

## Lecture 4: Investing

### I. Why Invest?

To transfer resources to the future and at least keep pace with inflation.

Inflation erodes the purchasing power of dollars - if keep "money in a mattress", it loses value.

### II. What Do You Look for When You Invest?

Want to earn the highest *real interest rate* (nominal or observed interest rate minus inflation rate) for the level of *risk* you're willing to take.

Example of real interest rate

Nominal, or observed, interest rate = 10%

Inflation rate = 4%

Real interest rate = 6%

Risk = chance of losing your invested money

Reality: Risk and real interest rate (also called "real rate of return") usually go together: the greater the chance you're willing to take with your investments, the higher the *potential* reward you must receive

Impact of taxes: Taxes come "off the top" - they are charged on the nominal interest rate. The "*after-tax nominal interest rate*" would be calculated as:

nominal rate - (tax rate x nominal rate)

Example: Nominal rate = 10%

Tax rate = 30%, or .3

After-tax nominal interest rate =  $10\% - (.3 \times 10\%) = 7\%$

Then, can also talk about *real after-tax interest rate*, where take

After-tax nominal interest rate and subtract the inflation rate:

After-tax nominal interest rate = 7%

Inflation rate = 4%

Real after-tax interest rate = 3%

### III. Basic Kinds of Investments

Stocks = ownership of net assets of a company

Inflation hedges = real estate, precious metals, collectibles

Cash = investments easily convertible to cash, like money-market funds and very short term CDs (certificates of deposit)

Long-term bonds = investments earning a fixed interest rate over a long period  
 Each investment has performance tied to stages of the business cycle, as shown below. The business cycle is the irregular ups and downs of the macroeconomy, measured by the characteristics of growth, the inflation rate, and interest rates. The four stages of the cycle are early growth, late growth, early recession, and late recession.

<u>Type</u>	<u>Stage of Business cycle</u>	<u>Growth</u>	<u>Inflation rate</u>	<u>Interest rates</u>
Stocks	Early growth	Yes	Low	Low
Inflation hedges	Late growth	Yes, but slowing	Rising	Rising
Cash	Early recession	No	Rising	Rising
Long term bonds	Late recession	No	Falling	Falling

Stocks thrive when the economy is growing and both inflation and interest rates are low. Inflation hedges do best when the economy is still growing, but the inflation rate is rising. Cash investments are the best pick when the economy has stalled but inflation and interest rates are still rising, because the cash investments will continually earn the higher interest rates. Finally, long term bonds excel when interest rates are falling. Why - because if an investor buys the fixed rate bond when interest rates have peaked, and then holds them when new interest rates fall, the value of the bond will increase.

#### IV. Investment Strategies

Accepting the fact that different investments perform well at different stages of the business cycle, the question is how the individual investor deals with this. There are two alternative approaches:

**Active Management:** Try to perceive what stage the economy is in and then buy the type of investment that does best in that stage.

**Benefit:** Make highest investment return this way.

**Cost:** May incorrectly guess what stage economy is in, and thus invest incorrectly.

**Passive Management:** Realize it is very difficult to predict the economy, so diversify investments among all the types. Change allocation according to life cycle stage, for example, but always invest in each type (diversification)

	<u>Early career</u>	<u>Mid career</u>	<u>Late career</u>	<u>Retirement</u>
Stocks	20%	55%	40%	10%
Inflation hedges	10%	25%	15%	5%
Cash	50%	10%	20%	60%
Long term bonds	20%	10%	25%	25%

## V. Other Investment Concepts

Mutual funds: a *way* of investing, not a *type* of investing; many investors pool their funds and hire a manager to pick the investments

Tax-favored investments: investments which get a tax break, by having their interest earnings either not taxed or taxed at a lower rate  
Examples: municipal bonds, IRAs, 401k plans

Insurance and risk-sharing: Purchase insurance to protect against large financial losses that you can't predict or control. Key is people know they are exposed to the risk, but they don't know if they will suffer the loss. So many people are motivated to contribute to a "pool" of money that then goes to those suffering the loss.

## VI. Interest Rates

Interest rates for short term investments, generally of a year or less, are called *short-term interest rates*. Interest rates for long term investments, generally of several years, are called *long-term interest rates*.

Usually, long-term interest rates are higher than short-term interest rates. The reason is the greater uncertainty, or risk of investing money for a longer period of time. A graph which shows the pattern of interest rates with the length of the investment is called a *yield curve*, and it usually slopes upward with time.

Sometimes, the yield curve flattens, meaning there is no difference between short-term and long-term interest rates. Often this means investors are forecasting a slower economy. Also, rarely, but sometimes, the yield curve becomes inverted, meaning short term interest rates are higher than long term interest rates. This is often interpreted as signaling an upcoming recession.

## VII. Present and Future Value

Future dollars will be worth less than current, or present, dollars for two reasons:

- \* inflation makes them worth less
- \* you could invest dollars today in something safe and have more dollars in the future

So to compare future dollars to current dollars, must adjust the future dollars. We do this by calculating the *present value* of future dollars.

The *discount rate* is the interest rate used to make this calculation. It gives the rate at which future dollars trade for current dollars. So, for example, a discount rate of 5% means it takes \$1.05 in one year to equal \$1.00 today.

Discount rate will vary by individual. People who live "more for now" will use a higher discount rate, whereas people who are "more forward looking" will use a lower discount rate.

Formula:

Present value = Future value x present value converter (Walden, p. 16).

For your reference, the present value converters on page 16 are the result of this calculation:

$$\frac{1}{(1 + r)^n}$$

where r is the discount rate and n is the number of time periods. The values "r" and "n" must be consistent with respect to time, for example, if r is a rate per year, n must be number of years, or if r is a rate per month, n must be number of months.

See Walden, Chapter 3 for examples.