IRVING FISHER (1867-1947) IN RETROSPECT
SIX ESSAYS

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Fisher's Introductory Text

By James Tobin*

Irving Fisher was a dedicated teacher—in classrooms, in books, and in the personal contacts by which he sought to educate presidents of the United States and influential business and government leaders throughout the world.

At Yale, Fisher liked to prepare for his students his own written expositions. He even wrote a calculus text for fellow students he was tutoring. Not surprisingly, when he assumed responsibility for the economics introductory course in 1910 he was dissatisfied with existing texts and wrote his own. He and a half dozen other instructors taught from experimental editions for two years before he settled on the published version of *Elementary Principles of Economics* (1912). It was reprinted ten times, the last in 1932, but never substantively revised.

*Elementary Principles* was not very popular outside Yale. However, much of the material survived, incorporated in the more conventional textbook published first in 1926 and in its fifth and final version in 1948, by Fisher’s Yale students and colleagues F. R. Fairchild, E. S. Furniss, and N. S. Buck. Their *Elementary Economics* was the market leader between the world wars.

Maybe Fisher’s text was too good for the market. Anyway it is very different from other texts of his day and of ours. Fisher does not try to capture students’ attention by covering contemporary events, controversies, and policies. He includes few statistics, none that have to be up-to-date to be useful. He does not tailor his expositions and illustrations too closely to the experiences and institutions of one country. He does not try to cover the entire domain of economics with its many applied fields; he urges students to take applied courses or explore those fields on their own.

Fisher tries to equip readers to think like economists. He stresses the basic concepts, not algebraic models and formulas. He does not train students to do synthetic numerical problems.

Why should a Principles text have to be revised every three or five years? Presumably the basic concepts and methods of the discipline are more durable than that. Rather it is the economic journalism which most textbooks combine with theory that compels frequent revision—perhaps to the profit of authors and publishers. A book like Fisher’s does not build in obsolescence and does not need revision until the profession rethinks principles.

Are there any modern elementary texts in the same spirit? I am aware of two, Donald Nichols and Clark Reynolds (1971) and Edmund S. Phelps (1985). I am afraid their market success was similar to Fisher’s.

Fisher suspects that his student-readers are unconsciously confused about simple basic concepts. He would set them straight about the differences and connections between stocks and flows; capital and income; insolvency and illiquidity; wealth and saving; deficits and debts; price level and relative prices. He wants them to distinguish “money” as used colloquially to refer to wealth or income from money as an asset with the definite properties of currency. He reminds them that bygones are bygones.

The book is unorthodox in its selection of topics and in their order and weight. He starts with 143 pages on capital and income accounting, individual and social. Then come 114 pages of his monetary theory. Only after half the book does he get to standard micro, supply and demand (which he deprecates [Fisher, 1912 p. 145] as an overused “glib” phrase

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that substitutes for "real analyses"), and relative prices. After 96 pages he returns to economy-wide concerns, the theory of interest, and the distribution of income and wealth.

Fisher's textbook implements his conviction that he can make even his most esoteric results understandable to nonprofessional readers. The accounting chapters carry the message of *The Nature of Capital and Income* (1906); the monetary chapters expound the gist of *The Purchasing Power of Money* (1911); and the theories of interest and of distribution are based on *The Rate of Interest* (1907). Fisher's first great work, *Mathematical Investigations in the Theory of Value and Prices* (1892) is not represented in the textbook. This is surprising; one would expect Fisher to enjoy explaining to students how the economy can be regarded as a system of simultaneous equations: he had, after all, built an instructive mechanical-hydraulic model to depict general equilibrium.

As would be expected, this book is particularly strong in treatment of intertemporal choices and markets. According to Fisher, interest is "by far the most important sort of price with which economics has to deal" (Fisher, 1912 p. 354). But these chapters would have been better if written after Fisher's second book on interest theory, *The Theory of Interest* (1930). In the textbook, Fisher appears to subscribe to "impatience" as the sole determinant of the rate of interest, neglecting the other blade of the scissors, opportunities, clearly awarded a parallel role in the later book. Here he scornfully dismisses as vulgar fallacies the concepts of productivity as a source of interest and the idea that the rate of return on capital could be a determinant of the interest rate. Like Joan Robinson later, he objects that the latter argument is circular, because the value of capital is itself determined by the rate of interest used to capitalize future earnings on capital goods. He ignores the fact that from the earnings or rents on reproducible capital can be determined a "rate of return over cost"—Fisher's own term subsequently—indeed independent of the interest rate.

In contrast to his rival John Bates Clark, Fisher does not regard interest as a return to a factor-of-production "capital" comparable to labor and land. Interest is an allowance for time delays between inputs of labor and land and their outputs. Capital goods are essentially like other intermediate goods, part of the time-consuming nexus of ultimate inputs and final outputs of consumer goods. Sometimes, indeed, he seems to be expounding a labor theory of value (e.g., Fisher. 1912 pp. 77, 306), but all he means is that the utilities (he calls them "desirabilities" for some reason) of consumption have to compensate for the disutilities of work. Only human beings, not machines and acres of land, have utilities and disutilities. (Fisher does play with the idea of human capital [p. 139], but he sees the prohibition of slavery as a drawback to the concept.)

The main messages to freshmen are those of classical economics, with exceptions. Money is neutral—except during monetary transitions, where interest rates lag price changes (pp. 359–62). This is the only mention of business cycles in the book. Markets generally work for the best—except that scale economies lead to cutthroat competition or collusion or monopoly and price discrimination. "Make work" is a fallacy. Free trade and labor-saving progress benefit society, but they do hurt some workers in the short run. Inequality of wealth is mainly due to differences in thriftiness, thus differential impatience (Fisher allows himself thus to explain the prosperity of Holland, Scotland, England, and France in contrast to the poverty of Ireland, China, India, and Java, and of Negroes, peasants, and American Indians everywhere.)

Nevertheless, there are some Fisherian heresies. What he calls "unequal foresight" (p. 362), anticipating asymmetrical information, can distort market interest rates. The efficiency of asset markets is impaired by those who would now be called "noise traders." Government regulation is essential to handle problems commodity markets do not solve: eugenics, alcoholism, unhealthy and unsafe hours and conditions of employment, and pollution, all subjects of Fisher crusades. Despite his theory of inequality, above, he sees a case for inheritance taxation and despises the very rich, whose irrational acquisitiveness he attributes to competitive spirals of "vanity."
Fisher is an ingenious architect of tables, balance sheets, diagrams, and figures. They all assist his verbal arguments, though some require considerable intellectual effort. In the textbook he is especially fond of pictures of reservoirs connected by flows that equalize their levels, or sometimes do not, and of scales balanced by weights representing, for example, supplies and demands. But there is less curve-shifting than in a typical modern textbook.

Matrix tables for flows of funds and asset stocks (columns for sectors and rows for asset groups) would greatly improve Fisher’s accounting chapters. Likewise Leontief input–output matrices would clarify his discussion of intermediate durable and nondurable goods.

The textbook appears in Volume 5 of the forthcoming collection of Fisher’s works, where the editor, William Barber, reviews comments on the book from prepublication readers (especially Edwin Kemmerer) and postpublication reviewers. These were quite negative: the book is too difficult for beginners, and too eccentric. Its coverage is incomplete. Fisher was not impressed.

REFERENCES


One Little Piece of Irving Fisher

By Robert M. Solow *

There is no doubt that Irving Fisher’s most important and most enduring contribution to economics was his development of the real side of the theory of interest in essentially the form that most of us would accept today. I guess that it will get plenty of attention from other members of this panel. So I have looked elsewhere and have lit upon Fisher’s paper called “Changes in the Wholesale Price Index in Relation to Factory Employment,” which appeared in the *Journal of the American Statistical Association* in 1936, along with a 2½-page Discussion by Morris Copeland, and a 1½-page Rejoinder from Fisher. The paper itself is only seven pages long, though Fisher was not noticeably given to brevity in his writing.

Fisher had published a very similar article some years earlier (1926): “A Statistical Relation Between Unemployment and Price Changes,” in the *International Labor Review*. I shall refer only to the later paper because (a) there is no essential difference between them, (b) it is more accessible, (c) I would like to refer to Copeland’s comments, and (d) historical scholarship is not my goal. Between them, these two articles may be the first appearance in economics of a distributed lag. Fisher is clear about the concept; and he gives it the name by which it is still known.

The title of either paper would allow one to infer that Fisher was going to express the (percentage) change in the wholesale price index as a function of lagged values of employment (or unemployment). In that case he would have been anticipating the Phillips curve. Some readers have adopted this interpretation. Actually, he has the causality going in the other direction: the volume of employment is explained by lagged values of the rate of change of wholesale prices. Fisher thinks that the success of his experiment confirms his view of the business cycle as a “dance of the dollar” during which tight money leads to lower prices, lower profits, lower production, and lower employment in that order.

This contrast about the direction of causation came to the surface in our time, not his, in discussion of the relation between inflation and unemployment. On the whole, monetarists interpreted the correlation as Fisher did, with changes in prices eliciting one way or another, opposite changes in employment. On the whole, Keynesians thought they were seeing a disequilibrium relationship, with high or low unemployment eliciting small or large changes in wages and prices. In this they were closer to Phillips, not to Fisher.

Interestingly enough, Copeland raises the question of reverse causality. He points out that the observation that A leads B, and thus possibly causes B, does not exclude the possibility that B also leads, and thus possibly causes A. Indeed Copeland notes that if A and B are represented by coincidental sine waves, then necessarily changes in A will lead B, and changes in B will lead A. Fisher’s reply is very nice. He says, “Moreover, even if it should some day be found that reverse causal relationships exist, this would not, as Professor Copeland seems to think, disprove the existence of the direct causal relationships of which I have shown evidence. On the contrary, in any study of booms and depressions we must always deal with vicious circles. We may joke over whether the egg precedes the chicken or the chicken the egg, but we know that both are true and that both are true causally.” That is well said; what is not so well said is Fisher’s remark that if Copeland thinks there may be a relationship between changes in the price level and a distributed lag of employment then Copeland should go look for it. If only he had!

Fisher says that his original presumption was that employment in month 1 would depend

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on lagged percentage price changes, and the shape of the lag distribution would be unimodal and in fact approximately lognormal. Thus presumably it could be estimated by systematic search on the two parameters of the lag distribution. But, he goes on, he has found that it works just as well to take the lag distribution as triangular; thus employment in month \( t \) is explained by rates of price change at months \( t - 1, t - 2, t - 3, \ldots, t - k \) with weights \( (k - 1)/k, (k - 2)/k, \ldots, 1/k \). Thus only \( k \) needs to be estimated by iterated search (and simple regression will produce the other parameters, assuming that the rest of the model is linear). In the paper, Fisher does not even bother to tell the reader what value of \( k \) he has found best, or what the regression coefficients are. Copeland is manifestly unhappy about this. In his Rejoinder, Fisher blandly says that it is always his practice to give all the details, and he refers to an earlier paper, although Copeland had already said that he did not find the value of \( k \) in the earlier paper. Is it possible that these two disliked one another? In that case, it was naughtly of somebody to recruit Copeland as discussant.

It is easy to sympathize with Copeland, even if he is a bit pedestrian. For instance, I rather doubt that Fisher actually did a regression of employment on his preferred distributed lag of price changes. He reproduces a graph that appears to represent the time series of actual and "predicted" employment. If that is what it actually represents, the mean error is pretty clearly negative. In fact employment is systematically underpredicted during 1907–1908, 1916–1919, and 1932–1935. (There is another underprediction in 1924–1925, and only one substantial overprediction, in 1921–1922.) Fisher explains away 1916–1919: conscription caused employment to be unusually low. But I think it is lame to blame the underprediction in the 1930’s on artificial price increases under the National Recovery Administration. The model seems unable to account adequately for recessions, and that is no surprise. Fisher says as much: "... the correspondence between the actual and the computed fluctuations in employment is naturally far from exact; since many other causes operate concurrently." Yes, yes, but that does not quite get it across that the model systematically understates the depth of recessions (if that is what is actually happening).

The direction-of-causality question is too interesting to pass by. I did not have time to take a long close look for this occasion. With the help of Howard Man, my undergraduate research assistant at MIT, however, I made a first pass. We were able to dig up monthly time series for 1919–1941 that seem to correspond pretty closely to Fisher’s, on wholesale prices and factory employment. We converted the price data to centered rates of change and took deviations of employment from a quadratic trend.

Instead of duplicating Fisher’s suggested triangular lag structure (maybe later), we regressed employment for 1919–1935 on last period’s price change and a few lagged dependent variables. The result was not successful. The coefficient of lagged price change was very small and had the wrong sign, borderline significant. At monthly frequency, that initial lag should have been longer. No doubt we will be able to make Fisher’s model work if we keep trying.

Then we interchanged the variables and put the equation in Phillips-curve form, regressing price change against last month’s employment and a few lagged dependent variables. The value of \( R^2 \) jumped from 0.75 to 0.98; the employment variable has a highly significant, appropriately positive, value; and the lag structure is close to accelerationist. Maybe Fisher did discover the Phillips curve after all, while thinking he had found something quite different.

Reflection on this tiny and atypical sample of his work cannot reveal a lot about Fisher as an economist. But I will record two impressions—no more than that—about his intellectual style. First, the discussion is a little thin. Of course he knows what he thinks and has explained it at length elsewhere. Still, a reader of just these two short articles could feel that he had been offered a take-it-or-leave-it proposition, with little of the sort of contextual conversation that ought to accompany a powerful causal assertion.

Second, apart from this thinness, if that is what it is, Fisher sounds very contemporary in these two papers. He has a thought, reduces it
to an explicit, simple model, tries it out on some data, claims victory, and walks away. He is far more concerned with type-I than with type-II error. Does that sound familiar? Perhaps naively, I had not thought of Fisher as a model-builder. The justly famous two-period intertemporal choice setup is implicitly a wonderful model, but my recollection is that Fisher does not use it as he uses the equation I have been discussing, to look for the simple, checkable constraints on observations that it implies.

REFERENCES


Irving Fisher’s Self-Stabilizing Money

By Robert E. Hall*

Irving Fisher believed passionately in the social benefits of a stable price level. His ideas have fed an underground spring of monetary economics since around 1980. My remarks deal with developments in this underground. That Fisher’s monetary ideas have remained so deeply underground is notable for two reasons. First, the ideas have been applied successfully in one nonsubterranean (but antipodal) economy. And second, although monetary economics based on conventional principles is disappearing as a professional specialty, neither the ideas of Fisher nor any other ideas have burbled up to fill the drying lake of conventional monetary thinking.

I will start with a brief discussion of the way that Fisher thought about the determination of the price level. Prices are quoted in a unit of value. To define the unit of value, the government makes a definition of the following generic form: the unit of value is $x$, units of resource $y$. Some examples are provided in Table 1.

Let $r$ be the value of one unit of the resource relative to the cost-of-living bundle. Then the real value of the unit of value is

$$v_t = x_t r_t$$

and the price level is

$$p_t = \frac{1}{x_t r_t}$$

To stabilize the price level at a level $p_0$, the rule is

$$x_t = \frac{1}{p_0 r_t}$$

This is precisely the price-stabilization policy promoted by Fisher. He drew up detailed rules setting forth the mechanics of stabilized money. The steps are, first, measure the cost of living according to the prices quoted by merchants under the current definition of the monetary unit. Second, adjust the resource content of the monetary unit, $x_t$, by the same proportion that the measured price level misses the target, $p_0$. Fisher presumed the use of gold as the resource, so his rule was to adjust the gold content of the dollar as needed to keep the purchasing power of the dollar constant. Fisher pioneered measurement techniques for the cost of living in order to make this idea practical.

To my knowledge, Fisher’s idea has never been used with a precious metal as the resource underlying the monetary unit. Most probably the neglect has been to society’s benefit. Fluctuations in the purchasing power of gold have been sufficiently large that substantial changes in the gold content of the monetary unit would have been needed to stabilize prices. Moreover, the nature of the forces that change the dollar price of gold may be such that anticipatory, discretionary monetary policy would be less disruptive to economic activity than the mechanical application of Fisher’s scheme.

Any credible method for price stabilization, including Fisher’s, will prevent monetary panics precipitated by fears of coming inflation, when the prices of gold and other commodities rise sharply. Consequently, the wide swings in the purchasing power of gold seen during periods when the credibility of price stability was in doubt (such as 1980) cannot be used to measure the magnitude of the changes in the purchasing power of gold that Fisher’s formula would be called upon to offset. Nonetheless, it appears that other sources of volatility in the purchasing power of gold would stand in the way of Fisher’s scheme based on gold as the resource. One such source would be financial panics, when the public loses faith in banks and seeks to hold more wealth in gold and other commodities. In the face of a panic,

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TABLE 1—HISTORICAL EXAMPLES OF DEFINITIONS
OF THE UNIT OF VALUE

<table>
<thead>
<tr>
<th>Provenance</th>
<th>Name of unit of value</th>
<th>Resource</th>
<th>Rule for number of units of resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States before Civil War</td>
<td>dollar</td>
<td>gold</td>
<td>0.04838 oz</td>
</tr>
<tr>
<td>Modern United States</td>
<td>dollar</td>
<td>paper dollar</td>
<td>1 bearer security issued by Federal Reserve</td>
</tr>
<tr>
<td>Proposal by Irving Fisher (1920)</td>
<td>dollar</td>
<td>gold</td>
<td>Amount needed to buy the cost-of-living bundle</td>
</tr>
<tr>
<td>Modern Chile</td>
<td>unidad de fomento</td>
<td>paper peso</td>
<td>Number required to buy the cost-of-living bundle</td>
</tr>
<tr>
<td>Argentina, Boromea</td>
<td>peso, FEC</td>
<td>U.S. dollar</td>
<td>1</td>
</tr>
</tbody>
</table>

the necessary decline in the gold content of the monetary unit could be achieved under Fisher’s scheme only by waiting for actual deflation to trigger the appropriate adjustment. Portfolio shifts originating in other countries also put stress on Fisher’s formula; for example, the revolution in Iran coincided with a large increase in the purchasing power of gold that would have required months or years of grinding application of the formula before it found the right decrease in the gold content of the dollar.

In place of Fisher’s mechanical formula, it appears in retrospect that it would be better to define the gold content of the dollar, \( x \), as an instrument of discretionary monetary policy. Alan Greenspan could probably considerably outperform Fisher’s formula, because he could use all available information about the current and likely future purchasing power of gold and adjust the gold content of the dollar before deflation or inflation actually occurred. But the superiority of discretion arises from defining the monetary unit in terms of an unstable resource, gold. Mechanical nondiscretionary rules can work well with a different resource.

The better application of Fisher’s program for defining a self-stabilizing monetary unit is to use a resource with more stable purchasing power. The extreme form would be to define the unit of value directly in terms of the cost-of-living bundle: this approach is completely impractical. The resource underlying the definition must be one in which actual transactions can occur. In practice, this limits the resource to standardized metals and other commodities or to securities. Earlier research of mine in Fisher’s framework demonstrated to my satisfaction that no bundle of commodities would work. This leaves securities. Practice, not research, has demonstrated beyond doubt that defining the monetary unit as \( x \), units of a standardized security is a foolproof way to create a self-stabilized monetary unit.

Though Fisher was regarded during his lifetime and long after as a crackpot visionary, his idea for self-stabilized money has been a complete success in actual practice. Since about 1980, Chile has had a monetary unit, the unidad de fomento, operated according to Fisher’s principles. The resource underlying the UF is a bearer security of the Bank of Chile. The number \( x \), is published every day in every newspaper. An elaborate but successful formula changes the peso content of the UF each day so as to track the best estimate of that day’s cost of living; the formula is driven by monthly data from the cost-of-living index. Soon after the introduction of the UF, essentially all forward contracts in Chile came to be written in UF’s; the country achieved universal cost-of-living indexation painlessly. Every apartment lease, mortgage, savings account, and pension is stated in UF’s.

Interestingly, the success of the UF has remained unknown, or at least unremarked upon, among economists in every country of the world outside Chile, despite the large number of self-professed Irving Fisher Fan Club members.

As I noted above, fluctuations in the purchasing power of the resource underlying the definition of the monetary unit are an inconvenience in Fisher’s scheme. Could one
design a security whose purchasing power is constant? If so, it would be unnecessary to distinguish between the security and the monetary unit. Chile would not need to have a peso and a UF if the terms of the peso could be altered so that its purchasing power was constant. It turns out to be straightforward to create such a security. (If the underground Fisherian literature has already considered this issue, I am unaware of it.)

Let \( p(t) \) be the price level measured in a country's existing unit of value and let \( n(t) \) be the short-term nominal interest rate set by the market for government debt. Consider a security that pays a floating amount

\[
p(t) \left[ n(t) - \frac{\dot{p}(t)}{p(t)} \right].
\]

That is, the security pays a nominal return equal to the current real interest rate multiplied by the price level. What is the nominal value of this security? It is

\[
\int_0^\tau \exp \left( -\int_0^\tau n(s) \, ds \right) p(t + \tau) \times \left[ n(t + \tau) - \frac{\dot{p}(t + \tau)}{p(t + \tau)} \right] \, d\tau.
\]

Let

\[
x(t + \tau) = \exp \left( -\int_0^\tau n(s) \, ds \right) p(t + \tau).
\]

Then, the nominal value can be written as

\[
\int_0^\tau dx
\]

which is just \( p(t) \). So the nominal value of the security is equal to the price level. Its real value, \( r(t) \), is 1. If the monetary unit is declared to be one of these securities, the price level must always be exactly 1.

In practice, a monetary policy based on this principle would involve paying interest on reserves. Each dollar of reserves would be credited with interest of \( n_p - p + p_{-1} \). As with the UF, there would be daily interpolation between monthly price observations.

In conventional terms, the idea is to stimulate the demand for reserves if the price level is too high, which will raise the demand for reserves and pull down the price level. It is like a policy of reducing reserves when prices are too high, but it raises demand rather than lowering supply.

REFERENCES

Irving Fisher: Modern Behavioral Economist

By Richard H. Thaler *

Irving Fisher is rightly thought of as one of the pioneers of neoclassical economics. The theme of my essay is that he should also be considered a pioneer of what I will call “modern behavioral economics.” I will start by defining what I mean by this term, then point to some of Fisher’s contributions in this domain.

Modern behavioral economics is characterized by three features. First, rational choice is used as a starting point for developing theories of economic decision-making and market equilibria. Second, actual individual behavior is analyzed using a variety of data-collection methods. Third, these observations of human behavior, along with some lessons from other social scientists (especially psychologists) are used to explain and understand the ways in which the rational theories fail to describe the world we live in. Two of Fisher’s favorite topics, time preference and money illusion, illustrate how he utilizes this approach.1

I. Time Preference

In The Theory of Interest (1930) Fisher develops what is still thought of as the modern theory of intertemporal choice. The famous Fisher diagram is still an essential element of any course on microeconomics, macroeconomics, or finance. The outcome of this analysis is that at the margin everyone has the same preferences for intertemporal substitution. Fisher even sketches out what can be considered the elements of a life-cycle model, since he stresses the role of borrowing or lending to smooth consumption over time. While it is impressive that Fisher essentially anticipates the life-cycle theory of saving, it is perhaps more impressive that he also anticipates the behavioral critique of this model (e.g., Hersh Shefrin and Thaler, 1988).

Fisher begins his theory of interest with the basic determinants of time preference or impatience (he uses the terms synonymously). He divides his discussion into two parts: the influence of economic factors (i.e., income) and what he calls “personal” factors. Fisher says that an individual’s impatience depends on four characteristics of his income stream: the size, its time shape, its composition, and its risk. The role of size is quite clear: “In general, it may be said that, other things being equal, the smaller the income, the higher the preference for present over future income, that is the greater the impatience....” (Fisher, 1930 p. 72). Notice that this claim is in direct contrast to the life-cycle or permanent-income theories of saving, which postulate that all savers smooth their consumption over their lifetimes, regardless of the levels of their income. However, Fisher’s analysis is a good description of the actual data. It is well established that saving rates increase sharply with permanent income, suggesting, as Fisher theorizes, that the poor are much more impatient than the middle class. Fisher is clear that the effect of income on impatience is partly rational and partly irrational. “The irrational aspect of the matter is often to relax foresight and self-control and to tempt us to ‘trust the luck’ of the future, if only the all-engrossing need of the present necessities can be satisfied” (Fisher, 1930 p. 73).

Foresight and self-control are two of six personal factors that Fisher identifies as determining an individual’s impatience, the others being habit, expectation of life, concern for the lives of other persons (i.e., bequest motive), and fashion. Again, Fisher often explicitly stresses the irrational component of these personal factors.

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1 Though I will argue that Fisher’s work is similar to that of modern behavioral economics, it is not the case that he was a fan of contemporary psychology, particularly at the beginning of his career. In his thesis (1892 p. 5) he criticizes Francis Edgeworth for borrowing from the psychologist Gustav Fechner: “This foisting of Psychology on Economics seems inappropriate and vicious.”
For example, he attributes the lack of impatience in some people to the fact that "the future is seldom considered in its true proportions. This is illustrated by the story of the farmer who would never mend his leaky roof. When it rained he could not stop the leak, and when it did not rain, there was no leak to be stopped!" (Fisher, 1930 p. 82). His discussion of self-control is very psychological. "Self-control, though distinct from foresight, is usually associated with it and has very similar effects. Foresight has to do with thinking; self-control with willing... Like those working men who, before prohibition, could not resist the lure of the saloon on the way home Saturday night, many persons cannot deny themselves a present indulgence, even when they know what the consequences will be" (Fisher, 1930 p. 83).

The other personal factor that Fisher derides as irrational is fashion: "The most fitting of the causes at work is probably fashion. This at the present time acts, on the one hand, to stimulate men to save and become millionaires, and, on the other hand, to stimulate millionaires to live in an ostentatious manner. Fashion is one of those potent yet illusory social forces which follow the laws of imitation..." (Fisher, 1930 p. 88).

Of course it is possible to salvage the "standard Fisherian" theory by interpreting these personal factors as determining an individual's impatience before entering the market. That is, an individual with a high level of impatience might borrow heavily until his marginal rate of time preference is equal to the interest rate. Just as is taught in Economics 101. However, while Fisher is not explicit on this issue, I do not believe this was his intent. He always stresses that his analysis depends on the assumption of perfect foresight, and his discussion of the issues above makes it clear that he did not believe that this assumption was descriptively valid. Therefore, I think he would agree with a behavioral interpretation, namely, that the Fisher model should be considered a normative theory, a theory of how rational agents would behave and a prescriptive lesson on how to behave, but not an accurate description of how real people do behave. To catch up on where the behavioral research lies today see George Loewenstein and Jon Elster (1992).

II. Money Illusion

As far as I can tell, in his book of the same title (1928) Fisher coined the term "money illusion." By his very use of this term, Fisher anticipates the modern research on the psychology of decision-making pioneered by Daniel Kahneman and Amos Tversky. In their work they stress the role of "cognitive illusions," tricks the mind plays on us. Indeed, one of the last papers Tversky produced before his recent and untimely death, was on this topic (Eldar Shafir et al., 1997). In this paper the authors show that individuals are often confused about real and nominal values. It was precisely this confusion that prompted Fisher to write his book.

To gather data for his research on money illusion Fisher took the sensible course of talking to 24 residents of post-World War I Germany (in 1922), which was experiencing a very high rate of inflation. He describes at length one interview with a woman shopkeeper in the outskirts of Berlin. At the time he talked to her, the mark had depreciated by 98 percent in the few years since the war (prices had increased by a factor of 50), but she seemed unaware of the role of inflation in determining the prices of the goods she sold. He describes a conversation after he had purchased a shirt: "Fearing to be thought a profiteer, she said: 'That shirt I sold you will cost me just as much to replace as I am charging you.' Before I could ask her why, then, she said it at such a low price, she continued: 'But I have made a profit on that shirt because I bought it for less' " (Fisher, 1928 p. 7). Fisher goes on to explain how the woman is a victim of the dreaded money illusion.

Fisher is very explicit about how he thinks the illusion works. He believes that people think of their local currency as fixed while other things (prices, foreign currencies, etc.) are changing. Shafir et al. (1997) offer a similar analysis. This illusion is the essence of the famous quip by Abba Eban, the Israeli diplomat, during a time of rapid inflation in Israel: "That dollar is an extremely unstable currency; one month it is worth 100 Israeli pounds the next month 200..."

Perhaps the most important implication of money illusion discussed by Fisher is the role
it plays in his discussion of the famous Fisher equation relating the nominal interest rate to the real rate plus the expected rate of inflation. Once again, Fisher's treatment of this relationship makes it clear that he did not think the Fisher equation was a good description of the world. Like his theory of savings, the equation was meant to describe how interest rates would behave in a world with what he called "foresight" (what we would now call rational expectations). What his extensive empirical work showed is that the nominal interest rate adjusted to changes in inflation only with very long lags (inventing distributed lag econometrics along the way). In one analysis of interest rates in five markets (London, New York, Berlin, Calcutta, and Tokyo), he concludes as follows: "[The results in a table show] that the real rate of interest in terms of the commodities is from seven to thirteen times as variable as the market rate of interest in terms of money. This means that men are unable or unwilling to adjust at all accurately and promptly the money interest rates to changed price levels. Negative real interest could scarcely occur if contracts were made in a composite commodity standard. The erratic behavior of real interest is evidently a trick played on the money market by the "money illusion,"..." (1930 p. 415).

III. Conclusion

Fisher, along with Edgeworth, Vilfredo Pareto and others, helped introduce mathematics to economics. Young economists are taught these modern concepts (equations, diagrams and the like) but rarely go back and read the surrounding text. If they did they would discover that these economists, as well as many others of Fisher's generation (e.g., John Maynard Keynes and A. C. Pigou) were very aware of the influence of behavioral factors (such as self-control and fashion) often left out of modern economics. It is time to stop neglecting the words and time to start updating our equations to include these behavioral factors.

REFERENCES


See Loewenstein (1992) for an elaboration of this view.
Irving Fisher and Modern Macroeconomics

By Robert W. Dimand *

No other American economist before Paul Samuelson and Milton Friedman has had anything close to the influence that Irving Fisher has had on later economics. James Tobin (1985 pp. 29–30) reports that Fisher led his contemporaries Wesley Clair Mitchell, J. B. Clark, and Frank W. Taussig in column inches in the Social Sciences Citation Index for 1976–1980 by the ratio 9:3:1:1 (with Fisher’s lead growing over time) and “Much more than the others, moreover, Fisher is cited for substance rather than for history of thought.” After being the most-cited economist in the monetary and fluctuations literature in the 1920’s, Fisher vanished from citation lists by the 1940’s as John Maynard Keynes captured the profession’s attention, yet contemporary macroeconomics builds largely upon Fisher’s foundations (Dimand, 1995, 1997). Once remembered primarily for his spectacular misprediction of stock prices in October 1929 and for eccentric crusades, Fisher emerges in retrospect as a major figure in the development of economics—and not least for those innovations his contemporaries found most ludicrous, such as building a model to simulate income and spending flows and price levels.

I. What Were Fisher’s Contributions?

The two-period intertemporal-optimization diagram of Fisher’s The Rate of Interest [1907] (1997 Vol. 3 p. 409) and The Theory of Interest [1930] (1997 Vol. 9) is the basis for permanent-income and life-cycle consumption theories, with the simple Keynesian absolute-income hypothesis restricted to cashflow-constrained consumers in imperfect credit markets. Fisher’s rate of return over costs, developed in the same books, was recogzized by Keynes as his marginal efficiency of capital (Jan A. Kregel, 1988; Dimand, 1995), so modern theories of investment, saving, and consumption all have roots in Fisher’s analysis of impatience and investment opportunity brilliantly anticipated in 1834 by John Rae. While Fisher worked with velocity of circulation rather than a money demand function, Bennett T. McCallum and Marvin S. Goodfriend’s (1987) New Palgrave article on money demand credits Fisher’s Theory of Interest [1930] (1997 Vol. 9 p. 216) with the first correct and unambiguous account of the marginal opportunity cost of holding money.

Fisher’s American Economic Association monograph, Appreciation and Interest [1896] (1997 Vol. 1), is the classic presentation of expected inflation as the difference between real and nominal interest rates. Fisher is often misremembered as asserting that real interest is independent of inflation and monetary shocks. That was true only for comparison of equilibria; his theory of economic fluctuations stressed the effect of monetary shocks on real interest during transition periods. His correlation of nominal interest rates with distributed lags of inflation was a pioneering use of adaptive expectations and a landmark in macroeconometrics.

Fisher’s compensated-dollar proposal for stabilizing the cost of a basket of commodities, advanced in The Purchasing Power of Money [1911] (1997 Vol. 4) and Stabilizing the Dollar [1920] (1997 Vol. 6), advocated a rule (varying the dollar price of gold to target a commodity price index, not a monetary aggregate) instead of discretion, at a time when advocacy of monetary rules (other than the gold standard) was unusual, as was his preference for internal stabilization over exchange stability.

Fisher’s monetary theory of economic fluctuations anticipated later developments such as Phillips curves and adaptive expectations. Fisher’s argument, contrary to W. Stanley Jevons, Mitchell, William H. Beveridge,
Henry L. Moore, and Nikolai Kondrat'ev, that economic fluctuations reflect the summation of truly periodic cycles has carried the field so completely that “business cycles” as the name of a field no longer implies that fluctuations are cyclical—even though David F. Hendry and Mary S. Morgan (1995 pp. 45–48) find that Fisher erred in claiming that his own monthly data for U.S. trade for 1915–1923 showed no cyclical tendencies. Like Friedman and Anna Schwartz, Fisher attributed the onset and severity of the Great Depression to a contraction of the money supply that the Federal Reserve could have prevented (Frank G. Steinl, 1996). Going beyond such a monetary theory of fluctuations, Fisher [1932, 1933] (1997 Vol. 10) developed a debt-deflation theory of depressions, stressing the consequences for stability of changes in the real value of nominal-valued inside debt that had not been anticipated when the debts were incurred. This analysis, which influenced Hyman Minsky’s theory of financial-system fragility, is only now being absorbed by the mainstream (Mervyn King, 1994; Dimand, 1997).

Fisher’s dissertation, Mathematical Investigations in the Theory of Value and Prices [1892] (1997 Vol. 1) introduced general-equilibrium analysis into American economics (with some unnecessary originality, as he wrote much of the thesis before discovering Léon Walras and Francis Y. Edgeworth) and presented his hydraulic model to simulate price determination. Though that machine was destroyed in transit to the Columbian Exhibition in Chicago, it and a later version by Fisher were ancestors of computer simulation models of economies. They reflected Fisher’s commitment to making his theory empirically meaningful. This commitment led to The Purchasing Power of Money’s attempted statistical verification of the quantity theory, to annual articles in the American Economic Review [1911–1919] on the equation of exchange, to his massive The Making of Index Numbers [1922] (1997 Vol. 7), and to Fisher’s Index Number Institute, whose weekly commodity price index was accompanied by weekly articles by Fisher. His exhaustive test approach to index numbers, searching for the formula that best satisfied a set of statistical tests, has borne belated fruit: in 1995, the U.S. Department of Commerce switched to a chain-weighted index as advocated by Fisher. A reliable price index was crucial for Fisher’s proposed monetary-policy rule, for his campaign to educate the public against The Money Illusion [1928] (1997 Vol. 8), and for his proposal to index transactions against monetary instability. Fisher persuaded Remington Rand to issue the first indexed bonds in the 1920’s; the U.S. Government followed only in 1996 (preceded by Canada in 1991). Fisher was notorious for an empirical failure, excessive optimism in 1929, but Kathryn Dominguez et al. (1988) argue that the Depression was not foreseeable.

II. Conclusions

These contributions had a breadth unmatched by Fisher’s contemporaries. John Bates Clark, paired with Fisher in Tobin’s article on the American Economic Association centenary, is remembered primarily as a favorite straw man of the Cambridge capital controversies. Fisher’s contributions closely parallel much of modern macroeconomics, yet his role was long neglected. References to Fisher vanished from macroeconomics in the early 1940’s. The “Mark I monetarism” of Friedman and his students had many Fisherian features: the quantity theory of money, a monetary-policy rule, domestic price stability rather than fixed exchange rates, adaptive expectations, the permanent-income consumption function, and Federal Reserve responsibility for the Depression. Nonetheless, Friedman placed less emphasis on links with Fisher than with Chicago oral tradition.

Tobin (1985 pp. 36–37) concluded that Fisher’s “insights contain the makings of a theory of the determination of economic activity, prices, and interest rates in short and medium runs. Moreover, in his neo-classical writings on capital and interest Fisher had laid the basis for the investment and saving equations central to modern macroeconomic models. Had Fisher pulled these strands together into a coherent theory, he could have been an American Keynes.” Fisher never pulled the strands of his economics together in a grand synthesis. His monetary economics, from the
equation of exchange through index numbers to the compensated dollar, was united by a concern with the consequences of imperfectly expected monetary shocks but was not set in the context of either the general-equilibrium analysis of his dissertation or his capital theory. Above all, Fisher did not deal with the macroeconomic coordination problem that Keynes and Friedrich von Hayek tackled in very different ways. He offered no explanation of how a drop in nominal income and spending led to mass unemployment in the 1930’s. Because of that lack, and amid the wreckage of his reputation and finances by his misjudgment of stock prices, Fisher found no contemporary audience for his debt-deflation theory of depressions, his explanation of the spending collapse. Even his monetary theory of economic fluctuations was forgotten as introductory textbooks attached his name to a constant-velocity, constant-output quantity theory. With historical perspective, however, Fisher can now be recognized among the most fruitful builders of modern macroeconomics.

REFERENCES


Irving Fisher (1867–1947) in Retrospect

By William J. Barber *

Anniversaries inspire retrospective reflections. In turn, retrospective reflections frequently generate scholarly publications. I should like to comment briefly on scholarly enterprises recognizing Irving Fisher at three moments in time. Though each is different, each throws significant light on aspects of Fisher’s prolific career as well as on the nature of our discipline.

The first anniversary benchmark date from 1937 and marks Fisher’s 70th birthday. This took the form of a Festschrift entitled The Lessons of Monetary Experience. The 14 contributors, as editor Arthur D. Gayer explained, were aware of the wide range of topics to which Fisher had made original contributions. They had decided, however, that it would be most useful to structure the Festschrift around “a single topic of leading importance.” In the environment of 1937, the salience of monetary issues “was not in doubt. Fisher himself—with his persistent calls for ‘deflation,’ then stabilization of the general price level—was in the thick of contemporary debate on these matters. So also were the contributors, whose ranks included Marriner S. Eccles, John H. Williams, Alvin H. Hansen, James Harvey Rogers, R. G. Hawtrey, and John Maynard Keynes. The essayists, it will be noted, were not all like-minded. Though they shared a high regard for Fisher’s contributions to the discipline, few of them were in complete accord with Fisher. The purpose of this anniversary exercise was to stimulate and sharpen professional understanding of problems of first importance to the nation’s economic health. In view of the priority he attached to “solutions” underpinned by scientific findings, Fisher was obviously comfortable with this approach, even though it meant that many of his other career achievements went unattended.

A tribute to Fisher of a quite different sort appeared in 1967 on the occasion of the 100th anniversary of his birth. All but one of the essays then appearing in a volume entitled Ten Economic Studies in the Tradition of Irving Fisher (William Fellner et al., 1967) were written by members of the Yale economics department. (The exception was a centennial appreciation prepared by Paul Samuelson.) The resulting publication was organized on the following principle: authors were to select a topic to which Fisher had made an original contribution and to extend the analysis he had offered to embrace the “state of the art” in the mid-1960’s. The broad sweep of Fisher’s inventiveness as a contributor to the economist’s tool kit was on display here. For example, Fellner took note of Fisher’s contribution to utility theory and his attempts to devise a statistical method to measure marginal utility; Marc Nerlove addressed distributed lags, a Fisherian innovation; Richard Ruggles used Fisher’s work on the making of index numbers as a point of departure; Herbert Scarf examined general-equilibrium modeling with attention to its Fisherian roots; James Tobin took note of the relation between Fisher’s theories of saving and interest and more recent work on life-cycle saving and balanced growth; Henry C. Wallich examined contemporary controversies over monetary theory and policy against the backdrop of Fisher’s “restatement and amplification of the quantity theory.”

The 100th-birthday volume bore ample testimony to the continuing vitality of Fisher’s analytic style in professional discourse. The contrast with the agenda set for the 70th-birthday Festschrift, it will be noted, could not have been more striking. The earlier publication focused on a single topic of immediate relevance to policy, to the exclusion of all else. The later publication captured multiple dimensions of Fisher’s professional pioneering, with emphasis on his innovations as a theorist. These volumes reflected priorities of the profession at the time they were produced.

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The year 1997 presents us with yet another chronological benchmark, the 50th anniversary of Irving Fisher’s death. Once again, the calendar suggests that the time is ripe for retrospective reflection. It is hoped that the publication of the 14-volume edition of The Works of Irving Fisher will serve as a catalyst to that process. The aim of that project is to make accessible the essential raw materials required for a thorough appreciation of Fisher’s impact on the development of modern economics. Thus, this edition reproduces a dozen of the core book-length texts. That material is supplemented by editorial introductions and postscripts which draw heavily on primary documents (many of them previously unpublished); among them, Fisher’s voluminous correspondence with professional colleagues and with public officials; his considerable testimony before Congressional committees; and his writings in popular as well as professional periodicals. The scholar who studies this material will come away enriched with insights into Fisher’s remarkable creativity and into the intellectual dynamics of American economics in the first half of the 20th century. The documentation reproduced in these volumes can nourish those who want to probe deeply into Fisher’s thinking and that of his contemporaries on a single topic (the route chosen in the 70th-birthday Festschrift) as well as those electing to explore Fisher’s thought for the purpose of recapturing its spirit and extending its scope in the modern setting (the route pursued in the 100th-birthday tribute).

It is also appropriate to observe that the structure of the 1997 publication, like that of its two predecessors, has been influenced by the intellectual atmosphere of its time. In light of the resurgence of interest in monetarism in the past two decades, the inclusion of Fisher’s monetary writings in substantial volume has been deemed appropriate. Stimulus is to be found from comparisons and contrasts between late 20th-century monetary controversies and the ones in which Fisher engaged. One may or may not be disposed to identify with any of Fisher’s pet “remedies” for monetary instability, which shifted considerably over time: the “compensated dollar” with its gold content adjusted to maintain stable purchasing power in the years immediately before and after World War I; legislative stipulations requiring the Federal Reserve to maintain a stable general price level in the 1920’s; “reflation” and stamped money as sure-cures for depression in the early 1930’s; 100-percent reserves from mid-1934 onward. Nonetheless Fisher, more than any other single economist, deserves credit for raising public consciousness about the dangers of an unstable dollar and of “money illusion.”

From the vantage point of 1997, archival materials now at hand illuminate why Fisher’s reputation was in the shadows (to all save a few cognoscenti) in the later 1930’s and in the first post-World War II decades. In this connection, the relationship between Fisher and Keynes makes a fascinating story, and it deserves to be explored in detail. Through the late 1920’s, the two men shared much in their approaches to monetary economics, though they did not see eye-to-eye on all points. Their paths diverged sharply in the 1930’s: Fisher’s memoranda to Franklin Roosevelt are the mischief that would accompany a Keynesian-style program of public-works spending are quite unambiguous. Fisher also was unsympathetic to the analytic message of The General Theory (Keynes, 1936), not just its message for the conduct of economic policy. Later the two came close to convergence in their recommendations for tax policy in wartime: both championed a tax targeting consumption. The analytic props to their conclusions, however, had nothing in common. Fisher’s recommendation rested on the analysis he had worked out in 1906 in The Nature of Capital and Income (reproduced in Fisher [1997 Vol. 2]), when he had argued that “income” should properly be defined as “expenditure on consumption”; thus, when an income tax was subsequently enacted, he maintained that a sound tax system, in all circumstances, should take aim at consumption spending. Keynes’s position, on the other hand, was informed by his analysis of the components of aggregate demand as set out in The General Theory. In the era when the momentum of the profession was driven by Keynesianism, it is not surprising that much of Fisher’s work should have been regarded as out of step with the times. But there are still lessons to be learned from revisiting the intellectual divide that separated Fisher and Keynes.
Fisher’s fate during the heyday of the Keynesian ascendancy had a further consequence: it meant that some of his achievements were overlooked and literally had to be rediscovered. A word is in order on two such instances. In 1926, Fisher published an article in the *International Labour Review* entitled “A Statistical Relation between Unemployment and Price Changes” (reproduced in Fisher [1997 Vol. 8]), which anticipated by more than three decades the essential insight contained in what was later to be labeled the “Phillips Curve.” Fisher’s priority was ultimately recognized in the early 1970’s. When his 1926 contribution was reprinted in the *Journal of Political Economy* in 1973, it was altogether fitting that the editor should position it in a section labeled “Lost and Found” and that he should superimpose the following language above the original title: “I discovered the Phillips Curve—Irving Fisher.” It is also entertaining to speculate whether or not the course of the “reswitching” controversy that divided Cambridge (U.S.) from Cambridge (U.K.) in the 1960’s and 1970’s would have been any different if the participants had been aware of Fisher’s contribution. Fisher had identified the “reswitching problem” in 1907.

Finally, one of the 14 volumes is devoted to reproducing representative samples of Fisher’s crusading for social causes (e.g., campaigns to improve the nation’s health and to promote prohibition, eugenics, and world peace). It is safe to assume that Fisher would have approved this publishing decision. He was aware that his enthusiasms led some to dismiss him as a “crank.” In his self-image, however, his crusades for social causes and his work to develop economic science as a tool for betterment were inseparable parts of his being.

**REFERENCES**


