

Banco Central de Chile
Documentos de Trabajo

Central Bank of Chile
Working Papers

N° 548

Diciembre 2009

**A HISTORICAL PERSPECTIVE ON THE CRISIS OF
2007–08**

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A HISTORICAL PERSPECTIVE ON THE CRISIS OF 2007–08

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Abstract

This paper provides a historical perspective on the current crisis, contrasting the old with the modern. We identify the growth of the nonbank financial sector (a shadow banking system) that was not regulated by the central bank or covered by the financial safety net as a key modern twist, compared to other crises. We also offer some lessons for monetary policy on key issues of liquidity, solvency, and the stability of the real economy.

Resumen

Este trabajo provee una perspectiva histórica acerca de la actual crisis, contrastando lo viejo con lo moderno. Identificamos al crecimiento del sector no bancario (un sistema bancario escondido) que no era regulado por el banco central o cubierto por la red de seguridad financiera como uno de los cambios modernos, comparado a otras crisis. También ofrecemos algunas lecciones de política monetaria en temas clave como liquidez, solvencia, y la estabilidad de la economía real.

INTRODUCTION

The current international financial crisis is part of a perennial pattern. Today's events echo earlier big international financial crises that were triggered by events in the U.S. financial system. Examples include the crises of 1857, 1893, 1907, and 1929-33. This crisis has many similarities to those of the past, but also some important modern twists.

The crisis started in the United States with the collapse of the subprime mortgage market in early 2007 and the end of a major housing boom. It occurred following two years of rising policy interest rates. Its causes include major changes in regulation, lax oversight, relaxation of normal standards of prudent lending, and a prolonged period of abnormally low interest rates. Defaults on mortgages spread to investment banks and commercial banks in the United States and across the world via an elaborate network of derivatives. It has recently spilled over into the real economy through a virulent credit crunch and collapsing equities market, which will likely produce a significant recession. The U.S. Federal Reserve and other central banks have responded in a classical way by flooding the financial markets with liquidity, and the fiscal authorities are also dealing with the decline in solvency in the banking system following the template of earlier bailouts like the Reconstruction Finance Corporation in the 1930s, Sweden in 1992, and Japan in the late 1990s.

This paper provides a historical perspective on the current crisis, contrasts the old with the modern, and offers some lessons for policy. Section 1 describes the crisis in a bit more detail. Section 2 provides some descriptive empirical evidence putting the crisis in long-run perspective. Section 3 presents some historical parallels and modern twists of the crisis. Section 4 discusses some of the issues in historical perspective for the emerging market economies. Finally, section 5 concludes with a discussion of the policy issues.

1. THE CRISIS

The crisis occurred following two years of rising policy interest rates. Its causes include major changes in regulation, lax regulatory oversight, a relaxation of normal standards of prudent lending, and a period of abnormally low interest rates. The default on a significant fraction of subprime mortgages produced spillover effects around the world via the securitized mortgage derivatives into which these mortgages were bundled, to the balance sheets of investment banks, hedge funds, and conduits (which are bank-owned but off the banks' balance sheets), which intermediate between mortgage-backed

and other asset-backed commercial paper and long-term securities. The uncertainty about the value of the securities collateralized by these mortgages spread uncertainty about the soundness of loans for leveraged buyouts. All of this led to the freezing of the interbank lending market in August 2007 and substantial liquidity injections subsequently by the U.S. Federal Reserve and other central banks.

Since then, the Fed both extended and expanded its discount window facilities and cut the funds rate by 300 basis points. The crisis worsened in March 2008 with the rescue of the Bear Stearns investment bank by JP Morgan, backstopped by funds from the Federal Reserve. The rescue was justified on the grounds that Bear Stearns' exposure to counterparties was so extensive that a worse crisis would follow if it were not bailed out. The March crisis also led to the creation of a number of new discount window facilities which gave investment banks access to liquidity and which broadened the collateral acceptable for discounting. The next major event was a Fed-Treasury bailout and partial nationalization of the insolvent government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, in July on the grounds that they were crucial to the functioning of the mortgage market.

Events took a turn for the worse in September, when the Treasury and the Fed allowed the investment bank Lehman Brothers to fail in an attempt to prevent moral hazard by discouraging the belief that all insolvent institutions would be saved. It was argued that Lehman was both in worse shape and less exposed to counterparty risk than Bear Stearns. The next day the authorities bailed out and nationalized the insurance giant AIG, fearing the systemic consequences for collateralized default swaps (insurance contracts on securities) if it were allowed to fail. The fallout from the Lehman bankruptcy then turned the liquidity crisis into a full-fledged global credit crunch and stock market crash (as described in Kindleberger, 1978) as interbank lending effectively seized up on the fear that no banks were safe.

In the ensuing atmosphere of panic, along with Fed liquidity assistance to the commercial paper market and the extension of the safety net to money market mutual funds, the U.S. Treasury sponsored its Troubled Asset Relief Plan (TARP) whereby \$700 billion could be devoted to the purchase of heavily discounted mortgage-backed and other securities to remove them from the banks' balance sheets and hopefully restore bank lending. The bill was initially rejected by the Congress, but it was passed a week later after the Senate added on many politically popular and expensive items.

In early October, the crisis spread to Europe and to the emerging countries as the global interbank market ceased functioning. The U.K. authorities responded by pumping equity into British banks, guaranteeing all interbank deposits, and providing massive liquidity. The E.U. countries responded in kind. On 13 October, the U.S. Treasury followed suit with a plan to inject \$250 billion into the U.S. banks to provide insurance of senior interbank debt

and unlimited deposit insurance coverage for non-interest-bearing deposits. Time will tell whether these plans, which are similar to earlier, mainly successful, rescue packages like the RFC in the United States in the 1930s and the Swedish and Japanese rescues in the 1990s, may solve the solvency crisis.

2. SOME DESCRIPTIVE HISTORICAL EVIDENCE

Today's turmoil must be viewed in historical perspective. Figure 1 provides some background evidence for the United States over the past century. Panel A, from 1953 to September 2008, shows the monthly spreads between the Baa corporate bond rate and the ten-year Treasury constant maturity (TCM) bond rate. The spread represents a measure of the financial market's assessment of credit risk, as well as a measure of financial instability reflecting asymmetric information (Mishkin, 1991). Figure 2 takes a longer view and shows the Baa corporate bond rate and the ten-year composite Treasury bond rate from 1921 to September 2008. Also displayed in both figures are National Bureau of Economic Research (NBER) recession dates and major financial market events, including stock market crashes, financial crises, and some major political events that affected financial markets. Panel B of figures 1 and 2 show policy interest rates—namely, the Federal funds rate since 1953 and the discount rate for the twentieth century.

As can be seen, the peaks in the credit cycle (proxied by the spreads) are often lined up with the upper turning points in the NBER reference cycles. Many of the events, especially the stock market crashes and the banking crises of the 1930s, occur close to the peaks. Moreover, panel B often shows the policy rate peaking very close to or before the peaks of the credit cycle. Its movements roughly reflect the tightening of policy before the bust and loosening in reaction to the oncoming recession afterward. In the recent crisis, by September 2008 the Baa ten-year TCM spread reached levels comparable to that reached in the last recession in 2001-02 and above that of the credit crunch of 1990-91. The Baa ten-year composite spread was just below the spreads in the early 1980s recession after the Volcker shock and President Carter's credit restraint program. All of these events were associated with significant recessions.

3. HISTORICAL PARALLELS AND MODERN TWISTS

Many of the financial institutions and instruments caught up in the crisis are part of the centuries-old phenomenon of financial innovation. The new instruments, which are often devised to avoid regulation, are then put to the

test when an economy experiences financial stress such as we have been recently encountering. The rise and fall of financial institutions and instruments occurs as part of a long-standing pattern of booms and busts in the markets for equities, land, commodities, foreign exchange, and other assets. The cycle is financed by credit. Lending booms and busts and the credit cycle are also intimately connected to the business cycle.

A well-known tradition in monetary economics, which goes back to the nineteenth century and in the twentieth century was fostered by Mitchell (1913), Fisher (1933), Minsky (1977), Kindleberger (1978), and others, tells the tale of a business cycle upswing driven by what Fisher called a displacement (that is, an exogenous event that provides new profitable opportunities for investment) leading to an investment boom financed by bank money (and accommodative monetary policy) and by new credit instruments (financial innovation). The boom leads to a state of euphoria in which investors have difficulty distinguishing sound from unsound prospects and in which fraud can be rampant. It can also lead to a bubble characterized by asset prices rising independently of their fundamentals. The boom inevitably leads to a state of overindebtedness, when agents have insufficient cash flow to service their liabilities. In such a situation, a crisis can be triggered by errors in judgment by debtors and creditors in an environment changing from monetary ease to monetary tightening. The crisis can lead to fire sales of assets, declining net worths, bankruptcies, bank failures, and an ensuing recession.

A key dynamic in the crisis is information asymmetry, manifest in the spread between risky and safe securities (Mishkin, 1997). Information asymmetry promotes adverse selection and moral hazard, which are ignored in the boom and come into play with a vengeance in the bust.

Banks played a key role in the traditional story because bank credit largely financed the boom, and the bust was often accompanied by bank failures and banking panics—events which eventually made the downturn worse. This led to the traditional case for the monetary authority to act as a lender of last resort and provide liquidity at penalty rates to the money market and discount window lending to solvent but illiquid banks.

Countercyclical monetary policy is also an integral part of the boom-bust credit cycle. Bordo and Wheelock (2007, 2009) use data for the United States and nine other countries for the past century to show that stock market booms occur in environments of low inflation, rising real GDP growth, and low policy real interest rates. Before World War II, central banks operated under the gold convertibility constraint, so they inevitably tightened their policy rates as the boom progressed and inflationary pressure grew, thus helping to trigger the ensuing crash. The story is similar for housing booms and busts, but they follow a different cycle because of long gestation lags in

construction and in the adjustment of prices to a collapse in demand (Leamer, 2007).

Stock market crashes can be serious events leading to a decline in wealth and consumption and a scramble for liquidity, which, in turn, contributes to incipient banking crises. Housing busts also have serious consequences for the banking system, via defaults on mortgages, and for the real economy, via the effect of declining wealth on consumption expenditure, the collapse of residential investment, and a financial accelerator effect as net worths decline. The recent housing boom in the United States was largely triggered by a long period of abnormally low interest rates, attributed to loose monetary policy in 2001-04 in reaction to earlier financial turbulence and fear of deflation and to a global savings glut (Bernanke, 2007). The bust was likely induced by a rise in rates in reaction to the inevitable inflationary pressure.

3.1 The Nonbank Financial Sector, Financial Innovation, and Financial Crises

The traditional financial crisis story depicts a shock to a major financial or nonfinancial firm, which leads to a banking panic as depositors attempt to convert their deposits into currency. Since the advent of deposit insurance, the source of the pressure has come from the asset side, rather than the liability side, of a bank's balance sheet. One example is the Penn Central episode in 1970, when the collapse of the railroad led to a panic in the commercial paper market and triggered to concern by the Fed that it would spill over into the banking system. The New York Federal Reserve responded by opening the discount window to the money center banks to freely discount nonfinancial firms based on the collateral of sound commercial paper. Other examples include the Latin American debt default of 1982, when many money center banks became close to insolvent until a massive rescue was orchestrated between the Fed and the IMF, and the collapse of the Long-Term Capital Management (LTCM) hedge fund in 1998, which also was perceived to be a threat to the banking system. LTCM was rescued when the New York Federal Reserve orchestrated a lifeboat operation by the New York banks. Historically, in 1763 a crisis in the market for bills of exchange spread from Amsterdam to Hamburg and, like LTCM, led to the failure of the principal player and many others (Schnabel and Shinn, 2001). In each of these cases, the crisis broke in the nonbank financial sector and then spilled over or threatened to spill over into the banks, who were the ultimate creditors.

Many of the financial crises of the past involved financial innovation that increased leverage. The 1763 crisis was centered on the market for bills of exchange, Penn Central on the newly revived (in the 1960s) commercial paper market, the savings and loan crisis on the junk bond market, and LTCM on derivatives and hedge funds.

3.2 Modern Twists

Although there are many historical parallels to the current crisis, there are several unique differences. In the most recent episode, the financial innovation derived from the securitization of subprime mortgages and other loans has shifted risk away from the originating banks into mortgage- and other asset-backed securities, which bundle the risk of less stellar borrowers with more creditworthy ones and which were certified by the credit rating agencies as prime. These were absorbed by hedge funds in the United States and abroad and in the asset-backed commercial paper of the commercial and investment banks. As Rajan (2005) presciently argued, shifting the risk away from banks, which used to have the incentives to monitor their borrowers, to hedge funds and other institutions, which do not, increased overall systemic risk by raising the risk of a much more widespread meltdown in the event of a tail event, as we have recently witnessed.

A key modern twist was the growth of the nonbank financial sector (a shadow banking system) that was not regulated by the central bank or covered by the financial safety net. According to Eichengreen (2008), its rapid growth was a consequence of the repeal in 1999 of the Depression era Glass-Steagall Act, which separated commercial from investment banking. These institutions held much lower capital ratios than traditional commercial banks and hence were considerably more prone to risk. When the crisis hit, they were forced to engage in major deleveraging involving the fire sale of assets into a falling market, which in turn lowered the value of their assets and those of other financial firms. A similar negative feedback loop occurred during the Great Depression (Friedman and Schwartz, 1963).

4. PROSPECTS FOR THE EMERGING MARKETS

Financial crises have always had an international dimension, as Morgenstern (1959), Kindleberger (1978), and Bordo (1986) have shown. Contagion spreads quickly through asset markets, through international banking, and through the monetary standard. Stock market crashes and banking panics have often occurred in many countries within a few months of the original shock. A classic example is the Baring crisis of 1890, which started in Argentina and affected the rest of Latin America and other emerging countries of the time. It was triggered by central bank tightening in England, France, and Germany. This led to a series of sudden stops and current account reversals (Bordo, 2006) in the emerging countries and a number of banking crises and debt defaults. These events were echoed in the late 1990s (see Calvo and Talvi, 2005).

The current crisis was initially contained to the advanced countries, among which contagion was spread by the holding of opaque subprime mortgage derivatives in diverse banks in Europe and elsewhere and by the seizing up of the asset-backed (mortgage-backed) commercial paper market. Pressure then spilled over to the emerging markets, especially those who were highly indebted to the advanced countries, with high current account deficits and significant exposure to the advanced countries' boom, as in the case of Iceland, Hungary, and Ukraine (IMF, 2008, chap. 1). The IMF and the European Central Bank initiated rescues. Many of the Asian countries (and some Latin American economies) have avoided the worst of the crisis, likely because of the precautionary measures many took in reaction to their meltdowns in the Asian crisis of 1997 (for example, the build up of large foreign exchange reserves and a reduction in their exposure to foreign borrowing.). As the credit crunch continues and the recession in the United States and Europe plays out, the emerging economies that are exposed to foreign capital have been more strongly affected, as have countries that rely on exports to the United States and Europe.

5. POLICY LESSONS

The crisis has implications for monetary policy on the key issues of liquidity, solvency, and the stability of the real economy. With respect to liquidity, the central banks reacted quickly in the Bagehot manner to deal with the freezing of the interbank markets in August 2007. The European Central Bank flooded the European money market with liquidity, as did the Fed in the U.S. market when it lowered the discount rate by 50 basis points. This suggests they heeded the first part of Bagehot's lesson to lend freely, but not quite the second part of lending at a penalty rate. The Bank of England followed a strict interpretation of Bagehot until mid-2007, by keeping its discount window open to all comers but at a penalty rate. The subsequent run on Northern Rock on 14 September led to a large infusion of central bank liquidity and the announcement of a temporary complete guarantee of all U.K. bank deposits. The run on Northern Rock very likely reflects not the failure of the Bank's lender-of-last-resort policy, but inadequacies in the United Kingdom's provision of deposit insurance, the ill-thought-out separation of financial supervision and regulation from the central bank and political pressure (Milne and Wood, 2008).

The pressure on the interbank market and liquidity in general increased during the winter of 2007–08. In March, with the Bear Stearns crisis, the Fed developed a series of new programs for access to the discount window, including the Term Auction Facility (TAF), the Term Security Lending Facility

(TSLF), and the Primary Dealer Credit Facility (PDCF). Since March, the Fed has also expanded its liquidity provision to the commercial paper market.

These facilities reflected a change in the Fed's tactics. The change involved the provision of credit directly to the financial firms that the Fed deemed most in need of liquidity, as opposed to delivering liquidity directly to the market through open market purchases of Treasury securities and then letting the market distribute liquidity to individual firms. The choice of targeted lending instead of imperial liquidity provision by the market exposed the Fed to the temptation to politicize its selection of credit recipients. This raises the question of why this complicated method of providing liquidity has been introduced when the uncomplicated system of open market operations is available. A second question is why the Fed has reduced its holdings of government securities. This will make it impossible for the Fed to tighten monetary policy when it finally decides to combat a rise in the inflation rate, since the only way to tighten is to sell government securities. The mortgage-backed securities now on the Fed's balance sheet are not marketable.

With respect to solvency, the Fed and the other U.S. monetary authorities have engaged in a series of bailouts of incipient insolvent firms deemed too systemically connected to fail. These include Bear Stearns in March 2008, the GSEs in July, and AIG in September. Lehman Brothers was allowed to fail in September 2008 on the grounds that it was basically insolvent and not as systemically important as the others. One wonders whether the severe crisis in September-October 2008 could have been avoided if Bear Stearns had been allowed to fail. Had Bear Stearns simply been closed and liquidated, it is unlikely that more demand for Fed credit would have come forward. The fact that general creditors and derivative counterparties of Bear Stearns were fully protected by the merger of the firm with JP Morgan Chase had greater spillover effects on the financial services industry than would have been the case had the Fed appointed a receiver and frozen old accounts and payments as of the date of the appointment. Fewer public funds would have been subjected to risk. When Drexel Burnham Lambert was shut down in 1990, there were no spillover effects.

Furthermore assume, as the Fed argued at the time, that there would have been a crisis in March like the one that followed Lehman's failure in September. Would it have been as bad as the latter event? The moral hazard implications of bailing out Bear Stearns most probably led the remaining investment banks and other market players to follow riskier strategies than otherwise on the assumption that they also would be bailed out. This surely made the financial system more fragile than otherwise. Consequently, when the monetary authorities decided to let Lehman fail, the shock that ensued and the damage to confidence was much worse.

The September 2008 crisis revealed that the deepest problem facing the financial system is solvency. The problem stems from the difficulty of pricing

securities backed by a pool of assets, whether mortgage loans, student loans, commercial paper issues, or credit card receivables. Pricing securities based on a pool of assets is difficult because the quality of individual components of the pool varies, and an accurate price of the security cannot be determined unless each component is individually examined and evaluated. As a result, the credit market—confronted by financial firms whose portfolios are filled with securities of uncertain value, derivatives that are so complex the art of pricing them has not been mastered—is plagued by the inability to determine which firms are solvent and which are not. Lenders are unwilling to extend loans when they cannot be sure that a borrower is creditworthy. This serious shortcoming of the securitization process is responsible for the paralysis of the credit market.

The Fed was slow to recognize the solvency problem. It emphasized providing liquidity to the market when the problem was the market's uncertainty about the solvency of individual or sectoral financial firms. No financial market can function normally when basic information about the solvency of market participants is lacking. The securities that are the product of securitization are the root of the turmoil in financial markets, which began long before the housing market burst.

The Treasury's plan of 13 October 2008, based on the U.K. plan to inject capital into the banking system, seems likely to help solve this problem. However, it is not clear whether funds will be injected into insolvent banks or into solvent banks that are temporarily short of capital. If funds go to insolvent banks, this can only prolong the credit crunch.

There is ample historical precedent for the Treasury plan, including the Reconstruction Finance Corporation (RFC) established by the Hoover administration in 1932. Under Roosevelt, it injected U.S.\$1.3 billion to 6,000 banks, which is equivalent to U.S.\$200 billion in equity today.¹ The RFC's efforts were hampered in 1932 by the publication of the list of banks raising capital. This led to runs on these banks and unwillingness by others to participate. The current Treasury plan also has precedent in the Swedish bank bailout of 1992 and Japan's long-delayed bailout in the late 1990s.

With respect to the real economy, the Fed, with its dual mandate of price stability and high growth (full employment), did follow the correct policy in cutting the Funds rate as vigorously as it did. Considerable empirical and historical evidence suggests that credit crunches exacerbate recessions (see figures 1 and 2 and IMF, 2008, chap. 4). Given the Fed's dual mandate, the risk of recession following the credit crunch seems to be a reasonable rationale for a temporary easing of monetary policy. Once recovery is in sight and once inflationary expectations pick up, it behooves the Fed to return to its (implicit) inflation target.

1. Richard Sylla, remarks on the NewsHour with Jim Lehrer, PBS, 15 October 2008.

Another lesson concerns whether the Fed should continue to follow its reactive policy to asset booms or move to a preemptive policy. The traditional view of monetary policy argues that central banks should act reactively and deal with the consequences for the financial system of an asset price boom after it has burst (Bernanke and Gertler, 2001). An alternative view argues that if an asset bubble (such as housing) is on the horizon, then the Fed should act preemptively to defuse it (Cecchetti and others, 2000). Bordo and Jeanne (2002) consider a circumstance in which the use of preemptive policy against the occurrence of a low probability event that could have catastrophic consequences, such as a national housing bust, can be welfare improving. Perhaps the recent events will convince the Fed to change its stance.

An additional lesson speculates on the genesis of the crisis. The recent financial crisis likely could have been avoided if the Fed had not provided as much liquidity as it did from 2001 to 2004. When no financial crisis occurred after Y2K, it promptly withdrew the massive infusion of liquidity it had provided. By contrast, when it later foresaw a series of shocks to the economy that might lead to financial crisis, such as the dot-com bust of 2001 and the 9/11 terrorist attack, it injected liquidity and then allowed the additional funds to remain in the money market when no financial crisis occurred. It also overreacted to the threat of deflation in 2003-04, which may have been of the good (productivity-driven) variety rather than the bad (recessionary) variety (Bordo and Filardo, 2005). If, following these events, the market had not been infused with so much liquidity for so long, then interest rates would not have been as low in recent years as they were and the housing boom may not have expanded as much as it did. Taylor (2007) thus suggests that interest rates in this period were, on average, considerably lower than would be the case based on his famous rule.

5.1 Some Less Gloomy Lessons from the Crisis

Finally, there are some less gloomy lessons from the crisis. First is the compressed consolidation of the U.S. banking industry. Since the 1990s, the U.S. banking system has been slowly consolidating to take advantage of the removal of barriers to interstate banking and branch banking. Canada and most European countries went through this consolidation by mergers and acquisition in the late nineteenth and early twentieth centuries. Evidence suggests that the U.S. banking system historically was both less stable and less efficient than its Canadian counterpart (Bordo, Redish, and Rockoff, 1996). The recent crisis has forced mergers and exits, thereby facilitating the move to a banking system closer to those of the other advanced countries, characterized by a few very large banks. Many smaller banks will survive, however, because of the legacy of community banking with significant local social capital.

Second, the crisis is resolving issues raised by the Glass-Steagall act of 1933, which separated commercial from investment banking. Since the act was repealed in 1999, the more lightly regulated investment banks, with their advantage of lower capital requirements, competed successfully with the commercial banks, inducing the latter to increase leverage and move liabilities off their balance sheets. The resultant increase in risk contributed to the crisis. The demise of Bear Stearns and Lehman Brothers has forced the other investment banks to merge with major commercial banks, to come under the umbrella of the Fed and FDIC safety nets. The creation of such universal banks has returned the United States to the system it had before Glass-Steagall and moves it closer to the banking systems in some European countries. Universal banks have a long history of stability and efficiency (Fohlin, 2007).

Third, the extension of the lender-of-last-resort function to include most types of collateral and most financial institutions seems to be following some of Bagehot's (1873) strictures on what the central bank should do in a panic. In describing what a Bank of England 's director said about its actions in the crisis of 1825, Bagehot states that "we lent it by every possible means and in modes we never adopted before; we took in stock on security, we purchased Exchequer bills, we not only discounted outright, but we made advances on the deposits of bills of exchange to an immense amount, in short by every means consistent with the safety of the Bank, and we were not on some occasions over-nice. Seeing the dreadful state in which the public were, we rendered every assistance in our power" (p. 52).

Finally, the monetary authorities in the United States and Europe responded quickly to resolve both the liquidity and solvency aspects of the crisis. This contrasts with the Great Depression, when the Fed did virtually nothing and it was up to Franklin D. Roosevelt and the Treasury to jump start the economy by devaluing the dollar in 1933 and purchasing gold thereafter. It also contrasts with the slow response of the Japanese authorities following the collapse of Japan's stock market and real estate bubbles.

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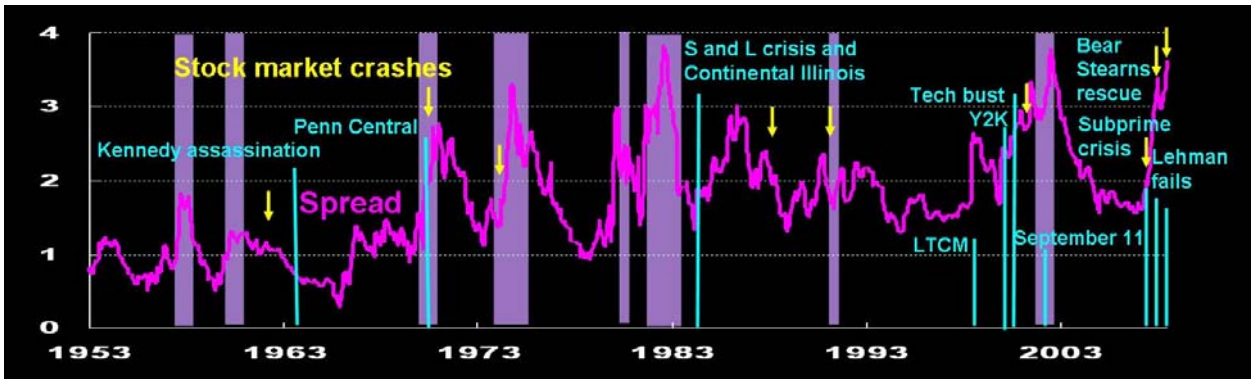
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Figure 1. The Federal Funds Rate and the Spread between Baa Corporate and Ten-Year TCM Bonds

A. The Baa-TCM spread



B. The Federal funds rate

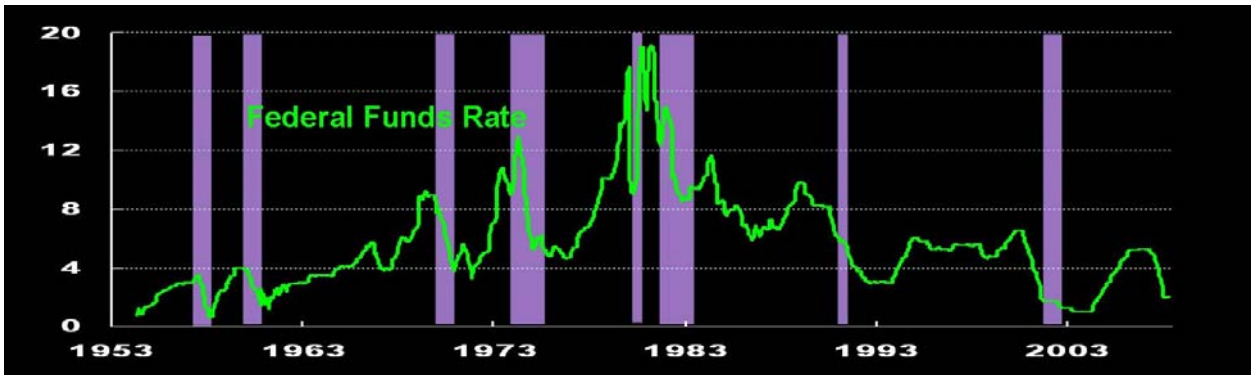
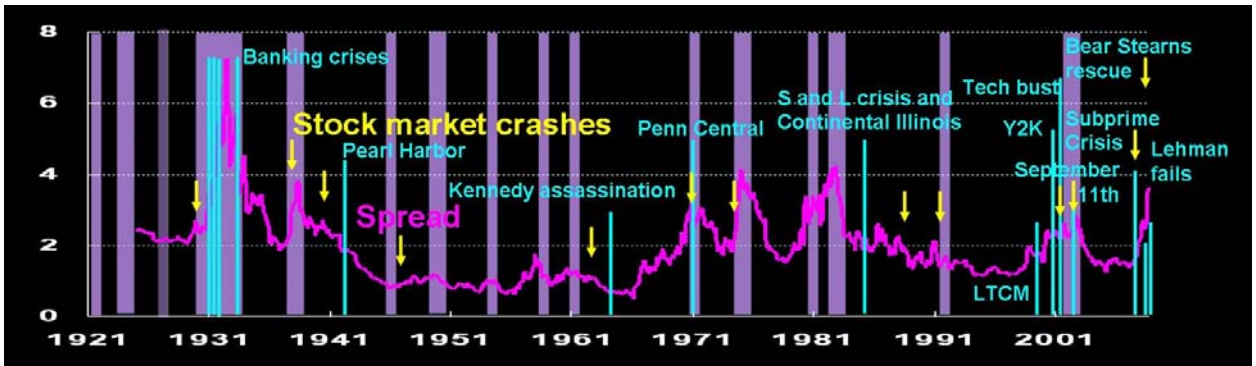
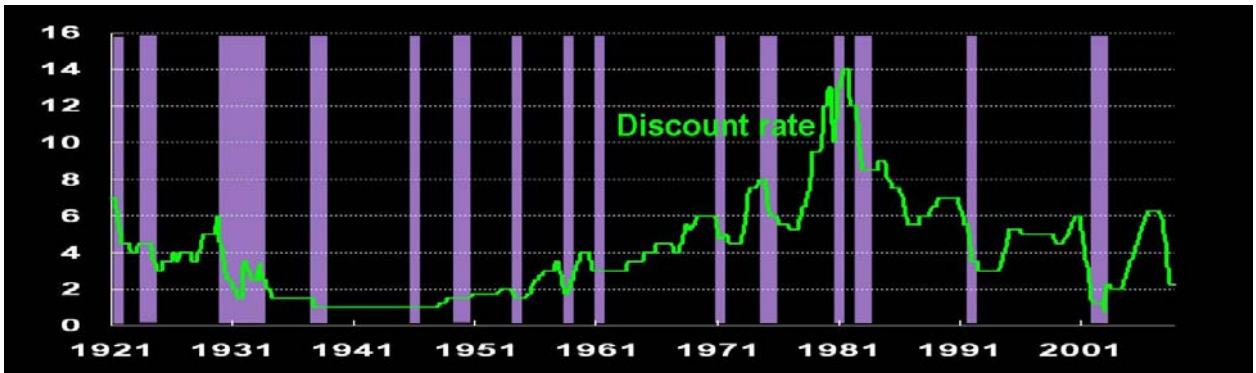


Figure 2. The Discount Rate and the Spread between Baa Corporate and Ten-Year Composite Treasury Bonds

A. The Baa-composite spread



B. The discount rate



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