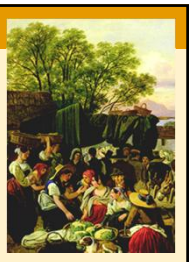
N. Gregory Mankiw

Principles of
Macroeconomics
Sixth Edition



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The Basic Tools of Finance

Premium PowerPoint Slides by Ron Cronovich

In this chapter, look for the answers to these questions:

- What is “present value”? How can we use it to compare sums of money from different times?
- Why are people risk averse? How can risk-averse people use insurance and diversification to manage risk?
- What determines the value of an asset? What is the “efficient markets hypothesis”? Why is beating the market nearly impossible?

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Introduction

§ The financial system coordinates saving and investment.

§ Participants in the financial system make decisions regarding

§ **Finance** is the field that studies such decision making.

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Present Value: The Time Value of Money

- To compare sums from different times, we use the concept of present value.
- The **present value** of a future sum:
- The **future value** of a sum:

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EXAMPLE 1: A Simple Deposit

- Deposit $100 in the bank at 5% interest. What is the future value (FV) of this amount?
-
- In three years, FV =
- In two years, FV =
- In one year, FV =

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EXAMPLE 1: A Simple Deposit

- Deposit $100 in the bank at 5% interest. What is the future value (FV) of this amount?
- In ***N*** years, FV = $100(1 + 0.05)^{N}
- In this example, $100 is the present value (PV).
- In general,
  where ***r*** denotes the interest rate (in decimal form).
- Solve for PV to get:

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EXAMPLE 2: Investment Decision

Present value formula: $PV = FV/(1 + r)^N$

- Suppose $r = 0.06$.
  Should General Motors spend $100 million to build a factory that will yield $200 million in ten years?

Solution:

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EXAMPLE 2: Investment Decision

- Instead, suppose $r = 0.09$.
  Should General Motors spend $100 million to build a factory that will yield $200 million in ten years?

Solution:

Present value helps explain why

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ACTIVE LEARNING 1

Present value

You are thinking of buying a six-acre lot for $70,000. The lot will be worth $100,000 in five years.

A. Should you buy the lot if $r = 0.05$?

B. Should you buy it if $r = 0.10$?

Compounding

- **Compounding**:

- Because of compounding, small differences in interest rates lead to big differences over time.
- Example: Buy $1000 worth of Microsoft stock, hold for 30 years.

  If rate of return = 0.08, FV = $10,063

  If rate of return = 0.10, FV = $17,450

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The Rule of 70

- The Rule of 70:

- Example:
  - If interest rate is 5%, a deposit will double in
  - If interest rate is 7%, a deposit will double in

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Risk Aversion

- Most people are **risk averse**—they dislike uncertainty.
- Example: You are offered the following gamble. Toss a fair coin.
  - If heads, you win $1000.
  - If tails, you lose $1000.

  Should you take this gamble?
- If you are risk averse,

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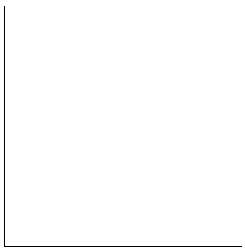
The Utility Function



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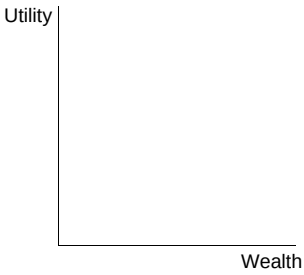
The Utility Function and Risk Aversion



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Managing Risk With Insurance

- How insurance works:
  A person facing a risk pays a fee to the insurance company, which in return accepts part or all of the risk.
-

  E.g., it is easier for 10,000 people to each bear 1/10,000 of the risk of a house burning down than for one person to bear the entire risk alone.

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Two Problems in Insurance Markets

1. **Adverse selection**:

2. **Moral hazard**:

Insurance companies cannot fully guard against these problems, so they must charge higher prices.

As a result,

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ACTIVE LEARNING 2

Adverse selection or moral hazard?

Identify whether each of the following is an example of adverse selection or moral hazard.

A. Joe begins smoking in bed after buying fire insurance.

B. Both of Susan's parents lost their teeth to gum disease, so Susan buys dental insurance.

C. When Gertrude parks her Corvette convertible, she doesn't bother putting the top up, because her insurance covers theft of any items left in the car.

Measuring Risk

§ We can measure risk of an asset with the **standard deviation**, a statistic that

§ The higher the standard deviation of the asset's return,

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Reducing Risk Through Diversification

- **Diversification**

- A diversified portfolio contains assets whose returns are not strongly related:
  - Some assets will realize high returns, others low returns.
  -

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Reducing Risk Through Diversification

- Diversification can reduce

- Diversification *cannot* reduce

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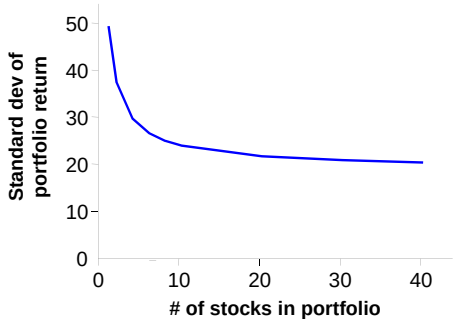
Reducing Risk Through Diversification



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The Tradeoff Between Risk and Return

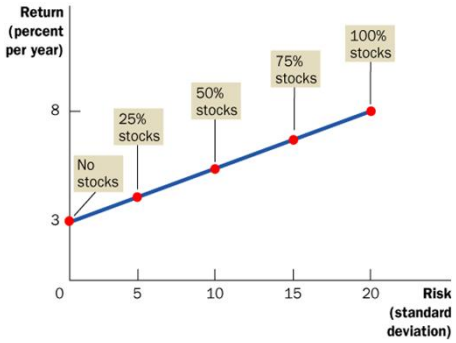
- Tradeoff:

- E.g., over past 200 years, average real return on stocks, 8%. On short-term govt bonds, 3%.

The Tradeoff Between Risk and Return

- Example:
  Suppose you are dividing your portfolio between two asset classes.
  - A diversified group of risky stocks:
    average return = 8%, standard dev. = 20%
  - A safe asset:
    return = 3%, standard dev. = 0%
- The risk and return on the portfolio depends on the percentage of each asset class in the portfolio…

The Tradeoff Between Risk and Return



Asset Valuation

- When deciding whether to buy a company's stock, you compare the price of the shares to the value of the company.
  - If share price > value, the stock is
  - If price < value, the stock is
  - If price = value, the stock is

ACTIVE LEARNING 3

Valuing a share of stock

If you buy a share of AT&T stock today,

- you will be able to sell it in 3 years for $30.
- you will receive a $1 dividend at the end of each of those 3 years.

If the prevailing interest rate is 10%,
what is the value of a share of AT&T stock today?

ACTIVE LEARNING 3

Answers

Asset Valuation

- Value of a share =

- Problem: When you buy the share, you don't know what future dividends or prices will be.
- One way to value a stock:

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ACTIVE LEARNING 4

Show of hands survey

You have a brokerage account with Merrill Lynch. Your broker calls you with a hot tip about a stock: new information suggests that the company will be highly profitable.

Should you buy stock in the company?

A. Yes
B. No
C. Not until you read the prospectus.
D. What's a prospectus?

The Efficient Markets Hypothesis

- **Efficient Markets Hypothesis (EMH)**:

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Implications of EMH

1. Stock market is **informationally efficient**:

2. Stock prices follow a **random walk**:

3.

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Index Funds vs. Managed Funds

- An **index fund** is
- An actively managed mutual fund aims to buy only the best stocks.
- Actively managed funds have higher expenses than index funds.
- EMH implies that

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Index Funds vs. Managed Funds

	2001–2006 annualized return	2006 expense ratio
S&P 500 (index fund)	6.2%	.351
Managed large cap funds	5.9	1.020
S&P MidCap 400 (index fund)	10.9	.535
Managed mid cap funds	8.1	1.458
S&P SmallCap 600 (index fund)	12.5	.550
Managed mid cap funds	10.3	1.272

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Market Irrationality

- Many believe that stock price movements are partly psychological:
  - J.M. Keynes: stock prices driven by "animal spirits," "waves of pessimism and optimism"
  - Alan Greenspan: 1990s stock market boom due to "irrational exuberance"
- **Bubbles**
- The importance of departures from rational pricing is not known.

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CONCLUSION

- This chapter has introduced some of the basic tools people use when they make financial decisions.
- The efficient markets hypothesis teaches that a stock price should reflect the company's expected future profitability.
- Fluctuations in the stock market have important macroeconomic implications, which we will study later in this course.

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