

# A Natural Experiment in Monetary Policy Covering Three Episodes of Growth and Decline in the Economy and the Stock Market

Milton Friedman

**T**he third of three episodes in a major natural experiment in monetary policy that started more than 80 years ago is just now coming to an end. The experiment consists 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 booms of the 1920s in the United States, the 1980s in Japan and the 1990s in the United States.

The prosperous 1920s in the United States were followed by the most severe economic contraction in its history. In our *Monetary History* (1963, chapter 7, pp. 299–419), Anna Schwartz and I attributed the severity of the contraction to a monetary policy that permitted the quantity of money to decline by one-third from 1929 to 1933. Since 1963, two episodes have occurred that are almost mirror images of the U.S. economy in the 1920s: the 1980s in Japan and the 1990s in the United States. All three episodes were marked by a long period of rapid economic growth, sparked by rapid technological change and the emergence of new industries, and accompanied by a stock market boom that terminated in a crash. Monetary policy played a role in these booms, but only a supporting role. Technological change appears to have been the major player.

These three episodes provide the equivalent of a controlled experiment to test our hypothesis about what we termed “The Great Contraction.” In this experiment, the quantity of money is the counterpart of the experimenter’s input. The performance of the economy and the level of the stock market are the counterpart of the experimenter’s output, that is, the variables whose relation to input the

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experimenter is seeking to determine. The three boom episodes all occurred in 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. This is the counterpart of the controlled conditions of the experimenter's laboratory.

## **Behavior of the Money Supply**

In addition, history has provided a close counterpart to the kind of variation in input that our hypothetical experimenter might have deliberately chosen. As Figure 1 shows, monetary policy, as measured by the behavior of the quantity of money, was very similar in the three boom periods, very different in the three postboom periods, with settings that might be described as low, medium, high.

To measure the quantity of money, I use M2 in the United States and the conceptually equivalent M2 plus certificates of deposit in Japan.<sup>1</sup> To express the data for the two countries and the widely separated periods in comparable units, I use as an index of the money stock, the ratio of the quantity of money to its average value for the six years prior to the cycle peak. The peak quarter of the relevant business cycle, as estimated by the National Bureau of Economic Research, is the third quarter of 1929 (29.3) for the earlier U.S. episode; the first quarter of 1992 (92.1) for Japan; and the first quarter of 2001 (01.1) for the second U.S. episode. Finally, the data are plotted to align the dates at the cycle peak.

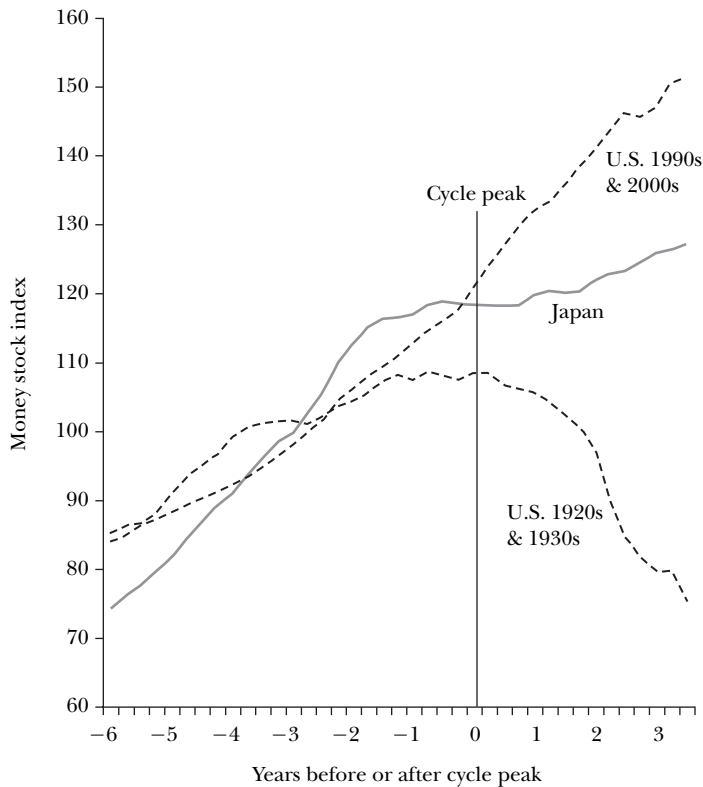
Figure 1 shows a striking contrast between the period before the cycle peak and the period after the cycle peak. There are some differences before the peak—money growth is slowest on the average for the earlier U.S. episode, fastest for Japan—but the differences are small, and there is reasonably steady money growth in all three episodes. The contrast with the period after the cycle peak could hardly be greater. Money supply declines sharply after the cycle peak in the first episode, goes from stable to rising mildly in the second and rises steadily and sharply in the third. Our hypothetical experimenter planned his experiment well.

## **Behavior of GDP**

The results of the third episode of this natural experiment are now all in. Figure 2 shows how gross domestic product in nominal terms (dollars or yen in current prices) behaved during the boom and postboom periods. I use nominal GDP rather than real GDP because M2 is also a nominal magnitude. How changes in nominal GDP are divided between prices and output is an important question, but one that is not directly relevant to this experiment. One further preliminary comment: I believe the erratic behavior of nominal GNP during the 1920s and

<sup>1</sup> I use M2 rather than either narrower aggregates, such as the base or M1, or broader aggregates, such as M3, because in prior research I have found M2 to have a more reliable relation to other economic magnitudes than the other monetary aggregates.

Figure 1  
Money Growth in Three Episodes



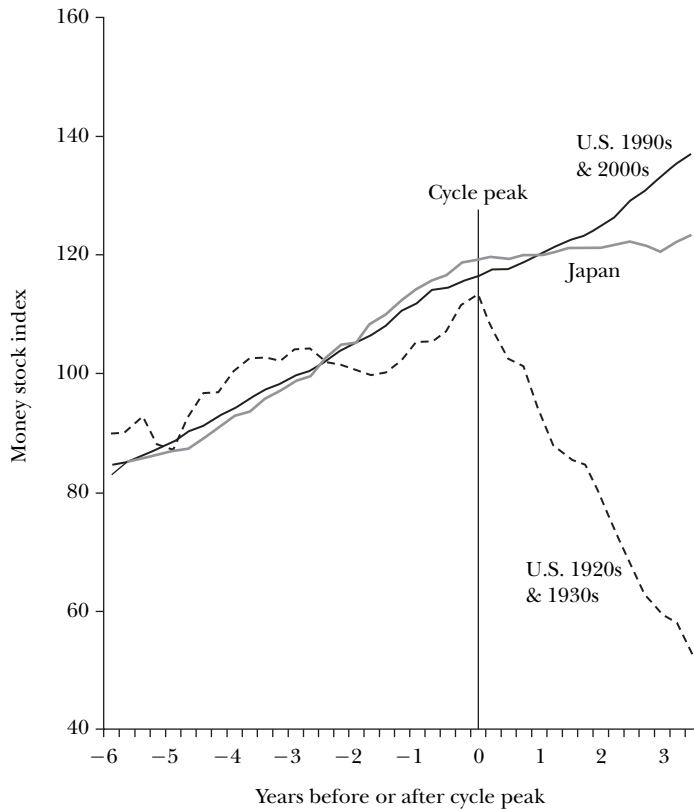
Notes: Data are money stock as percentage of average for six years prior to peak. Dates are chosen to align cycle peaks. The initial dates in the figure are 1923:3 for the U.S. 1920s, 1986:1 for Japan 1980s and 1995:1 for U.S. 1990s. The peak occurs at 1929:3 for the U.S. 1920s, at 1992:1 for Japan 1980s and at 2001:1 for U.S. 1990s. The terminal dates in the figure are 1933:1 for the U.S. 1920s, 1995:3 for Japan 1980s and 2004:3 for U.S. 1990s.

1930s, which I have drawn from Balke and Gordon (1986), is largely a statistical artifact. The data for that period are scarce and of poor quality. The rest of the data used in this paper are from Haver Analytics.

As in Figure 1, there is a striking contrast between the boom and the postboom periods: roughly similar growth during the booms, widely variable growth during the postboom period. Both before and after the cycle peak, nominal GDP growth paralleled monetary growth. During the boom, money and nominal GDP grew most rapidly in Japan, most slowly in the first U.S. episode and at an intermediate rate in the second U.S. episode. Table 1 shows the ratio of the money stock at the cycle peak to its value six years earlier (the initial date in the figures) and the corresponding ratio for GDP. In the first two rows of the table, the ratios are highest for Japan, lowest for the U.S. 1920s.

After the cycle peak, money fell sharply in the first episode and so did nominal GDP; money growth stagnated in the second episode and so did GDP; money grew at

Figure 2

**Economic Growth in Three Episodes**

*Notes:* Data are nominal GDP as percentage of average for six years prior to peak. Dates are chosen to align cycle peaks. The initial dates in the figure are 1923:3 for the U.S. 1920s, 1986:1 for Japan 1980s and 1995:1 for U.S. 1990s. The peak occurs at 1929:3 for the U.S. 1920s, at 1992:1 for Japan 1980s and at 2001:1 for U.S. 1990s. The terminal dates in the figure are 1933:1 for the U.S. 1920s, 1995:3 for Japan 1980s and 2004:3 for U.S. 1990s.

a rapid rate in the third episode and, after a brief lag (corresponding to the mild 2001 recession) so did GDP. Table 2 shows the ratio of the money stock at the terminal date plotted to its value at the cyclical peak and the corresponding ratio for GDP. Both ratios are decidedly lowest for the U.S. 1920s and decidedly highest for the U.S. 1990s.

**Behavior of the Stock Market**

The peak of the stock market, as measured by Standard and Poor's index, coincided with the cycle peak in the first episode, both occurring in the third quarter of 1929 (29.3). However, that was not the case in the later episodes. In Japan, stock prices as measured by the Nikkei index peaked in the fourth quarter of 1989 (89.4), nine quarters before the cycle peak. In the second U.S. episode,

Table 1

**Ratio of Value at Cycle or Stock Peak to Value Six Years Earlier**

	<i>U.S. 1920s</i>	<i>Japan 1980s</i>	<i>U.S. 1990s</i>
Money	1.27	1.59	1.44
GDP	1.26	1.43	1.37
Stocks	3.33	3.86	3.20

Table 2

**Ratio of Terminal Value to Value at Cycle or Stock Peak**

	<i>U.S. 1920s</i>	<i>Japan 1980s</i>	<i>U.S. 1990s</i>
Money	0.70	1.07	1.25
GDP	0.47	1.04	1.18
Stocks	0.17	0.37	0.58

stock prices as measured by Standard and Poor's 500 peaked in the third quarter of 2000 (00.3), two quarters prior to the cycle peak. Accordingly, Figure 3 plots the data to align the series at the stock market peak.

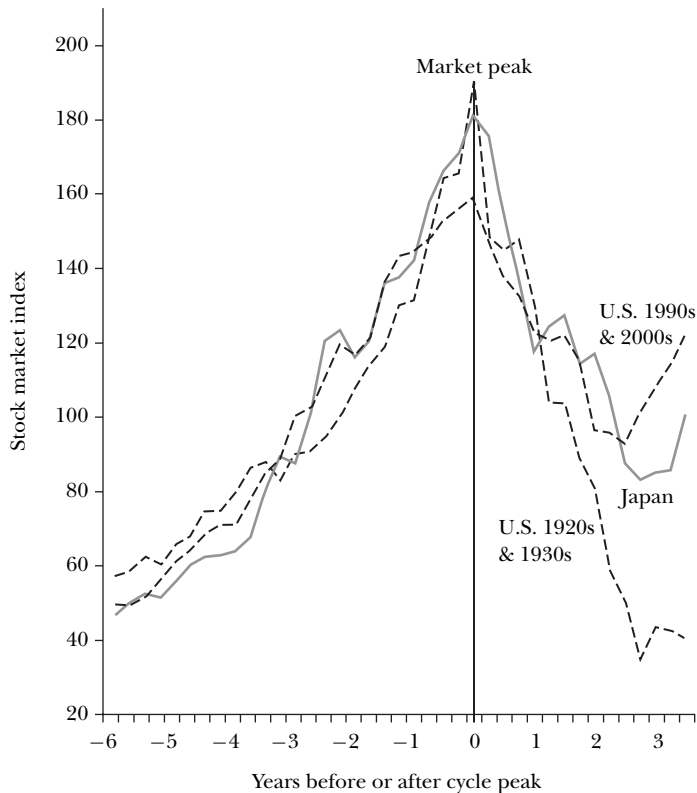
The near identity of the three stock market series during the boom is truly remarkable. Yet even the minor deviations that exist reflect to some extent the differences in monetary growth, as Table 1 makes clear. Money growth was highest in Japan, and the Nikkei shows the largest rise in the stock market. The other two do not conform: money rose more in the 1990s than in the 1920s, while stock prices rose slightly less, as shown by the ratio of peak to initial value in Table 2.

Of more interest for our purpose is what happened after the peak. For a year after the peak, the three stock price series fell in tandem, responding to the inner dynamics of a collapsing bubble. Then, the differences in monetary policy began to have an effect. Beginning in late 1930, the S&P index started falling away from the others under the influence of a collapsing money stock. For another year and a half, the other two indexes move in tandem. Then the much more expansive policy of the Federal Reserve in the 1990s than of the Bank of Japan in the 1980s takes effect and pulls the S&P 500 index away from the Nikkei, which stabilizes in response to the passive monetary policy of the Bank of Japan (as shown by the numbers in Table 2).

## Conclusion

The results of this natural experiment are clear, at least for major ups and downs: what happens to the quantity of money has a determinative effect on what happens to national income and to stock prices. The results strongly support Anna Schwartz's and my 1963 conjecture about the role of monetary policy in the Great Contraction. They also support the view that monetary policy deserves much credit for the mildness of the recession that followed the collapse of the U.S. boom in late 2000.

Figure 3

**Stock Markets in Three Episodes**

*Notes:* Data are stock market indexes as percentage of average for six years prior to peak. Dates are chosen to align market peaks. As noted in the text, the stock market peak does not align exactly with the peak of GDP, so the dates in Figure 3 are slightly different from those in Figures 1 and 2. In Figure 3, the initial dates in the figure are 1923:3 for the U.S. 1920s, 1983:4 for Japan 1980s and 1994:3 for U.S. 1990s. The peak occurs at 1929:3 for the U.S. 1920s, at 1989:4 for Japan 1980s and at 2000:3 for U.S. 1990s. The terminal dates in the figure are 1933:3 for the U.S. 1920s, 1993:4 for Japan 1980s and 2004:3 for U.S. 1990s.

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