Estimating Central Bank Preferences

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Abstract

Scholars often use Federal Open Market Committee (FOMC) votes to estimate the preferences of central bankers. However, rarely do people cast dissenting votes. As a result, voting records are not a random sample and using votes to measure preferences may cause misleading measures and wrong substantive conclusions. Instead of using voting records, this article demonstrates the usefulness of using what central bankers say in FOMC meetings as a way to better measure central bank preferences. Putting together automated text analysis tools and scaling methods, we estimate a new measure of central bank preferences on the FOMC leading up to the financial crisis.

The financial crisis has drawn increasing attention to the power of central bankers. More than ever before, the things that central bankers do and the things that central bankers say have a profound and instantaneous effect on the global economy. In March 2014, for example, Federal Reserve Bank Chair Janet Yellen hinted that the Fed might put the brakes on quantitative easing as early as October 2014. Within minutes, the stock market went down and interest rates rose. The power and influence that central bankers command means that it is important to understand what central bankers want –their preferences– and how the things that they want change over time.

In this paper, we present a new measure of central bank preferences for members on the Federal Open Market Committee (FOMC) leading up to the financial crisis. Using FOMC transcripts, we extract the top twenty-five words and phrases generated by the topics unemployment, output and inflation. Starting from the assumption that central bankers make interest rate decisions based on the tradeoff between inflation and unemployment and output, we develop a new positional measure of central bank preferences based on the things that they say about these topics. We present these new estimates and compare them against other expert and voting-based measures of central bank preferences.

1 Central Bank Preferences

The people that sit on the FOMC are mandated by U.S. Congress to fulfill three goals –maximum employment, stable prices, and moderate long-term interest rates. Despite the fact that all members of the FOMC are responsible for the same mandate, committee members have different preferences. Borrowing terms used to describe people's appetite for war, one useful ranking of central bank preferences is based on their inflation preferences. People that are relatively more inflation adverse are called *Inflation Hawks* whereas people less concerned about inflation are called *Inflation Doves*. Ranking committee members according to their inflation preferences along a single dimension allows for comparability across actors and over time.

If members of the FOMC are all tasked with the same objective, why do central bankers have different preferences? Three recent studies help explain the origins of central bank preferences. For one, the appointment process of the policymaker matters. In a recent paper, Hallerberg and Wehner (2013) find that left leaning politicians appoint bankers with more economics training than right leaning leaders. Another explanation is that central bankers themselves have career goals and objectives and that career objectives help explain variation in preferences. Havrilesky and Gildea (1991) show that employment in the financial sector is more likely to create conservative –interest rate tightening– central bankers whereas public service employment is associated with interest rate

loosening. Adolph (2013) also finds that central bankers are motivated by personal career objectives and that variation in past job experience and future career goals matter. Finally, central bankers may also represent particular constituencies, such as their home district in the case of the Federal Reserve System or their country of origin such as member states within the European Central Bank (Meade, 2005, Meade and Sheets, 2005).

When making decisions on interest rates, the voting members of the FOMC include seven members from the Board of Governors, the New York Federal Reserve Bank President, and four Bank Presidents from the Federal Reserve System. The fact that FOMC members make decisions together in a group leads to group dynamics that are different than if only one central banker made policy alone. In fact, Gerlach-Kristen and Meade (2010) find that dissenting votes on the FOMC depend on length of tenure, the intensity of opposition, Board member status, and the level of inflation in the economy. Such evidence suggests that the institutional environment –the rules, norms, and patterns of behavior– constrains central bankers voting behavior. Furthermore, the institutional environment is so tightly constraining that FOMC members rarely cast dissenting votes. For example, between February 2005 and December 2007, which is the time period that we examine in this study, there are only 6 dissenting votes compared to 245 consenting votes (Authors' calculations).

The lack of disagreement in votes means that scholars must look elsewhere for helpful information that can help us understand and estimate variation in central bankers' preferences. One fruitful approach is examining what central bankers say instead of what central bankers do. There are numerous benefits in using speech data. First and most important, dissent is more likely in speech-making than in voting. In one empirical study, Meade and Stasavage (2008) find that non-voting members on the FOMC are comparably more likely to show disagreement in speech than in voting and that this is especially true when the member is not on cycle to vote. Second, those on the FOMC have the right to speak even when they are not voting. This means that speech is observed for the full population at every meeting whereas only a subsample of FOMC members voting behavior is observed. In other words, everyone speaks even when they do not vote, thus reducing the sample

selection problem. In sum, there are two key benefits of using speech as data to measure central bank preferences. The first benefit is that there is much greater variation in dissent and the second benefit is that speech is less plagued by selection problems.

2   Estimating Central Bank Preference

The Taylor rule is a powerful approximation for estimating central bank preferences. Taylor's rule is a formula developed by Stanford economist John Taylor. It provides recommendations for how a central banker should set short-term interest rates as economic conditions change (Taylor, 1993). Importantly, the Taylor rule explicitly models these two objectives as a tradeoff. Because the Taylor rule is a tradeoff, it provides a useful theoretical model of central bankers' preferences on a common, single dimension of inflation aversion –or how willing a central banker is to forgo an increase in economic activity for a reduction in inflation. [1]

To our knowledge, we know of only one other scholar that uses machine learning from text to examine central bank speeches (Schonhardt-Bailey, 2013). In order to examine the effects of deliberation and persuasion amongst members of the FOMC, Schonhardt-Bailey runs Alceste software on FOMC transcripts. Her method and our method are different in three important ways. First, Alceste is proprietary software. Second, Alceste reduces the central bankers' choice problem to a set of nine topics using descending classification of text segments and expert classification. Instead, we set an arbitrary number of topics and then, using expert knowledge, hand classify those topics that fit best into the Taylor rule tradeoff. While we agree that the added complexity of multidimensional topic space is interesting, there is no theoretical explanation of how the nine topics relate to each other nor the relative importance of each component. Finally, the sample period used in Schonhardt-Bailey (1979-1999) ends well before our sample period (2005-2008) so our data extends her analysis and examines FOMC meetings leading up to the crisis.

Our method is as follows: First, we use a n-

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[1] Even when there is uncertainty about the true model of the economy, the Taylor rule delivers good outcomes in a variety of models. This means that it provides a useful guidance for policymaking and therefore a useful guide to estimating the preferences of policymakers.

gram topic model to get topic words and topic phrases (Wang, Mccallum and Wei, 2007). Second, we then use the topic words and topic phrases to hand classify those topics that fit into our Inflation and Output/Employment tradeoff. Topic models traditionally provide for each document a set of estimated topic proportions. However, because our units of analysis are of widely different lengths and because we focus on capturing the Taylor rule-motivated tradeoff in topic emphasis, we use the aggregated and unnormalised counts as a representation of topic emphasis. In the current, more model-based approach, we model the counts directly as Binomial observations as a function of speaker and time, and treat the linear predictor of these models as our estimate of the inflation vs. output ideal points of central bankers. From this count data, we could also treat empirical logits of inflation vs. output as positional estimates in the same way as left-right positions are estimated (Lowe et al., 2011), using a 'relative proportional emphasis' representation that underlies existing text scaling models such as Wordfish (Lowe, 2014, Slapin and Proksch, 2008).

The unit of analysis is a 'document' constructed by concatenating all contributions of each speaker per FOMC meeting between February 2005 and December 2007. Transcripts are published with a 5 year lag, so the time frame is restricted to what is publicly available. We then use the topical n-gram model to extract topics having a distribution of words and n-grams. We found that $K = 25$ topics were sufficient to identify the relevant elements required by the Taylor rule. We then identified topics corresponding to *Inflation* and *Output and Employment* and concatenated topic output to estimate the amount of each in each document, e.g.

- *Output/Unemployment:* productivity, compensation, energy, measured, hour, market psychology, large trucks, filter estimate, price elasticity, weekend strains

- *Inflation:* inflation, percent, year, time, don, basis points, core inflation, monetary policy, inflation expectations, energy prices
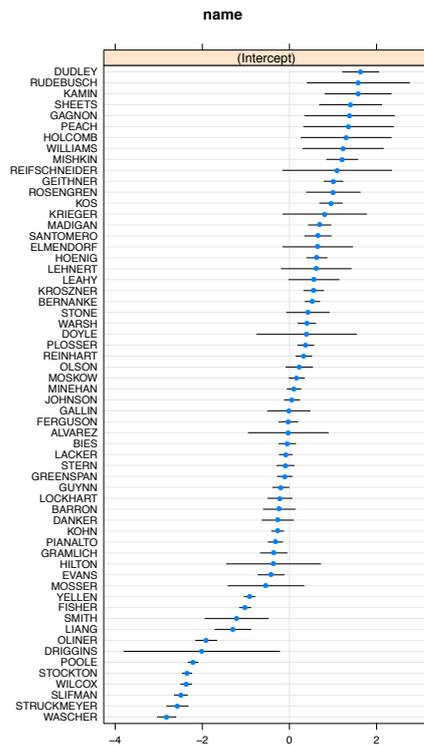
3 Results and Discussion

Figure 1 shows the estimates of FOMC member's ideal points. Each individual's estimate is a point prediction of their relative inflation preferences from a mixed model treating speakers as a draw from a wider population of central bankers, each with their own intercept, and controlling for the date of the meeting. The position of each speaker's intercept on the x-axis measures the degree of inflation aversion: that is, how willing a central banker is to forgo an increase in economic activity for a reduction in inflation, with those on the left hand side being relatively more *Inflation Dovish* than those *Inflation Hawkish* types on the right hand side.
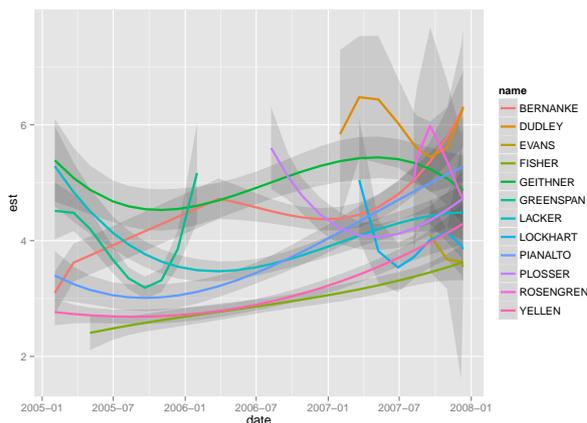
The model in Figure 1 assumes that speakers' ideal points are temporally stable. However, it is possible that changes in the financial and regulatory environment, or changes in the status of the speaker, might alter their preferences. Consequently Figure 2 shows the result of a spline model of the ideal point dynamics for a subset of individual speakers. It is clear that ideal points are in fact not always stable and the averages shown in Figure 1 are not always representative.

The results are both interesting in that they confirm previous measures of central bank estimates while still offering some new insights. The first surprise is that using speech data, Presidents Lacker, Fisher, and Plosser are all estimated to have much more moderate inflation preferences than measures based on voting or expert opinions suggest. Our estimate places Plosser to the right of the center opinion, with Lacker squarely in the middle and Fisher nearly as Dovish as Yellen. The position of Lacker is particularly important as this is exactly where we would expect to see a difference when compared to models based on voting. Lacker was the solitary dissenter in the August, September, October, and December 2007 FOMC meetings. In these meetings, the FOMC decided to keep interest rates the same whereas Lacker voted for additional tightening. Our findings suggest that Lacker is less extreme and that his preferences measured solely from votes over-estimates his inflation aversion.

Another interesting finding is that President Geitner is estimated as very Hawkish and significantly more Hawkish than both Chairman Bernanke and also Chairman Greenspan. This is important for two reasons. First, as President of the New York Fed, Geitner is perhaps more likely to represent the interests of the financial sector than other bank presidents; this suggests some evidence that constituency effects matter. Second, the New York Federal Reserve Bank President al-

[1]

[2]

fore, Figure 2 shows the estimated changes in FOMC member positions over time for a selection of members. The estimate where Bernanke is a horizontal line leading up to 2006 is when he is absent in the transcripts. In 2006, he transitions from Mr. Bernanke to Chairman Bernanke. Interestingly, when he is appointed, he immediately becomes more centrist. Current Chair Janet Yellen is consistently lower (more dovish) on inflation than Bernanke but both members, as expected, trend in the same direction over time.

4 Conclusion

This article demonstrates the utility in combining text as data and scaling methods to estimate the ideal point positions of economic policymakers. In this article, we develop a new and powerful way to estimate central bank preferences on the FOMC based on topics of speech. Our major contribution is that we offer an estimate that is not based on voting behavior, which is known to be biased. As a result, this paper makes a number of important and exciting discoveries.

One important finding is that when Bernanke became the Chairman of the Fed in 2006, our results suggest that his inflation preferences moderated. This implies that that the Chair of the FOMC faces an incentive to take up the middle position on the FOMC irrespective of his own preferences and that this is true even in speech. Such a finding is also supported by our ideal point estimate of Greenspan who, during his tenure at the Fed, is also estimated to hold the middle position. Future research should extend the analysis to see whether or not Chair Yellen moved in a similar direction at the time of her appointment. Such evidence provides further support for the idea that FOMC members are not neutral experts but are policymakers that face career incentives and institutional constraints that mediate their behavior.

Second, we also show that previous measures of central bank preferences that depend only on voting behavior over-emphasize the extremity of the positions taken by dissenting voters. For example, most expert surveys and other voting-based studies estimate President Lacker as an extreme Hawk. When we estimate Lacker's positions using words and topics, however, we find that Lacker's position is much more moderate. This is an excellent example of how failure to correct for known biases can cause misleading measures and wrong substantive

ways votes on the FOMC; this means that during his tenure at the FOMC, there was always an inflation hawk voting.

Lastly, Chairman Greenspan straddles the middle position when compared against his two successors, Chairman Bernanke and Chair Yellen. Bernanke is estimated as relatively more inflation adverse than either Greenspan or Chair Yellen, whereas unsurprisingly, Yellen is estimated as more Dovish.

While the ideal point estimates are interesting, they represent just a snapshot of a member's preferences and do not show how these positions change over time. This is especially important for the people that switch from Board to Chairman positions, such as Bernanke and Yellen. There-

conclusions. One fruitful item for further research, therefore, is to examine the relationship between dissenting in speech and dissenting in votes.

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