

One Hundred Years from Today

Irving Fisher, assisted by Harry G. Brown, *The Purchasing Power of Money: Its Determination and Relation to Credit, Interest and Crises*. New York: Macmillan, 1911, 2nd ed. 1913. Pp. xxiv + 515.

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1. Introduction: A Book to Remember

Irving Fisher's *The Purchasing Power of Money* was received in 1911 as a forceful restatement and statistical verification of the quantity theory of money. The quantity theory, going back to Jean Bodin in 1568 and David Hume in 1752, holds that changes in the quantity of money explain changes in the price level (the inverse of the purchasing power of money) and that, in the long run once all adjustments have occurred, a change in the quantity of money will change all prices and money wages in the same proportion, with no lasting effect on real variables such as output, employment, or real interest. "Why was it," asked Joseph Schumpeter (1948, p. 234), "that friends and foes of *The Purchasing Power of Money* saw nothing in it but another presentation, statistically glorified, of the oldest of old quantity theories – that is, a monument of an obsolescent theory that was to become obsolete before long? The answer is simple: because Fisher said so himself – already in the Preface and then repeatedly at various strategic points." And so Fisher did, announcing in his preface that "The main contentions of this book are at bottom simply a restatement and amplification of the old 'quantity theory' of money" (1911a, p. vii). Fisher presented his work that way in response to attacks on the quantity theory by American economists who derided the quantity theory as an irrefutable tautology (notably Francis Amasa Walker of MIT) or as an empirically refuted theory that gave aid and comfort to soft-money bimetallists (the view taken by such hard money, gold standard stalwarts as J. Laurence Laughlin of the University of Chicago).

If there had been nothing more to *The Purchasing Power of Money* than that, the book's centenary would merit no attention. But Fisher (assisted by his younger colleague and former student Harry Gunnison Brown) did much more than rehash and illustrate a centuries-old theory (see Ryan 1987 on Brown, and see Brown 1909, 1910a, 1910b as indications of contributions by Brown that were incorporated into the book). Fisher developed a monetary theory of fluctuations in real interest and output – although Schumpeter (1948, pp. 234-35) had grounds to complain that Fisher "shoved all his really valuable insights mercilessly into chapters IV, V, VI, and disposed of them semi-contemptuously as mere disturbances that occur during 'transition periods' when indeed the quantity theory is 'not strictly true'." To deal with "The Problem of Making Purchasing Power More Stable" (the title of Chapter XIII) and thus stabilize real output, Fisher proposed his "compensated dollar" plan, a monetary policy rule that would stabilize the price level, rather than just stabilizing one price, the dollar price of gold. To choose the right price index to be stabilized, Fisher considered the merits of various index number formulas, so the Fisher ideal index (the geometric mean of the Paasche and Laspeyres indices), like the "compensated dollar" policy rule, made its first appearance in *The Purchasing Power of Money*. Even the equation of exchange, drawn from Simon Newcomb (to whom Fisher dedicated *The Purchasing Power of Money*), was transformed in Fisher's hands, with different velocities of circulation for currency and bank

deposits and with elaborate statistical efforts (drawing on work by David Kinley) to measure those velocities independently of the equation of exchange. As J. Bradford De Long (2000, pp. 83, 85) insisted, “The story of 20th century macroeconomics begins with Irving Fisher” because “the transformation of the quantity theory of money into a tool for making quantitative analyses and predictions of the price level, inflation, and interest rates was the creation of Irving Fisher.” Fisher’s transformation of the quantity theory resonated with later macroeconomists, so that Milton Friedman (1972, p. 12), after quoting extensively from Fisher’s December 1910 exchange with Laughlin (in the discussion following Laughlin 1911 and Fisher 1911b), stated, “And now I must cease quoting from Fisher, with whom I am in full agreement, and proceed instead to plagiarize him – albeit with modifications to bring him down to date.”

2. The Context of *The Purchasing Power of Money*

Fisher (1911a, p. viii) lamented that “since the ‘quantity theory’ has become the subject of political dispute, it has lost prestige and has even come to be regarded by many as an exploded fallacy. The attempts by promoters of unsound money to make an improper use of the quantity theory – as in the first Bryan campaign – led many sound money men to the utter repudiation of the quantity theory.” In 1896, William Jennings Bryan mounted the first of his three presidential campaigns on a platform of adopting bimetallism to raise the price level by increasing the quantity of money, reversing the downward trend of prices since 1873 (when gold convertibility of the “greenback” was restored) and lightening the burden of debt, especially on farmers. Bryan’s Populist supporters combined the quantity theory of money, holding that a larger money supply would lead to a higher price level, with a claim that such a price increase would provide permanent real benefits, a lasting stimulus to real economic activity. William H. Harvey’s bimetallist tract *Coin’s Financial School* ([1894] 1963) sold perhaps a million copies (including bulk purchases by silver mining interests), reaching a wide public with its ridicule of academic defenders of sound money and the gold standard, notably a “Professor Laughlin” who is soundly defeated in debate by the fictional Coin. J. Laurence Laughlin, founding head of the Economics Department of the University of Chicago, did rather better when he faced Harvey in a real public debate in May 1895 (see Skaggs 1995, p. 4), but never forgot how Harvey and Bryan appealed to the quantity theory for support. Ironically, 1896 was the end of the era of declining prices under the gold standard, due to Klondike and Witwatersrand gold discoveries and especially the introduction of the cyanide process for extracting gold from lower grade ores.

The fierce monetary controversies surrounding the Bryan campaign of 1896, and then those following the crisis of 1907 and leading up to the creation of the Federal Reserve System, left Fisher with the task of making a case in *The Purchasing Power of Money* that the quantity theory of money was empirically sound as an explanation of the movement of prices (contrary to Laughlin and his students), that changes in the quantity of money would be neutral in the long run (contrary to Harvey and Bryan), that the equation of exchange was operationally useful and not just a tautology defining the velocity of circulation (contrary to Walker), and that the short-run non-neutrality of monetary changes, temporarily affecting real interest, explained economic fluctuations (contrary to views of fluctuations as true cycles, such as Jevons’s sunspot theory of the trade cycle). He also set himself the further task of devising a

monetary policy rule that would eliminate the fluctuations in real economic activity caused by monetary shocks, and to persuade the world to adopt that rule. To make such a rule operational, he also proposed to reform the calculation of index numbers. Being Fisher, he never doubted that he would succeed in all this.

Fisher's monograph *Appreciation and Interest* (1896), published by the American Economic Association at the time of the first Bryan campaign, pointed out that any expected deflation (appreciation of the purchasing power of money) would have been reflected in nominal interest rates, so that inflation or deflation, if correctly anticipated, would neither help nor harm debtors or their creditors. Further, he argued that expectations of price level changes would adjust to reflect actual changes, so that real effects of monetary shocks would be temporary. Fisher's careful analysis of expected inflation as the difference between real and nominal interest did not have the public appeal of Bryan's refusal, in his speech accepting the Democratic nomination that year, to let mankind be crucified on a cross of gold, but it had greater long-run impact on economic thinking. Fisher (1896) was the first to write down the equation relating real and nominal interest (now called the Fisher equation), but he drew attention to previous recognition of the relationship in verbal statements by others ranging in length from a paragraph in John Stuart Mill's *Principles* and a note in Alfred Marshall's *Principles* to a journal article by Jacob de Haas, and to numerical examples by William Douglass ([1740] 1897) in an anonymous colonial pamphlet and John Bates Clark in 1895 (both omitting the compounding term) – and also cited a larger number of examples of eminent economists such as Thomas Tooke, W. Stanley Jevons, and Bonamy Price who did not grasp the relation of money interest to price changes. More generally, Fisher (1896) moved beyond the effect on money interest of anticipated changes in the purchasing power of money to formulate a general statement invoking arbitrage to explain the difference between interest rates expressed in any two standards as due to the expected change of the exchange rate between the two standards: money and commodities, gold and inconvertible paper money, the currencies of two countries, gold and silver, gold and wheat. For the currencies of two countries, Fisher (1896) stated what is now called the uncovered interest parity condition. Attributing differences in nominal interest rates on loans of different duration to expectations about inflation, Fisher (1896) advanced what became known as the expectations theory of the term structure of interest rates. Setting the stage for the monetary theory of fluctuations in Chapter IV of *The Purchasing Power of Money* and for his lifelong insistence that the “so-called business cycle” was really a “dance of the dollar” (Fisher 1923, 1925, 1926), Fisher argued in *Appreciation and Interest* that money interest only adjusted gradually, so that it reflected long price movements more closely than short-lived swings in prices.

3. Fisher and the Equation of Exchange

The following year, Fisher (1897) first used the equation of exchange to present his version of the quantity theory. The equation had been used by earlier writers, sometimes correctly but sometimes omitting the velocity or price variable (see Humphrey 1984). Fisher (1897, 1911a) drew attention to the “equation of societary circulation” in Simon Newcomb's *Principles of Political Economy* (1885, Chapter XV), dedicating *The Purchasing Power of Money* “To the memory of Simon Newcomb, great scientist,

inspiring friend, pioneer in the study of ‘societary circulation’.” Fisher (1911a, p. 25n2) also noted subsequent expressions of the quantity theory equation by Edgeworth (1887) and in an 1896 textbook by Yale president Arthur Twining Hadley. Fisher (1897, p. 517) went beyond Newcomb in allowing money in circulation M and bank deposits D to have different velocities of circulation, so that the equation of exchange became $MV + DU = PT$ where P is the price level, T an index of the volume of transactions, and V and U the velocities of circulation. In 1911, Fisher rewrote this equation as $MV + M'V = PT$, to emphasize that bank deposits (M') are another kind of money.

In an article on “Algebraic Quantity Equations before Fisher and Pigou,” Humphrey (1984, p. 285) attributes the MV and DU notation to John Pease Norton’s *Statistical Studies in the New York Money Market* (1902), without mentioning the earlier appearance of that equation and notation in Fisher (1897) – or mentioning that Norton (1902) was a Yale doctoral dissertation by one of Fisher’s students and junior colleagues, who repeatedly cited Fisher on velocity of circulation (Norton 1902, pp. 2, 6, 7, 11). Taking notice of Fisher’s 1897 *Economic Journal* article also disposes of Humphrey’s citation of a 1907 book by A. de Foville as “evidence that French monetary theorists had fully developed algebraic quantity equations before Fisher and Pigou” (Humphrey 1984, p. 284), since Fisher used the equation of exchange with different velocities for currency and deposits in print fourteen years before *The Purchasing Power of Money* and ten years before de Foville’s *La Monnaie*. Léon Walras had previously used quantity equations, but not with Fisher’s two velocities: Walras’s 1874 version had a velocity of circulation for each commodity while his 1886 version had only one velocity, for metallic money (see Marget 1931 and Humphrey 1984). As Humphrey (1984, p. 285) notes, Edwin Kemmerer’s *Money and Credit Instruments in their Relation to General Prices* (published 1907, accepted as a Cornell PhD dissertation 1903) used the equation of exchange with different velocities for currency and deposits before *The Purchasing Power of Money*, but Kemmerer (1907, pp. 11, 75, 115, 133, 150) repeatedly (and positively) cited or quoted Fisher, especially Fisher (1897), as well as citing Newcomb (1885, Book IV) and Norton (1902). In turn, Fisher (1911a, Preface, p. x) stated that, “Most of the statistical results review and confirm the conclusions of Professor Kemmerer in his valuable *Money and Credit Instruments in their Relation to General Prices*, which appeared while the present book was in course of construction. I am greatly indebted to Professor Kemmerer for reading the entire manuscript and for much valuable criticism throughout.” Even the index of Fisher (1911a, p. 508), departing from the laconic neutrality expected of an index, referred warmly to “Kemmerer, E. W. ... pioneer work of, in testing statistically the quantity theory of money, 276-278, 430-432” (see Gomez Betancourt 2010).

Norton (1902) and Kemmerer (1907) are thus not anticipations of Fisher (1911a) on the equation of exchange. Rather, like Fisher (1911a), they built upon Fisher (1897), which has been overlooked in the history of the quantity theory of money (e.g., it is not cited by Patinkin 1965, Laidler 1991, or any contributor to Blaug et al. 1995), perhaps because of its title, “The Role of Capital in Economic Theory” – and it cannot have helped that the only time Fisher cited that article in *The Purchasing Power of Money* (1911a, p. 25n2) he garbled the reference, giving 1899 instead of 1897 as the year of publication.

The appearance in the *Economic Journal* in the 1890s of two Fisher articles on the quantity theory of money (Fisher 1894, 1897) is also relevant to the celebrated claim by John Maynard Keynes (1911, pp. 393-94) that Fisher’s *Purchasing Power of Money* should be viewed as a lucid, accurate, but rather late in the day, exposition of matters already independently developed in Cambridge oral tradition: most

English economists of that era may be assumed to have read the *Economic Journal* (but not necessarily back issues from before they began to study economics – neither Keynes nor Pigou would have been *EJ* readers in 1897). Fisher, in turn, knew and warmly acknowledged important contemporary English contributions to monetary theory in Edgeworth's British Association reports and Marshall's evidence to official inquiries. Keynes's 1911 statement that "there seems good reason to suppose that [Fisher] is not acquainted with" Alfred Marshall's evidence before the Gold and Silver Commission of 1887 is refuted by the citation in Fisher's *Appreciation and Interest* (1896, pp. 78, 79, 86, 90) of Marshall's evidence before the 1887 Gold and Silver Commission and the 1886 Royal Commission on the Depression of Trade and Industry (both reprinted in Marshall 1926, edited by Keynes) – even though the references to Marshall in Fisher's *Purchasing Power of Money* (1911a, pp. 71-72, 328, 423) happen to cite Marshall's suggestion for symmetallism or quote Marshall's *Principles* rather than his official testimony. In turn, Marshall's evidence to the Indian Currency Committee of 1899 referred enthusiastically to Fisher's *Appreciation and Interest* (see also Marshall 1920, p.493n). The long squabble about priority of the Cambridge over the Fisher version of the algebraic statement of the quantity theory (in which Fisher was seen as a late-coming interloper who neither knew nor influenced pre-1911 English monetary theory) was due to Keynes (1911) and A. C. Pigou (1917) overlooking Fisher's pre-1911 writings. Neither Fisher nor Marshall – nor Fisher's friend Edgeworth – contributed to that dispute. Fisher knew, cited, and praised Edgeworth's British Association reports and Marshall's official evidence. Edgeworth, as editor of the *Economic Journal*, made Fisher's early quantity theory articles available to British readers (Fisher 1894, 1897). Marshall cited and praised Fisher's *Appreciation and Interest*.

Fisher's organization of *The Purchasing Power of Money* around the equation of exchange $MV + M'V' = PT$ was a conscious choice of expository strategy. A recent American presentation of the quantity theory of money, David Kinley's *Money* (1904), stuck to a purely verbal account of the theory, eschewing any explicit writing down of the equation, perhaps as likely to frighten away non-mathematical readers (Kinley 1904, pp. 322-26, discussed Fisher's *Appreciation and Interest*, but did not cite Fisher 1897, Newcomb 1885, or Norton 1902). Fisher's use of the equation enabled him to show clearly how Laughlin and Laughlin's University of Chicago graduate students Sara McLean Hardy¹ (1895), Wesley C. Mitchell (1896), and H. Parker Willis (1896) had gone astray in their attempts at statistical refutation of the quantity theory of money. Laughlin and his students had argued that the price level P had not moved in step with the money supply M in the United States since the Civil War – but they had not allowed for the upward trend of T, which would increase the demand for real money balances. Fisher's attempt to persuade Laughlin of the error of his ways was not well received (see Laughlin 1911, Fisher 1911b), and the *Journal of Political Economy*, edited by Laughlin, was unusual among economics journal in not reviewing *The Purchasing Power of Money* (see reviews reprinted in Dimand 2007, Vol. 2).

4. Fisher and the Velocity of Circulation

¹ Sara McLean Hardy, one of the first female graduate students in economics in the United States, published as S. McLean Hardy.

Fisher also needed to respond to the widespread view that the equation of exchange was not a useful framework for organizing empirical research, but only a tautology that defined the velocity of circulation V as PT/M . Indeed, his expanded equation of exchange, separating currency M and bank deposits M' , would not even suffice to define the two velocities V and V' . Accordingly, Fisher attempted to obtain measures of the two velocities distinct from the equation of exchange. He insisted that, except for transition periods, changes in the velocity of circulation reflected such influences as improvements in payment systems, and were independent of changes in the quantities of currency and deposits, the price level and the volume of trade. To measure V , Fisher persuaded Yale undergraduates to keep track of their currency holdings and spending, reporting that “A hundred such returns among students at Yale University indicate an average velocity of forty-five times a year, making the average length of time a dollar rests in one man’s hands about eight days” (Fisher 1897, p. 520). Fisher (1911a, pp. 379-382) provided a fuller account in an appendix on “Statistics of Turnover at Yale University,” which he based on 116 people who actually kept careful accounts (out of 246 whose records were collected). Those 116 included 113 students, a professor, a librarian, and a stenographer – 115 men and one woman (the stenographer). Their “average annual annual rate of expenditure was \$660 and an average cash on hand was almost exactly \$10, giving the quotient 66 times a year” (1911, p. 379). Fisher did not explicitly address the possibility that his sample might not be strictly representative of the entire American population with regard to occupation, rate of expenditure or gender.

For V' , the velocity of circulation of bank deposits, Fisher (1911, p. 448) provided impressive (or at least impressive-looking) series of numbers, giving V' and $M'V'$ for each year from 1896 to 1909. He created these series by linear interpolation between exactly two observations: estimates of bank deposits (M') and clearings ($M'V'$) for one day, July 1, 1896, that David Kinley of the University of Illinois had made for the Office of the Comptroller of the Currency, and estimates of M' and $M'V'$ that Kinley had made for one day, March 16, 1909, for the National Monetary Commission (Kinley 1910). Fisher (1911, p. 441) attempted to correct the figures for the fact that the two days were not comparable, since only one of them was the first of the month, but the situation remains that the whole table of figures for velocity from 1896 to 1909 derives from estimates for just two days – which are not comparable. After David Kinley (1913) devoted his American Economic Association presidential address to “Objections to a Monetary Standard Based on Index Numbers” – that is, his vehement objections to Fisher’s compensated dollar plan – Kinley’s name appeared only infrequently in Fisher’s later writings, which tended to attribute the 1896 estimate to the Office of the Comptroller of the Currency and the 1910 estimate to the National Monetary Commission.

Fisher (1911a, pp. 74-89) considered at length how the velocities of circulation depend on tastes, technology, and endowments. As David Laidler (1991, p. 72) remarks, “It is hard to square Fisher’s placing the ‘habits of the individual’ at the top of his list of factors affecting velocity with the view that his version of the quantity theory is ‘mechanical’. Whether or not the ‘tale’ to this effect is, as Patinkin ... has suggested, Cantabrigian in origin, it is certainly a tale.” There is one surprising omission from Fisher’s 1911 list of factors affecting the velocity of circulation: the author of *The Rate of Interest* (Fisher 1907) neglected to mention the rate of interest. This omission is even more remarkable in view of a footnote in Fisher (1897, p. 518n – italics in the original): “Pierre Des Essars, in the *Jour. Soc. Statistique, Paris*, April, 1895, shows that the velocity of circulation of bank deposits, U , varies with *crises*. They will also be

found to vary with the *rate of interest*.” The first clear and correct statement of the nominal interest rate as the opportunity cost of holding real money balances was not published until 1930 – by Irving Fisher, in *The Theory of Interest* (1930, p. 216). John Maynard Keynes (1936) went on to write the money demand function (liquidity preference) as an explicit function of income and the interest rate.

5. The Dance of the Dollar – and its Remedy

Fisher devoted Chapter IV of *The Purchasing Power of Money* to a monetary theory of economic fluctuations, restricting the non-neutrality of money shocks to “transition periods” in which the quantity theory of money (changes in the quantity of money affect prices, not velocity or the volume of trade) is “not strictly true.” Since Fisher guessed that the transition period after each monetary shock might be ten years, and that monetary shocks were much more frequent than that, the economy would always be in a transition period, moving from one equilibrium price level towards another. The idea that changes in the quantity of money are neutral in the long run, but not in the short run, has a long history in the quantity theory of money, going back to David Hume in 1752 and Henry Thornton in 1802 (Blaug et al., 1995). Fisher advanced the monetary theory of short-run economic fluctuations beyond such earlier insights by grounding it in his theory of the slow adjustment of money interest rates to monetary shocks and price level changes, first propounded in Fisher (1896) and culminating in Fisher (1930) with elaborate correlations between money interest rates and a distributed lag of price-level changes (an adaptive expectations approach to estimating expected inflation), making use both of the Fisher ideal index of the price level and of Fisher’s invention of distributed lags. Fisher’s continuing development of Chapter IV of *The Purchasing Power of Money* led him to offer empirical evidence that the “so-called business cycle” was not really a cycle with stable periodicity (Fisher 1923) and that instead fluctuations in real economic activity were a “dance of the dollar” driven by monetary shocks (Fisher 1925). To further support Chapter IV’s monetary theory of fluctuations, Fisher (1926) correlated unemployment with a distributed lag of price-level changes in an article reprinted in 1973 in the *Journal of Political Economy* (the only economics journal not to review Fisher 1911a) as “Lost and Found: I Discovered the Phillips Curve – Irving Fisher.” Indeed, Fisher’s 1926 article, with causality running from inflation to unemployment, is closer to the textbook Phillips curve than is A. W. H. Phillips’s famous 1958 article, in which causality ran from unemployment to changes in money wages (Leeson 2000).

Fisher’s emphasis on slow adjustment of interest rates to monetary shocks and price level changes left him vulnerable to the counter-claim by Minnie Throop England (1912) that it would be equally plausible to emphasize slow adjustment of wages or raw material prices to changes in the purchasing power of money: “Taking up [Fisher’s] first statement, that interest lags behind prices in the upward movement, I hold that it may, on the contrary, take the lead”, as shown by data on interest rates and commodity prices preceding five crises in Germany and six crises in England (see Dimand 1999). Fisher ingenuously side-stepped this critique in the preface to his second edition in 1913: “In particular I should have liked to modify somewhat the statement of the theory of crises in Chapter IV and in Chapter XI to make use of the helpful criticism of Miss [*sic.*] Minnie Throop England, of the University of Nebraska, in *The Quarterly Journal of Economics*, November, 1912; also to meet a criticism of Mr. Keynes’ to the effect that, while my book shows *that* changes in the quantity of money do affect the price level, it does

not show *how* they do so.” Concluding a one-paragraph review of the second edition (reprinted in Dimand 2007, Vol. 2, p. 139), Edwin B. Wilson of Harvard tartly remarked, “With characteristic candor Professor Fisher expresses regret that the difficulty of altering plates has prevented him from taking advantage of certain criticism of the first edition by Mrs. M. E. [sic.] England and Mr. Keynes. It is to be hoped that the demand for this revision will be great enough to wear out the plates and give Professor Fisher occasion to issue a third edition just to his mind.”

Fisher (1911a) recognized that transition periods could be triggered by shocks to any element of the equation of exchange, but went on to treat such shocks as normally occurring in M or M' . In contrast, Joseph Schumpeter's *Theory of Economic Development* ([1911] 1934), published in the autumn of the same year, argued that the clustering of innovations (changing the volume of trade T) is the propagating mechanism in economic fluctuations.

Having identified imperfectly anticipated changes in the purchasing power of money as the cause of economic instability, Fisher (1911a, pp. 337-48) proceeded to try to eliminate such changes. In the context of the debates leading to the creation of the Federal Reserve System and of Fisher's call for an international conference on the rising cost of living, Fisher (1911a and many subsequent publications) and Senator Robert Owen proposed a monetary policy rule requiring the monetary authority to peg an index of commodity prices, rather than just the dollar price of one commodity, gold. Fisher tried to disguise this “compensated dollar” plan as a version of the gold standard, by having the monetary authority peg the dollar price of gold, altering that dollar price of gold at regular intervals to offset changes in the price index. Such a fixed exchange rate, subject to regular changes, would be vulnerable to speculative attack, and defenders of the gold standard or of the gold exchange standard (whether quantity theorists such as Kemmerer or opponents of the quantity theory such as Laughlin) were not fooled into mistaking it for a slightly fine-tuned gold standard. But, leaving aside the pegged dollar price of gold, Fisher (1911a) is noteworthy for proposing a monetary policy rule targeting the price level. Fisher (1914, p. 818) was pleasantly surprised to discover that Simon Newcomb, the dedicatee of *The Purchasing Power of Money*, had proposed a similar rule (Newcomb 1879). Fisher (1911a) went on to consider the merits and demerits of various price index formulae, including the one that he adopted eleven years later as the ideal index (Fisher 1922). As with his other reform schemes, Fisher remained mildly perplexed that the world did not let him reform it even when he explained clearly and firmly why his plan would be desirable.

Recent literature on the origins of the Federal Reserve System largely ignores Fisher's 1911 proposal of a price level rule and does not mention that Senator Owen managed to insert such a mandate to target the price level in the Senate version of the Owen-Glass Bill that became the Federal Reserve Act, only to have Representative Carter Glass persuade the House of Representatives to strike it out (see Owen 1919, Fisher 1934). R. H. Timberlake (1993, p. 407) firmly declares that “The first comprehensive proposal for a stable price level policy was made by Irving Fisher in his book *Stabilizing the Dollar*, published in 1920,” and Alan Meltzer (2003), who pays careful attention to discussions in the 1920s about Fisher's compensated dollar plan, also insists that it originated in Fisher (1920), seven years after the passage of the Federal Reserve Act. But *Stabilizing the Dollar* (1920) was only Fisher's first complete book on his plan, which had already been the subject of the concluding chapter of *The Purchasing Power of Money* (1911a) and of many journal articles (one reprinted from the March 1913 *American Economic*

Review Supplement as an appendix to the 1913 second edition, pp. 494-502). Similarly, although the economic ideas of Carter Glass have often been minutely examined, Senator Robert L. Owen has largely vanished from the history of the creation of the Federal Reserve apart from the name of the Owen-Glass (or Glass-Owen) Bill.

6. Fisher's Contribution to Monetary Economics

Irving Fisher extended Simon Newcomb's equation of exchange to allow currency and bank deposits to have different velocities, and, building on empirical work by David Kinley and Edwin Kemmerer, worked to make the quantity theory operational, with independent estimates of velocities. He followed *The Purchasing Power of Money* with annual *American Economic Review* articles on changes in the elements of the equation of exchange each year from 1911 to 1919. But he did far more than that. In *The Purchasing Power of Money* Fisher (assisted by Harry Gunnison Brown) advanced a monetary theory of economic fluctuations due to slow adjustment of money interest, leading on fifteen years later to his empirical article that was rediscovered and republished in 1973 as "Lost and Found: I Discovered the Phillips Curve" (Fisher 1926). To stabilize an economy subject to the real effects of monetary instability, Fisher (1911a, 1920) proposed to a new monetary policy rule, the "compensated dollar" plan to target the purchasing power of money (the inverse of the price level), rather than pegging the dollar price of just one commodity, gold – but he undermined his proposal by trying to disguise it as a form of the gold standard (and did not even mention the quantity of money in the plan). He proposed to target the price level indirectly by keeping the dollar convertible into gold on demand, but varying the dollar price of gold at fixed intervals in response to observed changes in the price level, a scheme vulnerable to speculative attacks. When Fisher (1935) finally proposed a monetary policy rule to stabilize the price level by varying the quantity of money through open market operations, with a flexible exchange rate, a quarter of a century after his first statement of the compensated dollar plan, he had lost the attention of his audience. To make his price level rule operational, Fisher needed to select a suitable formula for calculating the price index, and it was in 1911 that he first considered the formula, now known as the Fisher ideal index, that Fisher, in *The Making of Index Numbers* (1922), later adopted as the best index number for all purposes. Characteristically, he put his ideal index into practice with a weekly price index produced by an Index Number Institute located in Fisher's house and with an annual *Journal of the American Statistical Association* article on the year's index numbers, each year from 1923 to 1930 (except in 1929, when he was otherwise occupied). Fisher's extension of the equation of exchange, to allow for bank deposits to have a different velocity of circulation from that of currency, made it more suitable for an economy in which a smaller share of transactions were made in cash. The Fisher ideal index only became widely used in the 1990s. Fisher and Senator Robert Owen were unable to mandate a price level target in place of a fixed dollar price of gold in the Federal Reserve Act of 1913, but targeting the price level (or its rate of change, inflation) is now widespread. Together with the Fisher relation between expected inflation and nominal interest (propounded in Fisher 1896, reiterated in Fisher 1907 and 1911a) and the Fisher diagram for intertemporal consumption-smoothing (Fisher 1907, p. 409, including the Fisher separation theorem between the time-pattern of income and the time-pattern of consumption, given perfect credit markets), the contributions of *The Purchasing Power of Money*

became crucial building blocks of modern macroeconomics, decades after Fisher's public reputation was devastated by his disastrous optimism about the stock market in October 1929.

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