Student: _____ Class: _____ Date: _____

Decision Making in Finance: Building an Investment

VI.C Student Activity Sheet 7: Investment Probability

Interest rates are a measure, among many other factors, of risk. The more risky an investment is in actuality and perception, the higher the rate of return. In general, stocks (an investment security that gives you ownership in a company) are riskier than bonds (a security in which you actually lend money to a company). Thus, the rate of return is much higher for stocks than bonds; on average, stocks have a rate of return of 10% annually and bonds 5% annually.

Use the following information when working through these activities:

- All investments have a rate of return (which sometimes can be negative).
- The rate of return on stocks is a percentage called a *return on investment* (ROI) that compounds not from interest payments but from an overall annual increase based on a price per share that changes daily.
- The rate of return on bonds is an actual interest rate percentage that is assumed to compound (much like a certificate of deposit), but may not if you decide not to reinvest the interest.
- Financial analysts use the time value of money (TVM) based on risk, rate of return, and the relationship it has with other investments to determine the market value or price of a share of stock or bond.
- Although interest rates are used in bonds, financial experts use *interest* as the lending rate that the Federal Reserve sets for banks. This may not seem related to stock prices or bonds, but the interest rate set by the Federal Reserve affects the value of all investments.

1. Stock Texas is worth $14.92 per share on Monday. The interest rate drops on Tuesday, and Stock Texas is worth $15.04 per share. What type of relationship can you assume that Stock Texas has with interest rates? Why?

What does this relationship imply about the risk of stocks compared to bonds? Explain your reasoning.

2. On Wednesday, Bond Austin has the best risk rating, *Aaa,* at a price of $72. On Thursday, the risk rating drops to a lower rating of *Aa,* and the price drops to $64. What type of relationship can you assume that the price of Bond Austin has with its risk ratings? Why?

Do you think that this is a reasonable assumption about the relationship between bonds and risk ratings? Why or why not?

3. Assume losing a letter is considered one unit of risk and you assign the highest (meaning better) rating a 9. What does the price of Bond Austin drop to if the risk rating suddenly becomes *Bb* (a risk rating of 5)?

4. Stock Texas has a price of $156 per share when Bond Austin has a price of $23 per bond. Use an equation modeling the inverse variation between the stock and bond prices to predict the price of Stock Texas when Bond Austin is worth $75.

   What is the bond price if the stock price is $71.76?

5. **REFLECTION:** How certain is this prediction? What other factors could affect the price of either investment?

6. **EXTENSION:** Emily, who is 25 years old, has $25,000 to invest. She wants to invest in stocks, bonds, and/or cash accounts (collectively called an investment **portfolio**). Currently interest rates (and inflation) are relatively low, but seem to be on the rise. Decide the percentage and amount that Emily should invest in each category.

   Suppose interest rates go up, but overall risk in investments increases. Should Emily consider adjusting her portfolio? Explain your reasoning.

   Emily will keep her investment for 35 years, which is the time of her retirement. Using the portfolio you developed, find the future value of each category if stocks have an average annual rate of increase of 12%, bonds an average annual rate of increase of 6%, and cash an average annual rate of increase of 3%.

   What is the expected value of each category if the probability of realizing the average rate for stocks is 0.65, bonds 0.8, and cash 0.95?

7. **EXTENSION:** Create your own portfolio and explain what factors influence its expected value. Prepare a report of your information and predictions to share with the class.