The recession of 1937—A cautionary tale

François R. Velde

Introduction and summary

The U.S. economy is beginning to emerge from a severe economic downturn precipitated by a financial crisis without parallel since the Great Depression. As thoughts turn to the appropriate path of future policy during the recovery, a number of economists have proffered the recession that began in 1937 as a cautionary tale. That sharp but short-lived recession took place while the U.S. economy was recovering from the Great Depression of 1929–33.[1]

According to one interpretation, the 1937 recession was caused by premature tightening of monetary policy and fiscal policy prompted by inflation concerns. The lesson to be drawn is that policymakers should err on the side of caution. An alternative explanation is that the recession was caused by increases in labor costs due to the industrial policies that formed part of the New Deal—the policies of social and economic reform introduced in the 1930s by President Franklin D. Roosevelt. If a policy lesson can be drawn from this, it might have more to do with the dangers of interfering with market mechanisms.

The goal of this article is to present the relevant facts about the recession of 1937 and assess the competing explanations. Although overshadowed by its more dramatic predecessor, the recession of 1937 has received some attention before, in particular Roose (1954) and Friedman and Schwartz (1963). Then, as now, the competing explanations centered on fiscal policy, that is, the impact of taxation and government spending on the economy; monetary policy, or the management of currency and reserves; and labor relations policy, or more broadly government policy toward businesses.

The rest of this article is organized as follows. I first present the salient facts about the 1937 recession. I then review the competing explanations and finally provide a quantitative assessment of their likely contributions to the recession. I find that monetary policy and fiscal policy do not explain the timing of the downturn but do account well for its severity and most of the recovery. Wages explain little of the downturn and none of the recovery.

The recession

Before describing the salient features of the 1937 recession, I first take up the issue of its timing. The traditional National Bureau of Economic Research (NBER) business cycle dates put the peak of the recession in May 1937 and the trough in June 1938. Romer (1994) argues that there are inconsistencies in the way these dates were established over time, devises an algorithm that closely reproduces the dates of post-war business cycles, and applies it to the Miron and Romer (1990) industrial production series to produce new dates. In the case of the 1937 recession, Romer identifies August 1937 as the start of the recession. Cole and Ohanian (1999) implicitly use the same starting date when they state that industrial production peaked in that month. I will stick to the traditional date for several reasons. One is that Romer (1994) directs her argument mostly at cycles before 1927, when a shift in NBER methodology occurred. Another is that the NBER dating process considers a broader set of series than just industrial production. Roose (1954) lists the peaks of 40 monthly series and shows that 27 series peaked before August. Finally, industrial production as measured by the Board of Governors of the Federal Reserve System peaked in May 1937. There is no controversy over the end date of the recession, set by the NBER and Romer (1994) in June 1938.

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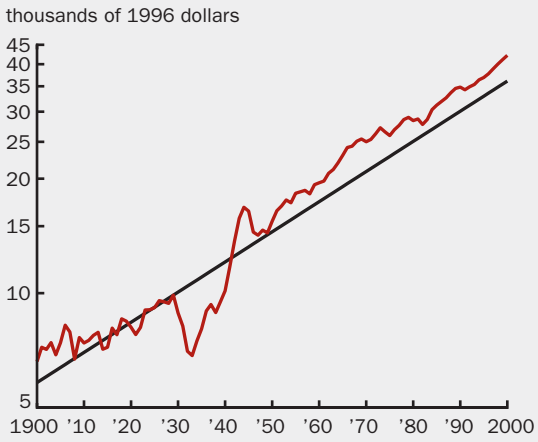
FIGURE 1

Gross domestic product per capita, 1900–2000

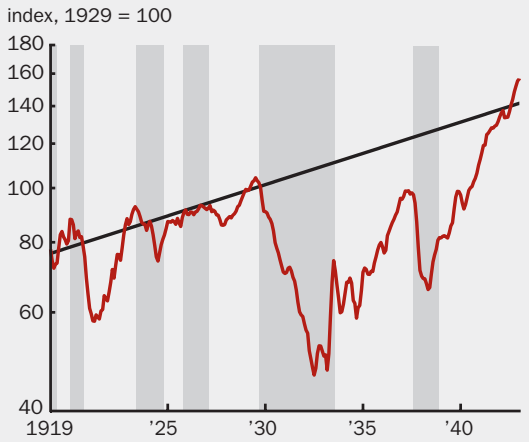


Notes: The population is age 16 and older; gross domestic product per capita is measured on an annual basis over the period 1900–2000. The trend line (black) grows at the average growth rate over the periods 1919–29 and 1947–97.

Source: Author's calculations based on data from Carter et al. (2006), tables Aa125–144 and Ca9–19.

FIGURE 2

Industrial production per capita, 1919–42



Notes: The population is age 16 and older; industrial production per capita is measured on a monthly basis over the period January 1919–December 1942. The trend line (black) is the average growth rate over the period January 1919–August 1929. The shaded areas indicate official periods of recession as identified by the National Bureau of Economic Research.

Source: Author's calculations based on data from the Board of Governors of the Federal Reserve System, G.17 statistical release, various issues.

Figure 1 plots real annual gross domestic product (GDP) per capita (population aged 16 years and older) over the twentieth century. The trend line follows that series' average growth rate over the periods 1919–29 and 1947–97, and is set to coincide with the series in 1929. This is the metric by which Cole and Ohanian (2004) show that the recovery after the Great Depression was weak, since the series does not return to trend until 1942. The exceptional nature of the Great Depression and the ensuing recovery is starkly evident, but the 1937 recession barely registers in the annual series. The reason is that the recession is so short, beginning in mid-1937 and ending in mid-1938.

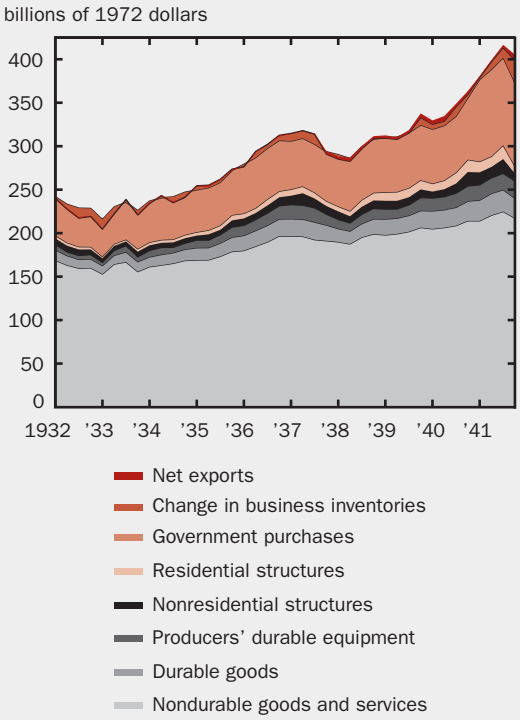
To get a better sense of the importance of this episode, we need to look at higher-frequency data. The national income and product accounts (NIPAs) are not available at the usual quarterly frequency before 1946, however, so we have to resort to other series. Figure 2 plots a monthly index of industrial production, which will be the main focus of my analysis in the final section. Again, a trend line has been added, growing at the average rate of growth for the period from January 1919 to August 1929. The severity of the 1937 recession is now apparent. In particular, it is striking to see that the speed at which industrial production contracted is greater than during the Great Depression. From its peak in July 1937 to its trough in May 1938, industrial production declined 32 percent. By comparison, it took two full years for industrial production to fall as much from its July 1929 peak. Other measures confirm the severity of the 1937 recession—for example, employment fell by 22 percent and stock prices declined by over 40 percent (Carter et al., tables Cb46 and Cb53).

Another striking aspect of the 1937 recession is the recovery that ensued. The rate of growth of industrial production was slightly higher than that which prevailed over the period 1933–37 (22 percent per year compared with 21 percent), and the recovery proceeded smoothly, without the pauses and reversals that marked 1934. Had it not been for the 1937 recession, industrial production would have returned to its trend three or four years earlier.

Although official NIPA data are not available on a quarterly basis during that period, Balke and Gordon (1986) have estimated the components of gross national product (GNP), using regression-based interpolation. Although these estimates should be taken with care, I show them in figure 3; I present the growth rates in table 1 for the period of interest, with the averages for the preceding expansion as the point of comparison. They display some interesting differences of timing with industrial production. Nondurables consumption growth, strong in the last three quarters of 1936, stalled in early 1937 and collapsed in the third quarter. The various components of investment do not show such a clear pattern until the fourth quarter of 1937, when all growth rates turn negative. In contrast, the recovery is firm across all sectors in the third quarter of 1938.

FIGURE 3

Components of gross national product, 1919–41



Note: Data are quarterly over the period 1919:Q1–1941:Q4.
Source: Balke and Gordon (1986).

Fiscal policy

In the 1930s, total government was still a relatively small but growing share of the economy: In 1929 total government consumption and investment represented 9 percent of GDP, and by 1939 it had reached 16 percent. During the same period, the federal government grew in importance relative to the states and local government: Federal spending grew from 1.6 percent to 6.4 percent of GDP.[2] However, figure 4 shows that the stance of fiscal policy at the state and local level did not change much during the period under consideration. I will therefore concentrate on federal finances.

Until the Great Depression, the traditional fiscal policy had been one of balanced budgets. During the early stages of the New Deal, the vast expansion of the federal government was financed through debt, but by the middle of the 1930s, concerns were growing over the size of the public debt, which had gone from 16 percent of GDP in 1929 to 40 percent in 1936.

In 1936, there was a deliberate attempt to return to a balanced budget. Figure 5 shows the components of federal revenues by source and also plots expenditures. On the expenditures side, there is little to note except a very large spike in the second quarter of 1936. This represents the payment of bonuses to World War I veterans, which Congress decided to accelerate that year before the November elections. This probably boosted demand in the last three quarters of 1936 well above its earlier levels (table 1), but it is hard to see how it could have precipitated a recession on its own.

TABLE 1

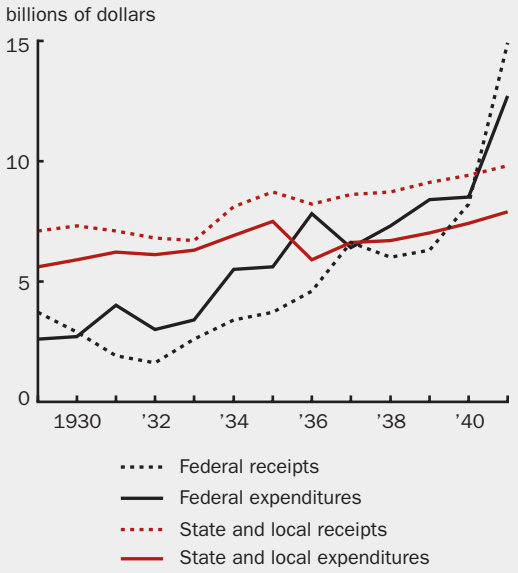
Growth rates of components of gross national product, annualized, 1933–38

	Nondurable goods and services	Durable goods	Producers' durable equipment	Nonresidential structures	Residential structures	Government purchases
	(percent)					
1933:Q1–1935:Q4	3.8	17.2	32.5	8.9	27.5	5.0
1936:Q1	2.5	18.4	4.5	7.1	–26.9	39.8
1936:Q2	10.9	18.1	29.6	–21.8	0.7	11.2
1936:Q3	10.5	21.5	44.6	59.4	93.0	3.8
1936:Q4	14.1	11.6	29.5	47.7	–15.7	–2.0
1937:Q1	–0.4	7.9	26.5	21.9	15.7	–19.9
1937:Q2	–0.3	–7.4	0.5	112.0	36.2	–2.4
1937:Q3	–7.8	10.8	3.9	–96.0	–63.5	2.8
1937:Q4	–2.5	–47.4	–106.0	–54.5	–63.6	7.1
1938:Q1	–2.7	–65.6	–73.0	–3.4	0.0	19.3
1938:Q2	–4.9	–17.4	–45.2	–71.3	13.6	6.9
1938:Q3	15.9	25.7	56.8	41.9	114.1	4.0
1938:Q4	7.7	44.0	43.5	21.2	45.4	3.8

Source: Author's calculations based on data from Balke and Gordon (1986).

FIGURE 4

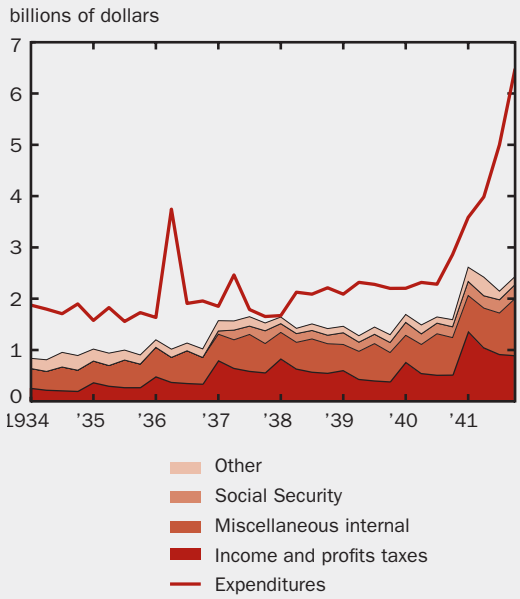
Federal and state and local receipts and expenditures, 1929–41



Note: Data are annual.
Source: U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, Historical Tables, tables 3.2 and 3.3.

FIGURE 5

Federal government revenues, by source, and expenditures, 1934–41



Note: Data are quarterly over the period 1934:Q1–1941:Q4.
Source: Board of Governors of the Federal Reserve System (1943), table 150, pp. 513–515.

On the revenue side, it is apparent that revenues increased sharply in the first quarter of 1937. There are two main factors. The most important one is the increase in income tax revenue, which grew by 66 percent from 1936 to 1937. This was due to a significant increase in income tax rates in the Revenue Act passed in June 1936. The rates previously ranged from 4 percent (starting at $4,000) to 59 percent (above $1 million). They remained unchanged for income brackets below $50,000, but were increased above that threshold, to reach 75 percent on the top earners. As a result, the average marginal tax rate for incomes above $4,000 almost doubled, from 6.4 percent to 11.6 percent.[3]

The second factor, of lesser quantitative importance, is the beginning of Social Security taxation. The Social Security tax rate was 2 percent, with half paid by the employer, and the ceiling was $3,000. Collection began in January 1937, and represented 10.5 percent of total federal tax receipts for the year 1937.

The undistributed profits tax

One interesting component of fiscal policy in that period was the introduction of a tax on undistributed profits (Lent, 1948). The motivation for the tax was not so much to raise revenue as to encourage firms to pay out dividends. The government saw this as desirable for two reasons. First, the accumulation of earnings by corporations allowed some earnings to avoid income taxation. Second, it was thought that firms did not know the best uses of the capital they were retaining and could possibly spend it on wasteful projects. According to this view, it would be better to send the earnings to the shareholder and flowing back into general capital markets.

The tax was announced, without warning, by President Roosevelt in March 1936, and enacted in the summer as part of the Revenue Act of 1936. Earnings that were not distributed as dividends were subjected to an additional tax. Lent (1948) found that the tax generated little revenue because most corporations, especially the large ones, simply paid out larger dividends. Also, smaller corporations were able to use legal mechanisms to require their shareholders to reinvest the dividends into shares of the corporation. The firms that were the most affected (as shown by the increase in their tax liability) were the medium-sized corporations.

The tax, although it had little effect in terms of revenues, could have had two effects on the economy. First, to the extent that small and medium firms find it difficult to access credit and capital markets, they have to rely on internal sources of funds to finance investment. The tax would obviously increase the cost of

investment for those firms. Second, the tax was reflective of a changed political climate and increasingly populist rhetoric coming from politicians and the Roosevelt administration. At the same time as the tax was announced, the Roosevelt administration was becoming increasingly vocal against "economic royalists," alleged monopolists, and business in general. Although the tax was widely considered a failure and was repealed in all but name after two years, it may have played a psychological role in increasing uncertainty about the profitability of investment. This assessment must be tempered by the fact that, as table 1 (p. 18) shows, there was a surge in investment in the second half of 1936, and all components of investment do not start falling uniformly until late in 1937.

By early 1938, the severity of the recession prompted a turnaround in fiscal policy. This was manifested in a dramatic announcement by President Roosevelt on April 14, 1938, of a new "spend–lend" program with a $2 billion increase in spending.

To sum up, fiscal policy became tighter in early 1937, with a brief return to a balanced budget due to tax increases. The stance was reversed in early 1938, shortly before the trough of the recession.

Monetary policy

Most of the recent discussions of the 1937 recession have centered on the monetary policy carried out by the Federal Reserve System. Because the 1930s were a period of great change for monetary policy, I will first provide some background on this change to show that the Fed abandoned its traditional instruments and adopted a passive attitude during the first half of the 1930s. When policy became active again in 1935, it was through the use of a new instrument, namely, changes in reserve requirements, coupled with actions by the U.S. Department of the Treasury. The stance of monetary policy, like that of fiscal policy, reversed as the 1937 recession took its toll. I will then examine in more detail the response of the banking system to monetary policy during the recession.

Background

The 1930s were a period of considerable change for U.S. monetary policy. The turning point was the Gold Reserve Act, passed on January 30, 1934. It nationalized all gold in the United States, including the gold reserve held by the Fed. It authorized the president to devalue the dollar, which he did immediately, changing the dollar price of an ounce of gold from $20.67 (its price since the 1830s) to $35. This implied that the Treasury made a capital gain of 60 percent, or about $2 billion, on its newly acquired gold holdings. The proceeds were used to create an Exchange Stabilization Fund under the sole discretionary control of the Treasury. The existence of the fund gave the Treasury a strong hand in its dealings with the Fed, and for the next 17 years the Treasury dominated monetary policy.

From its foundation to the early 1930s, the Fed's balance sheet had consisted essentially of its gold reserve, which backed the currency (subject to a 40 percent reserve requirement) and private debt. Monetary policy consisted of managing the portfolio of private debt, either through discounting or, since the 1920s, through open-market purchases and sales of private debt. The debt was short-term, either commercial paper or bankers' acceptances, with typically 90 days or less to maturity.

Figure 6, panels A and B show the rates at which the Fed bought commercial paper and bankers' acceptances, compared with open-market rates. The Fed's rate in panel A is somewhat lower than the market rate because the latter pertains to paper of four to six months maturity, whereas the Fed purchased shorter maturities. Both panels in figure 6 show that, until 1932, the Fed's rate was close to the market rate; in other words, the Fed was active in the open market. After 1934, the Fed's rates are above market rates, indicating that the Fed had ceased to use interest rates for the conduct of monetary policy.

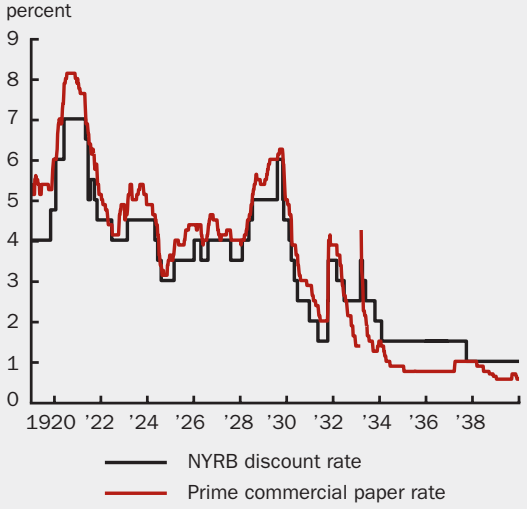
In the years that followed, the stance of monetary policy was dictated by actions of the Treasury. This can be seen in figure 7, which plots the sources of reserve funds—that is, the existing and potential sources of legal tender. Treasury currency (that is, currency issued directly by the Treasury) and Federal Reserve credit—the first two components—played no role in the 1930s, as they remained essentially constant. The Fed's portfolio during that period consisted of gold certificates (issued by the Treasury in 1934 in exchange for the Fed's gold reserve) and government bonds. Private debt had completely disappeared. The portfolio was kept constant throughout the period, with a few minor exceptions. The gold stock, the third component, was the main source of variation in the monetary base.

The Treasury did not immediately monetize the capital gain it had made on gold. The source of growth in the monetary base is to be found elsewhere. From 1934 on, persistent gold inflows into the United States account for the growth in the gold component. There were two reasons for the inflows. After the devaluation of 1934, foreigners bought dollars because they had become cheaper (and U.S. domestic prices had not adjusted fully). Later, gold inflows continued because increasing political instability in Europe induced long-term capital flows into the United States.

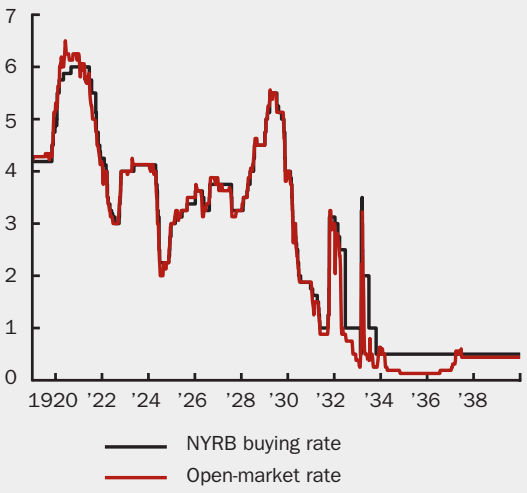
FIGURE 6

New York Reserve Bank (NYRB) rates and prevailing open-market rates, 1919–39

A. NYRB discount rate and open-market prevailing rate on 4–6 month prime commercial paper



B. NYRB buying rate and open-market prevailing rate for 90-day bankers' acceptances

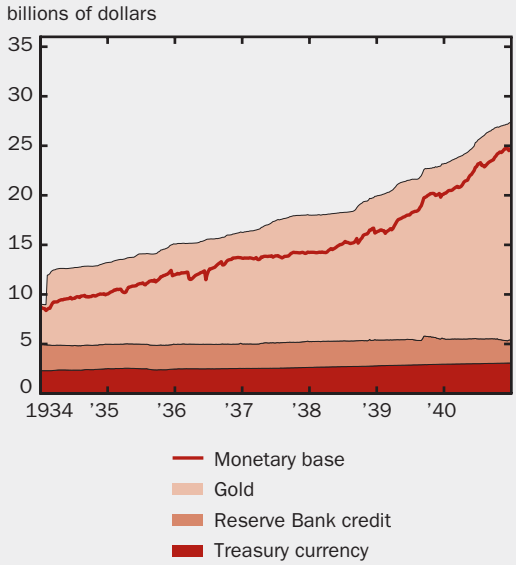


Note: Data are weekly over the period 1919–39.
Source: Board of Governors of the Federal Reserve System (1943), tables 115, 117, and 121, pp. 442–445, 452–459.

When foreigners offered gold for sale, the Treasury issued gold certificates and deposited them at the Fed, increasing its account's balances. The Treasury then used the increase to pay for the gold. Thus, gold inflows translated one for one into increases in the monetary base. In other words, gold inflows were monetized. This accounts for the steady increase in the monetary base.

FIGURE 7

Monetary base and components of the supply of reserve funds, 1934–40



Note: Data are weekly over the period January 3, 1934–December 31, 1940.
Source: Board of Governors of the Federal Reserve System (1943), table 103, pp. 378–394.

The growth in reserves

Then, as now, the U.S. banking system comprised a variety of banks depending on supervisory jurisdiction. Banks incorporated under federal law were all members of the Federal Reserve System and the Federal Deposit Insurance Corporation (FDIC). Banks incorporated under state law could be members of the Federal Reserve System and the FDIC, the FDIC only, or neither. Unincorporated banks could be members of the FDIC. In June 1936, member banks represented 70 percent of all bank deposits. In this section I focus on member banks' statistics, since they were more frequently collected by the Federal Reserve System and were directly affected by the System's changes in reserve requirements.[4]

Reserves (which can take the form of currency or balances at Federal Reserve Banks) were required by law since 1917. The quantity of required reserves depended on the total amount of demand deposits (net of deposits of other banks) or time deposits that a bank held, as well as its location (see table 2). Reserves above the required amount are excess reserves. If a bank located in a central reserve city held $1 in excess reserves, it could potentially increase its demand deposits by an additional $7.69.

For all member banks, reserves grew from $2,235 million in June 1933, near the trough of the

Great Depression, to $6,613 million by March 1937, on the eve of the 1937 recession, a 300 percent increase. Demand deposits during the same period grew only from $26,564 million to $41,114 million—a 150 percent increase. With constant reserve requirements, this meant that excess reserves grew considerably: In January 1934, they were estimated to be $827 million, but by March 1935, when the Fed began to be concerned, they had reached $2,200 million, or 48 percent of total reserves. By comparison, before the banking panics of 1931, excess reserves were typically 2 percent or 3 percent of total reserves (Board of Governors of the Federal Reserve System, 1943).

Why did banks hold such large reserves? Friedman and Schwartz (1963) propose a shift in banks' preferences for reserves as a consequence of the banking panics of 1931–33. This shift took place gradually over the period 1933–36, and subsided slowly only in the late 1930s and early 1940s as experience with the FDIC and general economic recovery made banks more comfortable holding lower levels of reserves.[5] In contrast, Frost (1971) has argued that banks' demand for reserves was stable throughout the period. With fixed costs of adjusting reserves, that demand for reserves behaves differently at low levels of interest rates than at higher levels. Below a certain threshold, the demand rises much more rapidly as rates fall. The reason is that, when short-term rates are low, it is less costly to hold large amounts of reserves than repeatedly to incur the fixed cost of adjusting. Frost's explanation for high reserves in the 1930s is solely the low level of interest rates.

Policy reaction (1935–37)

Beginning in March 1935, the Federal Open Market Committee (FOMC), which determines monetary policy and interest rates, became increasingly concerned with the growth in excess reserves. Its members feared that such reserves could ultimately lead to an uncontrolled credit expansion, once banks decided to increase their deposits. At that date, the Fed staff prepared a background memo titled "Excess reserves and Federal Reserve policy." The authors believed that increasing government debt supplied the bonds that led to reserve growth. But the memo concluded that neither past experience nor central bank theory gave any guidance for a policy response in the current circumstances (Meltzer, 2003, pp. 492–493).

Yet in spite of mounting concerns, it took the Fed over a year to take action. This was due partly to the uncertainty presented in the March 1935 memo and partly to the need to avoid antagonizing the Treasury. Concerns over potential inflation were balanced against concerns over the recovery and the federal government's desire for low interest rates when it was financing its debt.

By October 1935, excess reserves in the banking system exceeded the Fed's portfolio of government bonds, and the FOMC decided to analyze the distribution of excess reserves across banks to make sure that increases in requirements would not fall disproportionately on some banks. It also decided to coordinate policy with the Treasury. The ultimate result of this coordination was that the policy actions in 1936–37 took two forms: increases in reserve requirements by the Fed and sterilization of gold inflows by the Treasury (explained in more detail later).

Friedman and Schwartz (1963, p. 544) see monetary policy (that is, the increase in reserve requirements and, "no less important," the gold sterilization program) as "a factor that significantly intensified the severity of the decline and also probably caused it to occur earlier than otherwise."

Reserve requirements

The Banking Act of 1935, passed in August 1935, made important changes to the structure of the Federal Reserve.[6] One of the changes concerned reserve requirements. Since 1917, reserve requirements had been set in section 19 of the Federal Reserve Act at various levels depending on the location of the member bank.[7] The Board of Governors was now given the authority to change the reserve requirements "in order to prevent injurious credit expansion or contraction,"[8] but the requirements could be no lower than they had been since 1917 and no higher than twice those levels.

The purpose of increasing the reserve requirements was to pave the way for a return to the Fed's traditional policy tools, namely, rediscounting (buying privately issued debt at a discount to reflect the time to maturity) and open-market operations. The Fed thought that, as long as excess reserves were so large, it could have no effect on the banking sector's lending activities. Only if banks became borrowers again would the Fed be able to ease or tighten policy; until then, in the famous phrase of Marriner Eccles, Chairman of the Board of Governors, the Fed would be "pushing on a string" (Meltzer, 2003, p. 478).

Why were policymakers worried about inflation in 1936? The answer is twofold. First, there were objective signs of inflation. Wholesale prices, which had been stable in the early part of 1936, began to rise in late 1936 and early 1937. The annualized six-month change in wholesale prices rose steadily from 0.5 percent in August 1936 to 10.2 percent in March 1937. Retail prices as measured by the National Industrial Conference Board's (NICB) cost-of-living index did not rise as fast, but the 12-month change was nevertheless 5.4 percent by March 1937.[9]

TABLE 2

Member bank reserve requirements, 1917–41

Effective date	Percent of net demand deposits: Central reserve city	Percent of net demand deposits: Reserve city	Percent of net demand deposits: Country	Percent of time deposits: All
June 21, 1917	13	10	7	3
August 16, 1936	19.5	15	10.5	4.5
March 1, 1937	22.75	17.5	12.25	5.25
May 1, 1937	26	20	14	6
April 16, 1938	22.75	17.5	12	5

Source: Board of Governors of the Federal Reserve System (1943), table 107, p. 400.

The other answer is that some policymakers were still worried about repeating what they saw as the mistake of the 1920s. In that view, the Great Depression was partly a result of the speculative excesses of the 1920s, which the Fed had not done enough to prevent. Whether they saw incipient signs of a speculative boom developing (or whether they wanted to prevent such a boom from getting started in the first place), there was for some an inclination toward preemptive action. Although this view was perhaps not dominant in the FOMC, it nevertheless supported the move toward action in early 1937 and slowed the reversal of policy later on during the downturn.

That said, it should be emphasized that the Fed did not see the increase in reserve requirements as contractionary, and its public pronouncements insisted that the stance of policy had not changed. In the Fed's view, mopping up excess reserves through the increase in requirements should have had no effect. Recent authors such as Currie (1980), Calomiris and Wheelock (1998), and Telser (2001) have argued that the increase in reserve requirements did not cause the recession.

Table 2 shows the changes in reserve requirements. The first increase in reserve requirements was announced on July 14, 1936, and went into effect a month later. At the time, total reserves stood at $5.87 billion, split almost exactly between required reserves of $2.95 billion and excess reserves of $2.92 billion. Thus, an increase of 50 percent in reserve requirements could be easily met by banks with the excess reserves.

The second and third increases were announced on January 30, 1937: The first was to take effect on March 1; the second on May 1. At the time of the announcement, total reserves had increased to $6.78 billion, and required reserves were $4.62 billion, slightly higher than they had been after the first increase. The increase of 33 percent in requirements could again be met from excess reserves, leaving over $600 million in excess reserves.

Figure 8, panel A shows total and estimated required reserves at weekly reporting member banks. The four vertical dotted lines on this panel and on panels B and C mark the four changes in reserve requirements (three increases and one decrease).

Two things are apparent from figure 8. One is that, in the aggregate, the increase in reserve requirements did not reduce excess reserves to zero (see panel B): The estimated excess reserves on May 5, 1937, the first reporting date after the last increase, were $887 million—28 percent of what they were on August 12, 1936, before the increases began.

The second point to make is that the growth of total reserves paused during 1937, and then resumed, mirroring the behavior of the monetary base (see figure 8, panel A). The two lines in the graph thus summarize the two prongs of monetary policy: The lower line (required reserves) reflects the Fed's actions, while the upper line (total reserves) reflects Treasury's sterilization of gold inflows.

Gold sterilization

As explained previously, since 1934 the Treasury had let gold inflows increase the monetary base. Starting in December 1936, the Treasury changed its procedure. Instead of, in effect, converting gold inflows into the monetary base, it used proceeds from bond sales to pay for the gold that was brought to the Treasury at the price of $35 per ounce. As a result, the gold stock in the United States continued to increase but the monetary base remained roughly constant (see figure 9, p. 26). From December 1936 to February 1938, the gold stock increased 15 percent, but the monetary base grew by only 4 percent. The policy was halted in February 1938 and reversed over the ensuing months.

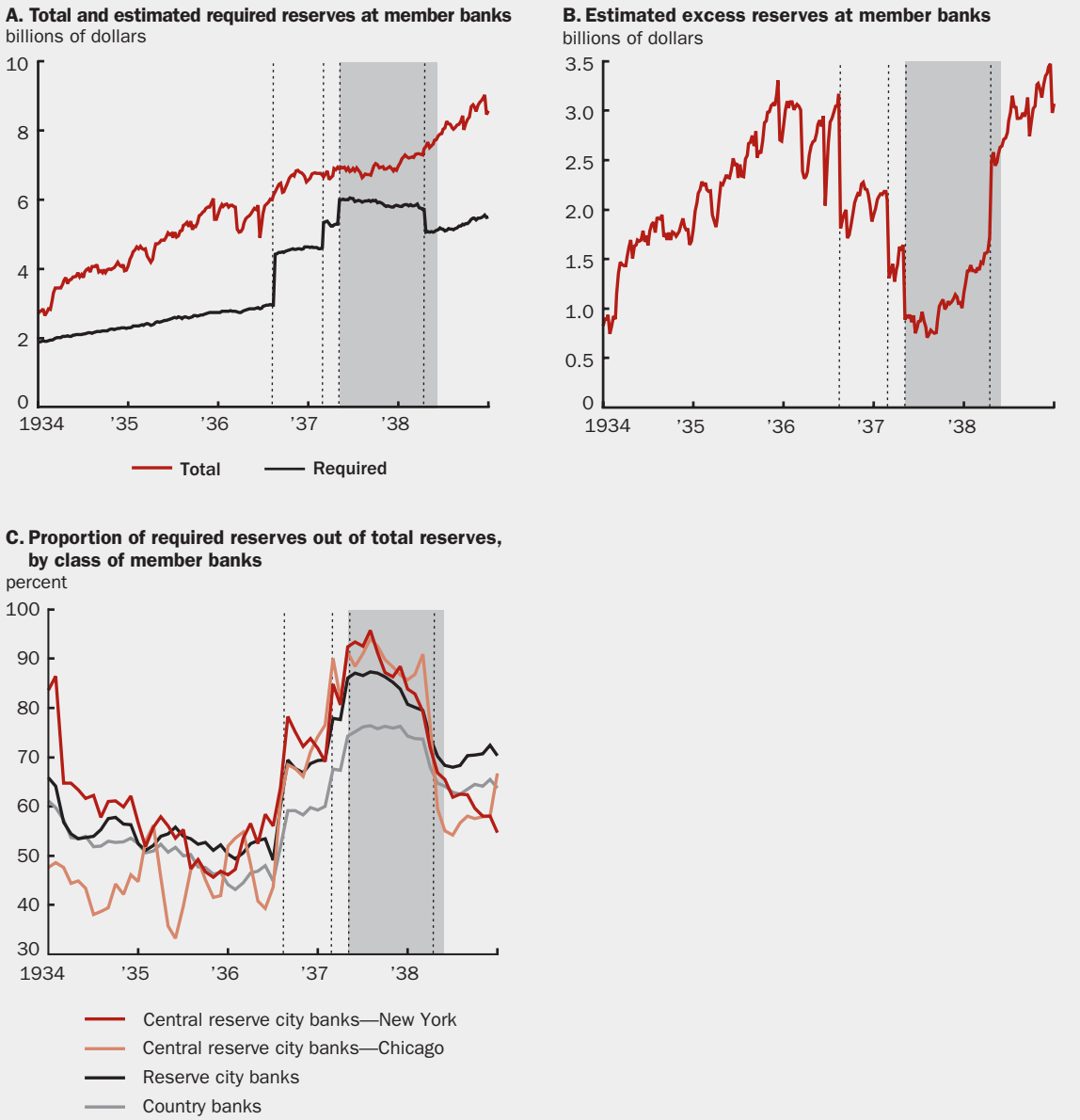
The response of banks

How did banks respond to the increase in reserve requirements? Figure 8, panel B plots excess reserves. It is apparent that, in the aggregate, excess reserves were sufficient to meet the new requirements, and panel B shows no sign of banks scrambling to keep their excess reserves at high levels, contrary to what is occasionally asserted.

The picture is somewhat different, however, if one looks at more disaggregated data. Figure 8, panel C shows the proportion of required reserves out of total reserves by class of member banks. Recall that member banks were classified according to their location. Banks in

FIGURE 8

Reserves of member banks, 1934–38



Notes: Data for panels A and B are weekly over the period January 3, 1934–December 28, 1938; data for panel C are monthly over the period January 1934–December 1938. The four vertical dotted lines in each panel mark the four changes in reserve requirements (three increases and one decrease) noted in table 2. The shaded areas indicate official periods of recession as identified by the National Bureau of Economic Research.

Source: Author's calculations based on data from the Board of Governors of the Federal Reserve System (1943), tables 103 and 105, pp. 378–394, 396–398.

New York City and Chicago (the two central reserve cities) were considerably closer to their limit than banks in reserve cities and country banks.

A comparison of table 3 and table 4 confirms that the reaction of member banks in New York City was markedly different from that of the banking system overall. From June 1936 to June 1937, total deposits grew by 2.3 percent overall but only 0.3 percent in New York City member banks. Loans increased by 8.6 percent overall, and by 21.2 percent among New York City banks; but the latter banks reduced their holdings of government bonds by 23.8 percent and other securities

TABLE 3

All banks: Main assets and total deposits, 1936–38

Call dates	Loans	Investments			Deposits
		Total	U.S. government bonds	Other securities	
	(millions of dollars)				
June 1936	20,636	27,776	17,323	10,453	57,884
December 1936	21,359	28,086	17,587	10,499	60,619
June 1937	22,410	27,155	16,954	10,201	59,222
December 1937	22,065	26,362	16,610	9,752	58,494
June 1938	20,982	26,230	16,727	9,503	58,792
December 1938	21,261	27,570	17,953	9,617	61,319

Source: Board of Governors of the Federal Reserve System (1943), table 2.

TABLE 4

New York City member banks: Main assets and total deposits, 1936–38

Call dates	Loans	Investments			Reserves	Deposits
		Total	U.S. government bonds	Other securities		
	(millions of dollars)					
June 30, 1936	3,528	6,028	4,763	1,265	2,106	11,387
December 31, 1936	3,855	5,426	4,209	1,217	2,658	11,824
March 31, 1937	3,961	5,140	3,829	1,311	2,719	11,400
June 30, 1937	4,276	4,730	3,630	1,100	2,749	11,421
December 31, 1937	3,673	4,640	3,595	1,045	2,738	10,759
March 7, 1938	3,532	4,785	3,611	1,174	2,941	10,570
June 30, 1938	3,172	4,841	3,740	1,101	3,517	11,192
September 28, 1938	3,146	5,209	3,987	1,222	3,743	11,410
December 31, 1938	3,262	5,072	3,857	1,215	4,104	11,706

Source: Board of Governors of the Federal Reserve System (1943), table 23.

by 13.0 percent, while banks overall reduced these holdings 2.1 percent and 2.4 percent, respectively.

Although banks did not suddenly increase their reserve holdings, they did reduce the rate of growth of deposits. Figure 9 shows that demand deposits, which had been growing steadily at 20 percent per year since March 1933, grew more slowly starting in July 1936 and peaked in March 1937. Over the next 12 months, they fell by 6 percent, reached a low in December 1937, and began growing again after the end of the recession.

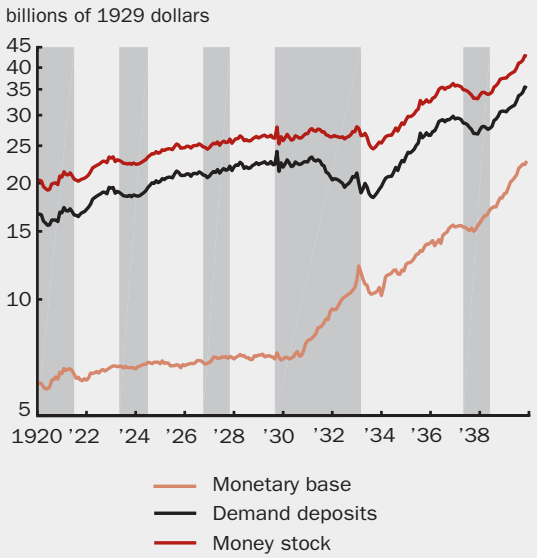
This describes the size of the banking sector from the liability side. Which assets shrank to meet this fall in liabilities? Figure 10 shows that member bank assets fell into three broad categories: reserves, investments (U.S. bonds and other securities), and loans. Reserves grew, as we saw. Loans were not affected much, although they grew more slowly than before. Among reporting member banks, the 12-month growth rate of loans peaks on August 4, 1937, at 19.1 percent, and the absolute level peaks on September 15, 1937, at $10.05 billion, 16 percent higher than a year before. Loans then fall 4.5 percent in the next three months as the recession deepens. The category that bore the brunt of the reduction was investments, particularly government debt, simply because those were the most liquid assets. This can be seen for weekly reporting member banks in table 5, which shows the composition of assets for the week following each change in reserve requirements. From the second to the third increase (March–May 1937), total assets fell by $1.3 billion: Loans actually increased by $0.5 billion, and most of the reduction came from U.S. bonds.

Looking at interest rates confirms that the impact of reserve requirements manifested itself on tradable securities rather than loans. Table 6 shows that rates charged by banks on loans were little affected (and in some locations fell) after the reserve requirements increased, while short-term commercial paper rates rose.

The impact of the second round of reserve requirement increases was felt immediately in the U.S. bond market. There is in fact a particular day, March 15, when U.S. long-term bonds, whose yields had remained very stable, went up by 2 basis points, prompting the Secretary of the Treasury to get on the phone and

FIGURE 9

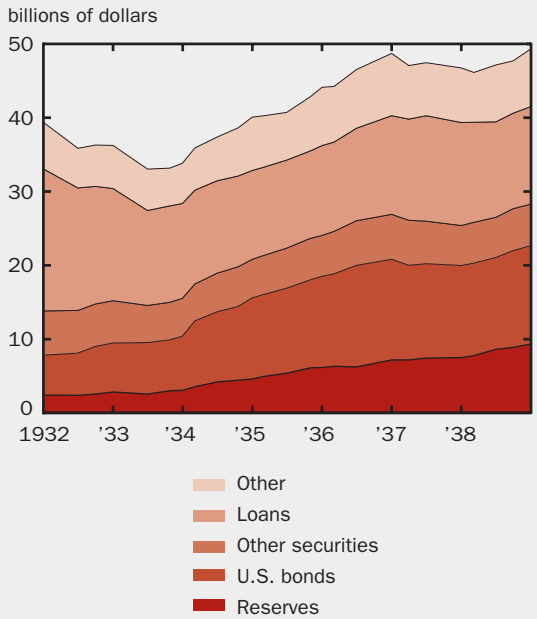
Monetary base, demand deposits at commercial banks, and money stock, 1919–39



Notes: Data are monthly over the period December 1919–December 1939 and adjusted for cost of living. The shaded areas indicate official periods of recession as identified by the National Bureau of Economic Research.
Source: Friedman and Schwartz (1963), appendix A.

FIGURE 10

Components of member banks' balance sheets, 1932–38



Note: Data are quarterly over the period 1932–38.
Source: Board of Governors of the Federal Reserve System (1943), table 18.

complain to Eccles, the Chairman of the Fed, that the Fed had bungled the increase in reserve requirements.

Figure 11, panels A and B show clearly how bond rates increased in March 1937, before the recession began. Figure 12, which shows that corporate issues declined sharply in March 1937, suggests a channel through which the increase in reserve requirements could have affected the economy, namely, by reducing the banking sector's demand for (government and) corporate liabilities. The fall in lending translated into higher interest rates and a lower volume of issues.

Prices

The behavior of prices (see figure 13) during the recession is broadly consistent with the notion that monetary policy was contractionary. Whichever indicator one uses, it is apparent that prices peaked in mid-1937, as the recession was under way (recall that there is some ambiguity as to the exact starting date, either May or August). The aggregate indexes normally used (the deflators for gross domestic product and personal consumption expenditures) are only available annually for this period. The monthly indexes such as the National Industrial Conference Board's cost-of-living index and the Wholesale Price Index, closely watched at the time for evidence of inflation, both peaked in September 1937; the Consumer Price Index did too, although it is not a very good measure for this period because data were not collected on a monthly basis, and missing data are interpolated.

What is rather puzzling is that the trend in prices, having turned deflationary during the recession, continued well after the end of the recession. The National Industrial Conference Board's index bottoms out in June 1939, having declined by 2.2 percent since the end of the recession, while wholesale prices, having fallen 3 percent, bottom out in August 1939 just before the outbreak of the European war sets off speculative buying.

Cole and Ohanian (1999) have used the recession of 1920–21, during which output fell sharply after a steep drop in prices and recovered strongly once the deflation ended, to highlight the puzzling nature of the slow recovery after the end of deflation in 1933. The recovery of 1938 adds to this puzzle: The economy rebounded as sharply as in 1921—an analogy noted by Friedman and Schwartz (1963) in spite of continued deflation (Steindl, 2007).

The following conclusions emerge from the foregoing discussion. First, monetary policy was as much

TABLE 5

Assets of weekly reporting member banks after reserve requirement changes, 1936–38

	Loans	Government bonds	Other securities	Reserves	Vault cash	Balances with domestic banks	Total assets
	(millions of dollars)						
August 19, 1936	8,369	10,564	3,323	4,884	373	2,288	32,315
March 3, 1937	9,054	10,303	3,318	5,291	398	2,055	33,677
May 5, 1937	9,533	9,499	3,208	5,307	337	1,797	32,362
April 20, 1938	8,585	9,156	3,068	5,980	330	2,188	31,938

Source: Board of Governors of the Federal Reserve System (1943), table 48.

TABLE 6

Short-term rates and lending rates, 1936–38

	1936		1937		1938	
	June	December	June	December	June	December
	(percent)					
Short-term open-market rates in New York City						
Prime commercial paper, 4–6 months	0.75	0.75	1.00	1.00	0.88	0.63
Prime bankers' acceptances, 90 days	0.13	0.19	0.47	0.44	0.44	0.44
Rates charged on customers' loans by banks in principal cities						
Total (19 cities)	2.71	2.58	2.57	2.52	2.56	2.60
New York City	1.71	1.74	1.73	1.70	1.70	1.70
North and East (7 cities)	3.02	2.94	2.79	2.72	2.70	2.95
South and West (11 cities)	3.51	3.14	3.29	3.23	3.31	3.31

Source: Board of Governors of the Federal Reserve System (1943), tables 2, 120, and 124.

a consequence of Fed actions as Treasury actions. The fall in the money stock was a direct consequence of the gold sterilization program. Second, the increases in reserve requirements began to bite only in early 1937. Finally, the channel through which monetary policy affected the banking system is not as straightforward as sometimes asserted. Lending did not begin to fall until the recession was under way. The reaction of the banking system was to liquidate securities holdings, primarily U.S. bonds, but also private sector securities. The impact on market rates is evident starting in March 1937.

Labor costs

Roose (1954) and other authors have cited alternative explanations to the monetary and fiscal policy stories. A number of these stories center on increased labor costs, which I now take up.

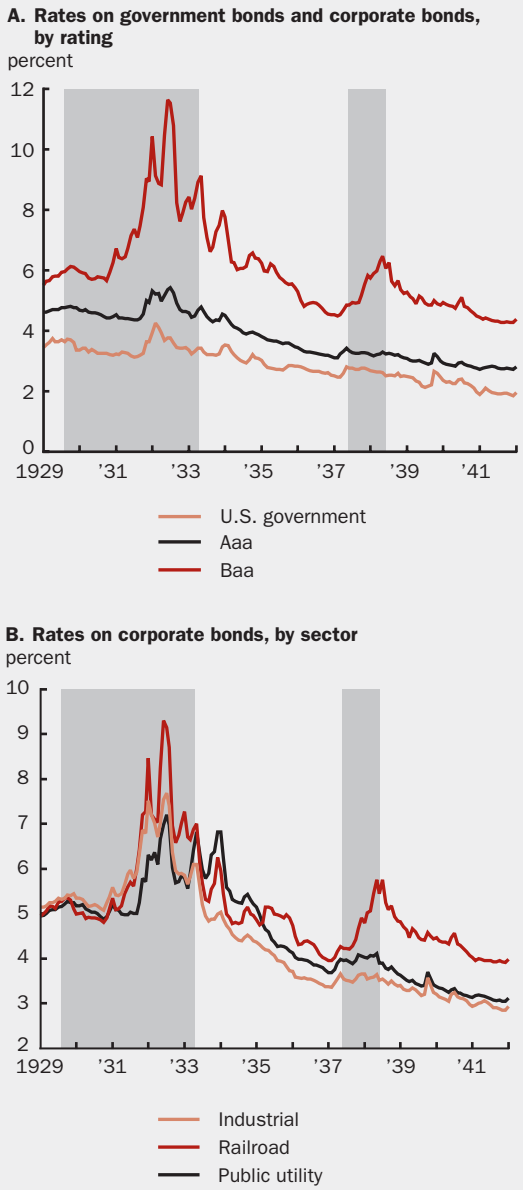
New Deal policies and the slow recovery

As Friedman and Schwartz (1963, p. 493) put it, "the most notable feature of the revival after 1933 was not its rapidity but its incompleteness": Unemployment remained high throughout the 1930s, the revival was erratic and uneven, and private investment (particularly construction) remained very low compared with the 1920s. They go on to note that prices rose much more than in earlier expansions despite the large resource gaps that remained. The reason was "almost surely the explicit measures to raise prices and wages undertaken with government encouragement and assistance. ... In the absence of the wage and price push, the period 1933–37 would have been characterized by a smaller rise in prices and a larger rise in output than actually occurred" (Friedman and Schwartz, 1963, pp. 498–499).

Cole and Ohanian (2004) develop a general equilibrium model to address this question. Specifically, they document that output, consumption, investment,

FIGURE 11

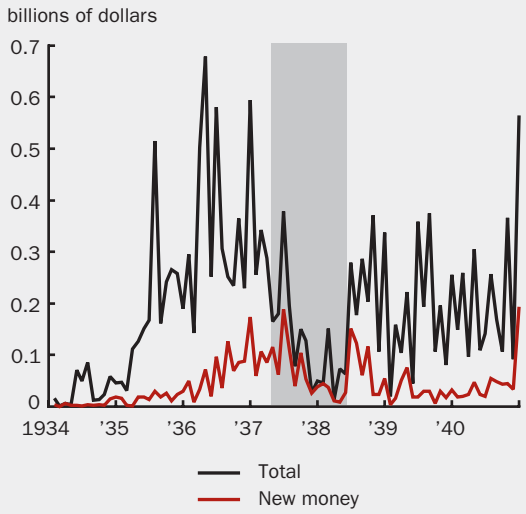
Rates on bonds, 1929–41



Notes: Data are monthly over the period January 1929–December 1941. The shaded areas indicate official periods of recession as identified by the National Bureau of Economic Research.
Source: Board of Governors of the Federal Reserve System (1943), table 128, pp. 468–471.

FIGURE 12

New corporate security issues, total and proceeds proposed as new money, 1934–40



Notes: Data are monthly over the period January 1934–December 1940. The shaded area indicates an official period of recession as identified by the National Bureau of Economic Research.
Source: Board of Governors of the Federal Reserve System (1943), table 138, pp. 491–492.

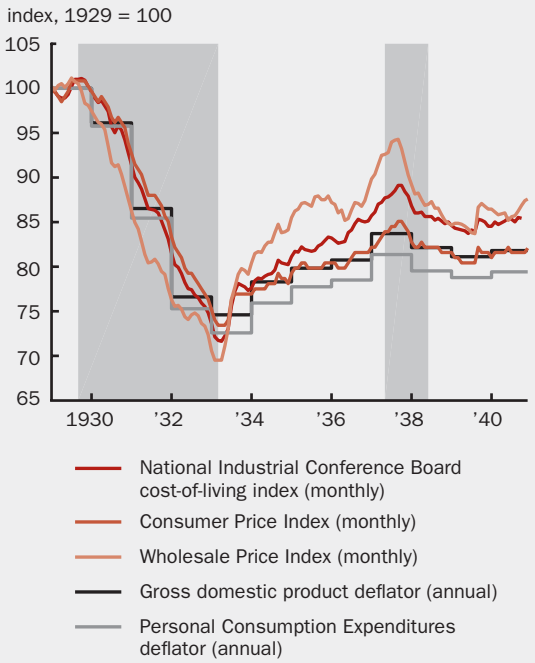
and hours worked remained far below trend from 1934 to 1939, while total factor productivity was back to trend in 1936 and wages were 10 percent to 20 percent above trend. They also document the history of the National Industrial Recovery Act (NIRA), which gave industries protection from antitrust legislation as long as firms raised prices and shared their profits with workers in the form of higher wages. The NIRA was struck down by the Supreme Court in May 1935, but the National Labor Relations Act (NLRA), or Wagner Act, was passed in July 1935 to increase the bargaining power of unions; furthermore, according to Cole and Ohanian (2004), the Roosevelt administration did not enforce antitrust laws, allowing firms to continue to collude in raising prices. The combined effect of firm collusion and worker bargaining power is shown in their equilibrium model to result in lower output than in a competitive version of the same economy. Starting from 1934 conditions and assuming the same changes in total factor productivity (that is, changes not due to changes in inputs) as in the data, the competitive version of the economy returns to trend by 1936 or so, while the cartelized version of the economy, calibrated so that wages are 20 percent above their normal level, displays lower consumption, investment, and employment, along with higher wages.

New Deal policies and the 1937 recession

The Wagner Act, which is still in force today, immediately generated legal challenges. Several cases involving that act were taken up by the Supreme Court in January 1937.

FIGURE 13

Various measures of prices, 1929–41

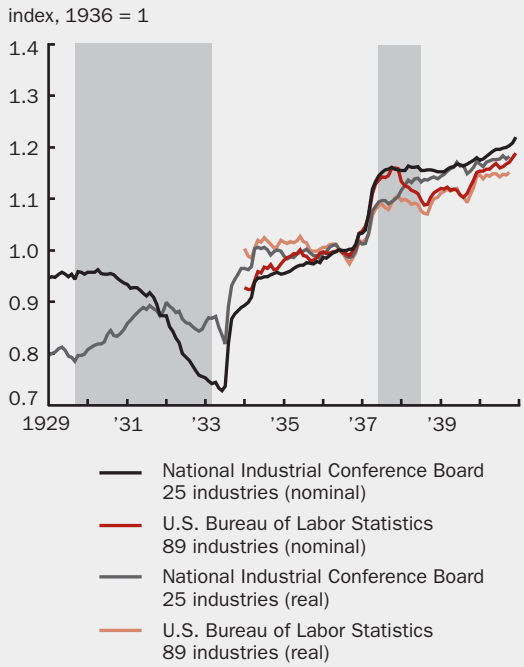


Note: The shaded areas indicate official periods of recession as identified by the National Bureau of Economic Research.

Sources: Beney (1936); National Industrial Conference Board (1938, 1939, 1940); U.S. Bureau of Labor Statistics from National Bureau of Economic Research, Macrohistory Database, series m04169a; and U.S. Bureau of Labor Statistics and U.S. Bureau of Economic Analysis from Haver Analytics.

FIGURE 14

Indexes of nominal and real wages, 1929–40



Notes: Data are monthly over the period January 1929–December 1940. The shaded areas indicate official periods of recession as identified by the National Bureau of Economic Research.

Source: U.S. Bureau of Economic Analysis, *Survey of Current Business*, 1934–41, various issues.

In an earlier version of their work, Cole and Ohanian (2001, p. 49) commented that "while more work is required to assess the 1937–38 downturn, our theory raises the possibility that an increase in labor bargaining power may have been an important contributing factor to the downturn of 1937–38." In recent testimony to the Senate, Ohanian (2009) went further to assert: "Wages jumped in many industries shortly after the NLRA was upheld by the Supreme Court in 1937, and our research shows that these higher wages played a significant role in the 1937–38 economic contraction."

The behavior of wages

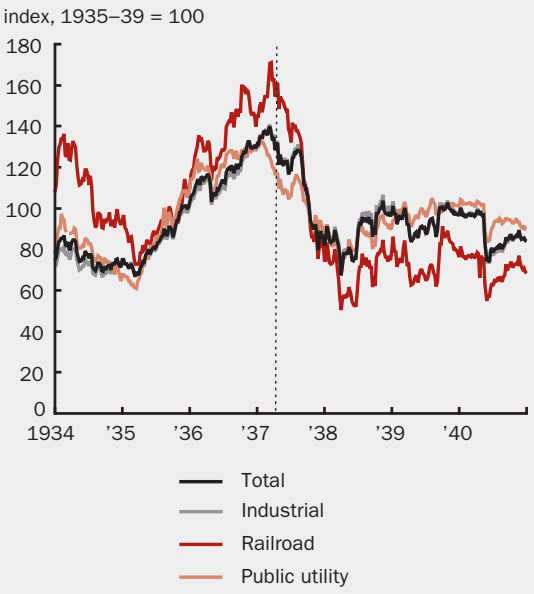
Figure 14 shows the behavior of wages, as measured by the U.S. Bureau of Labor Statistics (BLS) and the National Industrial Conference Board, both in nominal terms and deflated by the monthly cost-of-living index computed by the National Industrial Conference Board.

Nominal average hourly earnings as measured by the BLS had been close to constant from January to August 1936, oscillating between $0.571 and $0.575. They fell to $0.569 in September and then began to rise. By April 1937, they had reached $0.638; they peaked at $0.667 in November of that year, 17 percent higher than in September 1936. But most of that increase (70 percent) had taken place before the Supreme Court handed down its decision on April 12, 1937. The picture is not much different if we look at the National Industrial Conference Board's index: According to this measure, 67 percent of the rise had occurred before the decision.

Stock prices (shown in figure 15) do not support the notion that the release of the Supreme Court decision suddenly shifted bargaining power within existing collusive arrangements from firms to workers. If that had been the case, then the net present value of the firms' share of the collusive rents should have fallen upon receipt of the news. In fact, April 12, 1937, was a quiet day on stock markets, and the next day the *Wall Street Journal* commented that the decision "caused little more than a ripple in the markets," an initial sell-off in steels having been recovered before day's end, and trading before and after the decision "hardly

FIGURE 15

Stock prices, 1934–40

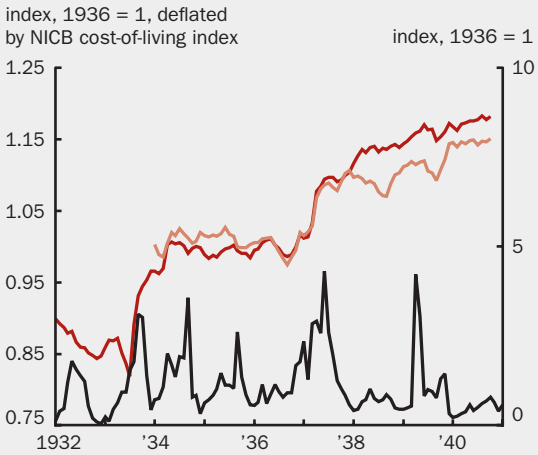


Notes: Data are weekly over the period January 3, 1934–December 25, 1940. The dashed vertical line marks April 13, 1937, the day after the Supreme Court decision on the Wagner Act was released.

Source: Board of Governors of the Federal Reserve System (1943), table 134.

FIGURE 16

Nominal wages and man-days lost to strikes, 1932–40



Notes: Data are monthly over the period January 1932–December 1940 (the BLS series starts in January 1934). Factory hourly average earnings are measured on the left-hand scale, and idle man-days due to strikes are measured on the right-hand scale.

Sources: National Bureau of Economic Research, Macrohistory Database, series m08257; and U.S. Bureau of Economic Analysis, *Survey of Current Business*, 1934–41, various issues.

better than dull." The paper went on to assert that "had the decisions ... gone the other way, there is little doubt that the share market would have responded with a show of active buying; but as the reverse was true, the stock market's following managed to be philosophic about it" (Dow Jones and Company, 1937b, p. 37).

The commentary, as well as a quotation by Henry Ford the following day that "we thought the Wagner Act was the law right along" (Dow Jones and Company, 1937a, p. 2), suggests that the decision had been correctly anticipated all along. Surprisingly, however, the stock market had been rising steadily over the previous two years. From May 1935, when the NIRA was struck down, to April 1937, it shot up 70 percent (see figure 15).

Why did wages rise in 1936–37?

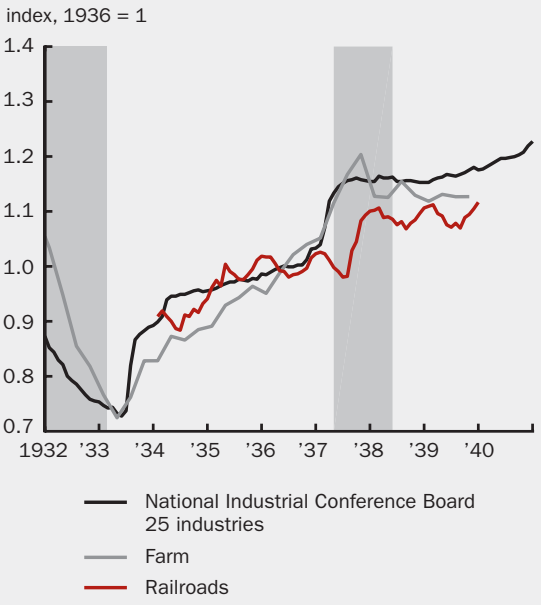
There is little doubt that the rise in wages was linked to the Wagner Act and the resulting increase in labor union activity. Figure 16 compares the level of wages with the number of man-days lost to strikes. While strikes were recurrent throughout the period, a sustained increase in strikes is noticeable from the end of 1936 to a peak in June 1937 of 5 million man-days—four times the decade's average.

To test the claim that the Wagner Act caused wage increases in manufacturing, I looked at wages in railroads and farming, sectors to which the act did not apply. Figure 17 shows data collected by the National Industrial Conference Board for wage rates in 25 industries, all wage earners in Class I railroads, and farm labor. Wages did not rise for railroad employees when they were rising in industry: In fact, railroad wages fell during the same period. However, farm wages follow the same pattern as industrial wages throughout the whole period.

I have looked at industry data to see if industries that saw a greater increase in wages also saw a larger drop in employment. To do this, I regressed the percentage change in employment from July 1937 to June 1938 (the peak and trough of total employment) on the percentage change in average hourly earnings from September 1936 to November 1937 (the trough and peak of nominal wages in figure 14, p. 29). The results for the 31 industries are shown in figure 18. The relationship is negative and significantly different from 0

FIGURE 17

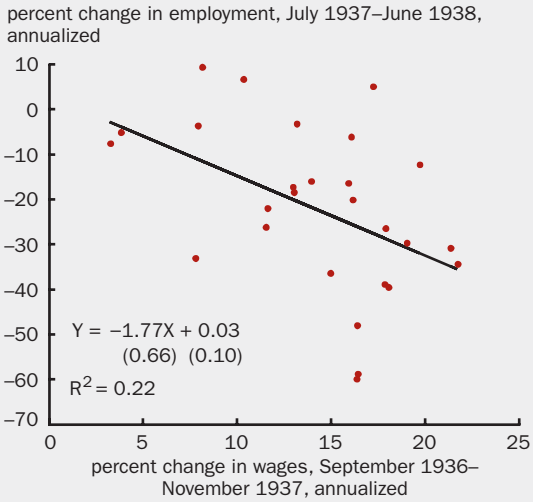
Average hourly earnings in 25 industries and in railroads and wage rates of farm labor, 1932–40



Notes: The average hourly earnings data for the 25 industries and the railroads are monthly and the monthly wage rates of farm labor data are quarterly, seasonally adjusted, over the period 1932–40. The shaded areas indicate official periods of recession as identified by the National Bureau of Economic Research.
Sources: National Industrial Conference Board (1938, 1939, 1940).

FIGURE 18

Impact of wage increases on employment across 31 industries



Source: Author's calculations based on data from the U.S. Bureau of Economic Analysis, *Survey of Current Business*, 1936–38, various issues.

at the 1 percent confidence level. The coefficient is large: A 1 percent increase in wages leads to a 1.8 percent fall in employment, but it is imprecisely estimated.

More problematic is the fact that these results are not robust to slight changes in the dates at which the changes are measured. For example, just changing the end date for wage increases from November 1937 to June 1937 reduces the R^2 statistic from 22 percent to 7 percent; and the estimated coefficient is three times smaller and not significantly different from 0 at the 5 percent confidence level.

Quantitative assessment

I have described the main explanations proposed for the recession of 1937. To assess which one (or more) of these explanations is the most plausible, it is necessary to go beyond theoretical plausibility and pure issues of timing. Ideally, one would construct a well-specified economic model that encompasses the competing explanations, estimate the parameters of the model using actual data, and then carry out experiments in the model. This is a difficult task, if only because there is not an agreed-upon model to use.

It is nevertheless possible to make a quantitative assessment, using the techniques of vector autoregression (VAR) analysis. The basic idea behind VAR analysis is to construct a statistical model of the relations between any number of variables of interest. The variables are all interrelated, both over time (one variable's current value affects another variable's future value) and within a single time period. That is because, typically, all of the variables are determined simultaneously by the economy. Prices do not explain quantities any more than quantities explain prices: Both are determined jointly by supply and demand relationships. In a dynamic setting, where variables evolve over time, an additional complication is that the future may influence the past. Suppose that it is known with certainty that a certain event will take place a year from now; individuals will plan ahead accordingly and alter their decisions today. The future is embedded in the present to the extent that it is anticipated. Only surprises may reveal to us what the effect of a particular variable might be.

VAR analysis is in some ways a generalization of standard regression analysis but acknowledges that the left-hand-side variable in one relation is the right-hand-side variable in another. Therefore all regressions are computed simultaneously. Each regression has a residual, which represents the effect of unexpected or unexplained variations. For example, we may specify that output is a function of past values of money growth,

TABLE 7

Variance–covariance matrix of the residuals of the vector autoregression

	M1	Surplus	AHE	CP rate	WPI	IP
M1	1.000					
Surplus	–0.026	1.000				
AHE	–0.203	0.087	1.000			
CP rate	–0.454	–0.041	0.041	1.000		
WPI	0.070	–0.064	–0.405	0.059	1.000	
IP	0.355	–0.032	–0.475	–0.163	0.327	1.000

Note: M1 is the money stock; surplus is the federal surplus; AHE is an index of real average hourly earnings in industries, adjusted for changes in output per man-hour; CP rate is the interest rate on commercial paper; WPI is the Wholesale Price Index; and IP is industrial production.

Sources: Author's calculations based on data from Friedman and Schwartz (1963); Board of Governors of the Federal Reserve System (1943), tables 115, 117, 121, and 150; Board of Governors of the Federal Reserve System, G.17 statistical release, various issues; and National Bureau of Economic Research, Macrohistory Database, series 08142 and 01300.

fiscal surplus, wages, and other variables of interest. In each time period, we will have the predicted value of output based on the past histories of these variables, and the actual value will differ to some extent: That is the error term, or innovation. Statistical theory tells us that a system of variables can be represented as the sum of the responses to current and past innovations. If the innovations are properly identified, it becomes possible to say, for example, that output responds in a certain way to an unexpected change in money growth or fiscal policy.

The problem is to identify the innovations to each variable. If we allow that, say, monetary policy can be affected within the current period by fiscal policy, then the error term in the money equation will combine innovations to money as well as innovations to fiscal policy. In that case, output responses to this innovation will be responses to *both* monetary policy and fiscal policy, and statistics are of no use in disentangling the two. In general, one must make identifying assumptions guided by economic theory to interpret a VAR.

The VAR I run includes a small set of variables to describe the state of the economy: industrial production (IP), the rate on commercial paper to measure short-term interest rates, and the Wholesale Price Index (WPI) to represent prices (Sims, 1980; and Burbidge and Harrison, 1985). Furthermore, it includes one variable for each competing explanation: the money stock (M1), the federal surplus, and an index of real average hourly earnings in industries (AHE), adjusted for changes in output per man-hour.[10] The data are monthly and extend from January 1919 to December 1941.[11]

The main identifying assumption is that money does not respond within the month to other contemporary variables. Thus, innovations to the regression of money growth on other variables represent only innovations to money growth itself. This is a common identification assumption for post-World War II data (Christiano, Eichenbaum, and Evans, 1999). I also assume that surpluses do not react within the month to anything but money growth, and that the wage does not respond to anything but money growth and the fiscal variable.

As it turns out, this particular ordering matters little. Table 7 shows the variance–covariance matrix of the residuals from the VAR. Note how it is close to diagonal in the first three elements, which means that the residuals of the monetary, fiscal, and wage equations are uncorrelated. Therefore, the residuals of the regressions can be interpreted as fundamental innovations, that is, exogenous and unpredictable changes in the monetary, fiscal, and wage conditions.[12]

Table 8 shows that the percentage of forecast error at various horizons is attributable to the innovations in each of the variables. The three factors together explain about half of the unpredictable movements in industrial production, but wages alone explain little. The other half is attributable to innovations to the other variables (interest rate, prices, and industrial production itself) to which I do not try to attach any particular meaning.

To understand how much each factor (monetary policy, fiscal policy, and wages) contributed to the recession of 1937, I examine a historical decomposition. The method is as follows. Using the estimated statistical relationships between the variables and data up through December 1935 only, I predict what industrial production will be in all succeeding months. Then, for each of the three factors, I compute the effect of its innovations on all the variables in each of the succeeding months from January 1936 to the end of the sample in December 1941. An innovation to money growth affects future money growth, but also all other variables. The effect of the sequence of innovations that I have computed from January 1936

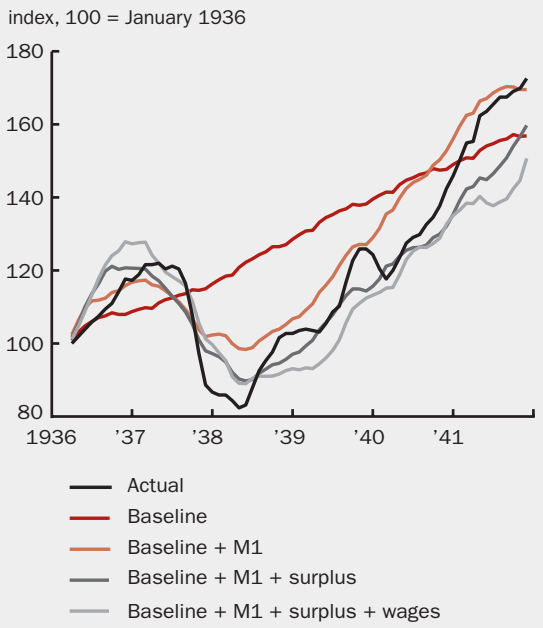
TABLE 8

Variance decomposition of industrial production at various horizons

Months	Standard error	M1	Surplus	AHE	CP rate	WPI	IP
		(- - -

FIGURE 19

Historical decomposition of industrial output, 1936–41



Notes: Data are monthly over the period January 1936–December 1941. M1 is the money stock; surplus is the federal surplus.

Sources: Author's calculations based on data from Friedman and Schwartz (1963); Board of Governors of the Federal Reserve System (1943), tables 115, 117, 121, and 150; Board of Governors of the Federal Reserve System, G.17 statistical release, various issues; and National Bureau of Economic Research, Macrohistory Database, series 08142 and 01300.

Moreover, monetary policy went into reverse: The New York Fed lowered its discount rate from 1.5 percent to 1 percent on September 27, 1937; the gold sterilization program ended in February 1938 and was reversed from February to April; and reserve requirements were lowered on April 16, 1938, just as the federal government announced a large increase in spending. The recession ended in June 1938.

An alternative story would rely on increased labor costs due to the effects of the Wagner Act. The act was passed in 1935, but labor activism built up over the ensuing two years and resulted in 10 percent wage increases over a short period in early 1937. Although it has no particular timing advantage over the monetary and fiscal policy explanations, the labor costs story would plausibly account for the onset of the recession but not for the recovery, since the wage increases were not reversed.

Finally, a simple VAR shows that monetary and fiscal factors account fairly well for the pattern of industrial production and, in particular, for the depth of the recession, although other factors are needed to explain why the economy did not contract earlier and why it rebounded so strongly. Wages cannot account for much of the downturn. Naturally, there are limits to the persuasiveness of an essentially statistical exercise. But, in the absence of a full-fledged economic model, this exercise suggests no additional explanation may be needed.

NOTES

[1]See Blinder, (2009), Krugman (2009), and Romer (2009).

[2]Author's calculations based on data from the U.S. Bureau of Economy Analysis, *National Income and Product Accounts of the United States*.

[3]These were computed as the marginal tax rate weighted by the number of returns in each bracket above $4,000, using numbers in U.S. Department of the Treasury (1938, p. 88; 1940, pp. 119, 193). Barro and Sahasakul (1983) find much lower average marginal tax rates because the number of filers was only 20 percent of all households, and they assign a zero marginal tax rate to the other 80 percent.

[4]Member banks made quarterly reports, whereas nonmember banks reported twice a year. Furthermore, some member banks, representing 82 percent of all member banks by assets, reported statistics on a weekly basis.

[5]The Federal Deposit Insurance Corporation, which began operations in January 1934, levied a premium on participating banks based on total deposits, and insured deposits up to $5,000 per depositor. In 1936, insured deposits amounted to $22,230 million, representing 68 percent of the deposits of participating banks and 47 percent of all bank deposits (Board of Governors of the Federal Reserve System, 1943, p. 401).

[6]Banking Act of 1935 (49 Stat. 706).

[7]There were two central reserve cities, namely, New York and Chicago, and 60 reserve cities (see the list in Board of Governors of the Federal Reserve System, 1943, p. 401).

[8]Banking Act of 1935 (49 Stat. 706).

[9]Beney (1936) and National Industrial Conference Board (1938).

[10]The data come from the NBER Macrohistory Database, series 08142 and 01300. Wages are deflated by the Wholesale Price Index.

[11]The VAR is monthly; all variables are in logs except the surplus, which can be negative. A time trend and seasonal dummies are added because the surplus is not seasonally adjusted. Lag length, chosen to minimize the Akaike information criterion, is 3. As an alternative, I have also used (the log of) man-days idle due to strikes instead of wages.

[12]There is some negative correlation between wages adjusted for labor productivity and money. An alternative specification in which average hourly earnings are not adjusted for productivity yields a nearly diagonal matrix, and the results of the historical decomposition are quite similar.

[13]The impulse response function of wages on output is negative at first but turns positive after ten months. This suggests that the shock identified as a wage shock is more complex than a shock to workers' bargaining power and probably includes a productivity component. If man-days idled by strikes is used instead of wages, the impulse response function is consistently negative, but of smaller magnitude: The percentage of IP variance explained by innovations to man-days at the three-year horizon is 2.5 percent instead of 6.5 percent for average hourly earnings.

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