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# **Monetary Policy in the Great Depression: What the Fed Did, and Why**

**S**IXTY YEARS AGO the United States—indeed, most of the world—was in the midst of the Great Depression. Today, interest in the Depression's causes and the failure of government policies to prevent it continues, peaking whenever the stock market crashes or the economy enters a recession. In the 1930s, dissatisfaction with the failure of monetary policy to prevent the Depression, or to revive the economy, led to sweeping changes in the structure of the Federal Reserve System. One of the most important changes was the creation of the Federal Open Market Committee (FOMC) to direct open market policy. Recently Congress has again considered possible changes in the Federal Reserve System.<sup>1</sup>

This article takes a new look at Federal Reserve policy in the Great Depression. Historical analysis of Fed performance could provide insights into the effects of System organization on policy making. The article begins with a macroeconomic overview of the Depression. It then considers both contemporary and modern views of the

role of monetary policy in causing the Depression and the possibility that different policies might have made it less severe.

Much of the debate centers on whether monetary conditions were “easy” or “tight” during the Depression—that is, whether money and credit were plentiful and inexpensive, or scarce and expensive. During the 1930s, many Fed officials argued that money was abundant and “cheap,” even “sloppy,” because market interest rates were low and few banks borrowed from the discount window. Modern researchers who agree generally believe neither that monetary forces were responsible for the Depression nor that different policies could have alleviated it. Others contend that monetary conditions were tight, noting that the supply of money and price level fell substantially. They argue that a more aggressive response would have limited the Depression.

Among those who conclude that contractionary monetary policy worsened the Depression, there has been considerable debate about why

<sup>1</sup>“The Monetary Policy Reform Act of 1991” (S. 1611) would have abolished the FOMC and thereby ended the voting on open market policy by Federal Reserve Bank presidents. Although hearings on the bill were held, it was not brought to a vote before Congress adjourned at the end of 1991. The Banking Act of 1935 established the

present form of the FOMC, whose members include the Board of Governors of the Federal Reserve System and the 12 Reserve Bank presidents. Five of the presidents vote on policy on a rotating basis.

Federal Reserve officials failed to respond appropriately. Most explanations fall into two categories. One holds that Fed officials, though well-intentioned, failed to understand that more aggressive action was needed. Some researchers, like Friedman and Schwartz (1963), argue that the Fed's behavior during the Depression contrasted sharply with its behavior during the 1920s. They contend that the death of Benjamin Strong in 1928 led to a redistribution of authority within the System that caused a distinct deterioration in Fed performance. Strong, who was Governor of the Federal Reserve Bank of New York from the System's founding in 1914 until his death, dominated Federal Reserve policymaking in the years before the Depression.<sup>2</sup> These researchers argue that authority was dispersed after his death among the other Reserve Banks, whose officials were less knowledgeable and failed to recognize the need for aggressive policies. Other researchers, like Wicker (1966), Brunner and Meltzer (1968), and Temin (1989), contend that Strong's death caused no change in Fed performance. They argue that Strong had not developed a countercyclical policy and that he would have failed to recognize the need for vigorous action during the Depression. In their view, Fed errors were not due to organizational flaws or changes, but simply to continued use of flawed policies.

A second category of explanations holds that the Fed's contractionary policy was deliberate. Epstein and Ferguson (1984) and Anderson, Shughart and Tollison (1988) contend that Fed officials understood that monetary conditions were tight. Epstein and Ferguson assert that the Fed believed a contraction was necessary and inevitable. When it did act, they argue, it was to promote the interests of commercial banks, rather than economic recovery. Anderson, Shughart and Tollison emphasize even more the

Fed's interest in aiding its member banks. They argue that monetary policy was designed to cause the failure of nonmember banks, which would enhance the long-run profits of member banks and enlarge the System's regulatory domain.

## AN OVERVIEW OF THE GREAT DEPRESSION

Analysts generally agree that the economic collapse of the 1930s was extremely severe, if not the most severe in American history. To provide a sense of the Depression, Figures 1-3 plot GNP, the price level and the unemployment rate from 1919 to 1939. As the figures show, after eight years of nearly continuous expansion, nominal (current dollar) GNP fell 46 percent from 1929 to 1933. Real (constant dollar) GNP fell 33 percent and the price level declined 25 percent. The unemployment rate went from under 4 percent in 1929 to 25 percent in 1933.<sup>3</sup> Real GNP did not recover to its 1929 level until 1937. The unemployment rate did not fall below 10 percent until World War II.<sup>4</sup>

Few segments of the economy were unscathed. Personal and firm bankruptcies rose to unprecedented highs. In 1932 and 1933, aggregate corporate profits in the United States were negative. Some 9,000 banks, with \$6.8 billion of deposits, failed between 1930 and 1933 (see figure 4). Since some suspended banks eventually reopened and deposits were recovered, these figures overstate the extent of the banking distress.<sup>5</sup> Nevertheless, bank failures were numerous and their effects severe, even compared with the 1920s, when failures were high by modern standards.

Much of the debate about the causes of the Great Depression has focused on bank failures.

<sup>2</sup>Until changed by the Banking Act of 1935, the chief executive officers of the Reserve Banks held the title "governor." Today these officers are titled "president," while members of the Board of Governors, which replaced the Federal Reserve Board in 1935, now hold the title "governor."

<sup>3</sup>The appendix provides a list of sources for the data used in this article. The GNP and unemployment series used here are standard, but Romer (1986a, 1986b) presents new estimates of GNP and unemployment for the 1920s. Both new estimates exhibit less variability than those traditionally used; Romer's estimate of the unemployment rate in 1929 is 4.6 percent, compared with 3.2 percent plotted here.

<sup>4</sup>Darby (1976) argues that the unemployment rate series considerably overstates the true rate after 1933 because it takes persons employed on government relief projects as unemployed. Kesselman and Savin (1978) offer an opposing view. Regardless of which argument is accepted, unemployment during the 1930s was exceptionally severe, particularly since there were relatively few multi-income households.

<sup>5</sup>There was no deposit insurance in these years. The Banking Act of 1933 created federal deposit insurance. During the 19th and early 20th centuries a number of states experimented with insurance plans for their state-chartered banks, but none was still in existence by 1930. See Calomiris (1989) for a survey of the state systems.

Figure 1  
Nominal and Real Gross National Product

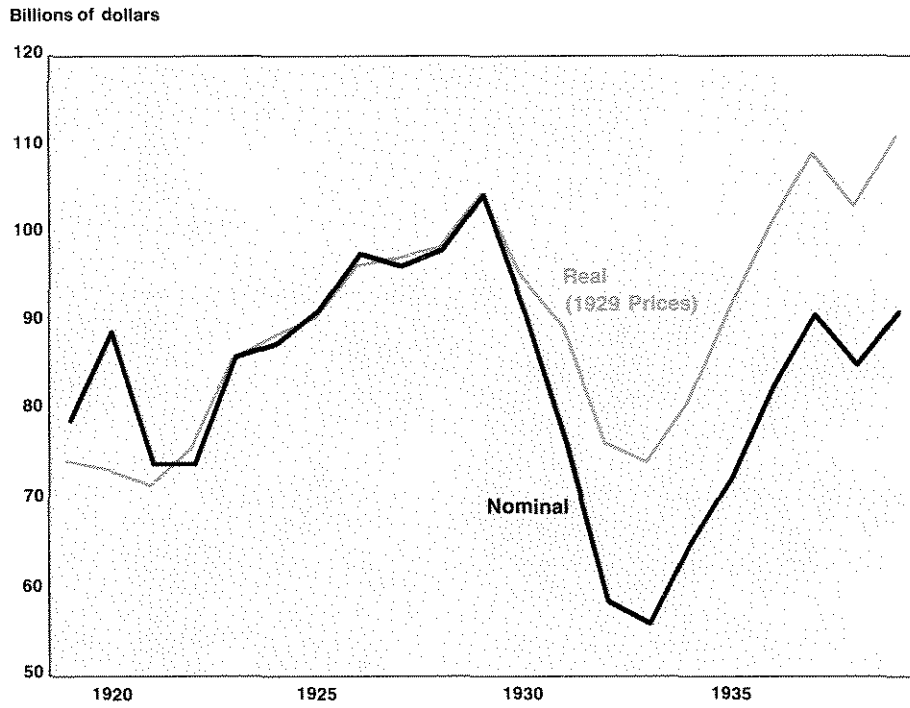
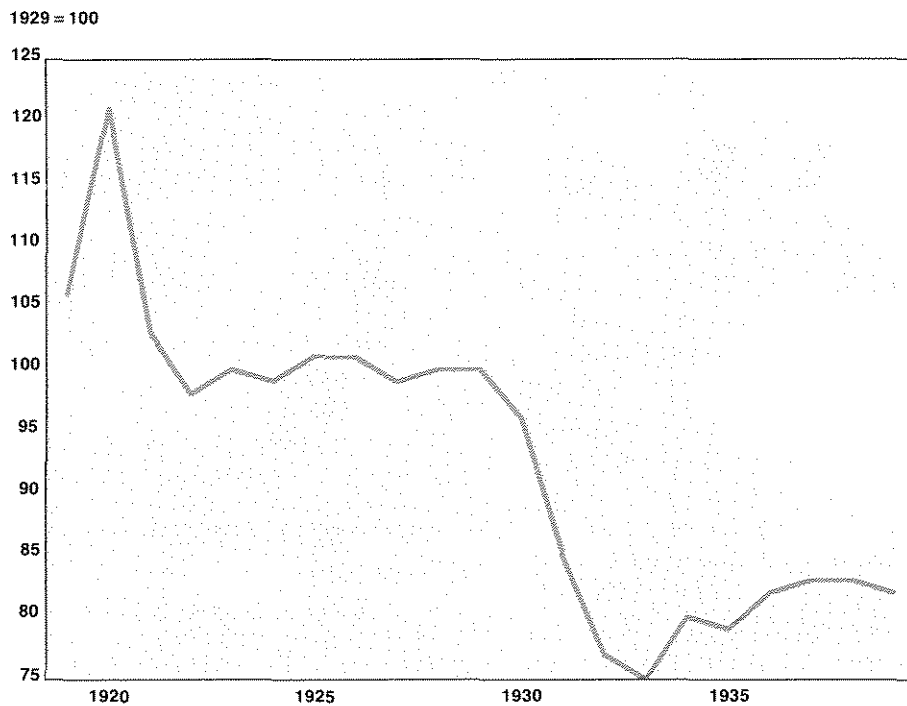
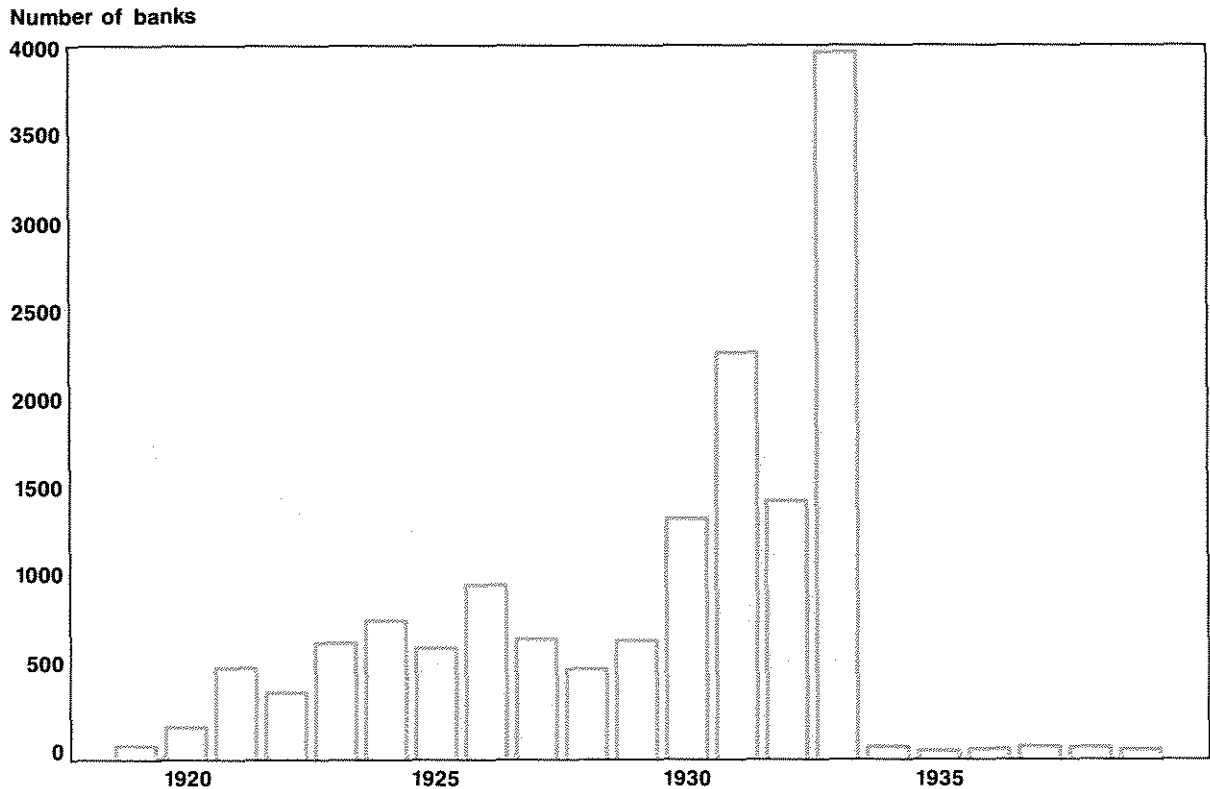


Figure 2  
Implicit Price Index



**Figure 3**  
**Unemployment Rate**



Were they merely a result of falling national income and money demand? Or were they an important cause of the Depression? Most contemporaries viewed bank failures as unfortunate for those who lost deposits, but irrelevant in macroeconomic significance. Keynesian explanations of the Depression agreed, including little role for bank failures. Monetarists like Friedman and Schwartz (1963), on the other hand, contend that banking panics caused the money supply to fall which, in turn, caused much of the decline in economic activity. Bernanke (1983) notes that bank failures also disrupted credit markets, which he argues caused an increase in the cost of credit intermediation that significantly reduced national output. In these explanations, the Federal Reserve bears much of the blame for the Depression because it failed to prevent

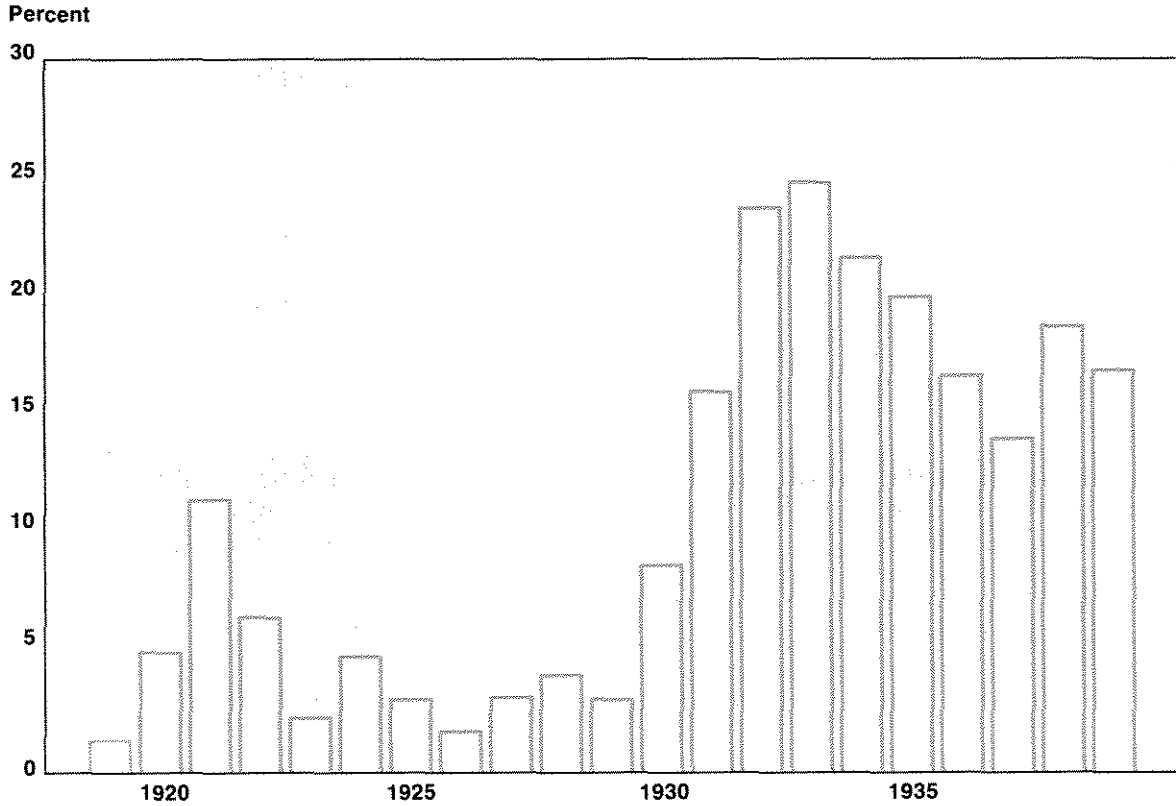
the banking panics and money supply contraction.

#### THE ROLE OF MONETARY POLICY: ALTERNATIVE VIEWS

Today there is considerable debate about the causes of business cycles and whether government policies can alleviate them.<sup>6</sup> Just as there is no consensus now, contemporary observers had many different views about the causes of the Great Depression and the appropriate response of government. A few economists, like Irving Fisher (1932), applied the Quantity Theory of Money, which holds that changes in the money supply cause changes in the price level and can affect the level of economic activity for short periods. These economists argued that the Fed should prevent deflation by increasing the money supply. At the

<sup>6</sup>See Belongia and Garfinkel (forthcoming).

**Figure 4**  
**Bank Suspensions**



other extreme, proponents of "liquidationist" theories of the cycle argued that excessively easy monetary policy in the 1920s had contributed to the Depression, and that "artificial" easing in response to it was a mistake. Liquidationists thought that overproduction and excessive borrowing cause resource misallocation, and that depressions are the inescapable and necessary means of correction:

In the course of a boom many bad business commitments are undertaken. Debts are incurred which it is impossible to repay. Stocks are produced and accumulated which it is impossible to sell at a profit. Loans are made which it is impossible to recover. Both in the sphere of finance and in the sphere of production, when the boom breaks, these bad commitments are revealed. Now in order that

revival may commence again, it is essential that these positions should be liquidated. . . .<sup>7</sup>

One implication of the liquidationist theory is that increasing the money supply during a recession is likely to be counterproductive. During a minor recession in 1927, for example, the Fed had made substantial open market purchases and reduced its discount rate. Adolph Miller, a member of the Federal Reserve Board, who agreed with the liquidationist view, testified in 1931 that:

It [the 1927 action] was the greatest and boldest operation ever undertaken by the Federal Reserve System, and, in my judgment, resulted in one of the most costly errors committed by it or any banking system in the last 75 years. I am inclined to think that a different policy at that time would have left us with a different

<sup>7</sup>Lionel Robbins, *The Great Depression* (1935) [quoted by Chandler (1971), p. 118].

condition at this time. . . . That was a time of business recession. Business could not use and was not asking for increased money at that time.<sup>8</sup>

In Miller's view, because economic activity was low, the reserves created by the Fed's actions fueled stock market speculation, which led inevitably to the crash and subsequent depression.

During the Depression, proponents of the liquidationist view argued against increasing the money supply since doing so might reignite speculation without promoting an increase in real output. Indeed, many argued that the Federal Reserve had interfered with recovery and prolonged the Depression by pursuing a policy of monetary ease. Hayek (1932), for example, wrote:

It is a fact that the present crisis is marked by the first attempt on a large scale to revive the economy. . . by a systematic policy of lowering the interest rate accompanied by all other possible measures for preventing the normal process of liquidation, and that as a result the depression has assumed more devastating forms and lasted longer than ever before (p. 130).

Several key Fed officials shared Hayek's views. For example, the minutes of the June 23, 1930, meeting of the Open Market Committee report the views of George Norris, Governor of the Federal Reserve Bank of Philadelphia:

He indicated that in his view the current business and price recession was to be ascribed largely to overproduction and excess productive capacity in a number of lines of business rather than to financial causes, and it was his belief that easier money and a better bond market would not help the situation but on the contrary might lead to further increases in productive capacity and further overproduction.<sup>9</sup>

While the liquidationist theory of the business cycle was commonly believed in the early 1930s,

it died out quickly with the Keynesian revolution, which dominated macroeconomics for the next 30 years. Keynesian explanations of the Depression differed sharply from those of the liquidationists. Keynesians tended to dismiss monetary forces as a cause of the Depression or a useful remedy. Instead they argued that declines in business investment or household consumption had reduced aggregate demand, which had caused the decline in economic activity.<sup>10</sup> Both views, however, agreed that monetary ease prevailed during the Depression.

Friedman and Schwartz renewed the debate about the role of monetary policy by forcefully restating the Quantity Theory explanation of the Depression:

The contraction is. . . a tragic testimonial to the importance of monetary forces. . . . Different and feasible actions by the monetary authorities could have prevented the decline in the stock of money. . . [This] would have reduced the contraction's severity and almost as certainly its duration (pp. 300-01).

Friedman and Schwartz argue that an increase in the money stock would have offset, if not prevented, banking panics, and would have led to increased lending to consumers and business that would have revived the economy.

Many disagree with the Friedman and Schwartz explanation, although some recent Keynesian explanations concede that restrictive monetary policy did play a role in the Depression.<sup>11</sup> Other studies, such as Field (1984), Hamilton (1987), and Temin (1989), conclude that contractionary monetary policy in 1928 and 1929 contributed to the Depression. Bordo (1989) and Wicker (1989) provide detailed surveys of the monetarist-Keynesian debate about the causes of the Great Depression, and interested readers are referred to them. Since most recent contributions to this literature emphasize the effects of monetary policy, a new look at the policies of the Federal Reserve during the Great Depression is warranted.

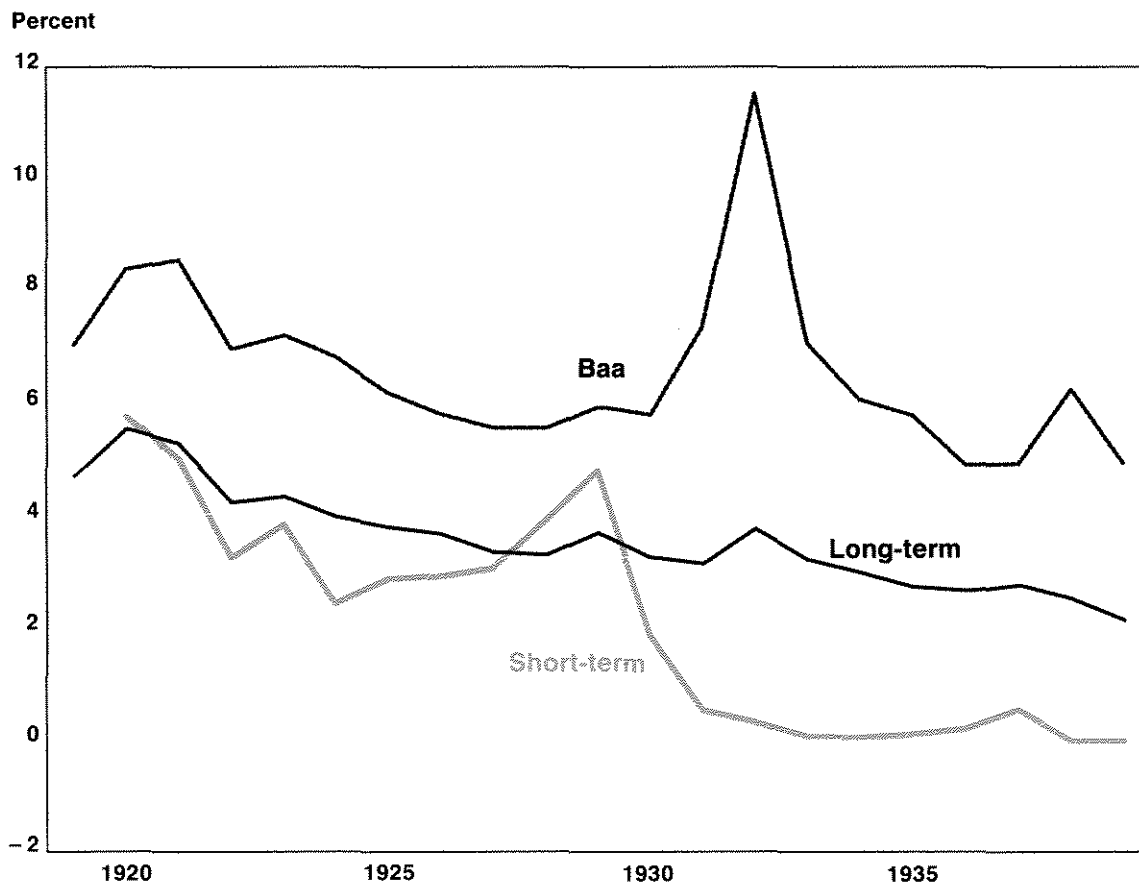
<sup>8</sup>U.S. Senate (1931), p. 134.

<sup>9</sup>Quoted by Chandler (1971), pp. 136-37. De Long (1990) details the liquidationist cycle theory, and Chandler (1971), pp. 116-23, has a general discussion of prevailing business cycle theories and their prescriptions for monetary policy.

<sup>10</sup>See Temin (1976) for a survey of Keynesian explanations of the Great Depression.

<sup>11</sup>Most criticize the Fed's discount rate increases and failure to replace reserve losses suffered by banks in the panic following Great Britain's departure from the gold standard in late 1931. See Temin (1976), p. 170, and Kindleberger (1986), pp. 164-67.

**Figure 5**  
**Interest Rates**



### WERE MONETARY CONDITIONS EASY OR TIGHT?

A fundamental disagreement within the Federal Reserve System and among outside observers, even today, is whether monetary policy during the Depression was easy or tight. Most Fed officials felt that money and credit were plentiful. Short-term market interest rates fell sharply after the stock market crash of 1929 and remained at extremely low levels throughout the 1930s (see figure 5). To most observers, the decline in short-term rates implied monetary ease. Long-term interest rates declined less sharply, however, and yields on risky bonds, such as

Baa-rated bonds, rose during the first three years of the Depression (see figure 5).<sup>12</sup> Nevertheless, the exceptionally low yields on short-term securities has suggested to many observers an abundance of liquidity.

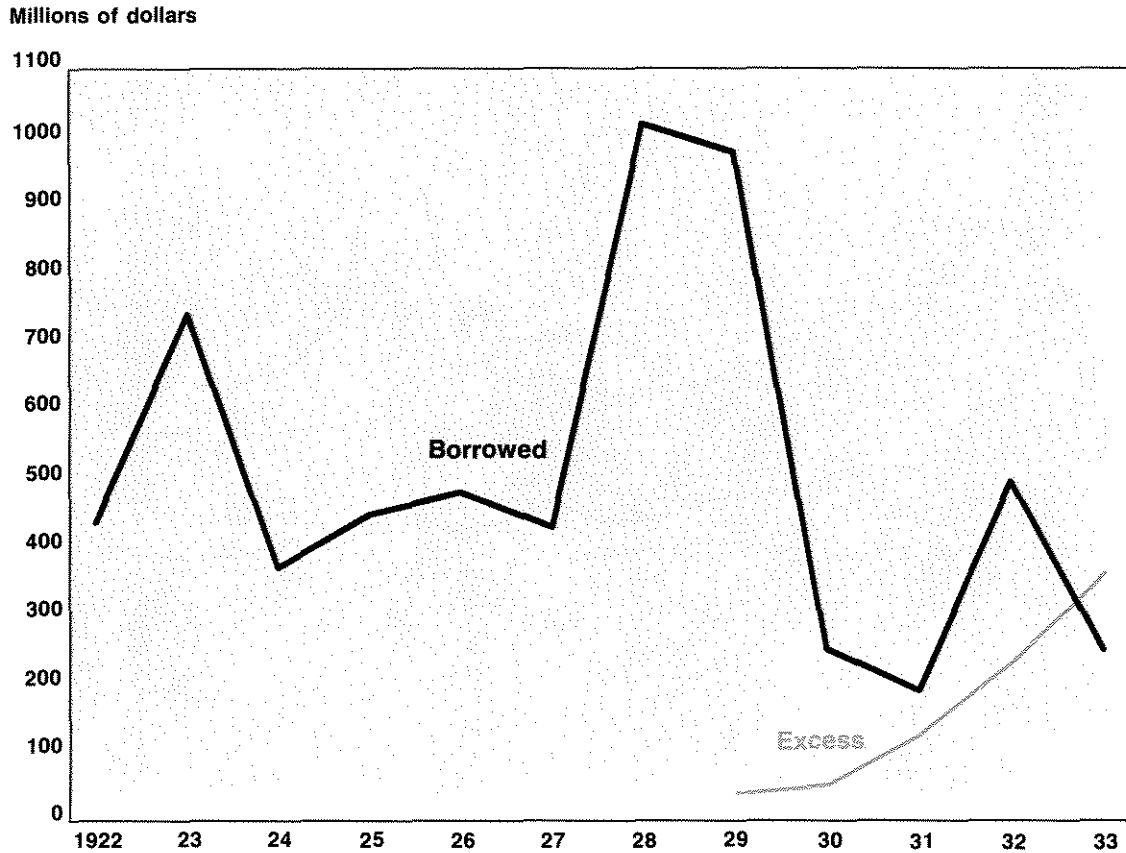
Other variables also have been interpreted as indications of easy monetary conditions. Relatively few banks came to the Fed's discount window to borrow reserves, for example, and many banks built up substantial excess reserves as the Depression progressed (see figure 6).<sup>13</sup> To most observers, it appeared that there was little demand for credit and, since most policymakers saw their mission as one of accommodating

<sup>12</sup>The short-term rate series through 1933 is the average daily yield in June of each year on three- to six-month Treasury notes and certificates, and the yield on Treasury bills thereafter. The long-term series is the average daily

yield in June of each year on U.S. government bonds.

<sup>13</sup>Data on excess reserves before 1929 are not available, but they were not likely very large.

**Figure 6**  
**Borrowed and Excess Reserves of**  
**Federal Reserve Member Banks**



ing credit demand, few believed that more vigorous expansionary actions were necessary.<sup>14</sup>

Low interest rates and an apparent lack of demand for reserves have led many researchers to conclude that tight money did not cause the Depression. Temin (1976), for example, writes:

There is no evidence of any effective deflationary pressure from the banking system between the stock-market crash in October 1929 and the British abandonment of the gold standard in

September 1931. . . . There was no rise in short-term interest rates in this two-year period. . . .

The relevant record for the purpose of identifying a monetary restriction is the record of short-term interest rates (p. 169).

Other indicators of monetary conditions, however, suggest the opposite conclusion. Deflation implied that the value of the dollar rose 25 percent from 1929 to 1933, which Schwartz

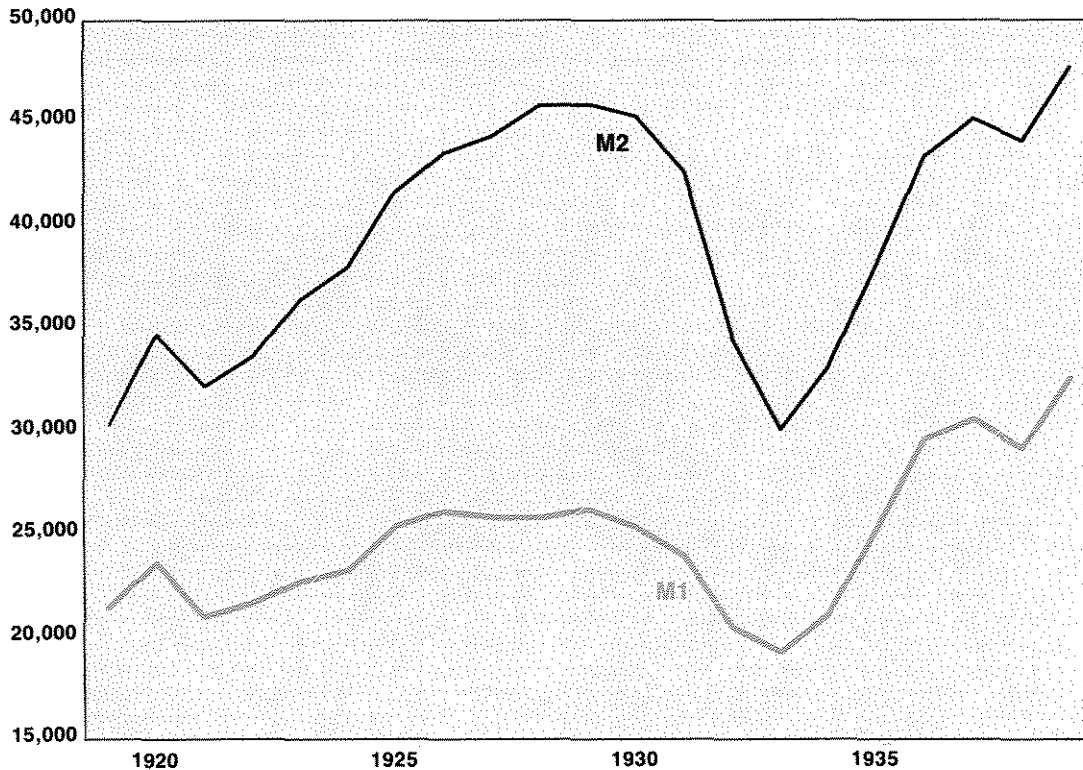
<sup>14</sup>The Federal Reserve System's founders intended that it operate according to the Real Bills Doctrine. Fed credit would be extended primarily through the discount window as member banks borrowed to finance short-term agricultural or business loans. A decline in economic activity would reduce discount window borrowing, causing Federal Reserve credit to decline. By 1924, System policy had evolved away from a strict Real Bills interpretation, but it

probably continued to have considerable influence on many Fed officials. See West (1977) or Wicker (1966) for discussion of the influence of the Real Bills Doctrine on policy over time.



**Figure 7**  
**Money Supply**

Millions of dollars



(1981) argues reflected exceptionally tight money. Another indicator, the money stock, fell by one-third from 1929 to 1933 (see figure 7).<sup>15</sup> Friedman and Schwartz contend that:

It seems paradoxical to describe as 'monetary ease' a policy which permitted the stock of money to decline. . . by a percentage exceeded only four times in the preceding fifty-four years and then only during extremely severe business-cycle contractions (p. 375).

And finally, numerous studies point out that the real interest rate, that is, the interest rate ad-

justed for changes in the price level, rose sharply during the Depression (see figure 8).<sup>16</sup> While the nominal yield on short-term government securities fell to an exceptionally low level, deflation implied that their real yield rose above 10 percent in 1930 and 1931. Thus, in contrast to the apparent signal given by nominal interest rates, member bank borrowing and excess reserves, the falling money stock and deflation suggest that monetary conditions were far from easy.<sup>17</sup>

Many economists now conclude that the Federal Reserve should have responded more

<sup>15</sup>M1 is the sum of coin and currency held by the public and demand deposits. M2 also includes time deposits at commercial banks.

<sup>16</sup>See Meltzer (1976) and Hamilton (1987), for example. The real interest rate plotted in figure 8 is calculated as the prevailing yield on short-term government securities in June of each year, less the rate of inflation in the subsequent year. Since actual, rather than anticipated, inflation is used to calculate the real rate, it is considered an *ex post*, rather than *ex ante*, rate.

<sup>17</sup>Yet another indicator is the real money supply, i.e., the growth rate of the nominal supply of money less the expected rate of inflation. Since the price level fell faster than the nominal supply of money (M1 or M2) during the first two years of the Depression, Temin (1976) argues that monetary conditions were not tight. The increase in real money balances was relatively slow, however, which Hamilton (1987) argues was contractionary.

**Figure 8**  
**Ex Post Real Interest Rate**



vigorously to the Depression. There is little agreement, however, about why the Fed did not. The next sections examine alternative explanations for Federal Reserve behavior during the Depression.

#### THE IMPACT OF STRONG'S DEATH: ALTERNATIVE VIEWS

Irving Fisher testified before Congress in 1935 that the Depression was severe because "Governor Strong had died and his policies died with him. . . . I have always believed, if he had lived, we would have had a different situation."<sup>18</sup> According to Fisher, Benjamin Strong had discovered how to use monetary policy to maintain

price level stability, "and for seven years he maintained a fairly stable price level in this country, and only a few of us knew what he was doing. His colleagues did not understand it."<sup>19</sup> In Fisher's view, Strong adjusted the quantity of money to maintain a stable price level; had he lived, Fisher says, he would have prevented the deflation of the 1930s by not allowing the quantity of money to decline.

Friedman and Schwartz agree with Fisher that Strong's death caused monetary policy to change significantly. They argue that Strong's aggressive open market purchases and discount rate reductions in 1924 and 1927 had quickly alleviated recessions, but that his death produced a sharply different policy during the Depression:

<sup>18</sup>U.S. House of Representatives (1935), p. 534.

<sup>19</sup>Ibid, pp. 517-20.

If Strong had still been alive and head of the New York Bank in the fall of 1930, he would very likely have recognized the oncoming liquidity crisis for what it was, would have been prepared by experience and conviction to take strenuous and appropriate measures to head it off, and would have had the standing to carry the System with him (pp. 412-13).

Friedman and Schwartz make a persuasive case. Strong was an experienced financial leader. He had served as an officer of Bankers Trust Company, and during the Panic of 1907 as head of a committee reporting to J. P. Morgan that determined which financial institutions could be rescued.<sup>20</sup> He was the first governor of the Federal Reserve Bank of New York and emerged as leader of the Federal Reserve System both because of his personality and stature in the financial community and because of the relative importance of New York member banks in the international financial market.<sup>21</sup> He chaired a committee of Federal Reserve Bank governors that coordinated System open market operations and represented the System in dealings with foreign central banks and Congress.<sup>22</sup> It is clear that, with his death, the Fed lost an experienced and forceful leader.

Some researchers argue, however, that Strong's death had little effect on policy. Temin (1989), for example, writes that "The death of Strong was a minor event in the history of the Great Depression" (p. 35). And Brunner and Meltzer (1968) argue that, "While there is some evidence that the death of Benjamin Strong contributed to a shift in the balance of power within the Federal Reserve. . . we find that a special explanation of monetary policy after 1929 is unnecessary. . ." (p. 341). The disagreement between these authors and those such as Fisher, Friedman and Schwartz rests on their views of whether Strong's policies would have prevented the monetary collapse and Depression.

## WHAT WAS STRONG'S POLICY?

Much of Strong's testimony before Congressional committees, as well as other speeches and writings, suggests that he had developed a policy of money supply control to limit fluctuations in the price level. For example, in an unpublished article dated April 1923, he wrote: "If, as is now universally admitted, prices are influenced to advance or to decline by increases or decreases in the total of 'money'. . . then the task of the System is to maintain a reasonably stable volume of money and credit. . ." <sup>23</sup> And, in a speech to the American Farm Bureau in December 1922, he said that monetary policy:

. . . should insure that there is sufficient money and credit available to conduct the business of the nation and to finance not only the seasonal increases in demand but the annual or normal increase in volume. . . I believe that it should be the policy of the Federal Reserve System, by the employment of the various means at its command, to maintain the volume of credit and currency in this country at such a level so that, to the extent that the volume has any influence upon prices, it cannot possibly become the means for either promoting speculative advances in prices, or of a depression of prices.<sup>24</sup>

These statements suggest that Strong would not have permitted the money supply collapse or deflation that occurred after 1929.

Other aspects of Strong's testimony, speeches and writings give different or ambiguous impressions of his views, however, making it difficult to infer what policies he would have advocated during the Depression. In testimony before the House Banking Committee in 1926, Strong described the relationship between Fed policy and the quantity of bank deposits, discussing in detail the multiplier relationship between bank reserves and deposits.<sup>25</sup> But he also

<sup>20</sup>Chandler (1958), pp. 27-28.

<sup>21</sup>The Federal Reserve Act gave the individual Reserve Banks authority to initiate discount rate changes and open market operations. The Federal Reserve Board could approve or disapprove these actions, but its role was primarily supervisory, with no clear authority to determine policy. Because of this, and perhaps because it lacked forceful leaders, the Board did not dominate policy making until after the System was restructured by the Banking Act of 1935. See Wheelock (forthcoming) for details of this reorganization.

<sup>22</sup>Initially, each Reserve Bank determined its own open market operations. But Treasury Department complaints that

they made it difficult to price new debt issues and a growing understanding of the impact of open market operations on economic activity, led the Banks to form a "Governors Committee" to coordinate open market operations. This committee was replaced in 1923 by the Open Market Investment Committee, which Strong headed until his death.

<sup>23</sup>"Prices and Price Control," in Burgess (1930), pp. 229-30.

<sup>24</sup>Quoted by Chandler (1958), p. 200.

<sup>25</sup>U.S. House of Representatives (1926), pp. 334-35.

testified that, "when it comes to a decline of price level, the origin of which can not be attributed to a credit policy, this effort that you make by a credit policy to arrest a fall of prices may do more harm than good. . . ."26 It is also difficult to interpret his writing that "the task of the System is to maintain a reasonably stable volume of money and credit, *with due allowances for seasonal fluctuations in demand, for normal annual growth in the country's development. . . and with such allowance as may be imposed by those great cycles of prosperity and depression. . .*"27 What sort of allowance for fluctuations does he mean? This statement could be read as advocating an increase or a *decrease* in money in response to a decline in economic activity. The latter is suggested by the following statement: "there should be no such excessive or artificial supplies of money and credit as will simply permit the marking up of prices when there is no increase in business or production to warrant an increase in the volume of money and credit."28 This sounds like the warnings by some officials during the Depression that monetary expansion would be inflationary or cause speculation *because* economic activity was low.

Strong also seems to have concluded that the deflation from mid-1920 to 1921 had positive effects:

The deflation which took place in the United States following the collapse of prices resulted in extricating the reserve system—the whole monetary system of the country—from a position of permanent entanglement. . . and I think that was one of the fortunate results of the policy. . . . One of the results of this liquidation. . . has been to put this country on as sound or a sounder monetary basis than any other country in the world, without the introduction of a lot of money or credit into circulation, based solely upon the Government debt to the bank of issue. I mean to explain that there have been offsetting advantages to that deflation. . . .29

This quotation suggests that Strong might have found similar offsetting advantages to the deflation that followed the stock market crash in 1929 and might have been reluctant to expand the money supply through purchases of government securities.

These quotations illustrate the ambiguity of many of Strong's statements and the difficulty of inferring what policies he would have pursued in the 1930s. To determine whether monetary policy was changed by Strong's death, it is probably more instructive to examine the policies he actually implemented.

Two aspects of Strong's policies have received attention from scholars studying Federal Reserve behavior. First, beginning in the early 1920s, the System offset or "sterilized" gold flows and other changes in reserve funds by altering the volume of Fed credit outstanding.<sup>30</sup> This policy limited fluctuations in bank reserves and, thus, in the money supply and price level. According to Friedman and Schwartz (1963), pp. 394-99, however, the Fed permitted gold outflows during the Depression to reduce bank reserves and the money supply and more than offset gold inflows. What had been an essentially neutral policy, therefore, became a contractionary policy after Strong's death.

Miron (1986) argues that a similar change occurred in the Fed's accommodation of seasonal credit and currency demands. From the System's inception, Federal Reserve credit was supplied to prevent seasonal demands from draining bank reserves and increasing interest rates. According to Miron, the Fed was less accommodative after 1928, which contributed to the frequency of financial crises during the Depression.<sup>31</sup>

Beyond the offsetting of gold and currency flows, a second aspect of Strong's policies has received considerable attention. In 1924 and 1927, the Fed made large open market purchases and discount rate reductions that were followed by increases in bank reserves and the

<sup>26</sup>Ibid, p. 577.

<sup>27</sup>"Prices and Price Control," April 1923, in Burgess (1930), p. 230 (italics added).

<sup>28</sup>From a speech to the American Farm Bureau in 1922 [quoted by Chandler (1958), p. 200].

<sup>29</sup>U.S. House of Representatives (1926), p. 309.

<sup>30</sup>Federal Reserve credit is supplied by Fed purchases of securities and discount window lending (member bank borrowing). It consists also of some miscellaneous compo-

nents, such as float. In this era, the Federal Reserve purchased both U.S. government securities and bankers acceptances (at fixed acceptance buying rates), and discount window lending consisted of both rediscount of eligible paper and advances to member banks at the discount rate.

<sup>31</sup>Miron does not test this claim except to show that Federal Reserve credit was somewhat less seasonal after 1928 than before.

money supply. Friedman and Schwartz (1963) argue that the Fed's purpose was to combat recessions and that its failure to respond as aggressively during the Depression reflected a distinct change in System behavior. Other researchers, however, such as Wicker (1966) and Brunner and Meltzer (1968), find no inconsistency in Fed behavior, arguing that the comparatively weak response to the Depression was in fact predictable from the policy strategy developed by Strong.

### *The Sterilization Policy*

Before entering World War I, the United States absorbed large gold inflows that added directly to bank reserves and caused a significant money supply increase.<sup>32</sup> Although inflows ceased after America entered the war, bank reserves and the money supply continued to increase rapidly as Federal Reserve credit was extended to help finance the war. After the war, gold outflows reduced the reserves of the Reserve Banks, leading them to raise their discount rates and thereby restrict credit to member banks.<sup>33</sup> The resulting decline in Fed credit coincided with a sharp decline in the money supply and deflation.<sup>34</sup>

Following the violent inflation-deflation cycle of 1917-21, the Fed began to intervene to prevent gold flows from affecting bank reserves.<sup>35</sup> In testimony before the House Committee on Banking and Currency, Strong gave a clear explanation of this policy, presenting charts showing the relationship between gold flows, Fed credit, bank reserves and the price level.<sup>36</sup> He explained:

In the old days there was a direct relation between the country's stock of gold, bank deposits and the price level because bank deposits

were. . . based upon the stock of gold and bore a constant relationship to the gold stock, and the volume of bank deposits and the general price level were similarly related. But in recent years the relationship between gold and bank deposits is no longer as close or direct as it was, because the Federal Reserve System has given elasticity to the country's bank reserves. Reserve Bank credit has become the equivalent of gold in its power to serve as the basis of bank credit. . . . Hence. . . the present basis for bank credit consists of gold plus Federal Reserve credit. Federal Reserve bank credit is an elastic buffer between the country's gold supply and bank credit.<sup>37</sup>

Strong credited the Federal Reserve System for preventing inflation in 1921 and 1922:

As the flow of gold imports was pouring into the United States in 1921 and 1922, many economists abroad, and in this country as well, expected that this inward flow of gold would result in a huge credit expansion and a serious price inflation. That no such expansion or inflation has taken place is due to the fact that the amount of Federal Reserve credit in use was diminished as the gold imports continued. Thus, in the broad picture of financial events in this country since 1920, the presence of the Reserve System may be said to have prevented rather than fostered inflation.<sup>38</sup>

Figure 9 illustrates the policy of offsetting gold and currency flows during the 1920s.<sup>39</sup> The shaded insert on pages 18-19 describes the mechanics of this policy. Since gold is a source of banking system reserves, gold inflows, unless offset, add to the stock of reserves. A gold inflow thus has the same effect on reserves as a

<sup>32</sup>The accompanying shaded insert discusses the sources and uses of reserve funds and explains the mechanics of the Fed's sterilization policy.

<sup>33</sup>The Reserve Banks were required to maintain gold reserves of 40 percent against their note issues and 35 percent against deposits. A discount rate increase was intended to reduce discount loans and, thus, the Fed's note and deposit liabilities, as well as encourage gold inflows as investors sought higher yields in the United States.

<sup>34</sup>In January 1916, the All Commodities Price Index stood at 112.8 (1913 = 100). In April 1917 (when the United States entered the war), it was at 172.9. At its peak in May 1920, the index was at 246.7. It then fell to a low of 138.3 in January 1922.

<sup>35</sup>Before the war, the Fed lacked the resources to offset gold inflows, so sterilization was impossible. By the end of 1921, the Reserve Banks had sufficient reserves to reduce

their discount rates, and individually they began to purchase government securities. By 1923, there seems to have been a conscious effort to offset gold flows [Friedman and Schwartz (1963), pp. 279-87].

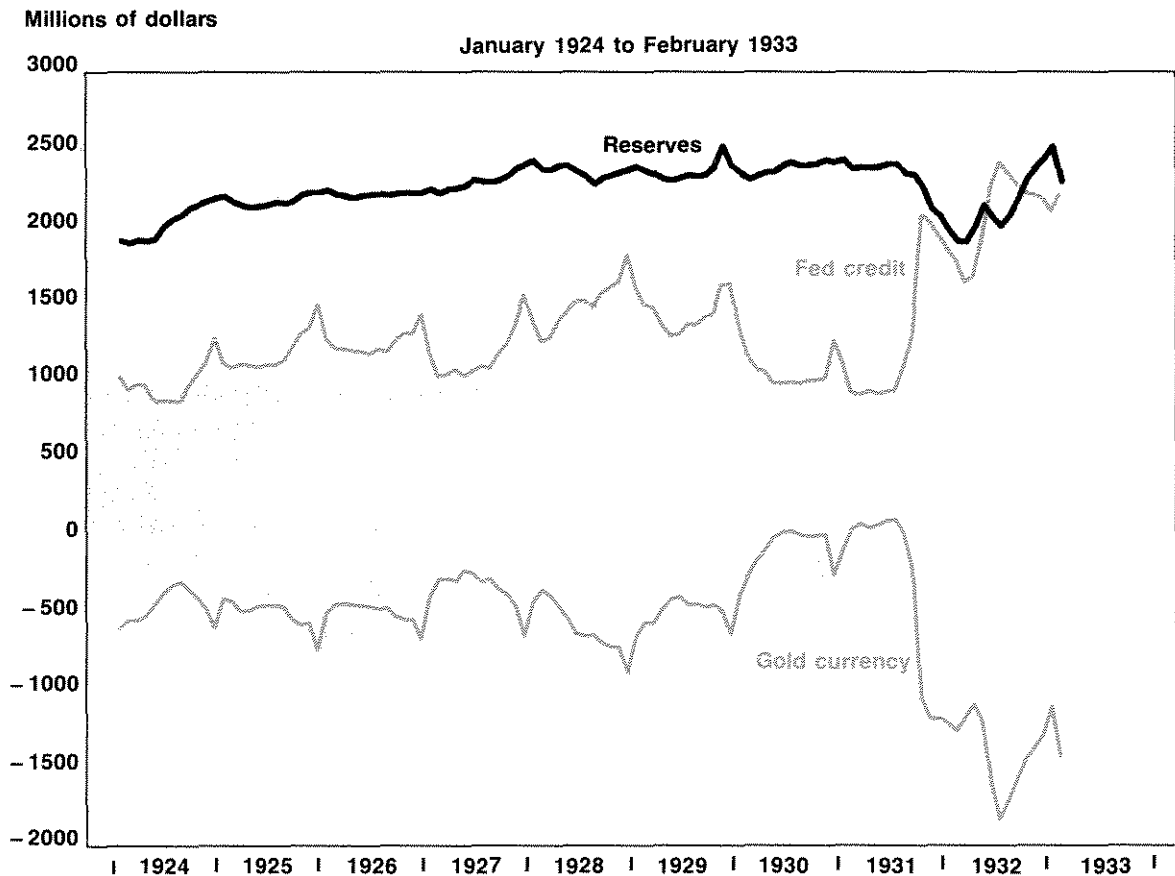
<sup>36</sup>These charts are reproduced by Hetzel (1985), p. 7, who examines Strong's unwillingness to support legislation that would require the Fed to adopt a price level stabilization rule.

<sup>37</sup>U.S. House of Representatives (1926), p. 470.

<sup>38</sup>Ibid, p. 471.

<sup>39</sup>In practice, the Fed also offset changes in other sources and uses of reserve funds, but gold and currency flows were the most substantial; the others can be ignored for illustrative purposes.

## Figure 9 Gold and Currency Sterilization



Federal Reserve purchase of securities. Currency held by the public is a use of reserves: increases in public currency holdings reflect reserve withdrawals from banks. Thus, if not offset, an increase in currency would correspond to a decrease in bank reserves. The difference between gold and currency is plotted in figure 9. It is clear that net increases (decreases) in this difference were largely offset by declines (increases) in Fed credit outstanding, so that total bank reserves changed relatively little.

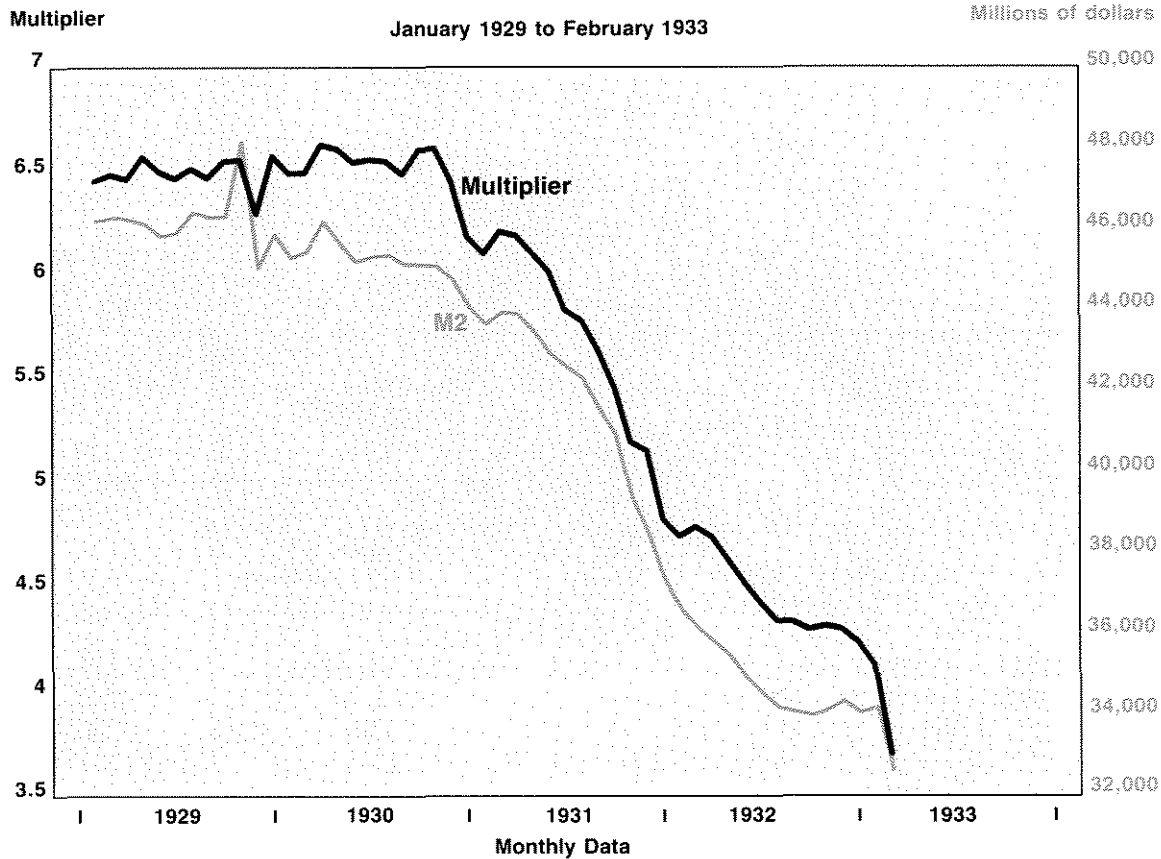
It is also clear that Benjamin Strong's death did not interrupt the offsetting of gold and cur-

rency flows, at least until the fourth quarter of 1931. The money supply contraction and deflation during the first two years of the Depression were not caused by a decline in bank reserves. Instead, as figure 10 illustrates, the money supply fell because the money multiplier declined.<sup>40</sup> This was particularly true beginning in the fourth quarter of 1930, when banking panics caused marked increases in the currency-deposit and reserve-deposit ratios.<sup>41</sup> The relative stability of bank reserves ended abruptly in September 1931. On September 21, Great Britain left the gold standard. Speculation

<sup>40</sup>The multiplier plotted in figure 10 equals  $(1+k)/(r+k)$ , where  $k$  is the ratio of currency held by the public to demand deposits and  $r$  is the ratio of bank reserves to deposits. The multiplier is defined as the money supply (here M2) divided by the monetary base, or "high-powered money," which is the sum of bank reserves and currency held by banks and the public.

<sup>41</sup>Friedman and Schwartz (1963), pp. 340-42, conclude that the money supply decline between August 1929 and October 1930 was caused by a decline in the monetary base. This decline was due to a decrease in currency, not bank reserves. Thereafter, the base rose, but less than necessary to offset the sharp decline in the multiplier.

**Figure 10**  
**Money Supply and Base Multiplier**



that the United States would soon follow led to a large withdrawal of foreign deposits from American banks and a consequent gold outflow.<sup>42</sup> In the six weeks ending October 28, 1931, the gold stock declined \$727 million (15 percent).<sup>43</sup> The Fed raised its discount and acceptance buying rates, hoping that an increase in domestic interest rates would halt the gold outflow by raising the relative yield of U.S. financial assets. This action was hailed as demonstrating the Fed's resolve to maintain gold convertibility of the dollar, and the gold outflow ceased.

Banks continued to lose reserves, however, as depositors panicked and converted deposits into currency. Member banks were able to partially offset the reserve outflows by borrowing and by selling acceptances to the Reserve Banks, albeit at the recently increased discount and acceptance buying rates. But the Fed made only trivial purchases of government securities, and, in all, Federal Reserve member banks suffered a \$540 million (22 percent) loss of reserves between September 16, 1931, and February 24, 1932.<sup>44</sup>

<sup>42</sup>If the United States had left the gold standard, it is likely that the dollar would have depreciated against gold and other currencies that remained linked to gold. This would have meant an immediate loss of wealth in terms of gold for anyone holding dollar-denominated assets.

<sup>43</sup>Board of Governors of the Federal Reserve System (1943), p. 386.

<sup>44</sup>Non-borrowed reserves declined \$1112 million (52 percent), while discount loans (borrowed reserves) increased \$572 million.

## The Federal Reserve Balance Sheet and Reserve Sterilization

A simplified version of the Federal Reserve System's balance sheet on December 31, 1929, is shown below. The principal assets of the Federal Reserve were its gold and cash reserves and Fed credit outstanding. The latter consisted of member bank borrowing (bills discounted),<sup>1</sup> bankers acceptances held by the Reserve Banks (bills bought),<sup>2</sup> U.S. government securities held by the Reserve Banks and a miscellaneous component, made up primarily by float. The principal liabilities of the System were Federal Reserve notes outstanding, deposits of member banks, and deposits of the U.S. Treasury and others, such as foreign central banks.

Most System transactions involve member commercial banks and directly affect member bank reserves. If the Fed makes an open market purchase of government securities from a member bank, for example, it pays for the securities by crediting the member bank's deposit with the Federal Reserve. Since a deposit at the Fed is the principal form in which banks hold their legal reserves,<sup>3</sup> an open market purchase adds directly to bank reserves.<sup>4</sup>

Many Federal Reserve transactions are initiated by commercial banks. When the United States was on the gold standard, the Fed held substantial gold reserves, and transactions in gold were common. For example, suppose gold coin was deposited by a customer of a member bank. The bank could send the coin to its Federal Reserve Bank and receive an increase in its reserve deposit of that amount. The Fed's gold reserves and member bank deposits would increase by the same amount. Suppose instead that a member bank was experiencing large cash withdrawals and needed extra currency. It could request currency, in the form of Federal Reserve notes, from its Reserve Bank and pay for the currency with a reduction in its reserve deposit. Hence, as Federal Reserve notes outstanding increased, bank reserves would decline by the same amount.

The Fed could offset, or "sterilize," the impact of one transaction on bank reserves

### Federal Reserve System Balance Sheet December 31, 1929 (billions of dollars)

Assets		
Gold and cash reserves		\$3.01
Federal Reserve credit		1.58
Bills discounted	\$0.63	
Bills bought	0.39	
Government securities	0.51	
Other	0.05	
Other assets		0.87
Total assets		\$5.46
Liabilities and Capital		
Federal Reserve notes		\$1.91
Deposits		2.41
Member bank	\$2.36	
Other	0.05	
Other liabilities		0.69
Capital accounts		0.45
Total liabilities and capital		\$5.46

with a second transaction having the opposite impact on reserves. For example, if the Fed sold government securities in the amount of a gold inflow, there would be no net change in aggregate member bank reserves. The open market sale would reduce reserves just as the gold inflow added to them, leaving no net reserve change. Similarly, a bank could borrow reserves from its Reserve Bank to pay for Federal Reserve notes needed to satisfy withdrawal demands, and thus avoid drawing down its reserve deposit. In this case, Federal Reserve credit (bills discounted) would increase by the amount of the increase in Federal Reserve notes outstanding, and bank reserves would not change. Note that, in this case, the Fed did not initiate the offsetting transaction. Indeed, much of the sterilization of gold and currency flows during the 1920s and early 1930s was at the initiative of member banks, although it was definitely the Fed's intent that sterilization occur.

Federal Reserve sterilization of gold and currency flows from January 1924 to February 1933 is illustrated in figure 9. Note that increases (decreases) in Federal Reserve



credit accompanied declines (increases) in the net of gold and currency outstanding, and thus bank reserves changed comparatively little. In 1930, for example, member bank reserves rose from \$2395 million in December 1929 to \$2415 million in December 1930, an increase of just \$20 million. Over the same

months, there was an increase of \$259 million in the monetary gold stock and a \$120 million decline in currency in circulation. The gold inflow and decline in currency would have added \$379 million to bank reserves, but Fed credit declined by \$370 million to offset their impact almost entirely.<sup>5</sup>

<sup>1</sup>Loans to member banks consisted of discounts and advances. Many commercial loans, which often were called "bills," were made on a discount basis; hence, when they were endorsed by a bank and sent to a Reserve Bank in exchange for reserve balances, they were "re-discounted" by the Reserve Bank at the prevailing discount rate. Alternatively, bills were used as collateral for direct advances to member banks, hence the term "bills discounted."

<sup>2</sup>The terminology is confusing because "bills" in this case refer to bankers acceptances, not to the promissory notes that member banks used as collateral for discount loans.

<sup>3</sup>From 1917 to 1960, such deposits were the only form in which member banks were permitted to hold their le-

gal reserves. At other times, vault cash has also counted.

<sup>4</sup>Even if the Fed were to purchase securities from someone other than a member bank, bank reserves would still increase once the check issued by the Fed to pay for the securities was deposited in a member bank. Open market security sales reduce bank reserves since, ultimately, a member bank reserve deposit is reduced to pay for the securities sold by the Fed.

<sup>5</sup>The gold inflow, decline in currency and decline in Federal Reserve credit do not sum exactly to the change in bank reserves because of the effect of other, small transactions affecting reserves.

The Fed's failure to fully offset the gold and currency outflows suffered by banks permitted the money supply contraction to accelerate. Fed officials claimed that the Reserve Banks' lack of reserves precluded government security purchases to offset the reserve losses suffered by banks.<sup>45</sup> The Reserve Banks were required to maintain gold reserves equal to 40 percent of their note issues and reserves of either gold or "eligible paper" against the remaining 60 percent.<sup>46</sup> Since gold outflows had reduced the System's reserve holdings, and since the System lacked other eligible paper, Fed officials asserted they could not increase Fed credit by purchasing government securities, which were not eligible collateral.

Friedman and Schwartz (1963), pp. 399-406, dispute the Fed's justification for not buying government securities. They argue that the System had sufficient gold reserves and, in any event, that the Federal Reserve Board had the power to suspend the reserve requirements

temporarily. Epstein and Ferguson (1984), pp. 964-65, contend, however, that Fed officials did feel constrained by a lack of gold. Wicker (1966), pp. 169-70, suggests that Fed officials feared that open market purchases would weaken confidence in the Fed's determination to maintain gold convertibility and thereby renew the gold outflow.

In any case, the Glass-Steagall Act of 1932 removed the constraint by permitting government securities to serve as collateral for Federal Reserve note issues. In March 1932, the System began what was then the largest open-market purchase program in its history.<sup>47</sup> Between February 24 and July 27, 1932, the Fed bought \$1.1 billion of government securities. Member bank reserves increased only \$194 million in these months, however, because of renewed gold and currency outflows and a reduction in member bank borrowing. Moreover, the supply of money continued to fall because of a sharp decline in the money multiplier (see figure 10).<sup>48</sup>

<sup>45</sup>See the Board of Governors of the Federal Reserve System. *Annual Report* (1932), pp. 16-19.

<sup>46</sup>Eligible paper consisted of either bankers acceptances or commercial notes acquired by direct purchase or pledged by member banks as collateral for discount loans. See Board of Governors of the Federal Reserve System (1943), pp. 324-29, and Friedman and Schwartz (1963), p. 400.

<sup>47</sup>Why the Fed undertook these purchases is unclear, especially if fear of undermining the gold standard explains

why purchases were not made immediately following Britain's departure from gold. Friedman and Schwartz (1963), pp. 384-89, argue that the Fed succumbed to pressure from Congress, while Epstein and Ferguson (1984) conclude that pressure from both Congress and commercial banks was important.

<sup>48</sup>During these months, both the reserve-deposit and currency-deposit ratios rose.

The Fed ended its purchase program in July 1932, largely because officials believed it had done little good.<sup>49</sup> Bank reserves continued to increase, however, as gold inflows were not offset by a corresponding reduction in Fed credit outstanding. Although the money supply ceased to fall, it also failed to rise significantly. In early 1933, large gold and currency outflows caused a renewed money supply decline.<sup>50</sup> On this occasion, the crisis was stopped by Franklin D. Roosevelt's decision to declare a Bank Holiday and suspend gold shipments. In essence, the Fed's failure to insulate the banking system from gold outflows and panic currency withdrawals had caused the president to act to prevent further reserve losses.

While failure to sterilize gold and currency outflows in 1931 and 1933 was inconsistent with previous actions, it did not represent a fundamental change in regime. Fed officials apparently believed strongly in the gold standard, and there seems to have been no discussion of following Great Britain off gold. Benjamin Strong had been a committed advocate of the gold standard, and it seems doubtful that he would have proposed actions that might have weakened it.<sup>51</sup> As an institution, the Federal Reserve System was willing to forego short-run stability to preserve the gold standard, which it saw as its fundamental mission.<sup>52</sup>

Reserve sterilization constituted one aspect of System policy begun under Strong, and the Fed deviated little from the policy after his death, at least until the fourth quarter of 1931. In fact, from the stock market crash in October 1929 to Britain's departure from gold on September 21, 1931, the Fed did little but offset gold and currency flows. It certainly did not make large open market purchases, despite the deepening depression. On the surface, this lack of vigor appears at odds with the relatively large open market purchases the Fed made during the minor recessions of 1924 and 1927.

### *Strong's Countercyclical Policy*

The Fed's actions in 1924 mark its first use of open market operations to achieve general policy objectives. In that year, the Fed purchased \$450 million of government securities and cut its discount rate (in three stages) from 4.5 percent to 3 percent. In testimony before the House Banking Committee in 1926, Benjamin Strong listed several reasons for these actions, including the following:

- 1) To accelerate the process of debt repayment to the Federal Reserve Banks by the member banks, so as to relieve this weakening pressure for loan liquidation.
- 2) To give the Federal Reserve Banks an asset which would not be automatically liquidated as the result of gold imports so that later, if inflation developed from excessive gold imports, it might at least be checked in part by selling these securities, thus forcing member banks again into debt to the Reserve Banks and making the Reserve Bank discount rate effective.
- 3) To facilitate a change in the interest relation between the New York and London markets. . . by establishing a somewhat lower level of interest rates in this country at a time when prices were falling generally and when the danger of a disorganizing price advance in commodities was at a minimum and remote.
- 4) By directing foreign borrowings to this market to create the credits which would be necessary to facilitate the export of commodities. . . .
- 5) To render what assistance was possible by our market policy toward the recovery of sterling and the resumption of gold payment by Great Britain.
- 6) To check the pressure on the banking situation in the west and northwest and the resulting failures and disasters.<sup>53</sup>

<sup>49</sup>Banks' excess reserves increased substantially during the months of the open market purchases, which many saw as idle balances that were unneeded and potentially inflationary. See Friedman and Schwartz (1963), pp. 385-89. As discussed below, Epstein and Ferguson (1984) suggest that pressure from commercial banks contributed to the Fed's decision to end the program.

<sup>50</sup>The money supply fell both because of a decline in reserves and a decline in the money multiplier induced by panic deposit withdrawals.

<sup>51</sup>Strong testified before the House Banking Committee in 1928 that, "When you are speaking of efforts simply to

stabilize commerce, industry, agriculture, employment and so on, without regard to the penalties of violation of the gold standard, you are talking about human judgment and the management of prices which I do not believe in at all." [Quoted by Burgess (1930), pp. 331.] See also Temin (1989), p. 35.

<sup>52</sup>See Temin (1989), pp. 28-29 and 78-87, and Wheelock (1991).

<sup>53</sup>U.S. House of Representatives (1926), p. 336.

The Fed undertook a second large purchase program in 1927, purchasing \$300 million of government securities and reducing the discount rate again. Strong left no written justification for these operations. Friedman and Schwartz (1963) argue that they were made in response to a recession, and that the 1924 purchases had also been intended to bring about a domestic recovery. Wicker (1966), pp. 77-94 and 106-16, challenges this interpretation, arguing that the actions were motivated by international considerations. According to Wicker, the purchases in 1924 were intended to encourage the flow of gold to Britain by reducing U.S. interest rates relative to those in London, with the goal of assisting Britain's return to the gold standard. The 1927 purchases were intended to help Britain through a payments crisis, again by directing capital toward London; these purchases followed closely a meeting between Strong and European central bank heads.

Chandler (1958), p. 199, argues that both domestic and international goals were important in 1924 and 1927, and Wheelock (1991), ch. 2, finds empirical support for this view. Wheelock also shows that, relative to the decline in economic activity, the Fed made substantially fewer open market purchases in 1930 and 1931 than it did during 1924 and 1927. This might reflect a significant change in System behavior between the 1920s and early 1930s. But an analysis of the Fed's policy methods suggests that its anemic response in 1930-31 might also be explained as the consistent use of a single strategy.

During the early 1920s, the Fed developed a strategy of using open market operations and discount rate changes to affect the level of member bank discount window borrowing. Fed officials observed that, when the System purchased government securities, member bank borrowing tended to decline by nearly the same amount and, similarly, that open market sales led to comparable increases in member bank borrowing. But, while the Fed's operations had little impact on the total volume of Fed credit outstanding, they appeared to have a significant

impact on money markets. According to Chandler (1958):

Federal Reserve officials soon discovered. . . much to their amazement at first, that open market purchases and sales brought about marked changes in money market conditions even though total earning assets of the Reserve Banks remained unchanged. When the Federal Reserve sold securities and extracted money from bank reserves, more banks were forced to borrow from the Reserve Banks, and those already borrowing were forced more deeply into debt. Since banks had to pay interest on their borrowings and did not like to remain continuously in debt, they tended to lend less liberally, which raised interest rates in the market pp. 238-39).

Strong testified that "the effect of open market operations is to increase or decrease the extent to which the member banks must of their own initiative call on the Reserve Bank for credit. . . ."<sup>54</sup> Security purchases led to less member bank borrowing and lower interest rates, while sales increased borrowing and rates.<sup>55</sup> Strong believed that monetary policy could stimulate economic activity by easing money market conditions:

. . . [W]hen we have very cheap money, corporations and individuals borrow money in order to extend their businesses. That results in plant construction; plant construction employs more labor, brings in to use more materials. . . . It may cause some elevation of wages. It creates more spending power; and with that start it will permeate through into the trades and the general price level.<sup>56</sup>

Chandler (1958) and Friedman and Schwartz (1963) conclude that under Strong's leadership the Federal Reserve System attempted to stimulate economic activity during recessions by promoting monetary ease (cheap money). This explains why Strong listed "to accelerate the process of debt repayment. . . by the member banks" as a reason for the open market pur-

<sup>54</sup>Ibid, p. 468.

<sup>55</sup>Presumably, discount rate changes alone could achieve the same impact on interest rates, but the Fed preferred to precede discount rate changes with open market operations. Strong testified that "the foundation for rate changes can be more safely and better laid by these preliminary operations in the open market than would be

possible otherwise, and the effect is less dramatic and less alarming. . . than if we just make advances and reductions in our discount rate." [U.S. House of Representatives (1926), p. 333].

<sup>56</sup>U.S. House of Representatives (1926), pp. 578-79.

**Table 1**  
**Fed Policy During Three Recessions**  
**(dollar amounts in millions)**

Date	AIP	GS	DR	DL	DL(NYC)
1929 Jul	124	\$147	5.0%	\$1096	\$319
Oct	118	154	6.0	885	74
1930 Jan	106	485	4.5	501	39
Apr	104	530	3.5	231	17
Jul	93	583	2.5	226	0
Oct	88	602	2.5	196	6
1931 Jan	83	647	2.0	253	5
Apr	88	600	2.0	155	0
Jul	82	674	1.5	169	0
Oct	73	733	3.5	614	74
1923 Apr	106	229	4.5	658	123
Jul	104	97	4.5	834	143
Oct	99	91	4.5	873	121
1924 Jan	100	118	4.5	574	85
Apr	95	274	4.5	489	45
Jul	84	467	3.5	315	13
Oct	95	585	3.0	240	28
1925 Jan	105	464	3.0	275	32
1926 Oct	111	306	4.0	663	84
1927 Jan	107	310	4.0	481	76
Apr	108	341	4.0	447	78
Jul	106	381	4.0	454	59
Oct	102	506	3.5	424	75
1928 Jan	107	512	3.5	465	94

Variable definitions: AIP: Index of Industrial Production (seasonally adjusted); GS: Federal Reserve government security holdings; DR: discount rate of the Federal Reserve Bank of New York; DL: discount loans (member bank borrowing) of all Federal Reserve member banks; DL(NYC): discount loans of reporting banks in New York City.

chases in 1924. Strong used the level of member bank borrowing to determine the specific quantity of security purchases necessary to bring about monetary ease:

Should we go into a business recession while the member banks were continuing to borrow directly 500 or 600 million dollars. . . we should consider taking steps to relieve some of the pressure which this borrowing induces by purchasing Government securities and thus enabling member banks to reduce their indebtedness. . . . As a guide to the timing and

extent of any purchases which might appear desirable, one of our best guides would be the amount of borrowing by member banks in principal centers. . . . Our experience has shown that when New York City banks are borrowing in the neighborhood of 100 million dollars or more, there is then some real pressure for reducing loans, and money rates tend to be markedly higher than the discount rate. On the other hand, when borrowings of these banks are negligible, as in 1924, the money situation tends to be less elastic and if gold imports take place, there is liable to be some credit inflation, with money rates dropping below our discount rate. When member banks are owing us about 50 million dollars or less the situations appears to be comfortable, with no marked pressure for liquidation. . . .<sup>57</sup>

Table 1 compares Federal Reserve actions during the 1924, 1927 and 1930-31 downturns. The Fed's index of industrial production indicates the severity of each recession. Following the stock market crash in October 1929, the New York Fed purchased \$160 million of government securities and, by the end of December, the System had purchased an additional \$150 million. But, from January 1930 to October 1931, the Fed made only modest purchases, particularly in comparison with those made in 1924 and 1927, when the declines in economic activity were less.

The relatively small purchases in 1930 and 1931 appear consistent, however, with the use of member bank borrowing as a policy guide. This, according to Brunner and Meltzer (1968), explains the Fed's failure to respond aggressively to the Depression.<sup>58</sup> Member bank borrowing fell substantially following the stock market crash in October 1929 and averaged just \$241 million from January 1930 to August 1931. Borrowing by reporting member banks in New York City averaged just \$8 million over the same months. Thus, by Strong's guidelines, money was exceptionally easy and substantial open market operations were unwarranted.

The Fed's use of member bank borrowing as a guide to monetary conditions could explain

<sup>57</sup>Presentation to the Governors' Conference, March 1926 [quoted by Chandler (1958), pp. 239-40].

<sup>58</sup>Wicker (1969) agrees that, to the extent that the Fed responded to domestic conditions, it used member bank borrowing as a guide. See also Meltzer (1976).

why it permitted the money supply to decline sharply during the Depression. During a recession, loan demand declines and banks have fewer profitable investment opportunities. Consequently, the demand for borrowed reserves declines. If this decline in demand is not offset, total reserves and the money supply fall. In a minor recession, as in 1924 and 1927, member bank borrowing falls little. The Fed's guidelines would have suggested that monetary conditions were relatively tight and, in response, it would have made large open market purchases. In a severe economic downturn, as in 1930-31, however, member bank borrowing may fall substantially. But, by Strong's rule the Fed would have made few open market purchases. Thus, ironically, this strategy could result in a greater contraction in the supply of money, the more severe a decline in economic activity.<sup>59</sup>

If, as Brunner and Meltzer (1968) argue, System officials followed Strong's prescription to use the level of bank borrowing to guide policy during the Depression, then it seems that the Fed made no fundamental change in policy after Strong's death.

Although Friedman and Schwartz (1963), pp. 362-419, believe that Strong would have responded aggressively to the Depression, they agree that a majority of Fed officials interpreted the low level of member bank borrowing in 1930 and 1931 as signaling monetary ease. They contend, however, that officials of the New York Fed understood the flaws in using member bank borrowing as a policy guide and would have pursued appropriately expansionary policies if they had the authority.<sup>60</sup>

In March 1930 the Open Market Investment Committee, which consisted of five Reserve Bank governors, was replaced by the Open Market Policy Conference, in which representatives of all 12 Banks participated. The Investment Committee had been led by Benjamin Strong, and then by George Harrison, Strong's successor as governor of the Federal Reserve Bank of New York. Friedman and Schwartz, p. 414, contend

that the Policy Conference was established to wrest power from the New York Bank. And they show, pp. 367-80, that New York officials proposed more expansionary actions, particularly in 1930, than were accepted by the rest of the System. Wicker (1966) finds, however, that Harrison ceased to advocate open market purchases once New York banks were no longer borrowing reserves. Thus, while the Federal Reserve would likely have pursued somewhat more expansionary policies had New York officials held more authority, the modest open market purchases of 1930 and 1931 were apparently consistent with the guidelines outlined by Strong.

In sum, during the Depression, the Federal Reserve continued to sterilize gold and currency flows and made limited open market purchases and discount rate reductions in response to the economic decline. Notable deviations from these policies occurred, such as the incomplete sterilization of gold outflows during the crises of 1931 and 1933. But it seems likely that monetary policy would have been somewhat more responsive to the Depression, particularly in 1930, had officials of the Federal Reserve Bank of New York been able to dominate policymaking in the way Strong had before his death.<sup>61</sup> The general thrust of policy, however, appears consistent with that of Benjamin Strong.

### INTEREST GROUP PRESSURE EXPLANATIONS OF FED BEHAVIOR

Until recently, most studies of Fed behavior have concluded that policymakers failed to perceive a need to take expansionary actions, despite deflation, rising unemployment and widespread bank failures. Some researchers now argue, however, that Fed officials were quite aware that their policies were contributing to the contraction. These researchers conclude that policymakers responded to interest group pressure and their own desire for in-

<sup>59</sup>Indeed, except for a brief decline in M1 in 1927, the absolute quantity of money did not fall in 1924 or 1927, although its rate of increase declined. The Fed's strategy and the consequences of using bank borrowing as a policy guide are examined in greater detail in Wheelock (1991), ch. 3.

<sup>60</sup>See also Schwartz (1981), pp. 41-42.

<sup>61</sup>It is by no means clear that Strong could have retained this degree of influence, as many officials believed that his

policies, particularly in 1927, had contributed to stock market speculation and the crash and depression that followed. See Wheelock (1991), ch. 4, for analysis of disagreements among System officials during the Depression.

fluence, rather than the public interest. Epstein and Ferguson (1984), for example, contend that a combination of ideology and conflicting interests explain the System's policy. And Anderson, Shughart and Tollison (1988) argue that "the restrictive monetary policy of the Fed in the 1929-33 period was not based on myopia but instead on rational, self-interested behavior" (p. 4).

Epstein and Ferguson (1984) focus their study on the Federal Reserve's \$1.1 billion open market purchase program of 1932. They ask why the Fed waited so long to begin an expansionary program, what had changed to cause the Fed to begin the program when it did, and what led to the decision to end the program.

To the first question, Epstein and Ferguson (1984) conclude that the liquidationist business cycle theory was dominant among Fed officials. Liquidationists believed that depressions were "vital to the long-run health of a capitalist economy. Accordingly, the task of central banking was to stand back and allow nature's therapy to take its course." (p. 963). This certainly was the opinion of some key officials, such as George Norris, who argued at the September 25, 1930, meeting of the Open Market Policy Conference:

We believe that the correction must come about through reduced production, reduced inventories, the gradual reduction of consumer credit, the liquidation of security loans, and the accumulation of savings through the exercise of thrift. These are slow and simple remedies, but just as there is no 'royal road to knowledge,' we believe there is no short cut or panacea for the rectification of existing conditions. . . .

We have been putting out credit in a period of depression, when it was not wanted and could not be used, and will have to withdraw credit when it is wanted and can be used.<sup>62</sup>

Norris clearly believed that monetary policy had been too stimulative and was interfering with the natural process of liquidation and recovery.

Strong and other officials apparently held similar views during the recession of 1920-21. According to Wicker (1966):

In the view of System officials the money supply in 1920 was redundant (excessive) and should decline to restore the 'proper' relationship between prices, credit, and volume of production. The term most frequently used to describe this process was 'liquidation,' the necessity for which was not disputed by either the Board or by any other Federal Reserve official including Benjamin Strong. . . (p. 49).

Most researchers argue that Strong's views changed significantly after the 1920-21 episode, however. Chandler (1958) writes:

Like most other Federal Reserve officials, [in 1920-1921 Strong] believed that some deflation of bank credit was essential and that some price reduction was inevitable and desirable. Within three years, Strong himself had rejected many of these ideas. A much smaller business recession in 1924 led him to advocate large and aggressive open-market purchases of government securities and reductions of discount rates to combat deflation at home as well as to encourage foreign lending (p. 181).<sup>63</sup>

In rejecting the importance of Strong's death, Epstein and Ferguson (1984) implicitly deny that Strong sought to prevent loan liquidation during recessions by pursuing monetary ease or that he subscribed to the countercyclical policy guidelines he presented to the Governors Conference in 1926: "Should we go into a business recession. . . we should consider taking steps to relieve. . . the pressure. . . by purchasing Government securities. . ."<sup>64</sup>

Epstein and Ferguson emphasize two additional reasons for the timing and extent of Fed actions during the Depression. First, in contrast to Friedman and Schwartz, they conclude that a lack of gold reserves did keep the Fed from making open market purchases in the fourth quarter of 1931. They argue further that, while the Glass-Steagall Act of 1932 lessened the problem for the System as a whole, some of the Reserve Banks were reluctant to continue the purchase program in 1932 because they lacked sufficient gold reserves.<sup>65</sup>

Second, Epstein and Ferguson argue that Fed concern with member bank profits contributed

<sup>62</sup>Quoted in Chandler (1971), p. 137.

<sup>63</sup>See also Friedman and Schwartz (1963), pp. 249-54, Wicker (1966), pp. 57-66, and West (1977), pp. 173-204.

<sup>64</sup>Quoted by Chandler (1958), p. 239-40.

<sup>65</sup>Each Reserve Bank was required to maintain its own reserves. Pooling was not permitted, although the Banks could lend to one another.

to the timing and extent of open market purchases in 1932. During the first two years of the Depression, leading bankers generally argued for loan liquidation and lower wages. But the sharp increase in interest rates in the fourth quarter of 1931 reduced the value of bond portfolios and threatened the solvency of many banks. Bankers then began to press the Fed to support bond prices. Epstein and Ferguson argue that "a major goal of the [purchases of 1932] was to revive railroad bond values. . . and bond prices in general." (p. 967).

Just as constituent pressure contributed to the decision to make open market purchases, it also seems to have caused the program's end. During the Depression banks generally had shifted their bond portfolios toward short-term maturities. And, while the need to support bond prices was paramount in early 1932, as the year progressed short-term interest rates fell sharply and bank earnings declined. The decline in earnings was especially acute in Boston and Chicago because banks in those cities had unusually large holdings of short-term securities. Epstein and Ferguson conclude: "That the governors of the Boston Fed and, especially, the Chicago Fed should be early critics of the reflation program is therefore no mystery." (p. 972).

Declining interest rates and questions about the willingness of the United States to maintain the dollar's gold convertibility led to deposit withdrawals by foreigners, causing commercial banks to raise further doubts about the purchase program: "The continued loss of gold and deposits put many New York banks in an increasingly uncomfortable position. . . . Many complained that the reflation program had 'demoralized money and exchange markets'."<sup>66</sup> Thus, pressure from member banks experiencing falling earnings and deposit outflows and the desire of some Reserve Banks to protect their gold reserves caused the System to abandon its program of open market purchases.<sup>67</sup>

Epstein and Ferguson (1984) were the first to explain Federal Reserve behavior during the Depression as a response to pressure from commercial bankers. Anderson, Shughart and Tollison (1988) push this view to the extreme, arguing that the principal aim of Fed policy during the Depression was to enhance the long-run profitability of member banks by eliminating nonmember competitors. This, in turn, benefited the Fed by increasing the proportion of the banking system under its regulatory control:

The fall in the money supply presided over by the monetary authority between 1929 and 1933 eliminated a large number of state-chartered and small, federally-chartered institutions from the commercial banking industry. The profits of those banks that survived. . . rose significantly as a result. Coincidentally, the monetary contraction expanded the proportion of the commercial banking system within the Fed's bureaucratic domain. Thus, rather than representing the leading example of bureaucratic ineptitude, the Great Contraction may instead be the leading example of rational regulatory policy operating for the benefit of the regulators and the regulated.<sup>68</sup>

Nonmember banks made up 75 percent of the banks that suspended operations between 1930 and 1933. Failures were highest among small institutions located in rural areas. Policymakers typically argued that such failures were caused by bad management or transportation improvements that made many banks redundant. George Harrison, Governor of the New York Reserve Bank, for example, testified before the Senate Banking Committee in 1931 that:

. . . with the automobile and improved roads, the smaller banks. . . with nominal capital, out in the small rural communities, no longer had any reason really to exist. Their depositors welcomed the opportunity to get into their automobiles and go to the large centers where they could put their money.<sup>69</sup>

<sup>66</sup>Epstein and Ferguson (1984), p. 975.

<sup>67</sup>In a comment on Epstein and Ferguson, Coetho and Santoni (1991) present econometric evidence suggesting that banks did not suffer reduced profits as a result of the Fed's 1932 purchases, and they question whether pressure from commercial banks caused the Fed to end its program. Indeed, they even doubt that expansionary policy was ended since the monetary base continued to rise. Epstein and Ferguson (1991) present additional qualitative evidence showing that banks thought that low interest rates had reduced their earnings.

<sup>68</sup>Anderson, Shughart and Tollison (1988), pp. 8-9.

<sup>69</sup>U.S. Senate (1931), p. 44.

From the Federal Reserve's inception, Fed officials argued that it was important that all banks join the System. Benjamin Strong argued in 1915 that "no reform of our banking methods in this country will be complete and satisfactory to the country until it includes all banks. . . in one comprehensive system."<sup>70</sup> Policymakers were likely less concerned with the failure of nonmember banks than they were with the health of member banks.<sup>71</sup> But it remains to be shown that Federal Reserve policies were deliberately intended to cause the failure of thousands of nonmember institutions.

Anderson, Shughart and Tollison (1988) argue that "the Great Depression. . . was a by-product of economically rational behavior on the part of Federal Reserve member banks seeking rents through the elimination of their nonmember rivals." (p. 9) Member banks did not capture the Fed directly, they argue, but rather exerted pressure through members of the House and Senate Banking Committees. To test this hypothesis, the authors regress deposits in failed nonmember banks in each state on dummy variables indicating whether a state was represented on the House or Senate Banking Committees.<sup>72</sup> They find that nonmember bank losses were higher if a state had a representative on the House Banking Committee. This, they argue, supports their view that the Fed deliberately caused nonmember bank failures to be highest in states having a congressman on the Banking Committee, thereby enhancing the long-run profits of the member banks that remained. The Fed's payoff came in 1933 when it was freed from having to return a portion of its revenues to the Treasury.<sup>73</sup>

This explanation of Federal Reserve policy provokes a number of questions. Left unclear, for example, is why member banks had more influence over Congress than nonmember banks. Nor is it explained how the Fed was able to affect the fortunes of nonmember banks in partic-

ular states with the tools at its disposal. The Fed cannot control the destination of reserve flows generated by open market operations, and the discount window was not open to nonmember banks. Perhaps Fed officials could have selectively restricted credit to member banks that lent to nonmember banks in particular states, but it is doubtful that such a circuitous route would have had a large impact on losses.

Huberman (1990) casts further doubt on the Anderson, Shughart and Tollison (1988) view. He notes that, although 75 percent of banks that suspended during the Depression were nonmember banks, the ratio of nonmember to member bank suspensions from 1930 to 1933 was lower than it had been during the 1920s. Nonmember banks that suspended, moreover, reopened twice as often as member banks. Membership in the Federal Reserve System grew at a comparatively low rate during the Depression.

Santoni and Van Cott (1990) also report evidence contrary to the Anderson, Shughart and Tollison hypothesis. They calculate a share price index for large New York City member banks and show that, relative to both the wholesale commodity price index and the Standard and Poor's index, bank share prices declined substantially from 1929 to 1934. They show also that the index of bank stock prices was not affected by changes in the money supply, suggesting that monetary policy did not enhance the fortunes of banks in their sample.<sup>74</sup>

## CONCLUSION

The Federal Reserve's failure to respond vigorously to the Great Depression probably cannot be attributed to a single cause. Each of the explanations discussed in this article clarifies certain points about Fed behavior during the Depression. A number of contemporary observers, both within and outside the System, attrib-

<sup>70</sup>Quoted by Chandler (1958), p. 80.

<sup>71</sup>Friedman and Schwartz, pp. 358-59, also make this point.

<sup>72</sup>They include deposits in failed member banks, total bank deposits, and other control variables as additional regressors.

<sup>73</sup>Anderson, Shughart and Tollison (1988), pp. 16-17.

<sup>74</sup>Anderson, Shughart and Tollison (1990) reply by pointing out that member bank share prices rose dramatically relative to those of nonmember banks during 1930. Even the

share prices of "small" member banks rose relative to those of nonmember institutions. Neither study tests whether the profits of surviving member banks were enhanced in the long run, although the former note that in 1936 the average national bank profit rate was higher than in 1925. Unfortunately, it is impossible to determine whether the increase in bank profits was caused by the demise of nonmember banks or by New Deal reforms, such as deposit interest rate ceilings, deposit insurance, and increased chartering requirements, which reduced competition and enhanced bank charter values.



uted some of the blame to what they viewed as excessively easy monetary policy during recessions in 1924 and 1927. They argued that the Fed's actions had promoted stock market speculation and led inevitably to the crash and Depression. The best policy during the Depression, according to these observers, was to promote loan liquidation and wage rate reductions, to allow recovery on a "sound basis." While those officials subscribing to the liquidationist view did not win approval of open market sales, they were able to prevent significant open market purchases until 1932. It is likely that the Fed would not have made large purchases even then without pressure from major bankers and Congress.

The most important explanations of Federal Reserve behavior during the Depression, however, appear to be the dedication of policymakers to preserving the gold standard and their attachment to policy guides that gave erroneous information about monetary conditions. Benjamin Strong's death robbed the System of an intelligent leader at a crucial time and undoubtedly imparted a contractionary bias to monetary policy during the Depression. It seems clear, however, that Strong's death did not cause a fundamental change in regime. Strong believed in the gold standard, and he would not likely have done anything to jeopardize gold convertibility of the dollar. There was also little deviation from either the gold sterilization or the countercyclical policy rules that Strong had developed during the 1920s—at least until the fourth quarter of 1931, when maintenance of the gold standard became the overriding goal of policy. Thus, while leadership changes and interest group pressure probably had some effect, monetary policy during the Depression was not fundamentally different from that of previous years. Federal Reserve errors seem largely attributable to the continued use of flawed policies.

## REFERENCES

- Anderson, Gary M., William F. Shughart II, and Robert D. Tollison. "A Public Choice Theory of the Great Contraction," *Public Choice* (October 1988), pp. 3-23.
- \_\_\_\_\_. "A Public Choice Theory of the Great Contraction: Further Evidence," *Public Choice* (December 1990), pp. 277-83.
- Belongia, Michael T., and Michelle R. Garfinkel, eds. *What Do We Know About Business Cycles?* (Kluwer Academic Publishers, forthcoming).
- Bernanke, Ben S. "Nonmonetary Effects of the Financial Crises in the Propagation of the Great Depression," *American Economic Review* (June 1983), pp. 257-76.
- Board of Governors of the Federal Reserve System. *Annual Report* (various issues).
- \_\_\_\_\_. *Banking and Monetary Statistics, 1914-1941* (1943).
- \_\_\_\_\_. *Federal Reserve Bulletin* (various issues).
- Bordo, Michael D. "The Contribution of A Monetary History of the United States, 1867-1960 to Monetary History," in Michael D. Bordo, ed., *Money, History, and International Finance: Essays in Honor of Anna J. Schwartz* (The University of Chicago Press, 1989), pp. 15-75.
- Brunner, Karl, and Allan H. Meltzer. "What Did We Learn from the Monetary Experience of the United States in the Great Depression?" *Canadian Journal of Economics* (May 1968), pp. 334-48.
- Burgess, W. Randolph, ed. *Interpretations of Federal Reserve Policy in the Speeches and Writings of Benjamin Strong* (Harper and Brothers, 1930).
- Calomiris, Charles W. "Deposit Insurance: Lessons from the Record," Federal Reserve Bank of Chicago *Economic Perspectives* (May/June 1989), pp. 10-30.
- Chandler, Lester V. *Benjamin Strong, Central Banker* (Brookings Institution, 1958).
- \_\_\_\_\_. *American Monetary Policy 1928-1941* (Harper and Row, 1971).
- Coelho, Philip R. P., and G. J. Santoni. "Regulatory Capture and the Monetary Contraction of 1932: A Comment on Epstein and Ferguson," *Journal of Economic History* (March 1991), pp. 182-89.
- Darby, Michael R. "Three-and-a-Half Million U.S. Employees Have Been Mislaid: Or, an Explanation of Unemployment, 1934-1941," *Journal of Political Economy* (February 1976), pp. 1-16.
- De Long, J. Bradford. "'Liquidation' Cycles: Old-Fashioned Real Business Cycle Theory and the Great Depression," National Bureau of Economic Research Working Paper No. 3546 (December 1990).
- Department of Commerce. *Historical Statistics of the United States* (1960).
- Epstein, Gerald, and Thomas Ferguson. "Monetary Policy, Loan Liquidation, and Industrial Conflict: The Federal Reserve and the Open Market Operations of 1932," *Journal of Economic History* (December 1984), pp. 957-83.
- \_\_\_\_\_. "Answers to Stock Questions: Fed Targets, Stock Prices, and the Gold Standard in the Great Depression," *Journal of Economic History* (March 1991), pp. 190-200.
- Field, Alexander J. "A New Interpretation of the Onset of the Great Depression," *Journal of Economic History* (June 1984), pp. 489-98.
- Fisher, Irving. *Booms and Depressions* (Adelphi, 1932).
- Friedman, Milton, and Anna J. Schwartz. *A Monetary History of the United States, 1867-1960* (Princeton University Press, 1963).
- Hamilton, James D. "Monetary Factors in the Great Depression," *Journal of Monetary Economics* (March 1987), pp. 145-69.
- Hayek, Friedrich A. von. "The Fate of the Gold Standard," in Roy McCloughry, ed., *Money, Capital and Fluctuations, Early Essays of Friedrich A. von Hayek* (Routledge and Kegan Paul, 1984), pp. 118-35.
- Hetzl, Robert L. "The Rules Versus Discretion Debate Over Monetary Policy in the 1920s," Federal Reserve Bank of Richmond *Economic Review* (November/December 1985), pp. 3-14.
- Huberman, Douglas A. "An Alternative to 'A Public Choice Theory of the Great Contraction,'" *Public Choice* (December 1990), pp. 257-68.
- Kesselman, Jonathan R., and N. E. Savin. "Three-and-a-Half Million Workers Never Were Lost," *Economic Inquiry* (April 1978), pp. 205-25.
- Kindleberger, Charles P. *The World in Depression, 1929-1939*, 2nd ed. (University of California Press, 1986).
- Lebergott, Stanley. *Men Without Work: The Economics of Unemployment* (Prentice-Hall, 1964).

- Meltzer, Allan H. "Monetary and Other Explanations of the Start of the Great Depression," *Journal of Monetary Economics* (November 1976), pp. 455-71.
- Miron, Jeffrey A. "Financial Panics, the Seasonality of the Nominal Interest Rate, and the Founding of the Fed," *American Economic Review* (March 1986), pp. 125-40.
- Romer, Christina. "Spurious Volatility in Historical Unemployment Data," *Journal of Political Economy* (February 1986a), pp. 1-37.
- \_\_\_\_\_. "New Estimates of Prewar Gross National Product and Unemployment," *Journal of Economic History* (June 1986b), pp. 341-52.
- Santoni, G. J., and T. Norman Van Cott. "The Ruthless Fed: A Critique of the AST Hypothesis," *Public Choice* (December 1990), pp. 269-75.
- Schwartz, Anna J. "Understanding 1929-1933," in Karl Brunner, ed., *The Great Depression Revisited* (Kluwer-Nijhoff, 1981), pp. 5-48.
- Temin, Peter. *Did Monetary Forces Cause the Great Depression?* (W. W. Norton, 1976).
- \_\_\_\_\_. *Lessons from the Great Depression* (The MIT Press, 1989).
- U.S. Bureau of Labor Statistics. *Wholesale Prices 1890 to 1925* (GPO, 1926).
- U.S. House of Representatives. *Stabilization*. Hearings Before the Committee on Banking and Currency. 69th Congress, 1st Sess. (GPO, 1926).
- \_\_\_\_\_. *Banking Act of 1935*. Committee on Banking and Currency. 74th Congress, 1st Sess. (GPO, 1935).
- U.S. Senate. *Operation of the National and Federal Reserve Banking Systems*, Committee on Banking and Currency, 71st Congress, 3rd Sess. (GPO, 1931).
- West, Robert Craig. *Banking Reform and the Federal Reserve 1863-1923* (Cornell University Press, 1977).
- Wheelock, David C. *The Strategy and Consistency of Federal Reserve Monetary Policy, 1924-1933* (Cambridge University Press, 1991).
- \_\_\_\_\_. "Banking Act of 1935," in John Eatwell, Murray Milgate, and Peter Newman, eds., *The New Palgrave Dictionary of Money and Finance* (Macmillan Press, forthcoming).
- Wicker, Elmus R. *Federal Reserve Monetary Policy, 1917-1933* (Random House, 1966).
- \_\_\_\_\_. "Brunner and Meltzer on Federal Reserve Monetary Policy During the Great Depression," *Canadian Journal of Economics* (May 1969), pp. 318-21.
- \_\_\_\_\_. "What Caused the Great Depression 1929-1933? A Survey of Recent Literature," unpublished manuscript (Indiana University, August 1989).

## Appendix

### Data Sources

- All Commodities Price Index: Bureau of Labor Statistics (1926), pp. 24-25.
- Bank reserves: Board of Governors of the Federal Reserve System (1943), pp. 369-77, (member banks) and Friedman and Schwartz (1963), table A-2 (all banks).
- Bank suspensions and deposits in suspended banks: Board of Governors of the Federal Reserve System (1943), p. 283.
- Currency stock: Board of Governors of the Federal Reserve System (1943), pp. 369-77.
- Discount rate (Federal Reserve Bank of New York): Board of Governors of the Federal Reserve System (1943), pp. 440-41.
- Federal Reserve credit and its components: Board of Governors of the Federal Reserve System (1943), pp. 369-77, and *ibid*, pp. 136-44 (discount loans of reporting New York City member banks).
- Federal Reserve System balance sheet: Board of Governors of the Federal Reserve System (1943), p. 331.
- Gold stock: Board of Governors of the Federal Reserve System (1943), pp. 369-77.
- Gross national product: Department of Commerce (1960), *Historical Statistics of the United States*, series F1 (current dollar) and F3 (constant dollar).
- Implicit price index: Department of Commerce (1960), *Historical Statistics of the United States*, series F5.
- Index of Industrial Production: Board of Governors of the Federal Reserve System (1937), *Annual Report*, pp. 175-77.
- Interest rates: 1) Baa-rated: Board of Governors of the Federal Reserve System (1943), pp. 468-70; 2) long-term (daily average yield in June of each year on U.S. government bonds): *ibid*, pp. 468-70; 3) short-term (daily average yield in June of each year on U.S. government three- to six-month notes and certificates (1919 to 1933), and on Treasury bills (1934 to 1939): *ibid*, p. 460.
- Money supply: Friedman and Schwartz (1963), table A-1, col. 7 (M1) and col. 8 (M2).
- Unemployment rate: Lebergott (1964), p. 27.