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# What Ended the Great Depression?

## *It Was Not World War II*

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FRANK G. STEINDL

There are two prominent views about what ended the Great Depression. The most widely accepted one by far emphasizes U.S. entry into World War II, with its attendant government spending for armaments.<sup>1</sup> According to this view, the U.S. economy in 1941, though approaching its potential output, remained well below it, so the war's fiscal stimulus moved the economy completely out of the Depression.<sup>2</sup> That the war ended the Depression is a view held not only by economists, but also by the public in general. The second view, in contrast, prominent particularly among economists, sees monetary expansion, which began in spring 1933, as the principal reason for its end.

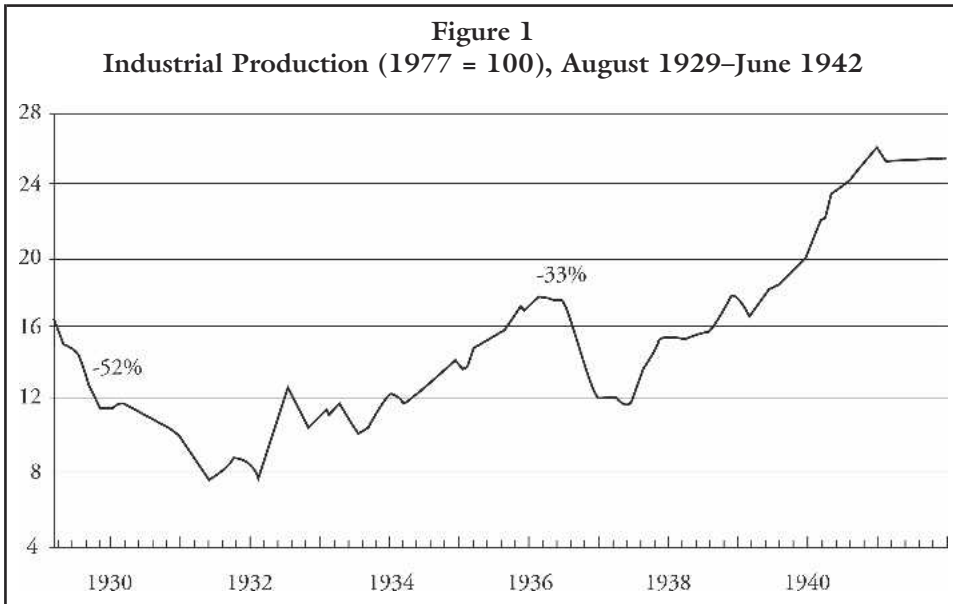
In this article, I offer another interpretation, arguing that neither of the conventional views is fundamentally correct. I maintain that forces inherent in the economy that promote productivity growth drove the recovery following the 1933 trough and moved the economy back to its trend. This view is not a radically new one,

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Frank G. Steindl is Regents Professor of Economics Emeritus at Oklahoma State University.

1. See, for example, the interviews of economists who lived in the 1930s in Parker 2002. Among those holding the position stated here are Paul Samuelson (35), Moses Abramovitz (68), Albert Hart (82), Charles Kindleberger (100), James Tobin (137–38), Morris Adelman (163), and Victor Zarnowitz (193). Abramovitz, for instance, states categorically, “the War ended the Great Depression. . . . [I]t was the War and the defense program that we set in motion even before we entered the War” (68).

2. Coupled with this view is the idea that monetization of the increases in debt associated with financing the war expenditures was of consequence. This view is held in particular by Milton Friedman (interviewed in Parker 2002, 50) and to an extent by Herbert Stein (interviewed in Parker 2002, 178).



but it is important to recognize that productivity-raising forces promoted recovery specifically during the 1930s—a time when aggregate-demand measures are held to have been fundamental to moving the economy back to its trend.

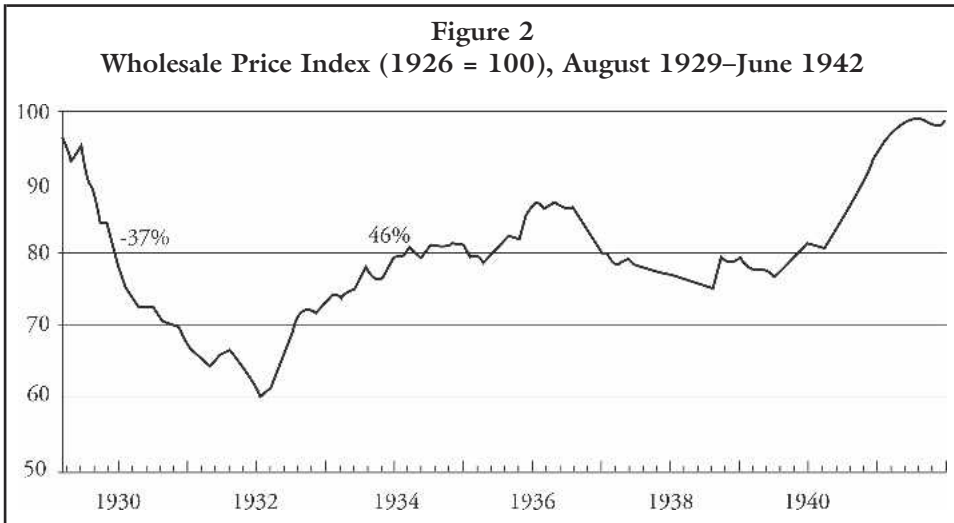
One of the difficulties of macroeconomic interpretation, indeed of scientific inquiry in general, is that of isolating a dominant mechanism from the complex of operative forces. Among the likely forces promoting the recovery was the return to trend attributable principally to monetary changes, fiscal measures, credit-channel influences, and inherent “mean reversion” influences. Or did it result from purely random developments? The years following the 1937–38 depression facilitate a natural experiment in which some of these influences can be identified and disentangled, and therefore are of special importance in any attempt to identify what ended the Great Depression.

### The Current Canonical Chronicle

The trough of the 1929–33 debacle came in early 1933.<sup>3</sup> The ensuing recovery ran to late spring of 1937, when an extremely sharp, year-long depression began, reducing industrial production by 33 percent.<sup>4</sup> Its nadir was in May 1938. The ensuing revival carried into early 1942. Figure 1 depicts the evolution of industrial production

3. Monthly data show a trough in March 1933; quarterly data show it in the first quarter of that year.

4. The fall in industrial production in the 1929–33 contraction was 52 percent, which implies an annual rate of decline slightly less than half that in the late-1930s depression.



in the Great Depression decade, showing the respective 52 and 33 percent declines in the two 1930s contractions. Industrial production in September 1939 was at the same level as a decade earlier. The economy was, however, still well below its trend. Using the Cole and Ohanian (1999) framework, updated to take account of National Income and Product Accounts (NIPA) revisions of annual gross domestic product (GDP), we find that in 1939 the economy was 22 percent below its trend. In 1940, it was 18 percent below, and in 1941, 8 percent below. Only in 1942 did it reach the trend and rise 6 percent above it.<sup>5</sup>

For understandable reasons, economists have concentrated on the behavior of output relative to capacity. Their interest in the course of prices has been secondary to their interest in the course of output. Figure 2 shows the behavior of wholesale prices in the Depression decade (this index was the most widely used one in the 1930s). Prices fell 37 percent in the 1929–33 contraction. They subsequently rose 46 percent, until the May 1937 onset of the later real-output contraction, during which they fell 11 percent.

In contrast to the normal, expected course during a recovery, prices continued to decline for twenty-seven months after the May 1938 trough, until August 1940. This deflation occurred despite an expanding stock of money (monetary base up 53 percent, M1 up 36 percent, M2 up 25 percent) and an expanding output (index of industrial production up 58 percent). The deflation was interrupted by a price spike in September–October 1939 associated with the outbreak of war in Europe, when

5. Real-output data for the war years pose a particular problem, owing to the presence of price controls, among other things, as Higgs (1999) has shown. For example, the NIPA data show output to have been almost 23 percent above its trend in 1944, followed by a three-year depression in 1945–47, with the 11 percent fall in 1946 being the second largest, following the 13 percent decline in 1932.

wholesale prices rose at an annual rate of 89 percent in September alone. Prices then resumed their decline for almost another year.

The Depression was a worldwide phenomenon, affecting all countries except those on a monetary standard other than gold (Choudri and Kochin 1980). The importance of the gold standard as fundamental to the international transmission of the Depression and of its abandonment as basic to recovery is Eichengreen's (1992, 2002) thesis: the transmission of depression reflected national monetary authorities' failure to play by the rules. According to this view, national economies with international-payments deficits contracted as their money stocks shrank, but economies with surpluses did not expand; rather, their monetary authorities sterilized the incoming gold flows. Hence, there was a net deflationary bias. Recovery came as countries abandoned the gold standard because then their monetary authorities could pursue independent expansionary policies. Long before Eichengreen's contributions, the Brookings Institution, in a comprehensive review of developments in the early stages of recovery, linked the recovery to abandonment of the gold standard. One of its conclusions was that "[c]ountries which remained on the gold standard show as a rule a considerably smaller degree of recovery than do those which abandoned or modified that standard" (1936, 109). This interpretation has become the theoretical context in which much research has proceeded, particularly in regard to monetary actions. These analyses generally conclude that the largely exogenous expansion of the money stock was primarily responsible for the recovery.

The earliest, most cogent, generally accepted analysis of the role of money in the recovery, Friedman and Schwartz's (1963, 493–545), appeared two decades after the economy had returned to its trend. Their preferred method of analysis was narrative, with heavy stress on timing relations based on charts. The data were generally monthly observations. The analysis carried into 1941, but the bulk of the investigation pertains to events through the onset of the late-1930s contraction.

Friedman and Schwartz advance two themes integral to the current understanding of the monetary interpretation of the recovery. First, the recovery was driven by increases in the stock of money: "the broad movements in the stock of money correspond[ed] with those in income" (1963, 497), and "the rapid rate of rise in the money stock certainly promoted and facilitated the concurrent economic expansion" (1963, 544). Second, the rapid monetary growth reflected a growing monetary base, which itself reflected increases in the stock of gold, initially because of the 1933–34 devaluation and then because of gold inflows associated with the growing uncertainties in Europe.<sup>6</sup> Changes in the money stock thus resulted largely from exogenous developments.

A complement to Friedman and Schwartz's narrative is Christina Romer's 1992

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6. Friedman and Schwartz emphasize two other points: the doubling of reserve requirements beginning in August 1936 was an important cause of the subsequent contraction; and, except for the increases in reserve requirements, the Federal Reserve was largely passive during the recovery.

study, in which simulations allow her to assess the importance of monetary and fiscal actions. Her conclusion with regard to monetary policy is unambiguously strong: changes in the money stock were “crucial to the recovery” (768). The reason for the “large estimated effect of monetary developments is not hard to find”: “the extraordinarily high rates of money growth in the mid- and late 1930s” (769). Further, the source of “the huge increases in the U.S. money supply during the recovery was the tremendous gold inflow that began in 1933” (773). In sum, fiscal policy “contributed almost nothing to the recovery” (767), and “monetary developments were crucial” (782).

In a comparative study involving at times twenty-six countries, Ben S. Bernanke (1995) investigated changes in the money stock as they were linked to gold. He did not study the forces of recovery throughout the entire decade, but concentrated on the period from 1929 to 1936 because the world economy spun down early in these years and then began to recover, with different countries initiating their respective returns to trend at different times. He focused on changes in the quantity of money as determinants of the decline and recovery, with an emphasis on the gold standard as the mechanism underlying the action.<sup>7</sup> In this view, the gold standard acted as a restraint on independent monetary measures: “In particular, the evidence that monetary shocks played a major role in the Great Contraction, and that these shocks were transmitted around the world primarily through the workings of the gold standard, is quite compelling” (2). As countries severed their ties to gold, recovery commenced: “the evidence is that countries leaving the gold standard recovered substantially more rapidly and vigorously than those who [*sic*] did not” (12). “[T]his divergence arose because countries leaving the gold standard had greater freedom to initiate expansionary monetary policies” (15).<sup>8</sup>

The most recent investigation is Allan Meltzer’s (2003). He similarly finds that the recovery was driven by increases in the money stock, based on an expanding monetary base attributable principally to gold inflows.<sup>9</sup> “The main policy stimulus to output came from the rise in money, an unplanned and for the most part undesired consequence of the 1934 devaluation of the dollar against gold. Later in the decade, German mobilization and annexation of the Rhineland, Austria, and Czechoslovakia, the rising threat of war, and war itself supplemented the \$35 gold price as a cause of the rise in gold and money” (573). The important effect of the growth of the money

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7. Bernanke builds on Choudri and Kochin’s 1980 study, which investigated the years through 1933. Bernanke and James (1991) expand the list of countries and the variables under consideration, and Bernanke (1995) further expands the sample. The results are similar: the sooner a country abandoned the gold standard, the sooner it began to recover.

8. Two issues are covered in these statements. The first is that the abandonment of the gold standard freed the policymakers’ hands. In this view, there is no preferred or even likely policy. Eichengreen (1992) holds this position. The second is that the currency devaluation associated with abandonment of the gold standard allowed expansion of the money stock. Bernanke (1995) takes this position.

9. The rising price of gold resulting from the devaluation also stimulated increased gold production.

stock is underscored in his assessment of the revival from the 1937–38 depression: “The principal force for recovery from the 1937–38 recession came from the decline in prices that raised the real value of the money stock and, later from the rise in the nominal money stock” (574).

In sum, the widely accepted present view that gold-flow-induced growth of the money stock drove the recovery after the spring 1933 trough appears to be a robust conclusion. This view, I might note, stands in marked contrast to the views of economists who were living and writing during the 1930s (Steindl 1998, 2004).

## The 1937–38 Depression and Revival

The late 1930s contraction began in May 1937 and lasted twelve months. As indicated in figure 1, industrial production fell 33 percent. Real gross national product (GNP) fell 10 percent during the four quarters after the second quarter of 1937. Wholesale prices also began to decline in May 1937, eventually falling 11 percent, as shown in figure 2.

Among the monetary factors contributing to this depression were the Federal Reserve’s doubling of reserve requirements in three steps beginning in August 1936 and the U.S. Treasury’s sterilization of gold in December of that year. These actions caused the M1 money stock to fall by 6 percent and the M2 money stock to fall by 2 percent, beginning in December 1936. The principal fiscal factor was the decline in the federal deficit owing to the drop in expenditures occasioned by the one-time Veteran’s Bonus in June 1936, coupled with the rise in revenues resulting from Social Security taxes mandated by the 1935 Social Security Act (Meltzer 2003, 521–22).<sup>10</sup>

The trough of this depression occurred in May 1938. Industrial production then began to increase sharply, rising 25 percent (an annual rate of 47 percent) by the end of the year. In all, it rose 58 percent through the end of the deflation, in August 1940 (an annual rate greater than 22 percent).

In contrast to the normal, expected course during a recovery, however, prices continued to decline. In all, wholesale prices fell 4 percent during the fifteen months between the beginning of the recovery to the start of the war in Europe and then fell another 3 percent between the price spike and the end of the deflation in August 1940.

This pattern is puzzling. Why should prices fall in the face of strong aggregate-demand pressures? An aggregate-demand interpretation of the revival would have prices and output increasing. Such an interpretation is clearly unsatisfactory in relation to the revival after May 1938.

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10. In addition, the imposition of an undistributed-profits tax raised the cost of capital, thereby deterring investment spending.

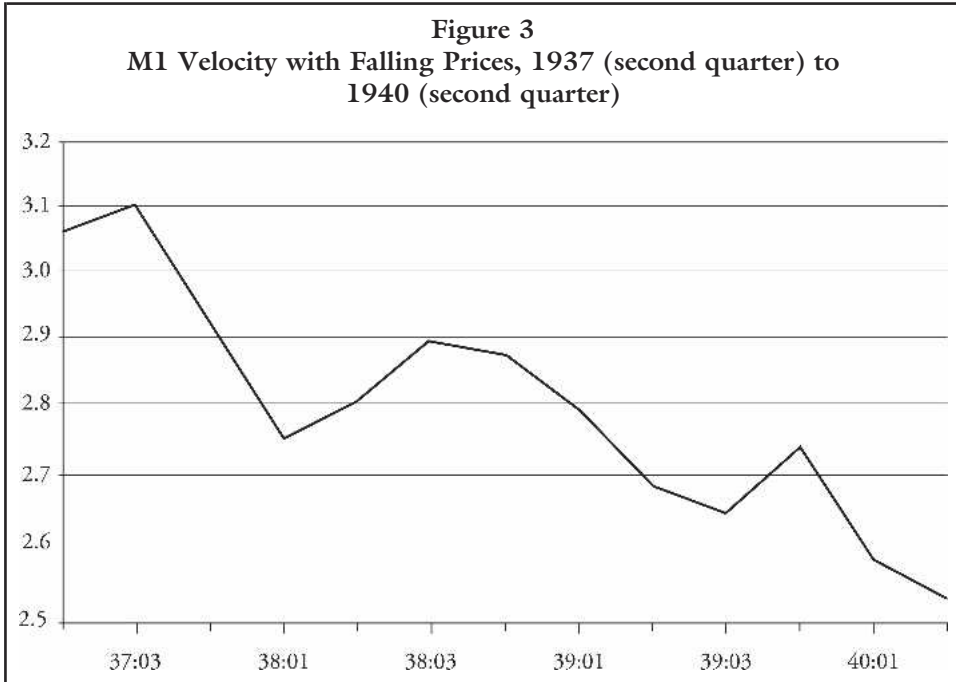
## An Alternative View

According to the currently prevailing interpretation, the recovery sprang from increases in money stock that stemmed from two exogenous developments, one domestic, the other foreign. The domestic development was the 1933 devaluation, which signaled the establishment of a policy regime of rising prices as a key to recovery. The difficulty with this view is its incompatibility with price changes during the revival from the late-1930s depression. How could rising prices be fundamental to the recovery in the 1933 turnaround but not in the more vigorous, later recovery, when prices actually fell?

The exogenous foreign development was the political turmoil in Europe. In this regard, had there been no continuing inflow of gold to raise the monetary base and hence the money stock, the economy would presumably have languished until the demands of World War II made their impact. In other words, without Adolf Hitler to spawn a capital flight to the United States, virtually no U.S. recovery would have occurred before 1941.

Of more consequence is the conundrum presented by the experience of more than two years of deflation in the face of dramatically rising aggregate demand, for which the sharply rising money stock appears to have been a major cause. From the beginning of the recovery in the spring of 1933, wholesale prices rose 46 percent until the contraction in the spring of 1937. Prices then began to fall, as this depression gave rise to an excess demand for money—that is, to a decline in the velocity of monetary expenditure. Velocity, however, continued to fall long after the following spring's depression trough, until the late summer of 1940, as shown in figure 3. The data are quarterly, with real GNP from Balke and Gordon (1986) and M1 from Friedman and Schwartz (1963). The clear downward movement is apparent. M1 velocity fell at a 6 percent annual rate from the cyclical peak in the second quarter of 1937 through the second quarter of 1940, after which prices began to increase. From the cyclical trough in the second quarter of 1938, the fall in velocity was at the somewhat reduced annual rate of 4.8 percent.

This fall in velocity during the revival is a puzzle because velocity is normally procyclical. Perhaps the sharpness of the 1937–38 depression explains the subsequent, unusual increase in the demand for money. As Meltzer observes, “it is no wonder that many feared the 1929–33 disaster had returned” (2003, 522). In the minds of many, the contraction's severity resembled the not-so-long-past debacle of 1929–33, and this similarity might have provoked an increase in the demand for money (as the earlier bust had). The 1937–38 depression might also have confirmed for many the transiency of the recovery, thereby reinforcing their uncertainties about the future, especially about the durability of any recovery. More significant perhaps, the idea that the economy was permanently mired in a less-than-full-employment state gained expression in the popular and professional literature (Hansen 1939; Lange 1939). Still another factor increasing the demand for money was the understandable ten-



dency in the 1930s to identify declining prices as synonymous with bad times, a tendency fostered by the decline in prices between 1929 and 1933.<sup>11</sup> In symmetrical fashion, people tended to associate improving economic conditions with rising prices—an understanding common to many of the Roosevelt administration’s early policies, especially the National Industrial Recovery Act. As prices fell during the year-long depression, many would have seen that fall as an omen of future difficulties and hence would have increased their demand for money. Finally, the deflation might also have created expectations of further price declines, another incentive to increase money holdings.

One important indication of the strength of the increase in the demand for money (relative to its robustly growing stock) is that the September 1939 shock of the outbreak of war in Europe did not sharply alter price expectations. After the price spike, prices (and velocity) continued to fall.

Money demand finally stopped increasing in response to the growing recognition that the war in Europe would involve the United States—as signaled, for example, by the debate preceding the September 1940 adoption of military conscription and by the initiation of what was to become the lend-lease program after the fall of France in June 1940. The shift from fear of continued depressed conditions to con-

11. For some, the 1929–33 experience reaffirmed the lessons of the 1920–21 depression, when prices fell 44 percent and industrial production 28 percent between June 1920 and June 1921.

cern about war and its prospective shortages would have moderated the increased demands for money relative to the growing stock of it.

One possible reason for the deflation as output rose is a lag in the effect of resumed monetary growth on prices. The difficulty with this view is its contrast with the turnaround in March 1933. At that time, prices and output began to rise immediately, with industrial production increasing 29 percent (an annual rate of 41 percent) and wholesale prices rising 18 percent (an annual rate of 24 percent) during the remainder of 1933. In contrast, as noted, output rose 25 percent (an annual rate of 47 percent) from May 1938 through the end of the year, but prices fell almost 2.5 percent. Monetary growth in the revival from the late-1930s depression was much more vigorous than in the rebound after 1933, approximately three times more rapid.<sup>12</sup> Yet prices continued to decline for more than a year and a half.

Prior to World War II, prices normally moved procyclically, rising during a recovery and falling during a contraction (Friedman and Schwartz 1963, 243). The extended deflation during the recovery from the 1937–38 contraction clearly stands as an exception. Cover and Hueng (2003), using a vector autoregression (VAR) model to investigate the relation between prices and output from 1876 through 1999, found that the relation varied with time and was positive through World War II.<sup>13</sup> Their study underscores the presumption that during the prewar period the normal relation between prices and output was positive.<sup>14</sup>

It is difficult to understand why prices were so much less responsive to monetary growth following the late-1930s depression than to monetary growth after the earlier, deeper depression. Lags do not help to explain the extended deflation. An aggregate-demand interpretation of the revival cannot satisfactorily explain the movements of output and prices.

Similarly, the changes of prices and output cannot be understood as attributable to a supply shock because such a shock would have had a one-time effect of increasing output and lowering prices to their new levels; it would not have produced a continuing decline.<sup>15</sup>

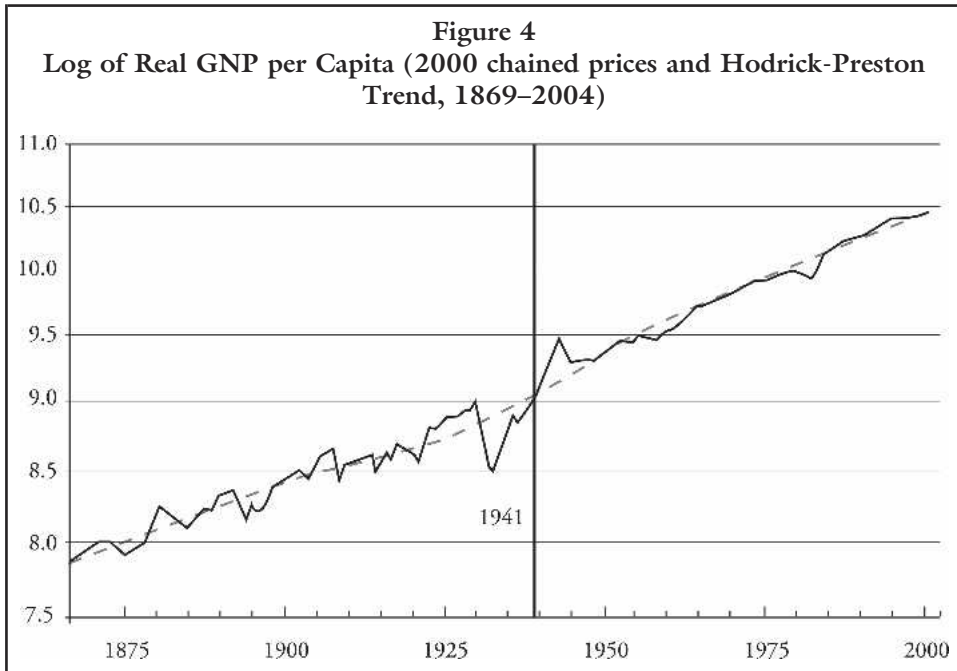
Forces inherent in the economy were apparently operating to move it toward its trend path—a type of *mean reversion*. Because this term implies adjustment from above as well as from below, a more satisfactory term may be *endogenous propagation*.

12. M1 grew at an annual rate of 16.3 percent from May to December 1938, whereas it grew at an annual rate of 5 percent from March to December 1933. For M2, the annual rates were 10.5 percent and 3.7 percent, respectively, for these time periods.

13. In an appendix, Cover and Hueng summarize the results of earlier studies. Without exception, those studies report a positive correlation for periods through 1946 (2003, 88–90).

14. In a related study, Cover and Pecorino (2003) present a theoretical model that implies the same time-varying result because of a move from passive to active (discretionary) monetary policy in the postwar period.

15. A further difficulty with the supply-shock view is the identification of such a shock with a particular event. A reading of the historical record does not suggest such a supply shock.



One way to appreciate what was happening is to view the movement as an ongoing response to a series of small supply shocks rather than to a single, dominant shock.<sup>16</sup>

This tendency to revert to trend is shown in figure 4, a staple of the growth literature.<sup>17</sup> The figure shows the log of annual real GNP per capita (in chained 2000 prices) for the years from 1869 to 2004 (Johnston and Williamson 2005) and with a Hodrick-Prescott filter fitted to the time series.<sup>18</sup> This fitting method produces a smoothed trend that allows for cycles. As the figure shows, the economy returns to the fitted trend following any deviation from it.

For the 136 years recorded in figure 4, growth occurred at approximately 2 percent per annum. The economy was 26 percent below trend in 1933. Though remaining well below trend, it moved up to only 10 percent below in 1937. With the depression that began in mid-1937, it fell to 17 percent below in 1938. It then recovered quickly, so that by 1940 it was only 7 percent below and in 1942 was actually slightly above trend. Thus, by early to mid-1941, the economy was back to its trend, according to this method of trend computation.

16. The difficulty in using the term *supply shock* is that such a shock is generally taken to be an exogenous development, whereas the present notion takes such aggregate-supply increases to be endogenous.

17. Romer employs the use of a return to trend of an aggregate-output series. Her measure of recovery is the return to trend of real GNP based on a trend calculated from 1923 to 1927 “because they are the four most normal years of the 1920s” (1992, 760).

18. The smoothing parameter  $\lambda$  is set at 1,600. This setting generates a deviation from the trend of 26 percent in 1933, which corresponds approximately to the 25 percent unemployment rate in that year.

For the postwar years, the economy tracked the trend very closely, a point often taken as indicative of the success of postwar aggregate-demand policies. Thus, Robert Lucas writes, “the stability of monetary aggregates and nominal spending in the postwar United States is a major reason for the stability of aggregate production and consumption during these years, relative to the experience of the interwar period” (2003, 11). But such aggregate-demand considerations cannot be invoked to explain the more than two years following the 1937–38 depression. At that time, although the economy moved quickly toward trend, its movement cannot be attributed principally to aggregate-demand pressures, whether policy induced or not.

Analysts employing markedly different procedures have adduced considerable empirical evidence of the economy’s tendency to revert to trend (Cochrane 1988; DeLong and Summers 1988; Bernanke and Parkinson 1989; Friedman 1993). DeLong and Summers as well as Bernanke and Parkinson deal explicitly with the post-1933 recovery. The former conclude that “the substantial degree of mean reversion [in the recovery] . . . is evidence that shocks to output are transitory” (1988, 467). The latter observe that the “self-correcting tendencies of the 1930s economy were probably much stronger than is generally acknowledged” (1989, 210). These analysts are concerned principally with the overall time-series properties of output, not with specific developments. Evidence about the late-1930s depression displays reversion to trend for a particular historical experience well outside the normal run of events.

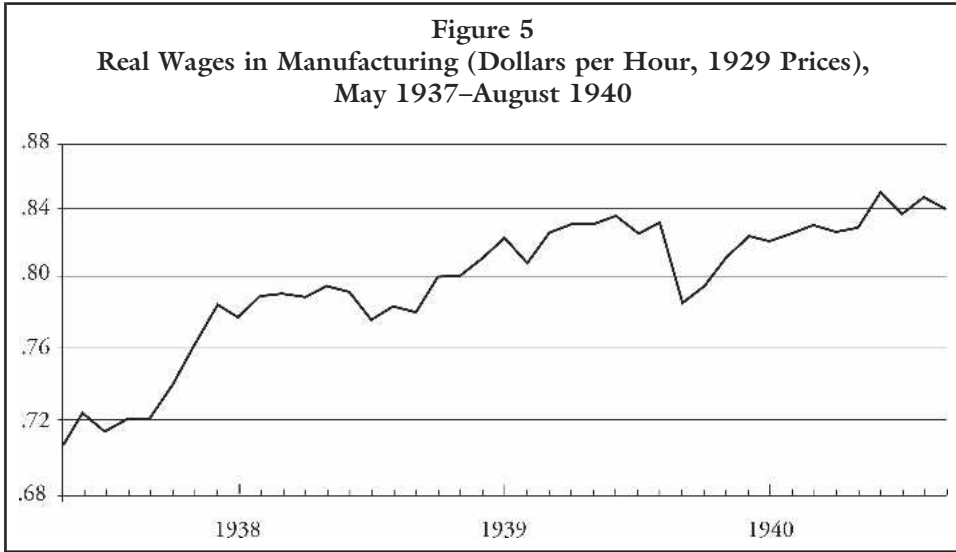
The forces that produce long-run growth of output are the proper focus of economic-growth studies. Questions about mechanisms that operate when the economy is below its potential-output trend typically lie outside the ambit of economic-growth studies. Although such division of labor may be analytically convenient, the workings of the economic system are not so bifurcated. There is no distinct growth sector and no distinct cycle sector, as Hodrick and Prescott have acknowledged in the development of their now-widely employed trend-cycle filter (1997, 3). The economy’s movements are determined by the interaction of all extant forces.

Growth theory concentrates on how inputs become more productive; it is oriented toward supply. The data used to measure growth, however, rest on market observations that reflect the interaction of aggregate-supply and aggregate-demand forces, not aggregate supply alone. Growth observations thus imply that the observed, increased productive potential must have been joined by correspondingly increased income and spending—that is, aggregate demand.

Growth of real income per capita attests the successful implementation of prospective improvements in organizing and carrying out production. How those potential developments are realized is part of the mystery of growth.<sup>19</sup> Education, for

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19. Robert Lucas’s introspective grappling makes an attempt to come to grips with this mystery by reflecting on the importance of learning-by-doing within a group as an element in human capital accumulation (2002, 9–13).



example, is one of the influences most widely regarded as critical to growth. But exactly how does it operate to enhance growth? If most university graduates were engineers, education's influence would not be mysterious, but most have concentrated their study in nontechnical fields. How does their expertise serve to promote growth? What specific pathway leads from increased education to innovations in organization, production, and product development? After all, the response of agents to the incentives and opportunities inherent in such prospective improvements is what drives the economy back to trend after a downward deviation.

The notion of endogenous propagation is rooted in aggregate-supply considerations. When the economy is below trend, aggregate-demand impulses in isolation do not influence the movement toward trend. Aggregate-supply impulses, too, must operate to raise output toward its trend, just as aggregate-supply changes are basic in determining the position of the trend itself.

One impetus to aggregate supply would be declining real wages. With prices declining and nominal wages sticky, however, it is unlikely that real wages would have fallen in the revival. Evidence shown in figure 5 indicates that real wages in manufacturing actually increased.<sup>20</sup> In fact, with few exceptions, real wages increased throughout the entire late-1930s deflationary period, rising 18 percent overall and 6 percent in the revival. Only in September 1939 did the real wage fall dramatically. By October, however, the increase in the nominal wage exceeded that month's moderate rate of increase in wholesale prices. The rising real wage rate was a detriment to increased aggregate supply.

A key component of the endogenous-propagation mechanism is productivity.

20. The real wage is calculated from nominal wage data supplied by the Bureau of Labor Statistics in response to a query regarding material posted at <http://www.bls.gov/opub/rtaw/pdf/chapter2.pdf>.

With output climbing rapidly and unemployment falling slowly—almost a “jobless recovery”—any of the usual measures of labor productivity would show a rise during the revival of the late 1930s. Output per hour worked in the private economy rose by 3, 4, and 3 percent during 1938, 1939, and 1940, respectively. Nonfarm output per hour worked increased similarly—by 3, 4, and 4 percent during the same years (U.S. Bureau of the Census 1975, 948, Series W 1-1, W 1-3).<sup>21</sup>

Difficult questions pertain to the factors that underlie these productivity increases. What induced rising labor productivity? Was it efficiency wages—perhaps eliciting better-quality effort from workers who feared the loss of their jobs—or higher productivity because laborers remained employed longer without spells of layoff or something else? Increased productivity is not a *deus ex machina*, but its source is a puzzle in much the same way that education’s influence on the trend rate of economic growth is a puzzle.

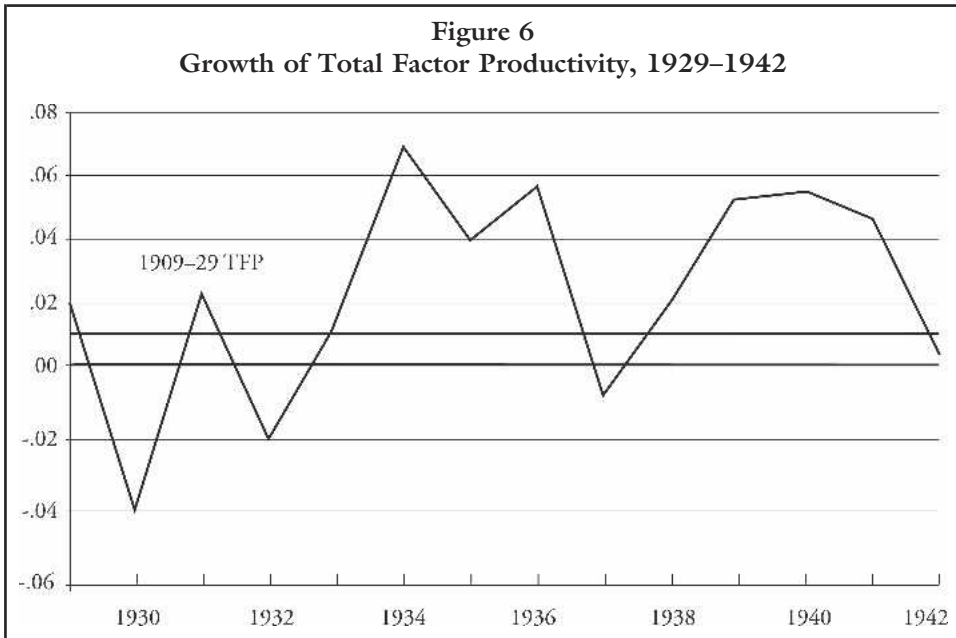
Alexander Field (2003) has presented a partial solution to the productivity puzzle of why aggregate supply was increasing at this time. He offers strong evidence that total factor productivity (TFP) increased rapidly during the 1930s: “the years 1929–41 were, in the aggregate, the most technologically progressive of any comparable period in U.S. economic history” (1399). The evidence is both macroeconomic, shown by Kendrick and Solow measures of TFP, and microeconomic, documented by Field with several specific sectoral developments. Among the important “technological and organizational innovations . . . [were those] in chemical engineering . . . aeronautics, electrical machinery and equipment, electric power generation and distribution, transportation, communication, and civil/structural engineering” (2003, 1401). Somewhat surprisingly perhaps, railroads exhibited rapid productivity increase during the Depression (Kendrick 1961, 544–45).

Francis and Ramey (2004) offer another recent study that documents substantial productivity increases during the 1930s recovery. They are concerned principally with the effects of a technology shock, defined as “any shock that has a permanent effect on labor productivity” (18), although no specifics of such shocks are noted. They found that the largest such shocks occurred in 1934–36 and 1941, and that a lesser shock occurred in 1939 as well (19).

The pioneering, fundamental study of total factor productivity is that of Robert Solow (1957), with its famous Solow residuals. Figure 6 shows the annual growth rates of TFP during the 1930s. Relative to the 1909–29 rate of 1.1 percent, the post-1933 rates were more than threefold greater—3.6 percent from 1933 to 1942.<sup>22</sup> The rate then fell 60 percent in the subsequent war and postwar years, 1942–48 (Field

21. Total unemployment fell by 9 and 14 percent in 1939 and 1940, respectively (U.S. Bureau of the Census 1975, 135). The fall in the unemployment rate was approximately one percentage point greater.

22. In the 1933–41 period, TFP rose at an annual rate almost four times greater than in the 1909–29 period.



2003, 1404).<sup>23</sup> During the 1929–33 contraction, TFP was essentially unchanged. From 1933 through 1941, it increased by 37 percent, or at an annual rate of 4 percent, which is more than five times greater than in 1919–29 and thirty-one times greater than in 1919–33 (Solow 1957, 315).

Having identified rapid productivity increases as basic to economic recovery in the 1930s, however, we must seek their causes. Serendipity—the idea that they just happened to occur at the right time and in the right amounts—is not an appealing explanation. The causes may well be rooted in the dynamics of an enterprise economy—the incentives, opportunities, and flexibilities of such a system. Such forces are intrinsic to a market-based economy, so that a deviation from the (equilibrium) trend brings as a matter of course economic responses that return the economy to its growth trend. In other words, when the economy is below trend, an endogenous-propagation mechanism operates in the economy. Its specific components and sources, however, are not easily observed, measured, or modeled.

Had no war occurred, productivity increases would have been sufficient to return the economy to its trend. As it was, however, the U.S. involvement in the war, with its dramatically increased military demands, served to reinforce the aggregate-demand interpretation that government spending on war-related goods and services ended the Great Depression. To argue that the mid-1940 to mid-1942 demands of the impend-

23. The principal reason for the fall in the rate of growth of TFP is the real GNP declines of 11 and 1 percent in 1946 and 1947, respectively—declines that reflect in large part the overestimation of real GNP during the war owing to the existence of price controls, as stressed in Higgs 1999.

ing and actual war were the prominent impetus ending the Depression, however, requires showing why aggregate-demand pressures were of principal consequence from the spring of 1933 until the 1937–38 depression, then abated for two and one-quarter years, and then again became the major force driving the economy back to its trend.<sup>24</sup>

Another way to see this analytical difficulty is to engage in the counterfactual experiment of assuming that no U.S. engagement in the war occurred. In that event, would the U.S. economy not have recovered beyond its level in 1940, remaining essentially moribund at that economically suboptimal level? The answer has to be no.

We can see the forces of endogenous propagation operating clearly only in the revival from the 1937–38 depression. From 1933 to 1937, these forces did not manifest themselves clearly, and the pre-1937 recovery therefore appeared to spring principally from monetary growth. If this cause had been generally operative, prices would have risen during the recovery from the 1937–38 depression, but, as we have seen, they did not. We may well suspect, however, that the endogenous-propagation mechanism was operating from 1933 onward, not only during the recovery from 1938 to 1941.<sup>25</sup>

## Concluding Observations

Contemporaneous analysts of the recovery did not put much weight on the influence of growth of the money stock. More recent analysts, in contrast, have emphasized its crucial importance, and this interpretation is now the canonical view. Moreover, the latter argue that the monetary growth was “financed” by gold inflows and by the 1933 devaluation, and therefore that it was effectively an exogenous event.

One advantage of studying the Great Depression is that behavior and observations outside the normal range of experience come into view. On that count, the twenty-seven months of deflation despite rapid monetary and output growth after the 1937–38 depression is of particular interest. Besides the conundrum of prices and output moving inversely as the money stock increased, we have the troubling implication in the “war-instigated recovery” theory that the U.S. economy would have experienced little recovery after 1933 had no political difficulties arisen in Europe to stimulate capital flight to the United States.

Analysts have generally ignored the post-1938 revival episode. The reigning view remains that “World War II got us out of the Depression,” supplemented by acknowledgment of the importance of monetary growth. Friedman and Schwartz, for example, devote only one paragraph to the post-1938 recovery, discussing rates of

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24. Higgs (1992, 1999) argues that the economy in fact did not regain full employment in the usual sense—his preferred term is *genuine prosperity*—until 1946.

25. The argument can be expressed graphically. Monetary growth increased aggregate demand, but productivity increases shifted aggregate supply even more, thereby moving the economy’s equilibrium point down the long-run aggregate-demand curve.

monetary growth and gold inflows, although they do recognize in passing that “[d]oubtless, other factors [besides monetary growth] helped to account for the onset of recovery and for its pace” (1963, 545). Likewise, Meltzer’s analysis of the revival does not comment on the seeming incongruity of the extended deflation in the face of rapid monetary and output growth, except to note the aggregate-demand effect in which “the principal force for recovery [from the 1937–38 depression] came from the decline in prices that raised the real value of the money stock and, later from the rise in the nominal money stock” (he offers no explanation for the decline in prices) (2003, 574).

Christina Romer (1999) acknowledges the fall in prices in 1939, but does not single it out for comment. This neglect is all the more surprising because earlier (1992) she had argued strongly for a money-driven recovery. Ironically, her framework for understanding why prices rose during the recovery does not employ the quantity of money as a consideration.<sup>26</sup> Kenneth Roose (1954) similarly did not acknowledge the incongruity, though his omission is more readily understandable because at the time he wrote there were no official data on the money stock, and the role of the quantity of money was held to be of no consequence.<sup>27</sup> A more recent and surprising case of overlooking the deflation is that of Gordon Sellon (2003), who is explicitly concerned with deflation and the prospect of a liquidity trap. He says nothing about those precise phenomena following the late-1930s depression. The most recent example of ignoring the deflation is the volume of articles edited by Burdekin and Siklos (2004), which is expressly concerned with deflation. None of the essays there considers the deflation following the 1937–38 depression.

The resolution of the seeming paradox about the two and one-quarter years of revival from this depression cannot rely on aggregate-demand shocks. Therefore, the notion implied in the title of Romer’s influential 1992 paper “What Ended the Great Depression?” is off the mark. Rapid growth of the money stock did not bring the Great Depression to an end.

Understanding the economy’s recovery after the 1937–38 depression requires consideration of two forces. One is the increase in the demand for money relative to its rapidly expanding stock. The other, seemingly most unlikely given the “inadequate aggregate-demand” orientation of most modern analyses of the Depression, pertains to what I call endogenous propagation—forces inherent in the economy that push it toward its trend value.<sup>28</sup> Those forces were operating throughout the post-1933

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26. This approach would seem to be an inversion of the usual quantity-theory process, in which prices, not output, are affected in the long run. Romer’s method has the money stock influencing output but not prices.

27. Roose does not include monetary growth in his list of causes to which revival from the 1937–38 depression may be attributed. Similarly, he does not include it in his list of causes of the depression (1954, 16–19).

28. If the Depression were viewed as a problem of insufficient aggregate demand, the appropriate policy would be to employ traditional measures to boost the demand for output. Investigations into the recovery, almost without exception, have concentrated on such actions.

recovery and were sufficient to bring an end to the Great Depression. Preparations for and engagement in World War II obscured the economy's inherent upward movement, just as the robust growth of money and aggregate demand obscured it during the 1933–37 recovery. The war-related actions, though connected temporally to the ending of the Depression, were not fundamental to bringing the economy back to its trend-level performance.

This view does not imply that the traditional recovery mechanisms had no force or that the role of monetary growth was a chimera. Standard policy-related aggregate-demand mechanisms may well have been operative. The operation of the endogenous-propagation mechanism, however, diminishes the relative importance of their effects.

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**Acknowledgments:** Earlier versions of this article were presented at the Federal Reserve Bank of Atlanta, Sam Houston State University, and the University of Mississippi. I thank the participants in those seminars for the spirited discussions and for comments that have been incorporated here. A special debt is due my colleague Mark Snead. Finally, I thank the two referees for their helpful comments.