

## The End of One Big Deflation\*

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This paper provides a new account of the recovery from the Great Depression in the second quarter of 1933. Our argument is that President Roosevelt established a new macroeconomic policy regime shortly after his inauguration in March 1933 that altered expectations and stimulated investment. The key to this change was Roosevelt's devaluation of the dollar and the resulting rise in farm prices and incomes. Hoover had been a financial conservative, adhering to the gold standard, a strong dollar, and fiscal orthodoxy. Roosevelt broke with this ideology, devaluing the dollar within 6 weeks of his inauguration, promoting the New Deal, and championing the virtues of inflation. The devaluation of the dollar was the single biggest signal that the iron grip of the gold standard had been broken. The New Deal emerged in the course of 1933 and reinforced the change in regime symbolized by devaluation. © 1990 Academic Press, Inc.

This paper proposes an explanation for the U.S. recovery from the Great Depression in the second quarter of 1933. Given the fact that recovery came, we all now believe that it was inevitable at some point. But why then? Why did the economy not fall farther before turning around? Our explanation relies on Sargent's (1983) model of changes in policy regimes and provides another illustration of its usefulness.

Friedman and Schwartz (1963, p. 493) described rather than analyzed the turning point: "Reopening of the banks was followed by a rapid spurt in personal income and industrial production." They suggested that the spurt in production was partly in anticipation of higher costs and prices under the National Industrial Recovery Act (NIRA) and imply from their analysis of the longer period from 1933 to 1937 that production rose also because the supply of money rose. NIRA was not passed until well after the recovery had begun, however, and the supply of money did not rise at the turning point (see below).

Kindleberger (1986, pp. 191–192) took a more Keynesian view: "the fact that gross investment has a limit of zero is useful in explaining that

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the depression had to end. . . . At some point gross investment turns up again and the accelerator principle comes back into its own." This Hicksian view of the Depression relies on the economy reaching a natural floor, but there was no natural floor to the economy. Gross *fixed* investment had largely ceased by 1932, but inventory decumulation continued. In fact, inventories had not fallen as much as sales and easily could have continued to contract. Steel inventories, for example, were between 97 and 40% of their 1924–1928 average in 1933, depending on the stage of production. But steel production was only 34% of its 1924–1928 average. Inventories, in other words, had risen as a proportion of sales (*Steel*, 1933; Federal Reserve System, 1940). The rise in the inventory to sales ratio was widespread; there was ample room for further disinvestment (Abramovitz, 1950, Table 114; Foulke, 1937, pp. 77–81). Prices and the money stock also could have continued to decline. The real money supply had not risen nor had real wages fallen to stimulate demand or production (Temin, 1976).

Eichengreen and Sachs (1985) argued that devaluation led to recovery in many European countries by permitting monetary expansion, but their model cannot be applied directly to the United States. They estimated a reduced form equation for 10 European countries in which the change in industrial production between 1929 and 1935 was explained by the change in the gold value of currency. The regression does not explain the American experience. Adding the United States to the regression lowers the  $R^2$  from 0.56 to 0.32. American industrial production in 1935 was only two-thirds of the predicted level.

None of these explanations provides a satisfying explanation of the recovery. The many volumes about the beginning of the downturn find no adequate echo in the literature on the low point. Yet there was a clear economic event in the spring of 1933; the economy stopped its decline and started a recovery. This turning point needs a careful description.

We propose to analyze the beginning of recovery in the United States within the framework used by Sargent (1983) to study the end of hyperinflations. He argued that the key to costless stabilization was the establishment of a new policy regime. Actions were needed to establish the new regime and its credibility, but Sargent argued that the immediate effects were through rapidly revised expectations.

Sargent's historical conclusions have been disputed by Garber (1982) and Wicker (1986). They have shown that expectations were not revised fast enough to avoid all costs of stabilization. They have not, however, disputed Sargent's more general point that changing expectations were the key to stabilization—whether costly or not. It is this construction of Sargent's work that we wish to employ here. Even though we are using Sargent's ideas to explain historical events, not using history to test his

hypothesis, our work supports the idea that regime shifts possess considerable explanatory power. It does not suggest that expectations alone can reverse the direction of the economy with no cost. The recovery from the Depression was neither rapid nor complete in the 1930s (Bernstein, 1987). And the change in expectations was confounded with many elements of the New Deal that had direct effects, making it impossible to argue that changing expectations alone could have ended the economic decline.

In fact, the market-clearing conditions needed for the full working of Sargent's mechanism were hardly present in early 1933. The pure form of the model in which expectations affect prices but not real variables is not relevant here, as critics have argued that it was not appropriate in the 1920s. Instead a change in expectations worked with changes in macroeconomic policies to produce changes in prices and real variables that cannot be understood as the result of the new macroeconomic policies taken in isolation.

Our argument is that Franklin Delano Roosevelt established a new macroeconomic policy regime shortly after his inauguration in March 1933. The Hoover administration had been financially conservative, adhering to the rules of the gold standard and fiscal orthodoxy. Its policy stance in the troubles of the early 1930s, therefore, was decidedly deflationary. Roosevelt broke with this ideology, devaluing the dollar within 6 weeks of his inauguration, promoting fiscal expansion, and championing the virtues of inflation—or reflation as he termed it.

The devaluation of the dollar was the single biggest signal that the deflationary policies implied by adherence to the gold standard had been abandoned, that the iron grip of the gold standard had been broken. Devaluation had effects on prices and production throughout the economy, especially on farm and commodities prices, not simply on exports and imports. It sent a general message to all industries because it marked a change in direction for government policies and for prices in general. The elements of the New Deal emerged in the course of 1933; the devaluation of April–July 1933 was the proximate cause of the recovery.

The next section lays out the theory in more detail. The shift in policy is described in the following section. Then the theory is tested by tracing the signs and effects of changing expectations and an important effect of devaluation, and conclusions follow that.

### THEORY

We can articulate the theory no better than by a paraphrase of Sargent (1983). The rational expectations model of deflation denies that there was an inherent contractionary movement. Instead, economic actors came to expect continued contraction, and they made deflationary bargains and investments in light of these expectations. However, people

expected continuing deflation because the government's monetary and fiscal policies warranted those expectations. Expectations and actions responded slowly to isolated expansionary actions that were viewed as temporary departures from what was perceived as a long-term government policy involving monetary and fiscal contraction in the future.

Deflation, therefore, only seemed to have a momentum of its own. It actually was the government policy of balancing the budget, contracting the money supply, and sustaining an overvalued dollar that provided this momentum. This is not to say that it was easy to arrest the contraction. On the contrary, it required far more than a few temporary expansionary monetary and fiscal actions. It required a change in the policy regime, that is, in the rule for taking actions. There had to be an abrupt change in the continuing government policy, or strategy, for determining the money supply, government expenditure, and the exchange rate that was sufficiently binding to be widely believed.

It is not necessary for this transition that economic decision makers in 1933 understood modern open-economy macroeconomics. They did not have to distinguish between their expectations of price and quantity movements. It was sufficient for them to have comprehended that gold standard rules dictated deflation in times of trouble. Roosevelt abandoned the rules that Hoover repeatedly articulated for directing the economy, championing an alternative that many wanted out of self interest or principle. Euphoria—that is, a dramatic shift in expectations—was the initial response. People anticipated that prices, incomes, or both were about to rise.

De Long and Summers (1986) proposed a model that incorporates this view, albeit without raising the question of what contemporaries understood. The channel of communication between expectations and expenditures was through the real interest rate in their model. They commented that a quick look at the trough of the Great Depression lent support to their position, although they said, "a convincing analysis must wait for the future." They then—like Friedman and Schwartz—focused on NIRA. As we will show in detail, the recovery started before NIRA was introduced in May and well before it was passed (Himmelberg, 1976).

The problem with the focus on NIRA is that it came too late to explain the turn around. This bill was, in Sargent's term, an action. What was needed was a change in policy or regime. There had to be a decisive break from the prevailing fiscal orthodoxy that was dictating a deflationary policy regime, albeit with an occasional expansionary action. We argue that the devaluation of the dollar served that purpose. Although only an action by itself (like NIRA), devaluation stood at the center of economic policy. It affected all macroeconomic policies, and it symbolized the change in those policies. It allowed a fiscal and monetary expansion without risk of a foreign-exchange crisis. It clearly showed

Roosevelt's new approach to macroeconomic policy. The New Deal as a whole contained the new policy; devaluation derived its importance in large part from its place in the New Deal.

Devaluation in fact had two effects. First, it signaled the abandonment of the previous fiscal orthodoxy as represented by the gold standard. Second, it had expansionary effects on American industry. The two effects clearly were interdependent. Devaluation was a constant reminder of the change in policy. Changing expectations reinforced the immediate expansionary effects of the devaluation.

#### HISTORICAL NARRATIVE

The Hoover Administration followed a policy regime that departed from orthodoxy in significant ways, but was highly traditional in its support for the gold standard and its focus on efforts to bolster the credit markets rather than the economy directly. While not initially deflationary, Hoover became decidedly deflationary as time went on, particularly after the gold standard crisis of 1931 (Stein, 1969, Chapter 2; Barber, 1985).

Hoover urged resistance to wage cuts in 1930 and stressed the role of the federal government in encouraging others to keep up spending. This policy of positive statements and appeals to cooperation, mixed with orthodox financial policies, came to grief in the sharp decline of production following the European currency crisis of 1931. Hoover turned from opposition to acceptance of wage cuts. He strenuously opposed the Veterans' Bonus of 1931 and public works. He successfully sponsored a massive tax increase in late 1931 in an effort to recoup the precipitous decline in federal tax revenues. The maximum personal income tax rate rose from 25 to 63%. Corporate income taxes rose, estate taxes were doubled, and gift taxes were reintroduced. Hoover's opposition to the veterans' bonus reveals the depth of his opposition to expansionary policies; the bonus was handed to him with no political risk and a rationale that allowed him to maintain its ideological purity. Hoover still declined this offer.

The Reconstruction Finance Corporation (RFC), Hoover's most forceful expansionary effort, was directed primarily at the relief of financial institutions; two-thirds of its 1932 loans went to them. Hoover wanted RFC to promote investment, but he limited it to an agency function, making RFC's finance "off-budget" and emphasizing the "soundness" and "bankable" quality of supported projects (Barber, 1985, pp. 130–132, 170–174). The expansionary aspect of RFC, therefore, was designed to be a mild exception to the prevailing deflationary regime, not the start of a new direction.

The Federal Reserve similarly maintained a passive stance in the early stages of the Depression, replaced by active contraction in response to the run on the dollar in 1931. The Federal Reserve's steps toward ex-

pansion in March to July of 1932 were halted when the open market purchases threatened gold reserves in New York (as a result of French and British withdrawals) and the solvency of some member banks (by lowering the returns on the short-term securities held for liquidity in the depth of the Depression) (Epstein and Ferguson, 1984).

The Hoover Administration's defense of the gold standard and the existing gold value of \$20.67 per ounce was never less than firm, despite the devaluations of Britain, Canada, and many commodity-producing countries. The administration was tested in this resolve twice—in the fall of 1931 and in February 1932. In each instance, the answer was a staunch adherence to the present gold value and orthodox monetary restriction. The Federal Reserve in late 1931 raised interest rates and accelerated the contraction; the Glass–Steagall Act of 1932 reiterated support for the gold standard 6 months later. Hoover even tried to make an issue of his defense of the dollar in his re-election campaign, only to have it backfire on him. As late as February 1933 Hoover spoke out against a U.S. devaluation and urged worldwide restoration of the gold standard. Devaluation, Hoover asserted, would lead to “a world economic war, with the certainty that it leads to complete destruction, both at home and abroad” (Hoover, 1933).

It was not clear during the presidential campaign of 1932 that Roosevelt would implement a change of policy regime. He had recently raised taxes in New York to balance the state budget and he emphasized a balanced federal budget as well. He strongly criticized Wall Street, business, and utilities during the campaign and employed generally antibusiness rhetoric. These were not features of a candidate one would expect to help the business environment. Indeed, he was widely criticized for providing no insights into his likely policies.

Nor did he give much insight into his likely policies between the election and February, except to oppose Hoover's efforts to settle war debts and reparations multilaterally, and to reverse the momentum for a proposed 2¼% manufacturers' excise tax, even though he humiliated his Vice President-elect, John Garner, in the process. (Garner had used his prestige as Speaker of the House to forge an agreement on a tax increase.)

In retrospect, the first inkling of a pronounced change in regime occurred in February 1933, when the President-elect began a serious discussion of devaluation as part of an effort to raise commodity prices, but this talk, combined with numerous state bank holidays, led to a run on the dollar and caused the Bank Holiday in March (Wigmore, 1987). This crisis was the denouement of the Depression and gave Roosevelt unprecedented Presidential power to change policies.

Yet for the first month the administration was absorbed with the Bank Holiday and preparing for action. Stock, bond, foreign exchange, and

commodities markets were quiet and little changed. It was more than a month after the Inauguration before the real change in policy became evident when FDR announced on April 18 that he would support the Thomas Amendment to the Emergency Farm Mortgage Act of 1933 which allowed him to set the price of gold (that is, devalue the dollar). He also prohibited by Executive Order the private export of gold. The dollar consequently began to float, falling steadily until July when it had declined between 30 and 45% against the currencies of most trading partners, although only 13% against our largest trading partner, Canada (Federal Reserve System, 1943, pp. 662–681).

The clarity of the change in policy was unmistakable. The United States was under no market pressure to devalue. It held one-third of the world's gold reserves, ran a chronic foreign trade surplus, dominated world trade in modern manufactures like automobiles, refrigerators, and sewing machines, and had exchange controls to deal with speculative flows. Orthodox financial opinion recognized the change in policy regime and condemned it. Senator Carter Glass called devaluation an act of "national repudiation." Winthrop Aldrich, the new chairman of the Chase National Bank, thought it was "an act of economic destruction of fearful magnitude." The *Commercial and Financial Chronicle* agreed: "The United States Government has the present week taken a step backward towards the darkness of the Middle Ages" (Wigmore, 1985, p. 426).

This was a change of regime of the type described by Sargent in his account of the end of several hyperinflations. It was a dramatic change, clearly articulated and understood. It was coordinated with fiscal and monetary policies. It also was supported by a wide degree of consensus, despite the vocal opposition of some financial leaders. The remarks by Aldrich and Glass show that the shift in regime was clearly visible. They represent, however, only a minority opinion identified with the previous, failed regime.

During Roosevelt's First Hundred Days, the passive, deflationary policy of Hoover was replaced by an aggressive, interventionist, expansionary approach. The New Deal has been widely criticized for internal inconsistency (Hawley, 1966). We seek to defend the new administration from this charge of inconsistency. There was a consistently inflationary thrust to policy that added up to a marked change from the Hoover administration.

Roosevelt seized upon the political opportunity given to him by the voters' resounding defeat of Hoover to initiate a flurry of legislative and administrative action. Devaluation was only one part of this new policy regime, but it was critical to the New Deal's success. It came first, it freed domestic policy from international monetary pressures, it had a dramatic impact on farm and other rural incomes, and it had a great

symbolic significance of the lengths to which the Administration would go to raise prices since a strong dollar was the touchstone of the financial conservatives whose policies had been so deflationary.

The Agricultural Adjustment Act (AAA) and the National Industrial Recovery Act contained numerous provisions raising farm and business prices. NIRA's Title II authorized \$3.3 billion for public works. "Hot oil" produced in conflict with state prorationing laws was outlawed, and Interior Secretary Harold Ickes was given power to take control of private refineries and raise prices. Congress appropriated \$500 million for grants to states by the Federal Emergency Relief Administration under the direction of Harry Hopkins. Federal expenditures rose by \$2 billion in the fiscal year ending in June 1934 despite a revenue increase of only half that amount (U.S. Bureau of the Census, 1975, p. 1104).

A major step toward compatible monetary policy was taken when Eugene Meyer resigned as Chairman of the Federal Reserve Board. Meyer was a haughty, orthodox Wall Street financier with a strong international orientation and commitment to the Federal Reserve's independence. He was replaced by Eugene Black, Governor of the Atlanta Federal Reserve Bank, who was far more compliant to the wishes of the Administration. The Federal Reserve cut the discount rate in both April and May from  $3\frac{1}{2}$  to  $2\frac{1}{2}$ %, and its holdings of U.S. Treasury securities rose from \$1.8 to \$2.4 billion between April and October (Federal Reserve System, 1943, pp. 343, 440). The National Industrial Conference Board proclaimed the birth of a "new monetary system" (National Industrial Conference Board, 1934).

Devaluation received wide, although not (as we have seen) universal, support. J. P. Morgan told reporters, "I welcomed the reported action of the President and the Secretary of the Treasury in placing an embargo on gold exports" (Wigmore, 1985, p. 426). Congress easily passed the New Deal measures. The business and farm community welcomed the possibility of reflation. Keynes advised a client that, "President Roosevelt's programme is to be taken most seriously as a means not only of American but of world recovery. . . . [H]is drastic policies have had the result of turning the tide in the direction of better activity" (Keynes, 1933).

The first one hundred days of the new administration from March to July 1933, therefore, contained a clear change in the economic policy regime that could not have been anticipated from the election campaign or the interregnum period. The focus shifted from a strong dollar to devaluation, from international cooperation to domestic recovery, from deflation to inflation, from emphasis on financial markets to direct intervention in the economy, and from budget balancing to fiscal stimulus. The devaluation was coordinated with a change in direction of fiscal and monetary policies as well as a change in the personnel responsible for



them. The rhetoric of government pronouncements and the tone of public discussion changed sharply as well. It would be a poor businessman, investor, or consumer indeed who was unaware that the previous policy regime had been overturned. Despite occasional expansionary acts by Hoover and deflationary ones by Roosevelt, the expansionary direction of the new policy and its contrast with the deflationary impulse of the old were clearly visible.

## TESTS

### *Expectations*

The stock market is a good index of expectations, albeit a noisy one (Shiller, 1981). The value of stocks had drifted downward during the interregnum. It rose sharply from its trough in March—at the time of the Bank Holiday—to a peak in July. Industrial stocks *doubled* in price in those 4 months and almost doubled versus stock prices at election time (Federal Reserve System, 1943, p. 481). This abrupt turnaround was hardly the result of the events during the interregnum or the Bank Holiday itself. They contained bad news about the health of the economy. Only after Roosevelt's commitment to inflationary policies became clear during the Hundred Days did the value of stocks rise. The stock market rose and fell with the value of the dollar during 1933, illustrating dramatically the link between devaluation and expectations for the economy.

During the deflation, people had been holding money in part for the positive real return it gave. When people no longer expected deflation to continue, they shifted out of money into assets whose value would rise with inflation. The rise in stock prices can be seen as a result of this portfolio shift. We cannot distinguish between expectations about the price level and about the expansion of industry. In either case, the rise in stock prices shows a result of rapidly changing expectations.

Sargent (1983) argued that the demand for real balances rises when a stabilizing regime takes over from an inflationary one. Similarly, we expect a fall in the demand for real balances to signal a change from deflationary to inflationary expectations. Real balances, of course, had not fallen consistently over the course of the contraction, that is, before the Bank Holiday (Temin, 1976, p. 141). They did fall from 1932 to 1933. Detailed data on real money balances are shown in Fig. 1, where it can be seen that there was a dramatic fall in real balances coincident with the devaluation of the dollar.

Anticipated real interest rates also must have fallen, although they cannot be observed. We would have to specify an explicit model of expectations and introduce a discontinuity in the second quarter of 1933 to calculate an ex ante real interest rate. But this rate would only reflect our assumed discontinuity; it could not add to the evidence for a change

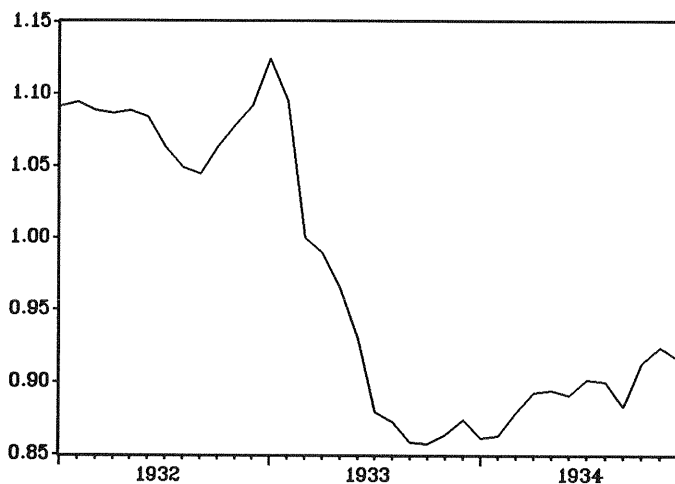


FIG. 1. Real money balances 1932–1934 (M2/WPI).

Sources. Friedman and Schwartz, 1963, pp. 713–14; *Survey of Current Business*, Supplement, 1936, p. 12. (March, 1933–100.)

in expectations. We can only say that the change in the stock market most probably had an analog in the money market, along the lines of De Long and Summers (1986). The clear reaction of the stock market suggests that expectations of growing sales and production were more widely held than expectations about rising prices alone.

The change in expectations can be seen, however, in the yield spreads between different bond ratings. The spread between Moody's Aaa and Baa bonds—an index of risk used widely in the literature on the start of the Depression—narrowed steadily from 4.23% in March to 2.26% in July (Federal Reserve System, 1943, p. 470). An almost pure observation is supplied by the bonds of the Pennsylvania Railroad. The railroad had four different bond issues outstanding with similar coupon rates and maturities, but different collateral security. They were rated Aaa, Aa, A, and Baa. The yield spreads between the Pennsylvania's Aaa and each of the railroad's other issues narrowed progressively in the second quarter of 1933. The spread between the Aaa and Baa issues fell from 3.54% in March to 1.25% in July. Phrased differently, the price of the Aaa bond rose only about 10% while the price of the Baa bond rose over 50% (Wigmore, 1985, pp. 591, 602).

A change in expectations is clear. Its impact on spending is equally clear. The rise in Tobin's  $q$  had an immediate effect on investment. Moody's Industrial Manual (1937, p. a14) contains a monthly index of new orders for "plant equipment," which provides a closer look at the changes within 1933 than the national income aggregates provide.



FIG. 2. Indexes of investment and consumption spending, 1932–1933. Solid line: investment spending; dotted line: consumer spending.

Source. Moody's, 1937, pp. a14, a20–21.

Moody's defined this index to be a combination of heavy electrical machinery and machine tools. It is "an index of demand for new plant equipment." It is shown as the solid line in Fig. 2.

The long slide down ended early in 1932, but orders for new plant equipment did not rise until a year later; orders continued to vary within a narrow band without any sustained movement up or down. This changed abruptly in the second quarter of 1933; new orders skyrocketed from their low in April to their temporary peak in August. The rise was approximately the same as that of stock prices; it was a clear break in the pattern of decline and stagnation.

Other indexes of investment spending in Moody's and Standard's behaved similarly, as did the production of consumer durables. There were different movements in March and April as firms struggled to deal with the Bank Holiday. There also were differences after July and August, when some series turned down again—although not to the level of late 1932—and others continued to rise. In all cases, the rise in the second quarter of 1933 is unmistakable (Moody's, 1937; Standard's, 1936).

International comparisons reveal the uniqueness of this American pattern. The production of investment goods in the third quarter of 1933 was between 13 and 43% above its level a year previously in six European countries. By contrast, it was 158% higher in the United States (League of Nations, 1934). Table 1 gives details for the United States and major European countries.

TABLE I  
Production of Investment Goods in Selected Countries (1932 III-100)

Country	1932 IV	1933 I	1933 II	1933 III
United States	117	113	179	258
United Kingdom	104	110	117	115
Germany	105	100	128	135
France	101	109	120	121

*Source.* League of Nations (1934, p. 130).

An index of nondurable consumer spending is shown as the dotted line in Fig. 2. It is a seasonally adjusted index of sales by department and chain stores and textile consumption, providing information about a broad range of purchases. It rises slightly in the spring of 1933, but the movement is much more gradual than the rise in investment. Consumer spending did not rise above the range of spending in late 1932 during the following year. The extreme observation in December 1932 reflects the low level of demand at Christmas 1932. In retrospect, this was the low point in (seasonally adjusted) consumer spending. The income generated by the new investment spending allowed for a more joyful holiday in 1933.

The change in expectations, therefore, stimulated business investment and expenditures on consumer durables, not consumption. Expectations changed before incomes. Those purchases that depended on expectations about the future, that is, investments, increased in the second quarter of 1933. Some incomes did rise at this time, due to devaluation and payments for investment spending. But the turnaround of expectations broadened the recovery and led to spending in anticipation of rising demand. The initial phase of the 1933 recovery was dominated by a rise in investment, caused in turn by a reversal of expectations.<sup>1</sup>

#### *Devaluation*

As Sargent noted, expectations cannot be altered without actions. We have described above how Roosevelt initiated the New Deal with great fanfare. These actions not only altered expectations; they had direct effects on the economy. In addition to their symbolic effects, therefore, we need to consider their direct effects.

This is not the place to debate the efficacy of the New Deal as a whole. It was a complex program containing elements of internal contradiction.

<sup>1</sup> Mankiw *et al.* (1987) maintained that expectations changed virtually instantaneously at the time of the founding of the Fed. We are arguing here for a similar recognition, although to a larger and more visible change in regime.

More importantly, most of the programs did not take until after the recovery was under way. The AAA and NIRA's National Recovery Administration (NRA) did not become effective until September; the FDIC did not become effective until the beginning of 1934 (Wigmore, 1987). We are seeking to explain how the recovery *started* in the spring of 1933. Only those actions with immediate effects are relevant.

The act with the most immediate impact was devaluation. Roosevelt restricted gold transactions in March and began to devalue the dollar in April. This devaluation was a primary stimulus for the industrial expansion of 1933 through its impact on commodities prices generally but most notably on farm prices. Grain and cotton prices rose as the value of the dollar fell. Farmers and the rural community looked forward to higher incomes as the higher prices for both production and inventories worked through the rural community. These people stepped up their purchases of durables accordingly, of which the most important was automobiles. This encouraged a rise in auto production, steel production, and industrial production in general. The rise in production was reflected in the stock market where the common stocks of steel, auto, farm equipment, and mail-order companies rose twice as fast as the stock market in general (Wigmore, 1985, pp. 481–489). The direct effect of devaluation cannot be completely disentangled from the impact of other policy measures such as the AAA, NRA, and banking measures, but this important link can be seen clearly in the data.

Figure 3 shows the U.S. farm price of cotton against the dollar-sterling exchange rate. The correspondence is obvious, particularly during the U.S. devaluation in 1933.<sup>2</sup> A regression of the monthly price of cotton (PRICE) on the English and French exchange rates (POUNDS and FRANCS, respectively) for 1930–1936 confirms the importance of the price of sterling. (*t*-statistics are in parentheses).

$$\begin{aligned} \text{PRICE} = & -13 + 0.14 \text{ POUNDS} + 4.95 \text{ FRANCS} \\ & (2.9) \qquad (1.8) \\ R^2 = & 0.95 \qquad N = 82 \\ \text{AR}(1) = & 0.90 \qquad \text{DW} = 1.7 \end{aligned}$$

The prices of grains behaved similarly.<sup>3</sup> Other farm prices—such as livestock, milk, fruit, and vegetables—did not respond as quickly to changes in the exchange rate; they were not traded so heavily on the

<sup>2</sup> Kindleberger (1986) argued that the British devaluation in 1931 lowered the world price of primary products, but it can be seen in the graph that the price of cotton fell well before the British abandoned the gold standard.

<sup>3</sup> The comparable regression for wheat, for example, looks exactly the same as the cotton regression, except for a slightly lower *t*-statistic for the French exchange rate and a slightly closer approach to a unit root.

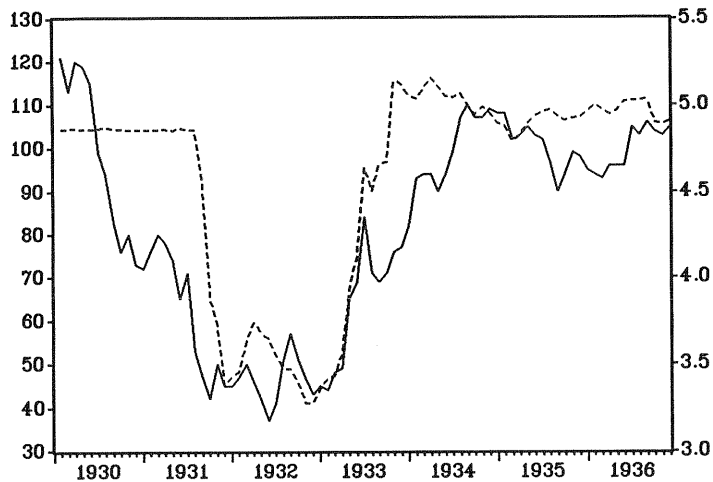


FIG. 3. The price of cotton and the exchange rate, 1930–1936. Solid line: cotton price; dotted line: value of the dollar in pounds.

Source: *Survey of Current Business*, Supplement, 1936, p. 15; Federal Reserve System, 1943, p. 681.

world market. Devaluation, therefore, brought more immediate prosperity to cotton and grain growers—and to businesses dependent on them—than to other farmers.

Auto sales in 1933 picked up from their low point in the previous year. The location of sales, of course, was determined by the income in different states, but not all income was equally likely to generate auto sales. Some farm income in 1933 came from selling stocks—which took a sharp dive in the second quarter—at inflated prices (Martin, 1937, p. 22). Rural car purchases, therefore, were in part of shift of asset holding from one form to another. In addition, a dollar of farm income represented a more permanent type of income than a dollar of wage or financial income at the depth of the depression. The rise in farm prices represented the success of groups like the Committee on the Nation that had long been advocating a new agricultural policy. The price rise clearly was the direct result of Roosevelt's policy; it, therefore, was expected to be permanent.<sup>4</sup> A dollar of farm income in 1933 was more likely than a dollar of other income to have been spent on a durable good like a car.

This hypothesis is confirmed by a cross-section regression of auto

<sup>4</sup> Even if farmers had feared competitive devaluation in April, they would have relaxed when Roosevelt destroyed the World Economic Conference in July by asserting that he would not allow the value of the dollar to rise.

TABLE 2  
Monthly Growth Rates, 1933  
(Percent per Month; Seasonally Adjusted)

Month	Autos	Steel	Industrial production	Purged industrial production
January	-02	07	00	-00
February	-29	00	-02	-01
March	-20	-26	-05	-04
April	42	46	07	04
May	18	35	16	14
June	19	35	14	11
July	14	29	10	07
August	06	-20	-05	-03
September	03	-21	-06	-05
October	-03	-09	-05	-05
November	-72	-28	-06	-01
December	03	24	01	-01

Source. Federal Reserve System (1940).

Note. Industrial production was purged of steel and autos by subtracting the indexes of those sectors times their weights in the overall index and then rebasing the index to 1935-39 = 100.

sales by state in 1933 (SALES) on gross farm income (FARM) and other income (OTHER):<sup>5</sup>

$$\text{SALES} = 8829 + 0.37 \text{ FARM} + 0.13 \text{ OTHER} \quad R^2 = 0.91$$

(7.1)                      (17.4)

A dollar of farm income generated three times as many auto sales as a dollar of nonfarm income. The gains from devaluation signaled a rise in permanent income to farmers. This rise in income was used in part to purchase a major durable good.<sup>6</sup>

Stimulated principally by farm demand, automobile production took off in the second quarter of 1933. Its growth is shown in the first column of Table 2. Automobile production, which had been declining for the first quarter of 1933, doubled in the second quarter. It grew 42% in April

<sup>5</sup> The data are from U.S. Bureau of the Census (1934, Retail Distribution, Table 1) and U.S. Department of Commerce (1936).

<sup>6</sup> The type of car sold in 1933 is consistent with this story. The rise in auto sales in 1933 was entirely in the lowest price category (under \$500). In fact, sales of more expensive cars continued to fall between 1932 and 1933 (U.S. Department of Commerce, 1940; p. 393). While it stands to reason that people would buy cheap cars at the bottom of the Depression, it is also true that farmers were much more likely to buy a basic car than one of the fancier models.

alone! Other consumer durables were similar. The automobile industry was the largest consumer of steel, taking over 20% of steel output in 1933 (*Steel*, 1934). Steel production—shown as the second column of Table 2—also rose dramatically, starting in April. But while automobile production merely slowed its rate of growth in August, steel began once again to fall. It did not, however, fall back to the same low level as at the start of 1933.

Steel production was the largest single component of the Federal Reserve's industrial production index, accounting for 10% of the total. The spectacular growth rates of steel production, therefore, pulled up industrial production as a whole. In fact, approximately two-thirds of the initial rise in industrial production was in steel: the growth rate of industrial production—the third column of Table 2—was about 15% of the growth rate of steel production in April 1933. But steel was not the only part of industrial production to rise. The final column of Table 2 shows the industrial production index purged of steel and autos. It showed the same pattern as industrial production as a whole, and almost the same magnitudes. The path of seasonally adjusted steel production and industrial productions as a whole during 1932 and 1933 are shown in Fig. 4.

These linkages can be shown more formally in a few regressions. Industrial production behaves like a random walk in this period, so we work here with rates of change. The variables in Table 3 are the same

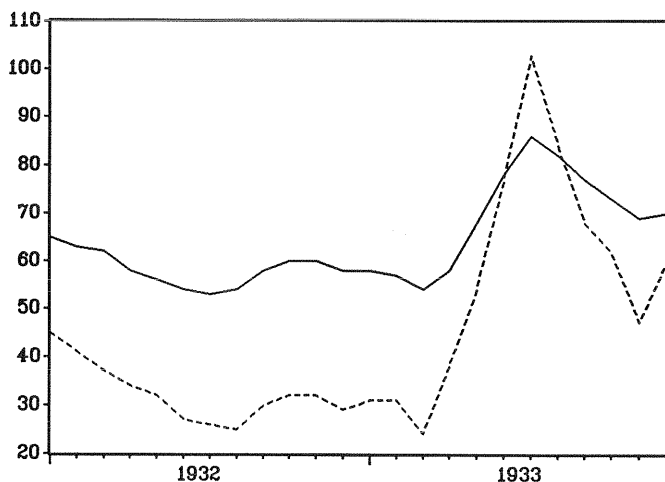


FIG. 4. Industrial and steel production indexes, 1932-1933. Solid line: industrial production index, seasonally adjusted; dotted line: index of steel production, seasonally adjusted.

Source. Federal Reserve System, 1940.



TABLE 3  
 Regressions on Monthly Rates of Growth  
 (Seasonally Adjusted, 1930–1936)

Independent variable	Industrial production	Purged industrial production
Constant	0.00	0.00
Steel production	0.20 (12.9)	0.12 (7.3)
Lagged Steel production	0.08 (5.4)	0.08 (4.9)
$R^2$	0.77	0.58
DW	1.42	1.34

as in Table 2: rates of change of seasonally adjusted indexes. The time period, however, is longer, from 1930 through 1936.

The first regression shows industrial production as a function of current and lagged steel production. The second regression shows the purged series as a function of the same variables. In both cases, the independent variables are highly significant. Current and lagged steel production account for over three-quarters of the variance in the monthly rate of growth of industrial production. They account for over half of the variance of the monthly growth rate of production other than steel and autos. The linkages between the steel industry and others are clear.

The connection between the exchange rate and industrial production through autos and steel provides only a partial explanation for the upturn in industrial production. The growth of steel production shown in Fig. 4, for example, was too precipitous to be explained fully by a rise in the demand for steel from one industry. Steel makers clearly decided that recovery was on the way and cranked up production as fast as they could. They expanded so rapidly that the rise could not be sustained, and Fig. 4 shows clearly that the growth stopped abruptly in August 1933.

Weinstein (1980), opposing De Long and Summers, suggested that the National Industrial Recovery Act, passed on the last day of the special session of Congress, could have choked off recovery by the threat of higher real wages. This seems unlikely. The National Recovery Administration was seen widely as a vehicle for raising prices, working in sympathy with devaluation. Even though costs rose as well, the price hike was popular. The NRA received almost universal support from business; about 90% of industry was estimated to be operating under codes by September 1933 (*Commercial and Financial Chronicle*, 1933, p. 2035).

We suggest instead that an apparent weakening of Roosevelt's commitment to devaluation halted the expansion. When Roosevelt ordered

the Federal Reserve to support the dollar in July, the Dow Jones Industrial Index dropped from 108 to 88 in 4 days. Commodity prices fell, and both the New York Stock Exchange and the Chicago Board of Trade temporarily restricted trading volume. The value of the dollar had become a key index of the Roosevelt administration's commitment to its new policy regime. When he hesitated, expectations fell and production faltered. Fortunately, the dollar resumed its fall and the recovery was not aborted.

### CONCLUSION

This account fills a gap in our knowledge of the Great Depression. The literature on unemployment in the 1930s and recovery at the end of the decade is now joined by an explanation of the turning point in 1933.

Sargent's view of successful stabilization policies gets support from the consideration of a successful "reflationary" policy. There was no automatic process that led to recovery in the spring of 1933, nothing in the structure of the economy that dictated that production could only fall so far and no farther. Instead, a dramatic shift in the policy regime had dramatic effects on the economy.<sup>7</sup> Investors in 1933 quickly realized that the policy regime had changed and adapted to it. While they had to be convinced by actions, the process of changing expectations was rapid.

This account also supports the international view of the depression championed by Kindleberger. Writers in the United States tend to ignore the international economy because American imports and exports are small relative to GNP. Price effects, however, depend on the degree of competition, not on the size of trade flows. The effects of price rises for agricultural goods traded on world markets rebounded through the economy. It was not that auto exports rose—although they did—but rather that the domestic demand for autos was stimulated by the change in international prices.

Eichengreen and Sachs (1985) documented the effects of devaluation within Europe. Their model, however, needs to be amended to extend to the United States. They ignored the date of devaluation by comparing exchange rates in 1929 and 1935. But the devaluing countries in their European sample—Great Britain and the Scandinavian countries—devalued in 1931, while the United States devalued in 1933. They also treated all devaluations as the same. But the British devaluation failed to usher in a new policy regime, unlike Roosevelt's action (see Cairncross and Eichengreen, 1983).

<sup>7</sup> The issue of costs does not arise, since the signs are different in deflation and inflation, but the question of speed is comparable to the cases that Sargent (1983) described.

This synthesis suggests that had the United States devalued in 1931, had it followed Britain off gold, and expanded instead of contracting, it might have been decidedly more prosperous by 1935. It might, in fact, have avoided the bottom of the Depression entirely. More explicitly, the argument that the change in regime inaugurated by FDR sparked the recovery suggests that a shift by Hoover at an earlier stage could have done the same.<sup>8</sup> The depth of the Depression, therefore, was due to the continuation of mistaken policies, not the structural instability of the interwar economy.

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<sup>8</sup> The need for credibility also suggests, however, that Hoover might not have been able to shift expectations as Roosevelt did. New policy regimes may need new faces in the White House, Treasury, and the Fed.

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