classes (phi coefficients) in order to narrate and visually portray a story about the thematic underpinnings of the data. We look specifically at the way individuals are associated with particular classes and thematic content, and how we can graphically represent the complex multidimensionality of monetary policy discourse.

a.   Portraying the Impact of Individuals

Given that all of the ICUs in the two corpora we analyse are prefaced with a passive tag line that affiliates MPC members or the MPC with its textual content (speeches or minutes, respectively), we can cross those names against the distribution of ECUs over the hierarchy of classes in order to calculate a phi coefficient that indicates the strength of the association between the individual or institution and each particular class. The strength of these associations represents the degree to which MPC members or the MPC display particular discursive tendencies in the speeches or minutes. As such, we can quantitatively identify *how* individual MPC members and the MPC itself speak.

b. A New Idea

Figures 1 and 2 present tree diagrams (dendrograms) of the clustering of the classes, where the nearer the proximity of the tree "limbs," the more overlap there is in the vocabulary or terms. For example, in Figure 1, the greatest overlap in vocabulary is between classes 3 and 4. In the right hand column, these figures also list statistically significant associations by name, institutional role [external/internal member], and the committee as a whole [MPC] for each class.

In both Figures 1 and 2, Class 1 is the largest *and* most distinct in terms of word co-occurrence. In the King corpus, discussion of the UK and international real economy (K1) is dominant, at 41% of the classified contextual units. No statistically significant components within real economy (e.g., productivity) are identified within that class as a whole. The second largest class (K2) is given to discussions of the MPC's role in furthering credit to the economy through the Bank's quantitative easing and liquidity schemes (at that time, the "Funding for Lending Scheme"). The two remaining classes (K3 and K4) together comprise 30% of the discourse and are both centred on modelling the framework of monetary policy and its broader strategy—that is, how to conceptualize and carry out monetary policy.

In the Carney corpus, three classes cover macroeconomic developments and are divided into a focus on the labour market and productivity (C3), inflation and financial markets (C4), and data and discussion related to the real economy (C5). Together these three classes comprise 49% of the classified corpus. Interestingly, the inflation class under Carney is more associated with financial markets (i.e., the interpretation of inflation prospects through the lens of financial markets). While only a conjecture, this association of inflation with financial markets might reflect Carney's background as an investment banker with Goldman Sachs. Also, the macroeconomic discussion in Carney's first year is more sharply defined in terms of subject matters, for instance in the discussion of productivity, which is consistent with the UK productivity story—namely, that unemployment had not risen as much as expected but, in the midst of weakened output, labour productivity was lower than otherwise. The second largest class in the Carney corpus (C2) is identified as Housing Finance, Mortgages and broader issues with the balance sheets of banks.

As anticipated, the new idea of forward guidance appears as its own distinct thematic class (C1), comprising 27% of the classified text. While the *idea* of forward guidance was new to the MPC in 2013, it can be categorized as falling into a discussion related to the framework of monetary policy, and so, in this sense, it somewhat parallels the discussion in the King MPC (K4). However, in Carney's MPC, the focus is, by definition, a more clearly set out statement on the conditions which stipulate action by the MPC, and the weight of the class is greater relative to the rest of the corpus.

In the Carney corpus, no class pertains directly to credit provision (as in King's K2), thereby reflecting the switch in policy focus from liquidity schemes under King to forward guidance under Carney.

c. People and Their Positions

Figures 3 and 4 provide the graphical representation of the coefficients obtained for each corpus. These findings afford us insight into the *relative* weights that individuals and the MPC as a whole placed on each of the thematic classes across the King and Carney corpora.[12] Importantly, negative coefficients do not suggest that a given individual or the committee did not discuss certain themes, or that their comments were in opposition to or against any theme. Instead, the coefficients reflect *relative* foci across all the classes identified in the analysis.

These figures, with Figures 1 and 2, cement four key findings. First, in both MPC corpora, there is a clear contrast between the discourse of the MPC as a committee and that of individual members in their public remarks, with the committee focusing on the real economy and, during Carney's governorship, inflation and financial markets. Partly, this may reflect the stylised nature of MPC minutes, which will be interesting to observe as they include transcripts in (many) years to come.

Second, a key difference between the two governorships lies in the associations of internal and external members of the Committee. For the King corpus, discussion of the framework of monetary policy is shared across both internal and external members (as seen in the significant phi coefficients). In the Carney corpus, the "big idea" of forward guidance, which created a new centre of gravity for the policy framework, is a significant theme for *internal* MPC members, but not for *external* members. Thus, something of a cleavage emerges between internal and external members with respect to forward guidance, at least in terms of their public remarks. While internals choose to comment on forward guidance in their speeches to outside audiences, externals focus more on the labour market and productivity.

This is not to say that there was no internal-external divide during the King period. Our third observation finds a clear distinction between the tendency of the internal members to speak to the Bank's credit and liquidity operations (K2) and the externals to focus more on economic modelling (K3). This no doubt reflects the relative expertise of the internal members in designing and implementing these operations, and so is not a particularly surprising observation.

Fourth, over the period from 2012-14, there is a growing importance of the housing market with economic conditions recovering as can be seen in the emergence of a distinct class on this theme in the Carney period (C2). This is linked to growing concerns regarding housing indebtedness and policy actions by the Bank's Financial Policy Committee in the summer of 2014 (which included both limits on lending to households with high loan-to-income ratios and the application of a mortgage affordability test which assumes a rise in interest rates in the future). Overall, this reveals an increase in the consideration of housing matters in MPC decision making—and notably, this theme is significant for *both* internal *and* external members in their public remarks.

VII.   Conclusion

This paper begins to evaluate the nature of the Bank's discursive activity, which is particularly relevant in an era where forward guidance—a distinctly discursive monetary policy tool—is a primary instrument in the deployment of the current MPC's policy toolkit. Forward guidance is carried out with the intention of serving as a persuasive protocol. In this sense, forward guidance can be thought of as a discursive activity wherein the Bank explains and reasons publicly about its policy decisions in a manner that seeks to encourage others to behave in a certain way.

The assessment of policy deliberation within the context of the MPC's decision making process is highly constrained by the lack of actual transcripts of the committee's meetings. Absent these transcripts, we have nonetheless gone some way towards assessing forward guidance as a new idea for monetary policymaking under the new governorship of Mark Carney by using readily available data that is, in our estimation, a reasonably proxy. Using MPC minutes and the speeches on monetary policy by its constituent members, we have mapped the effect of this new idea as an exogenous shock on the thinking of MPC members. Insofar as little empirical work has been done on how new ideas shape the thinking of monetary policy committees, our findings are novel in that they capture the effects of forward guidance on the MPC in the early days of Carney's governorship. In short, even without full transcripts, we have mapped out a marked shift in the discourse. We conclude by emphasizing two key findings.

First, the apparent effect of forward guidance on the MPC as a committee is that it did not alter the core public discourse of the committee as a whole (monthly meeting minutes). While Carney was seen in the press as the personification of forward guidance,[13] he does not seem to have single-handedly transformed the Committee's discourse. Under both King and Carney it is striking that the MPC appears to convey—as a committee—a central focus and commentary on the real economy, and where relevant (perhaps predominantly to the governor himself), on financial markets. As these are two areas that might be considered the mainstay of the Bank's MPC, it is not surprising that this focus is constant over the two governorships. Realistically, however, this focus may also be shaped by the stylized nature of the MPC minutes and so may be better informed by an analysis of meeting transcripts (in years to come). If analyses elsewhere of FOMC transcripts are any indication of the remit of monetary policy discussions, however, it is very unlikely that this central focus on the real economy will be any different with an investigation of MPC meeting transcripts.

Our most intriguing finding is the distinct divide in public discourse that emerged in the face of the new idea of forward guidance. In short, some committee members used public remarks to convey to outside audiences the conceptual underpinnings of this new form of central bank commitment, while others eschewed such discussions. And, this bifurcation appears to have created a divide between the internal members (who spoke to the theme of forward guidance) and the external members (who spoke to other themes, like productivity). This is a finding that warrants further investigation, particularly as forward guidance continues under Carney's Bank of England.

Clearly, more can be done to capture the transition in discourse, in the midst of a fundamentally new idea in the formulation of monetary policy. But, this is, we hope, a beginning.

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[1] There is a litany of alternative methods to ours available, though we believe ours is the best suited method for our research aims. As an example, topic models (Blei and Lafferty 2006; Blei and Lafferty 2009; Grimmer 2010; Quinn, Monroe et al. 2010; Grimmer and Stewart 2013) are a popular alternative that set out to automatically classify the contents of documents into topical categories. These types of methods typically take textual content as a "bag of words," meaning that the order of words and phrases normally do not inform the analysis. For our purposes here, extracting the "general meaning of a text" (Grimmer and Stewart 2013: 272) alone fails to capture the importance of the logic, meaning, and ordering of the specific content under scrutiny.

[2] Alceste is an acronym for Analyse des Lexèmes Co-occurents dans les Énnoncés Simples d'un Texte (Analysis of the Co-occurring Lexemes within Simple Statements of Text). The software is distributed by a Image-Zafar (Toulouse, France). See: http://www.image-zafar.com/. The software was originally developed by Max Reinert while serving as an engineer at the Centre National de La Recherche Scientifique (French National Center for Scientific Research). His various publications over twenty years, largely in French, document the early development of Alceste: Reinert (Reinert 1983; Reinert 1987; Reinert 1990; Reinert 1993; Reinert 1998; Reinert 1998; Reinert 2003).

[3] Prominent examples include: (Noel-Jorand, Reinert et al. 1995; Lahlou 1996; Jenny 1997; Noel-Jorand, Reinert et al. 1997; Brugidou 1998; Guerin-Pace 1998; Bauer 2000; Brugidou 2000; Brugidou 2003; Noel-Jorand, Reinert et al. 2004; Schonhardt-Bailey 2005; Schonhardt-Bailey 2006; Bara, Weale et al. 2007; Schonhardt-Bailey 2008; Schonhardt-Bailey, Yager et al. 2012; Weale, Bicquelet et al. 2012; Schonhardt-Bailey 2013).

[4] According to Reinert (Reinert 1987), the method assumes that "the speaker, during his speech, is investing successive different worlds and these worlds, by imposing their properties, thereby impose a specific vocabulary. Therefore, the statistical study of the distribution of this vocabulary should be able to trace these 'mental rooms' that the speaker has successively inhabited; traces perceptible in terms of 'lexical worlds'…"

[5] However, underscores can also be used to manually demarcate or combine certain terms and concepts in a corpus (our use of manual lemmatization is discussed further in the following sections). For example, replacing occurrences of monetary policy and monetary policies with monetary_policy would manually bind the component terms into one composite term. This is especially useful when certain idiosyncrasies in text data that would otherwise skew results can be accounted for in advance.

[6] The algorithms and their rationale are presented elsewhere in greater detail in (Schonhardt-Bailey, Yager et al. 2012; Schonhardt-Bailey 2013), with a more in depth analysis of its internal robustness and validation found in (Schonhardt-Bailey 2012).

[7] Alceste reports in both chi-squared and phi, however this paper will report only phi coefficients. At their core, phi coefficients are simply measures of association that factor out sample size in order to normalize chi-squared values so that they can be represented on a range from 0 to 1, where a value of 0 indicates no association and a value of 1 indicates perfect association. Where N is taken to be the sample size, phi coefficients are calculated such that

[8] Monthly MPC Meeting Minutes are available at:
http://www.bankofengland.co.uk/publications/minutes/pages/mpc/default.aspx
Transcripts of public remarks made by MPC members are available at:
http://www.bankofengland.co.uk/publications/Pages/speeches/default.aspx

[9] The Bank publishes a wide variety of public remarks made by its staff. In the data selection process, our aim was to create a corpus that was (a) specific to monetary policy deliberation and (b) contained the full text of the related documents. Importantly, this makes our data a full sample within the boundaries of our focus. In order to achieve this, we filtered the catalogue of public remarks made by individual MPC members to include only those public remarks related to monetary policy. The filtering of public remarks was carried out in consultation with Dr Andrew Bailey, Deputy Governor for Prudential Regulation and CEO of the Prudential Regulatory Authority, a subject matter expert.

[10] Notably, the highest associated ranking ECUs for Forward Guidance (C1) are from the monthly MPC minutes, although, the MPC as an entity is not significantly associated with this class. The software is capturing here the actual formulaic policy statement on forward guidance in the monthly minutes, which is highly specific and clearly relevant to a discourse on forward guidance. The lack of an association between C1 and the MPC signifies that the remainder of the minutes typically tend toward other themes (i.e., real economy, inflation, etc.), as seen in C4 and C5.

[11] Following the recommendation of Kevin Warsh in his review of the Bank's transparency, "Day Two" of the MPC meeting discussions—i.e., the decision day—will be transcribed and published, with an eight year delay. Also following the Warsh recommendations, "Day One" of the committee's discussions—i.e., in which arguments and data are deliberated—will not be transcribed (2013-December 11; Warsh 2014). These changes take effect in March 2015.

[12] One important caveat to our focus on the discourse of individual MPC members is that these reflect only the speeches by MPC members that pertained to monetary policy, and so, for instance, do not include speeches on financial stability. The implication for this is that in the King corpus, no speeches were given by Paul Tucker (Deputy Governor for Financial Stability) on monetary policy and so he does not appear, whereas in 2013 he gave one such speech in the month just before he left the Bank.

[13] (2013 (August 8); 2014 (13 Aug); Chu 2014 (13 Feb))

Table 1
Document Manifest

Date	Source	Governor	Content
King Governorship, Corpus: KingMS			
Jul. 2012	M	K	MPC Meeting Minutes
Aug. 2012	M	K	MPC Meeting Minutes
Sep. 2012	M	K	MPC Meeting Minutes
8 Sep. 2012	S	K	DALE, Spencer, "*Limits of Monetary Policy*"
11 Sep. 2012	S	K	MILES, David, "*Winding and Unwinding Extraordinary Monetary Policy*"
12 Sep. 2012	S	K	BROADBENT, Ben, "*Productivity and the Allocation of Resources*"
25 Sep. 2012	S	K	FISHER, Paul, "*Developments in Financial Markets, Monetary and Macroprudential Policy*"
Oct. 2012	M	K	MPC Meeting Minutes
23 Oct. 2012	S	K	KING, Mervyn, "*Speech*" (no title)
29 Oct. 2012	S	K	BROADBENT, Ben, "*Deconstruction*"
Nov. 2012	M	K	MPC Meeting Minutes
21 Nov. 2012	S	K	WEALE, Martin, "*The Labour Market, Productivity and Inflation*"
Dec. 2012	M	K	MPC Meeting Minutes
10 Dec. 2012	S	K	KING, Mervyn, "*Speech*" (no title)
12 Dec. 2012	S	K	DALE, Spencer, "*Sticky Inflation*"
13 Dec. 2012	S	K	DALE, Spencer, "*UK's Economy Recovery: Why now, will it last, and what next for monetary policy?*"
14 Dec. 2012	S	K	WEALE, Martin, "*Household Behaviour and Policy Analysis*"
Jan. 2013	M	K	MPC Meeting Minutes
18 Jan. 2013	S	K	MCCAFFERTY, Ian, "*Monetary Policy in a Changing Economy*"
22 Jan. 2013	S	K	KING, Mervyn, "*Speech*" (no title)
Feb. 2013	M	K	MPC Meeting Minutes
16 Feb. 2013	S	K	WEALE, Martin, "*The Balance of Payments*"
21 Feb. 2013	S	K	MILES, David, "*What Should Monetary Policy Do*?"
26 Feb. 2013	S	K	FISHER, Paul, "*Current Issues in Monetary Policy*"
27 Feb. 2013	S	K	BEAN, Charlie, "*Nominal Income Targets: An Old Wine in a New Bottle*"
Mar. 2013	M	K	MPC Meeting Minutes
15 Mar. 2013	S	K	DALE, Spencer, "*Inflation and growth: what role for monetary policy?*"
Apr. 2013	M	K	MPC Meeting Minutes
13 Apr. 2013	S	K	MILES, David, "*Inflation, Employment and Monetary Policy in the United Kingdom and United States*"
16 Apr. 2013	S	K	KING, Mervyn, "*Monetary Policy: Many Targets, Many Instruments. Where do we stand?*"
23 Apr. 2013	S	K	MCCAFFERTY, Ian, "*The United Kingdom Economy: The Road Ahead?*"
29 Apr. 2013	S	K	MCCAFFERTY, Ian, "*Article*" (no title)
May 2013	M	K	MPC Meeting Minutes
1 May 2013	S	K	BROADBENT, Ben, "*Forecast Errors*"
17 May 2013	S	K	WEALE, Martin, "*Monetary Policy and Monetary Policy-making*"

24 May 2013	S	K	FISHER, Paul, "*The Outlook for the United Kingdom Economy*"
29 May 2013	S	K	BEAN, Charlie, "*Rebalancing*"
Jun. 2013	M	K	MPC Meeting Minutes
14 Jun. 2013	S	K	MCCAFFERTY, Ian, "*Inflation targeting and flexibility*"
19 Jun. 2013	S	K	KING, Mervyn, "*A Governor looks back – and forward*"
26 Jun. 2013	S	K	MILES, David, "*Central Bank Asset Purchases and Financial Markets*"
Carney Governorship, Corpus: CarneyMS			
Jul. 2013	M	C	MPC Meeting Minutes
Aug. 2013	M	C	MPC Meeting Minutes
24 Aug. 2013	S	C	BEAN, Charlie, "*Global Aspects of Unconventional Monetary Policy*" (panel remarks)
28 Aug. 2013	S	C	CARNEY, Mark, "*Crossing the Threshold to Recovery*"
28 Aug. 2013	S	C	CARNEY, Mark, "*Speech*" (untitled)
Sep. 2013	M	C	MPC Meeting Minutes
23 Sep. 2013	S	C	BROADBENT, Ben, "*Conditional Guidance as a Response to Supply Uncertainty*"
24 Sep. 2013	S	C	MILES, David, "*Monetary Policy and Forward Guidance in the United Kingdom*"
24 Sep. 2013	S	C	TUCKER, Paul, "*Monetary Strategy and Prospects*"
Oct. 2013	M	C	MPC Meeting Minutes
2 Oct. 2013	S	C	FISHER, Paul, "*Financial Markets, Monetary Policy and Credit Supply*"
16 Oct. 2013	S	C	DALE, Spencer, "*Inflation Targeting and the MPC Forward Guidance*"
22 Oct. 2013	S	C	BEAN, Charlie, "*The United Kingdom's Economic Outlook*"
Nov. 2013	M	C	MPC Meeting Minutes
14 Nov. 2013	S	C	MILES, David, "*Housing, Leverage and Stability in the Wider Economy*"
15 Nov. 2013	S	C	WEALE, Martin, "*Monetary Policy-making and Forward Guidance*"
Dec. 2013	M	C	MPC Meeting Minutes
9 Dec. 2013	S	C	CARNEY, Mark, "*The spirit of the season*"
11 Dec. 2013	S	C	WEALE, Martin, "*Forward Guidance and its Effects*"
13 Dec. 2013	S	C	DALE, Spencer, "*The UK's economic recovery: why now; will it last; what next for monetary policy?*"
Jan. 2014	M	C	MPC Meeting Minutes
17 Jan. 2014	S	C	BROADBENT, Ben, "*The Balance of Growth*"
22 Jan. 2014	S	C	MCCAFFERTY, Ian, "*Achieving a Sustainable Recovery: Where next for business investment?*"
23 Jan. 2014	S	C	FISHER, Paul, "*Inflation, Interest Rates and Forward Guidance*"
24 Jan. 2014	S	C	CARNEY, Mark, "*Remarks at Davos CBI British Business Leaders Lunch*"
Feb. 2014	M	C	MPC Meeting Minutes
26 Feb. 2014	S	C	BROADBENT, Ben, "*The United Kingdom's Economy and the World Economy*"
27 Feb. 2014	S	C	MILES, David, "*The transition to a new normal for monetary policy*"
Mar. 2014	M	C	MPC Meeting Minutes
10 Mar. 2014	S	C	BEAN, Charlie, "*Sustaining the recovery*"
20 Mar. 2014	S	C	WEALE, Martin, "*Slack and the labour market*"
Apr. 2014	M	C	MPC Meeting Minutes
29 Apr. 2014	S	C	MCCAFFERTY, Ian, "*Slack, pricing pressures and the outlook for policy*"
May 2014	M	C	MPC Meeting Minutes
1 May 2014	S	C	CUNLIFFE, Jon, "*Momentum in the housing market: affordability, indebtedness and risks*"
20 May 2014	S	C	BEAN, Charlie, "*The future of monetary policy*"

Jun. 2014	M	C	MPC Meeting Minutes
12 Jun. 2014	S	C	CARNEY, Mark, *"Speech at the Lord Mayor's Banquet for Bankers and Merchants"*
18 Jun. 2014	S	C	WEALE, Martin, *"Spare Capacity and Inflation"*
19 Jun. 2014	S	C	MCCAFFERTY, Ian, *"The United Kingdom's Productivity Puzzle – A Sectoral Perspective"*

Table 2
Manual Lemmatization Protocol

Lemmatized Term	Original Term
Bank_of_Japan	*Bank of Japan*
bond_market	*bond markets*
	bond market
C_B_I	*CBI*
C_P_I	*CPI*
consumer_price	*consumer prices*
	consumer price
consumer_spending	*consumer spending*
E_C_B	*European Central Bank's*
	European Central Bank
	ECB's
	ECB
Eastern_Europe	*Eastern Europe*
energy_cost	*energy costs*
energy_price	*energy prices*
	energy price
euro_area	*euro area*
European_Council	*European Council*
European_Union	*EU*
exchange_rate	*exchange rates*
	exchange rate
F_T_S_E	*FTSE*
federal_funds_rate	*federal funds rate*
federal_government	*federal government*
Federal_Open_Market_Committee	*Federal Open Market Committee*
	FOMC
Federal_Reserve	*US Federal Reserve*
	Federal Reserve Bank of New York
	Federal Reserve
	(the) Fed
financial_market	*financial markets*
	financial market
fiscal_deficit	*fiscal deficit*
G_D_P	*GDP*
H_S_B_C	*HSBC*
housing_market	*housing markets*
	housing market
I_M_F	*International Monetary Fund*
	IMF
inflation_rate	*inflation rates*
	inflation rate
Inflation_Report	*Inflation Report*
inflation_target	*inflation targets*
	inflation target
interest_rate	*interest rates*
	interest rate
international_economy	*international economy*
L_i_b_o_r	*LIBOR*
labour_market	*labour market*

Latin_America	*Latin America*
M_P_C	*Monetary Policy Committee*
	MPC's
	MPC
Markit_C_I_P_S	*CIPS/Markit*
	Markit/CIPS
	CIPS
Middle_East	*Middle East*
monetary_policy	*monetary policy*
	monetary policies
National_Bureau_of_Statistics	*National Bureau of Statistics*
North_America	*North America*
O_P_E_C	*OPEC*
oil_price	*oil prices*
	oil price
	price of oil
overnight_index_swap	*overnight index swaps*
	overnight index swap
	OIS
private_sector	*private sectors*
	private sector
public_sector	*public sector*
R_P_I	*retail price index*
	retail prices index
	RPI
South_America	*South America*
unemployment_rate	*unemployment rates*
	unemployment rate
United_Kingdom	*United Kingdom*
	UK
	Britain
United_States	*United States*
	US
usd	*$*

Table 3
Basic Statistics for <u>KingMS</u>: King Governorship Minutes & Speeches

Corpus	KingMS
Total Word Count	166,639
Number of Unique Words Analyzed	7,523
Number of Passive Variables (tagged indicators)	30
Initial Context Units (number of speech acts)	41 (29 speeches, 12 sets of minutes)
Total Number of Elementary Context Units	4,092
ECU Classification Rate	72%
Number of Lexical Classes	4
Distribution of Classes (%) & Discursive Content	K1. (41%) Real Economy – UK & International K2. (29%) Quantitative Easing, BoE Liquidity Schemes & Credit Supply K3. (14%) Economic Modelling & Forecasting K4. (16%) Framework of Monetary Policy

Table 4
Basic Statistics for CarneyMS: Carney Governorship Minutes & Speeches

Corpus	CarneyMS
Total Word Count	162,507
Number of Unique Words Analyzed	7,148
Number of Passive Variables (tagged indicators)	32
Initial Context Units (number of speech acts)	40 (28 speeches, 12 sets of minutes)
Total Number of Elementary Context Units	3,994
ECU Classification Rate	84%
Number of Lexical Classes	5
Distribution of Classes (%) & Discursive Content	C1. (27%) Forward Guidance & The Policy Decision C2. (24%) Housing Finance, Mortgages & Broader Bank Balance Sheet Issues C3. (24%) Labour Market, Earnings & Productivity C4. (12%) Inflation & Financial Markets C5. (13%) Economic Growth, Real Economy & Data Releases

Table A1
Characteristic Words & Phrases for <u>KingMS</u>: King Governorship Minutes & Speeches

Class	Top 20 terms, φ in parentheses	Top characteristic phrases, in rank order (parentheses indicate classified terms)
Class K1: Real Economy – UK & Int'l	(.32) fall (.29) month (.27) rise (.27) quarter (.22) growth (.21) survey (.20) remain (.20) continue (.19) activ+ (.19) indic+ (.19) little (.18) product (.17) around (.17) export (.17) increase (.16) weak (.16) year (.16) price (.16) reflect (.16) euro_area	**[MPC Minutes – Aug. 2012]** "(the) (international_economy) (recent) (data) (had) (continued) to (suggest) a (weak) (near) (term) (outlook) for (global) (activity). (in) (the) (euro_area), (monthly) (indicators) (had) (remained) (consistent) (with) a (fall) (in) output (in) (the) (second) (quarter) and (there) (had) (been) no (improvement) (in) (the) (composite) (purchasing) (managers) (index), (PMI), for (july)." **[MPC Minutes – Nov. 2012]** "(signs) of a (modest) (recovery) (in) (the) (united_states) (housing_market) (had) (continued), (with) (increases) (in) (both) (home) (sales) and (prices) (in) (recent) (months). (the) (manufacturing) (PMI) (had) (edged) (up) a (little) (in) (october). less (positively), (the) (non) (manufacturing) (index) (had) (dropped) back, (although) it (remained) (consistent) (with) an (increase) (in) output." **[MPC Minutes – Jan. 2012]** "(in) (the) (euro_area), a (number) of (indicators) (had) (suggested) that (activity) (had) (continued) to (contract) (towards) (the) (end) of 2012. (industrial) (production) (had) (fallen) (by) 1. 4%in (october), (following) an even (sharper) (decline) of 2. 3%in (september), (with) (reductions) (in) (germany), (france) and (the) netherlands (suggesting) that economic (weakness) (was) not confined to (the) (periphery) (countries)." **[Speech by Dale – Mar. 2013]** "what is (unusual) is that (the) (moderation) (in) (wage) (growth) has not (been) (reflected) (in) a (corresponding) (fall) (in) (domestic) (cost) (pressures). from an (accounting) perspective, that (reflects) (the) unprecedented (weakness) (in) (productivity) (in) (recent) (years). (the) (level) of (private_sector) (productivity) is (around) 15%below (the) (level) (implied) (by) a (continuation) of its (pre) (crisis) (trend)." **[MPC Minutes – Sep. 2012]** "(activity) (in) (the) (euro_area) (had) (continued) to be (subdued). (G_D_P) (had) (declined) (by) 0. 2%in (the) (second) (quarter). (indicators) for (the) (third) (quarter) (had) (remained) (consistent) (with) (contraction), and (the) (composite) (purchasing) (managers) (index), (PMI), (had) (fallen) a (little) (further)." **[MPC Minutes – Sep. 2012]** "…(signs) of (improvement) (in) (the) (housing_market:) (mortgage) (approvals) (had) (increased) (in) (the) (fourth) (quarter) of 2012 and (the) nationwide and halifax (indices) (had) (suggested) that (house) (prices) (had) (risen) (modestly) (in) (the) (three) (months) to (january) (relative) to (the) (three) (months) to (october)."

| Class K2: Quant. Easing, BoE Liquidity Schemes & Credit Supply | (.44) bank
(.28) asset
(.25) lend
(.23) purchase
(.23) liquid
(.21) fund
(.21) gilt
(.18) scheme
(.18) borrow
(.18) sheet
(.18) system
(.16) capital
(.15) money
(.15) finance
(.15) portfolio
(.14) government
(.14) balance
(.14) commercial
(.14) hold
(.14) monetary | **[Speech by King – Jun. 2013]**
"that is why the (bank) (has) (stood) (ready), (through) the (special) (liquidity) (scheme), its (new) discount window (facility), (through) its (market) (operations), (including) the (ECTR), (and) (through) its (funding) for (lending) (scheme)…"
[Speech by Fisher – Feb. 2013]
"these (functions) do not depend on the (central) (bank) (balance) (sheet) (and) (so), in principle, do not (need) (to) be (undertaken) by the (central) (bank). but (they) are being (put) in the (central) (bank) for very good reasons, which (include), for (example), (exploiting) the synergies with (central) (bank) (operations) (and) (skills), (and) eliminating the underlaps that (arise) from separate (institutional) (arrangements)."
[Speech by Miles – Sep. 2012]
"(some) 350 billon (of) (government) (bonds) (have) been (purchased) by the (central) (bank) (and) (those) (purchases) are continuing. the (range) (of) (assets) that (commercial) (banks) can (use) (to) (borrow) (against) from the (bank) (of) (england) (has) been (widened)…"
[Speech by Miles – Sep. 2012]
"the (bank_s) (asset) (purchases) can be (reversed) (and) are (financed) by the (creation) (of) (reserves) that pay (bank) (rate). therefore (they) are not the (equivalent) (to) (permanent) (money) (financing) (of) (government) (spending)."
[Speech by Weale – Feb. 2013]
"(borrow) (more) (cheaply) than anyone (else). the (composition) effect, on the (other) (hand), might well (arise) (because) the (portfolio) (of) the (country_s) (assets) was (more) (risky) than were its (liabilities)."
[Speech by Fisher – Feb. 2013]
"if particular (markets) (have) (become) dysfunctional (so) that general (monetary) (expansion) (doesn_t) (help), relatively (small) (amounts) (of) direct (purchases) may unblock the relevant (markets). second we can (lend) (liquid) (assets) (including) (cash) (against) (assets) that are, or (have) (become) illiquid. That is what we did with the (special) (liquidity) (scheme) (and) (more) recently the (funding) for (lending) (scheme)."
[Speech by McCafferty – Jan. 2013]
"I am (more) sanguine about the (effectiveness) (of) the (portfolio) rebalancing (channel). by (reducing) the supply (of) (gilts) outstanding, we (encourage) (investors), (pension) (funds), (insurance) (companies), (to) (rebalance) (their) (portfolios) (into) higher yielding, (riskier) (assets), (thus) (lowering) (companies) (borrowing) costs (and) (raising) net worth." |

| Class K3: Economic Modelling & Forecasting | (.35) model
(.23) forecast
(.22) error
(.21) people
(.21) predict
(.16) forecaster
(.16) thing
(.15) structure
(.15) wrong
(.15) say
(.15) conclusion
(.15) sample
(.15) young
(.14) educat+
(.14) stud+
(.14) noise
(.14) fan
(.13) know
(.13) think
(.13) simple | **[Speech by Broadbent – May 2013]**
"(not) its (outcome) the (coverage) of (his) (report) was overwhelmingly (about) the (forecast) (errors) and the (failure) (that) they (represented). (I) (don_t) (want) to belabour (these) (points). (I) should (certainly) (not) (leave) (you) with the impression (that) (economic) (forecasting) is so inaccurate (that) (we) shouldn_t bother with (it)."
[Speech by Weale – Nov. 2012]
"(this) (chart) (illustrates) (that). (instead) of (looking) (at) (people) of (working) (age) classified by (age), (I) (can) classify them by (qualifications). (charts) 4 and 5 (show) overall unemployment_rate on (this) basis, and here (we) (see) (what) (I) (suppose) (I) (regard) (as) the (traditional) pattern (found) in most (advanced) (economies)."
[Speech by Broadbent – May 2013]
"(imagine) now (that) (we_re) trying to (predict) (not) (a) continuous variable, (like) G_D_P growth, but the (occurrence), (or) (not), of (a) discrete (event) (that) (occurs) (randomly). and (assume), (for) the (moment), (that) there is (nothing) to (know) but the average (frequency) with which (it) (happens). there (are) again (two) (forecasters), (each) of whom has (his), (or) her, (own) estimate."
[Speech by Broadbent – May 2013]
"(we) should (be) pleased with (forecast) (failures), (says) sir (david) hendry, the (distinguished) econometrician, (as) (we) (learn) greatly (from) them. yet, in reality, (we) (do) (not) (always) (find) (it) (a) pleasing (experience). (we) (all) of (us) (prefer) to (be) right and (are) (made) uncomfortable by (events) (that) (don_t) fit into (a) coherent (model) of the (world), (preferably) the (one) (we) already hold in our (heads)."
[Speech by Broadbent – May 2013]
"(at) (that) (point), the sampling (error) is already small (enough) (that) the outperformance of the (good) (model) will probably (be) (statistically) significant. but the noisier and (less) (predictable) the underlying (series) the more data (you) need. when the (signal:) (noise) (ratio) falls to (a) half, the (red) line, (you) need (a) (sample) size of 30 to (be) (reasonably) (confident) of (distinguishing) (good) (from) (bad)."
[Speech by Broadbent – May 2013]
"…and the (interesting) (thing) is (that) (this) (tendency) is (not) (just) (about) appearances: (unless) (reminded) with (hard) evidence, (people) (seem) (genuinely) to (believe) (that) their (prior) (predictions) were (different) (from) (what) they (actually) were." |

| Class K4:
Framework
of
Monetary
Policy | (.44) target
(.43) inflation
(.38) inflation
_target
(.33) monetary
_policy
(.31) remit
(.25) flex
(.23) bring
(.20) object
(.18) run
(.18) regime
(.17) cred+
(.17) nominal
(.17) volatility
(.16) stability
(.16) mandate
(.16) undesirable
(.16) trade
(.16) polic+
(.15) shock
(.15) output | **[Speech by Miles – Feb. 2013]**
"(attempts) to (keep) (inflation) at the (inflation_target) in these (circumstances) may cause (undesirable) (volatility) in (output). the (remit) (defines) a (flexible) (inflation_target). the (M_P_C) can (set) a (policy) that (does) not (bring) (inflation) (back) to (target) in the (shortest) possible time if that prevents undue (fluctuations) in (output)."
[Speech by King – May 2013]
"the (committee) had always (recognised) (such) (short) (run) (trade) (offs). in particular, (under) (its) (remit), the (committee) had the (flexibility) to temper the (speed) at (which) it (sought) to (return) (inflation) to (target) in (order) to limit the (volatility) in (output), subject to (meeting) the (inflation_target) in the (medium) term."
[Speech by Bean – Feb. 2013]
"so much for the theory behind a (target) for the level of (nominal) (income). it (is) (essentially) one (way) of (trying) to hardwire in a (commitment) to (maintaining) a (policy) that remains (loose) (long) after conditions have normalised in (order) to (generate) the expectation of (temporarily) (higher) (inflation) in the future."
[Speech by King – Apr. 2013]
"throughout the era of (inflation_targeting), the importance of the (trade) (off) (between) (output) and (inflation) (stabilisation) in the (short) term has been (well) understood. (monetary_policy) was seen as (aiming) at a (target) for (inflation) in the (long) (run), (which) was to be (achieved) by (bringing) (inflation) (back) to (target) over a suitable time horizon so as to (avoid) excessive (volatility) of real (variables) (such) as (output) and (employment)."
[Speech by Fisher – Feb. 2013]
"(our) (monetary_policy) (objective) (is) (set) in the annual (inflation_target) (remit) (given) to us in a (letter) from the (chancellor). the (remit) (requires) the (monetary_policy) (committee) to (target) a 2% inflation_rate in the (consumer_price) index…"
[Speech by Dale – Mar. 2013]
"(but) it also acknowledges that (inflation) will on (occasions) deviate from (its) (target) as a result of (shocks) and (disturbances), and that. (attempts) to (keep) (inflation) at the (inflation_target) in these (circumstances) may cause (undesirable) (volatility) in (output)."
[MPC Minutes – Feb. 2013]
"the (committee_s) (remit) was to (deliver) price (stability), (but) to do so in a (way) that (avoided) (undesirable) (volatility) in (output). it (judged) that (its) (policy) (stance) was fully consistent with that (remit)." |

Table A2
Characteristic Words & Phrases for <u>CarneyMS</u>: Carney Governorship Minutes & Speeches

Class	Top 20 terms, ranked by φ	Top characteristic phrases, in rank order (parentheses indicate classified terms)
Class C1: Forward Guidance & The Policy Decision	(.39) polic+ (.39) guidance (.36) monetary _policy (.31) committee (.31) stability (.21) member (.21) appropriate (.20) provide (.20) threshold (.20) knockout (.19) stance (.18) stimulus (.18) inflation (.17) inflation _target (.17) object (.17) framework (.16) set (.16) judge (.16) target (.16) financial	**[MPC Minutes – Apr. 2014]** "and the (FPC) had (agreed) (that) the (financial) (stability) (knockout) had (not) been (breached). with unemployment remaining above the 7%threshold, the (committee_s) (august) 2013 (policy) (guidance) (therefore) remained in (place) and (no) (member) (thought) (it) (appropriate) (to) (tighten), or (to) (loosen), the (stance) (of) (monetary_policy) at the (current) (juncture)." **[MPC Minutes – Mar. 2014]** "…(no) change (to) the (FPC) (judgement) (that) the (financial) (stability) (knockout) had (not) been (breached). with unemployment remaining above the 7%threshold, the (committee_s) (august) 2013 (policy) (guidance) (therefore) remained in (place) and (no) (member) (thought) (it) (appropriate) (to) (tighten), or (to) (loosen), the (stance) (of) (monetary_policy) at the (current) (juncture)." **[MPC Minutes – Aug. 2013]** "in these unprecedented (circumstances), the (committee) (agreed) (that) (explicit) (policy) (guidance) could (enhance) the (effectiveness) (of) (monetary) (stimulus) in three (ways). (it) could (provide) greater (clarity) (about) the (committee_s) (view) (of) the (appropriate) trade (off) between the (speed) with which (inflation) was returned (to) the (target) and the (support) (given) (to) the (recovery)." **[MPC Minutes – Jan. 2014]** "…(no) change (to) the (FPC) (judgement) (that) the (financial) (stability) (knockout) had (not) been (breached). with unemployment remaining above the 7%threshold, the (committee_s) (policy) (guidance) (therefore) remained in (place) and (no) (member) (thought) (it) (appropriate) (to) (tighten), or (to) (loosen), the (stance) (of) (monetary_policy) at the (current) (juncture)." **[MPC Minutes – Feb. 2014]** "…(no) change (to) the (FPC) (judgement) (that) the (financial) (stability) (knockout) had (not) been (breached). with unemployment remaining above the 7%threshold, the (committee_s) (policy) (guidance) (therefore) remained in (place) and (no) (member) (thought) (it) (appropriate) (to) (tighten), or (to) (loosen), the (stance) (of) (monetary_policy) at the (current) (juncture)." **[MPC Minutes – Dec. 2013]** "…(decision) the (committee) (set) (monetary_policy) (to) (meet) the 2% inflation_target in the (medium) term, but in a (way) (that) (helped) (to) (sustain) the recovery. in (pursuit) (of) (that) (objective), the (committee) had, at the (time) (of) (its) (august) inflation_report, (provided) (guidance) (regarding) the (path) (of) (monetary_policy)."

| Class C2: Housing Finance, Mortgages & Broader Bank Balance Sheet Issues | (.28) fund (.26) lend (.26) debt (.25) equit+ (.24) loan (.22) house (.22) sheet (.21) mortgage (.20) credit (.20) borrow (.20) bond (.18) home (.17) scheme (.17) repair (.17) capital (.17) bank (.16) share (.16) finance (.16) owner (.15) countries | **[Speech by Miles – Nov. 2013]** "the moral hazard (issues) of (linking) (repayments) (on) (outside) (funding) to the (house) (value) (are) also (serious). calculations by (shiller) (and) weiss, 2003, suggest that (equity) (loans) that represent much (more) than 20%of (funding) would (probably) (create) (very) poor (incentives) (for) (home) (owners) since outsiders might (then) need to (take) the (majority) of (capital) (gains) (or) (losses)."
 [Speech by Miles – Nov. 2013] "but (there) (are) (feasible) (sources) of (external) (equity) (where) the financial (contracts) (are) analogous to (home) (owners) (issuing) (equity), (shares), in (their) (own) (home). I (take) the key (feature) of (outside) (equity) (financing) to be that it is (a) (form) of (funding) (where) the (repayment) (value) is explicitly (linked) to the (value) of the (home)."
 [Speech by Miles – Nov. 2013] "(equity) (loans) (share) (an) (important) (characteristic) with (an) outright (equity) stake (taken) by (an) (outside) (funder), (namely) that the (outside) (funder) (takes) (on) (some) of the (risk) of (a) fall in the (value) of the (house), which (becomes) (a) (risk) (shared) with the (owner)."
 [Speech by Miles – Nov. 2013] "the united_kingdom (government_s) help to (buy) (scheme) is (an) (example) of what has been (called) (an) (equity) (loan). (unlike) with (shared) (ownership) (schemes) which has been the (more) (common) (form) of (external) (equity) (financing) with (equity) (loans) the (buyer) (retains) the (ownership) of the entire (property)."
 [Speech by Miles – Nov. 2013] "but although in (theory) (there) is (a) continuum of (contracts) that (can) (generate) the (required) (return) to (providers) of (equity) (loans) (there) (are) (incentive) reasons why (some) (contracts) with (very) (high) (insurance) against (loss), (high) (downside) (shares)…"
 [Speech by Miles – Feb. 2014] "this is (because) the (spread) (between) (risky) rates (and) (safe) rates (may) be (persistently) (higher). what (matters) (for) (conditions) in the (wider) economy, (and) (for) the (incentives) to spend (and) to (borrow), is the rate of (interest) (faced) by (households) (and) (companies)."
 [Speech by Miles – Nov. 2013] "but if (outside) (equity), (or) (equity) like (funding), were (more) readily (available) (gearing) might be (significantly) reduced yet (have) (a) (limited) impact (on) (home) (ownership) patterns. it is the scope (for) different (types) of (outside) (equity) (type) (funding) that I consider in the (rest) of this (paper). The (idea) of (equity) (type) (funding) of (house) (purchase) which (shares) (risk) (between) (owner) occupiers (and) (outside) (providers) of (funding)…" |

| Class C3: Labour Market, Earnings & Productivity | (.34) product
(.28) wage
(.25) work
(.25) hour
(.23) labour
(.21) employ
(.20) underempl+
(.18) labour
    _market
(.18) capacity
(.16) people
(.15) shortfall
(.15) unemploy+
(.15) employee
(.14) utilis+
(.13) pay
(.13) table
(.13) activities
(.12) input
(.12) margin
(.12) trend | **[Speech by Broadbent – Jan. 2014]**
"(real) (average) (pay) growth = (productivity) growth growth in (margins) growth in (real) (consumer_price) after (recessions) (it_s) not (unusual) to (see) (aggregate) (real) (wages) (underperform) (real) G_D_P, and equivalently, dividing both by (employment)…"
[Speech by McCafferty – Jun. 2014]
"the (narratives) for _social (work), (wholesale) trade and _residential (care) (activities), three (sub) (sectors) that respectively (account) for 12, 6%and 4. 5%of the (productivity) (shortfall), are (less) well supported by the (agents) (intelligence) network. it (is) (possible) (however) to (make) some informed conjectures about what (has) been behind the (relative) movements of (output) and (employment) in (these) (sectors)."
[Speech by Weale – Mar. 2014]
"here we (see) that the (people) (who) were (underemployed) in 2012 but (fully) (employed) in 2013 increased their (working) (week) by, on (average) 6. 5 (hours). (this) compares with the 11. 7 (extra) (hours) that (they) said (they) (wanted) to (work). but the mismatch between what (people) say (they) (want) and what (they) (settle) for (is) (much) (greater) (among) those (who) saw (themselves) (as) (overemployed) in 2012."
[Speech by Weale – Mar. 2014]
"(A) (summary) (answer) to (this) can be (seen) in (table) 11. (this) (table) (shows) the (average) (hourly) (wage) rates and the (number) of (hours) (worked) (as) (reported) by a (sample) of (people) in the (labour) (force) survey, (as) a function of what (they) were doing a year earlier."
[Speech by Weale – Jun. 2014]
"besides the (influence) of (these) factors on growth in total (pay), (I) (also) (want) to (explore) (how) (they) (affect) its constituent parts. the (average) (wage), (as) computed in the (office) for (national) (statistics) (measure) of (average) (weekly) (earnings), (is) (made) up of two (components), regular (pay) and (bonuses)."
[Speech by McCafferty – Jun. 2014]
"(one) (is) struck by the (fact) that (only) (six) (sectors) (representing) (close) to 40%of total (GVA) and total (employment) (explain), at least in an (accounting) (sense), the (aggregate) (productivity) (shortfall)."
[Speech by Broadbent – Sep. 2013]
"on (aggregate) (demand) (relative) to underlying (productivity), the (output) (gap). the (faster) (demand) grows, (relative) to (productivity), the (greater) the (demand) for (employment) from (firms) and the (greater) the (upward) pressure on (wages) and inflation." |

| Class C4: Inflation & Financial Markets | (.28) month
(.27) sterling
(.25) around
(.23) rise
(.21) price
(.19) united
    _states
(.19) implie+
(.18) little
(.18) appreci+
(.18) reflect
(.17) exchange
    _rate
(.17) basi+
(.16) expect
(.16) twelve
(.16) inflation
(.15) dollar
(.15) short
(.15) overnight
    _index_swap
(.15) year
(.15) fall | **[MPC Minutes – Feb. 2014]**
"(C_P_I) inflation had (fallen) (back) to 2. 0%in (december), and (was) (likely) to (remain) (at) (around) that (level). in the (near) (term), that (reflected) a (contribution) (lower) (than) (expected) previously (from) (administered) and (regulated) (prices), the waning impetus (from) past (increases) in import (prices), and disinflationary (pressures) resulting (from) (sterling_s) (recent) (appreciation)."
[MPC Minutes – May 2014]
"(over) the past few (months), (falls) in the (short) (term) interest_rate (curve) further (ahead) (implied) that (market) (participants) (expected) a more (gradual) (pace) of bank (rate) (rises) (than) (earlier) in the (year)."
[MPC Minutes – Mar. 2014]
"(short) (rates) had (fallen) (back) as the (month) had progressed, (partly) (reflecting) international developments, before (rising) in the (days) before the committee_s meeting. more (broadly), it (was) notable that, (abstracting) (from) (short) (term) fluctuations, the (expectations) (implied) (by) (market) (prices) of the (date) of the (first) (increase) in bank (rate) and the (likely) (pace) of (increases) (thereafter)…"
[MPC Minutes – Jul. 2013]
"as (falls) in (energy) and clothing and footwear (prices) a (year) (earlier) (dropped) out of the (annual) (comparison), (twelve) (month) (C_P_I) inflation (was) (expected) to pick up to (around) 3%in (june) and to (remain) close to that (level) (throughout) the (autumn)."
[MPC Minutes – Aug. 2013]
"but breakeven (inflation_rate) had (subsequently) (fallen) after the release of the (C_P_I) data for (june), which had been (lower) (than) (market) (participants) had (expected). the (sterling) (effective) (exchange_rate) (index) had (fallen) (by) (around) 2%on the (month), and (by) a (similar) magnitude (since) the may (inflation_report)."
[MPC Minutes – Aug. 2013]
"now (market) interest_rate (at) medium (terms), (at) (terms) of (two) to (five) (years), have also (risen) (recently). the (date) (at) which (markets) (expect) the (first) (increase) in bank (rate) has (moved) (from) the (end) of 2015 to (around) the (middle)."
[MPC Minutes – May 2014]
"(market) (prices) had been relatively unaffected (by) the (most) (recent) developments in (ukraine) and (russia). in equity (markets), the (united_kingdom) (F_T_S_E) all share (index) had (risen) (by) (around) 2 and the (united_states) (S&P) 500 (index) (by) (around) 1, (although) the (euro) (stoxx) (index) had (fallen) (slightly) and some eastern_european indices had (declined)." |

Class C5: Economic Growth, Real Economy & Data Releases		
Class C5:	(.32) quarter	**[MPC Minutes – Dec. 2013]**
Economic	(.29) growth	"9%in (the) (fourth) (quarter) of 2013. (the) recent (data) (suggested)
Growth,	(.23) estimate	that (the) (recovery) was being (driven) by (consumption) and
Real	(.23) business	(stockbuilding), (with) (both) (investment) and (net) (trade) (weaker)
Economy &	(.23) survey	than expected…"
Data	(.22) revise	**[MPC Minutes – Aug. 2013]**
Releases	(.21) data	"(the) (revival) (in) (growth) (had) partly (been) (driven) by a (pickup)
	(.21) release	(in) (private) (consumption), as (retail) (sales) (had) (strengthened)
	(.20) pickup	and (consumer) (confidence) improved. housing (investment) (had)
	(.19) manufactur+	also (grown) (strongly) (in) (the) first (quarter)."
	(.19) consum+	**[MPC Minutes – Jan. 2014]**
	(.17) staff	"(but) upward (revisions) (in) (previous) (quarters) (suggested) that
	(.17) fourth	(the) (recovery) (had) more (momentum), (with) (G_D_P) (estimated)
	(.17) continue	to be 0. 6%higher than (previously) thought. (the) mix of
	(.17) revision	(expenditure) (in) (Q3) (had) also (been) (revised), (with) higher
	(.16) composite	(consumption) and (business) (investment) (offset) by lower
	(.15) vintage	contributions from (net) (trade) and (stockbuilding)."
	(.15) strong	**[MPC Minutes – Apr. 2014]**
	(.15) spend	"(consumption) (growth) (in) (Q4) (had) (been) (revised) (up) to 0. 3,
	(.15) latest	(but) remained (weaker) than earlier (in) (the) year. (the) contribution
		of (net) (trade) to (Q4) (growth) (had) (been) (revised) (up) to 1
		percentage (point) on (the) back of very (strong) (estimated) (export)
		(growth), some of which (appeared) (unlikely) to (persist)."
		[MPC Minutes – Feb. 2014]
		"(the) (strength) of (the) forward looking components of (the) major
		(business) (surveys) (suggested) that (the) (momentum) (in) (growth)
		would be maintained (in) (the) (second) (quarter). (with) (activity) (in)
		(the) united_kingdom_s main (trading) (partners) (recovering) only
		(slowly), (the) (upturn) (in) (the) domestic economy (had) so far
		(been) characterised by a (reduction) (in) (private) (savings)."
		[MPC Minutes – Jan. 2014]
		"(consumption) (had) (grown) by 0. 5%in (november), employment
		(had) (picked) (up) (further) and there (had) (been) a (marked) rise
		(in) capital (goods) (orders). (the) (markit) (purchasing) (managers)
		(indices), (PMis), for (manufacturing) and (services) for december
		(both) (pointed) to (growing) (activity)."
		[MPC Minutes – Sep. 2013]
		"…(the) (estimate) of (G_D_P) (growth) (in) (the) (second) (quarter)
		(had) (been) (revised) (up) a little to 0. 7%in (the) (second) (release).
		(the) (initial) (estimates) of (the) (expenditure) (breakdown) (had)
		(suggested) that (growth) (had) (been) (fairly) broadly based, (with)
		(investment) and (export) (growth) (both) a little (stronger) than (the)
		committee (had) (anticipated)."

Table A3
Institutional & Individual Association with Classes (ϕ)

Legend:	Code	Category	Variable
	NM	= Name of Individual / Institution	(Committee or Member Name)
	INST	= Institutional Affiliation to MPC	(**Ext**ernal or **Int**ernal)
	FPC	= Financial Policy Committee Membership	(**Y**es or **N**o)
	GOV	= Sitting BoE Governor	(**K**ing or **C**arney)
	SRC	= Data Source	(**Min**utes, **Sp**eeches)

Identifiers					KingMS Classes				CarneyMS Classes				
MPC or Individual Member	*Institutional Affiliation*	*FPC Membership*	*Sitting Governor*	*Data Source*	*Real Economy (UK & Int'l)*	*Quant. Easing, BoE Liquidity Schemes & Credit Supply*	*Economic Modelling & Forecasting*	*Framework of Monetary Policy*	*Forward Guidance & The Policy Decision*	*Housing Finance, Mortgages & Broader Bank Balance Sheet Issues*	*Labour Market, Earnings & Productivity*	*Inflation & Financial Markets*	*Economic Growth, Real Economy & Data Releases*
NM	**INST**	**FPC**	**GOV**	**SRC**	**K1**	**K2**	**K3**	**K4**	**C1**	**C2**	**C3**	**C4**	**C5**
King Governorship													
MPC	-	-	K	MINS	.60	-.24	-.29	-.23	-	-	-	-	-
Bean	INT	Y	K	SPCH	-.05	-.03	-.05	.16	-	-	-	-	-
Broadbent	EXT	Y	K	SPCH	-.15	-.12	.45	-.08	-	-	-	-	-
Dale	INT	Y	K	SPCH	-.11	0	-.05	.20	-	-	-	-	-
Fisher	INT	Y	K	SPCH	-.19	.34	-.11	-.06	-	-	-	-	-
*King	INT	Y	K	SPCH	-.16	.19	0	-.02	-	-	-	-	-
McCafferty	EXT	N	K	SPCH	-.01	-.04	-.04	.12	-	-	-	-	-
Miles	EXT	N	K	SPCH	-.23	.13	.05	.09	-	-	-	-	-
Weale	EXT	N	K	SPCH	-.06	-.12	.23	.01	-	-	-	-	-
Carney Governorship													
MPC	-	-	C	MINS	-	-	-	-	-.07	-.21	-.21	.33	.33
Bean	INT	Y	C	SPCH	-	-	-	-	.09	.03	-.06	-.03	-.06
Broadbent	EXT	Y	C	SPCH	-	-	-	-	-.10	0	.18	-.08	-.01
*Carney	INT	Y	C	SPCH	-	-	-	-	.09	.05	-.05	-.07	-.06
Cunliffe	INT	Y	C	SPCH	-	-	-	-	-.07	.16	-.07	.03	-.04
Dale	INT	Y	C	SPCH	-	-	-	-	.17	-.04	-.06	-.06	-.04
Fisher	INT	Y	C	SPCH	-	-	-	-	.03	.09	-.07	-.04	-.03
McCafferty	EXT	N	C	SPCH	-	-	-	-	-.08	-.04	.25	-.10	-.05
Miles	EXT	N	C	SPCH	-	-	-	-	-.11	.34	-.04	-.03	-.04
Tucker	INT	Y	C	SPCH	-	-	-	-	.13	-.04	-.04	-.03	-.04
Weale	EXT	N	C	SPCH	-	-	-	-	.02	-.16	.28	-.07	-.12

Table A4

Tagged Passive Variable Associations with Classes (ϕ)

Tagged Passive Variables (as described)	Real Economy (UK & Int'l)	Quant. Easing, BoE Liquidity Schemes & Credit Supply	Economic Modelling & Forecasting	Framework of Monetary Policy	Forward Guidance & The Policy Decision	Housing Finance, Mortgages & Broader Bank Balance Sheet Issues	Labour Market, Earnings & Productivity	Inflation & Financial Markets	Economic Growth, Real Economy & Data Releases
	K1	**K2**	**K3**	**K4**	**C1**	**C2**	**C3**	**C4**	**C5**
King Governorship									
Tagged Passive Variables for Member Speeches									
Internal Members	-.31	.33	-.12	.13	-	-	-	-	-
External Members	-.28	-.09	.42	.09	-	-	-	-	-
Carney Governorship									
Tagged Passive Variables for Member Speeches									
Internal Members	-	-	-	-	.23	.12	-.17	-.11	-.13
External Members	-	-	-	-	-.16	.08	.36	-.19	-.17

Figure 1
Dendrogram – King Governorship

KingMS Corpus – Dendrogram

Structural Dendrogram	Class Content	Positive Associations

Class K2 (29%, 854 ECUs)
Quantitative Easing, BoE Liquidity Schemes & Credit Supply

Fisher (.34), King (.19), Miles (.13); INTM (.33), *EXTM (-.09)*

Class K3 (14%, 436 ECUs)
Economic Modeling & Forecasting

Broadbent (.45), Weale (.23), Miles (.05); *INTM (-.12), EXTM (-.42)*

Class K4 (16%, 439 ECUs)
Framework of Monetary Policy

Dale (.20), Bean (.16), McCafferty (.12), Miles (.09), Weale (.01); INTM (.13), *EXTM (.09)*

Class K1 (41%, 1210 ECUs)
Real Economy (UK & International)
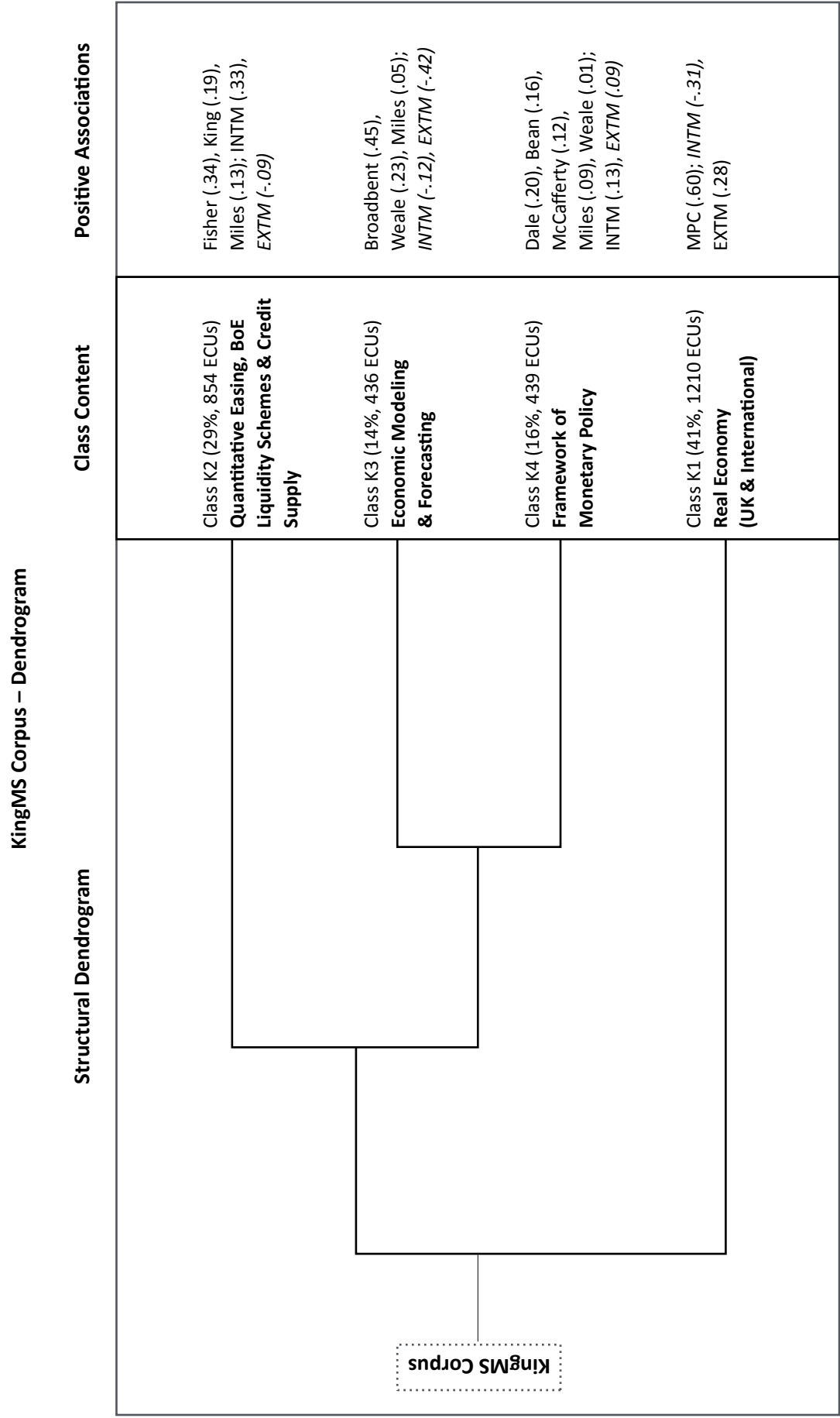
MPC (.60); *INTM (-.31),* EXTM (.28)

KingMS Corpus

Figure 2
Dendrogram – Carney Governorship

CarneyMS Corpus – Dendrogram

Structural Dendrogram	Class Content	Positive Associations
	Class C3 (24%, 812 ECUs) **Labor Market, Earnings & Productivity**	Weale (.28), McCafferty (.25), Broadbent (.18); *INTM (-.17),* EXTM (.36)
	Class C4 (12%, 407 ECUs) **Inflation & Financial Markets**	MPC (.33), Cunliffe (.03); *INTM (-.11), EXTM (-.19)*
	Class C5 (13%, 381 ECUs) **Economic Growth, Real Economy & Data Releases**	MPC (.33); *INTM (-.13), EXTM (-.17)*
	Class C2 (24%, 407 ECUs) **Housing Finance, Mortgages & Broader Bank Balance Sheet Issues**	Miles (.34), Cunliffe (.16) Fisher (.09), Carney (.08), Bean (.05), Broadbent (.03); INTM (.12), EXTM (.08)
	Class 1 (27%, 922 ECUs) **Forward Guidance & The Policy Decision**	Dale (.17), Tucker (.13), Bean (.09), Carney (.09), Fisher (.03), Weale (.02); INTM (.23), *EXTM (-.16)*

CarneyMS Corpus

**Institutional & Individual Association with Themes
MPC Minutes & Speeches, King Governorship (Jul 2012-Jun 2013)**

K1: Real Economy - UK & International
K2: Quantitative Easing, BoE Liquidity Schemes & Credit Supply
K3: Economic Modeling & Forecasting
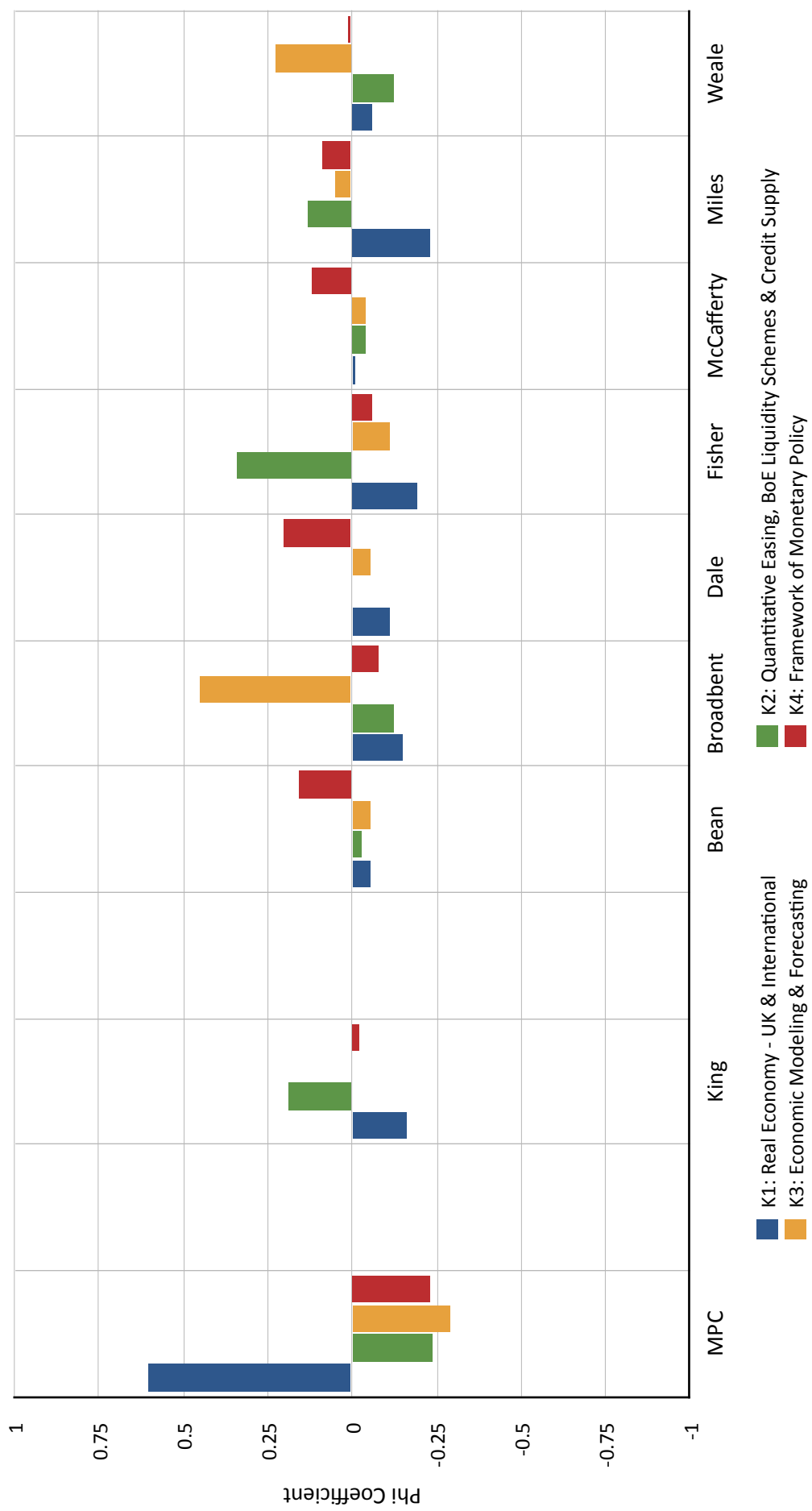K4: Framework of Monetary Policy

Figure 4
Institutional & Individual Association with Classes – Carney Governorship

Institutional & Individual Association with Themes
MPC Minutes & Speeches, Carney Governorship (Jul 2013-Jun 2014)

C1: Forward Guidance & The Policy Decision   C3: Labor Market, Earnings & Productivity
C2: Housing Finance, Mortgages & Broader Bank Balance Sheet Issues
C4: Inflation & Financial Markets   C5: Economic Growth, Real Economy & Data Releases

Phi Coefficient

MPC   Carney   Bean   Broadbent   Cunliffe   Dale   Fisher   McCafferty   Miles   Tucker   Weale