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How did the FOMC View the Great Recession as it was Happening?: Evaluating the Minutes from FOMC Meetings, 2006-2010

Herman O. Stekler
The George Washington University
hstekler@gwu.edu

Hilary Symington
Barnard College

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Herman O. Stekler*
George Washington University
Washington DC

Hilary Symington
Barnard College
New York NY

ABSTRACT

In setting monetary policy, the Federal Open Market Committee uses forecasts and other information to assess the current and future states of the US economy. Numerous studies have evaluated the Greenbook forecasts but did not determine why a forecast was made, what factors were considered or the uncertainty that was involved. The minutes of the FOMC provide such information. While the minutes are qualitative, using a quantitative index, we show that the FOMC saw the possibility of a recession but did not predict it. Using textual analysis, we determined which variables informed the forecasts.

How did the FOMC View the Great Recession as it was Happening?

Evaluating the Minutes from FOMC Meetings, 2006-2010

In setting monetary policy the Federal Open Market Committee uses an array of forecasts and other types on information to assess the current and future states of the US economy. For example, the Greenbook, prepared by the staff of the Federal Reserve prior to meetings, offers quantitative assessments of the national economy and forecasts its future direction. In addition, the Beige Book summarizes qualitative information about the state of the economy within the area of each of the 12 Regional Banks. Finally, each of the FOMC participant members also provides their own quantitative assessments and forecasts.

While numerous studies have evaluated these forecasts, they were not able to determine why a forecast was made, what factors were considered in constructing the prediction, or the uncertainty that was involved. Stekler (forthcoming) has indicated that it is necessary to undertake case studies of the process that was used in making particular forecasts. The information that we would obtain from these studies would enable us to understand why errors were made and would improve our forecasting abilities. There is a source of such information: the minutes from the FOMC's meetings. The assessments of the current state of the economy or the statements about its future direction that are included in these minutes have never been evaluated. They are qualitative statements and thus a methodology for converting these qualitative statements into a quantitative index must be developed. Using this index we can then evaluate the FOMC's judgments about the state of the US economy. We supplement this quantitative index with a textual analysis of the minutes to determine the information that the members of the FOMC considered in making these judgments.

The aim of this case study is to analyze the forecasts contained in the minutes of the FOMC meetings in order to ascertain how the Committee viewed the Great Recession as it was happening. Using the minutes as data, we show that the FOMC possessed the relevant information regarding sectors of the economy that were responsible for the recession and that members understood the implications and magnitude of these sectors' decline relatively quickly. While we show that the FOMC foresaw the strong possibility of a recession before it happened, they did not predict it in advance and only recognized it as it was happening. They did predict the upswing in the economy at the recession's end.

In addition to its value as a case study of the forecasting process, this analysis of the FOMC meetings' minutes offers two contributions to the forecasting literature. The first is to apply a consistent, verifiable scoring method of forecast evaluation that transforms qualitative into quantitative data. The second is to use textual analysis to determine the information that the FOMC was discussing.

The paper is divided into four sections. First, we introduce the minutes and review the literature evaluating comparable forecasts. Second, the methodology is explained. This is followed by the results, the conclusions, and a discussion which highlights the contributions of this paper to the forecasting literature.

I. Introduction and Literature Review

This section begins with a brief explanation of the minutes. This is followed by a discussion of the other forecasts made within the Federal Reserve System and a review of the literature that evaluates these forecasts. This section concludes with our reasons for believing that an analysis of the minutes provides unique insights.

A. The Minutes

The minutes are a record of the discussion among all 19 FOMC members[1] and the Federal Reserve staff at each of their eight regularly-scheduled meetings throughout the year. In the recorded discussion, members qualitatively assess the current state and future direction of the economy in order to set monetary policy. Discussion focuses on output growth, key sectors of the economy, inflation, and unemployment. The minutes remain relatively consistent in the language they use to describe participants' views and in their overall structure.[2] They are currently released about three weeks after the date of the meeting.[3]

B. Other Federal Reserve Forecasts/Reports

1. Beige Book

In addition to the minutes, there are other forecasts and/or reports generated within the Federal Reserve System that are concerned with the state of the US economy. Table 1 presents this information and describes the attributes of these forecasts/reports. Like the minutes, the Beige Book (officially titled "The Summary of Commentary on Current Economic Conditions by Federal Reserve District") provides qualitative information. It compiles anecdotal information on the state of the economy in each Federal Reserve District through interviews with "bank and branch directors... key business contacts, economists, market experts, and other sources" *(Board of Governors, 2013).* Balke and Peterson (2002) and Armesto et al. (2009) have shown that the Beige Book's assessments of regional economic situations are generally accurate and provide

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[1] The FOMC consists of 19 members in total; 12 vote. Voting members include the seven Governors of the Federal Reserve System, the Regional Bank President of New York, and a rotating group of four other Regional Bank Presidents. All 19 members—voting and nonvoting—participate in the meeting's discussion.

[2] This reduces the problems that might result if the language varied from meeting to meeting. See Armesto et al. (2009, p.37).

[3] They have been published in various formats since 1936. (For a complete history of the minutes, see Danker & Luecke, 2005.)

valid information about current economic activity and the future growth of the overall economy. Balke and Peterson (2002) used a methodology similar to that used in this study to transform the qualitative statements in the Beige Books into quantitative data. In particular they noted that the Beige Books possessed uniquely predictive information, which was not contained in indicators or time-series models.

Armesto et al. (2009) also converted the Beige Book qualitative statements into a quantitative measure but used a textual-analysis program to calculate two scores: optimism and pessimism. This procedure has the virtue of being perfectly reproducible but the disadvantage of not being able to relate the score to the context in which the qualitative statement was made. In any event, their analysis concluded that the content of the Beige Book had predictive power but also showed that there was an asymmetry in the statements of the reports from the various regions. Some were more optimistic (pessimistic) than others.

2. Greenbook Forecasts

Many studies have evaluated the accuracy of the Fed staff's quantitative forecasts which are contained in the Greenbook. Together, they provide strong quantitative evidence for the overall accuracy of the Greenbook. Romer and Romer (2000) and Sims (2002) demonstrated that the Greenbook forecasts outperformed commercial predictions. Gamber and Smith (2009) confirmed these results, although they noted that the gap between the Greenbook and commercial forecasts had narrowed. Using real-time data, Faust and Wright (2007) compared the 1980-2000 Greenbook forecasts against a number of atheoretical models. The Greenbook's inflation forecasts were better than the models' for all horizons, but this was not the case for the growth forecasts beyond the current period.

3. FOMC Forecasts

The members of the FOMC also prepare and issue forecasts, but only a few studies have analyzed these forecasts. (Gavin and Mandal, 2003; Romer and Romer, 2008; Nunes, 2013; Sheng, forthcoming). Most used the mid-points of the distributions[4] of the FOMC's forecasts while Sheng examined the individual forecasts of the FOMC participants that are only published ten years after they are made. The accuracy of these forecasts was compared to that of the Greenbook predictions because those forecasts are available to the FOMC before they made their own estimates. The general conclusions were that the Greenbook's forecasts of inflation were more accurate than those of the FOMC but that the results relating to the output estimates were mixed. Nunes argued that the FOMC predictions incorporated the information available in other public forecasts. More interestingly, Sheng concluded that the FOMC members possess valuable information beyond that of commercial forecasters and beyond that of the Greenbook. Furthermore, he found substantial variation in these forecasts which may result from the diversity of economic conditions in the Federal Reserve regions.

4. Value of the Minutes

The minutes contain information from many sources. The staff's quantitative forecasts are summarized and included in the minutes. So are the periodic forecasts of the FOMC. However, we obtain additional insights by considering the interpretations that FOMC members place on these inputs. This relates directly to the point that Sheng (forthcomin) made in his evaluation of the FOMC forecasts: they reflect the diversity of the FOMC participants.

As a record of a dynamic discussion between all members of the FOMC, the minutes provide additional insights about the way that information is interpreted to yield statements about

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[4] The FOMC forecasts that are released immediately exclude the three observations in each tail of the distribution and only the mid-point and the interquartile range of the distribution are made available.

the current state and future direction of the economy. This insight is more nuanced, more readily-available, and broader in its purview than a simple quantitative number. Furthermore, unlike the point forecasts of the Greenbook and FOMC members, the minutes provide an inherent assessment of risk, evident both in participants' express concerns about the economy and in their areas of disagreement, as well as their explicit statements regarding upside and downside risk.[5]

The combination of nuance, timeliness, broad purview, and attention to risk makes the minutes an especially valuable source of insight into FOMC thinking during major shifts in the economy — as in the case of the Great Recession and its aftermath. The current study's analysis will provide a method of extracting this insight.

II. Methodology

Three different methodologies were used to assess the predictive information that was contained in the minutes. First, we develop a method for scoring the qualitative statements in the minutes to generate a quantitative index that captures the FOMC's views about the current and future states of the economy. Second, we use software-based textual analysis to highlight which areas of the economy were of most concern to FOMC members. Third, traditional textual analysis is used to understand FOMC members' evaluation of risk.

A. Construction of a Quantitative Index

1. Constructing the index

An index to measure the FOMC's views about the state of the economy was constructed for each of the 40 regularly-scheduled FOMC meetings held between January 2006 and December 2010. One index was constructed that corresponded to members' current outlook and

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[5] The minutes' risk assessment is implicit in members' discussion and outlook. It is thus not as precise a determination of risks as the Fan Chart of the Bank of England. (For a discussion of the Bank of England's Fan Chart, see Elder, et al. 2005.) In 2008, the Greenbook added a similar fan chart.

another one reflected members' outlook for the future. The first measure was derived from the minutes' introductory paragraphs, which give an overview of the FOMC members' consensus on the current state of the economy. In each of the minutes these introductory paragraphs generally begin, "The information reviewed at the meeting suggested that…" and go on to summarize FOMC members' current outlook. These paragraphs can be interpreted as a qualitative nowcast of the economy.

The index measuring members' outlook for the future was also based on the paragraphs that introduced a summary of the members' discussion. In the discussions that follow, members delve into the implications of current economic trends, discuss the economy's future direction, and decide on appropriate measures of monetary policy. The second set of introductory paragraphs outlines their discussion. These future-oriented paragraphs generally begin, "In their discussion of the economic situation and outlook, meeting participants…" The paragraphs go on to summarize members' outlook for the future of the economy.

Both measures were derived from an outlook scale used by Goldfarb et. al (2005) to analyze the forecasts of the Great Depression. This scale was later applied by Lundquist and Stekler (2012) to analyze business economists' forecasts leading up to the Great Recession. The values of the outlook scale ranged from +1 to -1 with gradations of 1/4. For example, statements that assessed or forecast strong expansion earned a score of +1, while statements assessing or forecasting a recession received a score of -1. Table 2 presents the criteria for scoring the minutes' outlook. It is worth noting that all but the lowest two scores indicate that members assessed a growth in real output. Only the lowest two scores correspond to a contracting economy.

For consistency, the outlook scale criteria were supplemented with a set of key words from the minutes describing various economic situations. A score of +1, for example, consistently corresponded to "strong," "robust," or "considerable" growth, whereas a score of +1/2 consistently corresponded to "moderate," "modest," or "sustainable" growth. Table 2 also includes an abbreviated list of key words used to score the minutes.

2. Calibrating the Index

We must demonstrate that our scoring method is valid in order to use the Index as an explanation of the FOMC's forecasting process. We, therefore, determined whether the Index is calibrated with quantitative forecasts which were available at the time of the FOMC's meetings. Two sets of quarterly annualized forecasts of real GDP growth were used for this purpose: the Greenbook forecasts for 2006 and 2007 and the Survey of Professional Forecasts for 2008 through 2010.[6]The Greenbook forecasts were an ideal benchmark for calibrating the minutes because the staff of the Federal Reserve prepares these forecasts specifically for the FOMC meetings. For the scoring procedure to be valid, it should reflect this clear input to members' discussions. The SPF provided a suitable alternate source of forecasts for the years the Greenbook had yet to be released because studies have found the two sets are comparable in accuracy (Sinclair et al. 2012).

The process of calibrating the minutes with Greenbook and SPF forecasts presented a timing issue. The FOMC meets twice each quarter and it was necessary to align the implied forecasts in the minutes to the two sets of actual forecasts. We resolved this issue by aligning the forecasts for each current quarter with the index obtained from the minutes associated with the first FOMC meeting in each quarter.

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[6] At the time that this research was begun, the Greenbook forecasts for 2008 had not yet been made available to the public.

3. Quantitative Textual Analysis

Textual analysis — also referred to as content analysis — is "a systematic analysis of the content rather than the structure of a communication…including the study of thematic and symbolic elements to determine the objective or meaning of the communication" (Content Analysis, 2009). Content analysis can be either qualitative or quantitative in nature. We performed both. We first describe the quantitative, software-based mode of textual analysis followed by the qualitative, traditional process of textual analysis.

In reading the minutes, we discovered that issues related to the housing market, mortgages, and financial markets dominated the discussion. To measure the FOMC members' concern and interest in these sectors of the economy, we used an open-source version of Alceste, a textual analysis software developed by the French National Scientific Research Council. This was the same software-based textual analysis that Schonhardt-Bailey (2013) had applied in her analysis of verbatim FOMC transcripts. Like Schonhardt-Bailey, we measured characteristic words and phrases of the FOMC members.[7]

Alceste creates "characteristic" classes of words based on their patterns of distribution throughout the text. It does not use dictionaries or semantic classes to determine these characteristic words "so that the form of the output doesn't depend on the researcher's prejudices concerning the content" (Reinert, 1998, p. 1). In other words, Alceste recognizes characteristic classes of words *first*. The researcher then imposes categorical, semantic meaning on these "characteristic" words.

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[7] Armesto et al. (2009) had also used textual analysis in their analysis of the Beige Books. However, they sued a different software program.

Whereas the index was constructed from specific words that were in the summary paragraphs, the textual analysis examined the entire text of all the minutes between 2006 and 2010. The analysis required that each of the minutes be converted into an Alceste-compatible format. Alceste then analyzed the document for "active" words, ignoring prepositions and other "tool" words. These "active" words were then divided into characteristic categories, which were classified by market sector. The number of housing-related words (lemmatized[8] versions of "house," "homebuy," "homebuild," and "residential construction") in each set of minutes were then counted. A similar procedure was used for mortgage-related words (lemmatized versions of "mortgage," "financial," and "default"). By themselves, these word counts do not indicate the extent to which the discussions were dominated by these topics. A benchmark is required.

Given the Federal Reserve's dual mandate, the word-count for terms related to inflation served as a benchmark by which to compare other aspects of their discussions. We thus had three sets of word-counts: one set related to the housing market, one to financial markets, and one to inflation. Using these three word-counts, we compared the proportion of words related to housing and to financial markets with the proportion of inflation-related words, per meeting.

4. Qualitative Textual Analysis

The difference between and quantitative and qualitative, traditional textual analysis is similar to Starr's (2012) distinction between qualitative and quantitative research. According to Starr, "the primary difference between the two…concerns the open-ended character of data collection in qualitative research" (p. 3). Whereas quantitative research assumes *a priori* which specific information is of interest and proceeds to gather all of this information for comparison,

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[8] To lemmatize a term is to "group together the inflected forms of a word for analysis as a single item" (Lemmatise, 2009). For example, the lemmatized version of "homebuy" would also include "homebuyer," "homebuyers," and "homebuying."

qualitative research begins with more flexible criteria. It interacts with the subject matter to extract its most illuminating information. Our quantitative index and the quantitative textual analysis do not set the limits of the insights that may be obtained from the minutes. The use of traditional textual analysis to an engaged reading of the minutes permits us to extract additional insights.

Specifically, when reading the text of the minutes, we sought to determine how aware the members of the FOMC were of changes in the economy. What did they know? When did they know it? And why did they decide to shift their outlook?

III. Results

1. The Index: Quantification of Qualitative Statements

Table 3 and Figure 1A present the values of the Index referring to current economic conditions that we constructed from the qualitative statements in the minutes. The graph clearly shows the cyclical pattern that reflects the behavior of the US economy between 2006 and 2010. Similarly, Figure 1B presents the future outlook Index. It is similar to the current conditions Index except that it displays a much more pronounced upturn in the middle of 2008.

Before we can use the Index, it is necessary to determine its validity. We, therefore, calibrated the Index with the forecasts from the Greenbook and the Survey of Professional Forecasters (SPF). The scales used in this exercise are presented in Table 4. The calibration of the current quarter Index (Figure 2) shows that the scored minutes are generally consistent with the Greenbook and SPF forecasts. The nowcasts made at the meetings between June and December 2007, however, are a notable exception. The members were more optimistic than the Greenbook for those four meetings.[9]

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[9] Although we do not present the results here, the Index of members' outlook for the future is not as well calibrated with the Greenbook and SPF forecasts for two quarters ahead. Neither the Greenbook nor the SPF projects a future decline in the

Despite these differences, the Index of scored minutes appears consistent with the Greenbook and SPF forecasts. Figure 2 shows that the scored minutes track the best comparable forecasts fairly well. This result justifies our scoring procedure and allows us to use the index for further analysis of the forecasting process. Furthermore, the results about the forecasting process that we obtain from this study should generally hold for other forecasts.[10]

2. What the FOMC Knew and When

What did the FOMC know about the Great Recession and when did they know it? Based on the Index, it is possible to determine that there were several meetings when there was a fundamental change in the outlook of the FOMC members. There was an important shift in the outlook at the December 2007 meeting, just as the recession was beginning. At that meeting the weakness of the economy was clearly recognized with the views about both the current and future situations becoming much more pessimistic. Unfortunately, at the Spring and Summer 2008 meetings the FOMC changed its outlooks.

The severity of the weakness was only recognized after the collapse of Lehman at the October and December 2008 meetings. In that sense not only did the FOMC not predict the recession in advance[11], but they were also late in recognizing it. The Committee had no trouble in predicting and recognizing the upturn that occurred in the middle of 2009.

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economy, whereas the minutes do. Throughout 2007 and 2008, FOMC members talked about potential decline, then reversed themselves. Their discussions, as summarized in the minutes, do not follow the steadier downward trajectory of the Greenbook and SPF future forecasts.

[10] Furthermore, the scored minutes' volatility and their divergence from the Greenbook or SPF predictions suggest that the minutes from FOMC meetings include information not available in those predictions. Nevertheless, the minutes provide insights about the contents of the Greenbook that will not be available for another five years.

[11] The SPF and Greenbook predictions in Figure 2 show a similar result. Business economists were not more successful either. (See Lundquist and Stekler 2012 ,and Stekler and Talwar 2013). It would have been difficult to make a valid comparison of the Index with the projections made by the FOMC members. Those predictions refer to the fourth quarter over fourth quarter changes for the current and subsequent years while our Index refers to the current economic situation. Depending upon when the FOMC projections were made they would refer to forecasts of varying lead. When we graphed their projections for the current year, we did find that the mid-points of their projections are correlated with their discussions. However, the minutes display a more

While the FOMC did not predict the Great Recession, it must be given credit for their views at the December 2007 meeting where they quickly and correctly observed the underlying weakness of the economy. It is also possible to provide a possible explanation for the Spring-Summer 2008 changes in the outlooks. The real-time GDP figures that were released in that period differ substantially from the historical data that now refer to that period. (See Table 5). *It is hard to predict a recession when the real-time data showed that the growth rate of GDP was accelerating.*[12] A second possible explanation is that the Committee may have believed that the stimuli that had already been provided to the economy were sufficient to avert a downturn.

3. Major Inputs to the Forecasts: Housing and Financial Markets

While the Index reveals how members changed their outlook over time, it does not indicate the information that most informed their decision making. Obviously, information about the key economic variables and indicators was presented and discussed at each meeting. Using the quantitative textual software, we were able to determine what other subjects dominated the discussions at each FOMC meeting and how that information affected the outlooks.

The textual software, Alceste, confirmed that words related to housing, finance, and inflation were "characteristic" of their discussions. Figure 3 presents the data about the proportion of these three subjects that were contained within the minutes of each of these meetings. While we want to compare the attention that the Committee paid to the housing and finance sectors relative to their concern about inflation, it is important to note that the attention devoted to inflation diminished considerably after the failure of Lehman in 2008.

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negative point of view than do the FOMC's summarized quantitative projections. Thus in this period the minutes more accurately reflected the actual state of the economy.

[12] In a later section, we show how the FOMC's assessment of the risk changed over this period.

Our analysis shows that the FOMC discussed the housing market at length since the beginning of 2006, and it received more attention than inflation from the beginning of this period. However, the state of the financial sector began to receive extensive attention only at the August 2007 meeting when it was noted that volatility in that market had increased. Attention to that sector increased even more in September 2007. Both sectors received considerable attention throughout the entire recession and changes in their views about these sectors affected their overall outlooks. For example, in September 2007, Figure 3 shows a significant increase in the FOMC's discussion of the mortgage and financial markets. At the same time, members became more pessimistic about the future direction of the economy (see Figure 1B). The minutes thus reveal that members were aware of the root causes of a contraction long before the Great Recession began. Their discussions of housing, mortgages, and financial markets remained high throughout the recession, suggesting that these sectors remained important inputs to the members' changing outlook.

This analysis shows that the FOMC paid considerable attention to the two sectors that drove the Great Recession: housing and finance. Furthermore, the members' evaluations of the changing conditions in these two sectors are consistent with shifts in the Index. Consequently, the minutes show how disturbances in the housing and financial sectors informed the FOMC's changing outlook as the recession progressed.

3. Risks to the Economy

The Index that we have constructed can be viewed as the point estimates of the FOMC's current and future outlooks. The minutes also contain statements about the risks and uncertainties that the Committee associated with their outlooks. These statements can be considered the verbal

analogs of the fan charts that have been used to convey risks in a quantitative manner. Table 6 presents these statements about the risks to the economy that were associated with each of the meetings between June 2007 and December 2009.

Throughout 2007 the downside risks to growth were explicitly recognized, but until the fourth quarter of the year, the inflation risks were considered to be of more concern. The uncertainty at the end of 2007, when the recession actually began, was specifically noted. In the first half of 2008, even while some believed that the possibility of a recession was significant or that a severe downturn could occur, the risks associated with inflation were again mentioned. This consideration of inflation risks was that the run-up of oil prices might result in a pass-through to other prices. This focus on inflation risks did not diminish until the October 28-29, 2008 meeting. In the meantime, the Committee reduced the risks associated with the outlooks on growth. This reduction in the perceived risks coincides with the upward movements in the Index displayed in Fig 1a.

After the collapse of Lehman, the risks to growth increased substantially and the focus on the price dimension switched to the risks associated with disinflation and/or deflation. As the recession ended, the Committee reduced its assessments about the downside risk to growth.

Looking back, it is always difficult to assess statements about the risks that an economy faced. However, it appears to us that over this period the FOMC for the most part correctly assessed the state of the economy and the risks that might be encountered. The exception occurred in the first half of 2008 and we have already noted that the real-time GDP estimates failed to reflect the state of the economy that actually existed and is not seen in the historical data.

4. Analysis of Qualitative Data

The Index and the risk assessments provide information about the quality of the FOMC forecasts. However, the minutes can provide even more information, namely the factors that were considered in making the forecasts and risk assessments. Our textual analysis has already shown that housing and the financial stresses dominated their discussions. We, thus, will focus on how the FOMC discussions of these variables and their perceived interactions with the rest of the economy informed their forecasts and risk assessments for growth during the early part of the recession.

During 2007 the FOMC noted that the downside risk was significantly affected by the negative trends in the housing sector (8/7/07, 9/18/07), but increased attention, as shown in Fig 3, began to be focused on the financial issues. The financial shocks led to increased uncertainty and, given the financial stresses that existed, a further shock to the fragile financial sector could increase downside risk (9/18/07, 10/30-31/07, 12/11/07). These views were not unanimous because it was also argued that the economy had shown resilience to previous financial shocks and thus the macroeconomic effects might be limited (9/18/07).

The possibility of feedback loops was also noted. At first, it was argued that there was little evidence that there was a negative spillover from housing to the rest of the economy (10/30-31/07). By the end of 2007, the housing sector was weaker than expected, leading to foreclosures, downward pressure on housing prices, and a decline in household wealth. In turn, it was now recognized that this weakness could restrain other forms of spending, (12/11/07), but it was expected that the economy would grow in 2008, albeit weakly.

The discussions in the first quarter of 2008 are quite interesting. The FOMC recognized that the economy had decelerated rapidly at the end of 2007, and that most new information was

weaker than anticipated. While the discussion indicated that *some* felt that the risks of a

downturn were significant, the prevailing view was that the economy's weakness would dissipate

by the second half of 2008. The reasoning was: (1) monetary policy was being eased, (2) there

would be an abatement of the weakness in the housing sector, (3) oil prices would be a smaller

drag on the economy, and (4) the effect of fiscal stimulus (1/29-30/08).

The forecast made at the March 18, 2008 meeting was that GDP would rise slowly in the

second half of 2008 because of the fiscal stimulus. This forecast was made despite (1) all of the

coincident indicators declining, (2) evidence of an adverse feedback loop, (3) an increase in the

downside risk with some members believing that a severe economic decline could not be ruled

out, (4) an intensification of financial market stress, and (5) recovery depending on the housing

market stabilizing for which there was yet no evidence. (3/18/08).

There were two dominant but conflicting themes in the minutes of the Spring and

Summer meetings that preceded the collapse of Lehman Brothers. First, in every meeting the

significant downside risks attributable to the housing market were emphasized. In fact they could

be amplified by financial institutions and financial markets, (4/29-30/08), or there could be

spillovers or feedbacks from the decline in this sector. (6/24-25/08; 8/5/08). The other theme

focused on a reduction of the financial stresses, thus reducing the odds that economic activity

could be severely disrupted (4/29-30/08, 6/24-25/08).

Subsequent to the Lehman Brothers bankruptcy the discussions became more pessimistic

noting that downside risks had increased, that there was an adverse dynamic process, and that

there was a high degree of uncertainty about financial developments and their implications for

the economy (9/16/08, 10/28-29/08). By December the Committee indicated that the downturn

had intensified and that there were downside risks to even the weak projected economic

trajectory with the distinct possibility of a prolonged contraction. (12/15-16/08). In 2009 the FOMC became concerned about the extent of the recovery and the possibility that the inflation rate would be too low. (1/27-28/09; 3/17-18/09).

IV. Disscussion

Our analysis of the minutes of the FOMC meetings enabled us to obtain information about the forecasting process that the members used to judge the current economic conditions and to make forecasts about the future state of the economy. The record clearly showed that the members examined an extensive amount of GDP and sectoral data as well as the indicators that generally foreshadowed future developments in the economy. The Committee considered the implications of the housing market decline and the volatility of the financial markets and for the most part correctly assessed the risks that were associated with these developments.

Yet, while the record indicated that using all this information that they saw the possibility of a recession, they did not predict it in advance. Moreover, they were late in recognizing it and also did not immediately realize that the recession would be as severe as it ultimately was. We present several possible explanations for this result.

First, we have already indicated that the real-time GDP data did not reflect what we now know happened during the early part of the recession. This would have prevented them from correctly interpreting what was occurring in the economy. Second, they may have been reluctant to clearly indicate that a recession was imminent because of the possibility that this would become a self-fulfilling forecast. Third, there were strong beliefs that fiscal and monetary policies that had already been implemented would avert a major downturn. Fourth, there may have been a political constraint whereby the Committee sought to demonstrate virtual unanimity in order to send one signal to the financial community. Finally, the Committee may have failed

to recognize that this recession would be "different". We leave it to others to determine which of these explanations have merit. Given that the FOMC undertook many policy actions even before it recognized the recession, it may be that the failure to predict it in advance did not have a deleterious effect on the implementation of monetary policy.

V. Conclusions

An important contribution of this paper is to demonstrate that an analysis of qualitative forecasts can provide insights about the process of preparing forecasts and the variables and economic conditions that informed that process. We demonstrated that it is possible to evaluate qualitative forecasts, by converting these predictions using a quantitative scale. This made it possible to construct an Index which reflected the qualitative forecasts made by the FOMC. Consequently, we were able to determine that the Committee saw the possibility of a recession, but they did not predict it in advance. Using textual analysis we were able to determine the variables that were considered in the discussions that formed the basis of the forecasts. Finally, this analysis provided at least one explanation for the forecast errors that were observed.[13]

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[13] This type of analysis would yield even more insights if there were a qualitative discussion that was associated with quantitative predictions. The published Greenbook that is circulated to the FOMC contains both a qualitative discussion as well as the quantitative forecasts. This material might be an appropriate venue for such an analysis.

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Table 1 — *Characteristics of Federal Reserve System Forecasts/Reports*

Forecast	Member Input	Data	Content	Focus	Publication Schedule
Minutes from FOMC Meetings	all 19 FOMC members and the staff of the Board of Governors	qualitative	discussion between FOMC members and the staff of the Board of Governors	national	3 weeks after FOMC meetings
Beige Book	the 12 Regional Banks of the Federal Reserve	qualitative	anecdotal information about each region's economy	regional	2 weeks prior to FOMC meetings
Greenbook forecasts	staff of the Board of Governors	quantitative	assessments and projections of the direction of the US economy	national	5 years after FOMC meetings
FOMC Member Projections - Summary	13 FOMC members (the middle views)	quantitative	range and central tendency of the middle 13 members' economic projections	national	3 weeks after four of the 8 annual FOMC meetings
FOMC Member Projections - Individual	all 19 FOMC members	quantitative	individual economic projections from each of the 19 members	national	10 years after FOMC meetings

Table 2 — *Criteria for Scoring Outlook of the Minutes' Qualitative Forecasts*

Outlook	Assessment	Score	Recurring Words from the Minutes used for Scoring
Optimistic	**Strong Growth**	**+1**	strong, robust, considerable, upbeat, brisk, surge
	Normal Growth	+3/4	normal, solid, steady
	Modest Growth	+1/2	modest, moderate, sustainable
	Slow Growth	+1/4	slow, gradual, subdued, muted
Neutral	**Unclear**	**0**	unclear, mixed
	Decelerating Growth	-1/4	decelerating, stabilizing, ongoing adjustment, leveling out
	Continued Weakness	-1/2	continued weakness, sluggish, slack, below potential
	Decline	-3/4	declining, deteriorating
Pessimistic	**Recession**	**-1**	recession, contraction, sharp and widespread decline

Table 3
Values of the Current and Future Index

	Current	Future
Jan-06	0.75	0.50
Mar-06	1	0.50
May-06	1	0.50
Jun-06	0.25	0.50
Aug-06	0.5	0.50
Sep-06	0.25	0.50
Oct-06	0.25	0.50
Dec-06	0.25	0.50
Jan-07	0.25	0.50
Mar-07	0.5	0.50
May-07	0.25	0.50
Jun-07	0.5	0.50
Aug-07	0.5	0.50
Sep-07	0.5	-.25
Oct-07	0.75	0.25
Dec-07	-0.25	-.25
Jan-08	-0.5	-.75
Mar-08	-0.75	-1
Apr-08	-0.5	-.75
Jun-08	-0.5	0.25
Aug-08	-0.5	-.50
Sep-08	-0.25	-.50
Oct-08	-0.75	-.50
Dec-08	-1	-1
Jan-09	-1	-.75
Mar-09	-1	-1
Apr-09	-0.25	-.50
Jun-09	-0.25	-.25
Aug-09	-0.25	0.25
Sep-09	0.25	0.25
Nov-09	0.25	0.50
Dec-09	0.5	0.50
Jan-10	0.75	0.50
Mar-10	0.75	0.50
Apr-10	0.50	0.50
Jun-10	0.50	0.50
Aug-10	0.25	0.50
Sep-10	0.25	0.25
Nov-10	0.50	0.50
Dec-10	0.50	0.75

Table 4— *Calibration Scale Connecting Outlook Scores with Projected Real GDP Growth*

Assess-ment	Strong Growth	Normal Growth	Modest Growth	Slow Growth	Unclear	Decelerating Growth	Cntd. Weakness	Decline	Recession
Score	+1	+3/4	+1/2	+1/4	0	-1/4	-1/2	-3/4	-1
Real GDP Growth (Annual %)	4.0 or higher	3.4	2.8	2.1	1.5	0.9	0.3	-0.4	-1.0 or lower

Table 5

Real Time and Historical GDP Growth Data, 2000-2010

	90 Day Estimate	Historical
2006.1	5.6	5.1
2006.2	3.8	1.6
2006.3	2	0.1
2006.4	2.5	2.7
2007.1	0.7	0.3
2007.2	3.8	3.1
2007.3	4.9	2.7
2007.4	0.6	1.5
2008.1	1	-2.7
2008.2	2.8	2
2008.3	-0.5	-2
2008.4	-6.3	-8.3
2009.1	-5.5	-5.4
2009.2	-0.7	-0.4
2009.3	2.2	1.3
2009.4	5.6	3.9
2010.1	2.7	1.6
2010.2	1.7	3.9
2010.3	2.6	2.8
2010.4	3.1	2.8

Table 6 Risks Associated with the Forecasts

Date of Meeting	Current Risk - GDP	Uncertainty	Current Risk - Inflation
June 2007	Growth More Balanced		Inflation would fail to moderate predominant concern
August 7, 2007	Housing sector a significant downside risk		Inflation would fail to moderate remains prominent concern
Sept 18, 2007	Downside risk to growth had increased somewhat.	Outlook for activity characterized by particularly high uncertainty; risks to growth skewed to downside	Inflation would fail to moderate still a primary concern
October30-31, 2007	Decreased risk to growth less than in September but still significant	Uncertainty regarding outlook	Upside risks to inflation balanced downside risks to growth
December 11,2007	Financial stress poses increased risks to growth and makes outlook for economy consistently uncertain; downside risks had increased	Economic outlook unusually uncertain; given heightened uncertainty, no assessment of balance of risks	
January 29-30, 2008	Significant risks were on the downside; some noted that risks of a downturn were significant		Still worried about inflation even though it is expected to moderate
March 18, 2008	Downside risks had increased since January; some believed that a prolong and severe economic downturn could not be ruled out		Elevated risks of inflation
April 29-30, 2008	Risks to growth still skewed to downside	The risks were balanced	Upside risks to inflation if expectations of

			inflation increase
June 24-25, 2008	Reduced risks of an appreciable contraction of economic activity in near future, but significant downside risks to growth		Outlook for inflation had deteriorated; upside risks to the inflation outlook
August 5, 2008	Continuing downside risks to growth; the interaction between financial stresses and housing market contraction is primary source of downside risk; possible feedback		Significant concerns about upside risks to inflation; concern about long-run expectations
September 16,2008	Substantial downside risk to growth	Highly uncertain about financial developments and implications for economy	Persisting upside risk to inflation
October 28-29, 2008	Even after reduction in interest rates, downward risks to growth would remain		Rapid abatement of upside inflation risks, inflation would moderate to levels consistent with price stability
December 15-16,2008	Economic downturn had intensified; downside risks to even this weak trajectory were a serious concern; distinct possibility of a prolonged contraction but not the most likely outcome		Some saw the possibility that inflation would decrease below the rate of price stability
January 27-28, 2009	Risk to growth have tilted to downside but uncertain about outlook; significant risk that recovery would be delayed and initially quite weak		

March 17-18, 2009	Downside risk to an outlook that was already weak		inflation pressures will be subdued; some said it was below desired level
April 29-29, 2009	Downside risks to growth were significant		Inflation would be subdued and there was some risk that it would be too low
June 23-24, 2009	Downside risk diminished since April but still signifiicant		Less downside risk for inflation because economy was recovering
August 11-12, 2009	Smaller downside risk but slow recovery and vulnerable to shocks		A few saw signs of substantial disinflation
September 22-23, 2009		Risks to forecasts were balanced	Risk to inflation outlook roughly balance; some saw signs of disinflation but that risk has diminished
November 3-4, 2009	Balanced but uncertainty still quite elevated		Risk to inflation outlook balanced; downside in near-term, up in longer term
December 15-16, 2009	Downside risks to outlook diminished further-moderate growth	Near-term outlook uncertain- most likely a gradual strengthening over the next two years	Subdued inflation but disagreement about inflation risks

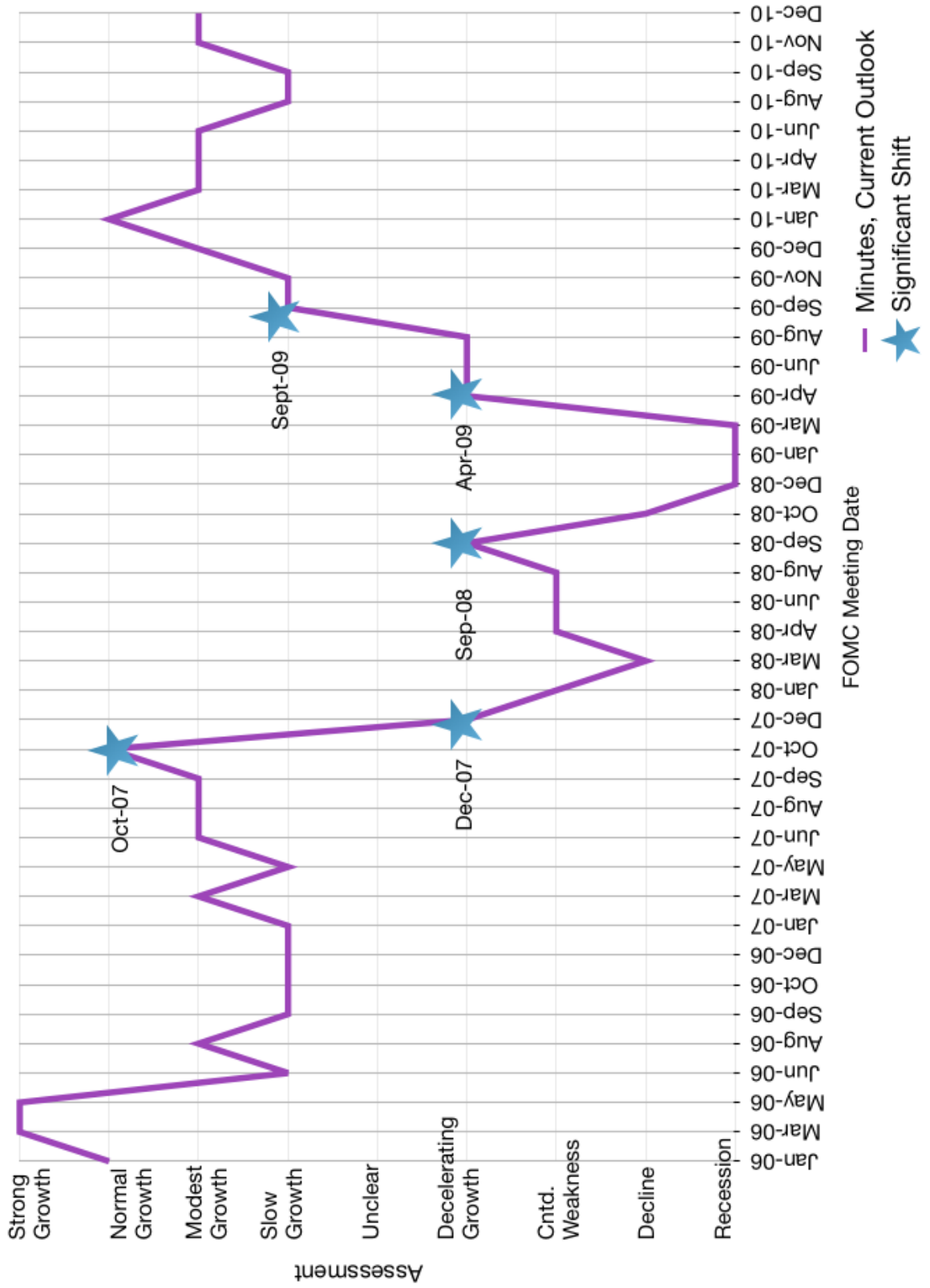Figure 1A - Index of Minutes, Current Outlook

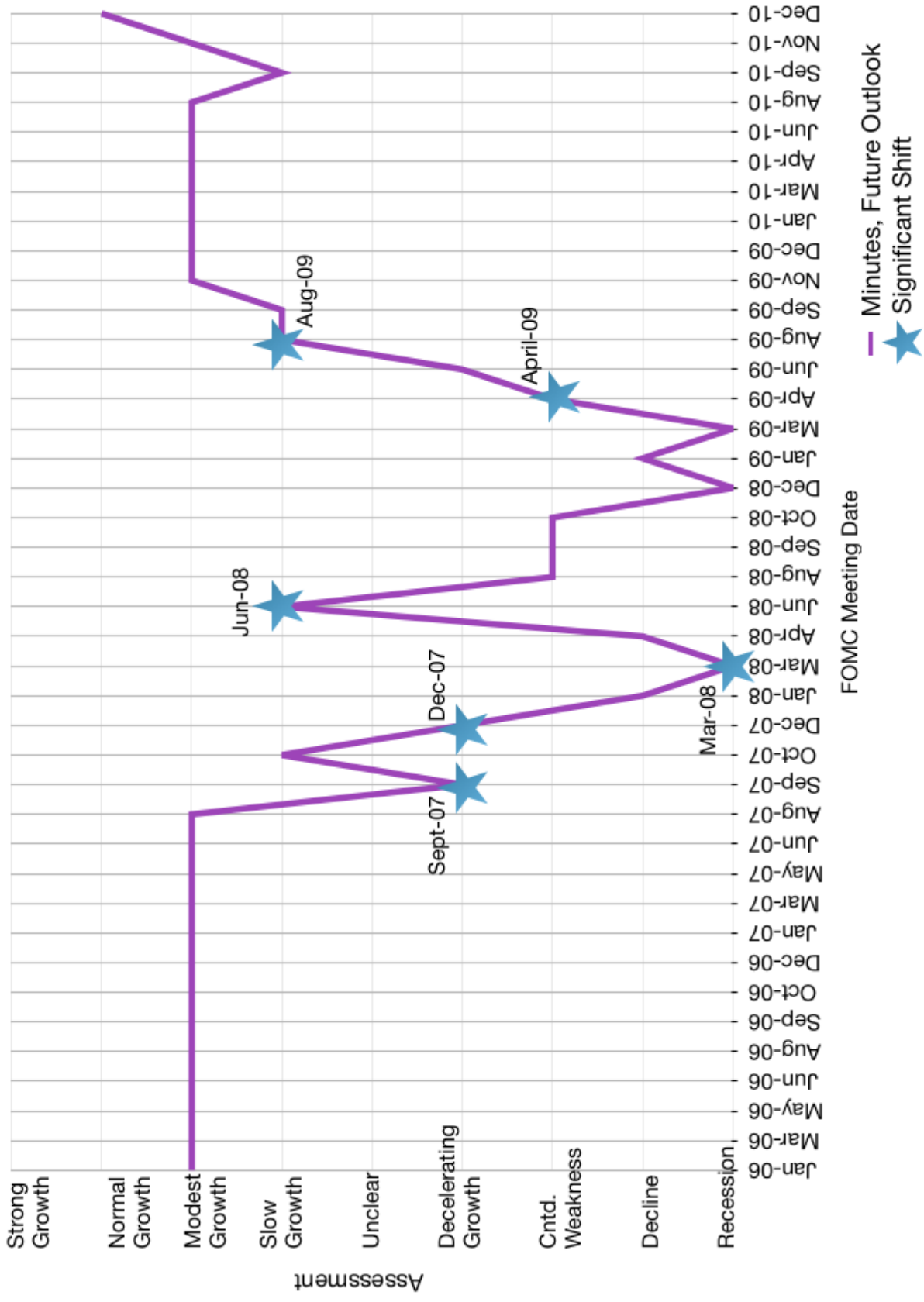Figure 1B - Index of Minutes, Future Outlook

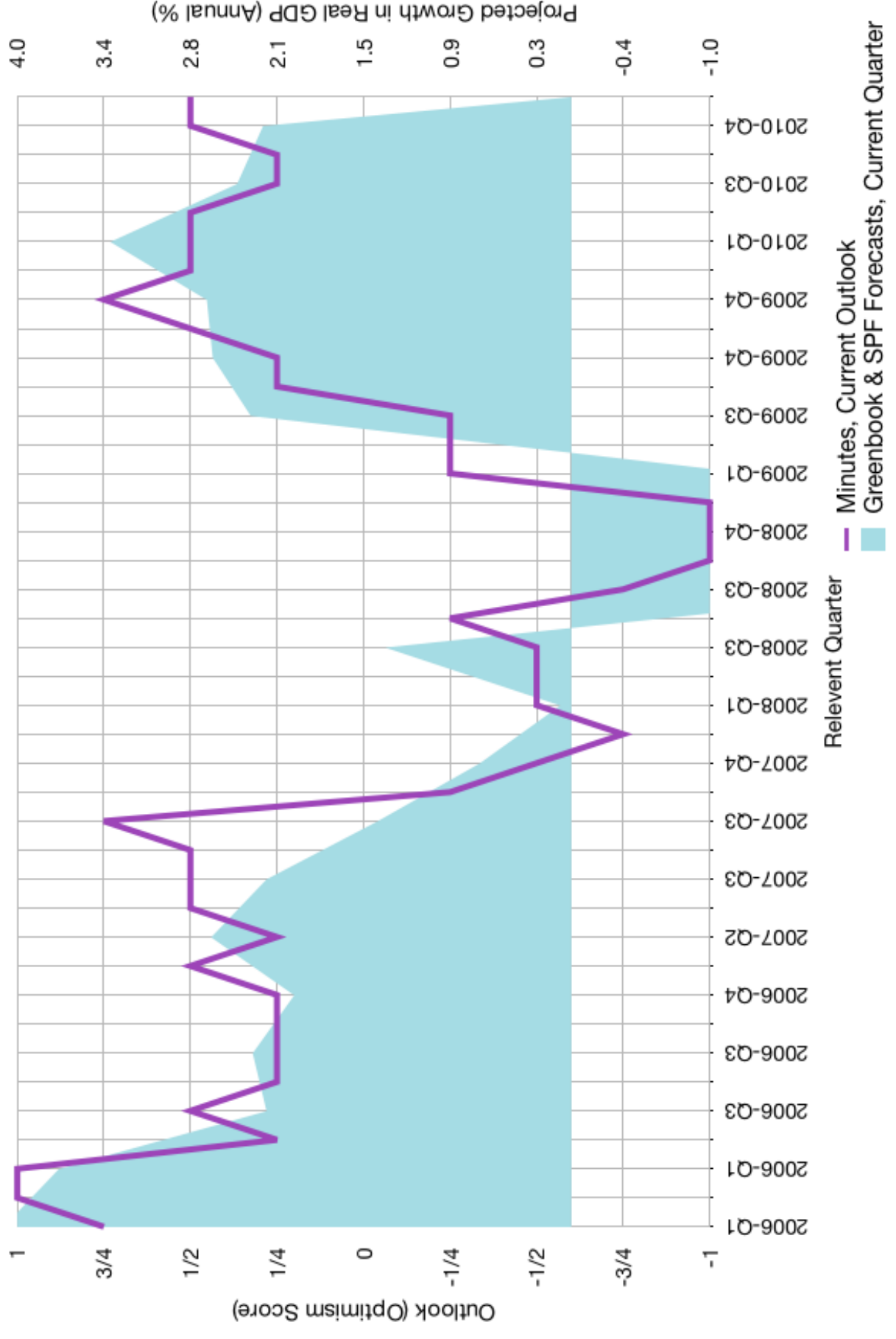Figure 2 – Calibrating the Scored Minutes with Comparable Quantitative Forecasts, Current
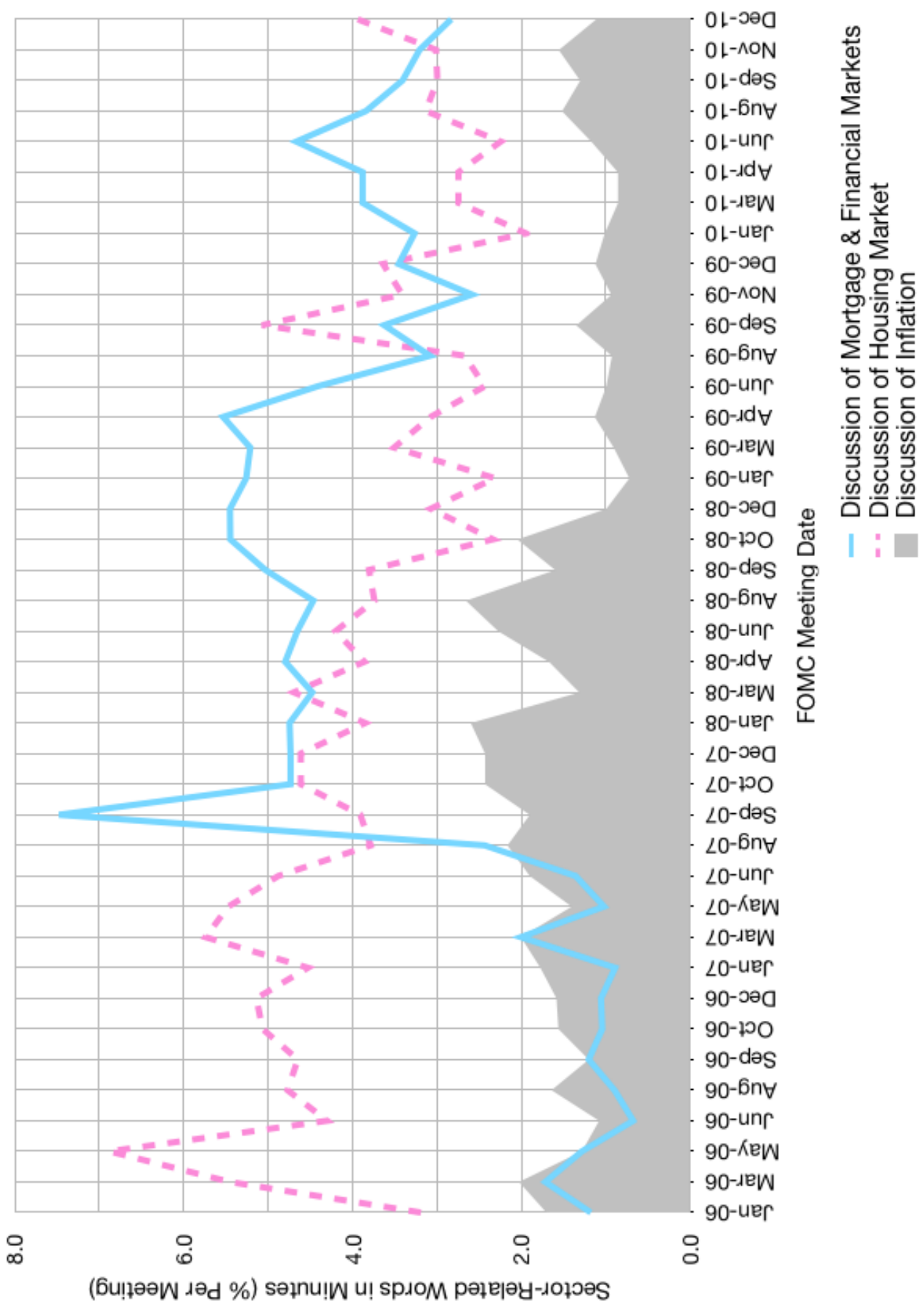
Figure 3 – Housing and Mortgage Discussions as Proportions of the Minutes

Appendix 1: Data Sources

Minutes -

Board of Governors of the Federal Reserve System. (2012, February 13). *FOMC: Transcripts and Other Historical Materials, 2006, 2007, 2008*. Retrieved from
http://www.federalreserve.gov/monetarypolicy/fomchistorical2006.htm, …2007.htm, …2008.htm

Board of Governors of the Federal Reserve System. (2013d, November 20). *Federal Open Market Committee: Meeting calendars, statements, and minutes (2009-2014)*. Retrieved from
http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm

Greenbook -

Federal Reserve Bank of Philadelphia. (2013a, March 4). *Greenbook Data Sets.* Retrieved from
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Survey of Professional Forecasters -

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Survey of Current Business' Actual Growth Data -

Survey of Current Business Online (2014, March). *Search by Date.* Retrieved from
http://www.bea.gov/scb/date_guide.asp

FOMC Projections -

Fraser - Federal Reserve Bank of St. Louis. (2013). *Federal Open Market Committee Economic Projections*. Retrieved from https://fraser.stlouisfed.org/publication/?pid=676