

Introduction to Interest Rates

1. Introduction

The nominal rate of interest is the annual percentage return that one gets when one lends a dollar instead of “consuming” it. Suppose the interest rate is 7.0%. If you lend \$100.00 at the beginning of the year, you should receive \$107.00 at the end of the year. Looked at from the other side of the same transaction, the interest rate is the cost of borrowing. The person who borrows \$100.00 must pay back \$107.00 at the end of the year.

Most borrowers and lenders do not deal directly with one another. They deal with each other indirectly through a financial institution such as a bank or money market fund. The lender of funds deposits them in the bank and the bank loans those funds to the borrower. Typically, the rate of interest received by the borrower is lower than the rate of interest paid by the lender. The difference between borrowing and lending rates is a revenue source for the financial institution.

2. The “real” rate of interest is the “price of patience.”

a. Good decision making requires that one adjust the rate of interest by subtracting from it the rate of inflation expected to occur during the period in question. If R is the nominal rate of interest and π is the expected rate of inflation then the real rate of interest, r , is given by the equation $r = R - \pi$.

Example: The nominal rate of interest is 7.00% and the expected rate of inflation is 2.5%. In this case, the real rate of interest is 4.5%.

Questions:

What is the proper interpretation of the real rate of interest?

What does it mean for the real rate of interest to be 4.5%?

Why does good decision-making require use of the real rate of interest?

b. Patience is the willingness to defer use of a valuable resources for a period of time. Patience is a valuable service. When someone defers use of resources, someone else is able to use those resources sooner than they otherwise would.

3. Because patience is scarce, the forces of demand and supply determine a positive price for patience. That price is the real rate of interest.

Notes on *Theory of Interest* by Irving Fisher

1. “Income is a series of events.” (p.3)
 - a. Most individuals labor and thereby earn money. With their earnings, they buy goods and services, and enjoy the use of those goods and services. At one level, “income” could be said to measure the enjoyment that individuals experience by using goods and services.
 - b. By “real income,” Fisher means the goods and services that an individual normally enjoys—the living of that individual. In modern economies, real income is a statistic that is computed as the dollar-value of goods and services (produced or consumed) divided by an index of the general level of prices.
 - c. Some goods are durable. When a durable good is part of an individual’s living, only a “... fair portion of the purchase price...” is part of the cost of living (p. 8).

2. “Discounting is fundamental.” (p. 14).
 - a. The value of capital is computed from the value of the estimated future income it produces.
 - b. Capital good μ Flow of Services μ Income value μ Capital value
 - c. Because a dollar received in the future is less valuable than a dollar in hand today, we need some procedure to evaluate the current value of future payments. In these notes, we assume that all payments will occur without any risk of default. The concept we will use to compute the value of future payments is “present value.”
 - d. Suppose the interest rate is expected to be constant over the M-year life of the asset and suppose the asset promises to pay S_{t+j} dollars in period t+j. Then present value is defined to be:

$$PV_t = \frac{S_{t+1}}{(1 + R)} + \frac{S_{t+2}}{(1 + R)^2} + \frac{S_{t+3}}{(1 + R)^3} + \dots + \frac{S_{t+M}}{(1 + R)^M}$$

The present value of a stream of payments is an amount that would permit you to replicate the stream provided you can borrow and lend at the same rate of interest used in the PV computation.

3. Capital gains are not the same as income.
 - a. Capital gains are due to changes in the future value of income or to changes in the rate of interest.
 - b. The reason that we often think of capital gains (say an increase in the value of shares of stock that we own) as income is that they are sometimes treated as income for purposes of taxation and that they permit us to buy more goods.

4. Human impatience is the preference for current over future income.
 - a. Fisher hypothesizes that early enjoyment of income is normally preferred to later enjoyment of income, other things unchanged.
 - b. Fisher expresses human impatience as a percentage. If Fred's rate of impatience is 5%, Fred would be willing to exchange 100 dollars of real income today for 105 dollars of real income next year.
 - c. Fisher hypothesizes that human impatience depends on the size and shape and certainty of one's income stream, that is on the time profile of one's lifetime income.
 - i. If Fred has higher income later than now, Fred will have a high rate of impatience.
 - ii. If Fred has a low income relative to what is needed to sustain life, Fred will have a high rate of impatience.
 - iii. If Fred's future income is uncertain but his present income is sure, Fred will have a low rate of impatience.
 - d. Fisher argues that personal characteristics also affect human impatience.
 - i. A person with foresight and self-control will tend to have a low rate of impatience.
 - ii. A person born into a tradition of patience will tend to have a low rate of impatience.
 - iii. A person who expects a long life or who has children will tend to have a low rate of impatience.
5. In the first approximation, Fisher argues that the rate of interest that is observed in the market place is the rate of interest that reconciles the desire of impatient people to borrow with the desire of patient people to lend.
 - a. If the market rate of interest is 4%, an impatient person with a rate of impatience of 5% will borrow and thereby increase current income and lower future income. Borrowing will lower the borrowers rate of impatience.
 - b. If the market rate of interest is 4%, a patient person with a rate of impatience of 2% will lend and thereby increase future income and lower current income. Lending will raise the lenders rate of impatience.
 - c. Borrowing and lending continue until everyone has a rate of impatience equal to the market rate of interest.
 - d. By borrowing (or lending) until her rate of impatience equals the market rate of interest, Fred increases her well being by trading a less preferred income stream for a more preferred income stream.
 - e. In equilibrium, the rate of interest must clear the market. It must balance the desires of those who entered the market as impatient people and those who entered the market as patient people. In equilibrium, everyone has a rate of impatience equal to the market rate of interest. No one wants to borrow more. No one wants to lend more.

6. If the collection of interest through loans was made illegal, private citizens would seek other methods to change the time shape of their income streams.
 - a. Those who wanted more future income would buy young orchards or equity in young companies with good business plans.
 - b. Those who wanted more current income would sell young orchards or equity or would enter into contracts whereby they received income now for labor supplied in the future.