

The Great Depression in Facts and Figures

This began as a result of the current economic downturn, whose severity has evoked many comparisons and references to the Great Depression that started in 1929. I had read a number of papers and books on the Great Depression and was reasonably familiar with it, but I wanted to make sure I was on firm ground in thinking and speaking about it. In particular, I wanted to be sure I had the facts and figures right.

I was hearing many people make strong assertions about the Depression. Some of these I already knew to be false, some sounded very questionable, and some seemed to be very interesting and significant - if true. I wanted to sort out the factual basis for myself.

After I got started on this I decided that I would make the results available on my Web site as a sort of rough working paper. In part my purpose is to aid others who may be looking for information, but I also hope for replies telling me where I have erred, or overlooked important data. It has been a very hurried effort, certainly not complete and probably not entirely correct.

In most cases I've presented the data in graphical form, for easy comprehension of large data sets. At the end of the paper there is a section on "Methods and sources" which details where each data set comes from. It is not at all necessary to read the paper through from start to finish - it should be easy to pick and choose just what you're interested in.

I have endeavored to present the data as they are, with a minimum of editorializing or analysis, except as absolutely necessary for comprehension, and no technical jargon. In the next-to-last section, "Where did it come from, and where did it go?" I very briefly summarize the views of economists on major issues. In "Some reflections," at the end, I do a little light analysis.

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The Depression of the 1930s in the United States

Selected charts and statistics

by [William D. O'Neil](#)

The Great Depression of the 1930s did a great deal to stimulate the collection of systematic statistics on the American economy, in order to serve the needs of economic policy-makers. However, it was not until toward the end of the Depression era that modern statistical collection was well established. To gain an accurate picture of the early phases economic historians have had to piece together the relevant data. Unfortunately, many earlier and unsystematic estimates are still widely quoted. This paper gathers and presents selected top-level statistics from high-quality sources in order to present an accurate overall view.

Employment and unemployment

Table 1. Civilian employment and unemployment, 1928-42

	Unemployed	Pvt. Non-farm Unemployed	Temporary Govt.	Regular Govt.	Private Non-farm	Farm
1928	4.7%	6.7%	0.0%	6.5%	66.5%	22.3%
1929	2.9%	4.1%	0.0%	6.4%	68.6%	22.1%
1930	8.9%	12.4%	0.0%	6.4%	63.3%	21.3%
1931	15.7%	21.7%	0.6%	6.6%	56.4%	20.8%
1932	22.9%	31.7%	1.2%	6.4%	49.3%	20.2%
1933	20.9%	30.0%	4.3%	6.2%	48.7%	19.8%
1934	16.2%	23.6%	5.8%	6.4%	52.3%	19.3%
1935	14.4%	21.1%	5.9%	6.7%	53.7%	19.3%
1936	10.0%	14.9%	7.1%	6.9%	57.0%	19.0%
1937	9.2%	13.3%	5.1%	7.0%	60.1%	18.6%
1938	12.5%	18.3%	6.6%	7.1%	55.8%	18.0%
1939	11.3%	16.3%	5.9%	7.2%	58.0%	17.6%
1940	9.5%	13.5%	5.1%	7.6%	60.7%	17.1%
1941	6.0%	8.4%	4.0%	8.3%	65.4%	16.3%
1942	3.1%	4.3%	1.6%	9.7%	69.2%	16.4%

The most immediately obvious effect of the Depression was the unemployment it brought. Table 1 shows the data on civilian employment and unemployment by sector.

It is often said that by 1933 unemployment had reached 25% of the workforce, but this is not a very clear or complete statement of the situation. On the one hand it does not count as “employed” those who were working in temporary jobs the government had

created for the emergency. While it is often said that these were not “real” jobs, they involved real work (mostly in maintaining and upgrading facilities) and paid real (albeit minimal) wages.

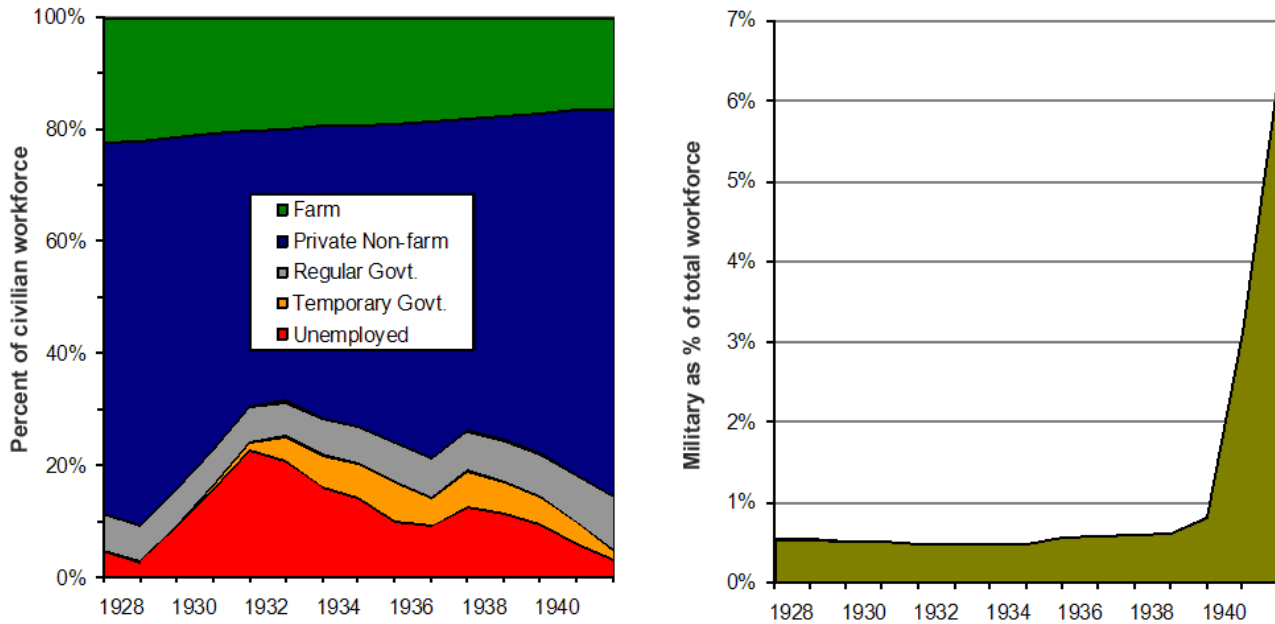


Figure 1. Civilian employment & unemployment, together with military percentage of total employment

On the other hand, however, the unemployment was almost entirely in the non-farm, non-government sector. Farm employment declined only slowly and ordinary government employment was little affected, but private non-farm employment fell sharply. By 1932, nearly one third of the private non-farm workforce was out of work.

Figure 1 shows percentages of employment and unemployment on the left, with the relationship between military manpower and total workforce to the right. The military share generally was constant at about half of one percent up to 1940 and rose sharply during 1941.

We hear different figures about the duration of the Depression. Economists often count only the length of the contraction phase, when unemployment is rising. This ended in 1932 or 1933, depending on how we count those employed in special temporary jobs. But unemployment did not return to normal levels until 1941. Thus we can count durations of anywhere from three to twelve years. Regardless of what suits economists, for most people at the time the Depression did not end until 1941.

GDP

Table 2. GDP and GDP per capita, 1929-1946

	Constant 2000 \$ billion				Constant 2000 \$	
	Personal consumption	Private investment	Government spending	GDP	Per capita personal consumption	Per capita GDP
1929	661.4	91.3	120.6	865.2	5,432	7,105
1930	626.1	60.9	132.9	790.7	5,087	6,424
1931	606.9	38.3	138.5	739.9	4,893	5,965
1932	553.0	11.5	133.8	643.7	4,430	5,156
1933	541.0	17.0	129.2	635.5	4,308	5,061
1934	579.3	30.7	145.7	704.2	4,584	5,572
1935	614.8	56.9	149.7	766.9	4,831	6,027
1936	677.0	72.9	174.7	866.6	5,287	6,768
1937	702.0	91.1	167.3	911.1	5,449	7,072
1938	690.7	60.2	180.2	879.7	5,320	6,776
1939	729.1	77.4	196.0	950.7	5,571	7,264
1940	767.1	107.9	201.5	1034.1	5,785	7,799
1941	821.9	131.7	335.1	1211.1	6,138	9,045
1942	803.1	69.6	788.6	1435.4	5,933	10,604
1943	826.1	41.1	1173.3	1670.9	6,019	12,174
1944	850.2	50.8	1320.5	1806.5	6,120	13,004
1945	902.7	67.0	1152.9	1786.3	6,426	12,717
1946	1012.9	172.1	396.8	1589.4	7,136	11,198

In Table 2 we see the GDP and its major components in constant-value terms all the way to 1946, together with GDP and its personal consumption component on a per-capita basis. The data are plotted in Figure 2. From this it would appear that on a per-capita basis GDP and personal consumption had recovered to pre-Depression levels by about 1937. To most people at the time this did not feel like

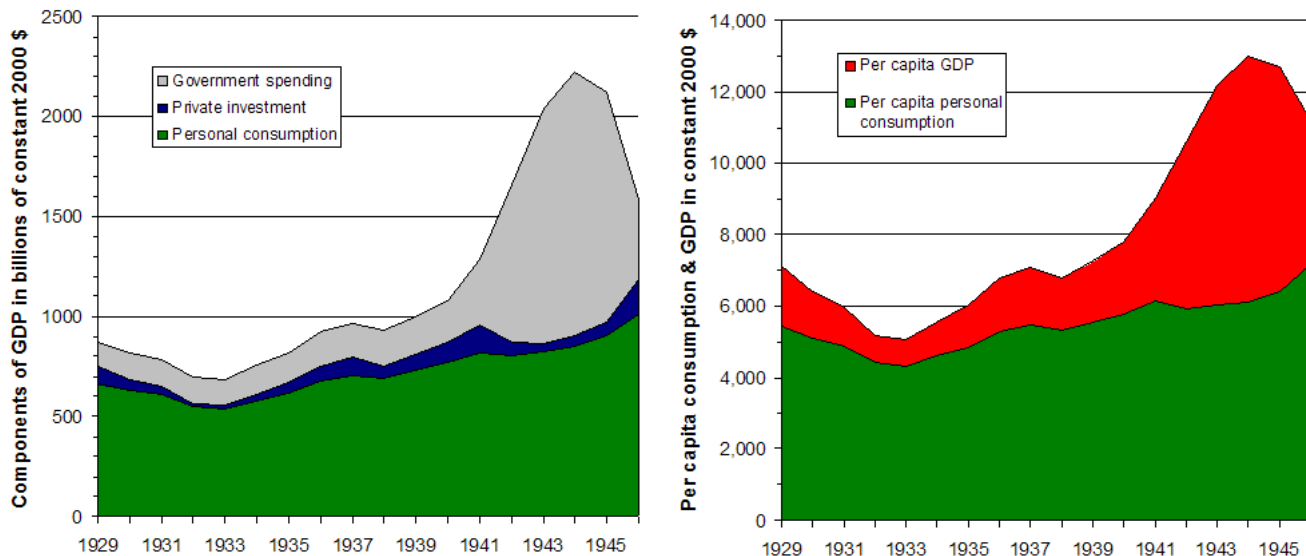


Figure 2. Major GDP components (left) and per-capita personal consumption and GDP (right).

the end of the Depression, however, for at least two reasons. The first, of course, is that a lot of people still were out of work - more than 9% of the workforce. That was a huge improvement over the situation four years previously, but certainly did not strike anyone as full employment. Beyond that, although real (constant-dollar) income had returned to 1929 levels, much of that was due to a fall in prices, so that money went further. But the worker who had made \$800 in 1929 (a typical year's income then) and earned only \$675 in 1937 might find it hard to see that he was really as well off. In any event the sharp dip in 1937-38 was enough to scotch any

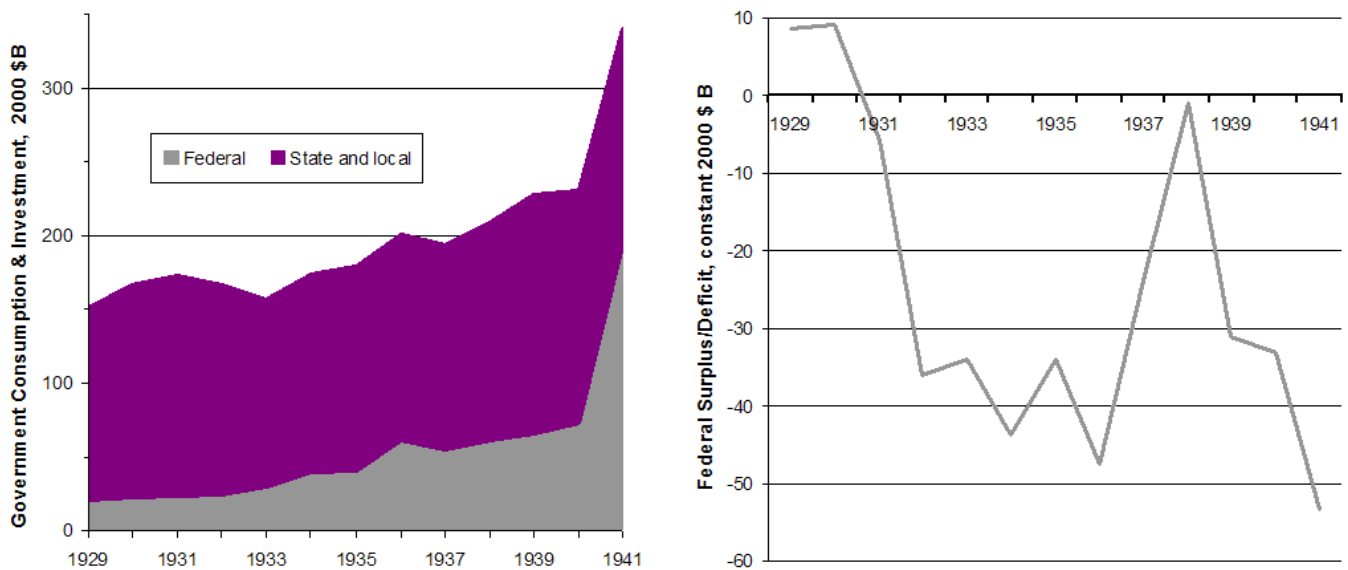


Figure 3. Government consumption and investment (left), and federal surplus and deficit (right).

complacency. In polls conducted in 1936 and early 1937 the numbers of people who thought the Depression was over or partly over increased over time, but the 1937-1938 recession brought a sharp drop in confidence.¹

One thing most people know - or think they know - about the Depression is that it was a period of massive federal government spending. Certainly there was an increase, as we see in Figure 3, but scarcely a massive one. As we see in Table 1, GDP fell \$230B (in constant 2000 dollars) or 26.5% between 1929 and 1933. Federal

¹ Hadley Cantril and Mildred Strunk, *Public Opinion, 1935-1946* (Princeton: Princeton University Press, 1951), pp. 61-4.

spending never came to an appreciable fraction of this until 1941, as the nation was pouring resources into rearming.²

What impressed and concerned people at the time was the federal spending deficit. Tax increases in 1932 failed to make up for widely falling revenues. As we see in Figure 3, falling tax revenues brought deficits on the order of \$40B each year (4% to 6% of GDP) from 1931 through 1936. By 1935 more than two thirds of Americans wanted the budget balanced, preferably through reductions in government spending. Sixty percent thought the government was spending too much on relief and recovery - only 31% wanted to see more spending for such purposes.³ It appears that they saw it purely as charity, not as a force for economic growth.

In 1936 federal spending was increased by a one-time event when Congress overrode presidential opposition to immediately pay off the bonuses to World War I veterans. (They had originally been due in 1945.)⁴ Increasing government receipts (partly from the new Social Security tax) combined with efforts to economize to reduce the deficit in 1937 and nearly eliminate it in 1938. It now seems clear that this move toward balancing the budget was a factor in bringing on the 1937-38 recession. At the time, however, only a relatively small portion of the public had any comprehension of this. It is likely that they were joined by most politicians.

Despite what John Maynard Keynes was saying, few drew a strong connection between government spending and renewed economic growth. Most Americans in the 1930s could not see government spending as a positive force in maintaining or restoring aggregate demand in a crisis.

² Close examination shows that the total of government consumption and investment in Figure 3 is not quite identical to that in Table 2. This is part of the inherent distortions involved in an attempt to compare values over time and is discussed further in *Methods and sources*, page 5.

³ George H. Gallup, *The Gallup Poll: Public Opinion, 1935-1971; Volume One: 1935-1948* (New York: Random House, 1972), pp. 12 and 1. These were some of the very earliest random-sample public polls; there is nothing comparable before 1935.

⁴ This bonus, a product of the *Adjusted Service Certificate Law of 1924*, had been the subject of the so-called Bonus March in 1932 when thousands of veterans had converged on Washington to demand immediate payment.

Prices and wages

During the Depression itself, particularly in its early phases, a great deal of attention focused on prices and wages, shown in Figure 4. In part this was because these were among the few economic statistics

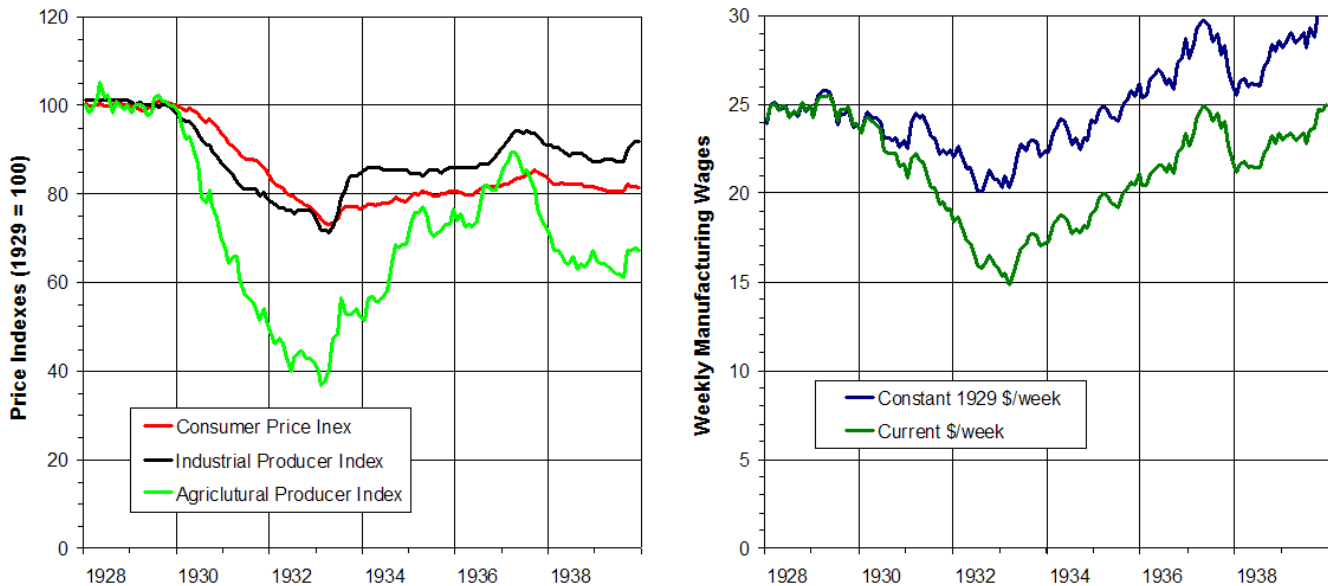


Figure 4. Prices and wages, 1928-1939.

that were collected and published at the time, but of course everyone was very sharply aware of the prices he or she received for the goods or services he or she depended on for livelihood.

Because the prices the worker or producer paid also declined, the reduction in his prices was not actually as bad as it seemed. But to the worker whose pay envelope had contained \$24 in 1929, the \$16 he got in 1932 no doubt seemed like a very great cut, even though it was worth \$20 in 1929 money. He was of course very glad to have a job at all, but surely the pay cut was depressing indeed. (For the most part the cut took the form of shorter hours rather than a reduction in hourly rate. If layoffs had been used, unemployment could have been far higher.)

Presidents Hoover and Roosevelt both tried to attack this very visible symptom directly. Hoover, characteristically, leaned toward persuasion and voluntary action (except in agriculture, where he experimented, not very successfully, with buying up surplus crops). This brought no visible results. Roosevelt's National Industrial Re-

covery Act (NIRA) took a somewhat more active approach, although enforcement powers were limited. Prices and wages did recover after it was passed, although it is not clear how much the mechanisms of NIRA, as opposed to expectations, had to do with this.

The 1937 recession-within-depression brought some further fall in prices of industrial and consumer goods and even more in farm prices and overall wages. Although wages began to recover in 1938, prices continued to slide until late in 1939. Increased export demand associated with the start of World War II in Europe played a part in stiffening them. It was only at the end of 1939 (where our data set ends) that real wages finally started to reach the levels of a decade earlier.

Productivity

We would like to produce as much as possible with as little as possible; the ability to do is measured by productivity. Two indexes of

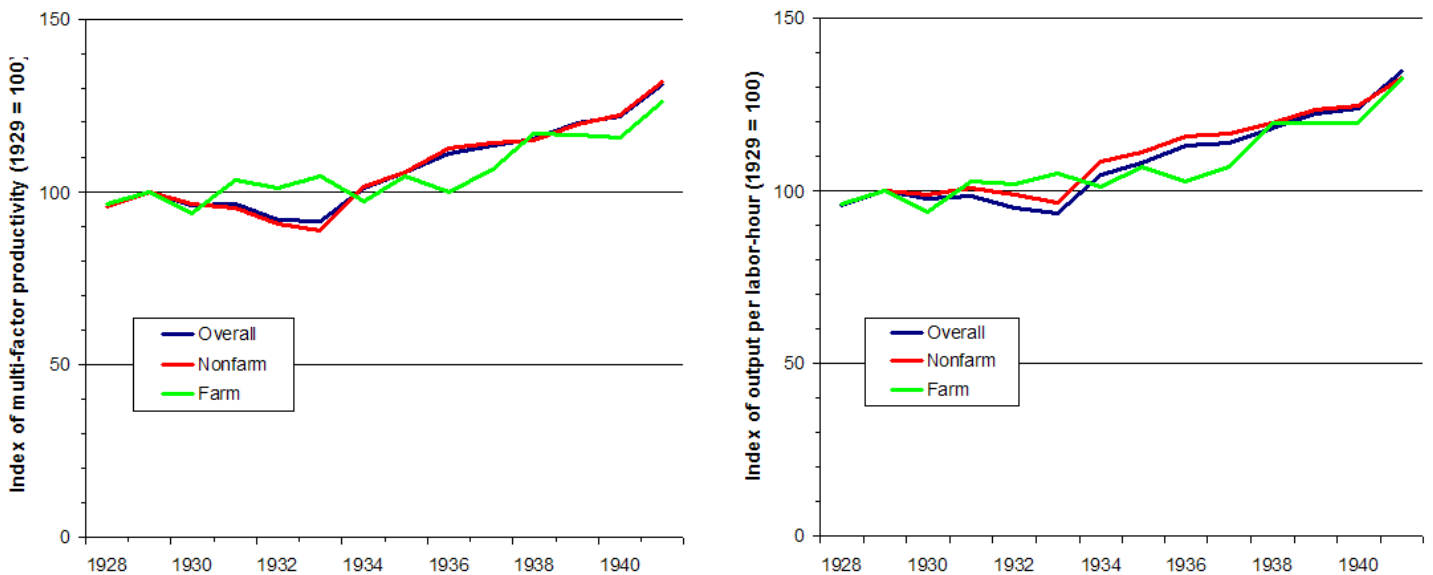


Figure 5. Two indexes of private-sector productivity, 1928-1941.

productivity are shown in Figure 5. On the left is an index of *multi-factor productivity (MFP)*, a measure of how much output is produced on average per unit of combined capital (investment in buildings and machinery), land, and labor (wages and benefits). This is often called *total factor productivity* (or, more obscurely, the *residual*), but I use this terminology to emphasize that we might identify

other factors as potentially important, even if we cannot give numerical values for them. (Knowledge, climate, and work ethic are among the many that have been proposed.) On the right is a more familiar index of output per labor hour.⁵

The fall in nonfarm MFP at the outset is characteristic of economic downturns generally, largely reflecting the drag of capital and land which is underutilized but still on the books. As firms failed or disposed of less productive assets the survivors consolidated and began to increase their efficiency of operation. The increase was particularly rapid in the Great Depression. Output per hour of labor input did not fall so far, but it too shows a pattern of steep increase in the years following the 1933 trough. The rapid rise continued through 1944 and represents the greatest increase in productivity over any comparable period in the history of the U.S. economy.⁶ The steep ramp in labor output accounts for some of the sluggishness with which unemployment diminished relative to total output (as seen in comparing Figure 1 and Figure 2), since manufacturers could produce a given level of output with fewer labor hours in any year after 1933 than they could in the year before, or in 1929.

There are more mysteries and uncertainties about these data than there are about most of the other data series reported in this paper. Productivity is inferred from other data rather than being measured directly, and there is not complete unanimity among economists about how best to do this.⁷ (The reason that MFP is sometimes called the “residual” is that it is measured as what is left over when everything definite is accounted for.) It is also difficult to be certain where productivity comes from or where it goes. One thing we know is that this was the great age of industrial research and development in the United States. Indeed, research personnel was among

⁵ These indexes show only productivity in the private sector, owing to technical problems in measuring productivity in the public sector where there is no market to value outputs.

⁶ Alexander J. Field, “The Most Technologically Progressive Decade of the Century,” *American Economic Review* 93, No. 4 (Sep 2003): 1399-1413.

⁷ See Field, *idem*, for some of the disputes regarding productivity in this period.

the few categories in which employment grew strongly across the whole period of the Depression.

Trade and tariffs

Next to Herbert Hoover, the best-known and most reviled villains of the Great Depression are two earnest and upright Republican legislators, Sen. Reed Smoot of Utah and Rep. Willis C. Hawley of Ore-

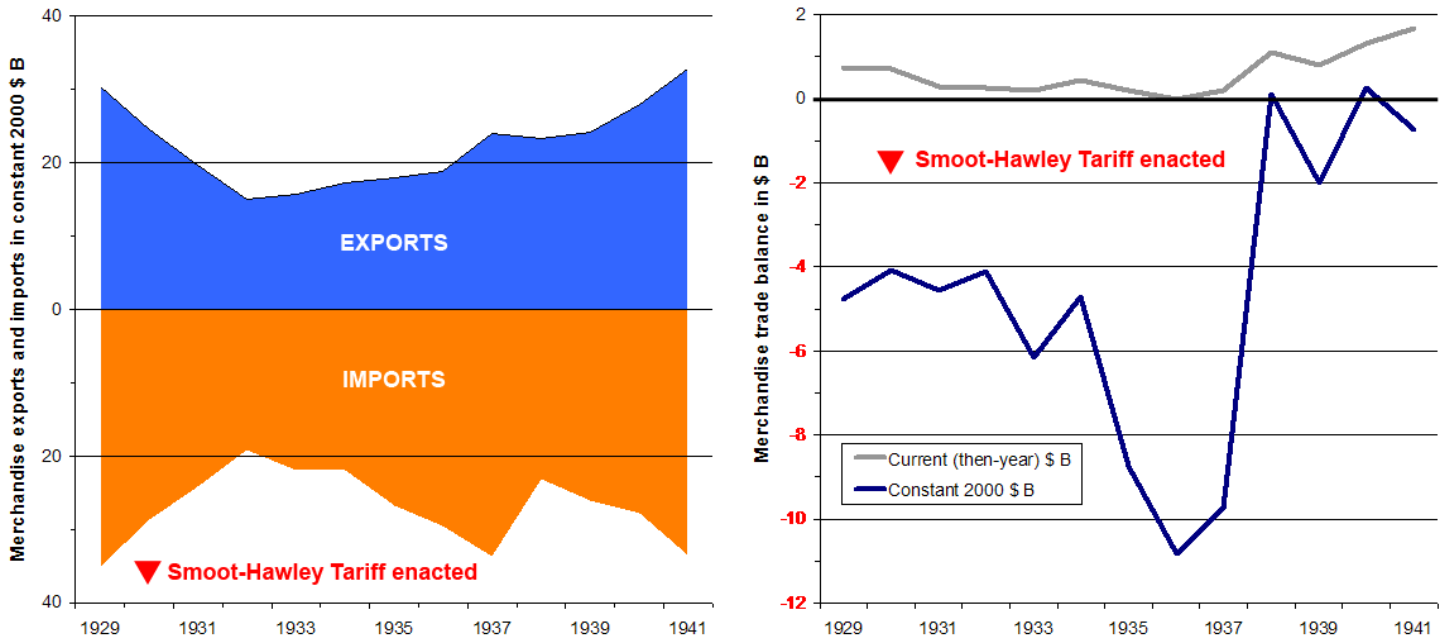


Figure 6. Exports and imports before and during the Smoot-Hawley era, 1929-1941.

gon. Their claim to fame - or infamy - is the 1930 tariff bill that bears their names. In 1930 more than 1,000 economists petitioned President Hoover to veto the bill, joined by many important business leaders. But increased trade protection was a popular issue among Republican voters and in June Hoover signed it into law despite his own misgivings. In the intervening eight decades the bill has become a popular symbol of misguided and even vicious policy, especially among Republicans, and widely blamed for exacerbating the Depression or even bringing it on (even though it began nine months before the bill was signed). Economists, on the other hand, while certainly regarding it as bad policy, see it as distinctly among the lesser problems of the Depression.

Figure 6 shows the trajectory of exports and imports from 1929 through 1941. On average the prices of the merchandise America then imported have risen more than those we exported in the interim, so the apparent balance between exports and imports has changed, as we can see in the right-hand panel.

From this it is clear that both exports and imports followed the general pattern of the Depression very closely, but there is nothing to suggest that the tariff was a major causative factor. There was no significant shift in the overall balance of trade until 1935-1936. (American imports and especially exports were dominated by agricultural products and other primary goods, with the result that the balance was sensitive to the large movements in their prices in the 1930s.) And even at worst the overall trade imbalance was quite minor compared to the movements we see in Figure 2. All this explains why economists do not think of the Smoot-Hawley Tariff - nor trade as a whole - as a major factor in the Depression.⁸

Whether despite or because of their legislative accomplishment, both Smoot and Hawley were swept from office in the 1932 tidal wave that caught Hoover. Both died before Pearl Harbor, but their tariff rates long outlived them, revoked only after World War II.

Money and credit

So far we have focused on the real economy of production and markets, but to really understand the Great Depression we need to consider money and credit as well. As early as 1931 the English economist John Maynard Keynes was insisting that rather than simply reflecting economic conditions, the monetary world was powerfully and negatively amplifying them.

In 1963 Milton Friedman and Anna Schwartz published the magisterial (and vastly influential) *A Monetary History of the United States, 1867-1960*, arguing that not only was the Great Depression first and foremost a monetary problem but that better management of money and credit by the Federal Reserve System (Fed) could have averted or reversed it.

⁸ Regarding economists' views see the article by Anthony O'Brien, "Smoot-Hawley Tariff," <http://eh.net/encyclopedia/article/obrien.hawley-smoot.tariff>.

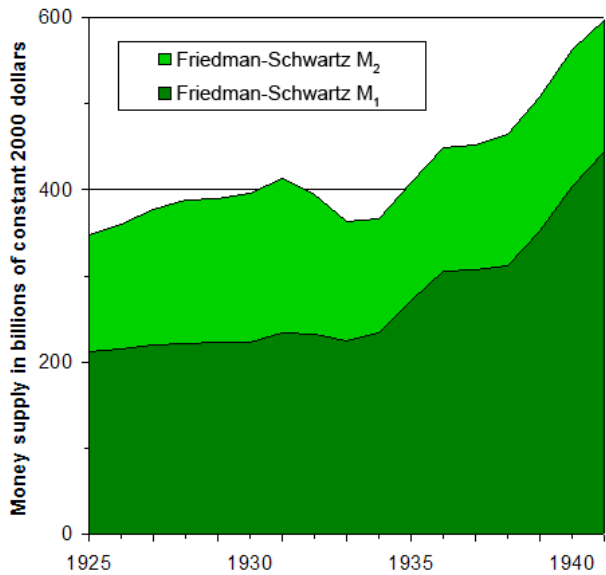


Figure 7. Money supply, 1925-41

Figure 7 is a plot of the Friedman-Schwartz data on money supply for the period of the Depression and a bit before. Their definitions of M_1 and M_2 are not exactly the same as those used today, simply because the structure of banking has changed: here M_1 is the sum of currency in the hands of the public plus demand deposits in commercial banks, while M_2 adds to this time deposits in commercial banks. The general resemblance to the trend of the economy as whole, as seen in Figure 2, is clear.

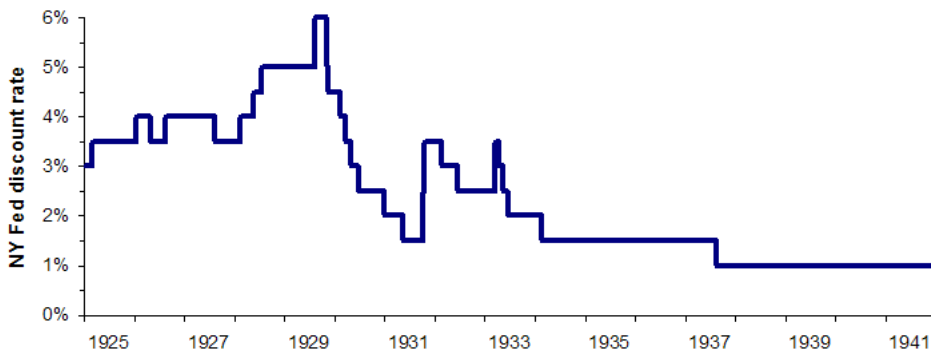


Figure 8. New York Federal Reserve Bank discount rate, 1925-41.

Actual currency is not a major portion of the money supply so defined, and the Fed does not control the money supply principally by printing or

withdrawing currency. Most of the money supply represented commercial deposits and most of it was funded from loan proceeds. Thus the Fed managed the money supply primarily through its control over bank lending. One of its key tools was (and is) the discount rate, the rate at which member banks may borrow funds in the very short term to meet day-to-day needs. This in effect becomes a base rate for the whole structure of bank interest rates.

Figure 8 shows every change in the discount rate between 1925 and 1941. In 1928-29 the Fed tried to throttle back on credit to dampen what it felt was a credit-fueled speculative bubble in the stock market. After the market crash at the end of 1929 it began reducing rates, but not as far or as fast as the modern Fed has done in com-

parable crises. Late in 1931, with the economy still contracting rapidly, it tightened credit significantly, something it would not think of doing in comparable circumstances today. The explanation was that Britain had left the Gold Exchange Standard and devalued the pound sterling in September and the Fed was concerned that the United States would lose gold as a result unless interest rates were raised to attract foreign investment. Since the dollar was based on gold, an outflow could have caused a monetary contraction.

After the United States abandoned gold convertibility (while retaining a gold basis for the dollar) and devalued the dollar against gold early in 1933 the discount rate was again cut. However, it never was reduced to the levels it has reached today.

We see the discount rate again in Figure 9, this time in smoothed and generalized form to serve as an indicator of interest rates. Plotted

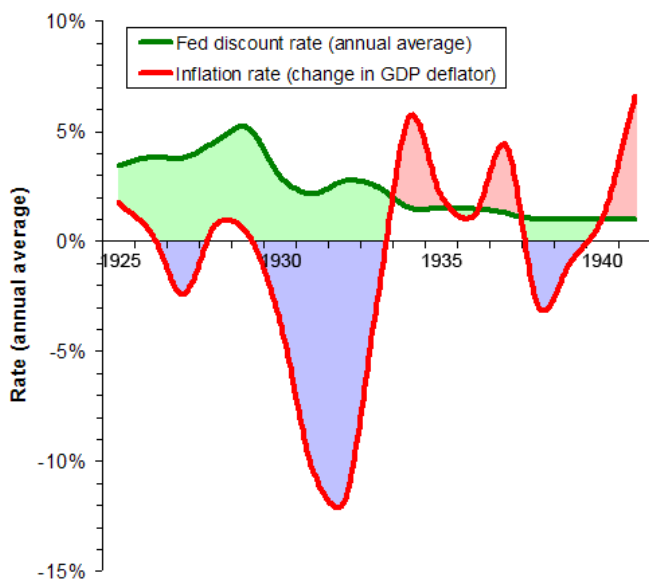


Figure 9. Interest and inflation rates.

ted on the same scale is the inflation rate, represented by the change in the GDP deflator from the previous year.⁹ If prices were unchanging then the nominal interest rate would be a direct indicator of how costly it is to borrow money - if the rate is 5% then if I borrow \$100 today I shall have to pay back \$105 in a year to settle the debt.

Let us suppose, however, that the value of the dollar is declining by 5% per year - that inflation is running at 5%, that is to say. Then

the \$105 I shall have to repay in a year will actually be no more valuable than the \$100 I borrow today, so that the loan costs me nothing (and gains nothing for the lender). If inflation reaches 10% then the sum I repay will actually be worth \$5 less than that I bor-

⁹ The deflator is the ratio between the overall price level in the economy in the year under examination and the base year (2000 in our case). Thus its change is a good overall measure of price level changes year to year.

row, if the interest remains at 5%. For this reason, when they anticipate inflation lenders will charge higher interest.

But suppose that inflation really is negative - deflation. If it is -5% then the \$105 I will need to repay will actually be the equivalent of \$110 today, making borrowing more expensive for me (and more profitable for the lender).¹⁰

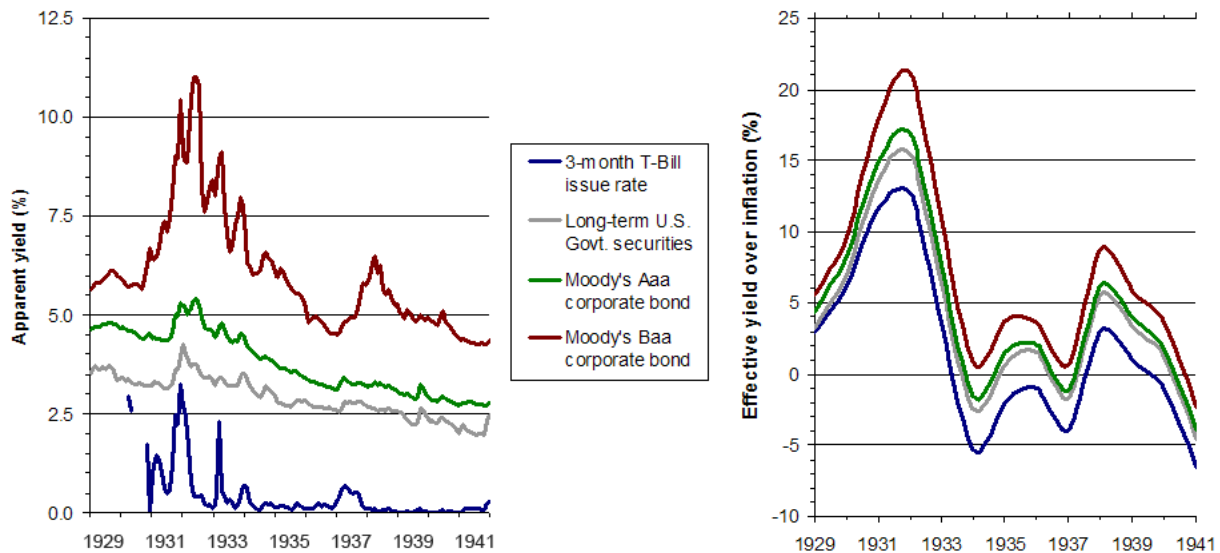


Figure 10. Apparent and effective interest rates.

As we see both in Figure 4 and Figure 9, there was very significant deflation between 1930 and 1933 and again in 1937-8. To know the effective interest rate we need to add the blue shaded area to the area shaded in green. Thus in 1933, the nominal interest rate was around 3%, but the effective rate was roughly 15%! The Fed could have cut the nominal rate further, but even if it were 0% the effective rate would still have been about 12% and there would still have been few people in a position to borrow.

Of course the period of really steep deflation lasted only for a few years, and there were periods of inflation in the Depression. Brief deflationary periods were a familiar fact of economic life in those days, so we might imagine that people would take a longer-term view and not be too influenced by the occasional downdraft. But over the decade between 1929 and 1939 price levels fell by 19%, or

¹⁰ Those familiar with interest calculations will recognize that the figures given here are really only approximate, but the simplicity suits the need here.

2.1% per year. And between 1929 and 1933 levels fell at an annual average rate of 7.2%, for a total loss of 25.9%. Anyone who took too long-run view of this would be in danger of being wiped out in the short run.

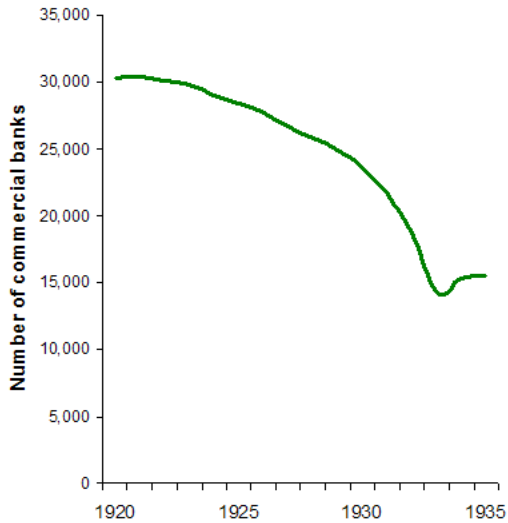


Figure 12. Commercial banks.

We can see all this more broadly in Figure 10, which shows both the apparent (or nominal) yields on a variety of classes of securities on the left, and their annual average effective (or real) yields, over and above inflation, on the right. I have not found a good index of bank lending rates, but there can be little doubt that they followed the general pattern shown here. To understand this better we need to look at the situation of the banks. Among the most enduring of Depression images is the failure of many banks under a wave of bank runs. The number of

commercial banks fell by 43% from 1929 to 1933. As Figure 12 shows, bank failures (or mergers) were common throughout the 1920s; banks were 18% fewer in 1929 than in 1921. But the Depression accelerated the process.

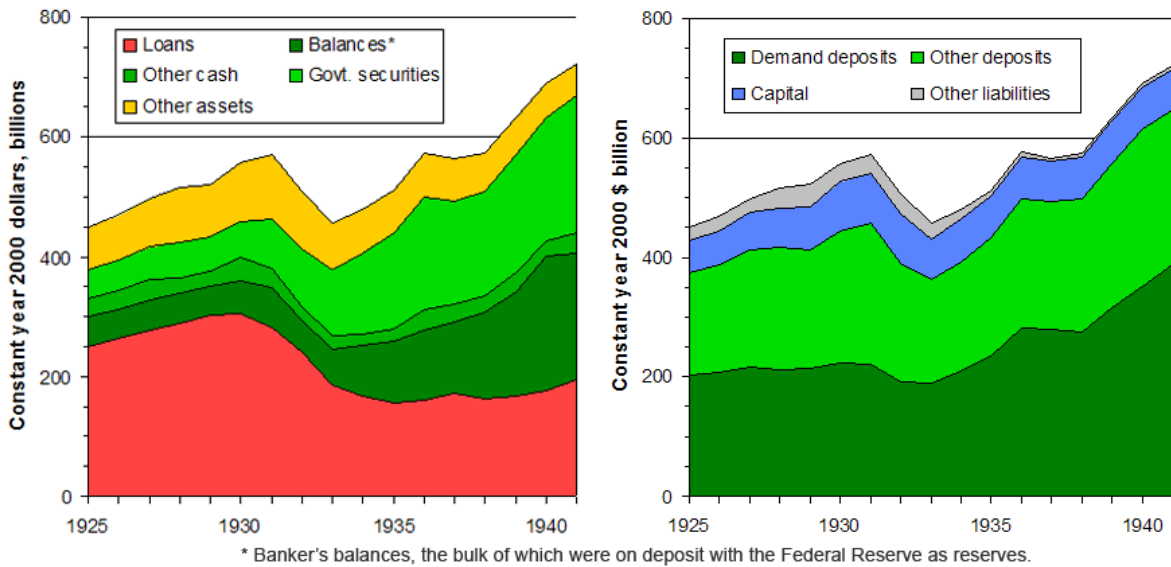


Figure 11. Bank balance sheets.

The effects on bank balance sheets were strong and important. The evolution of collective balance sheet of the banking system as a whole is illustrated in Figure 11, assets on the left and liabilities on the right. The two must always balance, with the capital account (a liability because it is owed to the shareholders of the bank) taking up any slack. It took up quite a lot of slack in the first years of the Depression, when banks as a group lost money in every year for four years straight, 1931-1934.¹¹ This is somewhat misleading in that the rise in the real value of assets due to deflation largely offset the nominal losses, but that was not the way it looked to bankers or regulators at the time.

Lending by commercial banks fell as a proportion of assets and relative to deposits. How much of this is due to reluctant borrowers and how much to reluctant lenders is not altogether clear. As we have seen, deflation gave businesses and individuals ample reason to reduce rather than take on debt. Lenders of course could make money by lending, but only if the borrowers could repay the debt. Moreover, they could make money, in real terms, by not lending. A banker who simply kept all his money in his vault would find it was worth 25.9% more in 1933 than it had been in 1929. Under such circumstances it did not pay to take much risk for the sake of modest additional gains. With businesses failing and individuals losing livelihoods at unprecedented rates there were not many truly credit-worthy borrowers. And bankers as a group viewed the innovations of the Roosevelt Administration with loathing and dread - many no doubt agreed with his first (short-tenured) Director of the Budget that they marked "the end of Western Civilization." Under the circumstances, an iron-bound balance sheet naturally held a lot of appeal for most bankers.

The recession within the Depression, 1937-1938

As we can see plainly in Figure 1, Figure 2, and Figure 4, after recovering at an impressive rate since 1933 the economy went into a sharp dive in the first part of 1937. For a closer look we can turn to industrial production statistics, plotted here in Figure 13.

¹¹ Federal Reserve Board, *Banking and Monetary Statistics, 1914-1941* (Washington, 1943), p. 261.

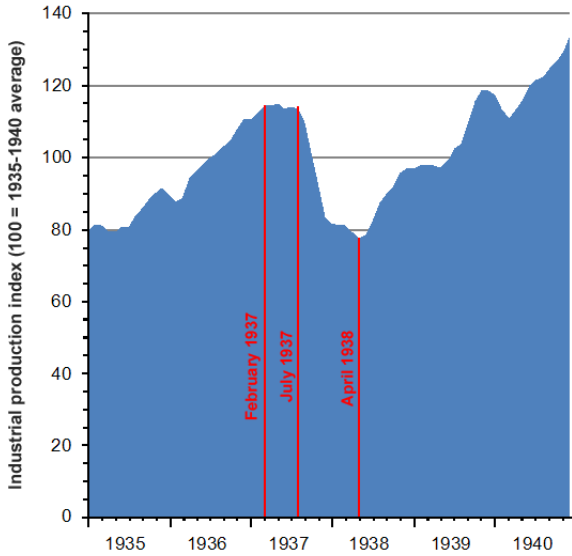


Figure 13. Index of industrial production.

We have observed before that there was a cutback in federal government spending after the veterans bonus payment of mid 1936, and a closing of the deficit. But it is difficult to see anything in Figure 3 of a magnitude to cause so sharp a fall. While it may have contributed it seems hard to imagine it can be the direct cause.

In any downturn the suspicion of economists always turns toward money. There was certainly one notable occurrence in the world of

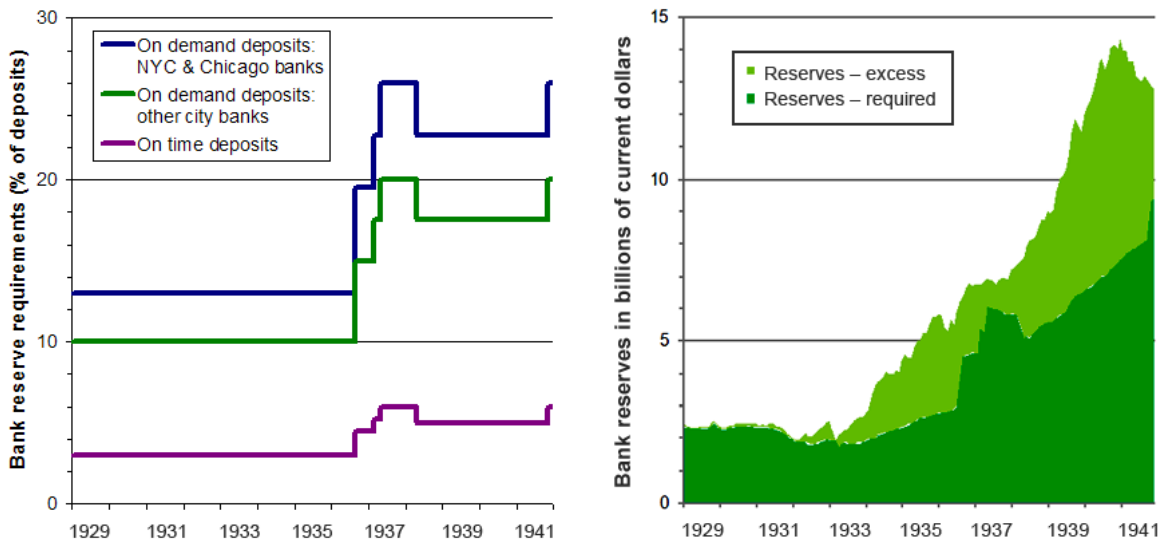


Figure 14. Bank reserve requirements and reserve positions.

money and credit at this time, as shown in the left-hand panel of Figure 14. After nearly 20 years of steady bank reserve requirements, the Fed abruptly started raising them in August of 1936.¹² Overall, the Fed in effect cut the lending capacity of the banks from

¹² Vault cash did not count toward reserves in those days; all had to be carried as deposits with a Fed bank. Present-day reserve requirements are 10% for all classes of banks, with a portion of vault cash counted toward the reserve. At that time the reserve requirements for some state-chartered banks were not set by the Fed, but Fed member banks were the mainstay of finance.

87% of deposits in mid 1936 to 74% by mid 1937. The discount rate was held at the same 1½% value it had been at since 1934, dropping to 1% in mid 1937.

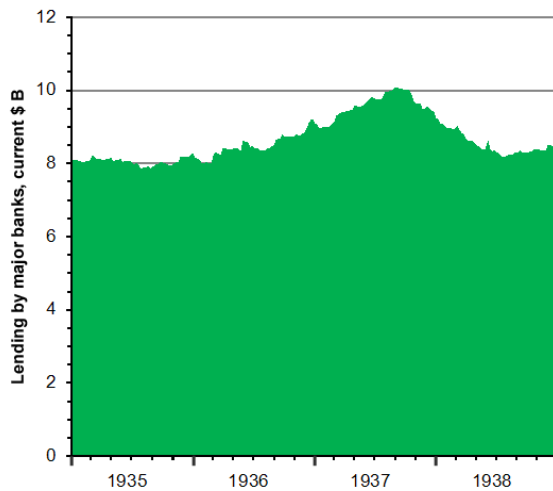


Figure 15. Bank lending, 1935-1938.

The reason for this seems to have been the same concerns about inflation that helped prompt the effort to close the government's budget gap. There certainly had been inflation, as we see in Figure 9 as well as Figure 4, although prices had yet to approach their pre-Depression levels.

Any effect on reserves seems to have been minimal, at very most – as the right-hand panel of Figure 14 shows, the only real effect was to

shift the accounting of a portion of the money already on deposit with the Fed from excess to core reserves. Neither was there any discernable effect on bank lending, which fell away only after industrial production had begun to plunge – see Figure 15.¹³

Worldwide Depression

Not many countries were untouched by the Depression. Figure 16 shows GDP per capita for ten nations – limited by how many nations could be clearly displayed in one graph. There are a few technical points that need to be borne in mind with this graph. The various national values have been converted to 1990 dollars (not 2000 dollars as elsewhere in this paper) at purchasing power parity (PPP), a calculation which is based on matching costs for a broad range of goods across the economy in order to gain a realistic perspective on actual living standards. A ratio or logarithmic scale is used so that the slope of a curve at any point is a direct indication

¹³ Note that the money figures of Figure 14 and Figure 15 are in current terms, not the constant year 2000 dollars used in most of this paper.

of its rate of growth. Thus if two curves show the same slope it means that economies were growing at the same rate.¹⁴

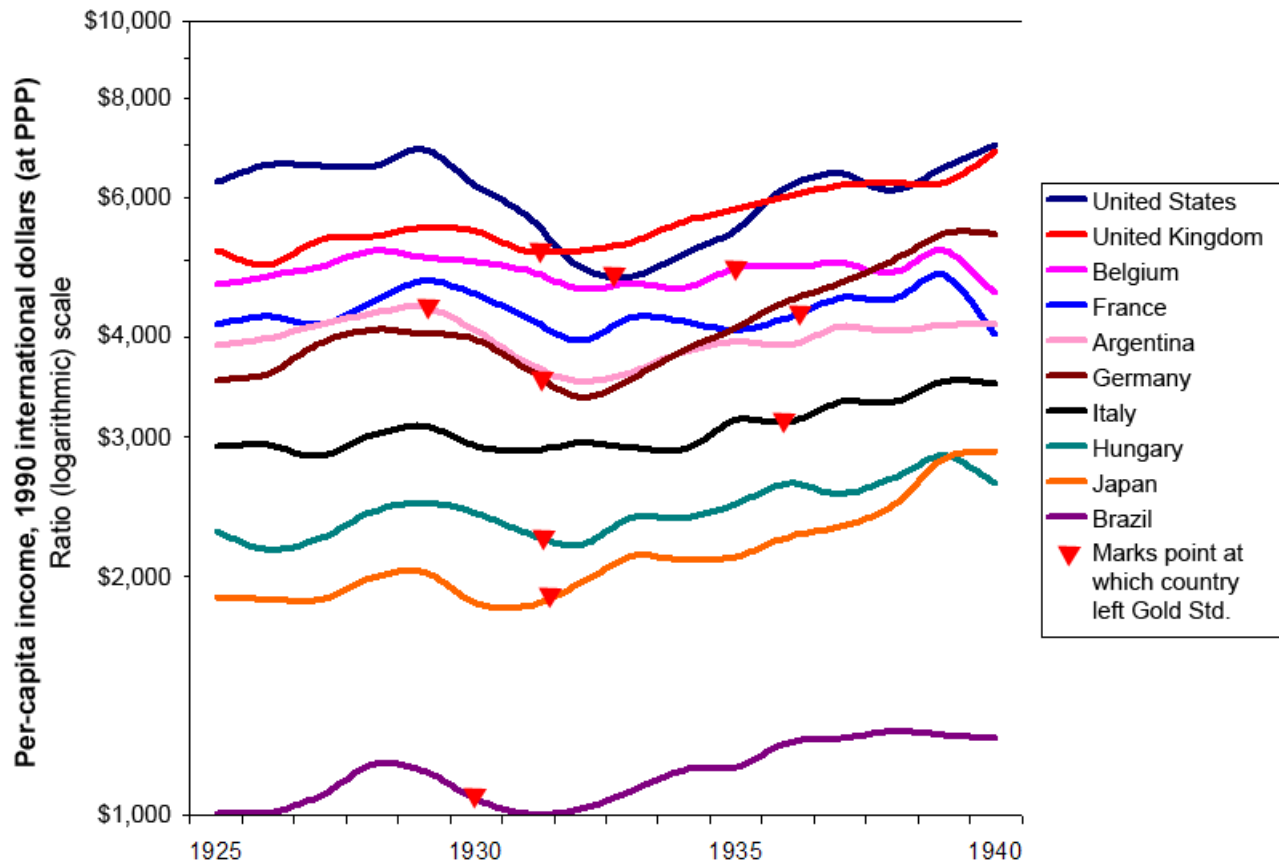


Figure 16. International comparisons.

There are several things of note, the first of which is that the Depression was more deeply depressed in the United States than anywhere else. When America finally started to recover, after 1933, its economy expanded about as rapidly as anyone's (even allowing for the 1937-8 recession-within-a-depression), but we were starting from a relatively lower point and so took a long time.

At the outset of the Depression almost every major nation adhered to the Gold Standard (actually the Gold Exchange Standard) for the settlement of international balances. It facilitated international

¹⁴ The downturns that can be seen in the incomes in several nations in 1940 represent the effects of the Second World War, which started in Europe in September of 1939, and are not related directly to the Depression.

trade but it also transmitted monetary pressures. When British authorities realized in 1931 that gold was dragging the nation into depression they suspended gold payments in that September. Many of the United Kingdom's closest trading partners necessarily followed suit. Others hung on for varying periods, with France leaving the standard only five years after Britain.¹⁵

The little red triangles show the dates on which the various countries left the Gold Standard and/or devalued their currency against gold. Casting off the yoke of gold allowed governments and central banks more flexibility in economic policy and generally aided in recovery from the Depression.

Where did it come from, and where did it go?

Taking leave of data, time to turn to analyses and opinions about the Depression. Broadly, these seem to be the major views at the time about the nature and causes:¹⁶

- **Panglossian.** *All is for the best in this best of all possible free market economies. These things happen naturally but if we just hang tight everything soon will be fine.* A view with wide popularity early in the Depression. It faded, but many never let go.
- **Divine chastisement.** *It's God's punishment for our sins and moral lapses.* The specific sins varied somewhat from prophet to prophet.
- **Liquidationism.** A sort of fusion of Panglossian and divine chastisement views. *Profligacy and waste has thrown the system out of balance. It all must be burned away and thrift, industriousness, and simplicity restored so that the market can function in its rightful fashion.* Liquidationist views were prominently repre-

¹⁵ The standard study of gold and its effects is Barry Eichengreen, *Golden Fetters: The Gold Standard and the Great Depression, 1919-1939* (Oxford: Oxford University Press, 1995). More succinctly, Barry Eichengreen and Peter Temin, "The Gold Standard and the Great Depression," *Contemporary European History* 9, No. 2 (Jul 2000): 183-207. For a brief and non-technical but sound summary see Michael D. Bordo, "Gold Standard," in *The Concise Encyclopedia of Economics*, <http://www.econlib.org/library/Enc/GoldStandard.html>.

¹⁶ I've drawn a lot on Randall Parker, "An Overview of the Great Depression," in *EH.net Encyclopedia*, <http://eh.net/encyclopedia/article/parker.depression>.

sented in the Hoover Administration and Andrew Mellon, the Secretary of the Treasury, was the Cotton Mather of Liquidationism. It quickly lost its appeal for people who were not as rich as Mellon and Hoover.¹⁷

- **Austrian School.** The “Austrian School” was a group of economists whose best-known exponent in our time is Friedrich von Hayek. Basically Panglossianism with an intellectual gloss. *Disinvestment in the 1930s is the result of over-investment in the 1920s. Disinvestment must be allowed to run its course so we can go back to healthy overinvestment.* More or less, anyway.
- **Debt-deflation theory.** Irving Fisher (1867-1947) lost much his reputation (and money) through his resolute and public insistence that the market crash of 1929 was a temporary aberration that would soon correct itself. But he was also a brilliant pioneering mathematical economist. His debt-deflation theory received relatively little attention at the time because he was in eclipse and because it came out after the worst of the deflation was past. But in a way it was the first serious theory. Its fundamental point is that falling prices increase burden of debt, leading to economic contraction as businesses and individuals pull back to stay afloat (or are swamped and go under).¹⁸ (My arguments in connection with Figure 9 above are an echo of Fisher.)

After the coming of the Roosevelt Administration in 1933, attention turned away from the causes of the calamity toward purely pragmatic action. Theorists and moralists all got largely sidelined.

Interest in the causes of the Depression revived with the thunderclap in 1963 of the publication of Milton Friedman and Anna Schwarz’s work on money and its role.¹⁹ While there had been a few foreshadowings, their demonstration that money and the Depres-

¹⁷ Parker, *op. cit.*, has some wonderful quotations from hellfire-and-brimstone Liquidationists.

¹⁸ Irving Fisher, “The Debt-Deflation Theory of Great Depressions,” *Econometrica* 1, No. 4 (1933): 337-57, available via the St. Louis FRB collection at http://fraser.stlouisfed.org/meltzer/record.php?collection_references_id=4252.

¹⁹ Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton, NJ: Princeton University Press, 1963). (Unlike the other references cited in this paper, I have not read their book.)

sion were closely connected was novel in its specificity and in the implications they drew. Out of the debates that have followed have emerged a number of views, which may be roughly grouped in four main categories. Many, perhaps most, economists do not seem to subscribe exclusively to any one of these, but rather see the Depression as a composite involving elements of several.

- **Financial - monetary.** This refers to Friedman-Schwartz view that the Depression was fundamentally a monetary phenomenon. As banks failed and lending contracted the money multiplier fell, but the Fed failed to work on other fronts to compensate for a reverse the resulting fall in money supply.²⁰ In its purest form (which Friedman himself seemed to support, at least in some of his non-technical statements) monetarism holds that not only was the Depression all about money but it was caused by Fed mismanagement of money, could have been reversed at any time by increasing the money supply, and finally ended when the Fed stopped mismanaging money so badly. I seem to encounter a fair number of pure monetarists. But most economic models predict that a change in money supply should cause only a brief, temporary effect in the real economy, not a deep and lingering depression. Moreover, close examination has failed to show the right time relationships between money changes and many of the changes in the course of the Depression.

Recent experience seems to cast some light on the limitations of the monetarist view. Over the course of the latter half of 2008 the Fed, under Bernanke's leadership, has done everything in its power to avoid the mistakes of the Depression era, but as Paul Krugman has pointed out, this seems to have had little effect.²¹

- **Financial - nonmonetary.** The nonmonetarist financial view really dates back to Fisher's debt-deflation theory, but is primar-

²⁰ The money multiplier is the amount by which the money supply increases per unit of bank deposits. If banks keep a fraction r of each dollar of deposit as reserve then it can be shown that the money multiplier is $1/r$. At the end of 2008 the money multiplier fell precipitously and is currently below 1.0. See <http://research.stlouisfed.org/fred2/series/MULT>.

²¹ "Was the Great Depression a monetary phenomenon?" in blog, *Conscience of a Liberal*, 28 Nov 2008,

ily associated with Ben Bernanke (now the Fed chairman), who first developed it fully and tested it against data.²² Bernanke does not reject the monetary hypothesis, but observes that there are crucial things it fails to explain. He sees widespread damage to banking stemming from the great wave of bank failures, damage that reduced its efficiency in allocating capital. In essence, a great deal of crucial knowledge went down with the sunk banks. Bernanke also emphasizes the failure of wages to fall as much as conditions would have seemed to warrant - “sticky” wages - which appears to have been widespread and to have worsened the Depression.²³ A full explanation for sticky wages (and prices) is lacking, and represents a major loose end.

- **Golden fetters.** The title of Barry Eichengreen’s book²⁴ on the subject neatly encapsulates the view that monetary contraction was spread worldwide through the rigidities of the Gold Exchange Standard. The fact that monetary contraction everywhere preceded and was followed by a fall in output provides powerful added evidence for the importance of monetary factors, as does the observation that no one succeeded in recovering before abandoning gold.²⁵
- **Nonfinancial.** Contraction can take place as a result of a simple collective decision to consume less (or invest less in capital) and there is some suggestion that such autonomous demand contraction did in fact take place at some points early in the Depression. The dampening of international trade resulting from the Smoot-Hawley Tariff and other protectionist measures is another example of a nonfinancial problem. No-one seems to regard

²² Ben S. Bernanke, “Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression,” *The American Economic Review* 73, No. 3 (Jun 1983): 257-76, available from the St. Louis Federal Reserve Bank collection at http://fraser.stlouisfed.org/meltzer/record.php?collection_references_id=4271.

²³ *Idem*, “The Macroeconomics of the Great Depression: A Comparative Approach,” *Journal of Money, Credit, and Banking* 27, No. 1 (February 1995): 1-28, http://fraser.stlouisfed.org/meltzer/record.php?collection_references_id=4261.

²⁴ See note 15, above.

²⁵ See Bernanke, “The Macroeconomics of the Great Depression,” for more on this.

these issues as primary in the Depression, but they may have had a role in getting it started.

- **Expectations.** Popular writers and historians have emphasized the element of psychology in the Depression from the beginning – the stark panic of the stock market crash and waves of bank failures, the bleak despair of Midwestern farmers, and the sudden revival of hope that accompanied the inauguration of the Roosevelt Administration in March, 1933. Economists took note of psychology too, but concentrated on factors they more readily understand and measure, like money. As they more became convinced that these did not offer adequate explanations, however, some economists turned to psychology and particularly to *expectations* about the economy, since it was clear that expectations about the future drive decisions about investment and commitments of resources. This work has been carried farthest by Gauti Eggertsson, who has constructed a model of the economy which explicitly incorporates expectations. In his model expectations do explain much of what happened.²⁶

One of the major economic as well as historical questions about the Depression is the role played by the New Deal policies, and particularly the NIRA (National Industrial Recovery Act) of 1933 which sought (until until it was thrown out by the Supreme Court two years later) to prop up prices and wages by allowing labor unions and business groups to restrict supply, thus breaking the spiral of deflation feeding depression feeding more deflation. Simply stated, there are two views:

- **The New Deal made the Depression worse.** Keynes was among the first economists who warned against the NIRA and other anti-competitive policies at the time, and many have followed him since, including Friedman and other major figures. Their arguments vary in some important details, but fundamentally all conclude that anything that interferes with the action of the market in setting prices according to supply and demand is sure to reduce overall output and employment, even though it might

²⁶ Gauti B. Eggertsson, “Great Expectations and the End of the Depression,” *American Economic Review* 98, No. 4 (Sep 2008): 1476-1516.

benefit some companies and individuals who receive more money as a result. The most recent and sophisticated exponents of this view are Harold Cole and Lee Ohanian, who have built a model of the economy in which New Deal policies promoting labor unions and business collusion to hold up prices severely slow recovery.²⁷

- **The New Deal made the Depression better.** The NIRA and other New Deal policies were widely popular at the time, and many accounts continued to praise them as raising morale. A small minority of economists supported these views, or at least said that the morale factors counterbalanced the economic costs. Since then a few have suggested that too much flexibility in prices and wages can lead to damaging instability, and thus that measures to make them more “sticky” might have some value after all. More recently, however, Eggertsson has used his model (discussed above under “Expectations”) to conclude that the New Deal policies were in fact part of the process of sharply altering expectations and thus stopping the deflation – just as their proponents originally envisioned.²⁸

The question of the economics of the Great Depression is far from being settled and we can feel confident that economists will continue to study it for new insights.

Some reflections

There is a great deal I do not know about the Depression, and a great many important books and papers I have not read. But I know much more than I did two weeks ago when I started this effort, and this seems the place to sum up how I see it at present.

²⁷ Harold L. Cole and Lee E. Ohanian, “New Deal Policies and the Persistence of the Great Depression: A General Equilibrium Analysis,” *Journal of Political Economy* 112, No. 4 (Aug 2004): 779–816; and *idem*, “How Government Prolonged the Depression: Policies that decreased competition in product and labor markets were especially destructive,” *Wall Street Journal*, Feb 2, 2009, p. A17, available from <http://online.wsj.com/article/SB123353276749137485.html>.

²⁸ Eggertsson, “Was the New Deal Contractionary?” Fed New York Staff Report 264, Oct 2006, http://www.newyorkfed.org/research/staff_reports/sr264.html.

I'm not an economist, but I have a fairly strong background in the subject - plenty strong enough to understand the arguments.²⁹ And I know a good deal about models, statistics and their relationship to science generally.

Statistics is fundamentally just a tool for looking more or less closely at the facts or phenomena of a field of study. My own experience in developing sophisticated statistical techniques for recognizing and identifying patterns in masses of data - far more massive data sets than any encountered in economics - early convinced me that it was extraordinarily difficult to improve on (or even duplicate) the ability of humans to see patterns in data presented in an appropriate visual form. Of course having humans screen masses of data is often not practical and statistics also has the advantage that differences of opinion can be reduced to precise numerical form. But a scientist who simply pursues statistical analysis without looking at the data is likely to overlook something important. Since I did not have a lot of time to spend on this informal project I simply plotted the data for examination and bypassed the statistics.

It would be better to do statistical analysis as well, but not fundamentally different. Whether you see it by eye or by statistical analysis the pattern you see may be deeply meaningful - or it may be incidental or even accidental. Models, whether mathematical, mechanical, conceptual, or whatever, play a crucial role in systematizing a coherent understanding of the phenomena. If we can be sure that the model accurately represents the phenomena then we can feel confident that we have a grasp of the system that underlies them in a scientific sense. Sometimes we are inclined to accept a model that simply "makes sense," but than can be tricky.³⁰

²⁹ I have an undergraduate degree in mathematics and a masters in what the UCLA Business School called "quantitative methods" - essentially applied business economics. I spent a good deal of time working as an industrial mathematician, studying issues in which economics played a prominent role, and have continued to read and make use of economics literature.

³⁰ I address the relationship between models and science in a brief, informal paper, "But Are They Sciences? Economics, climate, and experiments," available at http://www.analysis.williamdoneil.com/But_Are_They_Sciences.htm. In this

As I've discussed briefly under "Where did it come from, and where did it go?" there are a number of economic models or theories of the Depression. None of them is entirely satisfactory as a representation of the phenomena or factual data of the Depression and none can be said to be the "correct" model of it. I wonder whether we will ever have enough solid data about what actually happened to be able to be very confident that any model is correct, or to distinguish between competing models, but we can be confident that no model built so far is really correct because all are inconsistent with the exiting data in one way or another. Anyone who stakes his life on any of the existing models of Depression economics had better get out the hemlock.

That's not to say that we can't make some distinctions among incomplete and incorrect models. Some may have value in illuminating certain aspects of the Depression.

Turning to the event itself, there seems to be no room to doubt that financial and particularly monetary factors played a key role in bringing on the Depression, and in finally ending it. But the pure monetarist view that I still hear from some quarters seems untenable to me. To be sure, it might have been possible for the Fed to have stimulated somewhat more lending and thus more expansion of the money supply. But serious thought about the implications of Figure 9 makes it appear incredible that bankers could have been induced to exert much push for lending, or businesses and individuals much pull - and the only way to really grow money supply is with more lending to create more deposits. And as I've observed, standard economic models in general predict that monetary contraction can have only temporary effects in itself.

Certainly, recent experience seems to powerfully underline the conclusion that something more than money supply was involved in the great contraction of 1930-1933. It looks very much as if serious force majeure will be required if lending is to be re-started under present circumstances, let alone the circumstances of 1931-1932

scheme there is no difference whatever between "model," "theory," or "law" in the scientific sense - all mean exactly the same thing.

when it was clear to all that deflation was running at open throttle, even as the money supply was expanding (albeit modestly).

In fact, it seems hard to escape the conclusion that the initial contraction had a very great deal to do with expectations. Especially in the Midwest, banks that had lent to heavily-indebted farmers succumbed to waves of runs by depositors justifiably anxious about their ability to make good on their obligations. Measured in constant 2000 values, losses to depositors were \$2B in 1930, \$3.8B in 1931, and \$1.8B in 1932, finally reaching a crescendo at \$6.1B in the initial months of 1933 - losses spread over very substantially fewer people and businesses than there are today.³¹ It was like the end of the world; what rational person could expect anything but further decline?

Then Franklin Roosevelt rode into town in March of 1933 and changed everything.³² He does not seem to have had a coherent thought-through program for change, but he was committed to change things and that is what he did. The NIRA (for better or worse), the Glass-Steagall Act that dramatically tightened banking regulation and established nationwide deposit insurance for the first time, suspension of gold convertibility, and devaluation of the dollar all proclaimed that a new era had arrived. And as Eggertsson has stressed, FDR insisted that his administration would strive to inflate prices and wages back to pre-depression levels. Given that Roosevelt had just defeated a sitting president with close to half again as many votes (57.4% to 39.7% of the popular vote, with Socialist Party candidate Norman Thomas accounting for most of the rest) it is scarcely surprising that the public in general accepted all this as the real thing and responded accordingly.

All of which is to say that the theories about the crucial role of expectations advanced by Eggertsson and his predecessors seem quite credible to me, a credibility bolstered by Eggertsson's efforts, to-

³¹ Data on bank failures and costs from *Banking and Monetary Statistics, 1914-1941*, Section 7, "Bank Suspensions," inflated by *MeasuringWorth* GDP deflator at <http://www.measuringworth.com/calculators/uscompare/>.

³² The 20th Amendment to the Constitution, changing the date of inauguration from March 4 to January 20 was ratified before FDR took office but did not come into effect until October 15, 1933.

gether with Benjamin Pugsley, to explain the recession-within-the-Depression of 1937-1938 in terms of expectations.³³

As Eggertsson himself points out, however, expectations are far from a complete explanation. Their distinctive value is in clarifying the reasons for the turning points. But the worldwide depression we see in Figure 16 can scarcely be explained in terms of synchronous worldwide expectations. Here the “golden fetters” model advanced by Eichengreen and others seems generally sensible and persuasive. It does not, however, do more than explain the broad general pattern. It might be very illuminating to examine the role of expectations in several of the major countries affected by the Depression. This could provide considerable further evidence regarding how valid the expectations model truly is.

The case that the New Deal exerted a damping effect on recovery through distorting prices and wages seems to be undermined significantly when we consider the international comparisons picture shown in Figure 16, for no nation recovered significantly faster than the United States, regardless of whether they pursued New-Deal like policies (as few did). If we take out the “kink” of the 1937-1938 recession on the grounds that one way or another it represented the results of a policy mistake not intrinsic to the New Deal per se then the United States becomes the indisputable champion of recovery. Even countries such as Germany and Japan, which did nothing at all to shield labor or business from deflationary pressures, did not grow faster than that. I don’t think that meddling in prices or wages is a good idea in general, but I cannot see a strong case that the New Deal efforts did large-scale harm.

The rapid growth in productivity from 1933 onward (with no significant break for the 1937-1938 recession) merits more attention than it has received, it seems to me. Productivity growth largely remains a “black box” and this striking episode offers an opportunity to study it in greater detail.

³³ Gauti B. Eggertsson and Benjamin Pugsley, “The Mistake of 1937: A General Equilibrium Analysis,” *Monetary and Economic Studies* 24, No. S-1 (Dec 2006), <http://www.imes.boj.or.jp/english/publication/mes/2006/abst/me24-s1-8.html>.

While Keynes' ideas about the value of fiscal stimulus did command wide attention during the Depression, no one in power seems to have taken the hint - not in the United States, at least. It was a remedy that wasn't really tried on any useful scale here.

In Germany and Japan large increases in government spending do seem to have had a stimulative effect. In Japan's case this appears to have been the result of a deliberate effort at fiscal policy stimulus on the part of an economically sophisticated finance minister, Korekiyo Takahashi. Econometric studies suggest that his fiscal policies were the most important influence in Japan's rapid recovery from the Depression.³⁴

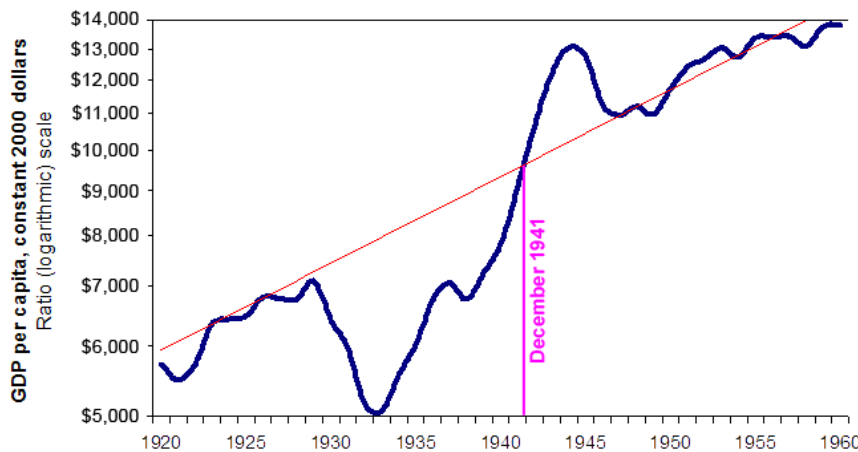


Figure 17. U.S. GDP, 1920-1940. (Ratio scale)

It is often said that only World War II finally lifted America out of depression. As Figure 17 shows, it was only at the end of 1941, after more than a year of greatly increased government spending for defense, that U.S. GDP finally reached the long-run

full output level.³⁵ To some this validates the theory that the coming of World War II had a decisive effect, but others point out that the United States was already growing vigorously by 1941 and that the added expenditure in 1941 brought only a limited increment.

³⁴ Myung Soo Cha, "Did Takahashi Korekiyo Rescue Japan from the Great Depression?," *The Journal of Economic History* 63, No. 1 (Mar 2003): 127-44. See also Dick K. Nanto and Shinji Takagi, "Korekiyo Takahashi and Japan's Recovery from the Great Depression," *American Economic Review* 75, No. 2 (May 1985): 369-74, as well as Richard J. Smethurst, *From Foot Soldier to Finance Minister: Takahashi Korekiyo, Japan's Keynes* (Cambridge: Harvard University Asia Center and Harvard University Press, 2007).

³⁵ Note that this chart is plotted on a ratio scale, so that the red line, growing at a constant 2.3%/year, appears straight. The vertical scale is stretched out more than that of Figure 16, so that any given rate of increase appears steeper.

I don't see their objections as at all realistic, for at least four reasons:

- Following the revision of the Neutrality Act in November, 1939, the United States offered to sell war matériel to belligerents on a “cash and carry” basis. This offer was taken up by France and Britain, and the United Kingdom spent more than \$25 billion (in 2000 dollars) with U.S. suppliers in 1940 and early 1941.³⁶ This was very significant compared to federal government spending in 1940 and probably accounted by itself for something like 3.5% out of the 8.8% GDP growth between 1939 and 1940. Particularly in the aircraft industry (but also in some segments of the armament industry) these orders had an important “pump-priming” effect in prompting (and in some cases directly financing) plant expansion.³⁷ This resulted in faster response when domestic orders (and then orders for Lend-Lease matériel) began pouring in late in 1940.
- As we see in Figure 3, federal government consumption and expenditure grew by \$120 billion (in 2000 dollars) from 1940 to 1941. This suggests that the increase in government spending accounted for a minimum of 12% out of the 17.1% rise in GDP.
- Private investment also surged in these two years - by \$30 billion from 1939 to 1940 and by another \$24 billion in the following year. It is clear from contemporary accounts that a great deal of this investment was made in anticipation of wartime orders.
- It is difficult to believe that the Fed and Treasury would have continued expansionary policies in the circumstances of 1940-1941, with the economy approaching full employment at a very rapid pace, in the absence of wartime pressures - especially so in light of their hair-trigger response in 1937.

³⁶ Hugh Rockoff, “The United States: From Ploughshares to Swords,” in *The Economics of World War II: Six Great Powers in International Comparison*, ed. Mark Harrison (Cambridge: Cambridge University Press, 1998), p. 94, citing data from Friedman and Schwartz, *Op. Cit.*

³⁷ Tom Lilley et al., *Problems of Accelerating Aircraft Production During World War II* (Boston: Graduate School of Business Administration, Harvard University, 1946), p. 7.

I conclude that a good deal of the growth over 1940 and the great majority of 1941 growth represented knock-on effects of the war. Thus it really was the war that finally brought full recovery.

From all this I conclude that although it was not tried on any large scale in the United States prior to 1940, the evidence says that Keynes was right, and that fiscal policy can work - government spending could have increased the GDP and speeded recovery. We see that not only in the U.S. 1940-1941 experience but in Japan in the early 1930s (and quite likely in Germany as well, although I have not studied that case much and would not want to make any strong statements about it).

The real question is whether the benefits are sufficient to justify the costs, both in economic terms and political ones. It is sobering to remember that Japanese Finance Minister Takahashi was assassinated in 1936 by army officers who were dissatisfied that his golden goose wasn't laying enough eggs, after which the army went on to drag the nation into a suicidally unwinnable war.

Methods and sources

Table 1 is derived from Susan B. Carter, "Labor force, employment, and unemployment: 1890-1990," Table Ba470-477 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, edited by Susan B. Carter, et al. (New York: Cambridge University Press, 2006). <http://dx.doi.org/10.1017/ISBN-9780511132971.Ba340-651>. The left panel of Figure 1 simply plots the data of the table. For the right panel I drew military force data from Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970, Bicentennial Edition*, 2 vols. (Washington: Department of Commerce, 1975), p. 2:1141, Series Y904. A digital copy can be accessed conveniently from the Census Web site at http://www.census.gov/compendia/statab/past_years.html.

Table 2 is derived from Bureau of Economic Analysis, National Income and Product Accounts (NIPA) Table 1.1.6, updated as of 30 January 2009, www.bea.gov/national/nipaweb/, together with popu-

lation data from the source used for Table 1. Again, Figure 2 simply plots the data of the table.

Government consumption and gross investment data in Figure 3 are derived by starting with the year 2000 figures from NIPA Table 3.9.5 and multiplying by the quantity indexes of Table 3.9.3 to obtain year 2000 dollar values for the subject years' expenditures. The discrepancies between the totals as represented in the figure and those reported in Table 2 are inherent in the chaining process used to compare amounts across vastly differing economic conditions. For more see the Bureau of Economic Analysis brief, "A Guide to the National Income and Product Accounts of the United States," www.bea.gov/national/pdf/nipaguid.pdf, p. 16.

Federal surplus and deficit data in the right panel of Figure 3 were drawn from Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2009, Historical Tables*, page 21, Table 1.1, inflated to year 2000 values using the deflator for federal government consumption expenditures and gross investment from NIPA Table 1.1.9, "Implicit Price Deflators for Gross Domestic Product [Index numbers, 2000=100]." Other deflators might be used, depending on one's purposes, but none would tell a fundamentally different story.

Price and wage data in Figure 4 drawn from Sutch, Richard, "Prices and wages — producer and consumer price indexes, and weekly manufacturing earnings: 1919-1939," Table Cb71-76 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*. <http://dx.doi.org/10.1017/ISBN-9780511132971.Cb35-76>

Productivity data for Figure 5 are from three appendix tables in John W. Kendrick, *Productivity Trends in the United States*, vol. 71, National Bureau of Economic Research, General Series (Princeton: Princeton University Press, 1961): A-XXII, "Private Domestic Economy: Real Gross Product, Inputs, and Productivity Ratios, Commerce Concept, 1869-1957," pp. 333-5; A-XXIII, "Private Domestic Nonfarm Economy: Real Gross Product, Inputs, and Productivity Ratios, Commerce Concept, 1869-1957," pp. 338-40; and B-I, "Farm Segment: Net Output, Inputs, and Productivity Ratios, 1869-1957,"

pp. 362-4. Readers may wonder at the date of this, and indeed it felt a bit strange to be taking down a book I've had on my shelf for more than four decades to look for data, but so far as I've been able to find, Kendrick is still the best available. Others have analyzed productivity for their research but no one has published the results in comprehensive form at Kendrick did. Given the uncertainties that are inherent in measurements of productivity it is certainly arguable whether any of these other inexplicit data sets are actually better for the purpose.

For the import-export data of Figure 6 I've used Series U 187-200. "Value of Exports and Imports: 1790 to 1970," from *Historical Statistics of the United States: Colonial Times to 1970, Bicentennial Edition*, pp. 2:884-6. They have been inflated to year 2000 values using the deflators for exports and imports from NIPA Table 1.1.9.

As indicated, the money supply data of Figure 7 are ultimately from Friedman and Schwartz, but more immediately I've taken them as tabulated in Series X 410-419, "Money Stock—Currency, Deposits, Bank Vault Cash, and Gold: 1867 to 1970," from *Historical Statistics of the United States: Colonial Times to 1970, Bicentennial Edition*, pp. 2:992-3.

The Fed discount rates shown in Figure 8 are from Table 107, "Member Bank Reserve Requirements," in Federal Reserve Board, *Banking and Monetary Statistics, 1914-1941* (Washington, 1943), p. 400.

For the interest rate in Figure 9 I used Series Cj 115, average annual discount rate, from Wheelock, David C., "Federal Reserve monetary policy - interest rates: 1914-1999," Table Cj113-117 in *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, <http://dx.doi.org/10.1017/ISBN-9780511132971.Cj108-141>. The inflation rate is from the *MeasuringWorth* GDP deflator series.

Figure 10's yields are from various sources. Yields of T-Bills at issue price are from Table 122—"Yields on Short-Term United States Government Securities, Monthly," 1920-1941 in *Banking and Monetary Statistics, 1914-1941*, p. 460. The remaining rates are all from series tabulated by the St. Louis Federal Reserve Bank at

<http://research.stlouisfed.org/fred2/>; series LTGOVTBD, AAA, and BAA. Figure 13's data on the index of industrial production also come from the St. Louis Fed Web site; series INDPRO.

The data of Figure 12 and Figure 11 are from Series X 588-609, "All Commercial Banks—Number of Banks and Principal Assets and Liabilities: 1896 to 1970," from *Historical Statistics of the United States: Colonial Times to 1970, Bicentennial Edition*, pp. 2:1021-2. (*Banking and Monetary Statistics, 1914-1941* offers the same data in greater depth.) I have inflated the dollars to 2000 values in the table and accompanying text using the GDP deflator series from Louis D. Johnston and Samuel H. Williamson, "What Was the U.S. GDP Then?" *MeasuringWorth*, 2008, URL: <http://www.measuringworth.org/usgdp/>, accessed 16 February 2009. The *MeasuringWorth* GDP data also are the basis for Figure 17.

The bank reserve and lending data of Figure 14 and Figure 15 are all from *Banking and Monetary Statistics, 1914-1941*: Table 107—"Member Bank Reserve Requirements, June 21, 1917— December 31, 1941," p. 400; Table 100—"Member Bank Reserves, Reserve Bank Credit, and Related Items, Wednesday Figures, 1922-1941," pp. 378-94; and Table 48—"Weekly Reporting Member Banks in 101 Leading Cities—Principal Assets and Liabilities, Weekly and Monthly, 1919-1941," pp. 150-63.

The multi-national per-capita GDP data of Figure 16 are from Angus Maddison, "Historical Statistics for the World Economy: 1-2006 AD," accessed via <http://www.ggdc.net/maddison/>. Dates for leaving the Gold Exchange Standard were culled from a variety of historical sources, some of which gave dates only to the year.