

## Why Money Matters: A Fourth Natural Experiment

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**Abstract:** Milton Friedman (2005, 2006) compared the behavior of money supply, nominal income and stock prices in the United States during the course of the 1920s and early 1930s with behavior in two other historical episodes, Japan in the 1980s and early 1990s and the United States in the 1990s and early 2000s. The three episodes, he argued, provided a natural experiment to test his and Anna J. Schwartz's explanation of the Great Depression of the 1930s. I use similar data for the U.S. recession that began in the fourth quarter of 2007 as a fourth such natural experiment. What makes this episode particularly interesting are the continuing comparisons between it and the Great Depression that have been made as events unfolded. The results are clear-cut. In the recent recession, like the U.S. recessions at the start of this century and the Japanese recession in the 1990s, there were no severe monetary shocks of the sort experienced in the 1930s. This recession, again like the other two, has been very much milder, and very likely will prove very much shorter than the Great Depression. This, in turn, is exactly what the Friedman and Schwartz hypothesis predicts.

**JEL Classifications:** E32, E51, E52, N12

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## **1 Introduction**

In an article published posthumously in the *Wall Street Journal*, “Why Money Matters,” Milton Friedman compared the behavior of money supply, nominal income and stock prices in the United States during the course of the 1920s and early 1930s with behavior in two other historical episodes, Japan in the 1980s and early 1990s and the United States in the 1990s and early 2000s.<sup>1</sup>

“These three episodes,” Friedman (2005, p. A20) argued, “provide [d] the equivalent of a controlled experiment” to test his and Anna J. Schwartz’s explanation of the Great Depression of the 1930s – in their terminology “the Great Contraction.” This experiment, Friedman went on to say, “consist[ed] in observing the effect on the economy and the stock market of the monetary policies followed during, and after, three very similar periods of rapid economic growth in response to rapid technological change.” The other two episodes, in addition to the Great Depression itself, were the recessions in Japan in the 1990s and in the United States near the start of this century.

## **2 A Fourth Episode**

As it turns out, we now have a fourth, albeit not yet completed, episode with which to test the Friedman and Schwartz hypothesis – the recession in the United States that began in the fourth quarter of 2007 and the boom period that preceded it. What makes this episode particularly interesting are the continuing comparisons between it and the Great Depression made by various commentators as events unfolded.<sup>2</sup>

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<sup>1</sup> An earlier version of the article was published in the *Journal of Economic Perspectives* in 2005.

<sup>2</sup> See for example Eichengreen and O’Rourke (6 April 2009) and subsequent updates, Krugman (2010), and Posner (2009).

In this episode, like the earlier three, the quantity of money serves as the counterpart to the experimenter's input while nominal income and stock prices serve as the counterpart to the experimenter's output. Like all three earlier contractions, the one now concluding was preceded by a period of continual increases in nominal income, stock prices and the quantity of money.

In all of these episodes, history provides the counterpart to the experimenter's laboratory controls. For as Friedman argued in connection with the earlier three episodes and as is true in this latest one, the booms all occurred in very similar economic settings – “developed private enterprise market economies, involved in international finance and trade, and with similar monetary systems, including a central bank with power to control the quantity of money.”

Completing the analogy with a laboratory experiment, are the differences that history has provided in the time pattern of variations in the quantity of money, the input variable. In the expansion phases of all four of these episodes, the behavior of the quantity of money was more or less the same, increases of varying degrees during most of the four expansions. In the contraction phases, in contrast, behavior differed substantially across the four episodes, much as it would in a proper laboratory experiment.

The question of interest, therefore, is whether the behavior of the output variables in the four contractions mirrored these differences in the behavior of the input variable, the quantity of money. For the three episodes that Friedman investigated, the answer was a rather emphatic “yes.” For this latest episode, the same thing holds.

Figures 1 through 3 and Table 1, all of which are patterned on Friedman's presentation of empirical results, speak to this issue. Figures 1 through 3 show the quarterly time paths of the quantity of money (M2), nominal income (GDP or GNP, depending upon

data availability) and stock prices (the Standard and Poor's Composite) during the course of the 1930s contraction and the current contraction and the boom periods that preceded them.<sup>3</sup> In all three charts, the series are quarterly averages aligned at the cycle peak. As in Friedman's presentation, all of these data are in the form of indices expressed as ratios of the quarterly observations to the respective averages during the six years prior to the cycle peak. For the money stock and nominal income the peaks are the quarterly reference cycle peaks, 1929.3 and 2007.4 respectively; for stock prices these are the specific cycle peaks, 1929.3 for the 1930's contraction and 2007.2 for the current contraction. The initial date in each instance is the quarter 24 quarters prior to the peak. The terminal dates in the respective episodes are 1933.1 and 2009.4.

The top half of Table 1 shows the cumulative increases in the quantity of money, nominal income and stock prices in all four boom phases; the bottom half shows the cumulative changes in the three variables in the contraction phases thereafter. The data for Japan in the 1990s and the United States in the 1990s and early 2000s come directly from Table 2 in Friedman's article.<sup>4</sup> Those for the United States in the 1920s and early 1930s and in the latest episode are my calculations.<sup>5</sup>

What stands out in particular in Figure 1 is the contrast between the behavior of the money stock after the respective business cycle peaks in the Great Depression and this latest

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<sup>3</sup> See the appendix for a list of data sources.

<sup>4</sup> The data for the United States in the 1990s are for M2, GDP in current prices and the Standard and Poor's index; the data for Japan are for M2 plus CD's (which Friedman describes as "conceptually equivalent" to M2 in the United States), GDP in current prices and the Nikkei Index. The initial, peak and terminal dates are listed in Table 1.

<sup>5</sup> Some of my data for the United States in the 1920s and 1930s are from different sources than Friedman's and, therefore, result in slightly different estimates of the cumulative changes during the boom and contraction phases of that cycle

episode. Prior to the peak, M2 followed close to an identical upward course for much of the period in both episodes. Then, a year or so before the peaks, the two time paths began to diverge, M2 growth slowing in the 1920s episode but continuing more or less apace in the latest one. After the peaks, however, is when the real divergence sets in, with M2 during the course of the Great Depression ultimately falling by an historically unprecedented 33 per cent and in this latest episode, in contrast, actually accelerating since the peak.

Consistent with Friedman's earlier results, the difference in the time paths of the money stock is reflected in similar differences in the time paths of nominal income and stock prices. We can see this in Figures 2 and 3. In the Great Depression, nominal income began its decline at the reference cycle peak and fell continuously thereafter, reaching a trough 14 quarters later at less than half its value at the peak. In this latest episode, the pattern has been very different. Nominal income continued to rise for three quarters after the business cycle peak, reflecting both the delayed decline in real income and continued increases in the GDP deflator. Nominal income declined during the next three quarters, reaching a trough in second quarter 2009 at 97 per cent of its peak value, but then in the two quarters that followed made up most of the shortfall.

In broad outline, stock prices in these two episodes exhibited similar patterns to nominal income. In the current episode, the boom was very much less pronounced and, because the data span the earlier dot-com decline, began later than in the 1920s. More important from the standpoint of the Friedman-Schwartz hypothesis, however, are the patterns of stock-price declines thereafter. In this latest episode, the Standard and Poor's index, peaked in 2007.2, remained very nearly constant over the next two quarters and then, following the peak in the economy in 2007.4, began a five-quarter decline. It reached a trough in 2009.1 a little below 45 per cent of its peak value. In the Great Depression, in

contrast, the index peaked in 1929.3 coincident with the peak in the economy and after a brief bounce back declined continuously over the following eleven quarters. When it finally reached its trough in 1932.1, the index stood 82 per cent below its peak value.

To add to the picture, I have plotted the data for real income in the two episodes. These data are shown in Figure 4. Like the three series examined above, real income increased substantially – though not continuously – during the respective boom periods. After the reference-cycle peaks were reached, however, is when the difference in the behavior of the two series again becomes manifest. Following the reference-cycle peak in 1929.3, real income declined precipitously – a cumulative 36 per cent drop until the reference-cycle trough was reached in 1933.1. In the latest episode – again as in the earlier comparisons – it behaved almost entirely differently. Real income declining for one quarter following the reference-cycle peak in 2007.4, in the next quarter more than made up that decline, and over the course of the next four quarters declined further. In 2009.2 – the likely date of the reference-cycle trough – it stood 3.8 per cent below its value in 2008.2. That decline, however, is less than a tenth of the decline experienced during the Great Depression. Its duration is less than a third that of the real-income decline during the Great Depression. In the two quarters, that have followed, moreover, the subsequent growth in real income has erased half of that 3.8 per cent loss.

Data summarizing the movements in the nominal money stock, nominal income and stock prices in both the expansion phases and contraction phases of the Great Depression, the latest episode and the two additional episodes studied by Friedman are shown in Table 1. These tell a very similar story to the data for the current episode. In the latter two episodes, we see very much the same picture as the latest one – substantial increases in the nominal

money stock, nominal income and stock prices during the expansion phase, and decreases thereafter that pale in comparison to those in the Great Depression.

Table 2 shows the rank correlations between the cumulative changes in the nominal money stock on the one hand and nominal income and stock prices on the other. We see a positive correspondence between the magnitude of the changes in money and the other two variables on the upside in all four episodes and, more important from the standpoint of the Friedman-Schwartz hypothesis, an even closer positive correspondence on the downside. These correlations range from .63 for money and nominal income during the expansion phases to 1.00 for the same two variables during the contraction phases.

### **3 Some Additional Observations**

The results that I have reported here are completely consistent with the broader set of findings on the role played by money in business contractions historically. Friedman and Schwartz, in a lengthy article published the same year as their *Monetary History of the United States* (1963a), entitled “Money and Business Cycles,” based on an analysis of U.S. data over the period 1867-1960 concluded that:(1963b, p. 53):

[There is] an extraordinarily strong case for the propositions that (1) appreciable changes in the rate of growth of the stock of money are a necessary and sufficient condition for appreciable changes in the rate of growth of money income; and that (2) this is true both for long secular changes and also for changes over periods roughly the length of business cycles.

They added (1963b, p. 55), however, that:

The case for a monetary explanation is not nearly so strong for the minor U.S. economic fluctuations that we have classified as mild depression cycles as the case is for the major economic fluctuations. Clearly, the view that monetary change is important does not preclude the existence of other factors that affect the course of business or that account for the quasi rhythmical character of business fluctuations. We have no doubt that other factors play a role.

Phillip Cagan, in his companion study (1965) to the Friedman and Schwartz volume, presented additional evidence for the United States in line with Friedman and Schwartz's conclusions. Cagan's focus was on the proximate determinants of the money supply – high-powered money, the currency-money ratio and the reserve-deposit ratio and their respective contributions to changes in money, both secularly and cyclically. With regard to cyclical movements, Cagan (1965, p. 267) concluded that his evidence was “consistent with, and, taken as a whole, impressively favors emphasis on the decline in the rate of monetary growth as the main reason some business contractions, regardless of what may have initiated them, became severe.” For milder cyclical contractions, he concluded that the relation between money and income was one of mutual dependence with causation running in both directions.

Wallace Huffman and I (1984), in a study of the transmission of cyclical fluctuations between the United Kingdom and the United States over the period 1833-1932, pursued a two-pronged approach. We used historical analysis similar to Cagan's to investigate the money-income relation in severe contractions and then estimated vector-autoregressive models for the two countries combined. We derived three important conclusions from our analyses: that monetary shocks were important independent factors leading to or worsening the severity and duration of the contractions in the two countries; that in severe contractions in both countries, such shocks were the most important causative factor; and that gold flows played a key role in transmitting monetary shocks from the one country to the other.

#### **4 Conclusions**

In Arthur Conan Doyle's tale “Silver Blaze” the key to Holmes cracking the case was that “the dog did nothing in the night.” The dog didn't bark. In the current recession, like Japan in the 1990s and the United States at the start of this century and now again more

recently, the key again is what did not happen. The Bank of Japan in the early 1990s and the Fed, both in this episode and the one that preceded it at the start of his century, did not let financial dislocations degenerate into classic banking crises with their resultant deleterious effects on money supplies. This in turn, I have argued, is the key to why none of the three recessions degenerated into turned into a “great depression.”

The current episode is particularly telling in this regard. Christina Romer, the Chair of the Council of Economic Advisers, in testimony before the Joint Economic Committee of the U.S. Congress in October 2009, described the U.S. economy as being “in terrible shape” at the start of that year, stating “that the shocks that hit the U.S. economy last fall were, by almost any measure, larger than those that precipitated the Great Depression (Romer, 2009, p. 1).”<sup>6</sup> To back up her claim, Romer presented data for both the Great Depression and the current recession for three factors that have figured prominently in discussions of the current episode: the decline in household wealth, uncertainty caused by increased volatility in financial markets and, as she termed it, the mood of “full-fledged financial panic” that had gripped those markets.<sup>7</sup>

Whether these factors exclusively “precipitated” the business decline that metastasized into the Great Depression might be argued. Nevertheless, they do speak to an important issue – the relative influence of monetary and credit shocks on cyclical declines. If credit crises were in fact the senior partner in such episodes, the recent recession should have been very much worse, matching, if not exceeding, the Great Depression in severity.

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<sup>6</sup> See also the discussions of the current episode by Bartram and Bodnar (2009), Dwyer and Tkac (2009), Lothian (2009), Melvin and Taylor (2009) and Taylor (2009).

<sup>7</sup> The specific measures Romer used in these comparisons were the percentage change in household wealth from 2007 to 2008 and from 1928 to 1929, the variance of daily stock returns for the periods September to December 2008 and September to December 1929, and the change in the spread between the yields on AAA and BAA corporate bonds for the periods September 2008 to December 2008 and September 1929 to December 1930.

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## **Data appendix:**

### United States, 1923-1933

Nominal and real income: GNP in current and constant prices from Balke and Gordon (1986).

Nominal stock of money: M2 from Friedman and Schwartz (1963).

Stock prices: Standard and Poor's Composite Index from Robert J. Shiller's web page.

### United States, 2001-2009

Nominal and real income: GDP in current and constant prices from the FRED database maintained by the Federal Reserve Bank of St. Louis.

Nominal stock of money: M2 from the FRED database.

Stock prices: Standard and Poor's Composite Index from Robert J. Shiller's web page.

### United States, 1995-2004

Figures are for nominal GDP, M2 and the Standard and Poor's Index, all of which were taken from the table in Friedman (2006).

### Japan 1986-1995

Figures are for nominal GDP, M2 plus CDs and the Nikkei Index, all of which were taken from the table in Friedman (2006).

**Table 1. Behavior of money supply, nominal income and stock-price indices in four expansions and the contractions that followed**

	US 1920s	Japan 1980s	US 1990s	US 2000s
<b><u>Ratio of value at peak to value six years earlier</u></b>				
<b>Money supply</b>	1.27	1.59	1.44	1.19
<b>Nominal income</b>	1.26	1.43	1.37	1.38
<b>Stock-price index</b>	3.70	3.86	3.20	1.34
<b><u>Ratio of value in terminal quarter to value at peak</u></b>				
<b>Money supply</b>	0.72	1.07	1.26	1.55
<b>Nominal income</b>	0.47	1.34	1.18	0.99
<b>Stock-price index</b>	0.22	0.37	0.58	0.73

Notes:

Initial, peak and terminal dates are as follows: US, 1920s: 1923.3, 1929.3, 1933.1 for both the business cycle and the stock-market cycle. Japan, 1980s: 1986.1, 1992.1, 1995.3 for the business cycle and 1983.4, 1989.4, 1993.4 for the stock-market cycle.

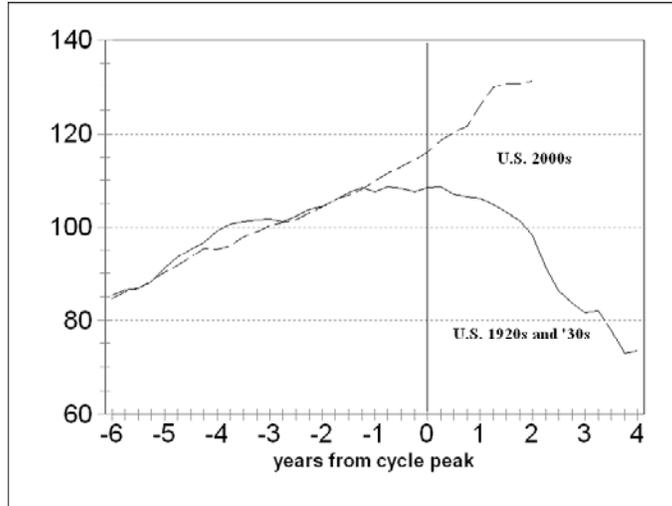
US, 1990s: 1995.1, 2001.1, 2004.3 for the business cycle and 1994.3, 2000.3, 2004.3 for the stock-market cycle. US, 2000s: 2001.4, 2007.4, 2009.4 for the business cycle and 2001.4, 2007.2 and 2009.4 for the stock-market cycle.

The data and their sources are described in the appendix.

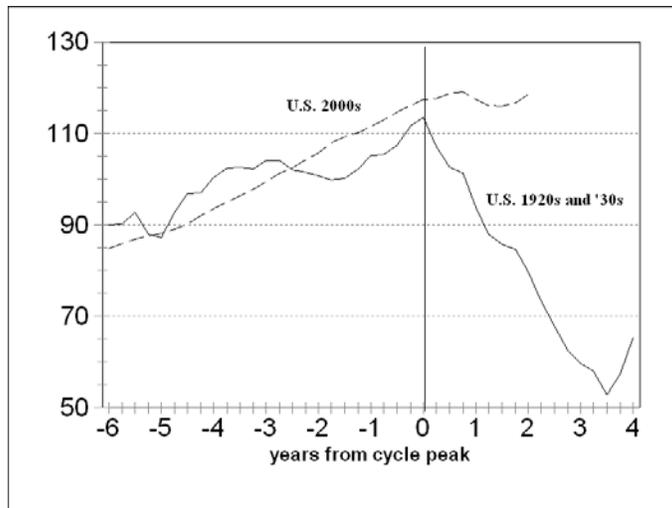
**Table 2. Rank correlations:  
Data for four cyclical episodes**

<b><u>Expansion phases</u></b>	
<b>Money supply, Nominal income</b>	0.63
<b>Money supply, Stock prices</b>	0.80
<b><u>Contraction phases</u></b>	
<b>Money supply, Nominal income</b>	1.00
<b>Money supply, Stock prices</b>	0.80

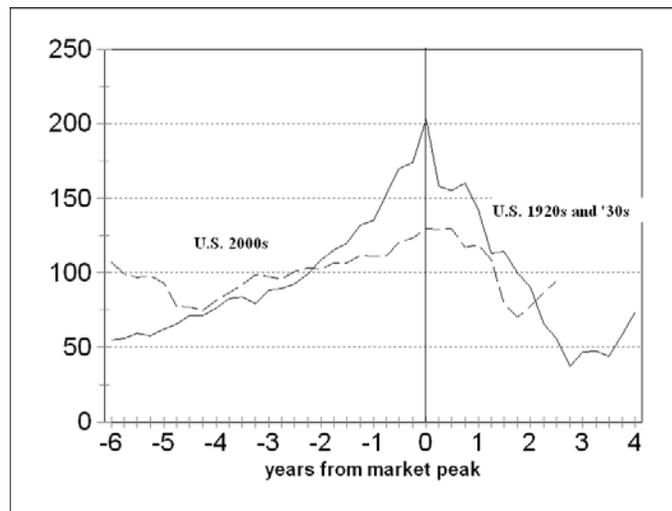
**Fig. 1. Money as a percentage of the average for six years prior to peak.**



**Fig 2. Nominal GDP as a percentage of the average for six years prior to peak.**



**Fig. 3. Stock prices as a percentage of the average for six years prior to peak.**



**Fig. 4. Real GDP as a percentage of the average for six years prior to peak**

