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Seeing Like the Fed: Culture, Cognition, and Framing in the Failure to Anticipate the Financial Crisis of 2008

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Abstract

One of the puzzles about the financial crisis of 2008 is why regulators, particularly the Federal Open Market Committee (FOMC), were so slow to recognize the impending collapse of the financial system and its broader consequences for the economy. We use theory from the literature on culture, cognition, and framing to explain this puzzle. Consistent with recent work on "positive asymmetry," we show how the FOMC generally interpreted discomforting facts in a positive light, marginalizing and normalizing anomalous information. We argue that all frames limit what can be understood, but the content of frames matters for how facts are identified and explained. We provide evidence that the Federal Reserve's primary frame for making sense of the economy was macroeconomic theory. The content of macroeconomics made it difficult for the FOMC to connect events into a narrative reflecting the links between foreclosures in the housing market, the financial instruments used to package the mortgages into securities, and the threats to the larger economy. We conclude with implications for the sociological literatures on framing and cognition and for decision-making in future crises.

Keywords

culture, policymaking, finance, organizations, economic sociology

> "Economic growth appears to have slowed recently, partly reflecting a softening of household spending. Tight credit conditions, the ongoing housing contraction, and some slowing in export growth are likely to weigh on economic growth over the next few quarters. Over time, the substantial easing of monetary policy, combined with ongoing measures to foster market liquidity, should help to promote moderate economic growth. Inflation has been high, spurred by the earlier increases in the prices of energy and some other commodities. The Committee expects inflation to moderate later this year and next year, but the inflation outlook remains highly uncertain. The downside risks to growth and the upside risks to inflation are both of significant concern to the Committee." – Federal Open Market Committee Statement, September 16, 2008

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The Federal Open Market Committee of the Federal Reserve is charged with making monetary policy for the United States. It is also one of the major economic forecasters for the U.S. government. Its meetings (about every six weeks) are widely watched by participants in the financial markets for clues regarding the future trajectory of the economy (Holmes 2014). On September 16, 2008, the day after the investment bank Lehman Brothers collapsed, precipitating the largest financial meltdown in postwar history (Swedberg 2010), members of the Federal Open Market Committee (hereafter, FOMC) met and issued the above statement.

Why was the FOMC so sanguine in its economic projections? It turns out that the FOMC consistently underestimated the risks to the economy during the months and years that preceded the financial crisis of 2007 to 2008. The purpose of this article is to explore why this was so. We draw on two related strands of theory to illuminate the processes that shaped and constrained the FOMC's perceptions of the economy: frame analysis, with its focus on how interaction in groups rests on shared frames (Diehl and McFarland 2010; Goffman 1974); and cognitive sociology, with its emphasis on how culturally structured cognition limits individuals' attention, often leading them to downplay uncomfortable facts (Cerulo 2006; Turner 1976; Vaughan 1996; Zerubavel 2015). Our theoretical contribution is to bring these literatures together, offering complementary and self-reinforcing mechanisms to explain the FOMC's decision-making.

These theoretical elements point to three possible mechanisms by which the FOMC failed to make sense of the financial crisis. We provide evidence that is consistent with all three. First, any primary frame operates as a filter through which a group understands its world (Diehl and McFarland 2010; Goffman 1974; Weick 1995). This filtering helps groups arrive at decisions by focusing arguments around a coherent narrative. But, by its very nature, any frame highlights certain facts while excluding others. This makes it difficult, or impossible, to see facts that are inconsistent with a group's prior beliefs, whatever those beliefs are.

Second, the FOMC's misperception of the financial crisis was a function of organizational and cultural tendencies to ignore and normalize discordant information (Cerulo 2006; Turner 1976; Vaughan 1996; Zerubavel 2015). Vaughan (1996) shows that organizations develop protocols or procedures that help them deal with uncertainty and risk. She argues that these procedures can make actors comfortable with risky decisions. Cerulo (2006) generalizes this insight, arguing that a wide variety of group settings have a tendency to eschew worst-case scenarios and reinterpret troubling facts in a positive light. We argue that the FOMC has the characteristics of what Cerulo (2006:6) calls "positive asymmetry": the group was biased against seeing worst-case scenarios.

Finally, the actual cultural content of a frame helps explain the substance of what is underestimated (and possibly overestimated) as a source of risk (Weick 1995). We argue that the FOMC failed to see the depth of the problems in the housing and financial sectors because of its overreliance on macroeconomics as the frame it used for making sense of the economy. Participants adhered to a version of macroeconomic theory and modeling that had achieved high consensus among academics and central bankers alike by the early 2000s—the "new neoclassical synthesis" (Goodfriend and King 1997; for its use at the Federal Reserve, see Brayton et al. 1997; Goodfriend 2007). Consistent with modern macroeconomic reasoning, FOMC participants believed that the large and complex U.S. economy could be successfully understood in terms of a small number of aggregate-level indicators, like the inflation rate, the unemployment rate, productivity, and growth in GDP (for the privileging of parsimony in modern macroeconomics, see Solow 2008).

The most important implication of this perspective is that it saw finance as just one sector of the economy, one that was unlikely to cause spillovers to other sectors that could affect economic growth in a dramatic way.

Specifically, the FOMC failed to see the importance of housing-related financial instruments in fueling the economy. In fact, the financial industry was producing $4 trillion in mortgages and nearly 40 percent of the profits in the entire economy by 2003 (Fligstein and Goldstein 2010; Krippner 2005). When the financial instruments started to fail, the banks that owned them began to collapse. This caused financial markets in the United States to freeze and made it difficult for anyone to borrow or lend. The crisis of the financial system thereby crippled the entire economy (Fligstein and Goldstein 2010; MacKenzie 2011). Because of its overreliance on macroeconomics, the FOMC was unable to see why the economy was so vulnerable to this downturn, even though its participants were aware that the financial sector was experiencing great difficulties.

To assess these claims, we examine how the FOMC conceptualized the economy during the lead-up to and initial phases of the financial crisis. Our analysis relies on the transcripts of every FOMC meeting between 2000 and 2008 (73 meetings in total). We use two forms of analysis. First, to demonstrate the nature of the FOMC's primary frame, we offer a quantitative analysis of the transcripts using topic modeling, a machine learning method for identifying thematic structures in texts (for an introduction, see Blei 2012).

We posit that macroeconomics was the primary frame at the FOMC. To test for the existence of this frame, it is useful to consider what alternative frame might have existed. The most plausible alternative to macroeconomics is a frame that uses the concepts of finance and banking as the basis for its economic analyses. Finance and banking offer a plausible alternative frame due to several reasons related to the Federal Reserve's central missions. As one of the main regulators of the U.S. banking system, the Federal Reserve is understandably concerned with financial stability. After all, any threat to that stability might spill over to the rest of the economy and produce a serious recession. Hence, we might expect the FOMC to focus squarely on the relationship between the providers of finance and its consumers. Moreover, the FOMC's policymaking orientation is toward the financial markets, the providers of equity and debt for the economy, which the FOMC views as the primary audience for its pronouncements (Holmes 2014). Such an orientation could have directed the FOMC's conceptual focus toward the financial sector as the engine of the real economy.

Accordingly, our topic analysis searches the topics for evidence of both the macroeconomics frame and its finance and banking alternative. Our results suggest that macroeconomics was the primary frame at the FOMC. We find some evidence that members of the FOMC who had a professional background in the private banking sector paid more attention to finance and banking, but they remained a marginal voice. We suggest that finance operated as a secondary framework, albeit one that contributed minimally to the overall discussion.

Second, to provide evidence of "positive asymmetry" (Cerulo 2006) and deeper evidence that the FOMC underestimated the links between finance and the real economy because of its macroeconomic frame, we pursue an in-depth qualitative analysis of two meetings where the FOMC considered critical events relating to the housing and financial crises. We selected these cases because they were moments in which the possibility of a negative scenario and the links between finance and the real economy were especially likely to be visible. In essence, we selected two meetings that provide "hard cases" for our hypotheses. If our hypotheses are wrong, then they should be *especially* wrong here. In the summer of 2005, the FOMC held a meeting devoted specifically to a possible housing bubble. Although some participants emphasized the link between finance and the broader economy and its attending risks, they were in a very small minority. For the most part, the FOMC downplayed the existence of a bubble and underestimated its effects on the rest of the economy, drawing explicitly on macroeconomics for support. This case illustrates

how the FOMC tended toward positive asymmetry and how the macroeconomics frame reinforced that bias.

Then, we consider how the FOMC interpreted the initial period of the financial crisis that culminated in the bankruptcy of Lehman Brothers in September 2008 (captured in the quote at the beginning of this article). Here too, if a frame grasping the full connection between the financial system and the real economy existed, it should be present. The FOMC was well aware of the crisis in home foreclosures and later the problems of financial institutions. Nevertheless, we show that the macroeconomic framing led many FOMC members to underestimate the peril presented by the financial crisis and instead emphasize their ongoing concern with inflation.

We conclude with theoretical implications for the literatures on framing and culture and cognition, and with policy implications for how organizations might make negative scenarios part of their deliberations.

THE FEDERAL RESERVE AND THE FEDERAL OPEN MARKET COMMITTEE

The Federal Reserve is the central bank of the United States. It is charged with making monetary policy and with partially regulating the country's banking system (Blinder 1998). In practice this means three things. The Federal Reserve supervises and sets regulations for a variety of commercial banks, including capital reserve requirements. It sets the discount rate, the rate at which banks can borrow from the Federal Reserve. Finally, it engages in open market operations, the buying and selling of U.S. Treasury Securities and other assets, in order to control the federal funds rate and thereby influence economic activity and inflation. The Federal Reserve has a congressional mandate to set monetary policy consistent with achieving maximum employment and price stability.

The FOMC is the primary policymaking body of the Federal Reserve. The FOMC consists of 12 members: the seven members of the Federal Reserve Board of Governors, the president of the Federal Reserve Bank of New York who serves as vice chair, and four of the other 11 Reserve Bank presidents, who serve on an annually rotating basis. All other Reserve Bank presidents attend Committee meetings, presenting reports and participating in discussion, but they cannot vote (Blinder 1998).

The FOMC holds eight regularly scheduled meetings per year, about once every six weeks. The main purpose of these meetings is to discuss economic and financial conditions in the United States and to make monetary policy decisions. The meetings are highly structured (Abolafia 2012; Baez and Abolafia 2002). Every meeting begins with a round of oral reports on the current conditions and future direction of the economy. These reports fall into two categories, those presented by staff and those presented by each Committee member and Reserve Bank president. Staff reports always include general data about growth and inflation, but they may also be geared to a special topic that the FOMC wishes to explore. The reports by the governors and presidents concern their own analyses and forecasts of output and inflation. The presidents' reports also cover current business conditions in their respective districts. They are based largely on surveys of, and informal discussions with, district business contacts like CEOs.

The second part of the meeting is devoted to the FOMC's main policy decision: setting the target for the federal funds rate. Committee members discuss whether to raise, lower, or hold constant the federal funds target rate. At the end of that discussion, Committee members vote on the policy decision. The result is announced publicly in a press release immediately following the meeting, which states the balance of risks to growth and inflation and notes the reasons for the (relatively rare) dissenting vote. The FOMC's actions are widely watched by Wall Street and the financial community at large as a harbinger of the future direction of the real economy, inflation, and interest rates. These actions move financial markets in the United States and the world (Holmes 2014).

FRAMING AND COGNITION AT THE FOMC

We consider two complementary theoretical literatures to develop hypotheses about the FOMC's way of seeing and its consequences. The literature on framing shows how group deliberation requires a primary frame that both structures and limits what can and cannot be seen. We suggest that the primary frame at the FOMC is macroeconomics. The literature on culture and cognition points to groups' socially structured tendencies to see positive over negative scenarios. We argue that the FOMC embodies many of the organizational and situational characteristics likely to produce such a positive bias. Bringing these literatures together, we argue that the FOMC's macroeconomic primary frame reinforced the positive bias inherent in the organization, especially as regards the connections between finance and the real economy.

Frame Analysis: Macroeconomics and Finance as Alternative Primary Frames

Frame analysis is concerned with how in a particular situation, people can arrive at a consensus about the nature of the external world (Diehl and McFarland 2010; Goffman 1974). The key explanatory tool here is the frame construct, defined by Goffman (1974:11) as "principles of organization which govern subjective meanings we assign to social events." As Goffman (1974:21) explains, framing gives order and meaning to our experience by enabling us "to locate, perceive, identify, and label a seemingly infinite number of concrete occurrences defined in terms of a given frame."

Frames are not just mental structures situated in individuals. They are intersubjective constructs that must be maintained in ongoing interaction (Diehl and McFarland 2010). Framing and the situation in which framing takes place form a coherent whole that helps make interaction possible (Goffman 1974). Actors have a set of rules and roles, and it is within those that they use, share, and modify a common set of frames to produce meaning (Fligstein and McAdam 2012). As Diehl and McFarland (2010) point out, this interactionist perspective implies that the content of frames is a product of history and setting.

Although a particular frame in a particular setting is likely to be unique in time and space, the process of framing itself is ubiquitous. Because it is both a system of particular meanings and a general way to make sense of what is going on, any frame will be open to some interpretations of reality and closed to others. Thus, it is necessary to separate the general features of the framing process limiting thinking from the specific ones creating contextually variable blind spots. One must keep in mind that all frames have blinders that cause us to pay attention to some things and not others. However, different frames will blind us to different things. Frame analysis implies that if we are to understand how a group's interactions work, we need to uncover its primary framework and observe it in action.

To apply frame analysis to the FOMC, it is necessary to consider how such a frame would be developed at the FOMC. The FOMC is a case where professional economic knowledge is at the core of the framing problem (Hirschman and Popp Berman 2014). The group relies on economic theories and models to pursue its goals of controlling inflation and promoting employment. Such work involves the creation, communication, and application of expert knowledge, knowledge used to solve concrete problems (Gorman and Sandefur 2011).

Three aspects of the application of professional knowledge are relevant to our case. First, the abstract knowledge of economics forms a set of styles of reasoning that can be used to inform policy ideas (Hirschman and Popp Berman 2014). Second, that knowledge leads to a set of policy devices that allow people to make sense of the world using statistics, measurement, and models (Muniesa, Millo, and Callon 2007). Finally, actors' professional backgrounds—their training as economists or their experience in the public

or private sectors—shape how they see the world and, therefore, the frames they bring to bear at the FOMC (Fourcade 2009).

Economics as a body of knowledge is broken into theory groups that focus on particular economic problems from a particular analytic and conceptual standpoint. These include topics like macroeconomics, labor economics, and finance and banking. This raises the possibility that different strands of economic thought might be part of the dominant frame of the FOMC. We consider two possible primary frames for the FOMC's activities: macroeconomic theory and a focus on finance and banking. These frames suggest different styles of reasoning, different kinds of policy devices, and the recruitment of different actors with different experiences that will reflect these points of view.

Macroeconomics as a form of abstract knowledge focuses on aggregate-level economic features such as output, growth, productivity, employment, inflation, and interest rates. Macroeconomists' models explain the relationships among indicators of these and related factors like savings, investment, and consumption (*Palgrave Dictionary of Economics* 2008). The particular version of macroeconomic theory and modeling dominating academic and policy circles during our period of interest is the "new neoclassical synthesis," sometimes called the "new Keynesian synthesis" (Goodfriend and King 1997; Woodford 2003). This approach seeks to develop dynamic, general-equilibrium models of entire economies synthesizing neoclassical theories of the perfectly efficient business cycle with neo-Keynesian understandings of "rigidities" and "frictions," especially regarding prices and wages.

There is good reason to believe that this way of approaching macroeconomic issues prevailed at the FOMC from 2000 to 2008. The primary model of the U.S. economy used by the Federal Reserve Board during this period, the FRB/US model, was explicitly founded on the principles of the new neoclassical synthesis (Brayton et al. 1997). This model can be seen as a policy device by which participants analyzed the economy. Academics and Fed economists writing in the 2000s took for granted that such principles directly informed the FOMC's efforts to analyze the economy and make monetary policy (Chari and Kehoe 2006; Goodfriend 2007). Indeed, these scholars saw the victory of the new neoclassical synthesis as marking an unprecedented level of consensus among academics and central bankers worldwide (Woodford 2009).

Finally, the professional composition of the FOMC leans toward macroeconomics. Academic macroeconomists had become increasingly prevalent on the FOMC beginning in the 1980s (Holmes 2014). We found that over our study period, 22 out of 36 (61 percent) of those with permanent or rotating votes on the FOMC had received an economics PhD with an emphasis in macroeconomics. Similarly, 73 out of 110 total speakers (61 percent), which include staff and others, were macroeconomists. These figures do not imply complete dominance by macroeconomists, but they do suggest that their way of seeing likely constituted the majority position at the FOMC. By contrast, only five governors and Reserve Bank presidents (14 percent) had prior experience working in the financial sector, and only 14 out of 110 total speakers (13 percent) had such a background. For all these reasons, we hypothesize that the concepts, tools, and theories of academic macroeconomics provided the primary frame for discussions at the FOMC.

In testing this claim, it is useful to consider a plausible alternative primary frame. We do this for two reasons. First, by definition, groups like the FOMC have a primary framework, so the null of our hypothesis about macroeconomics is not the absence of a primary framework, but rather a concrete alternative framework. It is thus important to test whether such an alternative dominates discussion or is even present in the room. Second, Goffman (1974) recognized that in any situation multiple frameworks might coexist. A particular group might have a primary and a secondary framework, and these frameworks might be in tension and the source of group dynamics.

The most plausible alternative primary framework takes the financial system as the core conceptual focus of the FOMC. The Federal Reserve is charged with regulating commercial banks, it closely monitors financial markets, the financial markets are the main audience for its proclamations, and its main policy tool involves interest rates, which play a dramatic role in all forms of financial intermediation. To enact its policy goals of controlling inflation and keeping unemployment low, the FOMC might therefore focus largely on banks and financial instruments and on sending signals to the financial markets about the state of the economy. The abstract theory of how finance matters to economic growth is well developed. Banks and other financial entities take capital from those who do not need it and loan it to those who do. Its role in intermediation is central to the economy's growth (Gorton and Winton 2002). It is well known that societies with active and developed financial markets experience higher rates of growth (Levine 1997). Moreover, finance has become especially central to the U.S. economy in recent decades, accounting for the largest share of corporate profits by industry during the 2000s (Krippner 2005, 2011).

Due to the FOMC's specific orientation to finance, and the latter's general importance to the economy, one might expect the concepts of finance and banking to constitute the primary framework at the FOMC. From this perspective, understanding the role of finance in structuring the economy should be at the core of the FOMC's activities and its prognosis for the future direction of the economy. Words like finance, bank, credit, debt, borrow, lend, liquidity, leverage, and instruments should dominate the discussions. These concepts should appear in the same discussions as the broader economic trends they help structure—like growth, employment, inflation, and prices—rather than forming mutually exclusive themes.

Finally, even if finance and banking do not constitute the primary frame, they may still provide a secondary frame (Goffman 1974) associated with minority perspectives on the FOMC. As we argued, prior professional training and work experiences shape the frames that actors employ. We therefore expect Committee members with a professional background in the financial sector will be more likely to use a finance and banking frame, independently of the frame that dominates overall discussion. This leads to our first hypotheses:

Hypothesis 1a: The primary framework at the FOMC meetings rested on the concepts, theories, and models of macroeconomics. We expect macroeconomic language to be pervasive and appear across a wide range of meetings and topics discussed.

Hypothesis 1b: The primary framework at the FOMC meetings rested on the concepts and tools of finance and banking. We expect financial language to be pervasive and appear across a wide range of meetings and topics discussed.

Hypothesis 2: The finance and banking frame was more prevalent among members of the FOMC who had a professional background in the private banking sector than among those who did not.

Culture and Cognition: Positive Asymmetry at the FOMC

Cognitive sociology alerts us to the notion that individuals cannot process huge amounts of information; a model of human agency that assumes full knowledge and rational action is therefore implausible (Martin 2015). People generally lack coherent worldviews and act typically—although not exclusively—out of habit (Cerulo 2010; DiMaggio 1997; Lizardo and Strand 2010; Martin 2010; Vaisey 2009; Zerubavel 2015). One potential solution to this problem, particularly in organizations, is the creation of schemas embodied in standard operating procedures informing decision-making.

Cerulo (2006) shows how such schemas are shaped by the organization of social groups. Specifically, she identifies a variety of cultural mechanisms that bias actors toward best-case scenarios. Particularly relevant for our purposes are Cerulo's insights into how

organizations reflect such a positive bias. The structure and culture of most organizations lead actors to either downplay negative information or reinterpret it in a positive light. The latter is similar to another endemic feature of organizations, which Vaughan (1996) calls the "normalization of deviance" (see also Turner 1976). The result is that organizations "often gravitate to data that supports the best case scenario" (Cerulo 2006:58). Cerulo (2006:6) calls this "positive asymmetry," a tendency to see the best cases clearly and the worst cases only vaguely.

The structure of the FOMC embodies some of the organizational and situational features that Cerulo (2006) associates with positive asymmetry. Committee meetings have a strongly *hierarchical* role structure: this consists, in descending order, of the chairman, vice chair, board of governors, presidents who vote (but exercise no decision-making autonomy), presidents who do not vote, and staff who present reports but rarely take positions of their own. The Federal Reserve takes pride in its insulation from politics and its arcane expertise (Blinder 1998; Holmes 2014), but these factors also produce *rigid boundaries* between the organization and its environment.

Prior research increases our expectation of positive asymmetry at the FOMC. Abolafia's (2004, 2010) analyses of FOMC meetings from the 1980s and 1990s show that meeting participants construct a narrative account of the economy. Much of the give-and-take of the conversation is oriented toward making sure that small disagreements do not turn into large disagreements. He also shows there is a kind of groupthink, whereby discordant facts tend to be ignored. These observations are consistent with Cerulo's (2006) and Vaughan's (1996) arguments about positive bias in organizations. In light of both theory and existing research, we expect that FOMC participants tended to marginalize or normalize troubling facts. This leads to Hypothesis 3:

> *Hypothesis 3:* The FOMC exhibited "positive asymmetry" in the sense that discordant facts raising negative scenarios tended to be marginalized or re-interpreted as "normal" outcomes.

Framing and Cognition at the FOMC: The Effects of Macroeconomics

We argued that primary frameworks are sets of cultural meanings orienting people to certain kinds of facts while leading them to ignore others. In the case of the FOMC, we suggest that macroeconomics, to the extent that it constituted the Committee's primary framework, reinforced positive asymmetry among participants. This is primarily because it led them to miss or underestimate the relationships between the housing market, financial instruments, the financial system, and the economy as a whole. To explain why this is a plausible hypothesis, we briefly unpack the key components of the new neoclassical synthesis in macroeconomics.

Quantitative macroeconomic models, like the Fed's FRB/US model, take as their core the "real business cycle" theory that formed a central element in the neoclassical revolution of the 1970s and 1980s (Brayton et al. 1997; Goodfriend 2007).[1] Real business cycle theory reinterprets economic fluctuations, like the business cycle, as an efficient response to exogenous shocks (Plosser 1989). It locates such shocks in "purely real factors . . . such as productivity shocks, fiscal shocks, and international terms-of-trade shocks" (Goodfriend 2007:59). The new neoclassical synthesis (Goodfriend and King 1997; Woodford 2003), by contrast, is more attuned to nominal factors, incorporating a variety of neo-Keynesian "rigidities" and "frictions"—most important, sticky prices and wages. It does not reject real business cycle theory per se; rather, it regards the real business cycle as a special case (Woodford 2009). Indeed, it suggests that the goal of monetary policy, in particular, is to smooth wage-price rigidities to "make the economy conform to its *underlying real business cycle core*" (Goodfriend 2007:61; emphasis added). The implication of this, one could argue, is that the "real business cycle" really does exist in the world and *would* operate according to its theory absent certain obstacles, which it is the role of monetary policy to remove.

We believe this framework had two important effects on the FOMC's ability to perceive

the risks associated with a financial crisis. First, to the extent that participants leaned toward the neoclassical aspects of their framework, they would maintain a default position of optimism in the face of any economic disturbance, since they viewed fluctuations themselves as elements of a self-regulating economy. Second, even if participants leaned toward the neo-Keynesian aspects of their framework, they were unlikely to direct attention to the place that could undermine optimism—the housing–finance nexus—precisely because the new neoclassical synthesis overwhelmingly brackets the real economy from the financial system. That is, because this framework incorporates "nominal" factors (like money and financial intermediation) as rigidities and frictions atop a "real business cycle core," it retains the basic assumption that economic shocks have "real" (non-financial) *sources* (Borio 2014:182).[2] Seen from this perspective, financial markets and the banking system may distort, extend, or amplify underlying economic fluctuations (Bernanke, Gertler, and Gilchrist 1999), but they do not *generate* such fluctuations (Borio 2011, 2014). Instead, the underlying model of the economy is a collection of sectors that have relationships to one another. The tendency is to view the spillover effects between sectors as relatively minor. As a result, events in the financial sector were no more or less likely to lead to spillovers than events in any other sector. This leads to our fourth hypothesis:

> *Hypothesis 4:* Macroeconomics hindered the FOMC's ability to perceive the sources and consequences of the financial crisis because it (1) discounted the importance of financial intermediation to the growth prospects of the economy and (2) treated the economy in general as roughly self-equilibrating.

RESEARCH DESIGN, DATA, AND METHODS

To provide evidence for our four hypotheses, we analyze transcripts of the meetings of the FOMC between 2000 and 2008. A total of 72 scheduled meetings occurred during this observation period, plus one unscheduled meeting in 2003. We exclude conference calls. The FOMC creates transcripts from recordings of the meetings, allowing near-verbatim reproductions of discussions. Once edited, transcripts are held for five years and then released together as a full year. We chose the period from 2000 to 2008 to utilize the most recent available records at the time of writing and to provide adequate historical background to the financial crisis.[3]

Our hypotheses deal separately with the nature of the frames, their ubiquity, and the general tendency of the FOMC to downplay negative scenarios. Connecting our hypotheses to these texts requires a mixed research design that combines both quantitative and qualitative methods.

Topic Modeling

Hypotheses 1a, 1b, and 2 concern the degree to which the discussions of economic challenges facing the FOMC are considered from a macroeconomic or a finance and banking perspective. We thus need a method that allows us to assess whether the language used across contexts and over time reflects theories and devices from macroeconomics or finance and banking. To do this, we use topic models, a class of statistical methods designed to uncover underlying semantic regularities in a set of documents by mapping recurring relationships between words (Blei 2012). The topic model algorithms use patterns of word co-occurrences to generate sets of words that hang together with varying strengths. Although simply termed "topics," these word groups are often interpreted as frames, themes, schemata, or motifs (Bail 2014; DiMaggio, Nag, and Blei 2013; Mohr and Bogdanov 2013).

Topic models have many advantages that make them quite flexible. Unlike many clustering techniques, each word can appear in multiple topics. Within a topic, both the meaning and importance of each word are determined relative to every other word. Word frequencies within a topic only gain

significance relative to their overall frequency and to the frequencies of other words in that topic. This means that if macroeconomic language dominates, words indexing such language will appear across topics. This ability to capture instances of polysemy in language use is one of the unique advantages of topic models.

Documents contain more than one topic. Topic modeling uses observed words within documents to infer the underlying topics that compose each document. The documents are understood as combinations of topics, rather than of words. Topic models therefore attempt to estimate the word content of each topic and the topic content of each document at the same time. This places topics in a mediating position, similar to a "latent variable," accounting for the relationship between words and documents. It also assumes that topics exist in advance of finding them in documents. In our case, this has the advantage of producing multiple topics potentially drawing on similar underlying framing words.

These features of topic models are useful for testing Hypotheses 1a, 1b, and 2. Because one of the FOMC's purposes is to discuss current business conditions, it follows that many of our topics will reflect the presence or absence of ongoing events like Hurricane Katrina, the housing bubble, and in 2008, the problems of financial markets. The search for primary frames, like those reflecting macroeconomics or finance and banking, should find words indexing those frames appearing in multiple topics over time. Macroeconomic language includes terms such as interest, rate, economic, growth, output, inflation, forecast, employment, consumption, and productivity. Finance and banking language includes terms like bank, finance, leverage, debt, asset, liquidity, lend, borrow, and credit.

We use Latent Dirichlet Allocation (LDA) as the underlying statistical model, which is both the simplest and most widely applicable topic-modeling algorithm (Blei and Lafferty 2007). LDA begins with the "bag of words" assumption, that the order of words within a document is not important. This allows the set of documents to be represented as a matrix of probabilities of word i in document d. The goal of LDA then is to infer a set of topics that splits the word-document relationship into a word-topic relationship and a topic-document relationship. Specifically, LDA models the probability of each word in a document as the product of word probabilities within a given topic, $\varphi^{(k)} = P(w_i \mid z_i = k)$, and topic probabilities within a given document, $\theta^{(d)} = P(z_i = k \mid D = d)$.[4]

$$P(w_i|D=d) = \sum_{k=1}^{K} P(w_i|z_i=k)P(z_i=k|D=d)$$

This model assumes that words in each document are generated by first choosing a topic and then choosing a word from that topic. The distributions of words within topics and topics within documents are both assumed to be multinomial. Each distribution is drawn from a Dirichlet distribution, which is a multivariate distribution of the beta function and conjugate prior of multinomial distributions, allowing estimates of $\varphi^{(k)}$ and $\theta^{(d)}$ to be updated with new information while still remaining multinomial.

The "bag of words" assumption has some important implications. A single sentence may include words generated from many different topics, and instances of a topic may be dispersed through the text. It also means topic words are recognized without accounting for their context. A discussion about how rising house prices are *not* a source of inflation will be indistinguishable from a discussion about how house prices are a source of inflation. The strength of a topic does not indicate the direction of belief about the topic.

One potential limitation of topic modeling in the context of the FOMC is that meetings are not the typical use of topic models. LDA was designed to model static texts with predetermined topics (Blei 2012), rather than discussions based on interaction, adaptation, and the joint construction of meaning. To date, the overwhelming majority of applications of LDA to language have been written documents, such as articles (Blei and Lafferty 2007; DiMaggio et al. 2013), press releases (Grimmer 2010), bureaucratic records (Miller

2013), or formal speeches (Mohr et al. 2013). The assumptions on which inference is based are violated in the case of conversation or other interactive uses of language. Nonetheless, as DiMaggio and colleagues (2013) point out, even a single text contains multiple, competing voices (e.g., the idea of "heteroglossia" developed by Bakhtin [1982]). If texts themselves are not as stable as we might expect, then the difference between textual and conversational analysis becomes much less significant. We argue that LDA still allows a great deal of insight in this context, provided conclusions are approached with caution.

For analysis, we preprocessed transcripts by removing front-matter, page numbers, and identification of the speakers. Next, we simplified the text by removing the most common English words, typically called "stop words" (e.g., "the," "and," "it"), and proper names. The text was stemmed to remove suffixes (e.g., *inflation* → *inflat*) and combine variants of the same word (e.g., *economy*/*economic* → *economi*). For legibility in the graphs and tables, we replaced these stems with the most common unstemmed word. Stems that occurred fewer than four times in the whole corpus were dropped from the text.

Measures of model fit exist for topic models and can be useful for determining the number of topics. These criteria are less than ideal for our case. Perplexity[5] and similar predictiveness metrics typically require division of documents into a training set and a test set (Asuncion et al. 2009). The training set is used to fit the model (i.e., to estimate the number and content of topics), and the test set is used to evaluate the predictiveness of the fitted model. Our design is not particularly amenable to such an approach for two reasons. First, transcripts reveal that there are single meetings of great significance and on distinct topics. Second, given that our analysis hinges on changes in topics as a result of discussion, there is no reason to expect that the topic distribution is constant throughout a meeting or over time.

Instead, we chose to follow the approach of DiMaggio and colleagues (2013), evaluating models by their interpretability and external validity. We chose three free parameters. First, we set the number of topics at 15, based on trade-offs between topic specificity and model simplicity. Runs of the model with different numbers of topics produced qualitatively similar results.

We also chose the values of hyperparameters alpha and eta. These values are called *hyper*parameters because they determine how the parameters, that is, topic and word weights, are estimated (Blei, Ng, and Jordan 2003). The hyperparameter alpha controls the number of topics likely to be found in a given document. A low value for alpha tends to represent documents using fewer topics, whereas a high value for alpha makes every topic appear in every document. Our choice of alpha was guided by Steyvers and Griffiths' (2007) recommendation that 50/K works well for most types of documents. Eta controls the expected concentration of words in a given topic. Low values of eta lead to topics dominated by a few words, and high values of eta produce topics with more uniform word weighting. The value of eta we chose was a trade-off between these two extremes. In general, model results were robust for different hyperparameter values. We compared these results across a range of different values of alpha and eta and found they have no noticeable effect on results. The hyperparameter values that do not support this interpretation (predominantly extreme values of eta) do not appear to have any coherent interpretation, much less a contradictory interpretation.

Finally, to test Hypothesis 2, we divide the utterances of people on the FOMC across topics according to whether they have a financial industry background. This is one way to investigate the degree to which speakers' professional experiences are associated with particular ways of framing. Given our interest in an alternative financial frame, professional profiles in finance constitute theoretically relevant outliers with respect to the dominant profile on the FOMC, which involves training in macroeconomics. Even if macroeconomics

is the primary frame, a finance and banking frame may appear when members with financial backgrounds are considered separately.

Specifically, we estimate the average differences in topic proportion between FOMC members with and without professional experience in private banking. First, we coded each speaker according to whether they had private banking experience. Next, we calculated a score for each topic for each utterance by summing the word weights found by LDA and normalizing by the number of words. Each participant's scores were averaged for each meeting, effectively weighting each speaker's contribution the same. These scores represent the average probability of a speaker's utterances given a topic. Finally, we found differences in topic proportion by subtracting the average private banker score from the average non-banker score.

To find the confidence intervals of each difference estimate, we used permutation tests. We estimated the distribution for the null hypothesis by randomly permuting profession codings and re-estimating differences between professional grouping 10,000 times. This process maintained the total number of private bankers and tested against the alternative that individual experience did not matter for choice of topic. Note that this method does not adjust for speakers' tendency to echo other speakers' topic use. As a result, the estimates we produce are conservative estimates of the differences between groups.

The online supplement provides a series of robustness checks. Part A explores the degree to which choosing 15 as a cutoff point for the topics affects our results. Part B examines how the results from the topic analysis compare to results using other content analysis and related techniques. Both appendices provide additional evidence that the topic models we present are robust.

Case-Based Analyses

Topic modeling shows us which words are being used together and when they are used, but it tells us nothing about the *way* they are used. To decide whether the FOMC suffered from positive asymmetry (Hypothesis 3) or was unable to connect financial risks to the rest of the economy (Hypothesis 4), we selected two meetings as case studies for in-depth interpretive analysis. We also use the case studies to provide further evidence for Hypotheses 1a, 1b, and 2, thereby validating the topic models. We selected meetings that represented hard cases for our hypotheses. That is, we chose case studies strategically to maximize rejecting our claims that macroeconomics was the primary framework, that the FOMC suffered from positive asymmetry, and that the FOMC missed or underestimated the links between finance and the real economy due to its macroeconomic frame.

We analyze the meeting that occurred on June 29 to 30, 2005, which focused explicitly on whether there was a bubble in the housing market and its potential consequences. This was a meeting in which the possibility of negative scenarios and the links between finance and the real economy were especially visible. If participants were attuned to such scenarios and links, they should have been especially likely to discuss them at this meeting. The second meeting we consider was held on September 16, 2008, the day after the bankruptcy of Lehman Brothers. This is a crucial case study because our central focus here is to ask why the FOMC failed to see the crisis coming. If the FOMC had shifted its primary frame in the spring and summer to one oriented to identifying the threats to the real economy presented by the meltdown of the banks and financial markets, we should have observed it at this meeting. To buttress the conclusions of both case studies, we broke out the utterances of each member of the FOMC who participated in these meetings, identified their positions on the issues, and mapped what they thought a reasonable policy response would be.

RESULTS

We begin by presenting the results of the topic models, which we use to test Hypotheses 1a, 1b, and 2. Table 1 shows the word composition for each topic. We ordered words by their frequency within a topic and by how

Table 1. Top Words for Selected Topics (hyperparameter values were alpha = 50/15 = 3.33 and eta = .2)

Bank Liquidity	Housing	Inflation	Financial Markets	Productivity	Employment	Weakness
April	housing	prices	credit	productivity	employment	easing
commodity	inflation	inflation	financial	slowing	improvement	weakness
options	section	energy	institutions	growth	hiring	sales
prices	forecast	increase	risk	supply	productivity	spending
facility	moderate	pace	market	nairu	growth	September
inflation	core	core	loans	labor	business	investment
primary	president	pass	banks	inflation	dollar	decline
June	growth	measures	downside	treasury	gap	cut
Lehman	subprime	pause	cut	demand	expansion	economy
pdcf	thank	higher	turmoil	year	output	sector
system	trend	costs	losses	acceleration	recovery	consumer
stress	bit	tightening	cdo	rise	job	manufacturing
headline	public	oil	mortgage	wage	spending	attacks
tslf	construction	compensation	deterioration	tightening	tax	ulus
institutions	uncertainty	pressures	tranches	trend	ten	tech
repo	language	expectations	capital	stock	recommenda-tion	fiscal
dealers	alternative	language	auction	increase	disinflation	November
party	residential	data	liquidity	tight	pickup	auto
banks	labor	statement	housing	pressures	payroll	recession
financial	past	remove	October	workers	recent	inventory
Stearns	comfortable	accommoda-tive	asset	prices	labor	equity
voluntary	think	path	January	tech	deflation	weakening
dis	narrative	meeting	sheet	higher	low	recovery
stigma	laughter	neutral	swap	unemploy-ment	data	Argentina
sec	mortgage	China	lending	technology	pick	industry
collateral	home	move	commercial	rate	inventory	rebound
March	utilization	year	agencies	dollar	equipment	downside
Reserve	builders	contained	senior	electricity	gains	travel
loop	vince	rise	insurance	euro	capital	capital
failure	want	graphs	paragraph	believe	orders	negative

Portfolio	Housing Bubble	Energy	Models	Policy Response	Minutes	Objectives	General
rps	bubble	war	panel	reserve	minutes	objective	will
portfolio	housing	Katrina	shown	target	release	goal	market
acf	rent	uncertainty	left	zero	statement	inflation	think
securities	land	geopolitical	model	program	committee	numerical	rate
study	home	hurricane	chart	funds	communica-tion	explicit	very
Treasury	prices	Iraq	line	sheet	draft	range	now
dissent	mortgage	gulf	rule	bound	members	stability	term
ginnie	ratio	oil	bottom	rate	discussion	mandate	point
asset	overvalued	gasoline	right	federal	language	target	expectations
government	index	august	black	December	words	dual	one
authorized	properties	military	middle	quantitative	public	communica-tion	also

(continued)

Table 1. *(continued)*

Portfolio	Housing Bubble	Energy	Models	Policy Response	Minutes	Objectives	General
contingency	arms	disruptions	depreciation	treasury	formulaic	Congress	see
Mae	lenders	gas	red	banks	think	horizon	like
window	loans	inertia	present	facility	announce-ment	adopt	economy
collateral	constant	storm	year	guarantee	meeting	achieve	well
outright	quality	impact	dollar	interest	expediting	anchored	don
sovereign	value	refinery	exports	purchases	vote	public	may
issue	afford	ports	top	ceiling	information	benefits	much
discount	family	barrel	foreign	quantity	process	committee	can
system	ofheo	crude	simulations	effect	decision	run	even
liquidity	percentile	energy	variables	deflation	view	definition	get
Lombard	nonmarket	heating	account	tools	memo	regime	chairman
Freddie	appreciation	effect	bars	excess	oni	prices	say
debt	bond	Venezuela	Taylor	money	give	defined	risk
operations	component	million	structural	policy	issue	specific	because
tally	Francisco	aftermath	rate	fomc	editing	think	look
gnmas	misalloca-tion	stagflation	unemploy-ment	size	use	cpi	come
diversified	shown	damage	productivity	monetary	transparency	consensus	know
disclose	bias	inertial	different	desk	press	diversity	next
Fannie	city	coast	show	alternative	convey	transparency	policy

Note: cdo = credit debt obligation, frb = federal reserve board, arms = adjustable rate mortgages, pdcf = primary dealer credit facility, tslf = term security lending facility, dis = depository institutions, cf = credit facility, ofheo = office of housing enterprise oversight, rps = repos, cpi = consumer price index, gdp = gross domestic product, ltv = loan to value ratio, gse = government sponsored enterprises, acf = asset credit facility, ceo = collateralized equity obligation, nairu = non-accelerating inflation rate of unemployment.

indicative of that topic they were. We chose topic labels to summarize the common themes among highly ranked words in each topic. We found three sets of topics: those involving the general mission of the Federal Reserve, those involving meeting-related business, and those involving substantive economic issues.

The substantive topics offer a good test of Hypotheses 1a and 1b because they cover a wide variety of issue areas and their prevalence varies considerably over time. A primary frame (whether macroeconomics or finance and banking) should thus be well represented across many such topics. In support of Hypothesis 1a, four of the substantive topics correspond to central themes of modern macroeconomics. The *inflation* topic primarily covers macroeconomic indicators of inflation: prices for core personal consumption, rising compensation, energy prices, as well as inflation expectations themselves (*prices, inflation, energy, core, compensation, expectations*). The *productivity* topic deals with macroeconomic indicators of productivity (*productivity, labor, workers, technology*). It involves discussion of the non-accelerating inflation rate of unemployment (*nairu*) and numerous other macroeconomic terms, mostly involving the relationship between employment and inflation (*inflation, unemployment, wage, prices, pressures, growth, supply, demand*). The *employment* topic also covers employment-related issues. Again, macroeconomic terms are highly represented among the top words (*employment, productivity, growth, output, disinflation, deflation, labor, capital*). The *weakness* topic emphasizes economic decline, again with reference to

macroeconomic indicators of such weakness (*recession, investment, consumer, spending, sales*) and affected sectors and industries of the macroeconomy (*sector, industry, manufacturing, auto, inventory*). The common thread in all these topics is an emphasis on aggregate-level indicators and on sectors of the "real economy"—consistent with Hypothesis 1a. By contrast, financial terms are virtually absent, despite the plausible implications of the financial system for economic issues like consumer demand and growth.

Five of the substantive topics (*energy, housing bubble, housing, financial markets*, and *bank liquidity*) deal with issues that are more historically specific. Like the above topics, however, the *housing* topic rests heavily on macroeconomic terms emphasizing aggregate indicators (*inflation, core, growth, labor*) and sectors of the real economy (*residential, construction, builders*), again consistent with Hypothesis 1a. The *housing* topic also contains some words indicating possible connections to finance (*mortgage, subprime*), but these are less well represented. Similarly consistent with an overall macroeconomic orientation, the *housing bubble* topic tends strongly toward the "real" aspects of the housing market (*rent, land, home, properties, lenders*), rather than its financial aspects (the one connection here is *arms* [adjustable-rate mortgages]). The underlying frame of the *energy* topic is not as immediately interpretable. This topic captures concerns about rising oil and gas prices, in large part dealing with supply problems caused by Hurricane Katrina (*gasoline, energy, disruptions*) and the effects of the Iraq War (*geopolitical, military*). Still, these issues appear to be filtered through a macroeconomic lens: the topic involves the doubly negative effect of oil supply shocks on the central macroeconomic concerns of growth and price stability (*stagflation*).

Financial terms, by contrast, are largely limited to the two topics most directly concerned with the 2007 to 2008 financial crisis. The *financial markets* topic covers financial products related to mortgages and mortgage-backed securities (*mortgage, loans, liquidity, credit, CDO, tranche*) and their negative effects (*turmoil, downside, deterioration, losses*). The *bank liquidity* topic is similar except it focuses more heavily on the financial health of specific banks (*Lehman, Stearns, institutions, failure*). Just as the macroeconomic topics omit financial terms, the financial topics contain virtually no words linking finance to other sectors of the economy or to broader growth prospects. This supports Hypothesis 1a, that the primary frame was based in macroeconomics, and not Hypothesis 1b, that the primary frame was based in finance. It suggests the FOMC discussed finance as one sector of the macroeconomy among others.

Four topics relate to the general mission of the Federal Reserve. Some words scattered across these topics index the macroeconomic perspective. The *general* topic contains elements related to appropriate monetary policy (itself a core concern of macroeconomic theory)—decisions to raise or lower the interest rate (*rate, point*) and the market's reaction to the actions taken (*market, expectations*). The *portfolio* topic deals with the Federal Reserve's own investment portfolio, the System Open Market Account, consisting largely of Treasury and other federal agency securities (*treasury, Fannie/Freddie, securities, sovereign, debt*), held outright or with repurchase agreements (*outright, rps, collateral*). Although it contains many works associated with finance (*portfolio*, s*ecurities, asset, collateral, liquidity*), these are used to analyze the Federal Reserve's own portfolio rather than the economy itself. The *objectives* topic reflects discussion about the Federal Reserve's congressional mandate to achieve maximum employment and stable prices, again core issues in macroeconomics (*Congress, dual, mandate, price, stability, inflation*). Finally, the *policy response* topic emphasizes the tools and actions available to the FOMC to conduct the Federal Reserve's economic mission (*target, quantitative, program, facility, rate, tools, policy*).

Finally, there were two other meeting-related topics. The *models* topic deals with reports and data oriented toward macroeconomic modeling prepared by staff and offered

during presentations that help guide decisions. This topic captures many of the instruments and tools of macroeconomic analysis (*chart, model, simulations, variables*). The *minutes* topic deals with policies surrounding announcements about decisions and releases of the minutes (*minutes, release, statement, public, announcement, decision*).

Thus far, we have looked for the existence of macroeconomic and financial frames *across topics*. Our analysis provides evidence for macroeconomics as a primary frame in many of the topics, supporting Hypothesis 1a. Still, finance and banking is the clear subject of two topics. To further assess which of these frames dominates discussion overall, we now turn to the prevalence of the topics themselves *across time*.

Topics over Time

Figures 1a and 1b show the temporal evolution of the topics. If macroeconomics is the primary frame, we should expect to see the topics associated with that frame predominate over time. If finance and banking is the primary frame, those terms should be reflected in discussions over time. The *productivity* topic is dominant from 2000 to 2001. This was a period of economic growth, but market expansion was brought to an abrupt end in 2001. Economic decline is indexed in the *weakness* topic. Both *employment* and *weakness* are strong topics of conversation through 2003. Concern with *weakness* finally ends with rising discussion over *energy* with the U.S. invasion of Iraq and Hurricane Katrina. With the economy rebounding, discussion shifts away from *employment* to *inflation*.

Language from macroeconomics is prevalent in many of these topics. Indeed, *productivity, weakness, employment*, and *inflation* are the key macroeconomic topics identified above. None of these topics mention finance or banking in any significant way. This pattern suggests that events at this time are being analyzed in terms of macroeconomic categories and not with reference to finance. Indeed, as the economy goes from boom to bust and back to a more robust state, macroeconomic analysis dominates the framing of concerns about the current state of the economy.

The discussion of *housing* issues rises sharply in 2006 with the peak and subsequent decline of the housing market. As noted earlier, this topic does not contain much language linking the housing decline to the financial sector. This suggests the FOMC is concerned with the aggregate effect of the housing decline, not its specific effect on the financial system.

The two topics most clearly focused on finance appear in 2007 and 2008 with the rise of the *financial markets* and *bank liquidity* topics. The *financial markets* topic concerns how house foreclosures have spilled over into financial markets. Yet there is little mention of the links between finance and the rest of the economy. The *bank liquidity* topic shows concern with the problems of particular banks, but it is interesting to note that even here, part of the topic is composed of an ongoing macroeconomic concern with inflation (*commodity, prices, headline, inflation*).[6]

Overall, the evidence does not show that the FOMC employed the categories of finance and banking to interpret economic events as they rose and fell over this period. Instead, attempts to understand the economy were consistently couched in the language of macroeconomics. This supports Hypothesis 1a and not 1b.

Topics by Professional Background

Earlier, we suggested that another way to assess competing frames, as proposed by Hypothesis 2, is to compare which type of speaker is making which kinds of arguments in the discussion of various topics. Table 2 presents an analysis of differences in language prior to 2008. Estimates represent the differences in the topic score of an average utterance between speakers with and without a professional background in private banking. Recall that 14 percent of members had such a background. Speakers with private banking experience were responsible for 15 percent of utterances and 17 percent of spoken words. Estimated differences in topic usage are justifiably small because (1) the average score for

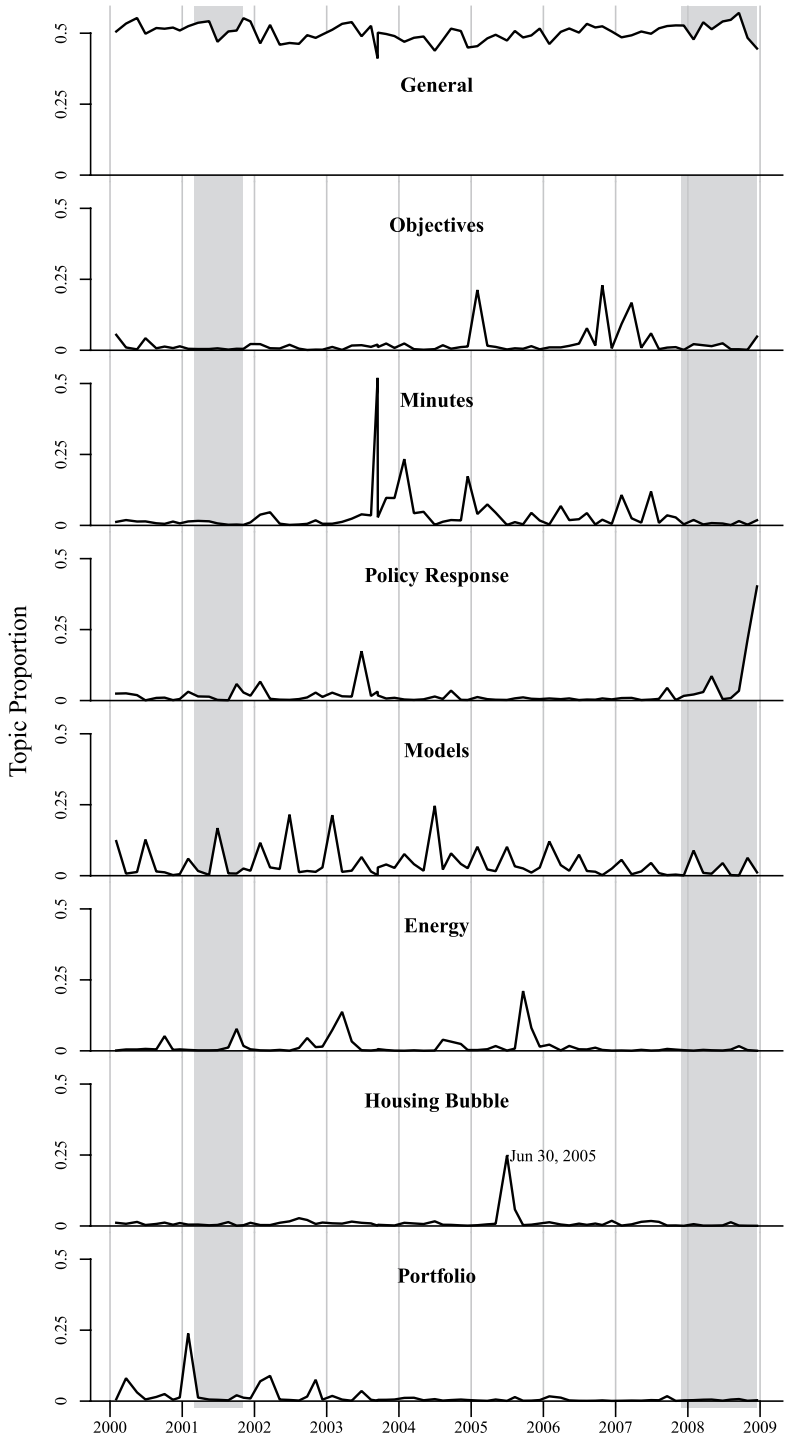

Figure 1a. Topic Proportions over Time; Additional Topics
Note: The height of each line represents the proportion of words in a given transcript assigned to that topic. Gray vertical bars indicate periods of recession.

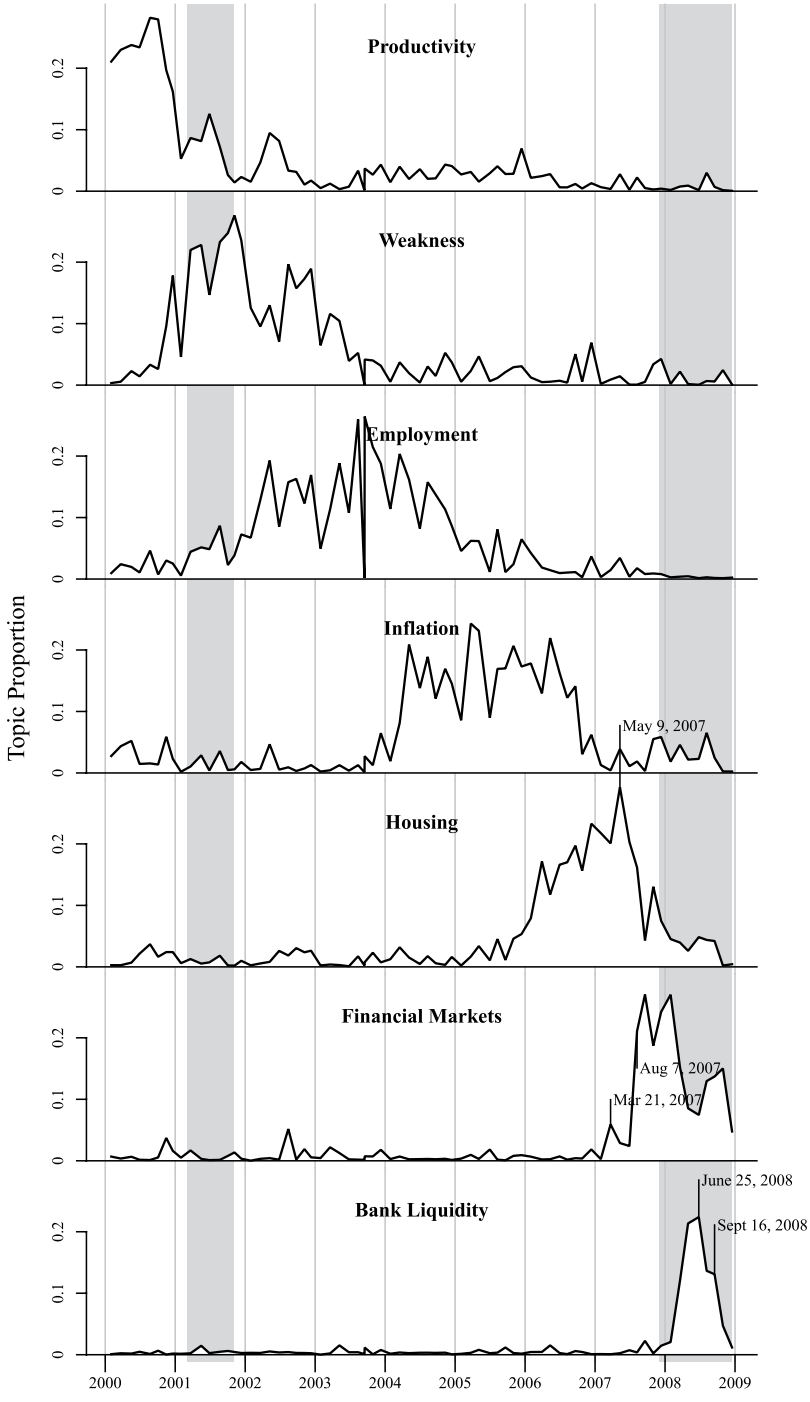

Figure 1b. Topic Proportions over Time; Framing Topics
Note: The height of each line represents the proportion of words in a given transcript assigned to that topic. Gray vertical bars indicate periods of recession.

Table 2. Differences between Topic Weightings of Participants with and without Private Banking Experience before 2008

Topic	Estimate	95% Confidence Interval	Pct Diff.
Bank Liquidity	.0007*	[−.0005, .0006]	9%
General	−.0054+	[−.0067, .0066]	−2%
Employment	−.0004	[−.0028, .0029]	−2%
Weakness	.0005	[−.0034, .0039]	2%
Financial Markets	.0019*	[−.0012, .0013]	12%
Models	.0010	[−.0023, .0025]	6%
Objectives	−.0004	[−.0010, .0011]	−3%
Housing	−.0013+	[−.0018, .0016]	−5%
Inflation	−.0014	[−.0025, .0026]	−6%
Portfolio	.0011+	[−.0011, .0014]	17%
Productivity	−.0003	[−.0019, .0022]	−2%
Energy	.0003	[−.0006, .0007]	5%
Housing Bubble	.0007*	[−.0005, .0006]	15%
Policy Response	.0017*	[−.0012, .0015]	13%
Minutes	−.0007	[−.0018, .0027]	−4%

Note: The fourth column shows the differences as a percentage difference. See text for details.
$+p < .10$; $*p < .05$.

each topic is small and (2) discussions require that participants respond to others' statements, generally using similar terms. For ease of interpretation, the fourth column of Table 2 rescales these estimates as a percentage of the average topic score.

Speakers with a banking background were significantly more likely to mention words that indexed finance and banking in all topics related to the financial crisis (*housing bubble, financial markets, bank liquidity*, and *policy response*). This does not suggest that they foresaw the problem, but it does suggest they were considerably more attuned to issues of finance and banking. These results point to meaningful variations in framing among members of the FOMC, some of whom were more inclined to use a finance and banking framework. In support of Hypothesis 2, they provide evidence of finance and banking as a secondary frame, specifically found among speakers with a financial industry background.

CASE STUDIES

Macroeconomics and Positive Asymmetry I: The Housing Market

Having considered primary and secondary frames at the FOMC, we now turn to the case studies to test Hypotheses 3 and 4. Our first case is the FOMC meeting on June 29 to 30, 2005, which was devoted to the possibility of an asset-price bubble in housing. The meeting was explicitly designed to present participants with negative scenarios caused by the risks posed by a possible bubble for the whole economy. It is an especially strong test for Hypothesis 3, the presence of positive asymmetry. If participants ignored or rationalized negative scenarios even in the face of organized prompting to the contrary, they likely did so on more routine occasions as well. This case also provides initial evidence to assess Hypothesis 4, the contribution of macroeconomics to positive asymmetry.

The meeting's opening presentation, by Federal Reserve Board economist Joshua Gallin, introduced the relevant data on housing prices, which had increased rapidly in recent years, far outpacing rents. As Gallin summarized the evidence: "The price-rent ratio is currently very high by historical standards, suggesting that housing might be overvalued by as much as 20 percent" (FOMC 2005:7).

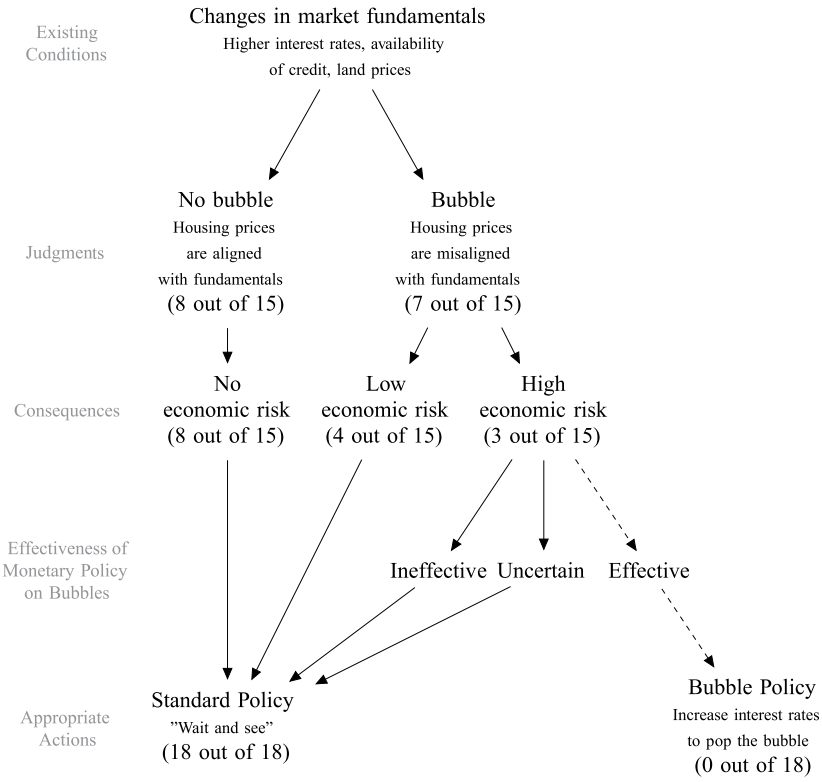

Figure 2. Reactions to Housing Overvaluation
Note: Positions taken during the FOMC meeting June 29 to 30, 2005. Counts shown indicate the number of participants who explicitly took that position.

How did the FOMC respond to this evidence? Figure 2 summarizes the positions taken during the meeting by the 15 participants who spoke. Eight participants felt there was no bubble; they believed housing prices aligned with factors present in the macroeconomy. Of the seven who expressed the view that housing prices might be misaligned, four saw low economic risk. Of the three who saw a potentially high economic risk, none felt the Federal Reserve should act to do anything about it.

One of the opening presenters was New York Fed Vice President Richard Peach, a trained macroeconomist, who framed the situation as driven by fundamental macroeconomic factors:

> Hardly a day goes by without another anecdote-laden article in the press claiming that the U.S. is experiencing a housing bubble that will soon burst, with disastrous consequences for the economy. Indeed, housing market activity has been quite robust for some time now. . . . But such activity could be the result of *solid fundamentals underlying the housing market*. After all, both nominal and real long-term *interest rates* have declined substantially over the last decade. *Productivity* growth has been surprisingly strong since the mid-1990s, producing rapid real *income growth* primarily for those in the upper half of the income distribution. And the large baby-boom generation has entered its peak earning years and appears to have strong preferences for large homes loaded with amenities. (FOMC 2005:11; emphasis added)

Peach gravitated toward the most positive and "normal" scenario ("fundamentals"), rather than a range of possible negative scenarios

(bubbles of various magnitudes). Note also that Peach's list of fundamentals contains the standard toolkit of macroeconomic indicators: interest rates, productivity, income, and consumption (here directed toward "large homes loaded with amenities").

Jeffrey Lacker, President of the Richmond Reserve Bank, further articulated the reasons for Peach's optimism, again drawing on macroeconomic trends:

> It seems to me as if there are a lot of plausible stories one can tell about fundamentals that would explain or rationalize housing prices. Obviously, low interest rates have to top the list. Strong income growth among home owning populations would be on the list, as would land use restrictions, which were mentioned earlier, and the recent surge in spending on home improvement. . . . So from that point of view, it's hard for me to see how it would be reasonable to place a great deal of certainty on the notion that housing is significantly overvalued, or that there's a bubble, or that it's going to collapse really soon. (FOMC 2005:62–63)[7]

Even those who believed a bubble might be present tended to underplay the risks to the economy, gravitating toward the more positive versions of the bubble scenario. The presenter who made the strongest case for the presence of a bubble, San Francisco Senior Vice President John Williams, sought to minimize concern by asserting that "the magnitude of the current potential problem is much smaller than, and perhaps only half as large as, that of the stock market bubble [of the late 1990s]" (FOMC 2005:18). Most of the rest who were worried about a bubble expressed similar sentiments. Chicago Reserve Bank President Michael Moskow stated that "with all of the concerns about froth in the housing markets, I found these presentations to be very informative. . . . But I also found the information comforting." Moskow concluded, "I come away somewhat less concerned about the size and consequences of a housing bubble than I was before" (FOMC 2005:47–48). Cathy Minehan, President of the Boston Reserve Bank, concurred: "I also want to thank the authors of the [staff] papers . . . because I found them very helpful *and reassuring*" (FOMC 2005:49; emphasis added). These responses all suggest that the FOMC filtered troubling facts about the housing market through a positive lens that either minimized their consequences or integrated them into the normal workings of the economy, consistent with Hypothesis 3.

Furthermore, participants' optimism was grounded in the logic of new neoclassical macroeconomics, as Hypothesis 4 expects. The reassuring explanatory recourse to "fundamentals" clearly articulates the assumption of real business cycle theory that market fluctuations are efficient responses to "real" factors. As Borio (2011:91) argues, new neoclassical models "were rooted in equilibrium representations of the business cycle . . . which drew strength from the view that financial markets were efficient, *with asset prices reflecting the fundamentals determined by the model*" (emphasis added). From the perspective of their macroeconomic framework, participants' optimism was a completely rational position.

Moreover, participants who broke from this position by acknowledging a possible bubble could still feel justified minimizing its consequences, because the new neoclassical synthesis holds that asset prices are more a "friction" than an underlying source of economic problems. For instance, Janet Yellen, current Federal Reserve Chair and then-President of the San Francisco Reserve Bank, raised, but quickly qualified, the possibility that financial innovations in the mortgage market were themselves driving house prices out of alignment:

> One view that I think is very prevalent is that the use of credit in the form of piggyback loans, interest-only mortgages, option ARMs [adjustable-rate mortgages], and so forth, involves financial innovations that are feeding a kind of unsustainable bubble. But an alternative perspective on that is that high house prices, in fact, are curtailing effective demand for housing at this point and that house appreciation probably is poised to slow. So the increasing use of

> creative financing could be a sign of the final gasps of house-price appreciation at the pace we've seen and an indication that a slowing is at hand. (FOMC 2005:36)

Yellen was not arguing that "creative financing" was driving the bubble and a day of reckoning was going to come. Rather, she viewed the spread of such financing as only a reflection of the final gasps of an exhausted market. From this perspective, financial innovations *indicate* a stabilization of demand; they do not *produce* effects of their own.

It is worth noting the profiles of the three participants who saw a high risk that the bubble would have consequences for the macroeconomy. Two of the three (Federal Reserve Governor Mark Olson and Atlanta Reserve Bank President Jack Guynn) were *not* professional macroeconomists, and two (Olson and Fed Governor Susan Bies) had previous experience in private banking, an unusual background for an FOMC member. None of their concerns emerged out of macroeconomic reasoning. Guynn's concerns stemmed from anecdotal evidence about housing in his own region (FOMC 2005:117–19), and Bies and Olson centered their arguments on the changing character of financial products (FOMC 2005:59–61, 148–55). However, these remained isolated observations, and none of these participants felt compelled to push for a policy response. These findings are consistent with the results of the topic models, which show that individuals with a background in private banking were more attuned to financial issues over the observation period but that this constituted a secondary frame at the FOMC.

To sum up, we find evidence that macroeconomic concepts and arguments structured the Committee's reasoning as a whole (in line with Hypothesis 1a), whereas the small minority of participants with backgrounds in finance were more inclined to use a financial frame (in line with Hypothesis 2). The discussion demonstrates a strong tendency toward positive asymmetry, supporting Hypothesis 3. The FOMC remained optimistic in response to the risks of a bubble, either denying its existence or minimizing its consequences. Finally, our analysis suggests that macroeconomics fueled this positive bias, supporting Hypothesis 4. Participants justified their optimism with macroeconomic concepts and theories. The only two participants who saw a deeper connection between the asset bubble, new forms of finance, and broader economic risks (Bies and Olson) had experience working in finance and banking. Their worries were based on their firsthand knowledge of how financial products were being used in a potentially risky way, *not* on macroeconomic reasoning.

Additional analysis of the transcripts over the following two years reproduces these tendencies, offering further support to our claim that macroeconomics shaped positive asymmetry regarding the housing market. The bubble issue never recurred as a primary focus after the June 2005 meeting, which indicates a relative lack of concern. Housing in general did remain a major theme throughout 2006 and early 2007, as the topic models show. By the fall of 2006, the FOMC recognized that the housing market was contracting. Yet they initially cast this in a *positive* light. Committee members repeatedly stressed that the housing "correction" would actually be good for the long-run stability of the economy, assuming it did not produce "spillovers" into other sectors, which they agreed was unlikely. As Federal Reserve Governor Frederic Mishkin, a professional macroeconomist, argued in September 2006:

> The excesses in the housing sector seem to be unwinding in an acceptable way, so I think it is quite reasonable . . . to think that the spillover here is not going to be a big problem because we're actually moving resources from a sector that had too much going into it, into sectors that need to have more resources at the present time. So in that sense, I'm actually quite positive. (FOMC 2006b:85)

Participants continued to view housing in isolation from the financial system, a key source for their optimism because the housing sector, seen in isolation, is not that large. Federal Reserve Chairman Ben Bernanke noted

in March 2006: "residential investment is, of course, only about 6 percent of GDP" (FOMC 2006a:97). Even when including "associated manufacturing sectors, like appliances and furniture," Bernanke reminded the Committee in December 2006 that "this is about 15 percent of the economy compared with 85 percent of the economy" (FOMC 2006c:81). Bernanke readily considered the indirect effects of housing on related sectors of the real economy, but he made no mention of its implications for financial markets, instruments, and institutions. In summary, when discussing the *housing* topic, like the *housing bubble* topic, participants sought out positive scenarios (consistent with Hypothesis 3), and they continued to anchor their optimism in a clear separation between the real economy and the financial system (consistent with Hypothesis 4).

Macroeconomics and Positive Asymmetry II: The Financial Crisis

In this section, we introduce a second case study, the FOMC meeting on September 16, 2008, following the failure of the investment bank Lehman Brothers. We show that even after financial turmoil began in 2007, the FOMC continued to exhibit positive asymmetry toward the risks involved (consistent with Hypothesis 3), and this positive slant was again driven by the macroeconomic frame (consistent with Hypothesis 4). It is useful to briefly summarize the Committee's discussions leading up to the Lehman bankruptcy to establish the broader trends.

The *financial markets* topic began to ascend massively in 2007 and remained the dominant issue-specific topic through much of 2008. This is unsurprising, as financial market disruption commenced in February 2007 in the wake of an unexpected jump in delinquencies and defaults on subprime adjustable-rate mortgages. By August, a near freezing of the collateralized debt obligation (CDO) and asset-backed commercial paper (ABCP) markets had produced what appeared to be a systemic banking crisis. Our reading suggests that by the winter of 2007 to 2008, the FOMC had become attuned to the connections between the real economy and the financial system, albeit after the financial crisis was underway. One of the FOMC's major concerns in early 2008 was an "adverse feedback loop" whereby tightening credit conditions restrain economic activity, which further tightens credit conditions (see FOMC 2008a:69). Note that this mechanism was represented in Bernanke's macroeconomic academic work on the "financial accelerator" (Bernanke 1983; Bernanke et al. 1999).

However, even after the FOMC grasped the nature of the risk embedded in the financial system, they continued to underestimate its *magnitude*. This is partly because a substantial minority of the FOMC had become focused on inflation as a bigger threat to the economy's overall welfare. When financial market turmoil temporarily receded in spring 2008, many participants on the FOMC abruptly shifted focus, expressing concern that recent spikes in food and oil prices would increase inflation. Our reading of the transcripts from spring and summer 2008 (FOMC 2008b, 2008c) suggests the FOMC was split between members who saw the risk of inflation as primary and those who saw the risks from inflation and growth as roughly equal (for a similar reading, see Eichengreen 2015:188–89).

This shift toward the threat of inflation is fully consistent with the new neoclassical synthesis in macroeconomics. The new neoclassical synthesis maintains that price stability *alone* is the key to controlling inflation and producing sustainable economic growth (Borio 2011; Goodfriend 2007; Goodfriend and King 1997; Woodford 2003). Note that this makes macroeconomic theory asymmetrically attuned to indicators of inflation in a way that actually goes beyond the Fed's institutional structure, whose dual mandate might otherwise lead to a more balanced approach. Macroeconomics-trained FOMC members were thus inclined to pay more attention to commodity prices than to the financial system, because they viewed the former as more directly linked to overall economic growth.

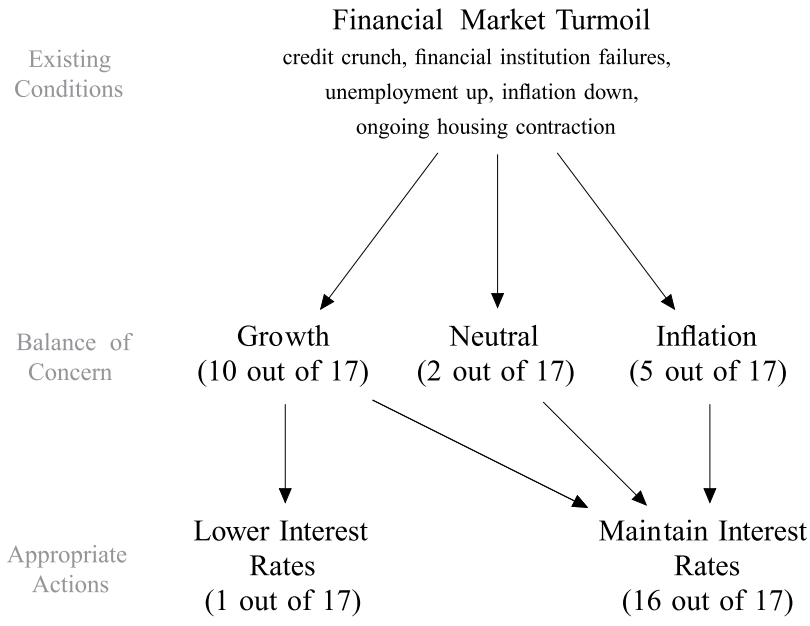

Figure 3. Reactions to Lehman Brothers Collapse
Note: Positions taken during the FOMC meeting September 16, 2008. Counts shown indicate the number of participants who explicitly took that position.

The FOMC meeting on September 16, 2008, occurred against the backdrop of large-scale financial problems in August and September, capped by the collapse of Lehman Brothers. Figure 3 summarizes the key positions taken at the meeting. We analyzed participants' comments according to whether they placed greater emphasis on prospects for economic growth or inflation and according to their views on the appropriate response of monetary policy. Ten participants were more concerned about growth, five paid greater attention to inflation, and two others were neutral. Only one participant expressed sufficient concern to justify lowering interest rates, and 16 out of 17 supported keeping interest rates constant. This suggests participants still significantly underestimated the degree of damage that the financial crisis was causing.

Even those participants who were more worried about growth tended to avoid worst-case scenarios, consistent with Hypothesis 3. Federal Reserve Governor Donald Kohn (growth-oriented) captured this sentiment with his projection that "[a]ctivity is more likely to stagnate than to decline" (FOMC 2008d:58). Similarly, a number of participants actively sought a silver lining to the Lehman collapse. St. Louis Reserve Bank President James Bullard (inflation-oriented) argued that "[f]inancial market turmoil is certainly a key concern, but the U.S. economy still outperformed expectations in the first half of 2008" (FOMC 2008d:35).

Regardless of their views on the prospects for growth versus inflation, almost all participants agreed that it was simply too early to assess the implications of recent financial events for the economy as a whole. Significantly, they defended this position in terms of the macroeconomic framework, questioning the degree of connection between finance and the real economy (consistent with Hypothesis 4). As Cleveland Reserve Bank President Sandra Pianalto (growth-oriented) put it: "I would like more time to assess how the recent events are going to affect the real economy" (FOMC 2008d:46). Philadelphia Reserve Bank President Charles Plosser (inflation-oriented) concurred: "While a lot of attention in the short run is being paid to financial

markets' turmoil, our decision today must look beyond today's financial markets to the real economy and its prospects in the future. In this regard, things have not changed very much, at least not yet" (FOMC 2008d:38).

Richmond Reserve Bank President Lacker, one of the members most concerned with inflation, treated finance as just another sector of the real economy: "There have been a lot of reports since the last meeting about . . . particular sectors of the economy, but they net out to only a small change, if any, in the broader contour of the outlook for me for overall growth" (FOMC 2008d:46–47). Bernanke summarized the overall discussion: "Financial markets received a lot of attention around the table. . . . However, the medium-term implications of the recent increases in financial stress for the economy are difficult to assess" (FOMC 2008d:71).

The significant minority of inflation-oriented participants (roughly one third) went even further in minimizing financial risk, suggesting it was actually distracting from the larger risk of inflation. As Bullard argued, "[A]n inflation problem is brewing. . . . While it makes sense to focus on financial markets for the time being, it is essential that we keep in position to put downward pressure on inflation going forward" (FOMC 2008d:36). Plosser acknowledged that "we must pay attention to the adverse effects of the financial disruptions. But we also must recognize that our policy actions today and over the next several months will affect the outcomes of inflation over the medium term. As I said, it is my view that the current stance of policy is inconsistent with price stability in the intermediate term" (FOMC 2008d:39). The FOMC policy statement released on September 16, 2008 (presented at the beginning of this article) reflected the tone of the meeting by suggesting the risks to inflation and growth were roughly equal.

Only one out of 17 participants raised worst-case scenarios in response to financial events. As Boston Reserve Bank President Eric Rosengren insisted: "The failure of a major investment bank, the forced merger of another, the largest thrift and insurer teetering, and the failure of Freddie and Fannie are likely to have a significant impact on the real economy" (FOMC 2008d:30). The extent of his alarm placed Rosengren in an extreme minority. He was also the only participant at the meeting who supported lowering interest rates. It is not surprising that Rosengren was the most outspoken on this issue. Rosengren had a PhD in economics, but his academic specialty was banking and his research concerned the links between the financial sector and the rest of the economy.[8]

To be sure, things would begin to change in a matter of days. By early October, the FOMC was coordinating a joint interest rate cut with the world's major central banks. By November, they were prepared to extend $700 billion of credit to the banking system. Nonetheless, our analysis of the September 16 meeting, in conjunction with meetings that immediately preceded it, allows us to draw several important conclusions about the FOMC's response to the initial phases of the financial crisis. Consistent with Hypothesis 1a, the FOMC tended to approach the financial crisis with macroeconomic styles of reasoning, just as they had approached its preconditions. In support of Hypothesis 3, the FOMC displayed positive asymmetry toward the financial crisis, significantly underestimating the degree of risk it posed to the real economy. This was especially evident among participants who were more worried about inflation.

Finally, in support of Hypothesis 4, participants' underestimation of risk was directly informed by their primary framework of macroeconomics. The mechanisms by which this occurred, however, were somewhat different from those that shaped participants' inattention to the housing market risks during the lead-up to the crisis (discussed earlier). Although participants were much more aware of the connections between housing and finance by this time, the separation between the financial system and the real economy inherent in macroeconomic models led them to underestimate the magnitude of those connections. Moreover, the priority given to price stability by the new neoclassical synthesis

produced what Cerulo (2006:164) calls "negative asymmetry" (a tendency to foreground worst-case scenarios) in one specific realm—inflation.[9] This distracted participants from the financial system, and the unintended result of this localized negative asymmetry was to reinforce participants' overconfidence in the economy's growth prospects.

CONCLUSIONS

We argued that the economic experts on the FOMC failed to anticipate the risks involved in the 2007 to 2008 financial crisis principally because of their overreliance on the frame provided by academic macroeconomics. First, using topic modeling, we showed that macroeconomic concepts appeared across a wide variety of issue areas and over time, constituting the primary frame at the FOMC. We also found some evidence of a financial frame, particularly associated with speakers who had a professional background in private banking. However, we found little evidence to suggest that this alternative frame was dominant at the FOMC.

Next, using in-depth case studies, we showed that the FOMC exhibited positive asymmetry (Cerulo 2006) with respect to the sources and consequences of the financial crisis, downplaying and normalizing discordant facts about the housing and financial markets. Critically, we then showed that the FOMC's macroeconomic frame contributed to this positive bias, most importantly by obscuring (and later minimizing) the links between the financial system and the real economy.

Theoretical and Methodological Implications

Our contribution to the study of culture, cognition, and framing is both theoretical and methodological. We highlighted several compatible mechanisms by which frames and cultural-cognitive processes affect group decision-making. The literature on framing suggests that frames provide both a common language to group discussions and a limit to what can be discussed, as actors tend to miss things that are outside their primary frame. The existence of a frame coupled with organizational conditions promoting positive asymmetry (hierarchical structures, rigid boundaries) suggests that groups will likely obscure or normalize discordant facts. Finally, the actual content of frames—a coherent set of shared meanings—defines what is likely to be missed. The substantive content of frames is partly a function of group identity and how its members are recruited, but also of actors' experiences acquired in prior social contexts (in our case through earlier professional training).

Our results raise questions about how to further elaborate and connect these theories. Goffman argued that every group might have primary and secondary frames, which would define political coalitions within the group and point analysts to the central lines of conflict. In our case, macroeconomics constituted a primary frame and finance and banking constituted a secondary frame. Subsequent research should investigate the degree to which such divisions exist within groups and provide stable patterns of interaction. For example, the FOMC transcripts would allow an analysis of the consistency of such frameworks and the degree to which stable coalitions formed around them.

This raises the question of the degree to which frames are dynamic and changing. One might expect a serious crisis, where the premises of a frame were undermined, would open the possibility for changing the frame. In our case, one could investigate whether the limitations of the macroeconomic frame in the 2008 crisis led to the promotion of other frames or groups within the FOMC. If frames prove impervious to crisis, and positive asymmetry allows dominant groups to downplay discordant information, one would expect groups to repeat similar errors. There is evidence for a different version of this problem at the FOMC. In the fall of 2008, a substantial part of the FOMC's membership maintained that the most critical problem facing the economy was inflation. This argument reflected a form of negative asymmetry that was quite discordant with the facts and yet was maintained with considerable

forcefulness. Investigating the persistence of a constant bias toward inflation would provide leverage on the question of how groups repeat errors of analysis (Vaughan 2005).

A second issue concerns positive and negative asymmetry. One potential problem is scholars' tendency to select on the dependent variable, studying crises where the dominant frame failed to take seriously discordant information. In the case of the housing bubble and the collapse of the banking system in the summer of 2008, good information existed that a serious crisis was underway, and that crisis was underestimated because of a tendency toward positive asymmetry. But, if a frame that produces positive asymmetry in a group leads to a successful decision nine out of ten times, then one could argue that positive asymmetry might be a rational approach to decision-making. If positive asymmetry works more than it fails, it might be a good fallback position. Future research needs to find contexts to study repeated decision-making to see how much (and for how long) discordant information can be ignored by positive asymmetry.

We make a methodological contribution as well. Topic modeling is a relatively new tool in sociology, useful for mapping meaning in texts and locating primary frames. Given the growing availability of machine readable texts, we are only beginning an era in which we can use this kind of technique to ask and answer sociological questions. Topic modeling allows researchers an overview of common themes in and across texts over time. But it does not claim to actually understand what those words mean. As a result, we believe that to be most effective, topic modeling should be fully paired with more conventional discourse analysis to provide evidence for how actors are using meaning to engage in interaction. Together, these methods provide a powerful tool with which to demonstrate the role of frames and categories in shaping social perceptions and actions (for a similar argument, see Spillman 2014).

Policy Implications

A recent report by the Independent Evaluation Office (2010) at the International Monetary Fund concluded that similar kinds of cognitive biases precluded that organization from seeing the dangers of the financial crisis as well. In the view of this study, "The *linking of macroeconomic and financial sector analysis* remained inadequate. . . . This reflected the lack of a suitable conceptual framework for analyzing such linkages within the economics profession at large" (Independent Evaluation Office 2010:18; emphasis added). The fact that the experts whose job it is to make sense of the direction of the economy at the Federal Reserve and at the International Monetary Fund were more or less blinded by their assumptions about how that reality worked is indeed a sobering result.

It is useful to ask what such organizations might do to overcome the effects of culture, framing, and cognition to better identify crises. One can certainly argue that little can be done. The complexity of troubling events and the rapidity with which that complexity can produce dramatic outcomes makes it especially difficult to overcome the blinders of any frame (Scott 1998).

However, our theory and results do point to several possible solutions that organizations might try. One strategy is for organizations to create independent work groups whose job is to study the potential pitfalls of any policy decision. These groups would need to have standard input into decision-making processes and become part of the policy discussions. Participation in these groups would have to be rewarded by ensuring that group members were rotated in and out and that participation would be a boost to one's career. This would reduce the penalties for having dissident views and potentially legitimate the ideas coming out of these groups in the more general discussion. It might also have the effect of instilling skepticism into future participants of decision-making groups.

Independent work groups might help undermine the effects of positive asymmetry, but they would not solve the problem that all primary frameworks limit the types and forms of understanding involved in decision-making. This presents an even more difficult challenge. First, such groups would conflict with

the fact that a primary frame serves a positive function for decision-making by allowing a consensus to emerge. Relatedly, giving legitimacy to multiple primary frameworks undermines the status and privilege of those who have power based on their use of the primary frame, in our case the macroeconomists.

This suggests that if a decision-making group were serious about bringing dissident voices into the discussion, they would have to make an effort to ensure these dissident members had a substantial presence. In the case of the Federal Reserve, this would mean decreasing the presence of macroeconomists and increasing the presence of people with expertise relating to finance as a new and potentially dominant force in the economy. Our analysis shows that FOMC members with a financial or banking background did speak up more on financial topics, and they clearly saw more danger in housing and finance than did members coming from the dominant macroeconomic perspective. Imagine what might have happened if the five members who considered inflation to be the most serious problem in the economy in the spring and summer of 2008 had been replaced by five members with significant finance and banking expertise. It is possible the FOMC would have recommended different policies throughout the year and worked to mitigate the financial collapse.

To be clear, we are *not* advocating a revolving door between the FOMC and the financial industry or the "capture" of the Fed by financial interests themselves. Rather, we are arguing that the FOMC should couple the theoretical logic of its members' academic training with greater on-the-ground attention to the "logic of practice" (Bourdieu 1990) of the industry the Fed actually regulates. In this regard, it is telling that on September 16, 2008, the single dissenting voice in the room (Rosengren) was himself an academically trained macroeconomist who also had extensive technical knowledge of banking. Perhaps Rosengren was uniquely positioned to perceive and act on the risks because he was somewhat autonomous from financial industry *interests* yet simultaneously knowledgeable of financial industry *concepts*. In this context, however, he was isolated and his perspective did not figure into the outcome of the meeting.

Finally, we see a challenge and an opportunity for economic sociology and the sociology of finance to play a greater role in policy discussions going forward. Sociologists have pioneered thinking about the growing role of finance and financialization in the modern economy (Knorr Cetina and Bruegger 2002; Knorr Cetina and Preda 2014; Krippner 2005, 2011; for a review, see van der Swan 2014). They are attuned to the links between the invention of new financial products and the growth of financial involvement for households and consumption in the "real" economy (Davis 2009; Fligstein and Goldstein 2015; Lin and Tomaskovic-Devey 2013). That said, sociology still needs much more empirically based, policy-oriented analysis that could help feed discussions about the pitfalls of those linkages and the ways to identify financial risks before they produce full-fledged crises. A re-orientation to such issues could help make sense of what might happen next time.

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Notes

1. The other major element of this disciplinary transformation was Lucas's (1976) critique, which attacked the practice of basing predictions of future developments in the economy on historical data, particularly macroeconomic aggregates. He argued that a more defensible approach was to make macroeconomic models consistent with microeconomic principles, basing predictions of aggregates on individual-, household-, and firm-level considerations.

The FRB/US model incorporates these principles as well (Brayton et al. 1997).

2. Chari and Kehoe (2006:4) thus applaud how general-equilibrium models have come to incorporate "financial market imperfections . . . *and other frictions*" (emphasis added). Borio (2011:88), a critic of this approach, goes so far as to argue that "[b]y construction, macroeconomic models could not incorporate financial instability."
3. Including earlier years does not appear to affect the results for the focal period. Analyses conducted on transcripts from 1995 to 2008 produced qualitatively identical results to the 2000 to 2008 period.
4. Following standard conventions, we use *d* to represent documents, *w* to represent words, *z* to represent topic assignments for each word, and *k* to represent topics.
5. Perplexity is a measure of the uncertainty in the predictions expressed as the number of sides a fair die would need to be equivalently unpredictable.
6. This concern with inflation might be interpreted as evidence that the FOMC is making connections between finance and broader economic trends, but we believe it is best to see inflation as a distinct subtheme within the *bank liquidity* topic. Logically, the broader economic trend affected by finance is growth, not inflation. The separation of inflation and finance concerns is supported by our qualitative analysis in the final section of the article.
7. See, similarly, St. Louis Reserve Bank President William Poole (FOMC 2005:57–58).
8. See Rosengren's profile on the webpage of the Federal Reserve Bank of Boston (https://www.bostonfed.org/people/bank/eric-rosengren.aspx).
9. We would like to thank the editors for raising this point.

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