

Economics and the Federal Reserve After the Crisis

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The invitation to address you this evening is a great honor for me. I matriculated in 1973, filled with a sense of awe and anticipation about the world of learning that was opening up before me. Little did I know that I was in for an intense period of personal growth and discovery as well. But just as important, it was here at Franklin & Marshall College that I made the choices that would set the course of my professional work for decades to come. I am very grateful to F&M for all it provided me.

My topic tonight is “Economics and the Federal Reserve After the Crisis.” F&M is where I first seriously studied economics, so that seems appropriate as a subject. The financial crisis of 2007–08 had significant consequences, to say the least, and the Federal Reserve was at the center of it all. So I thought I would share some reflections with you. But as I have thought back on those events in the intervening years, a vivid memory from my F&M days comes to mind. It was not from an economics class but a seminar in the government department — International Politics, I believe it was called, with Professor Robert Gray. We spent some time studying the Cuban missile crisis, and I believe we read Graham Allison’s book,¹ which was popular at the time. One broad insight I took away from the course was that a critical influence on the choices made by policymakers was the *theory* they brought to the table — their conceptual understanding of the fundamental forces at work in the world they are dealing with. Moreover, it is often the case that several plausible alternative theories are also available to policymakers.

Since the recent financial crisis, I have reflected often on the role of economics in shaping the policy response.² There is no substitute for theorizing about how the world works because there is no other way to form a judgment about whether a given policy action will be good or bad. To put it another way, if you think you know how a policy intervention might work in the world, you have a theory in mind. The challenge for policymakers, particularly for central bankers these days, is choosing which theories to place weight on. One can search for appropriate models by comparing alternatives to real-world observations, but at times a given set of observations is consistent with several different models. Sometimes additional observations can be found that discriminate between contending theories, but if not, policymakers may be forced to choose between competing theories.

In recent years, a trove of new, previously classified information about the Cuban missile crisis has been released, including transcripts of recordings President John F. Kennedy secretly made

of his meetings with his top advisers, the Executive Committee of the National Security Council. These have shed new light on the thinking of the president's policy advisers during this critical episode. Our understanding of the financial crisis is similarly benefiting from the emergence of new, previously classified information. The Federal Open Market Committee, the policymaking arm of the Federal Reserve, releases transcripts of its meetings and conference calls with a five-year lag. On January 18 of this year, the transcripts were posted for 2007, the year the financial market turmoil began.³ These records of the FOMC's deliberations provide a fascinating window into policymakers' thinking as the crisis began to unfold.

Popular accounts of the financial crisis focus heavily on the events that took place later, in the fall of 2008. Indeed, much of the media coverage of the release of the transcripts focused on the extent to which the Committee did or did not appear to predict exactly what was just around the bend. The critiques of Monday morning quarterbacks are entertaining, to be sure, and I agree that the events of the fall of 2008 had their roots in what happened in 2007 and earlier. But it's ultimately unproductive to act as if policymakers should have been omniscient. The transcripts show Committee participants grappling with how to interpret what was happening and what to do about it. Alternative assessments were plausible, given the information that was available in real time, although each had different implications for how the future might unfold.

In my remarks tonight, I would like to provide an overview of what economics had to offer to policymakers as the financial crisis began to unfold in 2007. A wide variety of research over the last couple of decades was directly relevant to financial market instability, and I do not intend to survey it all. But, at the risk of oversimplification, I will highlight two broad alternative views that have emerged, each with significantly different implications for the handling of the crisis. In 2007, the transcripts show that one was chosen, and it guided the diagnosis and prescriptions of senior Fed policymakers for the rest of the crisis. Indeed, that view has had a major influence on the legislative and regulatory responses designed to prevent future crises. Before I begin with an overview of these two views, I need to warn you that my remarks reflect my own views and not necessarily those of other Federal Reserve officials. If you have any doubt, the 2007 transcripts confirm this assertion.⁴

Alternative Theories

The banking system was obviously at the heart of the crisis, and economists have made a good deal of progress in recent decades on the theory of banking. The essence of what it means to be a bank is the use of short-term funding to invest in longer-term assets, a process called "maturity transformation." Traditionally this would take the form of loan portfolios funded through the issuance of deposits. Immediately demandable deposits are a short-term liability, unlike bank loans that are repaid over a number of years. Maturity transformation by financial intermediaries provides the benefit of insurance to depositors who might quickly need their funds — to purchase goods and services, for example, or to pursue an unanticipated investment opportunity. By pooling the funds of many such investors, a bank can make a set of longer-term investments that individual investors on their own would view as too risky to support.

Maturity transformation involves a potential risk of its own, however. If a large number of depositors sought to withdraw their deposits simultaneously, the bank might have trouble raising

enough funds through liquidating its asset holdings. As a result, a firm with a mismatched balance sheet is vulnerable to a “run,” in which people try to get their money out before the firm is no longer able to make immediate payment. Even though it may be individually rational, such a run can cause damage by inducing the untimely liquidation of bank assets.

In economists’ terms, what I’ve just described is a situation subject to “multiple equilibria.” One possibility (equilibrium) is that depositors run, even if they don’t need their money now, because they expect other depositors are running as well. The other possibility is that depositors don’t withdraw unless they truly need their money because they expect others to behave similarly. One way to prevent the possibility of the bad outcome is to provide government-backed insurance to the depositors. In fact, in the simplest versions of this theory, such insurance has almost magical powers. The mere presence of the backstop commitment makes depositors confident that other depositors won’t be heading for the exits — with the result that people only take their funds out when they really need to. The magical aspect is that the government backstop is never actually used.

This intuition may seem pretty easy to grasp, but it wasn’t until 1983 that two economists — Douglas Diamond and Philip Dybvig — published an article laying out this logic in a precise, rigorous fashion.⁵ This insight has had a tremendous influence on economists’ thinking about banking and financial markets. And as I’ll discuss, their portrayal of inherent financial fragility has had a tremendous impact on policy during the crisis and beyond.

Government-supplied deposit insurance has always been understood to carry its own risks, however. In the late 1970s John Kareken and Neil Wallace pointed out that deposit insurance created incentives that could lead to socially excessive risk-taking.⁶ Banks that can raise insured deposits have less incentive to avoid large losses, and their depositors have less incentive to monitor and constrain such risk-taking, because taxpayers could end up holding the bag. Thus, deposit insurance was paired with a system of comprehensive regulatory oversight. Indeed, such oversight is today a major function of the Federal Reserve System and other bank regulators and is a significant responsibility of Reserve Banks like Richmond’s.

Regulation comes with its own implications, of course. In this context, one of the most important is the incentive it provides market participants to perform functionally equivalent services just beyond the reach of regulations, effectively by-passing those regulatory constraints. This gives rise to what’s called “shadow banking” — bank-like activities conducted outside the legal confines of the banking industry. One example of shadow banking is the market for repurchase agreements, or “repos,” in which a lender purchases an asset from a borrower with a simultaneous agreement to resell it at a later date, often the next day. Maturity transformation is a key feature of the repo market and contributed to the demise of Bear Stearns in 2008.

But a government backstop is not the only mechanism for preventing self-fulfilling runs. The likelihood of such behavior also can be influenced by the details of the contracts between the bank and its depositors. For instance, if the arrangement includes conditions under which the bank can suspend depositors’ right to withdraw, then the self-fulfilling run outcomes also can be averted. Such a practice was common during U.S. financial panics in the 19th century, before the advent of government deposit insurance. Banks would suspend withdrawals, for exactly the

purpose of interrupting the dynamics of an emerging bank run. This type of mechanism reduces somewhat the services provided by the deposit but in the interest of altering incentives and ensuring the sustainability of the overall arrangement, much the way high insurance deductibles improve the sustainability of insurance coverage.

Close attention to contractual details like the ability to suspend payments highlights an important point in the study of financial institutions and their behavior. Financial contracts are not one size fits all — they vary dramatically across various settings and sectors. For example, equity contracts have long been an important source of finance for some groups, such as small high-tech startups, while in other settings, simple debt is more dominant.

Economists have made progress in understanding which financial contracts are best adapted to which settings using the tools of a branch of economics known as mechanism design.⁷ These tools allow you to ascertain the extent to which a given contract is consistent with opportunistic behavior by trading partners, taking into account that they may have superior information and may be able to take actions you cannot observe. In a famous example, over 30 years ago the economist Robert Townsend showed that in certain settings a plain-vanilla debt contract is exactly the optimal contract, in the sense that no other form of financial contract would make the borrower or lender better off without making the other one worse off.⁸ The same logic applies to financial institutions, such as banks, which can be thought of as a complex multilateral array of contracts. Equally famous work by the economist Doug Diamond showed that in certain settings banks do better than a system of bilateral lending.⁹

Mechanism design, as an approach to understanding financial markets, emphasizes the *endogeneity* of contracts and institutions. It takes into account in a systematic way the various frictions and transactions costs that make borrowing and investing challenging, such as limits to the information of various parties or the inability to precommit to future actions. It builds on the notion that contracting parties choose the form of contract for their mutual benefit. Mechanism design provides a way to understand and predict how financial contracts and institutions might adapt and evolve in response to changes in their economic environment.

One important part of the economic environment to which private financial institutions and contracts adapt is the set of rules imposed and actions taken by the government in its interactions with financial markets. Take, for instance, the two means of preventing the inefficient, self-fulfilling bank runs that I discussed earlier. One relies on the expectation of government support in the event of financial stress. The other relies on the incentives of market participants to adopt contractual arrangements that are as robust as possible to potential stresses. But the private incentives that drive this second approach depend on what people believe about the likelihood of government support in the event of a crisis. If they believe such support is likely, then their incentive to adopt more resilient arrangements is weaker.

The interaction between government backstops and endogenous financial arrangements poses a very general problem for policymaking. If we observe financial institutions or markets that are vulnerable to runs, it could reflect inherent fragility, or alternatively it could reflect expectations of government support that short circuit the incentive to adopt more robust arrangements.

As policymakers entered 2007, the economics literature offered them two broad but fundamentally different views of the world — two theories of financial instability. One tends to view market institutions and contracts as relatively fixed and the resulting financial system as inherently prone to the type of instability depicted by the simple model of bank runs. Under this theory, an expectation of government support may be necessary to make crises less likely, although that support necessitates regulatory oversight and constraints on banks to replace the market discipline that is lost when counterparties feel protected by government guarantees.

In the alternative view, private financial arrangements are themselves adaptable and endogenous. Much of the vulnerability observed in financial markets is itself the induced response of market institutions and behaviors to the expectation of government backstop support in the event of distress. In the absence of that expectation, there would be stronger incentives to seek more robust arrangements.

So on the eve of 2007, policymakers were faced with two broad, competing views on the origins of financial market fragility — either it was inherent in the structure of financial arrangements, or it was induced by expectations of government support.

The Backstory

Before discussing the policy debates of 2007, it's worth briefly reviewing the lead up to the crisis. Three threads course through this backstory. The first consists of the instances of financial stress that recur from time to time in U.S. history. There were significant panics in the second half of the 19th century in which investors sought to convert their deposits into currency. Bank failures were widespread at the start of the Great Depression, when deflation made it hard for borrowers to repay fixed-dollar debts. Bank failures were small and isolated in the 1950s and 1960s but began growing in size and frequency in the 1970s. Inflation and subsequent regulatory forbearance led to widespread failures among savings and loan institutions in the 1980s. Forbearance also extended to large, money center institutions, which were hammered by losses on loans to less developed countries in the 1970s and 1980s.

Official government support is the second thread in this backstory. The founding of the Federal Reserve in 1913 gave the Fed the capacity to act as a public sector backstop to banks — a “lender of last resort” — in the event of a run. Despite this there were widespread bank failures in the Great Depression. The associated losses of deposit savings by households and firms prompted tighter restrictions on bank activities and the creation of the Federal Deposit Insurance Corp., or FDIC.¹⁰

The third key feature of the backstory is the increasing frequency, starting in the 1970s, of government support being extended beyond the official scope of deposit insurance. This involved a series of successively larger institutions, including the noteworthy Continental Illinois in 1984, which prompted Congressional testimony that saw a senior federal bank regulator acknowledge that the largest 11 banks would not be allowed to fail without government assistance.¹¹ This was the first public articulation of the notion of “too big to fail.”

Other actions, beyond traditional banking, also contributed to the perception of an implicit government commitment to dampen financial instability, most notably the handling of the collapse of Penn Central in 1970, the response to the stock market crash of 1987 and the response to financial distress at Long-Term Capital Management in 1997.

This history created a situation at the beginning of this century in which it was widely acknowledged that a large fraction of our financial system was believed to be backed by explicit or implicit government guarantees.¹² In fact, in 2002 at the Richmond Fed we estimated that, as of the end of 1999, the share of financial sector liabilities likely to benefit from government protection was about 45 percent. Out of this, 27 percent was explicit protection, while the remaining 18 percent was implicit.¹³

August 16, 2007

Turning to the crisis itself, the story should be more familiar. As home prices crested and began to decline in many markets in late 2006 and early 2007, the cumulative rates of default on the most recent vintage mortgages began to rise precipitously, particularly for loans with nonstandard features — low credit scores, low down payments and minimal documentation, for instance. The clear implication was that the ultimate loss rates on those mortgages were going to exceed original expectations by a significant margin. Most of these loans had been securitized and sold, which dispersed the risk across the financial system. In early 2007, several firms involved in originating and securitizing such loans experienced financial distress, and some failed. The FOMC transcripts for 2007 show that as the housing market worsened — and strains emerged in housing finance — Committee participants actively discussed the likely magnitude of the fall out for the rest of the economy.

Housing-related financial market turbulence came to a head in August 2007, particularly in the market for asset-backed commercial paper, or ABCP. These securities were backed by the issuer's holdings of a variety of assets, including mortgage-backed securities of various types. A sponsoring financial firm — typically a large commercial or investment bank — would transfer a portfolio of assets into a separate legal entity, which in turn would issue the commercial paper. As the incoming housing market data called into question the value of mortgage-backed securities, the spread between interest rates on ABCP and interest rates on comparable Treasury securities began to rise. As maturing paper came due, some sponsoring firms took the underlying assets back onto their own balance sheets, and the volume of ABCP issued fell dramatically.¹⁴ With more banks turning to the unsecured interbank markets for funding, interest rates there rose significantly on August 9 and 10.

In this environment the Fed took its first official action in response to the financial crisis. The FOMC typically sets a target value for the federal funds rate — the rate at which banks lend to each other in the overnight market. For many years the interest rate that the Federal Reserve Banks set on their discount window loans to banks had been set at a fixed margin of one percentage point over the federal funds rate target. On a videoconference call the evening of August 16, the FOMC decided to lower that spread to one half of a percentage point.

This move reflected a judgment that deteriorating conditions in the ABCP market were creating strains in the banking system that, without an expansion of Fed lending, threatened to reduce the supply of credit to the rest of the economy. The problem was compounded, in this view, by the stigma that banks seemed to associate with the Fed's discount window — the idea that if counterparties found out that you borrowed from the window, they might downgrade their assessment of your creditworthiness.¹⁵ Announced at 8 a.m. the morning of August 17, the Fed's discount rate reduction — from 6-1/4 percent to 5-3/4 percent — was meant to encourage more borrowing. Later that morning Fed officials spoke with a group of bankers and urged them not to think of borrowing from the Fed as a sign of weakness. The following week, the four largest U.S. banks borrowed from their discount windows on a coordinated basis to demonstrate the propriety of borrowing from the Fed.

The diagnosis underlying the actions taken in August 2007 set the direction for policy prescriptions as the financial crisis unfolded; central bank credit would be used to alleviate strains in an inherently fragile financial system. When the flow of borrowing from the Fed seemed to remain relatively low even after the discount rate reduction, the Fed introduced new programs to push more credit out to the banking system, beginning with the Term Auction Facility, or TAF, in December 2007. This was followed by the rescues and an array of lending programs introduced over the course of 2008.

At the time of the August 2007 discount rate cut, I questioned the presumption that the markets were suffering from a problem for which increased Fed credit was the solution. An alternative diagnosis of the situation was that the deterioration in housing market conditions was causing a fundamental revaluation of housing-related financial instruments. Because exposures to this revaluation were distributed throughout the financial system, uncertainty about the creditworthiness of counterparties had increased substantially, and this caused investors to demand higher-risk premiums in compensation. For ABCP sponsors, bringing assets back onto their balance sheet was often less costly than paying elevated premiums to investors. This explained the reduced volumes in the ABCP market, but it required raising funds from other sources, such as the interbank market, which in turn contributed to the observed volatility and elevated interest rates on the interbank market. The ABCP market didn't "seize up," under this interpretation, it simply moved elsewhere.

Another source of additional bank funding in August 2007 was the Federal Home Loan Banks. These institutions are government-sponsored intermediaries that lend to their member banks. Because they are viewed as likely to be rescued by Congress in the event of distress, they generally can borrow from institutional investors at very favorable terms and pass on the funding advantage to their borrowers. Lending by the Home Loan Banks surged by \$110 billion during the turmoil in August 2007 because they charged interest rates that were well below those charged by the Fed. Indeed, when the Fed began to auction off credit in the TAF, a large share of the borrowings was taken by foreign banks, which did not have access to Home Loan Bank funding.

Evidence from research conducted since 2007 is consistent with the notion that increases in counterparty credit risk drove the financial market turmoil that August. A study by Daniel M. Covitz, Nellie Liang and Gustavo A. Suarez showed that the extent to which counterparties

pulled away from issuers of ABCP was directly related to the extent of their holdings of risky housing-related assets.¹⁶ And work by John Taylor and John Williams suggests that the evidence on the behavior of interest rate spreads around that time is consistent with counterparty risk.¹⁷

While these research results were not available to policymakers in real time, they do support the hypothesis that markets were responding in a plausibly efficient manner to a significant revision in expectations about the underlying economic fundamentals. If that's true, then central bank lending, by subsidizing borrowers, is likely to have simply undercut the private lending that would have taken place. This increases moral hazard by reducing the perceived cost to financial institutions of getting into funding difficulty in the future.

This trade-off between cushioning the blow of financial market disruptions and distorting banks' incentives is typically thought of as a long-run issue. Because financial crises are relatively infrequent, the incentive distortion will only affect outcomes in the relatively distant future, in this view. This may be why policymakers often seem willing to act so aggressively against current turmoil and often seem confident that sufficient time remains to contain moral hazard effects through tougher regulation. But the crisis we have just been through tells a more complicated story. It wasn't just some distant future crisis that was affected by the precedents being set; it was the next chapter in the current crisis. Each new move to expand institutions' reliance on Fed lending also had the effect of increasing expectations of official support in the months ahead.

So it seems quite plausible to me that the signal sent by the Fed's lending actions in August 2007 dampened the willingness of troubled institutions, such as Bear Stearns and Lehman Brothers, to seek safer solutions to the strains they were facing — whether by raising capital, selling assets or reducing reliance on short-term funding. In March 2008, Bear and many other large investment banks remained dependent on overnight repo markets to fund holdings of some illiquid mortgage-related assets. The perceived likelihood of Fed support in the event that investors pulled away is bound to have influenced the choice to continue that dependence.

When Bear lost funding in mid-March, the critical fear was that without government support, investors would pull away from other investment banks as well. Backstop lending was thus necessitated by expectations of backstop lending. The assisted purchase of Bear Stearns seems likely to have influenced in turn the perceptions of government support for other large financial institutions, which seems likely to have affected how such firms were positioned as the events of the fall unfolded. I believe that a more measured response by the Fed in August 2007 could have resulted in significantly less instability in 2008, although I recognize that I say this with the benefit of hindsight.

Financial Stability Policy After the Crisis

After the crisis, attention has naturally turned to financial reform. Not surprisingly, alternative visions of financial stability yield different prescriptions for the path forward. The main engine of post crisis financial policy is the Dodd-Frank Wall Street Reform and Consumer Protection Act, a massive new rule book with enhanced standards for regulation and market practices. Both the inherent fragility view and the induced fragility view find voice in this legislation.

Accordingly, the law itself contains some internal contradictions: some good points, some bad points. There's no doubt that interpretation and implementation of this law, and other policy actions to promote financial stability, will continue to be influenced by the alternative theoretical perspectives I've discussed.

It would take a separate lecture to do justice to the Dodd-Frank Act. I will just highlight one project that in my view holds out the promise of improving financial stability no matter which view one subscribes to. Title I of Dodd-Frank requires that important financial firms submit credible "living wills" — that is, plans for exactly how they would be wound down in the event of bankruptcy. Credible plans for resolving large failing financial institutions without government support can bolster policymakers' commitment to refrain from fragility-inducing rescues. And a detailed living will provides a road map for restructuring a firm so that it is not inherently fragile.

Many commentators argue that the crisis discredited modern economic science. I disagree. As I have pointed out along the way, several economists warned long ago about the risks associated with maturity transformation and government backstops. For some commentators, the crisis demonstrated that financial arrangements are inherently more fragile than we had thought. But one could just as well argue that the crisis showed how much fragility can be induced by ambiguous rescue policy.

There's no doubt that the crisis will stimulate research for decades to come. Given the magnitude of the interventions we've seen, research that improves financial policy could yield enormous social benefits. In this connection I would note that our most recent estimates at the Richmond Fed are that, as of December 31, 2011, 57 percent of financial sector liabilities benefit from perceived government support. This is up from 45 percent over a decade ago and reflects in part an expansion of implied commitments based on new precedents set during this crisis. In my view, this growth in government support for the financial sector is not sustainable. As economic policy challenges go, I would rate this as second only to the looming federal fiscal imbalance. I sincerely hope we can make progress in the years ahead.

¹ Graham Allison, "Essence of Decision: Explaining the Cuban Missile Crisis," 1st edition, New York: Little Brown, 1971.

² Jeffrey Lacker, "Economics After the Crisis: Reflections on a Return to Madison," Speech at the University of Wisconsin-Madison, Madison, Wis., October 3, 2011; and "Reflections on Economics, Policy, and the Financial Crisis," Speech to the Kentucky Economic Association, Frankfort, Ky., September 24, 2010.

³ These transcripts are available online at <http://www.federalreserve.gov/monetarypolicy/fomchistorical2007.htm>.

⁴ I would like to thank John Weinberg, Kartik Athreya, Ned Prescott and Huberto Ennis for assistance in preparing this lecture.

⁵ Douglas W. Diamond and Philip H. Dybvig, "Bank Runs, Deposit Insurance, and Liquidity," *Journal of Political Economy*, June 1983, vol. 91, no. 3, pp. 401-419. See also the Special Issue on the Diamond-Dybvig Model, *Federal Reserve Bank of Richmond Economic Quarterly*, First Quarter 2010, vol. 96, no. 1.

⁶ John H. Kareken and Neil Wallace, "Deposit Insurance and Bank Regulation: A Partial-Equilibrium Exposition," *Journal of Business*, July 1978, vol. 51, no. 3, pp. 413-438.

⁷ Perhaps not coincidentally, the 2007 Nobel Memorial Prize in Economic Sciences was awarded to Leonid Hurwicz, Eric Maskin and Roger Myerson. See

http://www.nobelprize.org/nobel_prizes/economics/laureates/2007/press.html.

⁸ Robert M. Townsend, "Optimal Contracts and Competitive Markets with Costly State Verification," *Journal of Economic Theory*, October 1979, vol. 21, no. 2, pp. 265-293.

⁹ Douglas W. Diamond, "Financial Intermediation and Delegated Monitoring," *Review of Economic Studies*, July 1984, vol. 51, no. 3, pp. 393-414.

¹⁰ States had earlier experimented with various deposit insurance programs, with only mixed results.

¹¹ Comptroller of the Currency Todd Conover, testimony to the Subcommittee on Financial Institutions, Supervision, and Insurance, Committee on Banking, Finance, and Urban Affairs, U.S. House of Representatives, 98th Congress, 2nd session, September 18, 1984.

¹² Gary H. Stern and Ron J. Feldman, "Too Big to Fail: The Hazards of Bank Bailouts," Washington, D.C.: Brookings Institution Press, 2004.

¹³ John R. Walter and John A. Weinberg, "How Large Is the Federal Financial Safety Net?" *Cato Journal*, Winter 2002, vol. 21, no. 3, pp. 369-393.

¹⁴ Daniel M. Covitz, Nellie Liang, and Gustavo A. Suarez, "The Evolution of a Financial Crisis: Panic in the Asset-Backed Commercial Paper Market," Board of Governors of the Federal Reserve System Finance and Economics Discussion Series, no. 2009-36, August 2009.

¹⁵ Huberto Ennis and John Weinberg, "[Over the Counter Loans, Adverse Selection and Stigma in the Interbank Market](#)," Federal Reserve Bank of Richmond Working Paper 10-07R, April 2010. Forthcoming, *Review of Economic Dynamics*.

¹⁶ See Covitz, Daniel M., Nellie Liang, and Gustavo A. Suarez (2009).

¹⁷ John B. Taylor and John C. Williams, "A Black Swan in the Money Market," *American Economic Journal: Macroeconomics*, January 2009, vol. 1, no. 1, pp. 58-83. The authors also discuss other analyses that reach different conclusions from their own.