COMMUNICATIONS

PRICE-LEVEL STABILITY, PRICE FLEXIBILITY, AND FISHER'S BUSINESS CYCLE MODEL

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Introduction

In a series of recent papers, De Long and Summers (1986, 1988) argued that "increased wage and price flexibility can easily be destabilizing because of the Mundell effect." They also suggested that early studies of the Phillips Curve by Irving Fisher (1923, 1925) had reached a similar conclusion. The National Industrial Recovery Act of 1933 (NIRA) was cited as a possible example of how policies designed to reduce price flexibility could have a stabilizing effect on output.

One motivation for this paper is to show that De Long and Summers appear to have misunderstood both the implications of Fisher's business cycle model and the impact of the NIRA on the level of U.S. output. De Long and Summers have apparently confused the concept of price-level instability (i.e., erratic fluctuations in the price level) with price flexibility (the absence of constraints separating the actual price level from its Walrasian equilibrium value). Although Fisher believed that price-level *instability* was the primary cause of output fluctuations, he would not have agreed with the proposition that a reduction in price *flexibility* is stabilizing.

A second purpose of this paper is to see how Fisher's model performs in the 10 years following its original publication. Fisher (1925) developed a model in which a distributed lag of inflation rates was used to explain deviations of output from the trend during 1915–22. It will be shown that Fisher's "Phillips Curve" model continues to perform reasonably well at explaining output fluctuations until July 1933. After July 1933, output falls sharply below the level predicted

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by Fisher's model. This structural break is associated with the implementation of the NIRA. The poor performance of Fisher's model after July 1933 may help explain why the monetary approach to business cycles, which was dominant during the 1920s, was virtually abandoned after the mid-1930s.

Fisher's Model of the Business Cycle

Fisher saw the business cycle as largely a "dance of the dollar." He differed from most modern researchers, however, by his assumption that the causality ran strictly from prices to output.[1] In his model, price fluctuations affected output because "When producers get higher prices, they do not at first have to pay higher wages and salaries" (Fisher 1925, p. 180). Another difference between Fisher's model and more recent models featuring sticky wages is that Fisher did not assume rational (or even adaptive) expectations.[2] During the early 1930s, Fisher began to stress the impact of deflation on debt burdens as an important factor in the rise in bankruptcies and unemployment.

Figure 1 is reprinted from Fisher's 1925 paper. It shows trend-adjusted output (T) and a distributed lag of inflation rates ($\overline{P}'$) extending over 114 months. The reported correlation is .941. (See the Appendix for a detailed description of Figures 1 and 2.) Using a similar technique, Fisher found somewhat lower price-output correlations during earlier periods of U.S. history.

Although Fisher was the first economist to provide a mathematical representation of the Phillips Curve, the idea of a short-run tradeoff between inflation and output was an essential part of macroeconomic theory during the 1920s. A number of contemporary economists, including Keynes (1923), Cassel (1922), Pigou (1927), Hawtrey (1923), and Robertson (1922), saw price instability as a major cause of the business cycle.[3] This view led many of these economists to recommend that monetary policy be directed toward the goal of

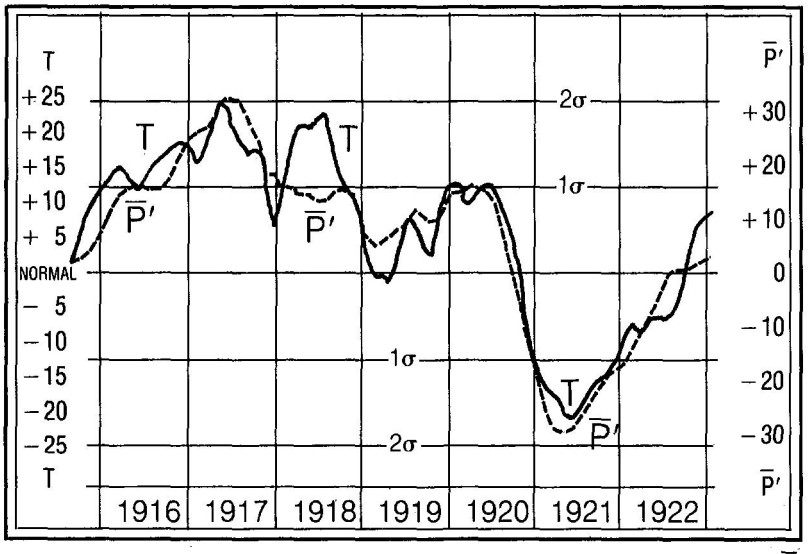
[1]Fisher (1925, p. 186) rejects the idea of estimating the correlation between changes in current output and future inflation on the grounds that this "would involve the apparent absurdity of bringing some of the effects earlier than their supposed cause."

[2]Fisher was familiar with adaptive expectations, having used this concept in his work on nominal interest rates. The fact that Fisher's model performed as well as it did during the interwar years may be due to the fact that the expected rate of inflation was probably close to zero under the gold standard.

[3]Pigou (1927) estimated that approximately one-half of the output variability was caused by price-level fluctuations.

FIGURE 1

TREND-ADJUSTED OUTPUT AND DISTRIBUTED LAG OF INFLATION RATES OVER 114 MONTHS



NOTE: T represents the volume of trade or the trend-adjusted output; $\bar{P}'$ represents a distributed lag of monthly inflation rates.

SOURCE: Fisher (1925, p. 188).

price-level stabilization.[4] Wage and price controls were not regarded as an effective substitute for monetary stability.

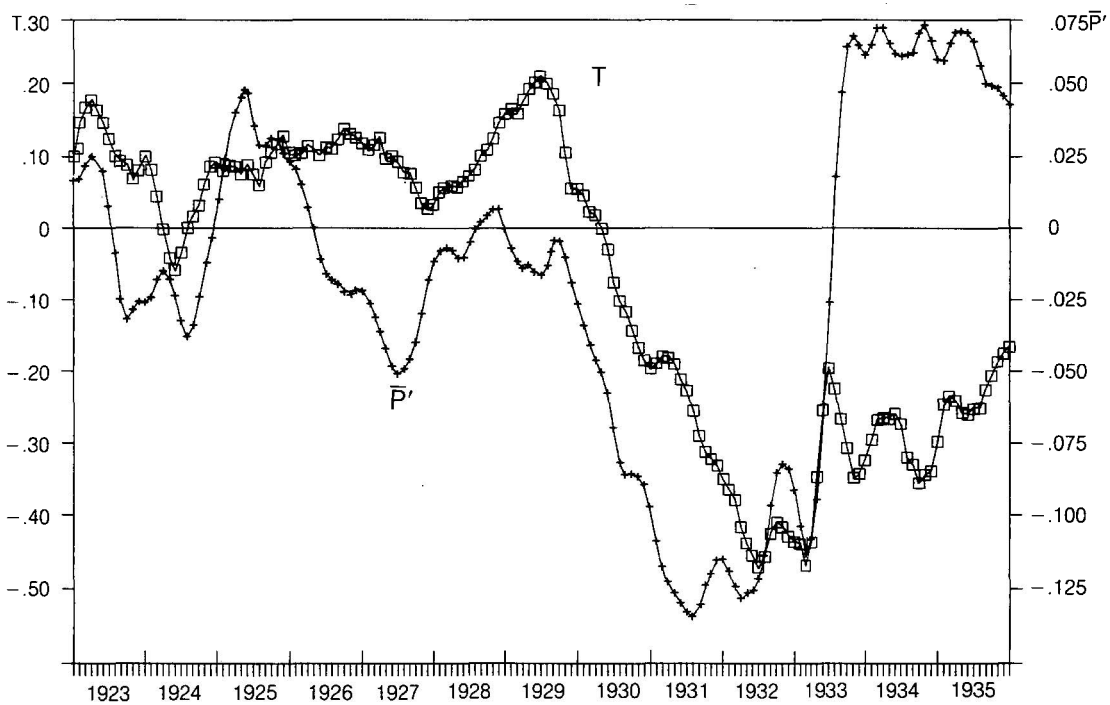
After the mid-1930s there was a sharp decline in interest in proposals to stabilize the price level. To see why the neoclassical macroeconomics of the 1920s was eclipsed by Keynesian economics, one might find it helpful to see how well Fisher's model explained output fluctuations in the period leading up to the 1936 publication of the *General Theory*.

Figure 2 shows the result of updating Fisher's model to the 1923–35 period. The correlation between the predicted and the actual output series was only .256. This low correlation, however, is somewhat misleading since, during the decade from January 1923 through July 1933, the correlation was .851. The variability of output

[4]Both Hawtrey and Cassel proposed the use of central bank cooperation under a gold exchange standard. Keynes and Wicksell preferred a completely managed fiat currency. Fisher's "Compensated Dollar Plan" would have adjusted the price of gold inversely to changes in the price level.

FIGURE 2

DEVIATIONS OF INDUSTRIAL PRODUCTION FROM TREND (T) AND DISTRIBUTED LAG OF MONTHLY INFLATION RATES ($\bar{P}'$), 1923–35



in that decade was somewhat higher relative to the variability of inflation than was the case during 1915–22, but the qualitative similarities between the two periods would suggest no apparent reason for rejecting Fisher's model.

The model also predicts a rapid recovery from the depression during 1933. Industrial production did rise by almost 50 percent during the first half of 1933—a much sharper rebound than occurred during the early stages of recovery from the 1920–22 depression. After July 1933, however, the economic recovery stalled and industrial production did not return to its July levels until August 1935.

One of the more unusual aspects of the U.S. economy during 1933 was the rapid increase in the price level during a time when output was far below capacity. McCloskey and Zecher (1984) compared weekly changes in the foreign exchange value of the dollar with wholesale prices; they argued persuasively that the inflation that occurred during the spring of 1933 was caused by a depreciation in the dollar.

De Long and Summers suggest that the NIRA helped increase prices during 1933. If so, then its major impact could not have occurred before June or July. The NIRA was passed on June 16 and was first implemented on July 15. The impact of the NIRA codes shows up most clearly in the Bureau of Labor Statistics' aggregate wage series (see Table 1). Note that the aggregate wage rate rose 22 percent (19 percent in real terms) between July and September 1933. It seems clear that only governmental intervention in the labor market could have produced such a large increase in wages during a period of 25 percent unemployment.

This sharp increase in real wages was associated with a dramatic slowdown in industrial production. During the first half of 1933 industrial production had increased simultaneously with the price level. After the adoption of the NIRA codes, however, industrial production dropped sharply while prices continued to increase.

In retrospect, it is not surprising that De Long and Summers viewed Fisher as a supporter of New Deal attempts at reducing price flexibility. Fisher argued that, under most circumstances, monetary policy should aim at price-level stabilization. After the sharp deflation of 1929–33, Fisher felt that some degree of reflation was necessary before prices were stabilized. In fact, Fisher was an enthusiastic supporter of President Roosevelt's policy of reflation.

As previously noted, however, the primary cause of rising prices during 1933 appears to have been the devaluation of the dollar. Unlike wage-price controls, this action was not inconsistent with Fisher's free-market ideology. Thus, although in 1933 Fisher clearly

TABLE 1

SELECTED ECONOMIC INDICATORS, MONTHLY, 1933

Month	Exchange Rate[a]	WPI[b]	Industrial Production[c]	Average Wages[d]
January	3.361	61.0	30.8	.406
February	3.422	59.8	30.7	.404
March	3.433	60.2	29.0	.405
April	3.579	60.4	31.0	.401
May	3.932	62.7	36.2	.398
June	4.136	65.0	41.6	.394
July	4.650	68.9	45.3	.399
August	4.503	69.5	43.5	.459
September	4.665	70.8	41.2	.488
October	4.668	71.2	38.9	.493
November	5.150	71.1	36.7	.496
December	5.116	70.8	37.0	.503

[a]Exchange Rate = Dollar Price of Pounds, from the *Federal Reserve Bulletin.*
[b]WPI = Wholesale Price Index as measured by the *Bureau of Labor Statistics,* (1926 = 100).
[c]Industrial Production is taken from the *Federal Reserve Bulletin,* (1947–49 = 100).
[d]Average Wages = Production-Worker Average Hourly Earnings (in dollars) from *Employment and Earnings.*

favored reflation and then price-level stabilization, he also argued that "the introduction of codes under the NRA, as well as the processing of taxes under the AAA, seemed to have a deterrent effect upon the activities of industry" (Fisher 1934, p. 362). Fisher favored price-level *stability* but not price *inflexibility.*

Fisher employed a quantity theoretic framework to analyze changes in the price level. While subsequent Keynesian theorists argued that monetary policy was ineffective during the Great Depression, Fisher believed that the 1929–33 deflation could have been averted by a more expansionary monetary policy. In fact, Fisher (1933, p. 347) believed that such a policy would have been adopted "had Governor Strong of the Federal Reserve Bank of New York lived, or had his policies been embraced by other banks and the Federal Reserve Board and pursued consistently after his death."

Fisher was also aware that the constraints imposed by the international gold standard could at times prevent the monetary authority from taking the steps necessary to stabilize the price level. He, there-

fore, proposed a "Compensated Dollar Plan" whereby the value of the dollar would be adjusted each month in proportion to changes in the price level (i.e., the price of gold would be adjusted inversely with the price level). One of the reasons why Fisher was so supportive of Roosevelt's policies was that the devaluation of 1933 in a sense represented a belated implementation of the Compensated Dollar Plan.

Conclusion

The view that price-level instability is an important source of output fluctuations was a key element of pre-Keynesian macroeconomic theory. By using Fisher's Phillips Curve model to predict output fluctuations over the period from 1923 to 1935, we can gain insights into the events that led to the Keynesian revolution. Fisher's model provides no explanation for the relatively low level of production from mid-1933 to mid-1935. There is circumstantial evidence that the adoption of the NIRA in June 1933 helped abort a vigorous economic recovery that was already under way.[5]

Although it appears that De Long and Summers were incorrect in suggesting that the NIRA might have had a stabilizing impact, this fact should not be interpreted as a rejection of their model. They noted that on theoretical grounds the NIRA's effect was ambiguous and that "The NIRA's encouragement of cartelization may have had contractionary macroeconomic effects" (De Long and Summers 1986, p. 1043). Neither should the fact that the adoption of NIRA codes was associated with a pause in the recovery be construed as ruling out other contributing factors that may have delayed recovery, such as trade wars or bank panics.

In a subsequent paper, De Long and Summers (1988) argued that recovery occurred after the *announcement* of the NRA. As noted earlier, the weekly data examined by McCloskey and Zecher show a clear relationship between inflation and devaluation. With respect to wages (a nontraded good), the impact of the NIRA does not occur until after July.

De Long and Summers (1988) also stated that "In an accounting sense *all* of the Great Depression was due to a collapse in monetary velocity that cannot implausibly be traced to deflation; recall that real broad money balances (M2) did not decline between 1929 and 1932" (p. 275). It is true that all four components of the quantity equation declined by approximately one-third between 1929 and

[5]Weinstein (1980) reached a similar conclusion.

1933. But if prices had been artificially restrained from declining after 1929, then, holding Federal Reserve policy constant, real money balances would have declined sharply.[6] Thus, their observation has no bearing on the stabilizing properties of price flexibility.

A more serious problem with their argument is that De Long and Summers seem to repeatedly confuse price flexibility with price instability. For instance, in the 1988 paper they cite evidence from earlier studies showing that price shocks affect future output movements. This finding is consistent with numerous conventional macro models, including new classical models where unperceived price-level changes affect output (with a lag caused by adjustment costs), as well as "Keynesian" models featuring the sort of wage rigidities described by Fischer (1977).[7]

Appendix

In his 1925 paper, Irving Fisher used a detrended, seasonally adjusted index of output (T) that was computed by Warren M. Persons. The Wholesale Price Index published by the Bureau of Labor Statistics was used to calculate the inflation rate. The monthly inflation rate was defined as the percentage change between the last period's price level and the next period's price level, multiplied by six. The distributed lag of inflation rates was derived by taking a weighted average of 114 lags of the inflation rate. The distribution of weights is approximately normal when the time axis is transformed logarithmically.

In updating Fisher's model to the 1923–35 period, I used the seasonally adjusted industrial production series computed by the Board of Governors of the Federal Reserve System. The output series shown in Figure 2 represents the percentage difference between actual industrial production and its predicted value derived by regressing monthly industrial production on time, over the 1913–46 period. Since the sample period ends in the middle of the Great Depression, the series was detrended over a period including several business cycles. I also attempted to use the same weights on lagged inflation as in Fisher's 1925 paper. However, as Fisher was somewhat vague regarding his methodology, there may be some slight differences.

[6]One could, of course, argue that had deflation not occurred, then the money multiplier, and therefore M2, would not have declined. This argument would not apply, however, to deflations accompanied by sharp drops in the monetary base, as occurred during 1920–21.

[7]Although Fischer's model is usually regarded as "Keynesian," it is clearly much closer to the pre-Keynesian models of Fisher and Pigou.

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