Reading notes from Irving Fisher’s *The Theory of Interest*, 1930

Preface -- It was the misunderstanding of my theory of interest put forward in my 1907 book the *Rate of Interest* that led me to adopt the catchword “investment opportunity” as a substitute for the inadequate term “productivity” which had come into general use. This combined with my early “impatience theory” led to the *impatience and opportunity theory* which can be said to be distinct from all other theories of interest because it explicitly analyzes opportunity and fits together impatience and opportunity and income. **The income concept plays the basic role in the theory of interest.** I venture to hope that the theory here presented, will be found not so much to overthrow as to coordinate previous theories, and to help in making the chain of explanation complete and strong.

The term “investment opportunity” seems to be the nearest expression in popular language to suggest the technical magnitude r employed in this book. The full expression for r is the rate of return over costs, and both cost and returns are differences between two optional income streams. So far as I know, no other writer on interest has made use of income streams and their differences, or rates of return over cost per annum.

Part I Introduction Chapter 1 income and capital Paragraph 1 subjective or enjoyment income.

It is only what we carry out of the marketplace into our homes and private lives which really counts. Money is of no use to us until it is spent. The ultimate wages are not paid in terms of money but in the enjoyment it buys. Enjoyment income is a psychological entity; we can approximate it indirectly by going one step back a bit to what is called real income. Real wages and indeed real income in general consist of those final physical events in the outer world which give us our inner enjoyment.

Just as we went back of an individual's enjoyment income to his real income, we now go back to his real income or his living, to his cost of living, the money measure of real income.

Enjoyment income, real income, and the cost of living are merely three different stages of income.

All three run closely parallel to each other, although they are not exactly synchronous in time.

Strictly speaking in making up our income statistics we should always calculate the value of services and never the value of the objects rendering those services. Spending and investing differ only in degree, depending on the length of time and lapsing between the expenditure and the enjoyment. To spend is to pay money for enjoyments which come very soon. To invest is to pay money for enjoyments which are deferred to a later time.

Thus we have a picture of three successive stages or aspects of a man's income: 1 enjoyment or psychic income, consisting of agreeable sensations and experiences; 2 real income measured by the cost of living; 3 money income consisting of the money received by a man for meeting his cost of living;
The last -- money income -- is most commonly called income; and the first -- enjoyment income -- is the most fundamental. But, for accounting purposes, real income, as measured by the cost of living, is the most practical.

To recapitulate, we have seen that enjoyment income is a psychological matter, and hence cannot be measured directly. So we look to real income instead; but even real income is a heterogeneous jumble. It includes quarts of milk, visits to the moving picture house, etc., and in that form cannot be measured easily or as a whole. Here is where the cost of living comes in. It is the practical, homogeneous measure of real income. As the cost of living is expressed in terms of dollars it may, therefore, be taken as our best measure of the income in place of enjoyment income, or real income. Between it and real income there are no important discrepancies as there are between money income and real income. Money income practically never conforms exactly to real income because either savings raise money income above real income, or deficits push money income below real income.

The entire group of property rights are merely means to an end -- income. **Income is the alpha and omega of economics.** The bridge or link between income and capital is the rate of interest.

*We may define the rate of interest as the percent of premium paid on money at one date in terms of money to be in hand one year later.* Theoretically we may substitute for money in this statement wheat or any other sort of goods. But practically, it is only money which is traded as between present and future.

The value of capital must be computed from the value of its estimated future net income, not vice versa. Valuation is a human process in which foresight enters. Coming events cast their shadows before. Our valuations are always anticipations.

Any cost is simply a negative item of income. The principles which have been explained for obtaining the present value of the future sums apply very definitely to many commercial transactions. The value of a note is always the discounted value of the future payment to which entitles the holder. Elaborate mathematical tables have been calculated that are used by brokers for informing their customers what price should be paid for a 5% bond in order that the purchaser may realize 5% or any other rate of interest on the prices to be paid. The price of the bond is calculated from two items, the rate of interest to be realized in the series of sums or other benefits which the bond is going to return to the investor. **Capital value is income capitalized and nothing else.**

The most interesting and valuable results of applying bookkeeping principles is that we automatically separate capital from income. Capital gains are merely capitalization of future income. They are never present income. Therefore the true meticulous accounting item by item of the income or the services and the services rendered by any specific group of capital items will never confuse capital gain in that capital group with income realized from that group. A bond price will grow with accrued interest between two coupon cuttings. That growth in its value is not income but increase of capital. Only when the coupon is detached does the bond render, or give off service and yield income.
The income consists in the event of such off giving, the yielding or separation. If the coupon is reinvested in another bond that event is outgo and offsets the simultaneous income realized from the first bond. There is then no net income from the group but only growth of capital. The absurdity is especially evident when the cause of an increase or decrease in the capital value of a bond or investment is not due to any change in the expected income at all but comes through a change in the rate of interest. Bond prices fluctuate in value every day with every change in the money market yet the income they actually yield flows on at the same rate.

The problem of the rate of interest is entirely a problem of spending and investing, of deciding between various possible enjoyments constituting income, especially between relatively small but immediate enjoyment and relatively large but deferred enjoyment. The student should try to forget all former notions concerning the law of supply and demand of capital as the causes of interest. Capital is merely the translation of future expected income into present cash value; whatever supply and demand we have to deal with is rather the supply and demand of future income.

We may define the pure rate of interest as the rate on loans that are devoid of chance. There are two chances which should thus be eliminated one tends to raise the rate the chance of default the other tends to lower it the chance to use the security as a substitute for ready cash.

We have described the rate of interest as the percentage premium on present goods over future goods of the same kind. Does the kind of goods affect the premium? This important question may well engage our attention at the beginning. If the monetary standard were always stable with reference to goods the rate of interest reckoned in terms of money would be the same as if reckoned in terms of goods. The influence of such changes in the purchasing power of money on the money rate of interest will be different according to whether or not the changes are foreseen. In so far as the appreciation is foreseen any increased burden to the debtor in the principal may be somewhat offset by a reduction in the rate of interest. This is a fact which is seldom been recognized. In order to compensate for every 1% of appreciation or depreciation, one point would be subtracted from are added to, the rate of interest; that is, and interest rate of 5% would become 4%, or 6%, respectively.

Limits of the divergence.
For instance if the rate of interest expressed in gold is 4% and if wheat appreciates relatively to gold at 4% also, the rate of interest expressed in wheat, if perfectly adjusted, would theoretically have to sink to zero! If it were definitely for known that wheat was to appreciate as fast as 4% when the rate of interest in money is 4% wheat would be hoarded since so many people would want it at its present price would instantly come within 4% of its next year's price. This would prevent the rate of interest in terms of wheat from passing below the zero mark. It is important to emphasize that these limits imposed on the rates of interest and depreciation imply the possibility of hoarding wheat or other durable commodities. We may regard the storage and other costs of carrying wheat as permitting to that extent a negative rate of interest in terms of wheat.
The theoretical relation existing between interest and depreciation implies that the rate of interest is always relative to the standard in which it is expressed. We thus need to distinguish between interest expressed in terms of money and interest expressed in terms of other goods. Since there are no two forms of goods that can be expected to maintain an absolutely constant price ratio towards each other there are therefore theoretically just as many rates of interest expressed in terms of goods as there are kinds of goods diverging from one another in value. Real income, a composite of consumption goods and services, in other words, a cost-of-living index in accordance with the principles set forward in Chapter 1, affords a practical objective standard. A rate of interest in terms of fundamental income itself would seem to come as near as we can practically expect to any basic standard in which to express a real rate of interest.

When the cost of living is not stable the rate of interest takes the appreciation and depreciation into account to some extent, but only slightly and in general indirectly. When prices are rising the rate of interest tends to be high, but not as high as it should be to compensate for the rise; when prices are falling the rate of interest tends to be low, but not as low as it should be to compensate for the fall. As matters are in view of almost universal lack of foresight the relation has greater practical and theoretical importance.

The translation of the rate of interest from one standard into another does not determine the rate of interest in any standard whatever; for it assumes that the rate in someone's standard is already known, and merely enables us on the basis of this known rate to calculate the rates in other standards. The premium that is the terms of exchange of this year's income and next year's income may be said to depend on the relative supply and demand of those two portions of the income stream; and this statement may be interpreted as including almost the entire impatience and investment opportunity theory of this book. To say that the rate of interest is fixed by supply and demand is merely to state not to solve the problem. The real problem is to analyze the particular supply and demand forces operative in determining the rate of interest.

Nor are we enlightened by saying that the rate of interest is the price of money. For it is equally true that the purchasing power of money is the price of money. Yet the rate of interest and the purchasing power of money are two very different things. Enough has already been said to show that an increase in the quantity of money in circulation tends to raise the price level and consequently to depreciate the value of the money unit. This depreciation tends to increase the rate of interest. Yet there is a very persistent belief that an increase or decrease in the quantity of money in circulation causes a decrease or increase in the rate of interest. This fallacy seems to be based on a confused interpretation of the general observation that the rate of interest rises or falls with a decrease or increase in the reserve ratio of banks. The maladjustment between the money in banks and in circulation is soon corrected as the demand for loans overtakes the supply. If a doubling of the quantity of money doubles prices and people need twice the money to make the same purchases in the demand is doubles along with the supply and the rate of interest remains as before.
One of the most common superficialities in this field of thought is the naïve idea that interest expresses the physical productivity of land or of nature or of man. The statement that capital produces income is true only in the physical sense; it is not true in the value sense. Capital value does not produce income value. In short we are forced back to the confession that when we are dealing with the values of capital and income their causal connection is the reverse of that which holds true when we are dealing with their quantities.

Interest is not a cost. While interest is a payment like any other it is a cost or outgo to the payor, but it is income to the payee. Interest itself is capital gain and is neither negative income nor positive income.

Part II The theory and words

It will help the reader to proceed in the following analysis if he tries to forget capital and instead think exclusively of income. Capital wealth is merely the means to the income, while capital value is merely the capitalization of expected income; the theory of interest bears a close resemblance to the theory of prices, of which, in fact, it is a special aspect.

All-time preference resolves itself in the end into the preference for comparatively early income over comparatively remote, or deferred, income. Moreover the preference for earlier prompt income ultimately resolves itself into the preference for early enjoyment income over deferred income. We may think of time preference as the preference for a dollar’s worth of early real income over a dollar’s worth of deferred real income. It is assumed, then, that the income goods are reduced to a common money denominator, and that the prices of all items of real income are predetermined.

All problems of local prices, exchange, and interest, act and react on each other in many ways. The problem of time foreign exchange, or forward foreign exchange, is indicated by the diagonals and involves both interest in foreign exchange that he is both the time to time factor and a place to place factor combined in the same transaction. In this book the problems of price determination in one place and at one time are supposed to have been solved.

In actual life there are many periods and an indefinite number of them. Theoretically there might be a rate of interest connecting every pair of possible dates. For instance, there might be a rate of interest between the present and one year hence, another between one-year hence and two years hence, and so on, all the rates being quotable in today's markets. In practice no rates are actually quoted except those connecting the present which of course merely means a future date near the present and several more remotely future dates. A rate on a five-year contract may be considered as a sort of an average of five theoretically existing rates, one for each of the five years covered.

It is to be remembered that the degree of impatience is the percentage preference for one dollar certain of immediate income over one dollar also certain of the income of one year
hence, even if all the income except that dollar be uncertain. The influence of risk on
time preference therefore means the influence of uncertainties on the anticipated income
of an individual upon his relative valuation of present and future increments of income
both increments being certain.

This view that the degree of impatience and consequently the rate of interest depend upon
income needs to be contrasted with a common view which makes the rate of interest
depend merely on the scarcity or abundance of capital. It is commonly believed that were
capital is scarce interest is high and where capital is plentiful interest is low -- in a
general way there is undoubtedly some truth to this belief yet it contains a
misinterpretation of borrowing and lending.

Chapter 6 -- The first choice from many optional income streams and second choosing
the most desirable time shape of his income stream by exchanging present income against
future. The two sets of choice are exercised concurrently in practice. The first flexibility
of income comes from borrowing and lending. Then comes the process of buying or
selling, which really includes the special case of borrowing and lending. It might be
claimed that just as buying and selling virtually include borrowing and lending so the
substitution of one use of a person's capital for another use they be said to include buying
and selling and therefore also to include borrowing and lending. It may evidently be
quite possible that one method of utilizing capital is to sell it. In fact the merchant
regards himself as making use of the stock in trade only in the sense of selling it.

The rate of interest is just as relevant to this initial choice of uses for maximum present
value as to the subsequent choice for shape alone, for it is used in finding the present
value; and when the rate changes, the relative present values of differently shaped
streams may change about. We shall suppose that there is a uniform rate of interest that
any individual is free either to borrow or lend at that rate up to the amount desired.
Under this hypothesis the choice among the three available options will simply fall on
that one which yields the maximum present value reckoned at the market rate of interest.

We may totally separate therefore the two choices made by the landowner, namely, 1- the
choice of mining in preference to farming or forestry on the ground of the greater present
value and 2-- the choice of time shape.

Paragraph 4 opportunity in to invest by change of use of capital

Since the double choice results, when made, in a perfectly definite income stream, it
might seem that the situation does not materially differ from the case of the rigid income
stream discussed in the first approximation. But the two cases do differ materially for
under the present hypothesis of optional income streams the choice made by the
individual depends upon what the rate of interest is. A change in that rate may shift the
maximum present value of some other option or alternative income stream and that shift
reacts on the rate of interest. A change in the rate of interest may thus change the relative
attractiveness of different optional income stream opportunities. A high rate of interest
will encourage investment in the quickly returning incomes whereas a low rate of interest
will encourage investment in incomes which yield to distant returns. For the individual the rate of interest will determine the choice among his optional income streams but for the society as a whole the order of cause and effect is reversed -- the rate of interest will be influenced by the range of options open to choice.

Chapter 7

Investment opportunity is the opportunity to shift from one such position or optimal income stream to another. The concept of investment opportunity rests on that of an option, an option is any possible income stream open to an individual by utilizing his resources. Thus we could think of a proposal to substitute the use of land for forestry for the use of land for farming as an opportunity to invest. At different rates of interest one or the other of these opportunities will be most profitable in the sense of having the highest present value. When we compare these two optional income streams and either may be preferable to the other according as one rate of interest or another obtained the two options would stand on a par if the right intermediate rate were used for calculating the present values of the two options. This hypothetical rate of interest which is used in calculating the present worth of the two options compared will equalize them may be called the rate of return over cost and here after this name was generally be employed.

This new magnitude in our study plays the central role on the investment opportunity side of interest theory. The expression rate of return over cost is applied to the comparative merits of two alternative income streams. I repeat that by cost is meant the comparative loss from one's income stream, at first caused by substituting one use of capital for another, and by return is meant the comparative game which accrues usually later by reason of the same substitution. The cost is literally the difference it makes today, and the return is the difference it makes in the future -- the first negative, the second positive. If the actual rate of interest is 4% a person using the land for farming or thinking of doing so would find forestry preferable. The change from farming to forestry would cause certain sacrifices of income in the first four years as specified in table 6 page 153 but would return certain net additions thereafter. The rate of return over cost which would be realized by choosing the forestry rather than the farming use is 4.2%. The farmer would be realizing 4.2% which is more than the market rate of 4%. If now the market rate of interest were 4.5% it would not pay to change from farming to forestry for to do so would return only 4.2% as compared with 4.5% which could be earned in the loan market. The farmer would prefer to invest at 4.5% by lending in the first four years rather than sacrifice the same amounts for 4.2% by giving up farming for forestry. To induce him to make a change the rate of return over cost must exceed the rate of interest.

Out of all possible options open to a person that particular one is selected for comparison of which with any other option offers a rate of return over cost equal or greater than the rate of interest

Paragraph 6 Marginal rate of return over cost
The range of choice may be expanded from a few definite options to an infinite number varying by continuous gradations. The farmer may carry farming to any degree of intensity in the same may be said of mining or lumbering. For each particular degree of intensity he will have a different income stream. Each successive choice compared with its predecessor follows the law decreasing returns. The intensiveness of his farming is thus determined by the rate of interest. When applied to natural sources there is an element of truth in the organic productivity of Henry George and Alexandre Del Mar to argue that the rate of interest depends on productivity in the average rate of growth of animals and plants.

Range of choice depends on interest-rate. Up to this point one complication has been kept in the background. It consists in the fact that not only does the choice between different optional income streams depend upon the rate of interest but also that even the range of choice depends upon that rate. If the rate of interest is changed it produces changes not only in the present values of the income items but in the income items themselves.

Impatience is strengthened by growing wants and opportunity is weakened because of diminishing returns.