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COMMENTARY ON IRVING FISHER, *THE NATURE OF CAPITAL AND INCOME (1906)*

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"[The book] ..., besides presenting the first modern theory of accounting, is (or should be) the basis of modern income analysis."
Joseph A. Schumpeter

THE BACKGROUND

Schumpeter regarded The Nature of Capital and Income as one of the three of Fisher's contributions to general theory generally recognized, at the time Schumpeter was writing, as "of first-class importance and originality." The other two were Fisher's Mathematical Investigations (1892) and his statistical method for measuring the marginal utility of income (1927). Actually Schumpeter cites, as if still another, Fisher's theory of interest (1907, 1930), but it is not quite clear whether he gives it full rank.[1]

Nature is the bridge, both in sequence and in logic, between the other two great works, the timeless general equilibrium theory of the 1892 dissertation and the extension of that theory to intertemporal choices in production and consumption in the theory of interest.

Fisher himself confessed that he had not appreciated the element of time when he was writing his doctoral thesis (1892), and accordingly he had not understood the importance of distinguishing between capital and income. "Just as 'accountants distinguish sharply between capital accounts or balance sheets

[1] Schumpeter (1954), pp. 871-2. The reason for Schumpeter's hesitation on Fisher's theory of interest, which most theorists would regard as Fisher's crowning contribution to pure theory, appears to be Fisher's generous, probably too generous, acknowledgement of the priority of John Rae and Bohm-Bawerk.

relating to a point of time and income accounts relating to a period of time,' he came to realize that the theory of capital and income should be built along similar lines. But...in 1895 'economics and accountancy were almost total strangers'..." (Irving N. Fisher, 1956, quoting from his father's unfinished and unpublished memoir (1946))

Fisher became a member of Yale University's faculty of political economy in 1895, and he began immediately to attack the problems of capital, income, and time in both accounting and economic theory. His work quickly bore fruit. He published three articles in the Economic Journal (1896b, 1897a, 1897b) and what amounts to a book, Appreciation and Interest (1896a), as an issue of the American Economic Association's series of Publications.

Just after his appointment as Professor at Yale in 1898 at the age of 31, Fisher was struck with tuberculosis. He was away from Yale for three years, recuperating in more salubrious climates. Even after he returned home and resumed teaching part-time, he was not functioning close to 100 percent until 1904.

His courageous and victorious bout with tuberculosis left him with an intense lifelong personal and intellectual interest in hygiene. His experience was fresh in his mind when he wrote in The Nature, "A large part of our subjective income is due to our condition of health or disease. A man with a good constitution has a more agreeable stream of consciousness than one without....[A] healthy body is absolutely essential for receiving and enjoying the income from external wealth....Economists, by fixing attention exclusively on physical phenomena leave out the most essential element of all, the vigor of human life. The true 'wealth of nations' is the health of its individuals." (1906, p. 176)

With characteristic vigor Fisher picked up in 1904 where he had left off six years before. His exhaustive historical survey of economists' treatment of capital continued. (1904) He reviewed books regularly for the Yale Review, among them works on capital and interest by two predecessors he greatly admired, Bohm-Bawerk and John Rae.

The stage had been set. The enterprise Fisher had begun in 1895 culminated in the two classic books of 1906 and 1907.

THE NATURE OF THE BOOK

In writings he regarded as of practical importance, Fisher addressed lay readers as well as economists. He generally had a message to policy-makers in business, finance, and government: here is a way you can do things more rationally, with benefits to yourselves and to the world. In those cases, Fisher started from scratch and designed his exposition so that any intelligent and concerned reader could understand. The main points are made in successive approximations, from primer-style simplicity to refined analysis. Mathematical derivations and other difficult or detailed materials are often consigned to appendices.

The Nature is such a book. Its style can seem tedious and repetitious to a modern professional economist. It is easy to forget that concepts and distinctions which are second nature to economists today were matters of confusion eighty-five years ago. Seeking generality for his system of accounts, Fisher devotes many words to fine points and to tortured interpretations of definitions and concepts. As Thorstein Veblen complained in an irreverent review, "[It] is a work of taxonomy, of definition, and classification." (Veblen, 1908). It is, after all, a treatise on the logic of accounting, but Fisher's approach creates new economic theory at the same time.

The Nature was received in the profession as an important book. It was widely reviewed, generally admired, but not always agreed with. The controversies that Fisher's earlier articles had inspired were rekindled. Fisher was busy defending his views. A lively discussion on "Are Savings Income?" took place at the 1907 meeting of the American Economic Association.

A significant achievement of The Nature is its clarity in insisting on the distinction between stocks and flows and on careful attention to the dimensionalities of the concepts used in economic discourse. One of Fisher's complaints about Adam Smith and his followers was their confusion on these points. According to Fisher, writers before Smith made more sense. (1906, Chapter IV)

Is "wealth" in Smith's title a stock or a flow? Maybe both, maybe neither. Maybe it just means material things of value. Although "stock" in Smith appears to refer to a stock of business capital, Smith confuses the reader by saying that a part of "stock" is invested to yield profits, while another part pays wages or other current expenditures. This muddle is frequently repeated in connection with classical economists' distinction between fixed and circulating (or working) capital, not that the distinction is itself faulty. Even John Stuart Mill, Fisher notes, says that wages are determined by dividing the wages fund by the number of workers, without informing the reader how long the fund has to last, how soon it will be replenished. (1906, p. 59)

Likewise Fisher cleared up many misunderstandings about interest rates and their relations to asset valuations. His exposition of the mathematics involved could hardly be improved upon. He treats compounding, both discrete and continuous. He shows how to compute present values, even when the future incomes being valued fluctuate and even jump and the discount rates themselves vary. He discusses interest rates in different standards -- money, wheat, gold, silver, bundles of goods -- and the relationships among them. Many of these topics had appeared in Appreciation and Interest ten years earlier, but The Nature is the complete and definitive exposition. (1906, Chapters XII-XV, XVII, and their appendices)

The Nature contains quite a modern discussion of the relation of asset values and interest rates to uncertainties and risks. (Chapter 16). Fisher took the view that the world is deterministic, that it is only our ignorance of nature's laws that makes events unpredictable. He recognizes the role of risk aversion and speaks of "coefficients of caution." In the appendix to the chapter he suggests the standard deviation as a measure of risk. He perceives that willingness to assume risks will differ among individuals, and that these differences will affect markets' allocations of risk among them. Yet, for all his insights, it cannot be said that he succeeds in integrating risk into his theory of valuation or in explaining the risk premiums in market interest rates and asset yields.

THE CONCEPT OF CAPITAL

Fisher's basic concept of capital is simple and comprehensive. Capital embraces all stocks of material objects that yield services that human beings like. Thus Fisher would include: land and other natural resources as well as reproducible goods; objects owned by households and governments as well as by businesses; houses and other consumer durable goods as well as producers' durables; objects whose yields are always in kind, like houses occupied by their owners, as well as those whose yields are marketed for cash; the bodies of human beings -- perhaps their minds too -- as well as non-human objects. Contemporaries schooled in the classical trilogy of "land, labor, capital" found Fisher's comprehensive view hard to take.

Services are ultimately psychic, subjective satisfactions in "the stream of consciousness" of a human being. Fisher goes so far as to count a loaf of bread as capital. Consumption occurs only as and when the body eats the bread and generates sensations the consumer feels. The difference between the bread and a house or a factory, he says, is a matter not of kind but of degree, the length of time over which the object yields services. (1906, Chapter X)

Fisher recognized disservices and negative psychic sensations too, from working, for example. (Yet he himself got only pleasure from his work.) At times he came quite close to washing out net social product from labor inputs, by treating them like intermediate goods and counting all wages as compensation for disutility of work. Although Fisher pushed the logic of his arguments to extremes, he was quite prepared to sacrifice purity to practicality in applications.

Fisher explained at length that many of the ultimate capital assets of a society, those that bring sensations of satisfaction to its members, are owned by its members indirectly, by complicated networks of financial and business institutions and intermediary claims and debts. Double-entry bookkeeping, he showed, makes it clear how intermediary claims and obligations wash out -- his "method of couples." What is left is the value of the social capital, whose yield is society's income. This is necessarily equal to the sum of the net worths of all individual members, obtained by his "method of balances." (1906,

THE CONCEPT OF INCOME

Fisher's "nature of capital" was controversial at the time, but it is much less so now. His "nature of income" was even more controversial then, and it remains controversial to this day. Fisher defined income as consumption. The implication that a wealthy household or society has a low "income" in periods when it chooses to live frugally and accumulate capital, and a high "income" in periods when it is depleting capital, is difficult to swallow. Some concept of <u>sustainable</u> consumption seems preferable. That is why what came to be known as the Haig-Marshall concept of income, namely that rate of consumption consistent with maintaining capital intact, gained wider acceptance than Fisher's proposed definition.

Fisher was well aware of the problem, and in <u>The Nature</u> he called the hypothetical intact-capital rate of consumption "standard income." (1906, p. 110) In his 1946 memoir, he confesses some regret that he lost some acceptance of his ideas by insisting too strongly on identifying income with actual consumption. At that time, he agreed that actual consumption plus capital accumulation, positive or negative, was a useful definition.

However, Fisher had a strong point in favor of his original position. His larger vision, brought to fruition in <u>The Rate of Interest</u> (1907), was that capital assets throw off streams of services of value in consumption, and that the <u>values</u> of those assets are the discounted values of those future services. Asset values are oriented to the future, not to historical cost. This clearly must be so in the case of land, and the principle applies generally. The rates of discount are determined jointly by intertemporal consumption preferences and production opportunities. It is not in principle possible to know what Haig-Marshall income would be, and to know how much saving and capital accumulation are taking place, without knowing what valuations of capital would prevail if capital actually were being held intact and its valuations were not changing. But capital valuations themselves depend on interest rates, which would be different in a steady state from what they are when consumption is irregular. For one thing, the provision for capital depreciation that must be made to maintain capital intact is not independent of interest rates -- consider how to write off a machine that yields constant services for a finite time and then collapses. If Haig-Marshall income is well defined only when it is steadily equal to Fisher income, i.e. to consumption, then it is not so clearly a preferable concept.

Considerations of this kind led J.R. Hicks to say that in economic dynamics income and saving "are bad tools, which break in our hands." (Hicks, 1939, p. 177). In Paul Samuelson' famous 1961 article on the subjects Fisher tackled in 1906, he showed that neither the Haig-Marshall nor the Fisher income definitions can be relied upon for reliable and sensible comparisons of welfare over time or between economies. For example, would you rather live in economy J or economy U, when U is currently producing and consuming more but J is building more capital facilities and is growing faster? Samuelson's conclusion is in the spirit of Fisher and of Hicks. Do not compare current incomes on any definition. Instead, measure welfare as the discounted value of the expected consumption stream of an individual or an economy.

One of Fisher's often stated arguments was that the inclusion of saving in income is double counting. A dollar of income is counted when it is received, and its future yields, which presumably equal a dollar in present value, are counted in future incomes. Fisher fought a lifelong crusade, publishing a tract as late as (1942), against double taxation of saving. He was essentially advocating a consumption tax to replace the conventional income tax. This is one of several Fisher causes that have picked up adherents in the profession in recent years.

The Rate of Interest, published the following year, deserves Samuelson's judgment (1961) as the greater of the two books. It is profound and seminal economic theory, while The Nature is a sophisticated treatise on accounting. Yet the first book was the indispensable prelude of the second. In The Rate there are no less than thirty-seven references to The Nature. Most important is the idea that the value of an asset is the capitalization of the stream of future services expected to be thrown off by the asset. That insight is central to both books. In the first, it is the central principle of individual and social accounting. In the second, it becomes the equilibrium condition for determining interest rates.

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