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Irving Fisher's Debt-Deflation Theory of Great Depressions*

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The eminent Yale monetary and capital theorist Irving Fisher is best known in the economics profession for the equation of exchange, the distinction between real and nominal interest rates, and an early analysis of intertemporal allocation. In fact, his contributions as an early macroeconomist were extensive, and his debt-deflation theory of depression both deserves and implicitly gets consideration currently. It is Fisher's misfortune, as well as that of the profession, that his analysis of the debt-deflation process, one of his most insightful contributions to macroeconomics, received little notice from his contemporaries.

Fisher has acquired lasting and unenviable fame for his predictions in September 1929 that "stock prices have reached what looks like a permanently high plateau" (Barber, 1985, p. 77) and for the consequences to Fisher of his predictive error. As John Kenneth Galbraith (1977, p. 192) remarked, "In the late nineteen-twenties Fisher went heavily into the stock market and in the Crash lost between eight and ten million dollars. This was a sizable sum, even for an economics professor." Fisher was known for this even to those, such as Robert Sobel (1968, pp. 97, 132), whose direct knowledge of Fisher and his work was vague enough to identify him as "Irving Fisher of Harvard." Kathryn Dominguez, Ray Fair, and Matthew Shapiro (1988) have now shown that even using modern statistical techniques and adding some retrospectively compiled time series to those available to Fisher and to the Harvard Economic Society, it would not have been possible to predict the onset, length or depth of the Great Depression by time-series analysis.

Dominguez, Fair, and Shapiro have done much to redeem Fisher's reputation as a forecaster relative to that of, for example, Roger Babson, whose successful prediction of a break in stock prices in the

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fall of 1929 must be balanced against his prediction of a stock price boom in 1930. If one views the bull market of the 1920s as a speculative bubble, all that could be predicted is that the bubble would eventually burst, not when.

Indeed, Fisher's formal statistical forecasting method, as distinct from his more subjective statements about future stock prices, held up quite well. In a series of journal articles, Fisher (1923, 1925, 1926) sought empirical verification of his monetary theory of economic fluctuations by correlating output and unemployment with a distributed lag of past changes in the price level (see Dimand, 1992). He was an innovator in the use of correlation analysis and distributed lags, and constructed his own price indices. His 1926 article was republished in 1973 as "I Discovered the Phillips Curve." Fisher (1925) found a correlation of .941 between a trend-adjusted measure of the volume of trade and a distributed lag of monthly inflation rates for the 114 months ending January 1923. Scott Sumner (1990) has found that, using the lag weights from Fisher's 1925 paper, Fisher's equation yielded a correlation of .851 for the period from January 1923 to July 1933, a close out-of-sample fit. The stable relationship between output and inflation collapsed only with the economic policy regime change after Franklin Roosevelt's inauguration, when the United States left the fixed gold value of the dollar for what Maynard Keynes termed "a gold standard on the booze" and U. S. output recovered sharply. Thus "updating Fisher's model to the 1923-35 period," Sumner found that "The correlation between the predicted and the actual output series was only .256" because of the structural change in 1933 (1990, p. 721).

Fisher's Audience

Apart from the regrettable impact on his personal finances, the stock market crash and subsequent depression had two important consequences for Fisher as a theorist of economic fluctuations. Fisher's attention was focused on a gap in his analysis in the 1920s of the business cycle as "a dance of the dollar": the need to explain why sometimes a deep and lasting depression occurred. He offered a brilliant solution of this puzzle in *Booms and Depressions* (1932) and "The Debt-Deflation Theory of Great Depressions" (1933). Secondly, his mistaken stock market predictions and the attention attracted by books by Keynes and Friedrich Hayek combined to take away Fisher's audience just when he had something important to tell it.

Patrick Deutscher (1990, pp. 188-94) analyzed citations in articles listed under “Aggregative and Monetary Theory and Cycles” and the nonhistorical categories of “Money, Credit and Banking” in the American Economic Association *Index of Economic Journals*. Fisher was the most cited macroeconomist in 1920-30, cited in 30 articles, compared to 24 citations for second-ranked Wesley Clair Mitchell and 9 for tenth-ranked John Maynard Keynes (mostly references to *A Tract on Monetary Reform*, 1923). In 1931-35, after the publication of *A Treatise on Money* by Keynes (1930) and *Prices and Production* (1931) by Hayek, Fisher was tied with Ralph Hawtrey for fourth most cited macroeconomist with 30 citations, behind Keynes (66), Dennis Robertson (44), and Hayek (33). The temporary seizure of the profession’s attention by Keynes’s *Treatise* has been discussed by Dimand (1989). For 1936-39, after Keynes’s *General Theory* (1936), Fisher was tied with Ragnar Frisch, Simon Kuznets, and Gunnar Myrdal for sixteenth most cited macroeconomist with 13 mentions, compared to 125 articles citing Keynes. Fisher did not make Deutscher’s list of the ten most frequently cited macroeconomists of 1940-44 (actually eleven, because of tie for tenth place between Kuznets and Abba Lerner). The effect of Keynes’s books in diverting attention from Fisher is ironic, in view of the ten references to Fisher in the index of the *Treatise* (two to passages of six or seven pages) and three in that of the *General Theory*. Keynes, writing from Bretton Woods in July 1944 in reply to Fisher’s praise of his world bank proposal, told Fisher that “You were one of my earliest teachers on these matters and nothing is more satisfactory to any of us than to satisfy one of those from whom we have learned” (I. N. Fisher, 1956, p. 326).

Fisher’s decline from first place to disappearance from the list is even more striking when it is noted that Deutscher’s tabulation excludes the *IEJ* categories of index numbers and interest. In Deutscher’s first period, in which Fisher published *The Making of Index Numbers* (1922a), the *Index of Economic Journals* records an article by Warren Persons on “Fisher’s Formula for Index Numbers” in the *Review of Economic Statistics* (1921), a 23-page review article of Fisher (1922a) by Allyn A. Young in the *Quarterly Journal of Economics*, a review article by Carl Snyder in the *American Economic Review*, and replies by Fisher to Young (in 14 pages), to Snyder, and to reviews by A. L. Bowley in the *Economic Journal* (with a reply by Bowley) and by G. Udny Yule in the *Journal of the Royal Statistical Society*. Fisher’s *The*

Theory of Interest (1930), a revision of his *The Rate of Interest* (1907), received an 18 page review essay by Gottfried Haberler in the *Quarterly Journal of Economics*, one of 37 pages by Frank Knight in the *Journal of Political Economy*, and one of 14 pages by Arthur W. Marget in German in the *Zeitschrift für Nationalökonomie*, all in 1931. After 1931, there were no more review articles on Fisher, apart from six pages by B. P. Adarkar on "Fisher's Real Rate Doctrine" (concerning Fisher, 1930) in the *Economic Journal* in 1934.

This extensive attention to slightly earlier writings of Fisher contrasts sharply with the reception of his *Booms and Depressions*. Harold Barger, of University College, London, reviewed it jointly with another book in the *Economic Journal*, allotting one paragraph to each. Barger rejected Fisher's debt-deflation theory in a single sentence as being at once nothing new and a deplorable innovation: "What little theory it contains is in no way novel, while Professor Fisher's contentment with price stability as a policy, and emphasis on over-indebtedness rather than over-investment as the root of all evil, are not encouraging" (1933, p. 681). In place of Fisher's concern with debt, Barger took it to be obvious that analysis should focus on overinvestment, the neo-Austrian/London School of Economics concept of the lengthening of the average period of production during a boom. Since Fisher (1907) had already shown that there may be multiple solutions for the average period of production and given a numerical example of reswitching of techniques (see K. Velupillai, 1975), this alternative would have had little appeal for him.

The Lessons of Monetary Experience, a volume of essays presented to Fisher on his seventieth birthday in 1937, offered an opportunity to offset the lack of attention given Fisher's post-1930 work, but the letter of invitation to contributors specified, presumably in accordance with the wishes of Fisher: "All contributors are asked merely to present scientific opinions on the lessons of recent monetary policies. Under no circumstances is it contemplated to include any eulogies of Professor Fisher's work. The only reference to him will be in the dedication of this book" (Gayer, 1937, p. vi). Fisher was not mentioned in A. L. Macfie's *Theories of the Trade Cycle* (1934). Fisher's writings, including those on the debt-deflation theory of depressions, were listed in the select bibliography of Raymond Saulnier's *Contemporary Monetary Theory* (1938), but his name did not appear in the index to the book and appeared in the text only in a footnote appended to the discussion of Hawtrey (Saulnier, 1938, pp. 77-78n.).

Diagnosis of the Depression

Fisher addressed the American Association for the Advancement of Science in New Orleans on the first day of 1932 on the subject of "The Debt-Deflation Theory of Depressions," on which he had lectured at Yale in 1931. With the word "Great" inserted before "Depressions" in the title, a revised version of this paper appeared in the first volume of *Econometrica* in October 1933 and in the *Review of the International Statistical Institute* the following January. As Fisher was the founding president of the Econometrics Society, this paper took the place of a presidential address. In these journals the theory would be offered for the consideration of the most technically sophisticated segment of the economics profession. Extended into a book with historical material, a literature survey, and appendixes, Fisher's theory was presented to the general public as *Booms and Depressions* in the fall of 1932.

Even before publishing his theory, Fisher expounded "the debt disease" to the House Ways and Means Committee at the end of April 1932. As an exposition to an official body of a new theory aimed at understanding and curing current economic problems, Fisher's presentation can be compared only to Keynes's private evidence on his forthcoming *Treatise on Money* to the Macmillan Committee in 1930. Fisher explained to the Congressmen that "When you have this overindebtedness, and people try to get out of debt by liquidating . . . it causes distressed selling and the contraction of the currency, and therefore a fall in prices," increasing the real burden of debts. In the absence of a policy of reflation through monetary expansion, the economy lacked any automatic mechanism to stop the debt-deflation (Barber, 1985, pp. 160-61).

Fisher rejected "The old and apparently still persistent notion of 'the' business cycle, as a single, simple, self-generating cycle (analogous to that of a pendulum swinging under influence of the single force of gravity)" as "a myth" (1933, pp. 338-41). He found some grain of truth in most of the cycle theories, which he had reviewed (Fisher, 1932, ch. VI), but often only a small one: "as explanations of the so-called business cycle, or cycles, when they are really serious, I doubt the adequacy of over-production, under-consumption, over-capacity, price-dislocation, maladjustment between agricultural and industrial prices, over-confidence, over-investment, over-saving, over-spending, and the discrepancy between saving and investment." Instead, he stressed two dominant factors in serious depressions: "over-

indebtedness to start with and *deflation* following soon after.” Over-investment and over-speculation mattered when carried on with borrowed money, over-confidence “when, as, and if, it beguiles its victims into debt.” He held that this was the explanation of why business contractions occasionally became deep depressions: “if debt and deflation are absent, other disturbances are powerless to bring on crises comparable in severity to those of 1837, 1873, or 1929-33.”

Changes in the real value of inside debt would generally be neglected in later discussions of what came to known as the Pigou-Haberler real balance effect as being transfers which do not affect aggregate wealth. Fisher, in contrast, emphasized the effect of the real value of nominal debt of changes in the price level that had not been anticipated when the debt was contracted. The possibility of bankruptcy created an asymmetry between the effect of falling prices and of rising prices. The bankruptcies and, even more, the fear of bankruptcy and loan default induced by falling prices and excessive nominal debts would increase risk premia on loans, lead to withdrawal of uninsured deposits from banks with loan portfolios considered in danger of default, and cause liquidation of assets and repayment of loans, all of which would depress asset prices and contract the money supply. The attempt to restore liquidity by selling assets to repay loans and increase bank reserves would be self-defeating, warned Fisher: “By March, 1933, liquidation had reduced the debts about 20 percent, but had increased the dollar about 75 percent, so that the *real* debt, that is debt measured in terms of commodities, was increased about 40 percent” (1933, p. 346).

Fisher summarized the process expounded in Chapters II and III of *Booms and Depressions* in nine links. First, debt liquidation, resulting from some random shock such as the bursting of a bubble in stock prices, “leads to *distress selling* and to (2) *Contraction of deposit currency*, as bank loans are paid off, and to a slowing down of velocity of circulation,” so that (3) the price level drops, causing “(4) *A still greater fall in the net worths of business*, precipitating bankruptcies.” Profits are reduced (5), so that firms curtail production and employment (6). “These losses, bankruptcies, and unemployment, lead to (7) *Pessimism and loss of confidence*, which in turn lead to (8) *Hoarding and slowing down still more the velocity of circulation*.” The ninth link was “a fall in the nominal, or money, rates and a rise in the real, or commodity, rates of interest” (Fisher, 1933, p. 342).

It is noteworthy that Fisher's analysis predicts contraction of the money supply during the debt-deflation process without the monetary base having fallen, due to repayment of bank loans and loss of confidence, which causes both banks and the public to hoard cash. This is consistent with U. S. experience during the Great Depression, in which the money supply fell by about a third while the monetary base rose.

These things would only occur "Assuming, as above stated, that this fall of prices is not interfered with by reflation or otherwise." Turning to the policy implications of his analysis, Fisher insisted that

Those who imagine that Roosevelt's avowed reflation is not the cause of our recovery but that we had "reached the bottom anyway" are very much mistaken . . . If reflation can now so easily and quickly reverse the deadly down-swing of deflation after nearly four years, when it was gathering increased momentum, it would have been still easier, and at any time, to have stopped it earlier. In fact, under President Hoover, recovery was apparently well started by the Federal Reserve open-market purchases, which revived prices and business from May to September 1932. The efforts were not kept up and recovery was stopped by various circumstances, including the political "campaign of fear" (1933, pp. 346-47).

Fisher's support for reflation — raising the price level back to its previous level — and price stabilization is opposed to the neo-Austrian view of Lionel Robbins (1934) and Murray Rothbard (1975) that falling prices would bring about needed readjustment, lower wage rates would restore full employment, and a growing economy should have falling prices. Rothbard (1975, pp. 157-63, 272-74) is particularly critical of Fisher's views on reflation and stabilization, although it was Hawtrey rather than Fisher whom he named as "one of the evil geniuses" of the stabilizationists. Fisher's emphatic endorsement, in his 1933 article and in several other publications, of Roosevelt's monetary expansion, which raised the price of an ounce of gold from \$20.67 in several erratic jumps to \$35, contradicts the claim by Fisher's associate Hans Cohnsen (1991, p. 827) that Fisher was an opponent of what Cohnsen regards as "Roosevelt's Marxist economic measures." Fisher's opposition to the National Recovery Administration's scheme of raising prices by restricting output (Sumner, 1990, p. 724) was offset by his support for devaluing the dollar against gold. Among Yale's full professors of economics, Fisher and his closest former student, James Harvey Rogers, a special adviser to the Roosevelt administration, stood apart

from the anti-New Deal views of Fred Fairchild, Edgar Furniss, and Norman Buck (see Fairchild, Furniss, Buck, and Whelden, 1935; and W. R. Allen, 1977).

Fisher's concern about deflation causing bankruptcy and the fear of bankruptcy parallels that expressed by Maynard Keynes (1931, p. 33; 1973, Vol. XIII, p. 361) in his Harris Foundation lectures at the University of Chicago in 1931 (see Dimand, 1991). Keynes opposed the wage and price deflation advocated by O. M. W. Sprague of Harvard, then economic adviser to the Bank of England and later to the U. S. Treasury, on the grounds that "all this financial structure would be deranged by the adoption of Dr Sprague's proposal. A widespread bankruptcy, default, and repudiation of bonds would necessarily ensue." A drastic rise in the real value of inside debt would have depressing consequences, such as higher risk premia, increased liquidity preference (increased hoarding in Fisher's terms), and disruption of the financial structure. These effects would be likely to exceed the stimulative real balance effect of a higher real value of outside money (of which Keynes was well aware by 1925 at the latest — see Presley, 1986).

Keynes argued, in Chapter 19 of the *General Theory*, that increased downward flexibility of wages and prices would eliminate unemployment. Even though an economy with a given stock of (outside) money and a given price level would have a larger real aggregate effective demand for output than another economy with the same money stock and a higher price level, it does not follow that swiftly falling prices will stimulate aggregate demand. Keynes and Fisher agreed on the contractionary effect of deflation when there are nominal debts, and on the role of fear of bankruptcy in raising real interest rates and disrupting the financial system. In addition, as emphasized by Robert Mundell (1963), the higher real return on holding money during deflation would cause a contractionary increase in demand for real money balances. James Tobin noted what he termed the Fisher effect on spending of transferring wealth from debtors to creditors through lower prices: "Debtors have borrowed for good reasons, most of which indicate a high marginal propensity to spend from wealth or from current income or from any liquid resources they can command" (1980, p. 10). Fisher's account of the debt-deflation process (1932, 1933) and Keynes's analysis of the contractionary potential of deflation (1936, ch. 19) have been taken up by contemporary macroeconomists, with Tobin (1975, 1980) and J. Bradford De Long and Lawrence Summers

(1986) emphasizing the implications for aggregate demand and Hyman Minsky (1975, pp. 64, 126; 1982; 1986, pp. 172, 177) stressing the fragility of the financial system.

The Experience Of The 1920s And 1930s

The experience of the 1920-21 deflation and recession helped shape analysis of the Great Depression. Britain began a contractionary monetary policy to raise the pound sterling from its 1920 low of \$3.20 towards its prewar parity of \$4.86, which was finally reached in 1925, even though the United States was itself undergoing a sharp deflation at the time. A. W. Phillips records that in the United Kingdom unemployment rose from 2.6 percent in 1920 to 17.0 percent in 1921 and 14.3 percent in 1922, while wage rates declined by 22.2 percent in 1921 and 19.1 percent in 1922, and the cost of living index fell by 12.8 percent in 1921 — largely a result of falling import prices — and 17.5 percent in 1922 (1958, p. 115). Phillips was concerned to explain changes in wage rates by unemployment and cost of living changes. From the point of view of Fisher (1926), concerned with explaining unemployment, these figures suggest that the unemployment of this period cannot be blamed on downward rigidity of either money or real wages. Rapid wage deflation did not eliminate British unemployment in the early 1920s, contrary to what the analysis of Edwin Cannan (1932, 1933) and Robbins (1934) would have predicted. This experience was also inconsistent with the argument in Keynes's *General Theory* (1936, ch. 2) that real wages are countercyclical, a claim that Keynes (1939) abandoned in the face of evidence advanced by John Dunlop, Michal Kalecki, and Lorie Tarshis. Because the 1921 drop in the cost of living largely reflected lower import prices, as the exchange value of sterling rose, the decline in the product wage, the real wage cost to firms, would have exceeded the decline in the purchasing power of money wages. The 1921-22 British experience of high unemployment and falling real wages recurred in many countries in the Depression: real weekly earnings in manufacturing in 1932 were 15 percent lower than in 1929 in Germany, 14 percent lower in the United States (Temin 1989, p. 121).

If rapidly falling British wage rates in 1921 and 1922 did not prevent high unemployment during deflation, what was the link from deflation to output and employment? Keynes drew attention in his *Tract on Monetary Reform* (1923) to the inability to reduce money interest rates below zero, if money is costless to store, so that deflation raises real

interest rates, and to the existence of outstanding nominal contracts. On the latter point, he drew attention to an article by Fisher (1922b) estimating the average maturity of outstanding nominal contracts (about a year). Fisher's article had appeared in the *Manchester Guardian Commercial's* series of supplements on "Reconstruction in Europe." Keynes had edited the supplements and based his *Tract* on four of his articles in the series. Keynes (1936, ch. 2) considered one particular variety of unexpired nominal contract, staggered money wage bargains when workers care about relative wages, as an explanation of involuntary unemployment and of the real effects of demand stimulus. Fisher (1932, 1933) went further in exploring how the existence of unexpired contracts in money terms, typified by debts, provided a channel for price changes to affect real spending. The larger the outstanding volume of nominal debts and other contracts in money terms, the more sensitive real spending would be to changes in expected prices, and hence changes in the perceived real burden of debts and real value of assets.

This dependence of the sensitivity of real spending to price changes on the extent of nominal indebtedness is the key to the debt-deflation theory of great depressions. Peter Temin (1989, p. 59) expressed skepticism about the "premise that the deflation caused the Depression" because the United States experienced a decline of wholesale prices by about one quarter over each of the two year periods 1920-21 and 1929-30, yet the Depression did not begin in 1921. (Britain did experience high unemployment throughout the 1920s, dipping below 10 percent in only one year, but the British deflation in 1921-22 was more severe than that in the U.S. because of the exchange appreciation.) Fisher's predictions in 1929 and 1930, as well as those of the Harvard Economic Service, reflected recollection of the briefness and mildness of the 1921 American recession. Fisher (1932, 1933) was able to explain why his earlier predictions were wrong and why the deflation of 1929-30 was followed by so much more economic disruption than a similar amount of deflation in 1920-21: the growth of nominal indebtedness associated with the intervening stock boom.

Fisher (1932, ch. VII) attempted to measure "The Over-Indebtedness that led to the World Depression." He found the growth of debt closely linked to margin buying of stocks beginning in 1923, and noted that "All security loans (loans with negotiable securities as collateral), increased from October 3, 1928, to October 4, 1929, by 36 percent and reached on that date a peak just under 17 billions" (1932, pp. 72-73,

81). Urban mortgages tripled to \$37 billion from 1920 to 1929, and commercial bank loans rose 50 percent to \$39 billion from 1922 to 1929, even though commodity prices remained roughly constant from 1923 to 1929, after their sharp drop in 1921. The deflation following the stock market crash of October 1929 had a greater effect on real spending than the deflation of 1921 had because nominal debt was much greater in 1929, including debt secured by stocks.¹

A Fisher Model Of Deflation and Depression

For Fisher, the sensitivity of real expenditure to deflation depended on the extent of nominal indebtedness. The importance of his approach can be seen clearly in the context of a three-equation model used by James Tobin (1975). Tobin called the model the Walras-Keynes-Phillips (or WKP) model, but, although it captures the concern of Keynes (1936, ch. 19) that increased wage and price flexibility might be destabilizing, it has more to do with Fisher than with Keynes or Phillips. Tobin (1975, p. 198) posited desired real aggregate expenditure E as a function, given the money stock M , of the price level p , expected inflation x^2 , and real income Y , so that $E = E(p, x, Y)$. He included in the model a “Phillips curve” equation relating the output gap ($Y - Y^*$) to the gap between actual and expected inflation, and he assumed that expected inflation adjusts adaptively to the difference between actual and expected inflation. Tobin remarked that “I do not mean necessarily to associate myself — much less Keynes! — with the natural-rate hypothesis in all its power and glory.” Fisher, however, as a believer in the long-run neutrality of money, would not have objected to association with the natural-rate hypothesis (that $Y = Y^*$ when inflation is correctly expected, and Y^* is independent of the inflation rate). Tobin’s equation 2.2.1, the “Phillips curve” linking the output gap to unexpected inflation, recalls the correlation of output and a distributed lag of price changes in Fisher (1923, 1925), not the dependence of wage changes on unemployment in Phillips (1958). The adaptive expectations hypothesis, Tobin’s equation 2.3.1, is consistent

¹That the stock crash of October 1929 was not followed by a depression may be explained by the concerted central bank response to the crash, in an institutional setting of deposit insurance and restrictions on margin buying of stocks.

²Because of the “flow Pigou effect,” the consumption effect of expected capital gains on money holdings, $-xM/p$.

with the practice of Fisher, who, after explaining the dependence of money interest rates on expected inflation, correlated money interest rates with a distributed lag of past price changes in *The Theory of Interest* (1930). Neither Keynes nor Phillips used adaptive expectations. The Walrasian aspect of Tobin's WKP model was equation 2.1.1, which made the rate of change of output a function of excess demand $E - Y$, in place of the more Marshallian assumption that the rate of change of prices depends on $E - Y$. Since the "Phillips curve" (2.2.1) and adaptive expectations (2.3.1) are Fisherian, and the choice of variables to explain E in 2.1.1 fits Fisher (1932, 1933), the Walras-Keynes-Phillips model would be better termed a "Fisher model."

$$(2.1.1) \quad \dot{Y} = A_y (E - Y)$$

$$(2.2.1) \quad \dot{\pi} = A_p (Y - Y^*) + x$$

$$(2.3.1) \quad \dot{x} = A_x (\pi - x)$$

Tobin investigated the local stability of his WKP model around its equilibrium at potential output, at which $E(p, x, Y) = E(p^*, 0, Y^*) = Y^*$. If the model was stable, Y would automatically move back toward Y^* after a perturbation. He found that the "critical necessary condition for stability is:

$$(3.4) \quad p^*E_p + A_x E_x < 0."$$

The second term would be positive: a higher expected rate of inflation would increase spending (that is, $E_x > 0$), both because of the "flow Pigou effect" named by Tobin (1975) and because of the reduced demand for real money balances discussed by Mundell (1963). Tobin suggested that E_p , and hence the first term of the stability condition, would be negative because of the "stock Pigou effect" — the wealth effect on consumption of lower M/p due to higher p — and the "Keynes effect" of higher interest rates.³ Discussion in the literature of Tobin's stability condition 3.4 has concentrated on its implication that more rapid adjustment of expectations (larger A_x) makes instability more likely, and on the related question "Is Price Flexibility Destabilizing?" (see Driskill and Sheffrin 1986, De Long and Summers 1986, 1988).

Fisher's debt-deflation theory has implications for both terms of Tobin's stability condition 3.4. With sufficient inside debt denominated in money, what Tobin (1980, pp. 9-11) termed the Fisher effect

³The lower M/p implies an LM curve further to the left, and higher interest rates reduce investment.

on inside debt could dominate the stock Pigou effect on outside money, so that E_p would be positive (a higher price level would increase real expenditure, a lower price level reduce it), the model would necessarily be unstable: Y and p move further away from their equilibrium values after an initial shock. (The Keynes effect would cease once deflation reduced nominal interest rates nearly to zero — as with the U.S. Treasury bill rates of three eighths of one percent in the 1930s.) The size of E_x , the derivative of desired expenditure with respect to expected inflation, could also be expected from Fisher's analysis to depend on the amount of nominal indebtedness. The larger the amount of nominal debt in this model relative to the scale of other variables, the less likely it is that the model is stable. This interpretation of the model captures Fisher's explanation of why the U. S. economy returned to potential output quickly after the deflation of 1921 but did not do so after the deflation of 1929-30 due to overindebtedness.

Unfortunately, these implications of Fisher's debt-deflation theory have not been brought out in the literature proceeding from Tobin (1975). De Long and Summers (1986), for instance, cited Fisher's 1923 and 1925 articles, but not his 1932 book or 1933 article. Their discussion led to an exchange between Sumner (1990) and De Long and Summers (1990), in which Sumner very usefully extended Fisher's 1925 analysis to the period 1923-35 as a byproduct of arguing that price rigidities due to New Deal policies, especially the National Industrial Recovery Act, depressed output from July 1933 to August 1935 (with some mention of reflation and a nearly 50 percent rise in industrial output in the first half of 1933, Sumner 1990, pp. 723-25).

Fisher's Debt-Deflation Theory and The Literature

As often happened with Fisher, he was overly enthusiastic about the reception and acceptance of his theory. Fisher reported that "Since the book (*Booms and Depressions*) was published its special conclusions have been widely accepted and, so far as I know, no one has yet found them anticipated by previous writers, though several, including myself, have zealously sought to find such anticipations. Two of the best-read authorities in this field assure that those conclusions are, in the words of one of them, 'both new and important'" (1933, p. 337). In fact, published contemporary discussion of his debt-deflation theory was very limited, the most important being the summary in 1937 in Gottfried Haberler's League of Nations survey of theories of *Prosperity and Depression* (1946, pp. 113-16).

In the final footnote of his *Econometrica* article, Fisher reported that Wesley Mitchell, to whom *Booms and Depressions* was dedicated, had drawn his attention to Thorstein Veblen's *Theory of Business Enterprise* (1904, ch. VII) as the work that "probably comes nearest to the debt-deflation theory. Hawtrey's writings seem the next nearest" (1933, p. 350). While Veblen stressed the importance of outstanding nominal debt in explaining fluctuations, this was not a recurrent theme in his writing and, unlike Fisher, he did not view monetary shocks as the source of instability (1904, pp. 100-101, 105).

Ralph Hawtrey of the British Treasury was the only prominent interwar economist with a theory of economic fluctuations as thoroughly monetary as that of Fisher. His account of the "vicious circle" of distress selling increasing the real burden of debt by depressing asset prices, although not at the heart of his theory, was closely related to Fisher's debt-deflation process. Fisher's acknowledgement of affinity to Hawtrey failed to satisfy Raymond Saulnier (1938, pp. 77-78n.) who, in his only mention of Fisher, criticized Fisher (1933, p. 350n.) for failing to remark that his complaint of the absence of the word "debt" from the indices of monetary treatises did not apply to Hawtrey's *Currency and Credit* (1927). The affinity of the two approaches was not noted by Hawtrey, who in 1950 cited Fisher in the fourth edition of *Currency and Credit* only for the equation of exchange and *The Making of Index Numbers*.

Fisher's debt-deflation theory enabled him to explain why some deflations, such as that of 1929-30, were followed by severe depressions, while others were not, as in 1921. His emphasis on the importance of unanticipated changes in the real value of inside debt and on the asymmetry created by the risk of bankruptcy was shared by later macroeconomic theorizing, notably by Minsky and Tobin. His theory of the debt-deflation process gave Fisher a powerful insight into the nature and remedy of the Great Depression, and of his personal financial disaster, just when his audience had walked out on him, repelled by his mistaken stock predictions and attracted elsewhere by the spectacularly successful new books of Keynes and Hayek.

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