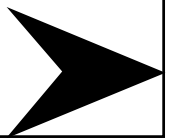# *The Investment Settings & The Asset Allocation Decision*

Chapter 1

The Investment Setting

Questions to be answered:
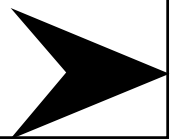
- **Why do individuals invest ?**

- **What is an investment ?**

- **How do we measure the rate of return on an investment ?**

- **How do investors measure risk related to alternative investments ?**

Chapter 1
The Investment Setting

- **What factors contribute to the rates of return that investors require on alternative investments ?**

- **What macroeconomic and microeconomic factors contribute to changes in the required rate of return for individual investments and investments in general ?**

Why Do Individuals Invest ?

- By saving money (instead of spending it), individuals trade-off present consumption for a larger future consumption.
- Sometime, you may have more money than you want to spend, at the other times, you want to buy more than you can afford.
- Borrow or save to maximalise long-run benefits from you income.
- When your income exceeds current consumption, people tend to invest income.
  - Trade-off of present consumption for a higher level of future consumption
    - Reason of saving
    - What you have to do with savings to make them increase over time is investment
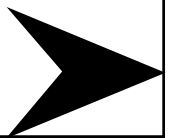
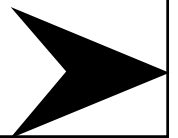# How Do We Measure The Rate Of Return On An Investment ?

- The <u>pure rate of interest</u> is the exchange rate between future consumption and present consumption. Market forces determine this rate.
- Pay for borrowed funds
- Wish to receive on savings
- Base on market conditions
  - Supply and demand

$$\$1.00 + 4\% = \$1.04$$
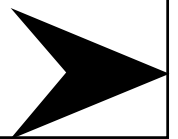
How Do We Measure The Rate Of Return On An Investment ?

People's willingness to pay the difference for borrowing today and their desire to receive a surplus on their savings give rise to an interest rate referred to as the <u>pure time value of money</u>.

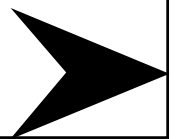# How Do We Measure The Rate Of Return On An Investment ?

If the future payment will be diminished in value because of <u>inflation</u>, then the investor will demand an interest rate higher than the pure time value of money to <u>also cover the expected inflation</u> expense.
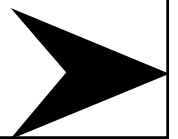
Inflation:

1986: 1,1 percent

1979: 13,3 percent

1970-2001: average 5,4 percent

# How Do We Measure The Rate Of Return On An Investment ?

If the future payment from the <u>investment is not certain</u>, the investor will demand an interest rate that exceeds the pure time value of money plus the inflation rate to <u>provide a risk premium</u> to cover the investment risk.

Defining an Investment

A current commitment of $ for a period of time in order to derive future payments that will compensate for:

- **the time the funds are committed**

- **the expected rate of inflation**

- **uncertainty of future flow of funds.**
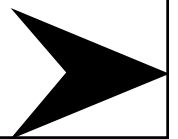
- **Investor**
  - Individual, a government, a pension fund or a corporation
- **Investments**
  - In corporation plants, equipments, individual bonds, stocks, etc.
- **Investor is trading known dollar amount today some expected future stream of payments that will be greater than the current outlay.**
- **Rate of return**
  - Compensation for investor time, expected rate of inflation and uncertainty of the return

- How to choose among alternative investment assets?
  - Estimate and evaluate the expected risk-return trade-offs for the alternative investment available
- Quantify return and risk
  - Measure both historical and expected rates of return and risk

Measures of Historical Rates of Return

- **Evaluation alternative investments**
  - Different prices and different lives
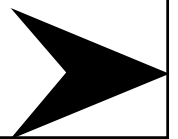   - Stocks paying and not paying dividends
      - Compare their historical rate of returns

- **Change in wealth**
  - Cash flows
  - Change in price

$$HPR = \frac{Ending\ Value\ of\ Investment}{Beginning\ Value\ of\ Investment}$$
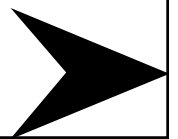
$$= \frac{\$220}{\$200} = 1.10$$

Measures of Historical Rates of Return

- HPR greater or equal to zero
  - Greater than 1
  - Less than 1
  - Equal to 0
- Percentage change to annual basis

Holding Period Yield

$$HPY = HPR - 1$$

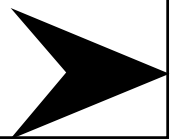$$1.10 - 1 = 0.10 = 10\%$$

Measures of Historical Rates of Return

Annual Holding Period Return

❑ Annual HPR = HPR $^{1/n}$

where n = number of years investment is held

Annual Holding Period Yield

❑ Annual HPY = Annual HPR - 1

Consider an investment that cost $250 and is worth $350 after being held for two years:

$$\text{HPR} = \frac{\text{Ending Value of Investment}}{\text{Beginning Value of Investment}} = \frac{\$350}{\$250}$$

$$= 1.40$$

$$\text{Annual HPR} = 1.40^{1/n}$$

$$= 1.40^{1/2}$$

$$= 1.1832$$

$$\text{Annual HPY} = 1.1832 - 1 = 0.1832$$

$$= 18.32\%$$

Measures of Historical Rates of Return

- **HPY for single investment for single year**
  - Mean rate of return
    - Highest or lower returns during some period
  - Take in consideration all of these returns but have some summarized figure
    - Typical experience
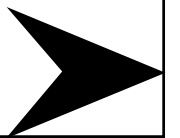
- Single investment
  - A set of annual HPYs

- The arithmetic mean AM

$$AM = \sum HPY / n$$

where :

$$\sum HPY = \text{the sum of annual holding period yields}$$
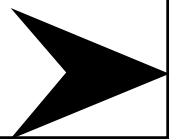
Geometric Mean

$$GM = [\pi\ HPR]^{1/n} - 1$$

$where:$

$\pi = the\ product\ of\ the\ annual$
$holding\ period\ returns\ as\ follows:$

$$(HPR_1) \times (HPR_2)...(HPR_n)$$

Year	Beginning Value	Ending Value	HPR	HPY
1	100.0	115.0	1.15	0.15
2	115.0	138.0	1.20	0.20
3	138.0	110.4	0.80	−0.20

$$AM = [(0.15) + (0.20) + (-0.20)]/3$$

$$= 0.15/3$$

$$- 0.05 - 5\%$$

$$GM = [(1.15) \times (1.20) \times (0.80)]^{1/3} - 1$$

$$= (1.104)^{1/3} - 1$$

$$= 1.03353 - 1$$

$$= 0.03353 = 3.353\%$$

- GM superior measure of the long-term mean rate of return

- AM good indicator of the expected rate of return for an investment during a future individual years

- AM is greater or equal to GM

A Portfolio of Investments

The mean historical rate of return for a portfolio of investments is measured as the weighted average of the HPYs for the individual investments in the portfolio.
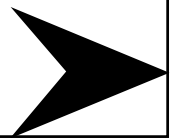
# Computation of Holding Period Yield for a Portfolio

Exhibit 1.1

Stock	# Shares	Begin Price	Beginning Mkt. Value	Ending Price	Ending Mkt. Value	HPR	HPY	Market Wt.	Wtd. HPY
A	100,000	$ 10	$ 1,000,000	$12	$ 1,200,000	1.20	20%	0.05	0.010
B	200,000	$ 20	$ 4,000,000	$21	$ 4,200,000	1.05	5%	0.20	0.010
C	500,000	$ 30	$15,000,000	$33	$16,500,000	1.10	10%	0.75	0.075
Total			$20,000,000		$21,900,000				0.095

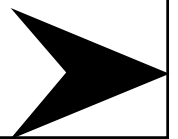$$ HPR = \frac{\$21,900,000}{\$20,000,000} = 1.095 $$

$$ HPY = 1.095 \quad -1 \quad = \quad 0.095 $$

$$ = \quad 9.5\% $$
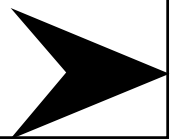
Expected Rates of Return

- **Risk is uncertainty that an investment will earn its expected rate of return**
- **Setting of expected returns means**
  - Setting probability values to all possible returns
  - Probability range from 0 to 1
  - Total value of probabilities is equal to 1
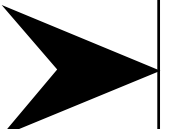- **Probability is the likelihood of an outcome**

Expected Rates of Return

$Expected\ Return\ =\ E(R_i)$

$$\sum_{i=1}^{n} (Probability\ of\ Return) \times (Possible\ Return)$$

$$[(P_1)(R_1) + (P_2)(R_2) + \ldots + (P_n R_n)$$

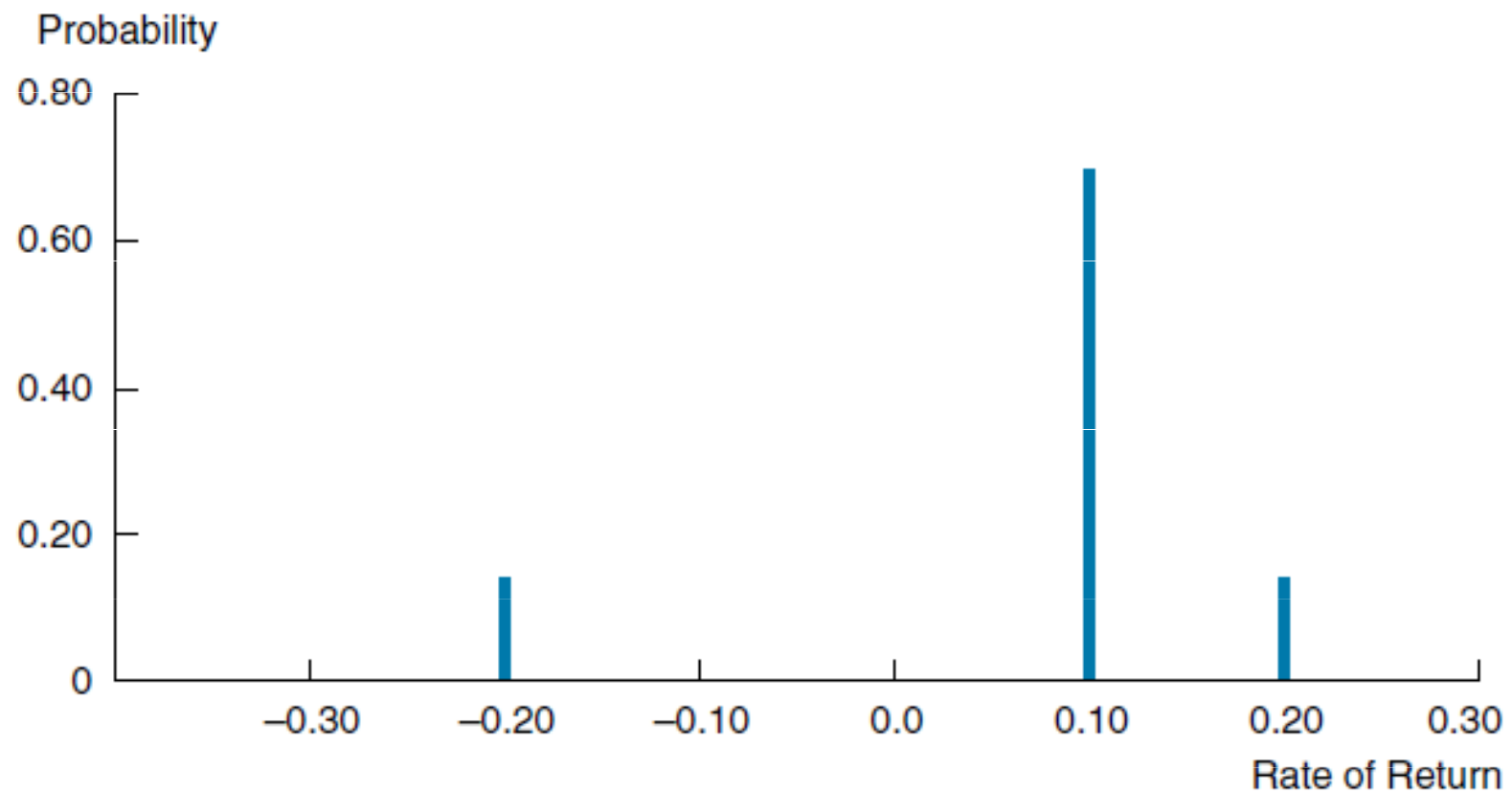$$\sum_{i=1}^{n} (P_i)(R_i)$$

Economic Conditions	Probability	Rate of Return
Strong economy, no inflation	0.15	0.20
Weak economy, above-average inflation	0.15	−0.20
No major change in economy	0.70	0.10

$$E(R_i) = [(0.15)(0.20)] + [(0.15)(-0.20)] + [(0.70)(0.10)]$$
$$= 0.07$$

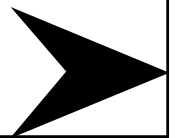# PROBABILITY DISTRIBUTION FOR RISKY INVESTMENT WITH THREE POSSIBLE RATES OF RETURN
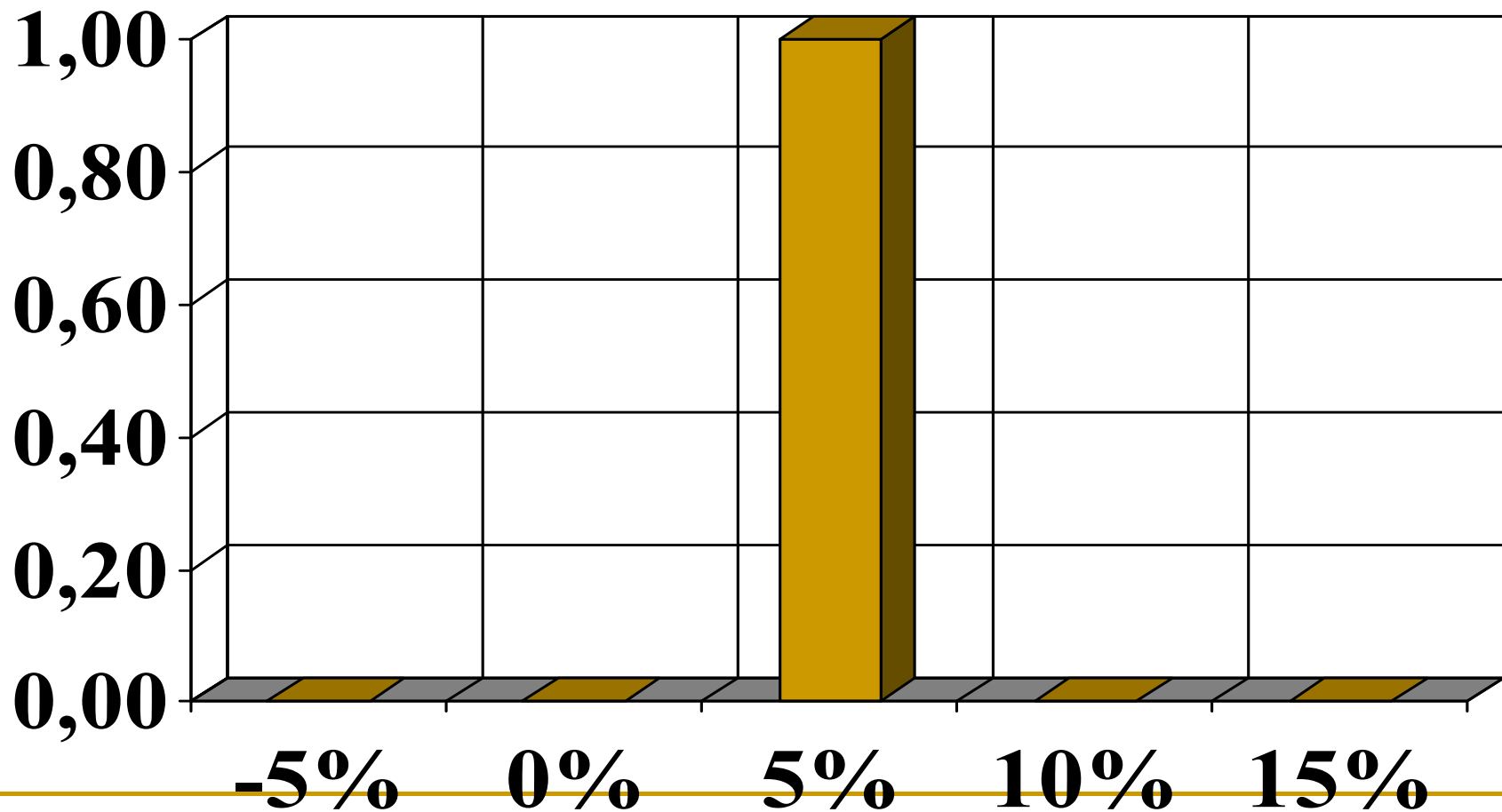
Risk Aversion

The assumption that most investors will choose the least risky alternative, all else being equal and that they will not accept additional risk unless they are compensated in the form of higher return

Probability Distributions
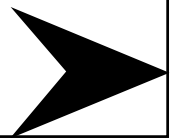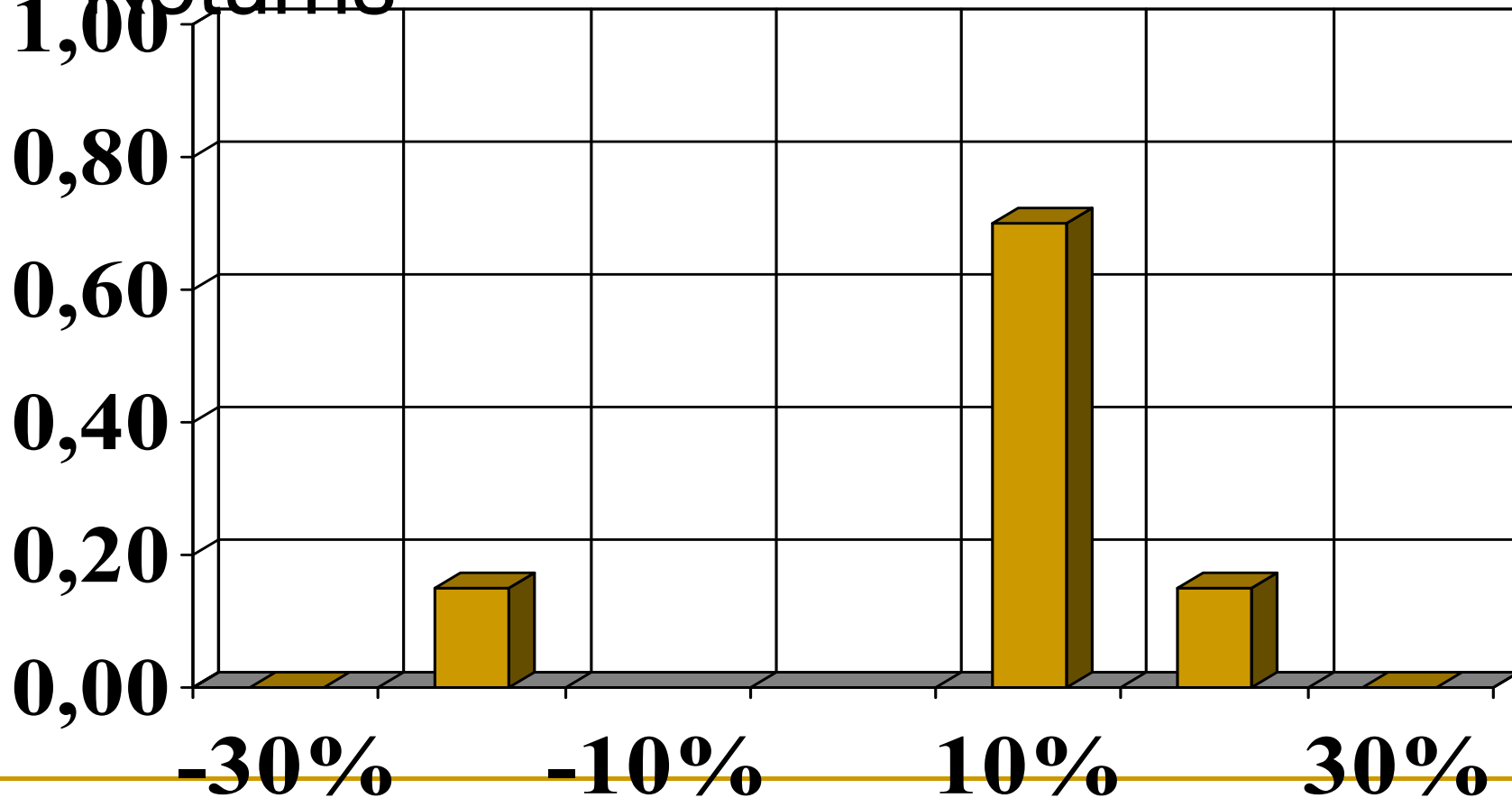
Exhibit 1.2

Risk-free Investment

Probability Distributions

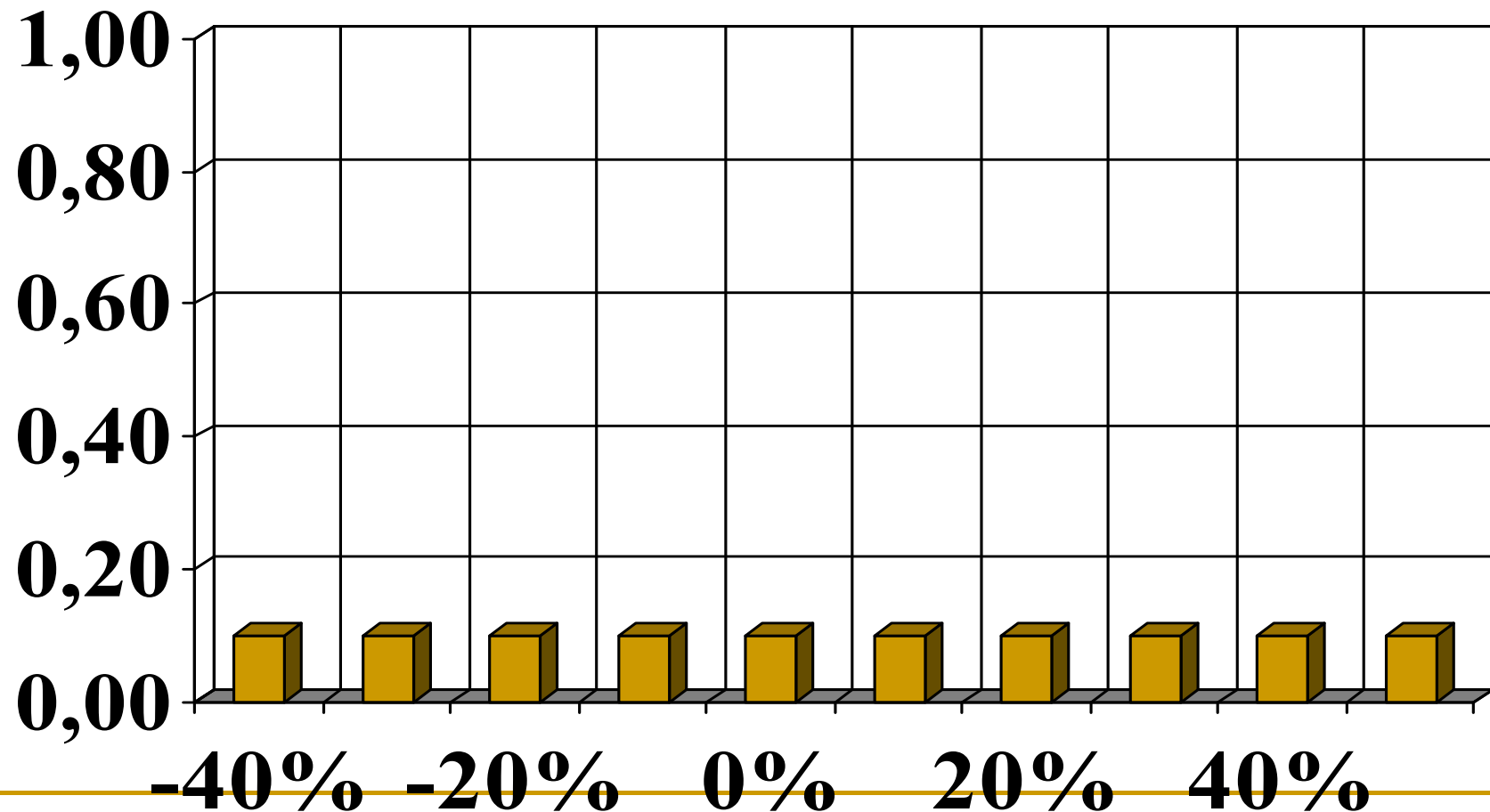Exhibit 1.3

Risky Investment with 3 Possible Returns

Probability Distributions

Exhibit 1.4

Risky investment with ten possible rates of return

Measuring the Risk of Expected rates of Return

- We can calculate the expected rate of return and evaluate the uncertainty
  - Identifying the range of possible return and setting probability that it will occur
  - Graph helps to visualize the dispersion of possible returns
  - But investors want to quantify this dispersion by using statistical techniques
    - Possible to compare the return and risk of alternative investments directly
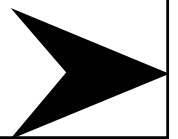
Measuring the Risk of Expected Rates of Return

$$Variance =$$

$$\sum_{i=1}^{n} (Probability) \times (Possible\ Return - Expected\ Return)^2$$
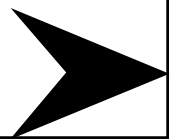
$$\sum_{i=1}^{n} (P_i)[R_i - E(R_i)]^2$$

Measuring the Risk of Expected Rates of Return

Standard Deviation is the square root of the variance

$$\sqrt{\sum_{i=1}^{n} P_i [R_i - E(R_i)]^2}$$

A Relative Measure of Risk

- ## In some cases using variance or standars deviation can be misleading

  - ### If conditions of two or more investment alternatives are not similar

    - #### Major differences in the expected rates of return

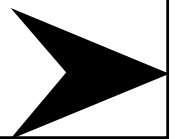   - Using relative variability to identify risk per unit of expected return

Measuring the Risk of Expected Rates of Return

Coefficient of variation (CV) a measure of relative variability that indicates risk per unit of return

$$\frac{\textbf{Standard Deviation of Returns}}{\textbf{Expected Rate of Returns}}$$

$$= \frac{\sigma_i}{E(R)}$$

Measuring the Risk of Historical Rates of Return
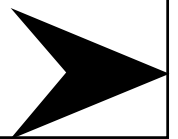
$$\sigma^2 = \sum_{i=1}^{n} [HPY_i - E(HPY)^2 / n$$

$\sigma^2 =$ variance of the series

$HPY_i =$ holding period yield during period I

$E(HPY) =$ expected value of the HPY that is equal to the arithmetic mean of the series

$n =$ the number of observations

Determinants of Required Rates of Return

- **If you selection securities in your portfolio**
  - Time value of money
  - Expected rate of inflation
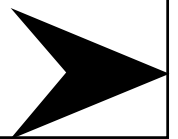 - Risk involved
- **-> required rate of return**

EXHIBIT 1.5   *PROMISED YIELDS ON ALTERNATIVE BONDS*

Type of Bond	1995	1996	1997	1998	1999	2000	2001
U.S. government 3-month Treasury bills	5.49%	5.01%	5.06%	4.78%	4.64%	5.82%	3.80%
U.S. government long-term bonds	6.93	6.80	6.67	5.69	6.14	6.41	6.18
Aaa corporate bonds	7.59	7.37	7.27	6.53	7.05	7.62	7.32
Baa corporate bonds	7.83	8.05	7.87	7.22	7.88	8.36	8.19

Source: *Federal Reserve Bulletin*, various issues.

The Real Risk Free Rate (RRFR)

Basic interest rate

- Assumes no inflation.

- Assumes no uncertainty about future cash flows.

- Influenced by time preference for consumption of income and investment opportunities in the economy
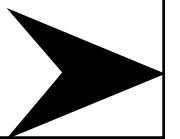
Factors Influencing the Nominal Risk-Free Rate

- Trade-off between current and future consumption
  - Risk free rate of interest
  - Measured in real terms
  - Real vs. Nominal rate of interest
    - Adjusted for changes in price level vs. Stated in money terms

THREE-MONTH TREASURY BILL YIELDS AND RATES OF INFLATION

Year	3-Month T-Bills	Rate of Inflation	Year	3-Month T-Bills	Rate of Inflation
1980	11.43%	7.70%	1991	5.38%	3.06%
1981	14.03	10.40	1992	3.43	2.90
1982	10.61	6.10	1993	3.33	2.75
1983	8.61	3.20	1994	4.25	2.67
1984	9.52	4.00	1995	5.49	2.54
1985	7.48	3.80	1996	5.01	3.32
1986	5.98	1.10	1997	5.06	1.70
1987	5.78	4.40	1998	4.78	1.61
1988	6.67	4.40	1999	4.64	2.70
1989	8.11	4.65	2000	5.82	3.40
1990	7.50	6.11	2001	3.80	1.55

Source: *Federal Reserve Bulletin*, various issues; *Economic Report of the President*, various issues.
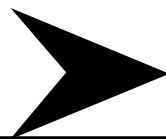
Adjusting For Inflation

Real RFR =

$$\left[\frac{(1 + Nominal\ RFR)}{(1 + Rate\ of\ Inflation)} \right] - 1$$

Nominal Risk-Free Rate

Dependent upon

- Conditions in the Capital Markets
  - Short-run: temporary disequilibrium in the supply and demand for capital
    - Fiscal or monetary policy
  - Long-run: changes in interest rates help to return to long-run equilibrium
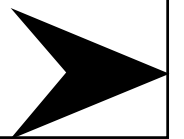- Expected Rate of Inflation

Nominal RFR =

(1+Real RFR) x (1+Expected Rate of Inflation) - 1

Risk Premium

- ## A risk-free investment
  - One for which is investor certain of the amount and timing of expected return
- ## A return of the most investment is different
- ## Risk-free securities T-Bills
- ## Speculative securities – stocks, bonds of small companies
- ## Highest return than risk free return
  - Risk premium RP

Facets of Fundamental Risk

- Composite of all uncertainty, main fundamentals of risk
  - Business risk
  - Financial risk
  - Liquidity risk
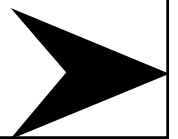 - Exchange rate risk
  - Country risk
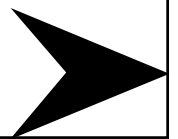
Business Risk

- Uncertainty of income flows caused by the nature of a firm's business

- Sales volatility and operating leverage determine the level of business risk.
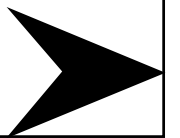
Financial Risk

- Uncertainty caused by the use of debt financing.

- Borrowing requires fixed payments which must be paid ahead of payments to stockholders.

- The use of debt increases uncertainty of stockholder income and causes an increase in the stock's risk premium.

Liquidity Risk

- Uncertainty is introduced by the secondary market for an investment.
  - How long will it take to convert an investment into cash?
 - How certain is the price that will be received?
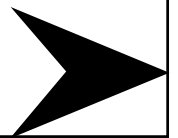
Exchange Rate Risk

- Uncertainty of return is introduced by acquiring securities denominated in a currency different from that of the investor.

- Changes in exchange rates affect the investors return when converting an investment back into the "home" currency.
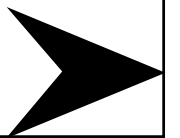
Country Risk

- Political risk is the uncertainty of returns caused by the possibility of a major change in the political or economic environment in a country.

- Individuals who invest in countries that have unstable political-economic systems must include a country risk-premium when determining their required rate of return
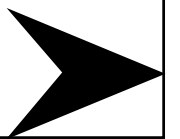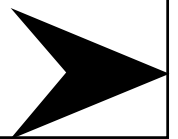
Risk Premium

f (Business Risk, Financial Risk, Liquidity Risk, Exchange Rate Risk, Country Risk)

or

f (Systematic Market Risk)

Risk Premium and Portfolio Theory

- Alternative view of risk
- External market measure of risk
  - Rational, profit-maximizing investors want to hold a completely diversified market portfolio of risk assets, and they borrow and lend to arrive at a risky level, that is consistent with their risky preferences
- The relevant risk measure for an individual asset is its co-movement with the market portfolio
  - Covariance between an asset and market portfolio
- Systematic risk relates the variance of the investment to the variance of the market
- Beta measures this systematic risk of an asset

Fundamental Risk versus Systematic Risk

- Fundamental risk comprises business risk, financial risk, liquidity risk, exchange rate risk, and country risk

- Systematic risk refers to the portion of an individual asset's total variance attributable to the variability of the total market portfolio

Risk Premium = f (Business Risk, Financial Risk, Liquidity Risk, Exchange Rate Risk, Country Risk)
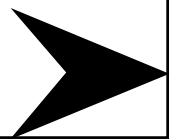
or

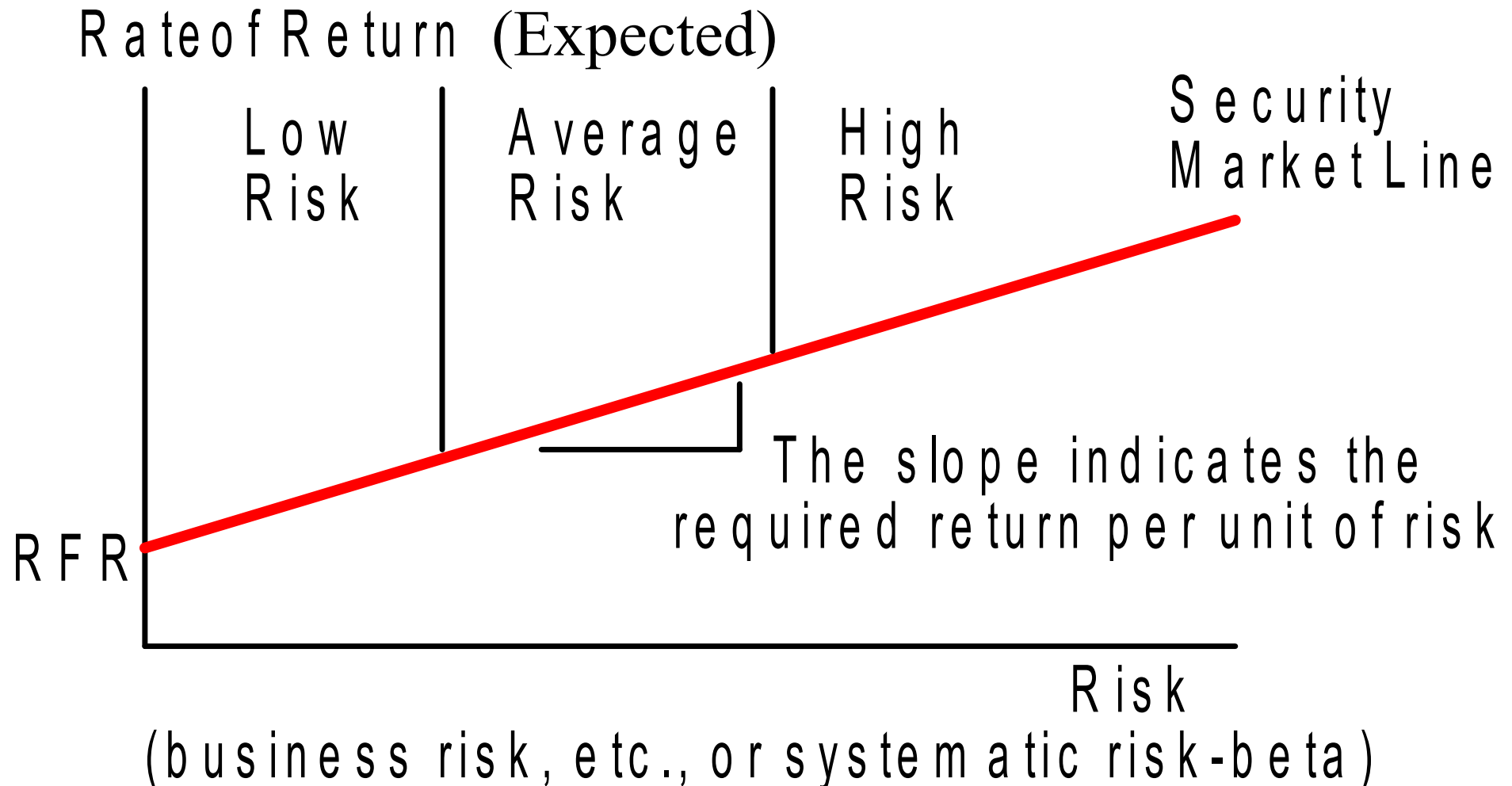Risk Premium = f (Systematic Market Risk)
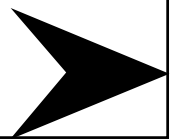
Relationship Between Risk and Return

- Exhibit 1.7 shows relations between risk and return
- Investor increase their required rates of return as risk uncertainty increase
- Line SML – Security Market Line
  - Risk-return combinations available for all risky assets in capital market at given time
  - SML can changes
    - Position on SML for investment – investor perceive of risk is changed
    - Slope – change attitude of investor toward risk
      - Changes in return that is require per unit
    - Parallel shift
      - Changes in RRFR of expected rate of inflation NRFR

Relationship Between Risk and Return

Exhibit 1.7

Rate of Return (Expected)

Low Risk | Average Risk | High Risk

Security Market Line

The slope indicates the required return per unit of risk

RFR

Risk
(business risk, etc., or systematic risk-beta)

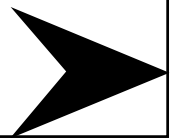# Changes in the Required Rate of Return Due to Movements Along the SML

Expected
Rate

Exhibit 1.8

Security
Market Line

RFR

Movements along the curve
that reflect changes in the
risk of the asset

Risk
(business risk, etc., or systematic risk-beta)

Changes in the Slope of the SML

$$RP_i = E(R_{i)} - NRFR$$

where:

RP_i = risk premium for asset i

$E(R_{i)}$ = the expected return for asset i

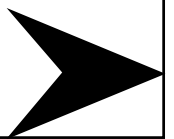NRFR = the nominal return on a risk-free asset

Market Portfolio Risk

The market risk premium for the market portfolio (contains all the risky assets in the market) can be computed:

$RP_m = E(R_m)$ - NRFR where:
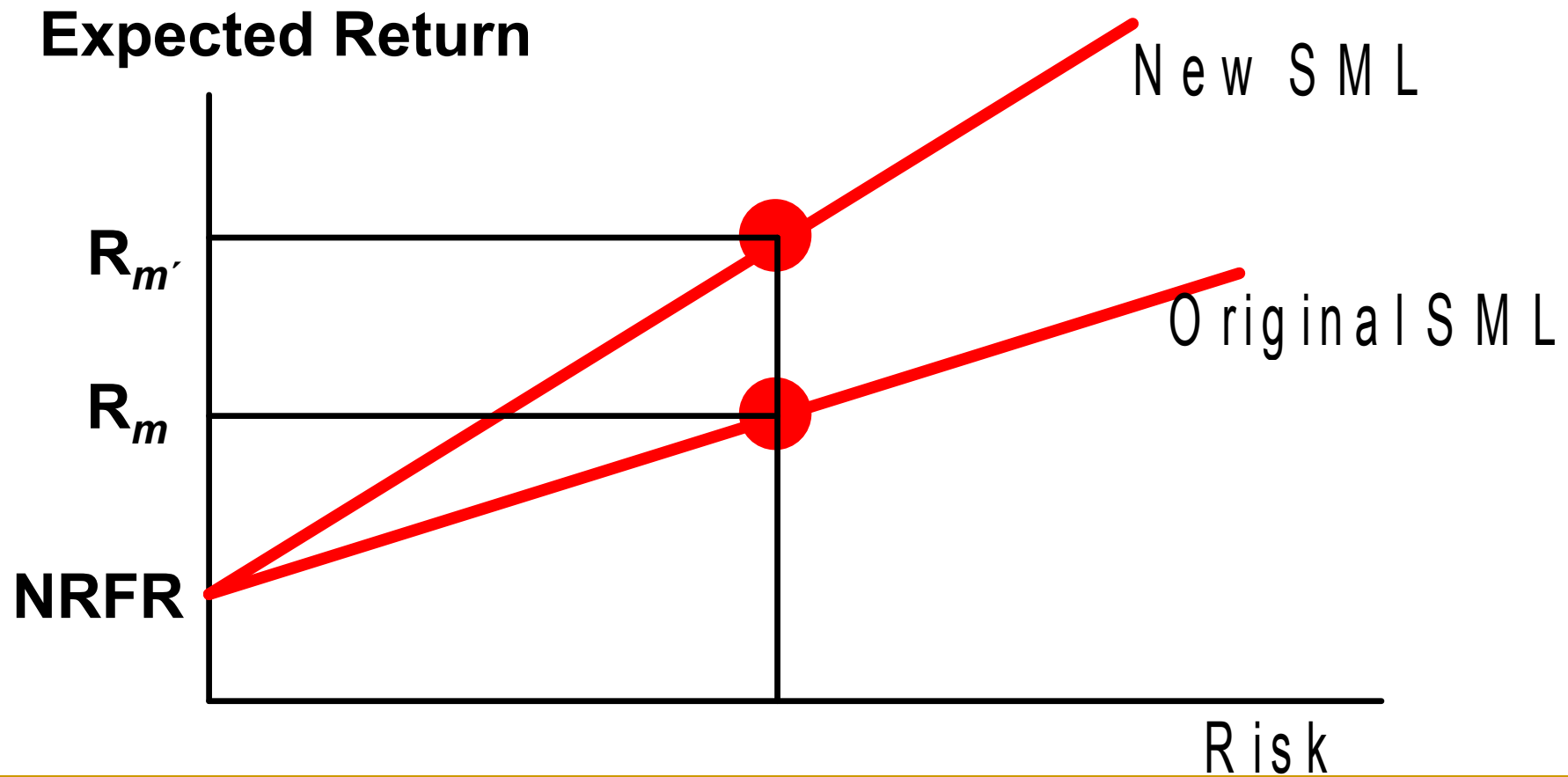
RP_m = risk premium on the market portfolio

$E(R_m)$ = expected return on the market portfolio
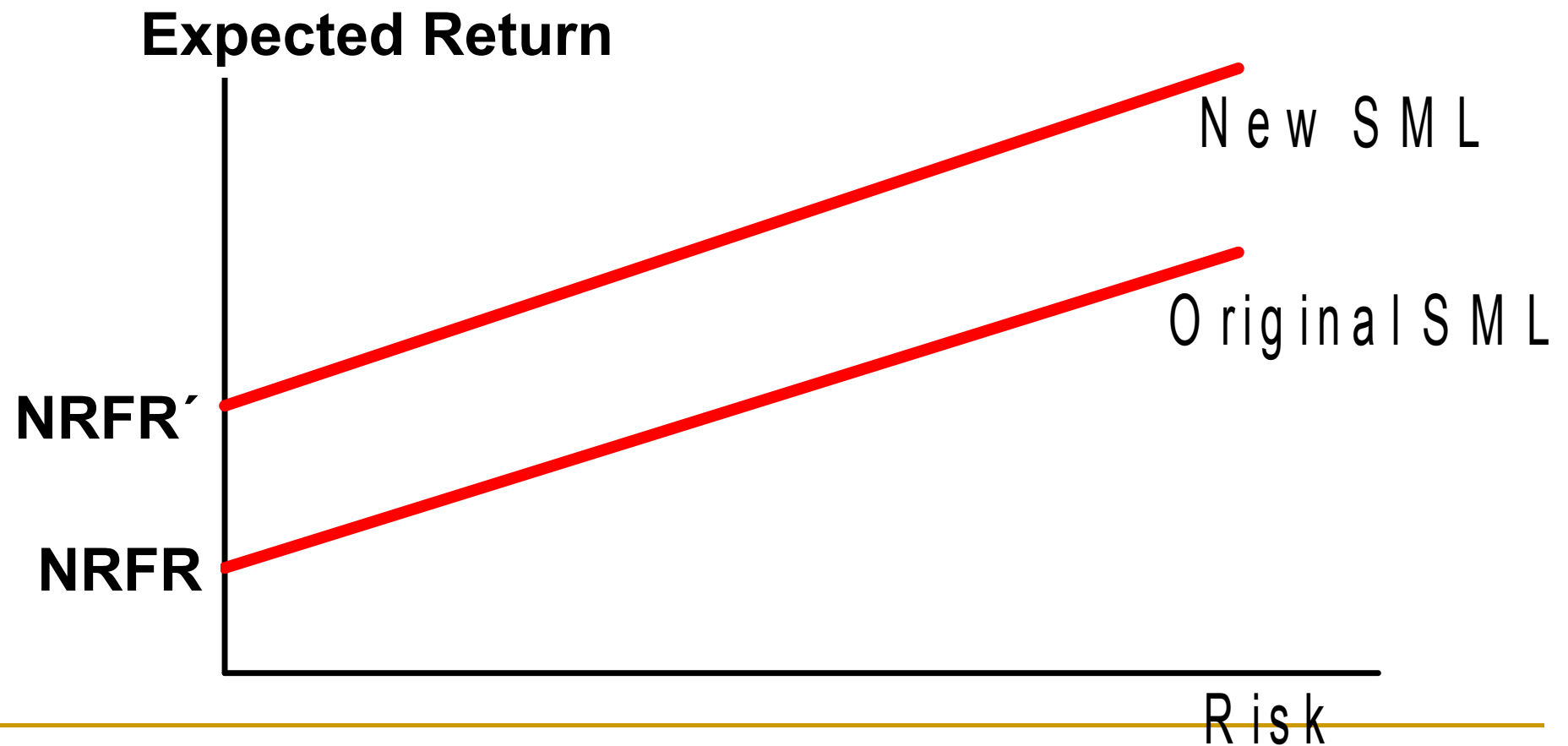
NRFR = expected return on a risk-free asset

Capital Market Conditions, Expected Inflation, and the SML

Exhibit 1.11

Capital Market Conditions, Expected Inflation, and the SML

- Expected real growth of economy

- Capital market conditions

- Expected rate of inflation

Summary of Changes in the Required Rate of Return

1. A movement *along* the SML demonstrates a change in the risk characteristics of a specific investment, such as a change in its business risk, its financial risk, or its systematic risk (its beta). This change affects only the individual investment.
2. A change in the *slope* of the SML occurs in response to a change in the attitudes of investors toward risk. Such a change demonstrates that investors want either higher or lower rates of return for the same risk. This is also described as a change in the market risk premium (R_m – NRFR). A change in the market risk premium will affect all risky investments.
3. A *shift* in the SML reflects a change in expected real growth, a change in market conditions (such as ease or tightness of money), or a change in the expected rate of inflation. Again, such a change will affect all investments.

The Portfolio Management Process

- ## The process of managing a portfolio never stops
  - If funds are invested according to plan
    - The real work begins in monitoring and updating the statues of the portfolio and investor needs

Exhibit 2.2

The Portfolio Management Process

1. Policy statement - Focus: Investor's short-term and long-term needs, familiarity with capital market history, and expectations

2. Examine current and project financial, economic, political, and social conditions - Focus: Short-term and intermediate-term expected conditions to use in constructing a specific portfolio

3. Implement the plan by constructing the portfolio - Focus: Meet the investor's needs at the minimum risk levels

4. Feedback loop: Monitor and update investor needs, environmental conditions, portfolio performance

The Portfolio Management Process

1. Policy statement

- specifies investment goals and acceptable risk levels
- should be reviewed periodically
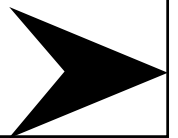- guides all investment decisions
- periodicaly reviewed and updated
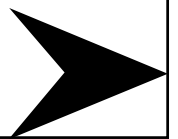
The Portfolio Management Process

2. Study current financial and economic conditions and forecast future trends

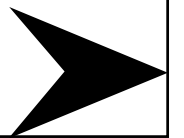- determine strategies to meet goals
- requires monitoring and updating

# The Portfolio Management Process

3. Construct the portfolio

- allocate available funds to minimize investor's risks and meet investment goals

The Portfolio Management Process

4. Monitor and update

- evaluate portfolio performance
  - Compare with expectation and the requirements set in the policy statement
- Monitor investor's needs and market conditions
- revise policy statement as needed
- modify investment strategy accordingly
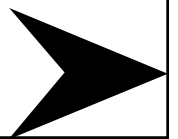
The Need For A Policy Statement

- Helps investors understand their own needs, objectives, and investment constraints

- Sets standards for evaluating portfolio performance

- Reduces the possibility of inappropriate behavior on the part of the portfolio manager
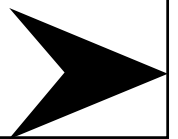
Constructing A Policy Statement

Questions to be answered:

- What are the real risks of an adverse financial outcome, especially in the short run?

- What probable emotional reactions will I have to an adverse financial outcome?

- How knowledgeable am I about investments and the financial markets?
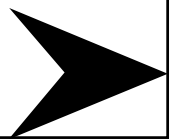
Constructing A Policy Statement

- What other capital or income sources do I have? How important is this particular portfolio to my overall financial position?

- What, if any, legal restrictions may affect my investment needs?

- What, if any, unanticipated consequences of interim fluctuations in portfolio value might affect my investment policy?

Investment Objectives

- Investor goals in the term of
  - Risk and return
  - Only return can by misleading
- Risk Tolerance
  - „double my investment in five years…"
  - A careful analysis and of the client risk tolerance should precede any discussions of return objectives
  - Test for evaluation of tolerance
  - Merrill Lynch table
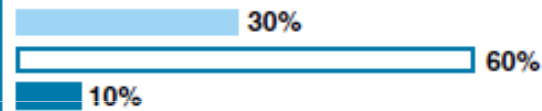- Absolute or relative percentage return
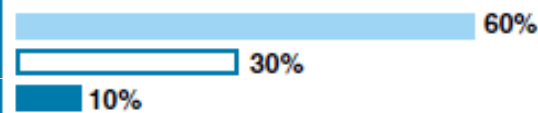- General goals
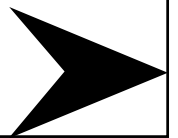
How Much Risk?

Merrill Lynch asset allocation recommendations in its new categories

Stocks ☐ Bonds ■ Cash

CONSERVATIVE FOR INCOME
- 30%
- 60%
- 10%

CONSERVATIVE FOR GROWTH
- 60%
- 30%
- 10%

MODERATE RISK
- 50%
- 40%
- 10%

AGGRESSIVE RISK
- 60%
- 40%
- 0%

BENCHMARK
(Merrill's allocation for a large, balanced corporate pension fund or endowment)
- 50%
- 45%
- 5%

Source: Merrill Lynch

Investment Objectives

General Goals

- Capital preservation
  - minimize risk of real loss

- Capital appreciation
  - Growth of the portfolio in real terms to meet future need

- Current income
  - Focus is in generating income rather than capital gains

Investment Objectives

General Goals

- Total return
  - Increase portfolio value by capital gains and by reinvesting current income
 - Maintain moderate risk exposure
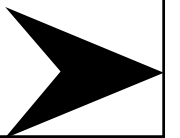
Investment Constraints

- **Liquidity needs**
  - Vary between investors depending upon age, employment, tax status, etc.
  - T-Bills vs. Real estates, joint venture capital
- **Time horizon**
  - Influences liquidity needs and risk tolerance
    - Relations between
      - Liquidity needs, time horizon and ability to handle risk
      - Long horizon
        - Less liquid, greater portfolio risk
      - Short horizon
        - More liquid and lower risk of portfolio
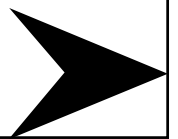
Investment Constraints

- **Tax concerns**
  - Capital gains or losses – taxed differently from income
  - Unrealized capital gain – reflect price appreciation of currently held assets that have not yet been sold
  - Realized capital gain – when the asset has been sold at a profit
  - Trade-off between taxes and diversification – tax consequences of selling company stock for diversification purposes
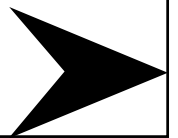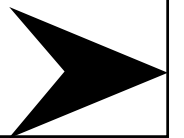
Investment Constraints

- Tax concerns (continued)
  - interest on municipal bonds exempt from federal income tax and from state of issue
  - interest on federal securities exempt from state income tax
  - contributions to an IRA may qualify as deductible from taxable income
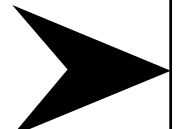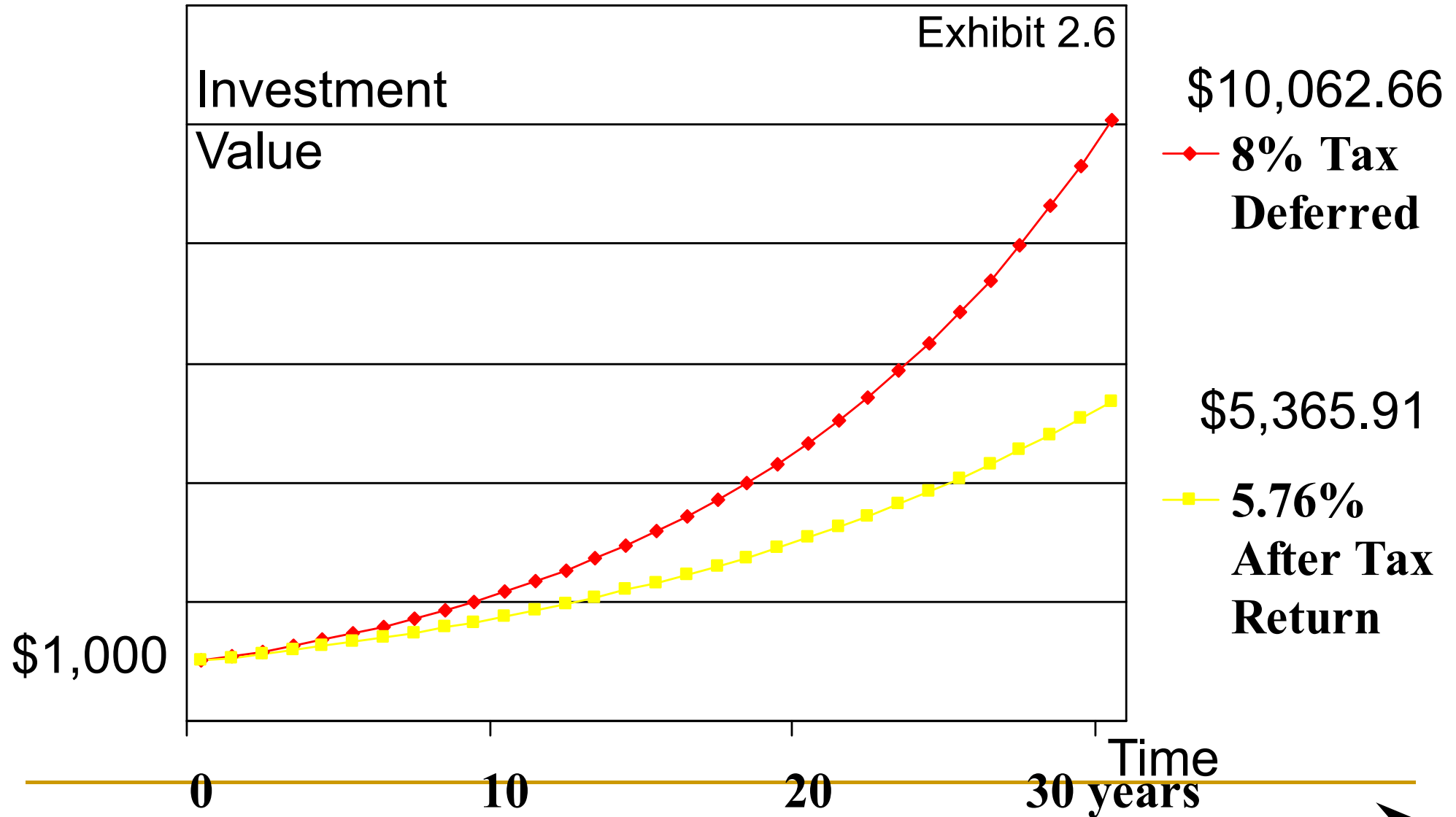 - tax deferral considerations - compounding
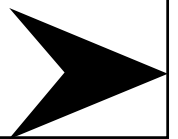
Equivalent Taxable Yield

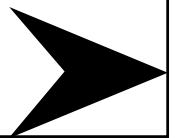$$\text{ETY} = \frac{\text{Municipal Yield}}{1 - \text{Marginal Tax Rate}}$$

Effect of Tax Deferral on Investor Wealth over Time

Exhibit 2.6

Investment Value

$10,062.66
—♦— 8% Tax Deferred

$5,365.91
—■— 5.76% After Tax Return

$1,000

Time
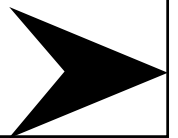
0   10   20   30 years

Methods of Tax Deferral

- Regular IRA - tax deductible
  - Tax on returns deferred until withdrawal
- Roth IRA - not tax deductible
  - tax-free withdrawals possible
- Cash value life insurance – funds accumulate tax-free until they are withdrawn
- Tax Sheltered Annuities
- Employer's 401(k) and 403(b) plans – tax-deferred investments

Legal and Regulatory Factors

- Limitations or penalties on withdrawals

- Fiduciary responsibilities - "prudent man" rule

- Investment laws prohibit insider trading

Unique Needs and Preferences

- Personal preferences such as socially conscious investments could influence investment choice

- Time constraints or lack of expertise for managing the portfolio may require professional management

- Large investment in employer's stock may require consideration of diversification needs

- Institutional investors needs
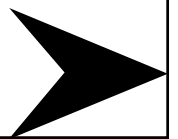
Constructing the Policy Statement

- Objectives - risk and return

- Constraints - liquidity, time horizon, tax factors, legal and regulatory constraints, and unique needs and preferences

- Developing a plan depends on understanding the relationship between risk and return and the the importance of diversification
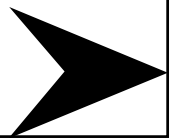
The Importance of Asset Allocation

- An investment strategy is based on four decisions
  - What asset classes to consider for investment
  - What normal or policy weights to assign to each eligible class
  - Determining the allowable allocation ranges based on policy weights
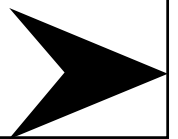 - What specific securities to purchase for the portfolio
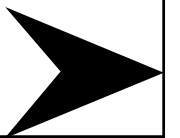
The Importance of Asset Allocation

- According to research studies, most (85% to 95%) of the overall investment return is due to the first two decisions, not the selection of individual investments
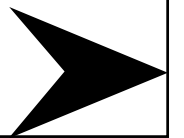
Returns and Risk of Different Asset Classes

- Historically, small company stocks have generated the highest returns. But the volatility of returns have been the highest too

- Inflation and taxes have a major impact on returns

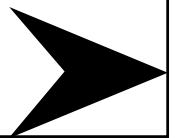- Returns on Treasury Bills have barely kept pace with inflation

Returns and Risk of Different Asset Classes

- Measuring risk by probability of **not** meeting your investment return objective indicates risk of equities is small and that of T-bills is large because of their differences in expected returns

- Focusing only on return variability as a measure of risk ignores reinvestment risk
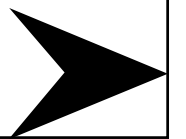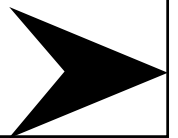
Asset Allocation Summary

- Policy statement determines types of assets to include in portfolio
- Asset allocation determines portfolio return more than stock selection
- Over long time periods, sizable allocation to equity will improve results
- Risk of a strategy depends on the investor's goals and time horizon

Asset Allocation and Cultural Differences

- Social, political, and tax environments influence the asset allocation decision

- Equity allocations of U.S. pension funds average 58%

- In the United Kingdom, equities make up 78% of assets

- In Germany, equity allocation averages 8%

- In Japan, equities are 37% of assets

Summary

- Identify investment needs, risk tolerance, and familiarity with capital markets
- Identify objectives and constraints
- Enhance investment plans by accurate formulation of a policy statement
- Focus on asset allocation as it determines long-term returns and risk