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## The Basic Tools of Finance

- *Finance* is the field that studies how people make decisions regarding the allocation of resources over time and the handling of risk.

# PRESENT VALUE: MEASURING THE TIME VALUE OF MONEY

- *Present value* refers to the amount of money *today* that would be needed to produce, using prevailing interest rates, a given future amount of money.

# PRESENT VALUE: MEASURING THE TIME VALUE OF MONEY

- The concept of *present value* demonstrates the following:
- Receiving a given sum of money in the present is preferred to receiving the same sum in the future.
- In order to compare values at different points in time, compare their present values.
- Firms undertake investment projects if the present value of the project exceeds the cost.

# PRESENT VALUE: MEASURING THE TIME VALUE OF MONEY

- If  $r$  is the interest rate, then an amount  $X$  to be received in  $N$  years has present value of:

$$X/(1 + r)^N$$

# PRESENT VALUE: MEASURING THE TIME VALUE OF MONEY

- Future Value
  - The amount of money in the future that an amount of money today will yield, given prevailing interest rates, is called the *future value*.

# FYI: Rule of 70

- According to the rule of 70, if some variable grows at a rate of  $x$  percent per year, then that variable doubles in approximately  $70/x$  years.

# MANAGING RISK

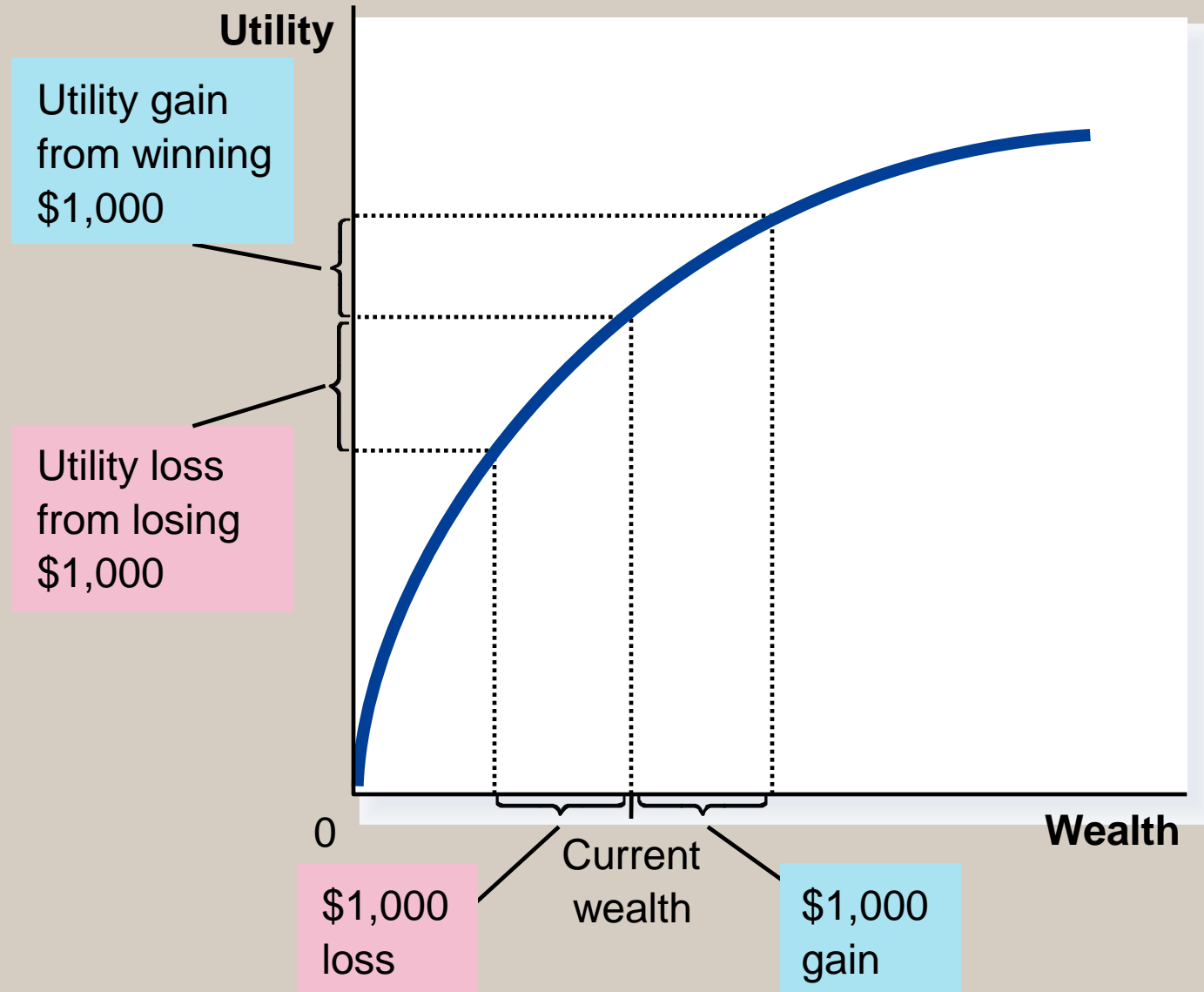
- A person is said to be *risk averse* if she exhibits a dislike of uncertainty.



# MANAGING RISK

- Individuals can reduce risk choosing any of the following:
  - Buy insurance
  - Diversify
  - Accept a lower return on their investments

# Figure 1 Risk Aversion



# The Markets for Insurance

- One way to deal with risk is to buy insurance.
- The general feature of insurance contracts is that a person facing a risk pays a fee to an insurance company, which in return agrees to accept all or part of the risk.

# Diversification of Idiosyncratic Risk

- *Diversification* refers to the reduction of risk achieved by replacing a single risk with a large number of smaller unrelated risks.

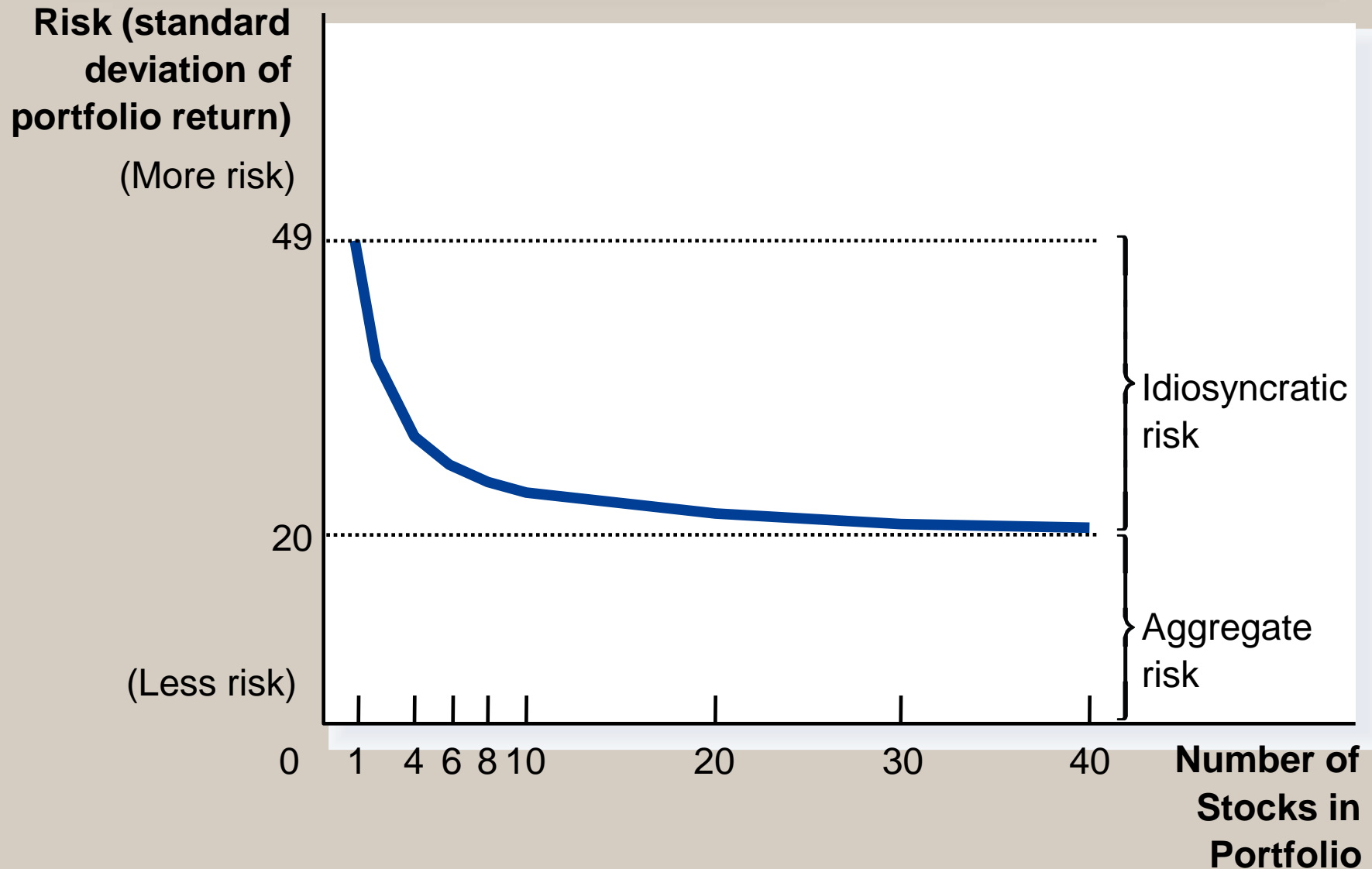
# Diversification of Idiosyncratic Risk

- *Idiosyncratic risk* is the risk that affects only a single person. The uncertainty associated with specific companies.

# Diversification of Idiosyncratic Risk

- *Aggregate risk* is the risk that affects all economic actors at once, the uncertainty associated with the entire economy.
- Diversification *cannot* remove aggregate risk.

# Figure 2 Diversification

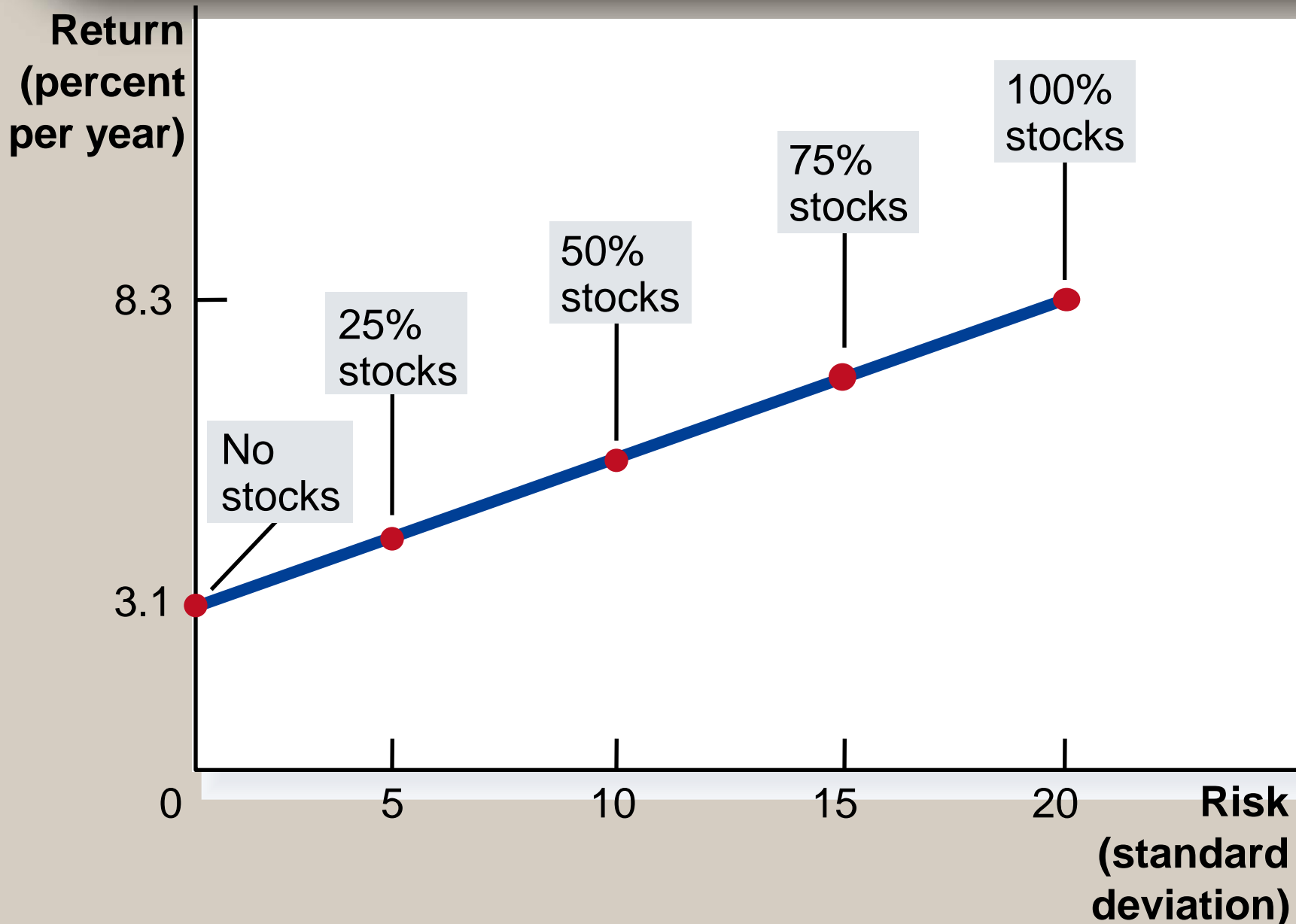


# Diversification of Idiosyncratic Risk

- People can reduce risk by accepting a lower rate of return.



## Figure 3 The Tradeoff between Risk and Return



# ASSET VALUATION

- *Fundamental analysis* is the study of a company's accounting statements and future prospects to determine its value.

# ASSET VALUATION

- People can employ fundamental analysis to try to determine if a stock is *undervalued*, *overvalued*, or *fairly valued*.
- The goal is to buy *undervalued stock*.

# Efficient Markets Hypothesis

- The *efficient markets hypothesis* is the theory that asset prices reflect all publicly available information about the value of an asset.

# Efficient Markets Hypothesis

- A market is *informationally efficient* when it reflects all available information in a rational way.
- If markets are efficient, the only thing an investor can do is buy a diversified portfolio

# CASE STUDY: Random Walks and Index Funds

- *Random walk* refers to the path of a variable whose changes are impossible to predict.
- If markets are efficient, all stocks are fairly valued and no stock is more likely to appreciate than another. Thus stock prices follow a random walk.

# Summary

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- Because savings can earn interest, a sum of money today is more valuable than the same sum of money in the future.
- A person can compare sums from different times using the concept of present value.
- The present value of any future sum is the amount that would be needed today, given prevailing interest rates, to produce the future sum.

# Summary

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- Because of diminishing marginal utility, most people are risk averse.
- Risk-averse people can reduce risk using insurance, through diversification, and by choosing a portfolio with lower risk and lower returns.
- The value of an asset, such as a share of stock, equals the present value of the cash flows the owner of the share will receive, including the stream of dividends and the final sale price.



# Summary

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- According to the efficient markets hypothesis, financial markets process available information rationally, so a stock price always equals the best estimate of the value of the underlying business.
- Some economists question the efficient markets hypothesis, however, and believe that irrational psychological factors also influence asset prices.