FINANCIAL TERMINOLOGY
AND
BASIC CALCULATIONS

Economics
Finance
Unit Four BA
Marshall High School
Mr. Cline
* Finance is Investing

• An **investment** is a current commitment of money or other resources with the expectation of reaping future benefits. You can define a sacrifice in much the same way, so investing does require sacrifice, or delayed gratification, which is putting off doing or receiving something small today in exchange for the expectation of gaining something more important in the future. This is also the definition of opportunity cost.

• We make investments in many areas of our lives. Important investments include education and skills, knowledge, friendships, food storage, emergency funds and finances.

• For the most part, we will be working with financial investments in this section of the course; stocks (or equities), bonds, cash, treasury bills and notes, options, futures and so on.

• Just as money is not everything in pursuing a career, it is also not everything in investing. It is important that we have a broader view of what an investment is so that we recognize those investments that are of the most worth. You should have priorities when it comes to your investments.
* Define the Word “and”…..

- For you to understand your investments and the language of finance, you must understand several key terms.

  - **Amortized loan**: A loan paid off in equal installments composed of both principal and interest.

  - **Annuity**: A series of equal payments; these payments are made at the end of a specific time period for a specified number of time periods (generally months or years).

  - **Compound annuity**: An investment that involves depositing the same amount of money at the end of each year for a certain number of years and allowing the investment to grow.

  - **Compounding (annually, quarterly, daily, etc.)**: The number of periods during the year where interest is calculated. Compound interest is where interest is paid on previously earned interest, as well as on the principal. The shorter the compounding period, the higher the effective annual rate of interest.
For you to understand your investments and the language of finance, you must understand several key terms.

- **Effective interest rate**: The actual rate (as opposed to the stated or nominal rate) that is received after the effects of compounding have been taken into account.

- **Future value (FV)**: The value of an investment at some point in the future.

- **Interest or discount rate**: The stated rate that you will receive for investing at a specified compounding period for a specified period of time.

- **Nominal return**: The return on your investment before the impact of inflation or taxes is taken into account.

- **Present value (PV)**: The current value (today’s value) of a future sum of money.
For you to understand your investments and the language of finance, you must understand several key terms.

- **Principal**: The money that you have available to invest or save, or the stated amount on a bond or deposit instrument.

- **Real return**: The rate of return on an investment after the impact of inflation is accounted for. The formula for approximating the real return is the nominal return minus inflation.

- **Reinvesting**: Taking money that you have earned on an investment and investing it again.

- **Tax-adjusted return**: The return on your investment after the impact of federal and state taxes has been taken into account.
As we stated earlier, compounding is a very powerful force, however, how powerful is dependent in large part on the compounding period.

So, how will different compounding periods impact my investments and my investment returns?

Compounding Periods refer to the frequency with which interest is applied to your investment.

Interest may be compounded daily, weekly, monthly, semiannually or annually.

A key relationship exists between time and interest rate. The shorter the compounding period, the higher the effective annual interest rate.

For example, if interest is compounded daily, the investment will grow faster than if the interest is compounded monthly or annually.
* The Secret Formula

- Finance involves a complex terminology, but much of it can be reduced to simple quantitative formulas which I will demonstrate here.

- The calculation for approximating the real return on an investment is merely the nominal return minus the inflation. However, the exact formula is 
  \[
  \left( \frac{1 + \text{nominal return}}{1 + \text{inflation}} \right) - 1
  \]
  Or,

  \[
  \text{REAL RATE OF RETURN} = \frac{1 + \text{NOMINAL RATE}}{1 + \text{INFLATION RATE}} - 1
  \]

- As we move on in this class, the exact formula is what we will be referring to.

- An example of the real rate of return formula would be an individual who wants to determine how much goods they can buy at the end of one year after leaving their money in a money market account that earns interest.

- For this example of the real rate of return formula, we must assume that the individual wants to purchase the exact same goods and same proportion of goods that the consumer price index uses considering that it is used often to measure inflation.
* The Secret Formula

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- The **Consumer Price Index (CPI)** is a government collected data set that calculates the change in a select number of items for sale in urban markets, and the changes in prices for all of these items over a stated period of time.

- For this example of the real rate of return formula, the money market yield is 5%, inflation is 3%, and the starting balance is $1000. Using the real rate of return formula, this example would show:

  \[
  \text{REAL RATE OF RETURN} = \frac{1 + 0.05}{1 + 0.03} - 1
  \]

  Which would return a real rate of 1.942%. With a $1000 starting balance, the individual could purchase $1,019.42 of goods based on today's cost. This example of the real rate of return formula can be checked by multiplying the $1019.42 by (1.03), the inflation rate plus one, which results in a $1050 balance which would be the normal return on a 5% yield.
**The Secret Formula**

- The Effects of Compounding

- The formula for calculating the effective interest rate (EIR) is as follows:

  \[
  EIR = \left( 1 + \left( \frac{\text{NOMINAL RETURN (OR APR)}}{\text{NUMBER OF PERIODS}} \right) \right)^{\text{Number of Periods}} - 1
  \]

- Consider a stated annual rate of 10%. Compounded yearly, this rate will turn $1000 into $1100. However, if compounding occurs monthly, $1000 would grow to $1104.70 by the end of the year, rendering an effective annual interest rate of 10.47%. Basically the effective annual rate is the annual rate of interest that accounts for the effect of compounding.

- The following are examples of four investments with four different nominal returns. Which of these investments would you rather own?

  - Investment A- 12.0% Annually
  - Investment B- 11.9% Semi Annually
  - Investment C- 11.8% Quarterly
  - Investment D- 11.7% Daily
* The Secret Formula

• The Effects of Compounding

  • Investment A- 12.0%
    Annually
  • Investment B- 12.25%
    Annually
  • Investment C- 12.33%
    Annually
  • Investment D- 12.41%
    Annually

• Even though Investment D has the lowest nominal return, because of compounding, it has the highest effective interest rate. Investment D would be the best vehicle, assuming you were lending money at this rate. Compounding makes an important difference!
* The Secret Formula

• Back to the........Present?

  • Let’s suppose you want to determine the current value of the ultimate earnings on an investment?

• This question could be restated in the following manner:

  • What is the present value of my investment that will mature in \( n \) years at \( I \) percent interest?

• To solve this problem, you will need to know the future value of your investment, how many years are required for the investment to reach maturity, and what interest rate your investment has.

• The result of the equation will be a dollar amount that is smaller than the future amount of principal and interest that you will have earned; it is the amount that the investment is worth at the present time.
* The Secret Formula

- Back to the……..Present?
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  - This question could be restated in the following manner:
    - What is the present value of my investment that will mature in \( n \) years at \( I \) percent interest?
  - The present value (PV) equation can be stated as follows:
    - \( PV = \frac{\text{FUTURE VALUE}}{(1 + \text{INTEREST RATE})^n} \)
    - In this equation, \( n \) is the number of periods (years in this case) in which interest is compounded.
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• The key inputs in the PV equation are as follows

  • FV = The future value of the investment at the end of \( n \) years.
  • N = The number of years in the future
  • PV = The present value, in today’s dollars, of a sum of money that you have invested or plan to invest

• After you find these inputs, you can solve for the present value (PV)

• You must remember that money you will earn in the future is less valuable than money you have right now in terms of opportunity cost; this is because you cannot use future money to earn interest today, You can only earn interest with money you have in hand.
* The Secret Formula

- Back to the........Present?

- Now, lets try to solve for present value .

- \[ PV = \frac{FUTURE\ VALUE}{(1 + INTEREST\ RATE)^n} \]

- Let’s suppose that your rich uncle promises to give you $500,000.00 in forty years. Assuming a 6% interest rate, what is the present value of the amount your uncle is promising to give you in forty years?

- Now, let’s suppose that you know in five years you will want to buy a house in a particular area, and the average home cost there at that time is estimated to be $350,000. How much would you need to invest now if it would grow at 7.25% annually to pay for the house in total?
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  - \[ PV = \frac{500,000}{(1 + .06)^{40}} \]

  - \[ PV = \$48,611.00 \]
The Secret Formula

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• \( PV = 350,000 / (1 + .0725)^5 \)

• \( PV = 350,000 / 1.419 \)

• \( PV = $246,650.24 \)