

THE LIQUIDITY CRISIS IN HISTORICAL PERSPECTIVE

updated 11 January 2009 from November and October 2008

T. S. Coleman PhD
Close Mountain Advisors
www.closemountain.com

We are in a credit or liquidity crisis that seems to be following the pattern of 19th century speculative booms and busts described in Charles Kindleberger, *Manias, Panics, and Crashes*. Understanding the current environment and judging where we might go from here is facilitated by examining the history of these earlier booms and busts.

- Speculative booms and busts occurred periodically during the late 1800s and early 1900s. Kindleberger cites five speculative cycles over the period 1860-1940: peaking in 1873, 1892-93, 1907, 1920-21, and 1929.
- Everything indicates that we are currently in the crisis or panic phase of a speculative bust, unwinding the speculative excesses first exhibited in dot-com stocks and later in world-wide real-estate. Historically, the unwinding of a speculative episode has been marked by three characteristics: a severe slow-down in economic activity; a fall in the general price level; and major banking or monetary disturbances.
- Economics tells us that a speculative crisis will produce a sharp increase in liquidity preference or money demand. I lay out reasonable mechanisms by which such an increase in money demand can intensify the severity of recessions, deflate the price level, and wreak havoc on the banking system, thus generating the historical regularities noted above.
- Given the historical perspective we should expect the current speculative bust to be followed by a sharp recession, particularly because the boom also saw large increases in household debt that will likely be reversed (see link at <http://www.closemountain.com/publicatons.html>).
- Nonetheless, in the present episode the Federal Reserve has taken significant measures (for example, substantial quantitative easing of monetary policy) which have a high likelihood of defusing the most devastating repercussions from the bust's monetary shocks. Although we will no doubt experience a severe recession (maybe the worst since 1973-75) I do not expect anything on the order of the Great Depression. Nor would I expect to see substantial deflation of the general price level or a long period of stagnation as in Japan during the 1990s.
- One final historical observation – for the historical period considered here (apart from the Great Depression) recovery following a speculative bust has tended to be robust, stronger than the average economic recovery.

BACKGROUND AND DETAILS

Speculative Manias, Panics, and Crashes

Charles Kindleberger in his book Manias, Panics, and Crashes – A History of Financial Crises describes speculative manias and panics having roughly the following pattern:

- **Displacement and opportunity** - an event, such as the widespread adoption of a technology with pervasive effects, that alters the economic outlook by changing profit opportunities
- **Economic growth and expansion** - the displacement opens profit opportunities in new areas. Firms and individuals take advantage and growth takes off, led by new investment, capital spending, and profits generated from the new opportunities
- **Monetary expansion** - the economic expansion is fed and often accelerated by an expansion in credit and the money supply
- **Euphoria** - the growth in new areas, returns from capital investment, and rising incomes provide a positive feedback which itself gives rise to new profit opportunities - the best of all possible worlds
- **Speculation and asset price inflation** - the positive feedback can be so strong that it overtakes the original displacement and opportunity, with speculation for price increases largely replacing investment for production and sale. (Note, however, that full-blown speculation is never easy to distinguish from balanced assessment of new opportunities until well after the fact.)
- **Financial distress** - at some stage new recruits to speculation are balanced by those insiders who decide to take profits and sell out - possibly in the fear that a rush for liquidity would generate losses and it would be better to take what is available rather than hold out for the last of the profits. This period of distress, where asset prices flatten out, has historically lasted for a number of months.
- **Crisis and debt deflation** - a sudden fall, first in the price of the primary object of speculation, then in most or all assets. The rush for liquidity is on. Bankruptcies increase. Liquidation speeds up, sometimes degenerating into panic. The value of collateral collapses - credit and money sharply contract. Real interest rates rise even as nominal rates fall, since the nominal price level tends to fall.
- **Renewal and recovery** - debt deflation ends as productive assets move from financially weak owners (often speculators or the original entrepreneurs) to financially strong owners (well-capitalized financiers). This provides the foundation for another cycle, assuming that all the required factors (displacement, monetary expansion, appetite for speculation) are present

This seems to be a reasonable description of the past decade. Starting in the mid-1990s productivity growth accelerated (for a variety of reasons, some understood and some not). The economic expansion continued through March 2001 and was the longest in US history, followed by a shallow recession and a resumption in growth. Monetary policy was arguably easy during the early part of the period, and certainly easy (with negative real rates) during the period 2002-2005. The late 1990s and early 2000s saw a speculative boom in stocks and the early-to-mid 2000s saw a world-wide speculative boom in real-estate.

The period July 2007 through August 2008 would probably qualify as a period of “Financial distress”. The period since end-August 2008 certainly qualifies as a period of “Crisis and debt deflation”, with the price of real estate securities and most other assets falling.

Review of the Historical Record

Kindleberger cites five speculative cycles during the 1860-1940 period (peaking in 1873, 1892-93, 1907, 1920-21, and 1929). Each was followed by a severe downturn – NBER reference cycles, peak-to-trough, 10/73-3/79, 1/93-6/94, 5/07-6/08, 1/20-7/21, 8/29-3/33). Friedman and Schwartz (1963) place these five as among the “six periods of severe economic contraction that produced widespread distress and unemployment ... of a different order of magnitude.” (Friedman and Schwartz considered the 93 years 1867-1960, and the sixth contraction was 1937-1938. The five cited by Kindleberger were five out of 16 business cycles over the period 1870-1933.)

Table 1 shows the US speculative booms and busts identified by Kindleberger. The table also shows the NBER reference dates for the subsequent recessions, and changes in prices, income, and money. A couple points before considering general conclusions. First, although the table shows that real income grew for 1873-1879, this is almost certainly overly-optimistic. Second, the price figures for 1907-1908 show a fall of 0.2% but prices almost certainly fell more than this. With these two caveats in mind, we can conclude that, historically, speculative episodes have been followed by:

1. A severe slow-down in economic activity
2. A fall in the general price level;
3. Substantial falls in the money stock

This is reinforced when comparing recessions following speculative versus non-speculative episodes over the period 1870-1929 (i.e. excluding the Great Depression). There were four speculative recessions (1873-79, 1893-94, 1907-08, 1920-21) and 11 other recessions. Income, prices, and money all fell much more following the four speculative episodes than during other recessions.

Average Recessions – Speculative vs. Non-Speculative Episodes, 1870-1929

	Ch Prc	Ch Inc	Ch M
Average recessions following speculative episodes	-6.3%	-6.0%	-3.5%
Average non-speculative recessions	0.2%	-0.9%	3.7%

Conversely, however, recoveries following speculative recessions tended to be robust, and on average substantially stronger than recoveries following non-speculative recessions.

Average Recoveries – Speculative vs. Non-Speculative Episodes, 1870-1929

	Ch Prc	Ch Inc	Ch M
Average recoveries following speculative episodes	1.0%	7.1%	6.3%
Average non-speculative recoveries	3.2%	2.4%	6.2%

Table 1 – Length of Recessions after Various Speculative Crises

Date	Boom Peak	Bust	Speculation in	Recession NBER peak/trough	length	Ch Prc	Ch Inc	Ch M	Recovery Ch Inc
1873	Mar 1873	Sep 1873	Railways, homesteading, Chicago bldg	Oct 1873 - Mar 1879	5.4yr	-3.8%	2.5%	-1.8%	4.3%
1892-93	Dec 1892	May 1893	Silver, gold	Jan 1893 - Jun 1894	1.4yr	-6.3%	-7.9%	-1.5%	9.4%
1907	early 1907	Oct 1907	Coffee, Union Pacific (railway?)	may 1907 - Jun 1908	1.1yr	-0.2%	-12.5%	-3.3%	5.4%
1920-21	summ 1920	spring 1921	Securities, ships, commodities, inventories	Jan 1920 - Jul 1921	1.5yr	-14.8%	-6.1%	-7.4%	9.3%
1929	Sep 1929	Oct 1929	Land to 1925, stocks 1928-1929	Aug 1929 - Mar 1933	4.2yr	-7.5%	-11.1%	-9.5%	11.6%

The identification, dating, and description of the boom and bust is from Kindleberger (1989) appendix B. The NBER peak/trough dating is from the NBER web-site (<http://www.nber.org/cycles.html>). The change in prices and income are based on annual data from Friedman and Schwartz (1982) table 4.8. Change in prices, income, and money are the compounded annual percent change from the year in which the NBER peak occurs to the year in which the NBER trough occurs. I use per-capita real income and per-capita money stock. Income “refers to annual estimates of net national product, variant III, component method, computed by Simon Kuznets, in current and 1929 prices, 1869-1947, as revised by [Friedman and Schwartz] for 1869-1909, 1917-19, and 1942-1945.” Prices are “the implicit price index obtained by dividing national product in current prices by national product in 1929 prices.”

One additional characteristic to note is that the length of the recessions following these speculative episodes varied considerably, with 1837-1879 and 1929-1933 being quite long and the others quite short.

The recessions following the speculative busts were all associated with monetary disturbances of one sort or another. Friedman and Schwartz highlight four of the episodes (1873, 1890s, 1907-08, and 1929-33) as characterized by major banking or monetary disturbances, and the 1920-21 episode as an event where the Federal Reserve substantially tightened monetary policy. These five recessions were the only five, out of the 16 from 1870-1933, during which money stock fell.

The year 1873 saw a banking crisis (September) and the whole period 1873-79 saw controversy over greenbacks and resumption of specie payments. Money stock fell by about 3%, mainly due to a contraction of high-powered money. Table 2 shows the change in money stock, together with the contribution from the three components of high-powered money, deposit-to-reserve ratio, and deposit-to-currency ratio.¹

The 1890s saw the controversy over silver, and particularly a banking crisis in 1893. Early 1893 saw a panic, touched off in May by a failure of a “stock-market favorite”. Failure and suspension of banks in early 1893 was followed by restriction by banks on the convertibility of deposits into cash.² Convertibility resumed September 1893. Money stock fell by about 6% from 1893 to 1894, mainly due to an increase in the deposit-to-reserve ratio (i.e. banks’ increased desire to hold reserves).

Table 2 – Change in Money Stock Following Various Speculative Crises

Date	NBER peak/trough	Ch High Pow Mon	Ch Mon Stock	Contr'n to Ch Mon Stck due to		
				High Pow	Dep/Res	Dep/Cur
1873-79	Oct 1873 - Mar 1879	-6.31%	-3.13%	-202%	135%	-31%
1893-94	Jan 1893 - Jun 1894	2.58%	-5.66%	46%	-141%	-6%
1907-08	may 1907 - Jun 1908	8.11%	-3.80%	213%	-263%	-58%
1920-21	Jan 1920 - Jul 1921	-6.56%	-5.25%	-125%	31%	-7%
1929-33	Aug 1929 - Mar 1933	16.21%	-43.45%	37%	-52%	-109%

Change in High-Powered Money and Money Stock are the logarithmic changes over the stated periods. Money stock, high-powered money, and deposit-to-reserve and deposit-to-currency ratios are from table B-3 of Friedman and Schwartz (1963). Because of data

¹ The chronologies are primarily from Friedman and Schwartz (1963). For the decomposition of changes in money stock, see Friedman and Schwartz (1963) appendix B. Arithmetically, money stock can be defined as:

$$\text{Money stock} = \text{High Powered Money} \cdot \text{dr} (1 + \text{dc}) / (\text{dr} + \text{dc})$$

with dr = deposit-to-reserve ratio and dc = deposit-to-currency ratio. We can then decompose changes in money stock into changes in the three components of high-powered money and the two deposit ratios. This decomposition is useful because, to a large extent, high-powered money is either exogenous (e.g. under a gold standard) or controlled by the central bank, while the deposit ratios are the result of behavioral decisions by banks, companies, and individuals.

² That is, banks voluntarily banded together and restricted customers’ ability to convert deposits into currency. Deposits could still be used for payments (e.g. writing a check to settle a bill). This effectively provided two forms of money which were not convertible into each other. But it did effectively stop bank runs.

limitations the early periods do not match exactly: for 1873-1878 changes are 2/73 to 2/79, for 1893-1894 changes are 6/92 to 6/94.

October 1907 saw a banking panic, again with restriction of convertibility of deposits into cash (lifted in early 1908). Money stock fell by almost 4%, due to increases in deposit-to-reserve and deposit-to-currency ratios (i.e. banks' increased desire to hold reserves and individuals' increased desire to hold currency), only partly offset by an increase in high-powered money.

The period 1920-21 did not see a banking panic but rather a deliberate tightening of monetary policy by the Federal Reserve, with a substantial rise in the discount rate starting in early 1920. Money stock fell by over 5%, due to a fall in high-powered money.

The period 1929-33 is particularly important because the Great Depression is by far the most severe economic downturn in US economic history, at least for the past 150 years. Not only was it deeper and more prolonged than any other US downturn, it was also international in nature and counts as the most widespread and severe international downturn of modern times. Kindleberger dates the peak of the speculative cycle to September 1929 and NBER dates the peak of the business cycle to August 1929. The stock market crashed in October. Whatever the reason for the downturn (and it does seem have started decisively even prior to the October crash) declines in real income, consumer spending, and other real variables were substantial through 1930, with the pace accelerating after the October 1929 crash.

The October 1929 crash was essentially a widespread desire to switch from more to less risky assets. This was accomplished partly by a fall in price of the risky assets (the crash) and partly by, in essence, creating money to satisfy the demand for less risky assets: New York banks increased loans to brokers, thus increasing deposits and the stock of money.³ The New York Fed supplied additional reserves (increased high-powered money) allowing New York commercial banks to increase their deposits (New York commercial banks were unwilling to increase their deposit-to-reserve ratio as it was already lower than in other parts of the country). These actions were effective: "Despite the stock market crash, there were no panic increases in money market rates such as those in past market crises, and no indirect effects on confidence in banks." (Friedman and Schwartz p. 339)

Although real variables were falling through 1930, the situation significantly deteriorated with the banking crisis in October 1930, and the subsequent crises of March 1931 and March 1933. With the Federal Reserve now in existence, in contrast to 1893-94 and 1907-08, banks did not restrict convertibility. Restrictions might have broken the cycle that led from the desire for liquidity, to conversion of deposits to currency, through to bank runs and failure and yet more desire for liquidity. Friedman and Schwartz express the opinion that restriction in 1930 would have prevented the subsequent waves of failures. Friedman and Schwartz argue that the Federal Reserve could have supplied currency and reserves to the banking system that would have helped alleviate the pressure on banks to shrink deposits, thus helping to forestall the waves of bank failures. During the period after October 1930, however, high-powered money increased

³ Most of this chronology is from chapter 7 of Friedman and Schwartz (1963).

by only 18% (December 1930 to March 1933) and not sufficiently to offset banks' increased desire for reserves (as evidenced by the declining deposit-to-reserve ratio).

The net result is that during the 1929-1933 downturn the money stock fell by over 40%, due to substantial falls in the deposit-to-reserve and deposit-to-currency ratios and only partially offset by an increase in high-powered money.

Mechanism by which Monetary Disturbances Effect Output and Prices - Liquidity Preference and Demand for Money

The crisis and debt deflation stage of a speculative boom / bust is characterized by a sharp increase in the demand for liquidity. Everyone shuns risky assets and desires to hold the least risky asset, i.e. money of one sort or another. This corresponds to a sudden increase in liquidity preferences – in a standard money supply / money demand analysis, a sudden upward exogenous shift in the demand for money (for any given level of income, interest rates, etc.). I will now lay out a possible mechanism by which the shift up in liquidity preference can translate into a banking crisis.

There are two forms of adjustment to the increase in money demand. First, the general price level will fall (or rise less quickly) because money demand has risen relative to money supply.⁴ Second, agents will demand less risky forms of money so that, for example, demand for currency will increase relative to deposits.⁵ These two may interact to create a banking panic in the following manner.

The rise in money demand means agents will desire more currency and deposits (at the initial price level). Banks will demand more reserves; first to be able to supply more deposits; second because reserves have been depleted as agents convert deposits to currency, and finally because their desired holdings of reserves relative to deposits may have increased. But currency and reserves are created across the banking system as a whole only by an increase in high-powered money (by an increase in specie or fiat money, depending on the monetary regime). Say that the monetary base (high-powered money) is not increased. Banks will sell assets to realize cash for reserves. This will push down the price of assets (push up the interest rate) and may erode banks' balance sheet position. In addition the overall price level must fall (to equilibrate agents' demand and supply for money) which will tend to increase companies' real debt burden. If this weakens companies enough that bank loans start to sour, this may also erode banks' asset base and thus bank's balance sheet position.

⁴ There is sometimes debate about the relation between prices and money but there is no doubt that for large changes, prices are determined by the demand for money relative to the supply of money. Bernanke's macro textbook calls the close link between prices and money supply "one of the oldest and most reliable conclusions about macroeconomic behavior" (Abel, Bernanke, Croushore p 269). See also M. Friedman "The Supply of Money and Changes in Prices and Output".

⁵ Now, in contrast to the pre-1930s environment, there is probably little desire to switch from deposits to currency because federal deposit insurance and the long history (since the 1930s) with no depositor losses have confirmed the view that deposits are total fungible with currency. There may be, however, a desire to switch from money-market mutual funds to deposits, and September 2008 saw signs of such a switch.

In the extreme (and before federal insurance of bank deposits), the erosion of banks' balance sheet positions together with individuals' desire to convert deposits to currency may be sufficient to trigger a banking crisis and bank runs, where individuals try to withdraw deposits before a bank closes and thus force the bank to close. With deposit insurance today bank runs by individuals are not likely, but a bank may lose deposits on the wholesale market and suffer consequences equivalent to an old-fashioned bank run.⁶ The disruption to the financial and credit-creation system resulting from a banking crisis or series of bank runs will increase the severity of any downturn in real activity. The damaging effect of a banking crisis can be seen in the recessions discussed above.⁷

In the historical episodes, once a bank run developed the demand for currency relative to deposits increased and we would expect to see the deposit-to-currency ratio fall. This is what did occur after the banking crises of 1873, 1907, and 1929-33 (but not substantially after 1893).⁸ We should also expect to see the deposit-to-reserve fall as remaining banks try to strengthen their reserve position. This did occur after the banking crises of 1893, 1907, and 1929-33 (but not after 1873). Interestingly, there were no big falls in either the deposit-to-currency or deposit-to-reserve ratios after the 1920-21 speculative cycle, when there was not an associated banking panic.

The policy prescription to neutralize this possible series of events is to create high-powered money, and do so liberally. This says nothing more than what Walter Bagehot prescribed more eloquently: "A panic, in a word, is a species of neuralgia, and according to the rules of science you must not starve it. The holders of the cash reserve must be ready not only to keep it for their own liabilities, but to advance it freely for the liabilities of others."⁹ The creation of high-powered money will both provide reserves to banks, thus forestalling asset sales as banks shrink their asset base in an attempt to increase reserves relative to deposits, and help stop a fall in the general price level by supplying money to meet the increased money demand.

There are reasonable arguments, in fact, that the extreme length and severity of the Great Depression was in no small part due to the Fed's failure to appropriately increase the money stock. Chapter 7, section 6 of Friedman and Schwartz (1963) is an extended discussion of the likely result of alternative Fed policies during 1929-33. They conclude that things would have and could have been quite different: "The foregoing explanation of the financial collapse as

⁶ Iceland's banking system effectively collapsed fall of 2008 as international deposits disappeared.

⁷ Friedman and Schwartz (1963, p. 157) give a good example of the detrimental impact of a banking crisis:

The [1907-08] contraction is sharply divided into two parts by the banking panic that occurred in October 1907. From May to September, the contraction showed no obvious signs of severity. ... In October came the banking panic, culminating in the restriction of payments by the banking system, i.e., in a concerted refusal, as in 1893, by the banking system to convert deposits into currency or specie at the request of depositors. The contraction simultaneously became much more severe.

⁸ Today we would not expect currency to rise relative to deposits, but for deposits to increase relative to other forms of "money" such as money-market mutual fund holdings. Indeed from end-August (before the worst of the liquidity crisis hit) through end-December, deposits in the US rose by 28.3% or over 100% at an annual rate, presumably as holders switched from money-market funds. Indeed, Non-M1 M2 (which includes retail money funds) grew by only 3.7% over this period.

⁹ Quoted by Friedman and Schwartz (1963 p 395) from Walter Bagehot *Lombard Street*, London, Henry S. King, 1873, p. 51.

resulting so much from the shift of power from New York to the other Federal Reserve Banks and from personal backgrounds and characteristics of the men nominally in power [which forestalled effective remedial action] may seem farfetched. ... Yet it is also true that at times small events at times have large consequences.” (p. 419). Ben Bernanke has also stressed the importance of monetary policy actions during this period, and even acknowledged that the Fed was responsible: : “Regarding the Great Depression. You’re right, we [meaning the Federal Reserve] did it. We’re very sorry. But thanks to you [Friedman and Schwartz] we won’t do it again.” (Bernanke, “On Milton Friedman’s ninetieth birthday”, November 8, 2002.)

Prognosis and Current Fed Actions

Given historical precedent and the analysis regarding effects of the monetary shock associated with a speculative bust, one might predict an extreme recession, a banking panic, and price deflation. The analysis above, however, argued that the extreme effects of the monetary shock resulted when the money supply was not increased, or increased insufficiently. Examination of table 2 shows that high-powered money did not increase substantially during any of these periods. The largest change was for 1929-33, when the deposit-to-reserve and deposit-to-currency ratios fell so dramatically (associated with the banking panics) that the increase in high-powered money that did occur had absolutely minimal effect.

At present, however, we are in a quite different environment. The monetary base has exploded. Table 3 shows that the monetary base (high-powered money) has grown by almost 50% from the first quarter of 2008 to the most recent reporting period. Bank reserves have increased by almost seven times. The deposit-to-reserve ratio has collapsed, but unlike during the 1930s where that was due to a collapse in bank deposits, here banks’ reserves have increased. In fact deposits have grown, at points dramatically. During September (from the last week in August through the last week of September) deposits grew at 18.5% in response to concerns over money-market funds, but the deposit-to-reserve ratio still fell at an unprecedented rate. Under normal circumstances these numbers might signal future inflationary pressures. But these are not normal circumstances and I believe the Fed is acting appropriately, to supply liquidity and satisfy the increased demand for money.

Table 3 – Money Stock Measures

	Currency CU	Mon Base MB	Bank Res =MB-CU	Deposits DEP	Money, M1 =CU+DEP	RATIOS	
						Depo-reserve DEP/RES	Depo-curren DEP/CU
2002	609.0	662.9	53.9	587.3	1,196.2	10.891	0.964
2003	647.6	704.5	56.8	625.8	1,273.5	11.012	0.966
2004	680.7	741.1	60.4	663.8	1,344.4	10.983	0.975
2005	710.1	772.8	62.7	661.7	1,371.8	10.550	0.932
2006	740.1	803.1	63.0	634.3	1,374.4	10.067	0.857
2007	756.4	819.9	63.5	613.3	1,369.6	9.658	0.811
Q1 2008	759.4	823.7	64.3	612.3	1,371.7	9.530	0.806
Q2 2008	763.6	827.8	64.2	611.3	1,374.9	9.522	0.801
Q3 2008	776.8	861.1	84.3	640.2	1,417.1	7.595	0.824
9/08	780.1	903.5	123.4	673.8	1,453.9	5.459	0.864
10/08	795.1	1,128.5	333.4	678.0	1,473.1	2.034	0.853
11/08	804.9	1,433.6	628.7	717.5	1,522.4	1.141	0.891
29-Sep	783.7	984.7	201.0	726.4	1,510.1	3.614	0.927
6-Oct	787.0	984.7	197.7	677.6	1,464.6	3.428	0.861
13-Oct	791.5	1,141.7	350.2	664.8	1,456.3	1.898	0.840
20-Oct	795.9	1,141.7	345.8	659.2	1,455.1	1.906	0.828
27-Oct	800.2	1,235.8	435.6	687.3	1,487.5	1.578	0.859
3-Nov	802.9	1,235.8	432.9	728.7	1,531.6	1.683	0.908
10-Nov	803.0	1,476.4	673.4	707.3	1,510.3	1.050	0.881
17-Nov	803.8	1,476.4	672.6	703.3	1,507.1	1.046	0.875
24-Nov	805.2	1,469.0	663.8	726.5	1,531.7	1.094	0.902
1-Dec	808.8	1,469.0	660.2	729.7	1,538.5	1.105	0.902
8-Dec	809.6	1,658.1	848.5	773.0	1,582.6	0.911	0.955
15-Dec	811.8	1,658.1	846.3	794.9	1,606.7	0.939	0.979
22-Dec	813.3	1,686.4	873.1	778.3	1,591.6	0.891	0.957
29-Dec	819.5	1,686.4	866.9	786.1	1,605.6	0.907	0.959

Currency and Deposits are from table h.6.2 and h.6.8, Monetary Base from table h.3.1 and h.3.4 at <http://www.federalreserve.gov/releases/>

Further Fed and Treasury actions, such as direct injection of capital into banks, guarantees for money-market mutual funds, and intervention in the commercial paper market, have all been unprecedented, substantial, and apparently effective. From end-September to end-October the overnight libor rate fell by over 400bp, indicating a substantial easing of money market conditions.

My conclusion is that at present there is only a small likelihood that monetary shocks will translate into price deflation, banking panics, or substantially increased severity of the downturn. We will no doubt experience a severe recession. Because the speculative boom was also associated with increases in household debt (see www.closemountain.com/papers/macro_0810.pdf) I believe the collapse of the bubble will also entail de-leveraging of household balance sheets. Household de-leveraging will mean a slow-down in spending, and thus a recession, that could be quite severe. I would not be surprised to see the most serious recession since 1981-82 (where GDP contracted by 2.8%, unemployment went from roughly 7% to 11%) or even 1973-75 (where GDP contracted by 3.4% and

unemployment went from roughly 4% to 9%). But I think comparisons with the Great Depression are not warranted.

Nor do I think comparisons with Japan, concluding that the US may experience a substantial period of mild price deflation and stagnation in growth, are appropriate. Japanese monetary authorities never reacted with the aggressiveness that the US Fed and Treasury are exhibiting. Furthermore, the unwinding of speculative excesses was much delayed by the reluctance of banks to mark assets to market and recognize falling asset values.

The most recent appropriate comparison might be with Sweden. During the late 1980s and early 1990s Nordic countries experienced a cycle which appeared to be the result of a speculative boom followed by a financial crisis. Sweden's real GDP growth went negative in 1991:2 and remained negative through 1993:3 - a recession of 2 ½ years. Although the recession was quite severe, Sweden recovered well and grew rapidly following 1993 without suffering Japanese-style lingering stagnation. Again, this is consistent with sharp but relatively short recessions.

Ben Bernanke, "On Milton Friedman's ninetieth birthday", November 8, 2002, available at <http://www.federalreserve.gov/newsevents/speech/2002speech.htm>

A. Abel, B. Bernanke, D. Croushore (2008) *Macroeconomics 6th ed.*, Pearson Education, Inc.

M. Friedman "The Supply of Money and Changes in Prices and Output," in *The Optimum Quantity of Money and Other Essays*, Chicago, Aldine Publishing Co., 1969, reprinted in *The Essence of Friedman*, Stanford, Hoover Institution Press, 1987.

Milton Friedman and Anna J. Schwartz (1982), *Monetary Trends in the United States and the United Kingdom*, University of Chicago Press.

Milton Friedman and Anna J. Schwartz (1963), *A Monetary History of the United States, 1867-1960*, Princeton University Press

Charles Kindleberger (1989), *Manias, Panics, and Crashes - A History of Financial Crises*, revised edition 1989, Basic Books Inc.

T. Liesner, *Economic Statistics 1900-1983*, Facts on File, 1985