

BEN BERNANKE VERSUS MILTON FRIEDMAN:

The Federal Reserve's Emergence as the U.S. Economy's Central Planner

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Revised: October 15, 2010

* I would like to thank David Beckworth, Warren Gibson, David R. Henderson, Daniel Klein, Arnold Kling, Kurt Schuler, George Selgin, Scott Sumner, Robert Wenzel, and Bill Woolsey for their helpful comments and edits. Any remaining errors are entirely my own. Forthcoming in *Leaning With the Wind: How Monetary and Financial Policies Helped Create the Great Boom and Great Recession*, edited by David Beckworth and published by the Independent Institute.

Ben S. Bernanke and Milton Friedman are both economists who studied the Great Depression closely. Indeed, Bernanke admits that his intense interest in that event was inspired by reading Milton Friedman and Anna Jacobson Schwartz's *Monetary History of the United States, 1867-1960*. Bernanke agrees with Friedman that what made the Great Depression truly great, rather than just a garden-variety depression, was the series of banking panics that began nearly a year after the stock market crash of October 1929. And both agree that the Federal Reserve was the primary culprit failing to offset, if not initiating, that economic cataclysm within the United States. As Bernanke, while still only a member of the Fed's Board of Governors, put it in an address at a ninetieth birthday celebration for Friedman: "I would like to say to Milton and Anna: Regarding the Great Depression. You're right, we did it. We're very sorry. But thanks to you, we won't do it again."¹

But this seeming similarity disguises significant differences in Friedman's and Bernanke's approaches to financial crises, differences that have played an enormous yet rarely noticed role in the recent financial crisis. Not only have those differences resulted in another Fed failure—not quite as serious as during the Great Depression, to be sure, yet serious enough—but they have also resulted in a dramatic transformation of the Fed's role within the economy. For Bernanke has so expanded the discretionary actions of the Fed beyond merely controlling the money stock that it has become a gigantic, financial central planner. In short, despite Bernanke's promise, the Fed *did* do it again.

I. Conflicting Lessons of the Great Depression

The banking panics associated with the Great Depression were not only the worst in the

¹ "Remarks by Governor Ben S. Bernanke At the Conference to Honor Milton Friedman," University of Chicago, Chicago, Illinois, November 8, 2002: <http://www.federalreserve.gov/boarddocs/speeches/2002/20021108/default.htm>; Greg Ip, "Long Study of Great Depression Has Shaped Bernanke's Views," *Wall Street Journal* (December 7, 2005): A1. Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton, NJ: Princeton University Press, 1963).

history of the United States; they were also the largest in the history of the world. Bernanke's and Friedman's differences center on why those panics generated economic catastrophe. For Friedman and Schwartz, the causal mechanism was the resulting changes in the money stock and therefore in the equilibrium price level. The panics brought about a collapse of the broader measures of the money stock over the four years from 1929 to 1933: a one-third fall in M2 and a one-fourth fall in M1. This collapse induced, in their view, a further fall in money's velocity (or what is the same thing, an increase the portfolio demand for money), requiring an enormous contraction in nominal income. Without full and immediate flexibility of all prices and wages, a one-third contraction in the economy's real output was the consequence. In other words, Friedman conceives of the bank panics as an enormous shock to *aggregate demand*.

This analysis leaves unanswered the prior questions of what triggered the banking panics in the first place, and why the U.S. banking system was so uniquely vulnerable after so much government intervention to prevent such a crisis. Friedman and Schwartz attribute the panics to inept Federal Reserve policy, along with legal restrictions on the issue of money substitutes by private clearinghouses, but other economists have come up with myriad alternative explanations, ranging from the Smoot-Hawley tariff, through misplaced adherence to the gold standard, to an attack of Keynesian animal spirits. Despite disagreement about what initiated the panics, however, there is a fair consensus that the collapse of the banking system, once underway, made the depression far more severe than it otherwise would have been.

Yet in contrast to Friedman, Bernanke's major *American Economic Review* article on the Great Depression, published in 1983, is openly entitled "*Nonmonetary* Effects of the Financial Crisis in the Propagation of the Great Depression [emphasis mine]." Banks were the economy's premier financial intermediaries, channeling savings from the household sector both to firms, which used the savings to maintain and accumulate capital, and to other households engaged in consumption. The failure of over nine thousand banks caused a massive interruption of this credit flow, and in his view, that was the primary reason for the contraction in output and its long duration. Even in his tribute to Friedman, Bernanke reiterated his belief that during the Great

Depression “banking panics contributed to the collapse of output and prices through nonmonetary mechanisms” by “creating impediments to the normal intermediation of credit.”²

At first glance, Bernanke appears to be arguing that the bank panics constituted an enormous shock to *aggregate supply*. Despite finding “this possibility . . . intriguing,” Bernanke actually develops (especially in subsequent articles) a convoluted explanation of why a banking collapse would instead depress aggregate demand, even without any impact on the money stock. He speculates that such a disruption of what he calls “the credit channel” will, in effect, induce household and firms to hold more money rather than spend it on consumption and investment. True to his New Keynesian inclinations, what Bernanke is thus saying is that the failure of banks brings about a prolonged, negative velocity shock, although he never expresses it in such straightforward terms. While the supply-side effects of bank failures would seem to make Bernanke’s emphasis on the credit channel more compelling, either avenue clearly posits a mechanism for severe economic dislocations distinct from Friedman and Schwartz’s.³

Admittedly these two explanations for the Great Depression’s severity are not mutually exclusive, as Bernanke himself has pointed out. Financial panics clearly constitute a hit both to the money stock and to financial intermediation. But very different policies are implied depending on which is the primary effect. If the danger from bank panics is a collapse of the money supply, then the proper response is a *general* injection of liquidity into the financial system, in order to prevent any drastic fall in aggregate demand and the price level. The survival of particular financial institutions is *at most* of secondary significance, and indeed those that are already insolvent due to taking on excessive risk, corrupt management, or other reasons can be

² Ben S. Bernanke, “Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression,” *American Economic Review*, 73 (June 1983): 257-76; reprinted in Bernanke, *Essays on the Great Depression* (Princeton, NJ: Princeton University Press, 2000).

³ Bernanke, *Essays on the Great Depression*, p. 56; Bernanke, “Monetary Policy Transmission: Through Money or Credit?” Federal Reserve Bank of Philadelphia *Business Review* (September-October 1988): 3-11; and Bernanke and Mark Gertler, “Inside the Black Box: The Credit Channel of Monetary Policy Transmission,” *Journal of Economic Perspectives*, 9 (Fall 1995): 27-95. Joseph E. Stiglitz and Bruce Greenwald, *Towards a New Paradigm in Monetary Economics* (Cambridge: Cambridge University Press, 2003), offer a highly technical argument that bank failures do indeed cause significant supply shocks.

safely permitted to go under if money and prices remain stabilized. So long as very few banks fail because of a pure liquidity squeeze that forces the selling off of assets at fire-sale prices, the damage should be contained.⁴

On the other hand, if the danger from bank panics is a choking off of credit that either reduces aggregate supply or demand, then targeted bailouts may be the proper response. A general stabilization of the money stock in order to hold up prices will be utterly inadequate if major financial institutions are insolvent. The economy still will suffer from a throttling of financial intermediation, making these institutions too big to fail. Even should contagion effects have no significant impact on money, they could in and of themselves bring about a serious economic contraction. Notice that this view bestows upon the financial sector a privileged status, enjoyed by no other economic sector. Threats to the financial sector's solvency are uniquely dangerous to the economy.⁵

Bernanke did not make these policy implications explicit in his scholarly writings, nor do they *necessarily* follow from his focus on the credit channel. As George Selgin pointed out in email correspondence: "So long as some banks are pre-run solvent, a sufficient dose of base money should suffice to keep those banks afloat, and in the presence of an efficient interbank market would do so even if the dose were administered via the open market" that is, through the Fed's purchase of Treasury securities or Federal-agency issues on the market. "Friedman and Schwartz took for granted that the same base creation that would have sufficed to maintain M2 would also suffice to maintain the flow of credit, though not without allowing some perhaps substantial change in banks' credit market shares. The mere change in credit market shares itself needn't entail any credit-channel effects" and therefore no "fall in aggregate intermediation."⁶

⁴ Anna J. Schwartz makes the point in "Real and Pseudo-financial Crises," in *Financial Crises and the World Banking System*, ed. by Forrest Capie and Geoffrey E. Wood (New York: St. Martin's Press, 1986).

⁵ For an appreciation of this distinction, see Robert L. Hetzel, "Monetary Policy in the 2008-2009 Recession," Federal Reserve Bank of Richmond *Economic Quarterly*, 95 (Spring 2009): 201-33.

⁶ George Selgin, email to me (September 9, 2010).

It was left for the British monetary theorist Charles Goodhart to extend Bernanke's analysis into a rationale for targeted bailouts. He concluded it was necessary to keep specific banks afloat, mainly because rebuilding relationships between borrowers and lenders takes time, so that financial intermediation can be impaired even if the central bank preserves aggregate liquidity. Nonetheless, we can see more than a glimmer of Goodhart's argument in Bernanke's initial article. Both believe that what distinguishes banks from other financial intermediaries is not merely that deposits are used as money but also that banks, in Bernanke's words, "specialize in making loans to small, idiosyncratic borrowers whose liabilities are too few in number to be publicly traded." Because bank loans are especially unmarketable, a bank collapse interrupts the flow of funds more than the insolvency of other financial institutions. Bernanke conceded that "some of the slack" might be "taken up by the growing importance of alternative channels of credit," but "in a world of transaction costs and the need to discriminate among borrowers, these shifts in the loci of credit intermediation must have at least temporarily reduced the efficiency of the credit allocation process." It is no giant leap from Bernanke's claim that commercial banks in general are uniquely vital to financial intermediation to Goodhart's suggestion that some banks in particular are vital, especially if they are very big.⁷

Moreover, Bernanke clearly revealed in his original *American Economic Review* article that he considered *direct* government aid essential for the survival of certain forms of lending. "To the extent that the home mortgage market did function in the years immediately following 1933," he wrote, "it was largely due to the direct involvement of the federal government. Besides establishing some important new institutions (such as the FSLIC and the system of federally chartered savings and loans), the government 'readjusted' existing debts, made investments in the shares of thrift institutions, and substituted for recalcitrant private institutions in the provision

⁷ C[harles] A. E. Goodhart, "Why Do Banks Need A Central Bank?" *Oxford Economic Papers*, new ser., 39 (March 1987): 84-89; Goodhart, "Price Stability and Financial Fragility," in *Financial Stability in a Changing Environment*, ed. by Kuniho Sawamoto, Zenta Nakajima, and Hiroo Taguchi (New York: St. Martin's Press, 1995), both articles reprinted in Goodhart, *The Central Bank and the Financial System* (Cambridge, MA: MIT Press, 1995); Goodhart, *Money, Information and Uncertainty*, 2nd edn. (Cambridge, MA: MIT Press, 1989), pp. 188-93, 202-4; Bernanke, *Essays on the Great Depression*, pp. 50-3.

of direct credit.” He goes on to state that “[s]imilar conditions obtained for farm credit and in other markets.” Thus, “it seems safe to say . . . that the financial recovery would have been more difficult without extensive government intervention and assistance.”⁸

The dividing line between the differing policies of Bernanke and Friedman can sometimes be hazy. The failure of a single, large bank can in theory set off a panic that causes a monetary contraction. Thus, Friedman and Schwartz did imply that the Fed could have done more to shore up the Bank of United States, to whose failure in December of 1930 they attached special importance in spreading the Great Depression panic. Scholars still debate to what extent banks, during that episode, succumbed to solvency versus liquidity problems, and Friedman did endorse deposit insurance as a cure for bank panics. But Friedman and Schwartz’s central complaint about Fed operations during the Great Depression was that its expansion of the monetary base with open market operations was too little and too late. Indeed, Friedman in his *Program for Monetary Stability* contended that central banks could dispense altogether with making loans to individual banks through discounts and rely exclusively on open market operations. Among other benefits, he believed this reform would prevent the widespread “confusion between the ‘monetary’ effects of monetary policy—the effects on the stock of money—and the ‘credit’ effects—the effects on recorded rates of interest and other conditions in the credit market.”⁹

One objection to Friedman’s remedy for financial crises comes from Keynesian economists. With their focus on fluctuations in money demand (in other words, velocity shocks) as the main source of business cycles, they have argued that the demand for money can become so elastic that no increase in the money stock, no matter how large, can offset the fall in output and employment. This is the infamous Keynesian liquidity trap, possibly prevailing during the

⁸ Bernanke, *Essays on the Great Depression*, pp. 64-5.

⁹ Friedman and Schwartz, *Monetary History*, pp. 309-12, 357-8; Charles W. Calomiris, “Banking Crises,” in *The New Palgrave Dictionary of Economics*, 2nd edn., ed. by Steven Durlauf and Lawrence Blume (New York: Palgrave Macmillan, 2008), v. 1, pp. 348-52; Milton Friedman, *A Program for Monetary Stability* (New York: Fordham University, 1960), p. 43.

Great Depression or even currently, in which firms and households end up just hoarding any new money. Friedman himself believed that severe changes in velocity were caused by volatile monetary policy, and that so long as money growth remained constant, velocity would change at a fairly predictable and stable rate. But it is Bernanke, with unintentional irony (as we shall see), who offered the definitive refutation of the liquidity trap. He pointed out that, through what has misleadingly come to be called “quantitative easing,” a central bank could ultimately buy up everything in the entire economy—except that sometime before then people would certainly start spending. This is the argument that earned him the sobriquet “Helicopter Ben.”¹⁰

What is crucial for our purpose, however, is that a bank panic that causes a drastic *decrease* in such measures of money as M2 or M1 stems from an *increased* demand for currency and reserves, the two forms of base money. In this case, a fall in the broader money stock and a fall in the velocity of the monetary base are exactly the same thing, and become alternative ways of describing what happened during the Great Depression. Indeed, the Fed did start expanding the supply of base money once the banking panics were well underway, but not enough to counteract either the fall in the broader monetary supply or the fall in base velocity, however you choose to describe what was going on. Thus, whether we label a particular decline in aggregate demand as a monetary shock or a velocity shock can depend on how broadly or narrowly we define the money stock. While Friedman’s primary worry was monetary shocks, the internal logic of his position requires a central bank response to velocity shocks as well. He even implicitly accepted this equivalence when, in a 2003 *Wall Street Journal* op-ed, he applauded Alan Greenspan’s deft offsetting of the M2 velocity bubble of the mid to late 1990s.¹¹

¹⁰ Ben S. Bernanke, “Japanese Monetary Policy: A Case of Self-Induced Paralysis,” paper presented at the Allied Social Science Associations meeting (December 1999), pp. 14-5, and reprinted in *Japan’s Financial Crisis and Its Parallels to U.S. Experience*, ed. by Ryoichi Mikitani and Adam S. Posen (Washington: Institute for International Economics, 2000); Bernanke, “Deflation: Making Sure ‘It’ Doesn’t Happen Here,” Remarks Before the National Economists Club, Washington, D.C. (November 21, 2002), <http://www.federalreserve.gov/boarddocs/speeches/2002/20021121/default.htm>. Bernanke’s argument was anticipated in an unpublished paper by George Selgin, “Japan: The Way Out” (September 1999).

¹¹ Milton Friedman, “The Fed’s Thermostat,” *Wall Street Journal*, (August 19, 2003): A8. As far as I know, James C. W. Ahlakpor, in “On the Definition of Money: Classical vs Modern,” a paper reprinted in his *Classical Macroeconomics: Some Modern Variations and Distortions* (London: Routledge, 2003), pp. 55-6, is the only

Offsetting negative shocks to money or velocity (i.e., stabilizing the growth rate of M times V in the equation of exchange) with untargeted, general injections of liquidity, as consistent with Friedman's analysis, has the added advantage of helping to clarify which banks are just illiquid and which are also insolvent, whereas direct bailouts, as implied by Bernanke's analysis, obscures the distinction. The United States has experienced at least two episodes of extensive bank insolvencies unaccompanied by any major macroeconomic downturns. These episodes would seem to confirm Friedman's emphasis on monetary shocks versus Bernanke's emphasis on intermediation shocks. Throughout the decade of the 1920s, inordinate numbers of rural banks were failing due to distress in the agricultural sector, but the twenties were boom times for the U.S. economy generally, and no one as far as I know has assigned those failures any causal role in the Great Depression.

More recently, as a result of the savings and loan crisis of the 1980s, over two thousand financial institutions failed. Obviously this episode is not as clear-cut, because there was a bailout costing taxpayers \$130 billion. Among the many regrettable features of federal deposit insurance—aside from moral-hazard-induced, excessive risk taking, which brought on the crisis in the first place—is that some government agency must decide when a depository is thrown into bankruptcy rather than leaving the decision to private parties on the market, as with most firms. But the bailout mainly went to cover depositor losses and not to keep insolvent institutions in business. The major exception, the nationalization of Continental Illinois National Bank and Trust Company in 1984, did involve temporary discount loans of up to \$7 billion. The Fed also extended credit to certain Ohio thrifts insured by a state fund that was in trouble in 1985, and in 1989 eased collateral requirements for a few thrifts as the final details of the federal resolution were debated in Congress. However, the scope of and sums involved in these Fed interventions

economist to have noticed the equivalence of monetary and velocity shocks in describing the Great Depression. Even some Austrian-school economists have acknowledged the desirability of a system that prevents both types of shocks, starting with Friedrich A. Hayek, *Prices and Production*, 2nd edn. (London: Routledge, 1935), pp. 27, 113-34, and including such advocates of free banking as George A. Selgin, *The Theory of Free Banking: Money Supply under Competitive Note Issue* (Totowa, NJ: Rowman and Littlefield, 1988), Lawrence H. White, *The Theory of Monetary Institutions* (Malden, MA: Blackwell, 1999), and Stephen Horwitz, *Microfoundations and Macroeconomics: An Austrian Perspective* (London: Routledge, 2000).

were small relative to the overall cost of shutting down failed institutions. More to the point, the monetary determinants of aggregate demand remained free from major shocks during the S & L crisis, and the one *possible* macroeconomic ripple was *debatably* the minor recession of 1990-1991.¹²

Yet the real proof of both the stark difference between Friedman and Bernanke and of the superiority of Friedman's approach comes from a close comparison of the record of Greenspan as Fed Chairman with that of Bernanke. Many have forgotten that Greenspan actually faced three potential financial crises during his long tenure: the October 1987 stock market crash, the fear surrounding Y2K, and the terrorist attack of September 11, 2001. And his primary response to all three was not targeted bailouts but flooding the economy with liquidity in the short term.

II. Greenspan's Handling of Potential Crises

The crash of Black Monday, October 19, occurred almost exactly two months after Alan Greenspan had assumed his Fed post in August of 1987. Initially he had tightened up on the growth of the monetary base and other monetary measures, whose growth rates had actually been quite high during the last four years of his predecessor, Paul Volcker. But when the Dow Jones Industrial Average plunged by 508 points, more than 20 percent, and before trading began the next morning, Greenspan issued a short, public statement, affirming the Fed's "readiness to serve as a source of liquidity to support the economic and financial system." He backed that up with high-profile, open market operations, frequently conducted an hour or more before normally scheduled market interventions by the New York Fed's trading desk. As a result, Fed holdings of Treasury securities jumped by over \$8 billion within two weeks, while its holdings of Federal-

¹² Bert Ely, "Savings and Loan Crisis," in *The Concise Encyclopedia of Economics*, ed. by David Henderson, 2nd edn. (Indianapolis, IN: Liberty Fund, 2008), pp. 459-63; Federal Deposit Insurance Corporation, *History of the Eighties—Lessons for the Future*, v. 1, *An Examination of the Banking Crises of the 1980s and Early 1990s* (1997), <http://www.fdic.gov/bank/historical/history/voll.html>; Marcia Stigum, *The Money Market*, 3rd edn. (Homewood, IL: Business One Irwin, 1990), pp. 387-90. My figure for total failures covers *both* commercial banks and thrifts (some accounts report only one or the other) from 1980 to 1992 and comes from the FDIC website, "Historical Statistics on Banking": <http://www2.fdic.gov/hsob/index.asp>.

agency issues jumped by another \$4 billion. Most of these increases were repurchase agreements, in which the Fed temporarily creates base money to buy securities that the dealer has agreed to buy back usually between one and fourteen days later (with interest added in). The Fed also opened the discount window, although its loans to banks only temporarily increased by a little over \$2 billion.¹³

The most serious danger from the stock market crash was centered in the investment banks, coincidentally the same institutions that have played such a notorious role in the financial crisis of 2007-2008. In 1987, investment banks were not yet engaging in the massive proprietary trading that caused recent difficulties. But their broker-dealer operations, specifically margin accounts, still depended heavily on loans to customers with money borrowed in turn from major New York and Chicago commercial banks. The lending banks became skittish, and if they had refused to roll over these call loans to the investment banks, the collapse of credit could have cascaded seriously. But Greenspan's prompt response ensured that securities loans at commercial banks actually went up during the crisis.¹⁴

At the same time, E. Gerald Corrigan, then president of the New York Fed, was making numerous calls to Wall Street players, leaning on the commercial banks to keep credit flowing. In addition to creating money, something else that the Fed has long done is lend, for very short durations, securities from its own portfolio to primary dealers (either commercial or investment

¹³ Probably the best study of Greenspan's handling of the 1987 stock market crash is Mark Carlson, "A Brief History of the 1987 Stock Market Crash with a Discussion of the Federal Reserve Response" (Federal Reserve Board, 2006), but also worth consulting are Bob Woodward, *Maestro: Greenspan's Fed and the American Boom*, expanded paperback edn. (New York: Simon & Schuster, 2001), pp. 36-49; Justin Martin, *Greenspan: The Man Behind the Money* (Cambridge, MA: Perseus, 2000), pp. 171-79; Steven K. Beckner, *Back from the Brink: The Greenspan Years* (New York: John Wiley & Sons, 1996), pp. 34-62; Alan Greenspan, *The Age of Turbulence: Adventures in a New World* (New York: Penguin Books, 2008), pp. 104-10; and "Statements and Comments of Alan Greenspan, Chairman of the Federal Reserve," "Black Monday": *The Stock Market Crash of October 19, 1987*, Senate Committee on Banking, Housing, and Urban Affairs, Hearing, 100 Congress, 1 Session (Washington: Government Printing Office, 1988). For a wildly sensationalist account, see James B. Stewart and Daniel Hertzberg, "How the Stock Market Almost Disintegrated a Day after the Crash," *Wall Street Journal* (November 20, 1987): 1. One can follow the change in the Fed's balance sheet during this period through its weekly H.4.1 releases, which are available online for download at <http://fraser.stlouisfed.org/statereleases/h41/1987/>.

¹⁴ The most convincing, detailed discussion of how the 1987 crash might have spiraled into a full-fledged panic is in Beckner, *Back from the Brink*, pp. 45-58.

banks) who provide other securities as collateral. Except for the interest paid by the borrowing dealer, this is essentially a barter transaction, in which securities briefly swap for other securities rather than for cash, leaving the impact on the monetary base neutral. After the crash, the Fed temporarily relaxed its restrictions on this type of security lending, by suspending per issue and per dealer limits as well as the requirement that the loans not facilitate a short sale.

So the Fed's actions during the 1987 crash were not a pure Friedmanite liquidity injection. Indeed, Greenspan considered the further step of loaning money directly to investment banks, something Bernanke would start doing in 2008. But this proved unnecessary as the crisis dissipated almost as quickly as it had emerged. The Fed's actions therefore left almost no noticeable imprint on any of the monetary measures, including the base and total reserves (in part because Treasury lending to the Fed in the form of Treasury deposits also went up temporarily at the same time). Some have even concluded that Greenspan's one-sentence announcement was alone sufficient to restore confidence, calming markets and averting panic. But the important point is that nothing the Fed did during the 1987 crisis involved or even hinted at a Bernankeite bailout of particular insolvent institutions.

Ironically the Y2K threat, arising from fear that computer programs were unequipped to handle the transition to the year 2000, made the biggest blip in the monetary measures, despite being the least remembered of the potential crises Greenspan faced. Y2K barely merits a few paragraphs in Greenspan's memoirs, and those relate only to the Fed's own computers and not to policy. Nonetheless, he was concerned "that people are going to draw too much out [of banks and other depositories], and walking around with a lot of hundred dollar bills is not the safest way to keep your money." Just a casual glance at Figure 1 shows Y2K's hefty impact on both the monetary base and on total bank reserves (not seasonally adjusted), one that was far larger than the regular Christmas run up of those two magnitudes. The base rose from \$551 to \$608 billion over three months before falling back to \$577 billion in March of 2001. Much of this spike was concentrated in reserves (properly measured), whose year-on-year growth rate started at 0 percent annually, peaked at 40 percent, and then fell down to negative 30 percent (as depicted in

Figure 2). All of this was orchestrated through open market operations using repurchase agreements. The Fed also established what it called a “Special Liquidity Facility,” so banks could borrow through the discount window without the usual stigma that then attached to doing so, and it even sold banks options on the future discount rate at which they could borrow, but neither of these measures proved necessary when Y2K fizzled into a non-event.¹⁵

Figures 1 and 2 display an equally dramatic although somewhat smaller increase in reserves following the terrorist attack of September 11, 2001 on the World Trade Center. The average monthly size of the base experienced a \$20 billion temporary increase, mostly concentrated in reserves, whose year-on-year growth rate rose from 0 percent up to 30 percent annually and then eventually, after the Christmas holidays, fell back down to negative 20 percent annually. This time the Fed relied more heavily on discount loans to banks, which soared from an average of \$200 million to \$45 billion on September 12. Greenspan recounts that this temporary credit extension was something “that the staff and the individual Federal Reserve banks were entirely capable of handling.” The 9-11 attack also witnessed an innovation that would reappear under Bernanke: currency swap lines with foreign central banks, but the amounts

¹⁵ Greenspan, *Age of Turbulence*, pp. 203-4. Former Governor of the Fed, Laurence H. Meyer, gives Y2K more attention in *A Term at the Fed: An Insider's View* (New York: HarperCollins, 2004), pp. 155-7. The Greenspan quotation comes from Jerome Tuccille (who served on Y2K task force for financial institutions), *Alan Shrugged: The Life and Times of Alan Greenspan, the World's Most Powerful Banker* (Hoboken, NJ: John Wiley & Sons, 2002), p. 245. The relevant Fed H.4.1 releases can all be found at <http://www.federalreserve.gov/releases/h41/>. The numbers that are the basis for Figures 1 and 2 come from the enormously convenient website of the St. Louis Federal Reserve, <http://research.stlouisfed.org/fred2/>. The monetary base is Board of Governors Monetary Base (monthly and not seasonally adjusted), Not Adjusted for Changes in Reserve Requirements: BOGUMBNS. Currency in circulation is the Currency Component of M1 (monthly and not seasonally adjusted): CURRNS. I have subtracted the latter from the former to get total reserves.

As David R. Henderson and I pointed out in “Greenspan’s Monetary Policy in Retrospect: Discretion or Rules?” *Cato Institute Briefing Paper*, no. 109 (November 2008), all of the officially reported measures of bank reserves are deficient: “those compiled by the St. Louis Fed are adjusted for changes in reserve requirements, whereas those compiled by the board of governors exclude any excess reserves held in the form of vault cash, all required clearing balances, and Fed float. (You can find this critical detail only in the footnotes of the Fed’s H.3 release.) For some idea of how massive the resulting distortion can be, consider December 2007. The Board of Governors reported total reserves (monthly, not seasonally, adjusted, and not adjusted for changes in reserve requirements) of \$42.7 billion. If you add in vault cash not covering reserve requirements, that number jumps to \$60.3 billion. And when you bring in required clearing balances and float, the number rises to \$72.6 billion, 70 percent greater than the board’s estimate. If the distortion were consistent across time, the board’s reserve totals would still tell us something. But the distortion is not close to consistent across time, in part because banks increasingly used vault cash in their ATMs.” Recently one of our graduate students, Justin Dean Rietz, has compared our estimates of total reserves as calculated above with estimates based on adding together bank deposits at the Fed, total vault cash, and service related balances from the weekly H.3 and H.4.1 releases. He found the two estimates comparable.

ultimately involved were small and the swap lines expired after thirty days. Meanwhile, when the stock market reopened on Monday, September 17, trading was orderly.¹⁶

Of course, no one can know with certainty what might have happened to the financial system or the economy without Greenspan's three liquidity interventions. It is possible that none were necessary, particularly his preparations for Y2K. The recent unexpected fragility of the financial system, however, when faced with what seemed like containable losses from subprime mortgages, certainly raises the prospect that full-fledged financial panic may have ensued in one or more of these cases without the Fed action. Whether necessary or not, all three constituted sudden, general injections of base money into the financial system that were just as quickly unwound. Even when flowing through the discount window, none of the liquidity was aimed *specifically* at any institution facing insolvency.

Greenspan's only significant deviation from the Friedman formula came before 9-11 and Y2K, when he permitted the head of the New York Fed—William McDonough at that time—to “godfather,” in Greenspan's word, a private bailout of Long-Term Capital Management (LTCM) after the Russian sovereign default of August 1998. Although no Federal Reserve or taxpayer money was involved, this represented a portentous signal to send to the financial community, encouraging moral hazard. For the first time, “too-big-to-fail” was applied to a non-depository institution, uncovered by deposit insurance. LTCM was not a commercial bank, which the Fed normally oversees, nor was it an investment bank, which were still at this time outside the Fed's province, nor was it even a money market fund, which despite also being beyond the Fed's purview at least affects the money stock. LTCM was a hedge fund, whose shares were legally

¹⁶ Greenspan, *Age of Turbulence*, pp. 4-5, and Meyer, *A Term at the Fed*, pp. 183-4. See also Greg Ip and Jim VandeHei. “Economic Front: How Policy Makers Regrouped to Defend The Financial System,” *The Wall Street Journal*, (September 18, 2001): A1. These central-bank currency swaps are covered in Dino Kos, “Treasury and Federal Reserve Foreign Exchange Operations.” *Federal Reserve Bulletin*, 87 (December 2001): 757-62. (From the 1960s through 1998, the Fed had earlier standing swap lines with several central banks, but their purpose was to facilitate foreign-exchange intervention rather than to provide liquidity. Most of these older swap lines were phased out by mutual agreement in 1998, although Canada and Mexico retained small swap lines under the auspices of the North American Free Trade Agreement.) Again, the relevant Fed H.4.1 releases can all be found at <http://www.federalreserve.gov/releases/h41/>.

confined to very wealthy individuals because of the risky investments the fund might undertake. If central bankers felt it necessary to step in to forestall the failure of a fund so seemingly unrelated to the Fed's traditional orbit, then creditors of other financial institutions surely could conclude that they might depend on being bailed out if their investments went sour in the future.¹⁷

Indeed, government assurances may have already been at work in a small way. David Mullins, Jr., previous Vice Chairman of the Fed, was a major LTCM partner. Warren Buffett of Berkshire Hathaway was, on his own initiative, offering \$4 billion for the fund, but the partners rejected the unattractive offer. They were the ones who had alerted McDonough at the New York Fed to LTCM's difficulties and were now aware that he was backstopping Buffett's offer, calling together the parties to the rescue deal that ultimately went through. Greenspan privately did not fully agree with McDonough's assessment of the potential risk from an LTCM failure and felt that McDonough's brokering of the bailout was too aggressive, but publicly Greenspan made a show of solidarity with his subordinate. Perhaps just as bad as the signal that this Fed intervention sent to private creditors is the precedent it set for financial regulators like Bernanke. A gross violation of the Friedman formula could now be credited with averting a financial collapse, whether it actually had or not, reinforcing the perceived necessity for similar targeted bailouts in the future.¹⁸

III. Bernanke: Phase One

Ben S. Bernanke became chairman of the Federal Reserve Board on February 1, 2006.

¹⁷ Greenspan, *Age of Turbulence*, p. 192; Meyer, *A Term at the Fed*, pp. 112-18; Tyler Cowen, "Bailout of Long Term Capital: A Bad Precedent?" *New York Times*, (28 December 2008): BU5. Ch. 10 of Roger Lowenstein, *When Genius Failed: The Rise and Fall of Long-Term Capital Management* (New York: Random House, 2000) contains the standard account of the Fed involvement.

¹⁸ Woodward, *Maestro*, pp. 197-209, suggests that the partners rejected Buffett's offer because they knew he would oust them. Lowenstein, *When Genius Failed*, 201-3, believes the rejection hinged on legal difficulties with the offer. Be that as it may, the fact that the partners knew the New York Fed was coming to the rescue made it easier to reject Buffett's offer, rather than try to negotiate improvements.

His subsequent response to the financial crises of 2007-2009 went through two phases. The first phase began in the fall of 2007, when it became apparent that rising mortgage defaults were having serious systemic effects. Up until then, many if not most economists had concluded that potential subprime losses would be no larger and have no more macroeconomic downside than the losses from the S & L crisis of the 1980s. As late as May 17, 2007, Bernanke was predicting “that troubles in the subprime sector on the broader housing market will likely be limited, and we do not expect significant spillovers from the subprime market to the rest of the economy or to the financial system.” The second phase of Bernanke’s policies was initiated in September 2008, at the same time that he and Secretary of the Treasury Henry Paulson decided to scare hell out of the American people in order to gain passage of what became the Troubled Asset Relief Program (TARP). To fully understand these two phases, both their similarities and differences, we need to make a brief excursion into the events culminating in the crisis.¹⁹

We now know from the research of Gary Gorton that what generated the widespread systemic repercussions of the mortgage defaults was a panic beginning in August of 2007, and its epicenter was investment banking.²⁰ The nature of investment banks had changed significantly during the new century. In the past they had served primarily as underwriters, brokers, and dealers—that is, facilitating the transfer of financial securities between two other parties. Insofar as they owned securities themselves, it was predominately in conjunction with those functions. Back in 1994, the total financial assets of all investment banks, as reported in the Fed’s flow of

¹⁹ Ben S. Bernanke, “The Subprime Mortgage Market,” speech at the Federal Reserve Bank of Chicago’s 43rd Annual Conference on Bank Structure and Competition (May 17, 2007): <http://www.federalreserve.gov/newsevents/speech/bernanke20070517a.htm>.

²⁰ Gary B. Gorton, “The Panic of 2007,” Prepared for the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, Symposium (August 21-23, 2008): http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1255362, reprinted in *Maintaining Stability in a Changing Financial System* (Kansas City: Federal Reserve Bank of Kansas City, 2009); Gorton, “The Subprime Panic,” *European Financial Management*, 15 (January 2009): 10-46; Gorton, “Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007,” Prepared for the Federal Reserve Bank of Atlanta’s 2009 Financial Markets Conference (May 2009), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1401882; Gorton and Andrew Metrick, “Securitized Banking and the Run on the Repo,” Yale ICF Working Paper No. 09-14 (November 2009); and Gorton, *Slapped by the Invisible Hand: The Panic of 2007* (Oxford: Oxford University Press, 2010). For an accessible summary of this research, see Gorton, “Questions and Answers about the Financial Crisis,” Prepared for the U.S. Financial Crisis Commission (February 2010), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1557279.

funds accounts, was less than \$500 billion, as compared with more than \$4 trillion for commercial banks. But over the next decade investment banks began acquiring ever larger amounts of various securities on their own balance sheets, in what is called proprietary trading, transforming these institutions into major financial intermediaries. By 2007 they held over \$3 trillion in assets, a sixfold increase that made them collectively bigger institutions than such conventional intermediaries as thrifts, money market funds, or finance companies. And this total does not include any hedge funds managed by investment banks, whose assets are classified by the flow of funds accounts within the household sector. Over the same period the assets of commercial banks had increased less than half as much, to \$11 trillion.²¹

Investment banks still financed some of their expanded balance sheets with borrowing either from customer accounts or through bank loans. But over \$1 trillion worth of their funds came from repurchase agreements (RPs or repos). Although repos technically involve exchanging a security for cash, then reversing the transaction, they can also be thought of as short-term borrowing, frequently overnight, with the underlying security pledged as collateral. In other words, just like commercial banks and thrifts, investment banks were now borrowing short to lend long, in what has been designated the “shadow banking system.” Nearly all of this borrowing was either from abroad or from large institutional investors within the financial sector, especially money market mutual funds. Moreover, while repos were once conducted predominately with Treasury securities, they now were collateralized with almost any marketable instrument, including complex securitized debt.

Commercial banks have also relied on repos as a source of funds, and in fact employed

²¹ Quarterly *Flow of Funds Accounts of the United States*, from mid-1996 on forward, are available here: <http://www.federalreserve.gov/releases/z1/default.htm>. Most investment banks are listed as “Security Brokers and Dealers.” For earlier reports, go to <http://www.federalreserve.gov/releases/z1/Current/data.htm>. The term “investment bank” is sometimes distinguished from security brokers and dealers, either to refer to firms that concentrate on underwriting (the brokering and dealing of securities when they are first issued) or to the financial holding companies that own broker-dealer subsidiaries. I am using the term in its broadest sense, to encompass the entire sector, including those investment banks or broker-dealers that are subsidiaries of banks or bank holding companies. This coincides with the flow of funds category of “Security Brokers and Dealers,” except for nonbank financial holding companies, which are put into the “Funding Corporations” category. Adding the latter potentially increases the size of the investment-banking sector by another trillion dollars or more in 2007, but these holding companies do not themselves appear to employ repurchase agreements to raise funds, at least not on net.

them extensively in the late 1970s and early 1980s, during a period of high interest rates, to get around interest ceilings on bank deposits. A bank, for example, might convert a million-dollar checking account (on which even today it cannot pay interest to corporate businesses) into an overnight loan secured by a Treasury bill (on which it could pay interest) and then the next day convert this repo back into an account with full check-writing privileges and the interest added in. As a result, the overnight repos *of commercial banks* were counted as money in M2, and their term repos in M3. Declining importance of this ploy with declining nominal interest rates was one factor that contributed to the Fed moving overnight repos from M2 to M3 in 1997, and then the Fed discontinued reporting M3 in March of 2006.²²

Investment bank repos were never counted in the monetary measures, and no one knows precisely how big this market became before August 2007. The flow of funds accounts put total repos for *all* institutions at nearly \$2.4 trillion, but that is net of any repo loans between one commercial bank and another or between one investment bank and another. Thus, the net total fails to capture interbank lending through repos, which provided investment banks with their own analog to the Federal funds market (the market where commercial banks and other depositories can loan each other reserves). Some financial institutions were even making what are called “matched book” repos, two transactions where they lend money on the asset side in exchange for a security which they then use as collateral to borrow money on the liability side. As a result, the same underlying security could be used as collateral several times, in a process called “rehypothecation.” Although Gorton has suggested that the gross size of the repo market may have reached \$12 trillion, that estimate involves some double counting of both the asset and liability side of single transactions. An article by Peter Hördahl and Michael R King puts the peak total closer to \$6 trillion, with the amount arising from investment banks, both within the

²² Marcia Stigum and Anthony Crescenzi, *Stigum's Money Market*, 4th edn. (New York: McGraw Hill, 2007), is the definitive reference on repurchase agreements. Older editions, by Stigum alone and entitled *The Money Market*, contain some details about practices that have since changed. A terminological anomaly: for banks or other private institutions, the repurchase agreement is the liability of the borrower and the reverse repurchase agreement is the asset of the lender; for Federal Reserve, this terminology is the opposite: a repurchase agreement is an asset, and a reverse repurchase agreement is a liability.

sector and with institutions outside the sector, accounting for two-thirds of the total. This estimate for investment banks roughly agrees with those reported by the Securities Industries and Financial Markets Association and the Securities and Exchange Commission.²³

Defaults on mortgages were already rising by mid 2006, and then in June of 2007 Moody's began downgrading its ratings on asset-backed securities containing subprime mortgages, while two Bear Stearns-managed hedge funds that had invested heavily in such securities were in danger of shutting down. These growing solvency problems turned into a liquidity run on investment banks, as the repo market began to contract in August (see Figure 3). Between the third and fourth quarter of 2007, the total amount of *net* repos fell by over \$200 billion, most of which represented borrowing by investment banks. The run continued into 2008, as investment bank repos fell by another \$550 billion. If you also count the additional repo transactions between two different investment banks, another trillion dollars worth had disappeared. As a result, total financial assets of investment banks declined by almost as much. Some of this decline represents genuine losses from bad investments, of course, but much of it was induced by vanishing liquidity.²⁴

The panic also affected another type of short-term borrowing by financial institutions: asset-backed commercial paper. Stand-alone investment bank *holding companies* (i.e., those unconnected with commercial banks) not only relied on borrowing through this source but also so did another major part of the shadow banking system: structured investment vehicles (SIVs). Set up by commercial banks, which had been encouraged by the Basel capital requirements to securitize mortgages, SIVs were bank subsidiaries that issued their own debt of varied maturities

²³ Peter Hördahl and Michael R King, "Developments in Repo Markets during the Financial Turmoil," *BIS Quarterly Review*, (December 2008): 37-53; Securities Industries and Financial Markets Association, *Research Report*, 4 (May 2009): 10; U.S. Securities and Exchange Commission, *Select SEC and Market Data Fiscal 2009* (<http://www.sec.gov/about.shtml>), p. 24. See also Tobias Adrian, Christopher R. Burke, and James J. McAndrews, "The Federal Reserve's Primary Dealer Credit Facility," Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, 15 (December 2009): http://www.newyorkfed.org/research/current_issues/ci15-4.html.

²⁴ For the Fed's *Flow of Funds Accounts*, I have calculated all changes in assets or liabilities from the level tables rather than the flow tables. The two do not always coincide, because the flow tables omit changes in market value.

to purchase assorted mortgage-backed securities and other financial products. Only about 20 percent of their \$4.5 trillion worth of assets was funded by commercial paper, but when added to the commercial paper issued by the investment-banking sector, the total outstanding had reached \$1.2 trillion by mid 2007. As depicted in Figure 3, after the August panic hit, this market also collapsed. Evidence of the panic in these two markets was most visible in the rise of various interest-rate spreads that measure risk. The haircuts off the face value of the underlying securities for certain repo loans began to rise; the spread between the London Interbank Offered Rate and the overnight index swap rate (Libor-OIS) increased by a full percentage point; and the Treasury-Eurodollar (TED) spread jumped by nearly 2 percentage points.²⁵

So what was the Fed's response in Phase One of Bernanke's policies? At first glance, it might appear to be a Friedmanite liquidity injection. Back in January 2003, the Fed had altered its policy with respect to discount loans to banks. Instead of setting the discount rate below the Fed's target for the Federal funds rate and rationing its lending, the Fed began setting the discount rate slightly above the Federal funds target and permitting unlimited short-term borrowing without any stigma. But the higher discount rate, relative to the rate at which banks could borrow reserves from each other, prevented this change from having any noticeable effect on total borrowing, which remained a trivial part of the Fed's balance sheet, ranging between \$30 and \$400 million, or always less than 1 percent of total assets. In reaction to the panic, the Fed announced on August 17, 2007, that it was bringing down the spread between the two rates and allowing banks to borrow for as long as 30 days (later extended to 90 days). Finally in December of that year, Bernanke created the Term Auction Facility (TAF) to provide additional

²⁵ Matthew J. Eichner, Donald L. Kohn, and Michael G. Palumbo, "Financial Statistics for the United States and the Crisis: What Did They Get Right, What Did They Miss, and How Should They Change?" Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board (April 2010), which is also the source for Figure 3. The Fed's *Flow of Funds Accounts* tracks SIVs under the category "Issuers of Asset-Backed Securities," which excludes government agencies and government-sponsored enterprises. Asset-backed commercial paper is not reported directly, but it approximates the total of commercial paper reported as issued by ABS issuers and funding corporations. On the early unfolding of the crisis, see Paul Mizen, "The Credit Crunch of 2007-2008: A Discussion of the Background, Market Reactions, and Policy Responses," *Federal Reserve Bank of St. Louis Review*, 90 (September/October 2008): 531-67.

funds to banks for periods of up to 84 days. Unlike the discount window, where the Fed sets the interest rates and the banks decide how much to borrow, under the Term Auction Facility, the Fed sets the amount to be borrowed and the banks, through auction, determine the interest rate. The Fed simultaneously reinstated currency swaps with foreign central banks.

By the summer of 2008 lending to banks through the Term Auction Facility had climbed to \$150 billion, and discounts added another \$18 billion. Other things equal, this lending would have brought about a substantial bulge in the monetary base. But other things were not equal. For *pari passu*, Bernanke was pulling money out of the economy by selling Treasury securities. Consequently during the year ending in August 2008, the monetary base had increased less than \$20 billion, a mere 2.24 percent, which was well below its average annual growth of 7.54 percent during Greenspan's nineteen years in charge. Moreover, nearly all of the increase was in the form of currency in circulation. Total reserves during the first year of the crisis had risen from \$72.4 to \$73.0 billion, less than a percent. As for the broader measures of money, the annual growth rate of M1 rose somewhat, the growth rate of M2 fell a tad, and that of MZM was volatile around a roughly constant average (see Figure 4). Bernanke was not injecting liquidity, just redirecting it.

This complete sterilization of new Fed loans applied equally to the other initiatives it created before Bernanke's Phase Two kicked in, as depicted in Figure 7. Justified by the final failure of Bear Stearns, the Primary Dealer and Other Broker-Dealer Credit Facility (PDCF) and the Term Security Lending Facility (TSLF) were both set up in March 2008 (and both terminated two years later). The former basically extended discount loans to investment banks generally, while the latter lengthened the time that dealers could borrow securities from the Fed in exchange for other securities. Allowing dealers to temporarily swap their riskier assets for Treasuries made it easier for them borrow cash from other lenders in the repo market. Despite the fact that these two facilities greatly expanded the Fed's dealings with investment banks, they occupy the hazy boundary between Friedmanite and Bernankeite interventions. Even traditional open market operations conducted with repurchase agreements can admittedly be construed as

short-term Fed loans to primary dealers. This ambiguity, however, does not apply to the direct bailout of Bear Stearns in the same month, channeled through a limited-liability company dubbed Maiden Lane and set up under the New York Fed.²⁶

The monetary historian Michael Bordo questioned Bernanke's practices at the time. At the annual symposium of the Kansas City Fed in Jackson Hole, Wyoming, during late August of 2008, he pointed out: "The oddest part of the creation of these new discount window loans is that they are sterilized." Implicitly invoking the theoretical disparity between Friedman and Bernanke, Bordo further wondered "why this complicated method of providing liquidity has been introduced when the uncomplicated system of open market operations is available." The latter would leave "the distribution of liquidity to individual firms to the market," whereas the new facilities "exposed the Fed to the temptation to politicize its selection of recipients of its credit." Overall, we can say that Phase One represented an innovative, bold, and unproven attempt to stem on onrushing financial panic, and it utterly failed.²⁷

Given Bernanke's awareness of the growing crisis, why indeed did he preclude even a modest, short-term, reversible blip in the monetary base or reserves? Part of the answer probably involves his infatuation with inflation as the proper, long-run central-bank target. Through 2007 into 2008, people were quite concerned about rising commodity prices worldwide, particularly the price of oil. Driven to a large extent by increasing international demand, these hikes in certain relative prices represented a minor supply shock to the U.S. economy. Inflation targeting

²⁶ Descriptions of all the additional facilities created by the Fed during both of Bernanke's phases can be found at both the Board of Governors website, <http://www.federalreserve.gov/monetarypolicy/default.htm>, and the New York Fed website, <http://www.newyorkfed.org/markets/index.html>. For good summaries of how these facilities affected the Fed's balance sheet, see William T. Gavin, "More Money: Understanding Recent Changes in the Monetary Base," *Federal Reserve Bank of St. Louis Review*, 91 (March/April 2009): 49-59; and John Carlson, Joseph G. Haubrich, Kent Cherny, and Sarah Wakefield, "Credit Easing: A Policy for a Time of Financial Crisis," *Federal Reserve Bank of Cleveland, Economic Trends* (November 11, 2009), <http://www.clevelandfed.org/research/trends/2009/0209/02monpol.cfm>.

²⁷ Michael D. Bordo, "Commentary: The Subprime Turmoil: What's Old, What's New and What's Next," Remarks for the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, Symposium (August 21-23, 2008), reprinted in *Maintaining Stability in a Changing Financial System*, p. 118. See also Bordo, "The Crisis of 2007: The Same Old Story, Only the Players Have Changed," Remarks prepared for the Federal Reserve Bank of Chicago and International Monetary Fund Conference: Globalization and Systemic Risk, Chicago (September 28, 2007), available at <http://sites.google.com/site/michaelbordo/home32>.

does not deal well with supply shocks, because to the extent that the central bank tightens to suppress rising prices, it will exacerbate any negative impact on output and unemployment. On top of that, the positive impact on prices of a supply shock will partly disguise the negative impact from any velocity or monetary shock. Bernanke did not tighten as much as the European Central Bank did at the time, but his aversion to inflation left little room for a genuine liquidity injection.²⁸

One might argue that since all of the broader monetary measures continued to grow at varying rates, pumping up base money was not the Fed's proper response. But because neither repos nor commercial paper were counted in any of the monetary measures, the contraction of those markets was not showing up as a fall in the money stock but as an increase in money demand. The panic therefore witnessed drastic declines in velocity, as Figure 5 illustrates. If Bernanke was going to prevent nominal GDP from also declining, with its attendant fall in output, he needed to offset the negative velocity shock with monetary expansion. It is no coincidence that this is the exact policy that Scott Sumner, in his influential economics blog, *The Money Illusion*, has been stubbornly insisting should have been implemented to avoid the economic downturn. Surprisingly, it also a policy that Bernanke should have automatically implemented if he really took seriously his supposition that the credit channel works its havoc through velocity rather than through aggregate supply.²⁹

IV. Bernanke: Phase Two

All hell broke loose in September of 2008, a little over a year after the panic had

²⁸ Janet L. Yellen, "The U.S. Economic Situation and the Challenges for Monetary Policy," Federal Reserve Bank of San Francisco, *Economic Letter*, no. 2008-28-29 (September 19, 2008): 3. An Austrian advocate of free banking who agrees that prices should be permitted to rise with a supply shock is George Selgin. See his *Less than Zero: The Case for a Falling Price Level in a Growing Economy* (London: Institute of Economic Affairs, 1997).

²⁹ Velocity is calculated by dividing the relevant monetary measure into nominal GDP. These estimates, the basis for Figure 5, are somewhat crude, given that official GDP is reported only quarterly and seasonally adjusted, while the money stock figures used are monthly and not seasonally adjusted. Scott Sumner's blog, *The Money Illusion*, is at <http://www.themoneyillusion.com/>. See also Hetzel, "Monetary Policy in the 2008-2009 Recession."

commenced. The investment bank of Lehman Brothers went bankrupt; the government-sponsored mortgage agencies, Fannie Mae and Freddie Mac, were nationalized; a major money market fund, Primary Reserve Fund, “broke the buck” in industry parlance, meaning that it could no longer redeem its shares for a dollar; and the enormous thrift holding company, American International Group (AIG), whose primary subsidiaries sold insurance, was unable to post the requisite collateral against its credit default swaps guaranteeing assorted securities. These developments were all manifestations of the ongoing collapse in the repo and commercial paper markets. The average haircut on repos for securitized debt spiked to 25 percent, the Libor-OIS spread reached 3.5 percentage points, and the TED spread approached 6 percentage points. Each of these spreads had been close to zero before August of the previous year. As a result, Bernanke hit the panic button on September 17 and inaugurated Phase Two of his crisis response.³⁰

Along with the TARP, in which Congress appropriated \$700 billion for targeted bailouts to be managed and funded by the Treasury Department, the most obvious feature of Phase Two was an unprecedented expansion of the monetary base, which doubled over a mere four months, from \$850 billion to \$1.7 trillion (Figure 6). Nearly all of this increase was in bank reserves, whose year-on-year growth rate peaked at astonishing rate of 1200 percent annually. The increase in the Fed’s balance sheet was even greater, reaching \$2.2 trillion, for reasons we will explore below. By the time this expansion had tapered off, M1 was backed by more than 100 percent reserves. It would seem hard to deny that this response represented a massive liquidity injection. Yet all was not quite as it seemed.

The key to what Bernanke was doing was revealed earlier in 2008, when Fed officials began floating the idea of gaining authorization for the Fed to borrow money with its own securities. The Fed was running out of Treasury securities that it could sell to sterilize its targeted bailouts. Its holdings (not counting those acquired through repurchase agreements) had dropped from \$790.6 billion on July 12, 2007, constituting 90 percent of its balance sheet, to \$479.8

³⁰ For a detailed journalistic account of this period, see James B. Stewart, “Eight Days: The Battle to Save the American Financial System,” *The New Yorker*, 85 (September 21, 2009): 58-81.

billion on September 11, 2008, constituting 52 percent of its balance sheet. Moreover, \$118 billion of the remainder was tied up in loans to dealers in exchange for other securities. If the Fed could market its own debt, it would be able increase its total assets without affecting the monetary base. Its borrowings would simply pull money out of the economy on one end of its balance sheet, and that money could be put back in on the other end through loans to favored firms and purchases of favored instruments. Notice how this is exactly the policy implied by Bernanke's analysis of the Great Depression. If the concern is that failing intermediaries will harm the economy mainly through the credit channel, then the goal is to subsidize them independently of what is happening to the money stock.³¹

The Fed in fact was already doing some borrowing indirectly. One insignificant way was through Maiden Lane, the Fed's very own SIV, set up to rescue Bear Stearns. As a subsidiary of the New York Fed, Maiden Lane had some liabilities that constituted funds not provided by the Fed. So Bernanke followed the same pattern after the explosion of the monetary base, creating four more limited-liability companies. Maiden Lane II and III, established in November and December of 2008, were major parts of the AIG bailout. The Commercial Paper Funding Facility (CPFF), established in October 2008 and terminated in February 2010, purchased commercial paper. And the Money Market Investors Funding Facility (MMIFL), established in October 2008, was never actually employed. The Fed, however, provided the bulk (when not all) of the money to these subsidiaries, whose other sources of funds never amounted to more than a few billion dollars.

Far more significant a beneficiary of indirect Fed borrowing was the currency swaps with

³¹ Greg Ip, "Fed Weighs Its Options in Easing Crunch," *Wall Street Journal* (April 9, 2008): A1; <http://online.wsj.com/article/SB120768896446099091.html>; Ip, "What Could the Fed Do?" *Wall Street Journal Blogs* (April 9, 2008), <http://blogs.wsj.com/economics/2008/04/09/what-could-the-fed-do/?mod=WSJBlog>; and Janet Yellin, "President's Speech," Federal Reserve Bank of San Francisco (March 29, 2009), <http://www.frbsf.org/news/speeches/2009/0325.html>. Friedman, in *A Program for Monetary Stability*, pp. 34, 52-57, also once suggested that the Fed be granted "power to issue its own securities," but *not* for the purpose of buying other securities on the market but instead as a means of reducing the money stock in case the Fed ran out of government securities to sell. Concerned about the impact that the Treasury had on the money stock either through issuing its own base money (as with coins) or through issuing securities and then depositing the proceeds at the Fed, which Friedman recognized would contract base money, his ultimate *economic* solution was to merge the Treasury and Fed, eliminating Fed independence.

foreign central banks, mentioned above. By the beginning of 2009 swaps, which were coordinated with the U.S. Treasury's Exchange Stabilization Fund, had soared to more than half a trillion dollars. Yet much less than half of that total was financed by Fed money creation. The Treasury Department created a supplementary financing account that issued as much as \$400 billion worth of securities *not* for the purpose of financing government expenditures; instead the money was deposited at the Fed. In essence, the Treasury was borrowing money from the general public and lending it to the Fed, which then lent it to foreign central banks. The Treasury through its deposits at the Fed withdrew money from circulation, while the Fed's purchase of foreign currencies put it back in to circulation. The foreign currencies acquired as assets therefore showed up on the Fed's balance sheet but made no net contribution to the monetary base. These Treasury deposits explain why the increase of the balance sheet so greatly exceeded the increase of the base.³²

Another source of divergence between the Fed's balance sheet and base money was some direct borrowing through more extensive *reverse* repurchase agreements, in which the Fed uses its Treasury securities as collateral to secure short-term loans. In the past, this device was conducted almost exclusively with foreign central banks, and the amounts had run as high as \$20 billion. But by late 2008, the Fed owed through reverse repurchase agreements a total of \$25 billion *domestically* to primary dealers, and as it repaid those loans, it went into debt for up to \$90 billion from foreign central banks.³³

But the most important way that the Bernanke Fed began borrowing and continues to do so is indirect and largely unrecognized: by paying interest to banks on their reserves. The Fed

³² Jeffrey Rogers Hummel, "Recent Fed Machinations," *Liberty & Power: Group Blog* (October 25, 2008), <http://hnn.us/blogs/entries/56095.html>; Hummel, "Is the Fed Reining Back," *Liberty & Power: Group Blog* (January 26, 2009), <http://hnn.us/blogs/entries/60613.html>; Hummel, "Update on the Fed," *Liberty & Power: Group Blog* (February 2, 2009), <http://hnn.us/blogs/entries/61061.html>.

³³ Prior to December 2002, the Fed's H.4.1 Release treated its reverse repurchase agreements as "matched-sale purchase agreements," and so netted them out from the balance sheet, subtracting the amount from the asset side rather than adding it to liability side. Thus, instead of increasing the balance sheet's size, the amounts involved were listed in a footnote.

was originally scheduled to gain this power in 2011, but on May 13, 2008, Bernanke sent a letter to House Speaker Nancy Pelosi asking for an immediate authorization. Permission was therefore included in the TARP act, and the Fed implemented the power within days. To be fair, other central banks, including the European Central Bank, were already paying interest on reserves to help them hit their interest-rate targets, and even Friedman had once advocated this step, to facilitate the imposition of 100-percent reserves. Potential justifications for this policy are several.³⁴

Nonetheless, many have come to recognize that interest-earning reserves have encouraged banks to raise their reserve ratios rather than expand their loans to the private sector. The rate that the Fed pays started out as high as 1.40 percent on required reserves and 1.00 percent on excess reserves, but is now fairly low on both: 0.25 percent. Yet so are the alternatives available to the banks, especially after adjusting for risk. It is the gap between these rates that determines the incentive for individual banks to hang on to reserves. The interest on three-month Treasury bills remains lower, and both T-bills and reserves are assets that impose no legally mandated capital requirements on banks. Furthermore, an equally valid way to think about paying interest on reserves is that, by doing so, the Fed has made itself the preferred destination for a lot of bank lending. Bernanke in effect created money and then borrowed it back from the banks by paying them interest. The banks in turn partly financed their implicit loans to the Fed by reducing loans to the public by almost \$500 billion as of the last quarter of 2009. Thus, the result is partly a net wash, with a shuffling of assets from the private sector to the Fed.³⁵

³⁴ Greg Ip, "Bernanke Asks Congress to Accelerate Authority to Pay Interest," *Wall Street Journal Blogs* (May 16, 2008), <http://blogs.wsj.com/economics/2008/05/16/bernanke-asks-congress-to-accelerate-authority-to-pay-interest/>. Jeffrey Rogers Hummel, "Interest on Bank Reserves and the Recent Crisis," *Liberty & Power: Group Blog* (October 13, 2008), <http://hnn.us/blogs/entries/55621.html>; Hummel, "Paradoxes of Paying Interest on Reserves," *Liberty & Power: Group Blog* (December 10, 2008), <http://hnn.us/blogs/entries/58090.html>; George Selgin, "Wholesale Payments: Questioning the Market-Failure Hypothesis," *International Review of Law and Economics*, 24 (2004): 333-350; Friedman, *A Program for Monetary Stability*, pp. 69-75.

³⁵ The decline in bank lending, taken from the Fed's *Flow of Funds Accounts*, is for the commercial banking sector only and does not include savings institutions. It is based on totals for mortgages, consumer credit, security credit,

Not all bank reserves earn interest—only those reserves held as deposits at the Fed. A bank’s vault cash earns nothing, but vault cash currently amounts to only a little over \$50 billion, less than total reserves before Bernanke launched Phase Two. What this means is that the payment of interest on reserves was tantamount to borrowing back from depositories the full \$800 billion increase in reserves, and more. No wonder the impact of the base explosion on the broader monetary measures (except for M1) was so muted. Today in fact, the growth rates of M1, M2, and MZM are all declining. So Phase Two’s seeming massive injection of liquidity turns out to be not much of a liquidity injection at all.³⁶

Who were the recipients of the funds the Fed was assiduously borrowing? In addition to the limited-liability subsidiaries and currency swaps already discussed, Bernanke created two other new facilities: the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), in operation between October 2008 and February 2010, and the Term Asset-Backed Securities Loan Facility (TALF), initiated in November 2008 to work in conjunction with the Treasury’s TARP subsidies and still in operation. But the bulk of the money went to four other uses. First, lending to depositories through the Term Auction Facility doubled to half a trillion before falling back down to zero in mid-2010. Second, the Fed restored its holdings of Treasury securities to approximately the same dollar level it held before the panic began in August 2007, but with a much heavier proportion of long-term Treasury notes and bonds in its portfolio, as compared with short-term Treasury bills.

The third major asset in the Fed’s new bloated balance sheet became securities issued by such Federal agencies as Fannie and Freddie. Up until the early 1980s, the Fed had frequently purchased small quantities of Federal-agency securities when conducting open market

and loans not elsewhere classified. It does not include bank holdings of securities, including securitized mortgages, which remained roughly constant anyway.

³⁶ Figures on vault cash are available from the Fed’s weekly H.3 Release: <http://www.federalreserve.gov/releases/h3/>. For a virtual admission that the Fed’s goal was *not* a liquidity injection, see Todd Keister and James J. McAndrews, “Why Are Banks Holding So Many Excess Reserves?” Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, 15 (December 2009): http://www.newyorkfed.org/research/current_issues/ci15-8.html.

operations, and after that it still continued to use them in its repurchase agreements. By March 2010, however, its holdings of these securities had reached almost \$170 billion. Finally, the fourth major and now largest asset on the Fed balance sheet is mortgage-backed securities, over a trillion dollars face value as of March 2010. Although the Fed had never purchased this particular type of security before January 2009, even this operation is not entirely without precedent. Up through 1984 the Fed had actually purchased a type of private securities known as bankers' acceptances, essentially bank-guaranteed private debt, which had figured quite prominently in open market operations during the 1920s and 1930s.

With this barrage of sometimes seemingly incremental steps when viewed individually, an amped-up Fed was bailing out such firms as Bear Stearns and AIG, assisting the Treasury with its TARP subventions, lending extensively to a new array of institutions including investment banks and money market funds, and purchasing large amounts of such new financial instruments as commercial paper and mortgage-backed securities. Over half of that activity was financed not by issuing true base money but by borrowing from the private sector, directly or indirectly, in one way or another. This is how Phase Two of Bernanke's policies transformed the Federal Reserve from a central bank confined primarily to managing the money supply into an institution that is also a giant, government intermediary that borrows large sums in order to allocate credit. In that respect, it has become similar to Fannie or Freddie, with the important distinction that that the Fed has greater discretion in subsidizing a wider variety of assets.

Bernanke's intention to continue down this path became apparent on April 30, 2010, when the Fed announced creation of the Term Deposit Facility (TDF). This is a mechanism through which banks can convert their reserve deposits at the Fed (which are just like Fed-provided, interest-earning checking accounts for banks) into deposits of fixed maturity at higher interest rates set by auction (which will be just like Fed-provided certificates of deposit for banks). Although the Fed so far has tested term deposits amounting to only a few billion dollars at maturities ranging from 14 to 84 days, term deposits make the Fed's borrowing more explicit. They also permit Bernanke to drop (at least for now) seeking permission for the Fed to issue its

own securities. In his July 2010 testimony before Congress he confided that “the Federal Reserve is putting in place the capacity to conduct large reverse repurchase agreements with an expanded set of counterparties. Second, the Federal Reserve has tested a term deposit facility, under which instruments similar to the certificates of deposit that banks offer their customers will be auctioned to depository institutions.” Both of these are ways for the Fed to maintain its hefty support of various financial markets without recourse to changes in the money stock.³⁷

In sum, Phase One and Phase Two of Bernanke’s policies turn out to be only slight variations on the same theme. Almost nothing that the Fed did during either phase can be accurately described as an effort to stimulate, or even stabilize, aggregate demand. Whatever the ostensible rationale, everything ended up being a supply-side intervention designed to prop up failing financial institutions. Helicopter Ben talks a good line about being ready to unleash quantitative easing. But this only imparts an aura of justification for the Fed’s incredibly expanded role in allocating the country’s scarce supply of savings. If anything, his policies were closer to a quantitative tightening. A better moniker would therefore be “Bailout Ben.”

V. Central Banking as the New Central Planning

Three related arguments have been nested within the foregoing narrative. The first exposes the divergence between Milton Friedman and Ben Bernanke over the prescriptions they advocate during financial panics, a divergence arising from their contrasting emphasis on the money stock versus financial intermediation. The second credits Alan Greenspan with possibly averting panics using Friedmanite liquidity injections, whereas it blames the severity of the financial crises of 2007-2008 at least in part on Bernanke’s consistent failure to do so. And the third alleges that Bernanke’s targeted and sterilized bailouts have altered the fundamental nature

³⁷ The Fed press release announcing the Term Deposit Facility is at <http://www.federalreserve.gov/newsevents/press/monetary/20100430a.htm>; and general details about the facility are at <http://www.federalreserve.gov/monetarypolicy/tdf.htm>. Bernanke’s July 21, 2010 testimony before the Senate Committee on Banking, Housing, and Urban Affairs is at <http://www.federalreserve.gov/newsevents/testimony/bernanke20100721a.htm>.

of the Federal Reserve. The second argument, about the comparative efficacy of Friedman's and Bernanke's respective prescriptions, is undoubtedly the most controversial, and I have no illusions about having come to a full understanding what caused the recent recession. But one does not have to accept this relative evaluation for the other two arguments still to be correct. Nor must one even agree about Friedman's and Bernanke's critical theoretical differences to recognize that the Fed that emerged from the crisis is no longer the same as what came before.

For the foreseeable future, Bernanke has added to the Fed's traditional function of simply manipulating the money supply, and letting the market determine where the credit will flow, the function of centrally allocating credit, much of which it has borrowed. During his opening remarks at the most recent Fed symposium at Jackson Hole, Wyoming, he even revealed the terminology that goes along with this new approach. The Fed is now working through what Bernanke calls the "portfolio balance channel," where policy is designed to change "the quantity and mix of financial assets held by the public." Based on the assumption "that different financial assets are not perfect substitutes in investors' portfolios," this goal is achieved by manipulating the "securities the central bank holds or is anticipated to hold at a point in time (the 'stock view'), rather than the current pace of new purchases (the 'flow view')." ³⁸

Most economists appear not to fully appreciate yet just how drastic are the changes that Bernanke has wrought. When the proposal of Congressman Ron Paul to audit the Fed was before Congress, hundreds of them interpreted this as a threat to the Fed's independence and rallied to its defense. Granted, the independence of a central bank that is primarily confined to monetary policy may provide an important safeguard against inflation and political business cycles. But another question altogether is independence for a bloated central bank that has assumed on a grand scale the same task of those assorted government-owned and sponsored agencies that

³⁸ Ben S. Bernanke, "The Economic Outlook and Monetary Policy," speech at the Federal Reserve Bank of Kansas City Economic Symposium, Jackson Hole, Wyoming (August 27, 2010), <http://www.federalreserve.gov/newsevents/speech/bernanke20100827a.htm>; Caroline Baum, "Monetarists Follow Milton Friedman to the Grave," *Bloomberg* (August 29, 2010): <http://www.bloomberg.com/news/2010-08-30/monetarists-follow-milton-friedman-to-grave-commentary-by-caroline-baum.htm>.

redirect credit flows into privileged markets and institutions, contrary to what would occur on the market.³⁹

Bernanke is undoubtedly honest and dedicated, as well as very smart; favoritism and pull probably had little or no influence on who received the vast amounts that the Fed dispensed during the crisis. We can go further; Bernanke has even brought the Fed to new levels of transparency, with respect to both proceedings of the Federal Open Market Committee and the Fed's releases and websites. I would have found it much harder to write this article were that not so. But can we depend in the future on always having someone of impeccable integrity at the Fed's helm, someone who will steadfastly insulate this enhanced intimacy with the U.S. economy from politics and corruption? An institution with such enlarged command over the financial system must not be free from close oversight. The excesses of Fannie and Freddie should have taught us that.

And let us not kid ourselves about Bernanke's promise to shed all the myriad new asset powers the Fed has acquired, once the economy fully recovers. The problem is not simply dumping securities that are no longer marketable. Although many of its new facilities have been discontinued or are no longer functioning (at least for the time being), several Fed press releases left open the possibility that the Term Auction Facility, for instance, would be permanent. Bernanke may be quite sincere about his intention, but when in the history of the Fed, or most other government agencies for that matter, has newly acquired authority and reach been easily, entirely, and voluntarily relinquished?⁴⁰

The unprecedented growth in the Fed's discretionary authority is actually in keeping with Bernanke's opinions about the proper role of government, another respect in which he differs

³⁹ Here is a link to a list of the 386 economists, some quite prominent, who ultimately signed the petition opposing an audit:
<https://survey.chicagobooth.edu/ViewsFlash/servlet/viewsflash?cmd=showform&pollid=gfm!FedIndependence>.

⁴⁰ Board of Governors for the Federal Reserve System, Press Release (September 24, 2009), <http://www.federalreserve.gov/newsevents/press/monetary/20090924a.htm>; Press Release (December 12, 2007), <http://www.federalreserve.gov/newsevents/press/monetary/20071212a.htm>.

from Friedman. Even before the financial crisis, Bernanke expressed great admiration for President Franklin D. Roosevelt and his handling of the Great Depression. In a testament to what Bernanke termed “Rooseveltian Resolve,” he wrote in 1999 that “Roosevelt’s specific policy actions were, I think, less important than his willingness to be aggressive and to experiment—in short, to do whatever was necessary to get the country moving again. Many of his policies did not work as intended, but in the end FDR deserves great credit for having the courage to abandon failed paradigms and to do what needed to be done.” Notice not just Bernanke’s strong faith in government intervention, but also his embracing of the popular fetish of good intentions, where a policy is judged not according to systematic outcomes but according to hoped-for results. As long as the government *tries* something, what matter if its efforts do not work?⁴¹

Our tedious rendition above of the new lending facilities that Bernanke set up, each with its own acronym, reveals even an emulation of FDR’s alphabet soup of New Deal agencies, however unconscious. In a speech on April 8, 2010, Bernanke reaffirmed his praise for the “bold experimentation” of Roosevelt, drawing explicit parallels with the Fed’s recent actions under his own leadership. “[P]olicymakers must respond forcefully, creatively, and decisively to severe financial crises,” he exclaimed. Or consider the following, which Bernanke included in his tribute to Friedman: “what we do know is that the central bank of the world’s economically most important nation in 1929 was essentially leaderless and lacking in expertise. This situation led to decisions, or nondecisions, which might well not have occurred under either *better leadership or a more centralized institutional structure* [emphasis mine].” These are not the words of a sedate central banker reluctantly intervening in a crisis but rather of an activist regulator who views the economy as requiring expert, detailed management with constant, coordinated control. Still more recently at Princeton University, Bernanke explicitly called for improved “economic

⁴¹ Bernanke, “Japanese Monetary Policy”: 25; Ip, “Long Study of Great Depression Has Shaped Bernanke’s Views;” John Cassidy, “Anatomy of a Meltdown: Ben Bernanke and the Financial Crisis,” *The New Yorker*, 84 (December 1, 2008): 48-63.

engineering” and “economic management” on the part of the regulatory authorities.⁴²

In the final analysis, central banking has become the new central planning. Under the old central planning—which performed so poorly in the Soviet Union, Communist China, and other command economies—the government attempted to manage production and the supply of goods and services. Under the new central planning, the Fed attempts to manage the financial system and the supply and allocation of credit. Contrast present-day attitudes with the Keynesian dark ages of the 1950s and 1960s, when almost no one paid much attention to the Fed, whose activities were fairly limited by today’s standard. Even before Bernanke, the Fed’s increasingly conspicuous targeting of interest rates had major economic players sitting on the edge of their chairs, waiting to hear the Open Market Committee’s latest pronouncement, rationally oblivious to the fact that the Fed is basically a noise trader in the market for loanable funds and cannot ultimately control *real* interest rates.

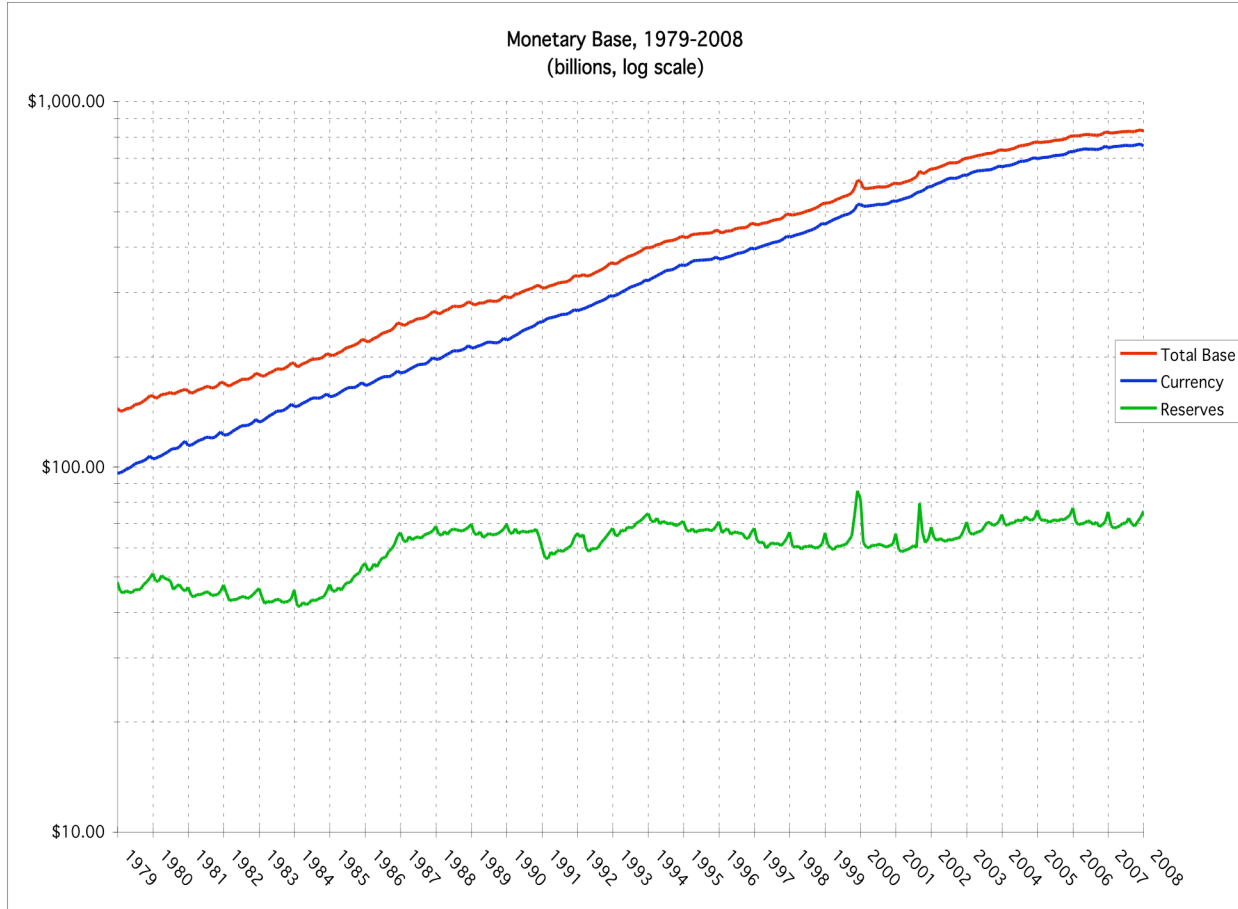
This pretense of control led William A. Fleckenstein (a critic of Greenspan who is unduly harsh, in my opinion) to aptly write: “Central bankers are actually *central planners*. Like bureaucratic leaders of central-planned or command economies, they pick an interest rate to within two decimal places that they guess will be the correct one, and then they proceed to cram it down the throat of the banking system [emphasis his].” But now with Bernanke, the central planning aspect of central banking has become far more encompassing. As George Selgin put it in an interview, “the Fed . . . has morphed into a central planning agency with a corporate welfare department.” It requires a certain hubris to undertake such a daunting task, yet a hubris that Bernanke clearly does not lack. Unfortunately, as the prolonged and incomplete recovery from the recent recession suggests, the Fed’s new central planning, just like the old central

⁴² Ben S. Bernanke, “Economic Policy: Lessons from History,” speech at the 43rd Annual Alexander Hamilton Awards Dinner, Center for the Study of the Presidency and Congress, Washington, D.C. (April 8, 2010): <http://www.federalreserve.gov/newsevents/speech/bernanke20100408a.htm>; “Remarks by Bernanke at the Conference to Honor Milton Friedman”; Bernanke, “Implications of the Financial Crisis for Economists,” speech at the Conference Co-sponsored by the Center for Economic Policy Studies and the Bendheim Center for Finance, Princeton University (September 24, 2010): <http://www.federalreserve.gov/newsevents/speech/bernanke20100924a.htm>.

planning, will ultimately prove an unfortunate, and possibly disastrous, failure.⁴³

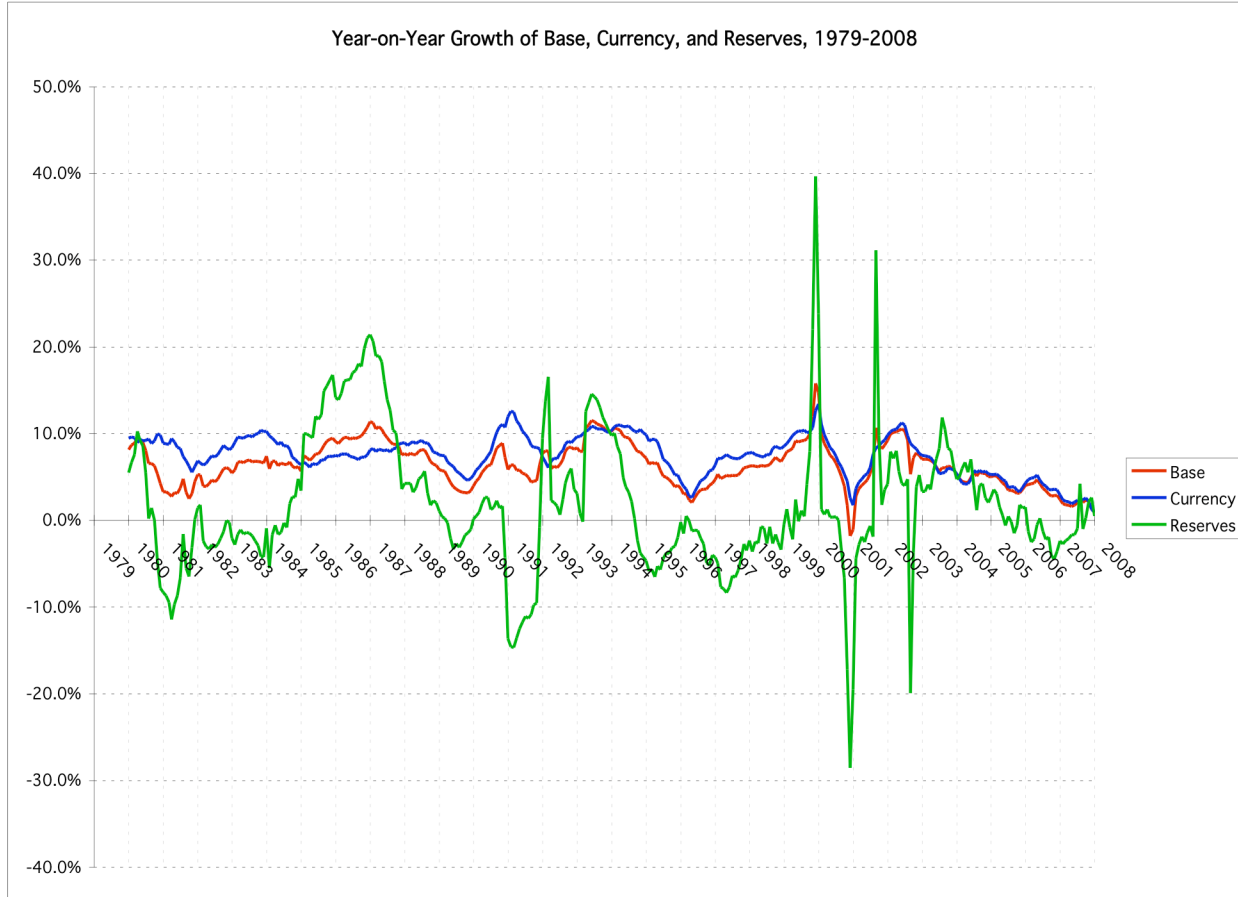
⁴³ William A. Fleckenstein (with Frederick Sheehan), *Greenspan's Bubbles: The Age of Ignorance at the Federal Reserve* (New York: McGraw Hill, 2008), p. 3; Selgin interview in Thomas Oliver, "Fed Didn't Save the Economy," *Atlanta Journal-Constitution* (August 22, 2009), <http://www.ajc.com/business/fed-didnt-save-the-121009.html>.

Figure 1



Source: Federal Reserve Bank of St. Louis: <http://research.stlouisfed.org/fred2/>. The monetary base is Board of Governors Monetary Base (monthly and not seasonally adjusted), Not Adjusted for Changes in Reserve Requirements: BOGUMBNS. Currency in circulation is the Currency Component of M1 (monthly and not seasonally adjusted): CURRNS. Total reserves are the latter subtracted from the former.

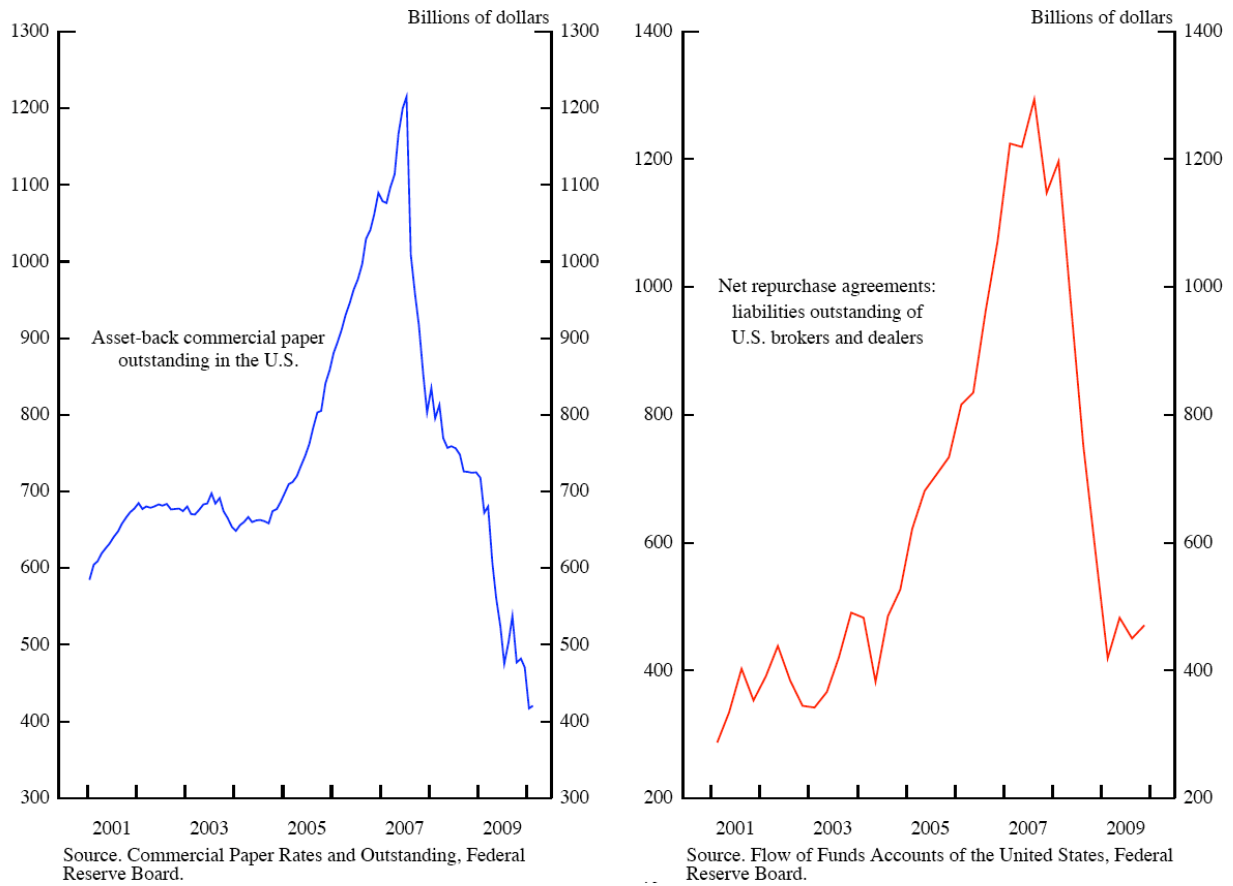
Figure 2



Source: Annual year-on-year growth rates are author's calculations from the data for Figure 1.

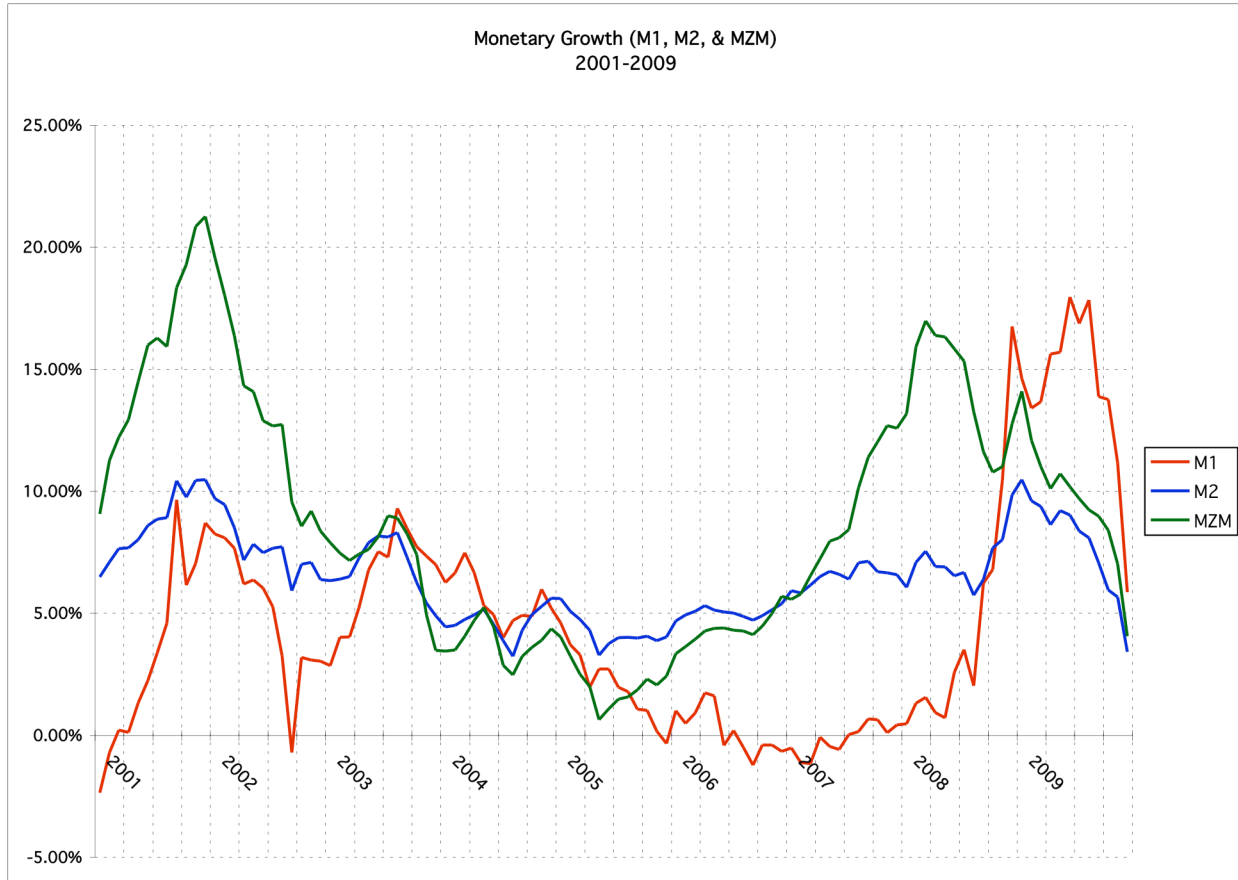
Figure 3

Selected Short-term Collateralized Debt Instruments, 2001 to 2010



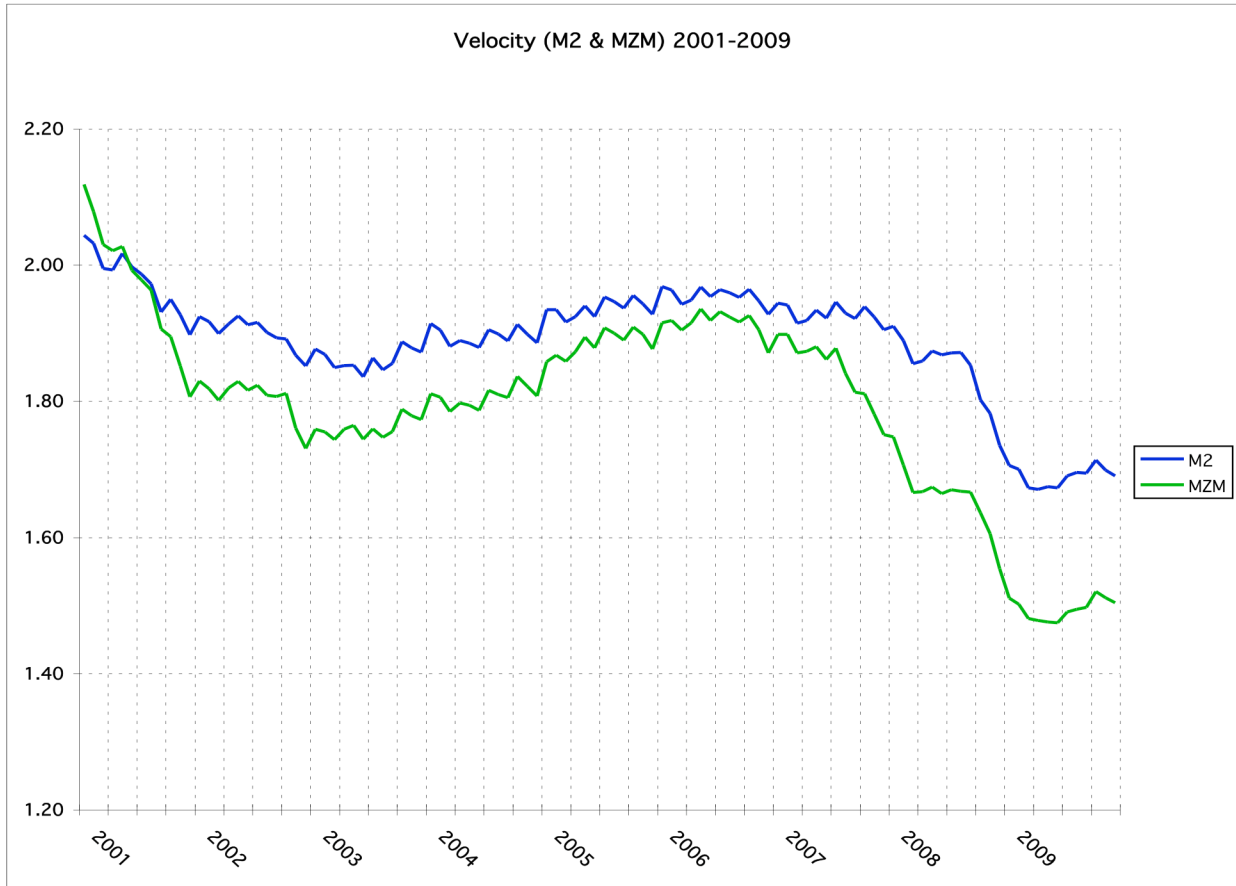
Source: Matthew J. Eichner, Donald L. Kohn, and Michael G. Palumbo, “Financial Statistics for the United States and the Crisis: What Did They Get Right, What Did They Miss, and How Should They Change?” Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board (April 2010), p. 40.

Figure 4



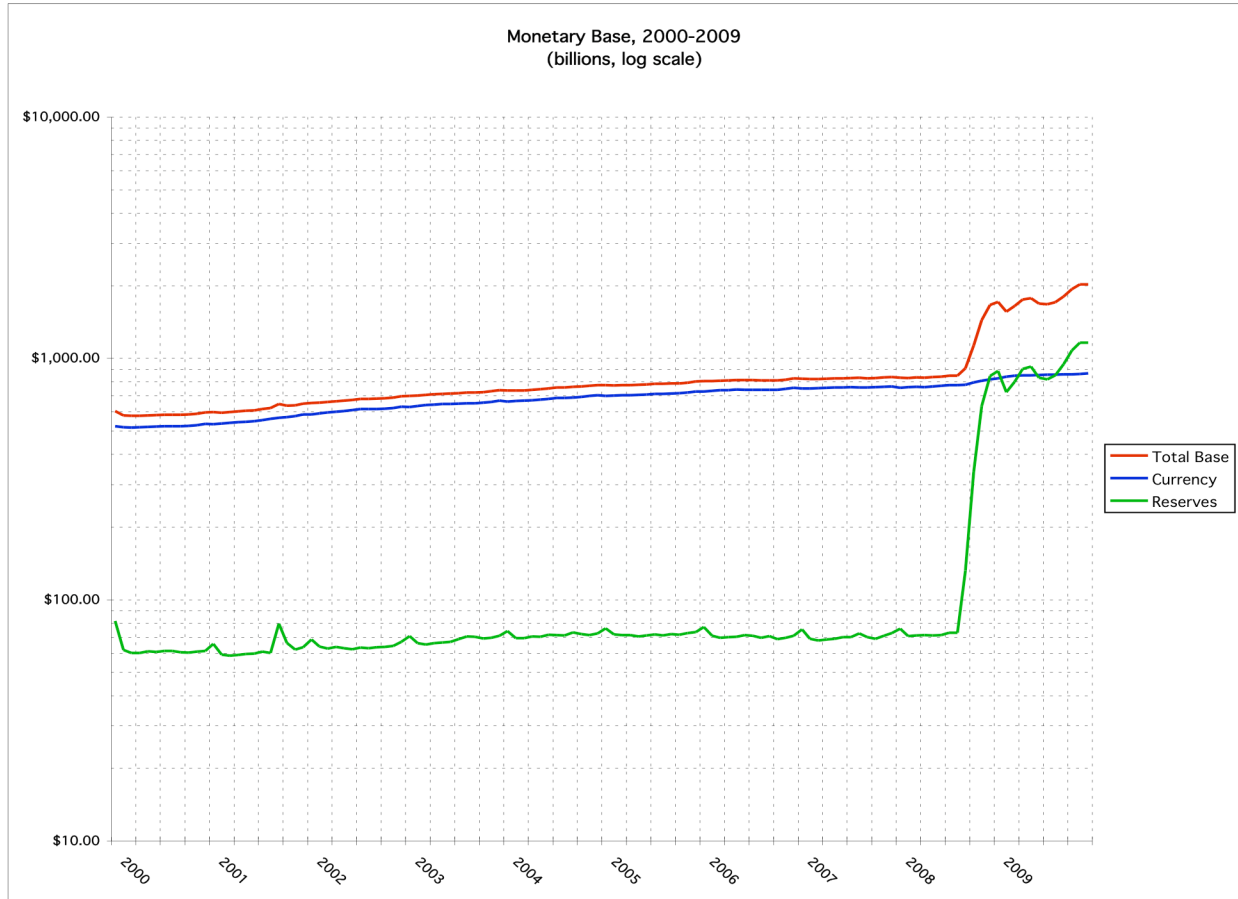
Source: Federal Reserve Bank of St. Louis (1979-2010), <http://research.stlouisfed.org/fred2/>. M1 is from the Board of Governors, monthly and not seasonally adjusted: M1NS. M2 is from the Board of Governors, monthly and not seasonally adjusted: M2NS. MZM is from the St. Louis Fed, monthly and not seasonally adjusted: MZMNS. Annual year-on-year growth rates are author's calculations.

Figure 5



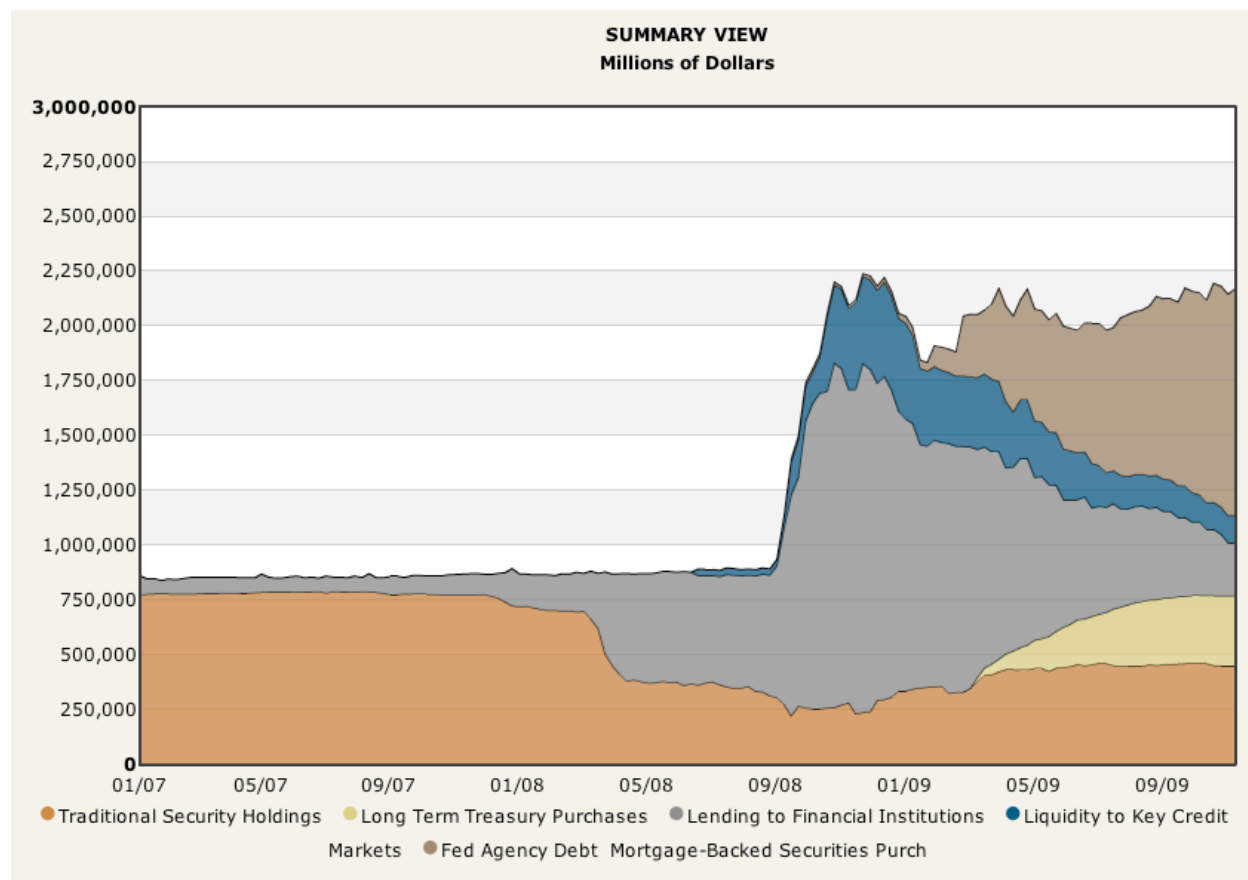
Source: Federal Reserve Bank of St. Louis (1979-2010), <http://research.stlouisfed.org/fred2/>. M2 is from the Board of Governors, monthly and not seasonally adjusted: M2NS. MZM is from the St. Louis Fed, monthly and not seasonally adjusted: MZMNS. Nominal Gross Domestic Product is the Bureau of Economic Analysis GDP, 1 decimal, quarterly, seasonally adjusted annual rate: GDP. Velocity divides GDP by the relevant monetary aggregate.

Figure 6



Source: Federal Reserve Bank of St. Louis: <http://research.stlouisfed.org/fred2/>. The monetary base is Board of Governors Monetary Base (monthly and not seasonally adjusted), Not Adjusted for Changes in Reserve Requirements: BOGUMBNS. Currency in circulation is the Currency Component of M1 (monthly and not seasonally adjusted): CURRNS. Total reserves are the latter subtracted from the former.

Figure 7
Federal Reserve Assets, 2007-2009



Categories:

Traditional Security Holdings includes Treasury securities held outright through open market operations but not those acquired through repurchase agreements (usually classified as open market operations, but in this chart included with Lending to Financial Institutions). Beginning in 2009, long-term Treasury securities and Federal agency debt are separated out into other categories.

Long Term Treasury Purchases.

Lending to Financial Institutions includes Repurchase Agreements, Discounts, Term Auction Facility (TAF), Central Bank Liquidity Swaps, Primary Dealer and Other Broker-Dealer Credit Facility (PDCF), credit extended directly to AIG, and all miscellaneous Federal Reserve assets.

Liquidity to Key Credit Markets includes Maiden Lane I, II, and III, Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), Commercial Paper Funding Facility (CPFF), and Term Asset-Backed Securities Loan Facility (TALF).

Federal Agency Debt and Mortgage-Backed Securities Purchased.

Source: Federal Reserve Bank of Cleveland, "Credit Easing Policy Tools,"
http://www.clevelandfed.org/research/data/credit_easing/index.cfm