MBA 803 – Fundamentals of Finance
Financial Decision Making and the Law of One Price

1) Valuation Decisions
   a) The central goal of this course is to help you develop the tools to make good financial decisions on behalf of the firm's investors

   b) Identify the costs and benefits
      - Generally, the skills you learn in other businesses classes will be needed to identify the relevant costs and benefits of a proposed project:
        – Economics and Marketing
        – Accounting
        – Organizational Behavior & Strategy
        – Operations

   c) Analyze the costs and benefits
      - Suppose a jewelry manufacturer has the opportunity to trade 15 ounces of platinum and receive 10 ounces of gold today. Suppose gold can be bought and sold at a current market price of $1,300 per ounce, while platinum can be bought and sold at $950 per ounce. Should the manufacturer undertake this trade?

d) Using Market Prices to Determine Cash Values

- A _____ is a market in which goods can be bought or sold at the same price.

- Example: Your car recently broke down and it needs $2,000 in repairs. But today is your lucky day because you have just won a contest where the prize is either a new motorcycle, with a MSRP of $15,000, or $10,000 in cash. You do not have a motorcycle license, nor do you plan on getting one. You estimate you could sell the motorcycle for $12,000. Which prize should you choose?

e) The Valuation Principle

- The value of an asset to the firm or its investors is determined by its competitive market price. The benefits and costs of a decision should be evaluated using these market prices, and when the value of the benefits exceeds the costs, the decision will increase the market value of the firm.
- Example #2: You are offered the following investment opportunity: In exchange for $40,000 today, you will receive 2,500 shares of stock in the Ford Motor Company and 10,000 Euros today. The current market price for Ford stock is $9 per share and the current exchange rate is $1.50 per Euro. Should you take this opportunity? Would your decision change if you believed the value of the euro will rise over the next month?

2) Interest Rates and the Time Value of Money

a) Consider an investment opportunity with the following certain cash flows.
   - Cost: $100,000 today
   - Benefit: $105,000 in one year

   The difference in value between money today and money in the future is due to the ***time value of money***.

   Question: How can we compare money we pay today with money we receive in the future?

b) The rate at which we can exchange money today for money in the future is determined by the current interest rate.
   - Let r_f = risk-free interest rate (discount rate)

$$\text{Interest Rate Factor} = 1 + r_f$$

$$\text{Discount Factor} = \frac{1}{1 + r_f}$$

   - Suppose the current annual interest rate is 7%.
     – By investing or borrowing at this rate, we can exchange $1.07 in one year for each $1 today.
   - Value of Investment in One Year
     – If the interest rate is 7%, then we can express our costs as:

     – Both costs and benefits are now in terms of "dollars in one year," so we can compare them and compute the investment's net value:

- Value of Investment Today
  - Consider the benefit of $105,000 in one year. What is the equivalent amount in terms of dollars today?

  - Now we are ready to compute the net value of the investment:

- Present vs. Future Value
  - This analysis demonstrates that our decision is the same whether we express the value of the investment in terms of dollars in one year or dollars today. If we convert from dollars today to dollars in one year:

  - When we express the value in terms of dollars today, we call it the **present value** (PV) of the investment. If we express it in terms of dollars in the future, we call it the **future value** of the investment.

c) The Discount Factor and the Discount Rate

- We can interpret $\frac{1}{1+r} = \frac{1}{1.07} = 0.93458$ as the price today of $1 in one year.
  - The amount $\frac{1}{1+r}$ is called the one-year discount factor.
  - The risk-free rate is also referred to as the discount rate for a risk-free investment.

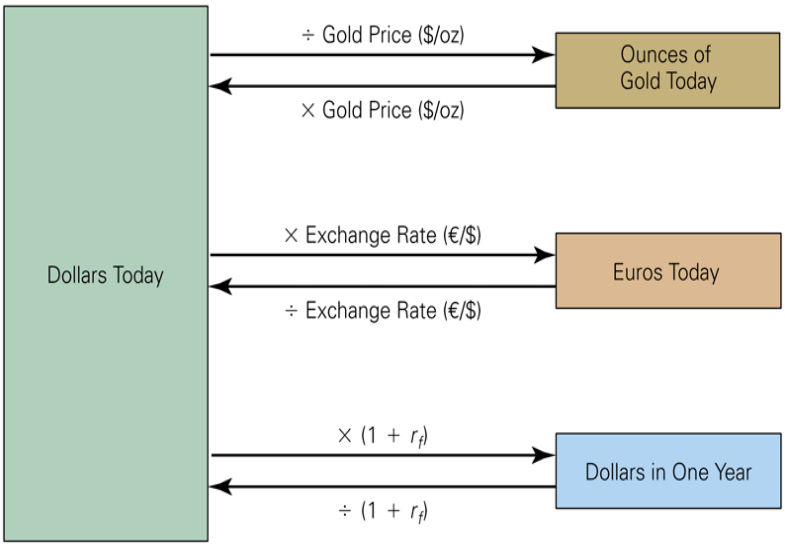
d) Example**:** The cost of replacing a fleet of company trucks with more energy efficient vehicles is $100 million this year; your dealer says that this will be 8.5% higher next year. If the interest rate is 4%, what is the cost of delaying this replacement until next year in today's dollars?

- If the project is delayed, its cost next year will be:

- Compare this amount to the cost of $100 million in 2009 using the interest rate of 4%:

- The cost of a one-year delay would be:

e) Figure 3.1 – Converting between Dollars Today and Gold, Euros, or Dollars in the Future



3) Present Value and the NPV Decision Rule

a) The _____ of a project or investment is the difference between the present value of its benefits and the present value of its costs.

- The NPV Rule says that you should:

  – Accept those projects with _____ NPV because accepting them is equivalent to receiving their NPV in cash today.

  – Reject those projects with _____ NPV because accepting them would reduce the wealth of investors.

b) Example: NPV is Equivalent to Cash Today

Each year your company spends $50,000 on raw materials for your manufacturing process. Your supplier has offered you a discount of $5,000 if you pay for next year's materials in advance. Suppose the risk-free interest rate is 6% per year. Is this offer a good deal?

- The cost of this offer is to pay $45,000 today.

- The benefit is to not have to pay $50,000 in a year.

- What if you don't have $45,000 to pay right now?

c) We can also use the NPV decision rule to choose among projects. To do so, we must compute the NPV of each alternative, and then select the one with the highest NPV. This alternative is the one which will lead to the largest increase in the value of the firm.

- See Example 3.5 in the text

d) NPV and Cash Needs: Regardless of our preferences for cash today versus cash in the future, we should always maximize NPV first. We can then borrow or lend to shift cash flows through time and find our most preferred pattern of cash flows.

- This is also illustrated in Example 3.5 in the text

4) Arbitrage and the Law of One Price

a) Definitions

- The practice of buying and selling equivalent goods in different markets to take advantage of a price difference is called _____.

- An _____occurs when it is possible to make a profit without taking any risk or making any investment.

- A _____is a competitive market in which there are no arbitrage opportunities.

b) The Law of One Price

- If equivalent investment opportunities trade simultaneously in different competitive markets, then they must trade for the same price in both markets.

5) Section 3.5 – No-Arbitrage and Security Prices

a) Valuing a Security with the Law of One Price

- Assume a security promises a risk-free payment of $1,000 in one year. If the risk-free interest rate is 6%, what can we conclude about the price of this bond in a normal market?

  – Suppose the price is $920. In this case, consider the following strategy:

	Today ($)	In One Year ($)
Buy the bond		
Borrow from the bank		
Net cash flow		

  – Suppose instead that the price is $960. In this case, consider the following strategy:

	Today ($)	In One Year ($)
Sell the bond		
Save in the bank		
Net cash flow		

- Unless the price of the security equals the present value of the security's cash flows, an arbitrage opportunity will appear.

  – The *no-arbitrage price* of a security is the price that equals the present value of all of the security's cash flows.

b) If we know the price of a risk-free bond, we can use this no arbitrage condition to determine what the risk-free interest must be.
   - Suppose a risk-free bond that pays $1,000 in one year is currently trading with a competitive market price of $941.18 today. What must be the risk-free interest rate?

c) The Separation Principle
   - In a normal market, the NPV of buying or selling a security is zero:

   - This implies the **Separation Principle:**

     We can evaluate the NPV of an investment decision separately from the decision the firm makes regarding how to finance the investment or any other security transactions the firm is considering.

     – See example 3.7 in the text

d) Valuing a Portfolio
   - Consider two securities, A and B. Suppose a third security, C, has the same cash flows as A and B combined. In this case, security C is equivalent to a portfolio, or combination, of the securities A and B.

     – Value Additivity

- Example: Moon Holdings is a publicly traded company with only three assets:

  – 50% of Due Beverage Co.
  – 70% of Mountain Industries
  – 100% of the Oxford Bears, a football team.

  The total market value of Moon Holdings is $200 million, the total market value of Due Beverage Co. is $75 million and the total market value of Mountain Industries is $100 million.

  What is the market value of the Oxford Bears?