CORPORATE FINANCIAL MANAGEMENT

PART II　DETERMINANTS OF VALUATION

(chapter 4-7)

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Chapter 4

The Time Value of Money

Introduction

1. Interest
2. Future Value and Present Value
3. Annuity
4. Uneven payment

Notation

I to denote simple interest

i to denote the interest rate per period

n to denote the number of periods

PMT to denote cash payment

PV to denote the present value dollar amount

t to denote time

T to denote the tax rate

PV_0 = principal amount at time 0

FV_n = future value *n* time periods from time 0

1. Interest

- Simple Interest
  - Interest paid on the principal sum only
- Compound Interest
  - Interest paid on the principal and on prior interest that has not been paid or withdrawn
- In Finance, Compound Interest is more important

Figure 4.1

Simple interest and compound interest (PMT = \$1,000; i = 6%)

...continued

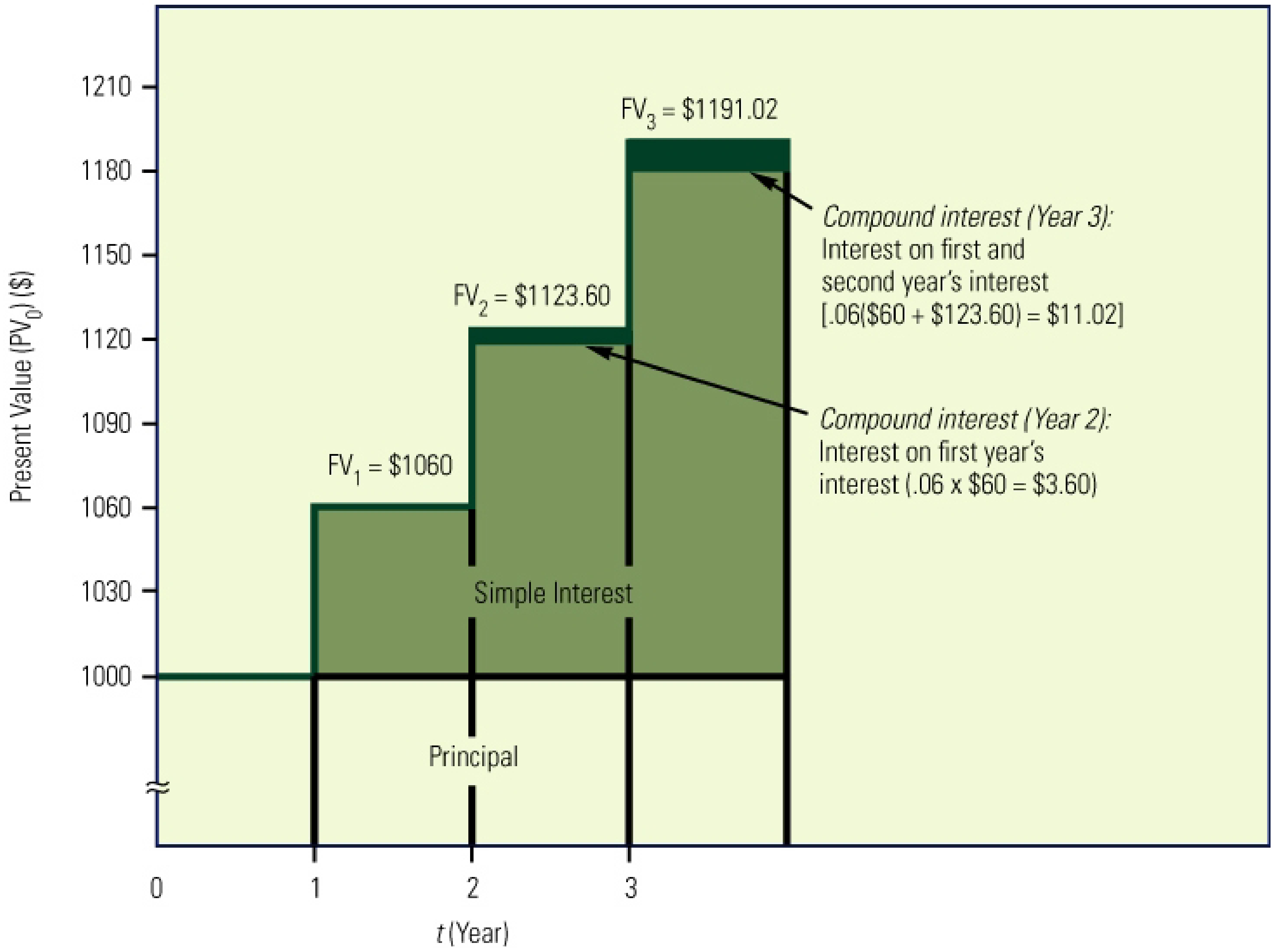

Figure 4.2

Growth of a $100 Investment at Various Compound Interest Rates

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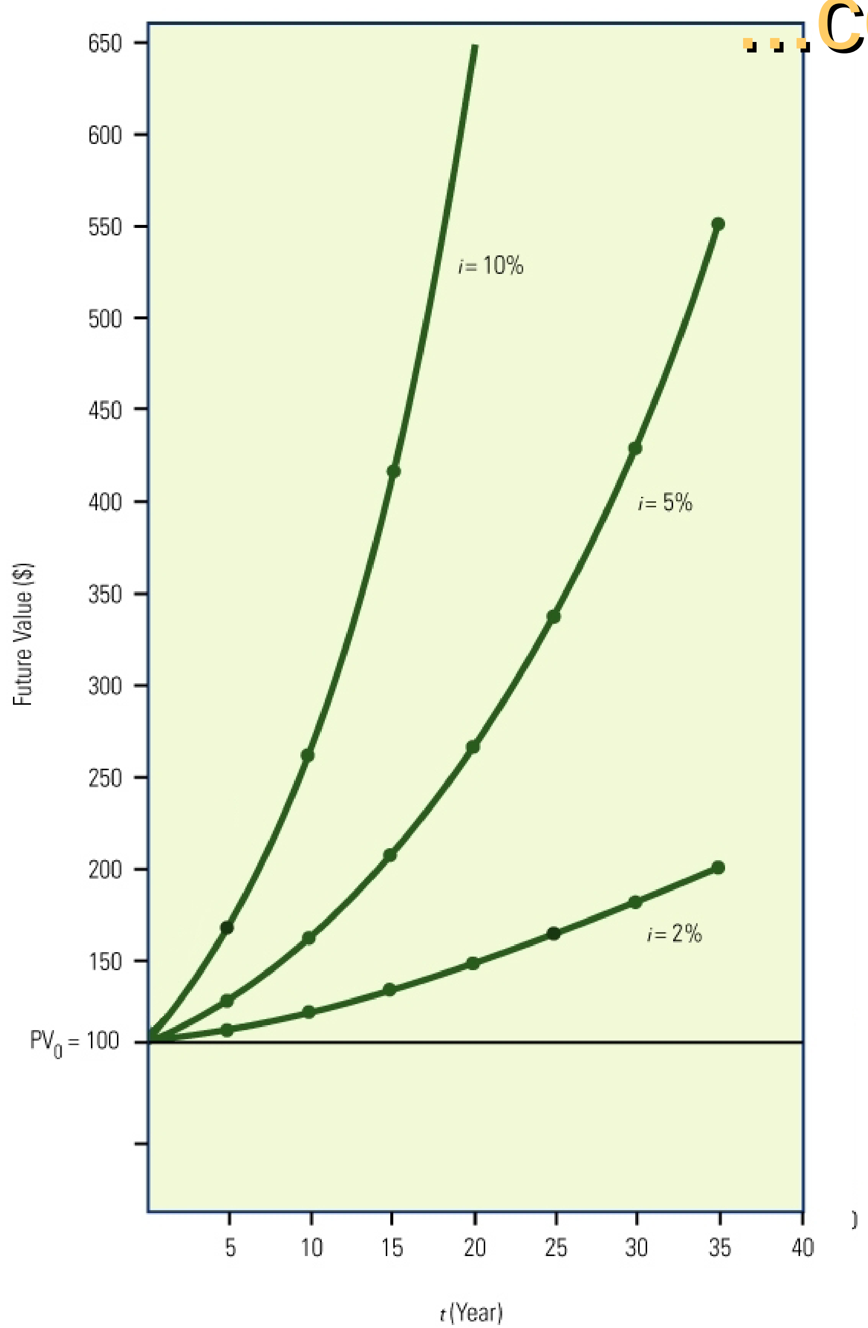


2. Future value

- "How much is a dollar worth later?"

At the end of year *n* for a sum compounded at interest rate *i* is

$$FV_n = PV_0 (1 + i)^n \quad \textit{Formula}$$

In Table I in the text, ($FVIF_{i,n}$) shows the future value of $1 invested for *n* years at interest rate *i*:

$$FVIF_{i,n} = (1 + i)^n \quad \textit{Table I}$$

When using the table, $FV_n = PV_0(FVIF_{i,n})$

...continued

Interest factors (IF)

Time periods (*n*)

Interest rates per period (*i*)

If you know any two, you can solve algebraically for the third variable.

Present Value

- "How much is a dollar in the future worth today?"

$$PV_0 = FV_n \left[\frac{1}{(1+i)^n} \right]$$

Formula

$$PVIF_{i,n} = \frac{1}{(1+i)^n}$$

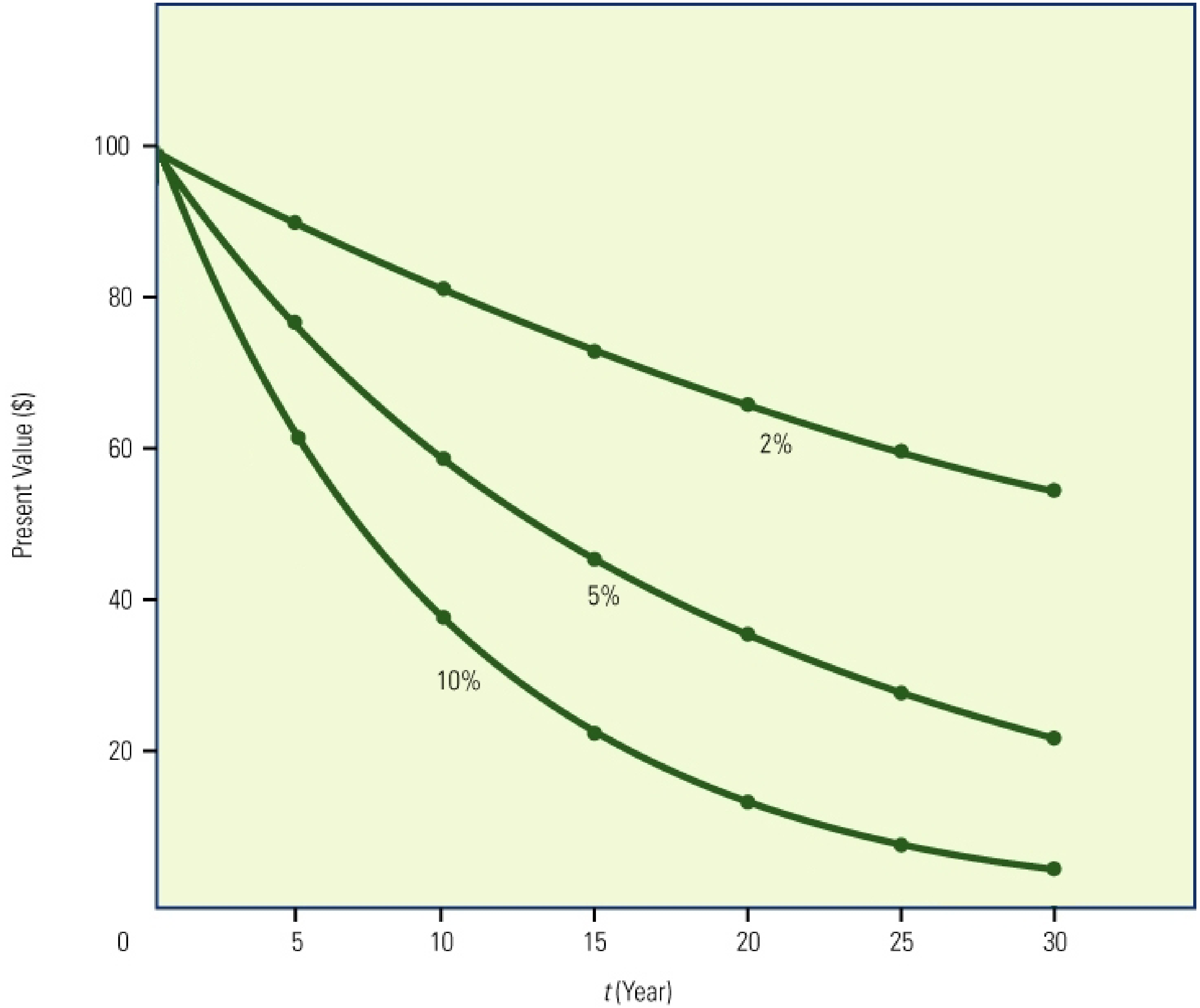
Table II

$$PV_0 = FV_n(PVIF_{i,n})$$

Table II

Figure 4.3
Present Value of $100 at Various Discount Rates

...continued



...continued

- What is the PV of $100 one year from now with 12 percent interest compounded monthly?

$$PV_0 = \$100 \times 1/(1 + .12/12)^{(12 \times 1)}$$

$$= \$100 \times 1/(1.126825)$$

$$= \$100 \times (.88744923)$$

$$= \$\ 88.74$$

$$PV_0 = FV_n(PVIF_{i,\,n})$$

$$= \$100(.887)$$

$$= \$\ 88.70$$

From Table II

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Special Problems

- Solving for the interest rate
- Solving for the number of compounding periods

Interest compounded *more frequently than once per year*

m = # of times interest is compounded
n = # of years
nm = number of periods

Future Value

$$FV_n = PV_0 \left(1 + \frac{i_{nom}}{m}\right)^{nm}$$

Present Value

$$PV_0 = \frac{FV_n}{\left(1 + \frac{i_{nom}}{m}\right)^{nm}}$$

Effective interest rate

- Effective interest rate: the actual rate of interest so it is the most economically relevant interest rate
- Nominal interest rate: the period rate of interest that is stated in a loan agreement or security
  - Effective annual rate of interest

    $$\boldsymbol{i}_{\text{eff}} = (1 + \boldsymbol{i}_{\text{nom}} / \boldsymbol{m})^{m} - 1$$

  - Rate of interest per compounding period $\boldsymbol{i}_{m}$ (annual/quarterly/monthly) that will yield the effective rate $\boldsymbol{i}_{\text{eff}}$

    $$\boldsymbol{i}_{m} = (1 + \boldsymbol{i}_{\text{eff}})^{1/m} - 1$$

3. Annuity

- A series of *equal* dollar CFs for a specified number of periods

- Ordinary Annuity (PVAN, FVAN)

  is where the CFs occur at the end of each period.

  Example: paycheck, interest payments

- Annuity Due (PVAND,FVAND)

  is where the CFs occur at the beginning of each period.

  Examples: apartment rent, insurance premiums

1) ordinary annuity-----FV

- $$\text{FVIFA}_{i,\,n} = \sum_{t=1}^{n} (1+i)^{t-1} = \frac{(1+i)^n - 1}{i}$$ *Formula for IF*

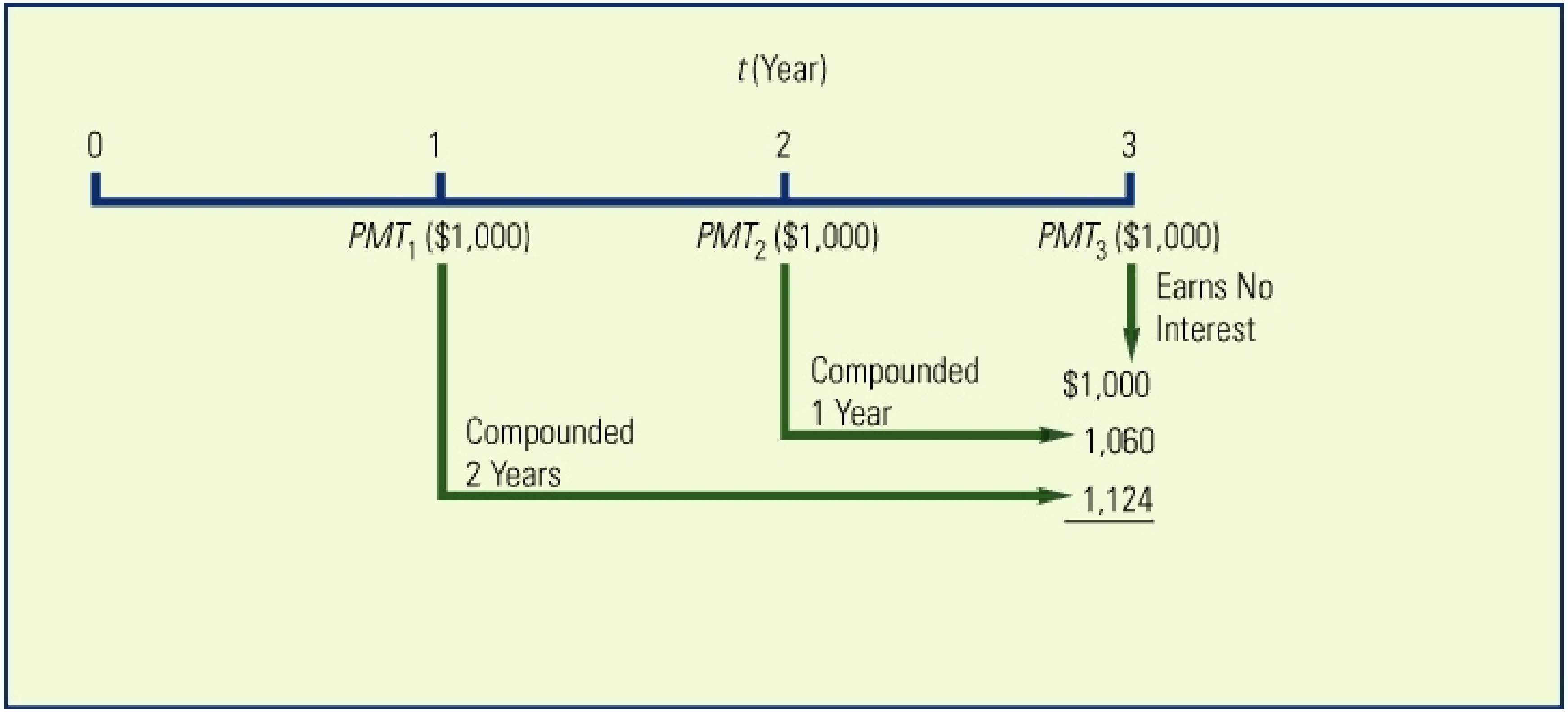
- $\text{FVAN}_n = PMT(\text{FVIFA}_{i,\,n})$ *Table III*

- Sinking fund problem: determine the annuity amount that must be invested each year to produce a future value

  $PMT = \text{FVAN}_n / (\text{FVIFA}_{i,\,n})$ *Table III*

Figure 4.4

Timeline of the Future Value of an Ordinary Annuity
(*PMT* = $1,000; *i* = 6%; *n* = 3)



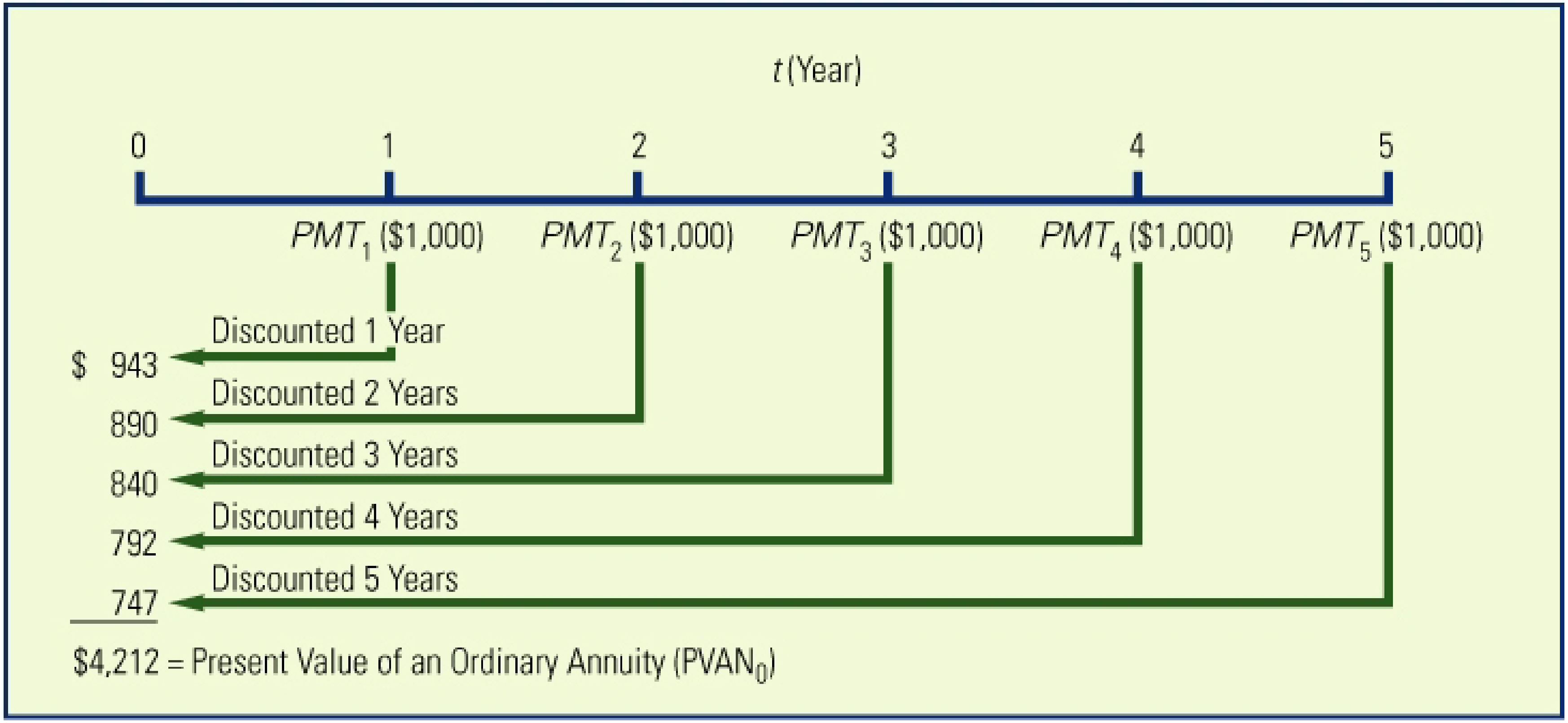
1)ordinary annuity-----PV

- $\text{PVIFA}_{i,\,n} = \sum_{t=1}^{n}(1+i)^{-t} = \dfrac{1-(1+i)^{-n}}{i}$ *Formula*
- $\text{PVAN}_0 = PMT(\text{PVIFA}_{i,\,n})$ *Table IV*
- Capital recovery problem: determine the annuity amount necessary to recover some initial investment
- Loan amortization problem: determine the payments necessary to pay off or amortize a loan

  $PMT = \text{PVAN}_0/(\text{PVIFA}_{i,\,n})$ *Table IV*

Figure 4.5

Timeline of a Present Value of an Ordinary Annuity (PMT = $1,000; i = 6%; n = 5)



2) Annuity due

- Future Value of an Annuity Due

$$FVAND_n = PMT(FVIFA_{i,\,n})(1 + i) \qquad \textit{Table III}$$

$$= PMT\left[\frac{(1+i)^{n+1}-1}{i} - 1\right]$$

$$= PMT(FVIFA_{i,\,n+1} - 1)$$

- Present Value of an Annuity Due

$$PVAND_0 = PMT(PVIFA_{i,\,n})(1 + i) \qquad \textit{Table IV}$$

$$= PMT\left[\frac{1-(1+i)^{-(n-1)}}{i} + 1\right]$$

$$= PMT(PVIFA_{i,\,n-1} + 1)$$

Figure 4.6

Timeline of the Future Value of an Annuity Due
(*PMT* = $1,000; *i* = 6%; *n* = 3))

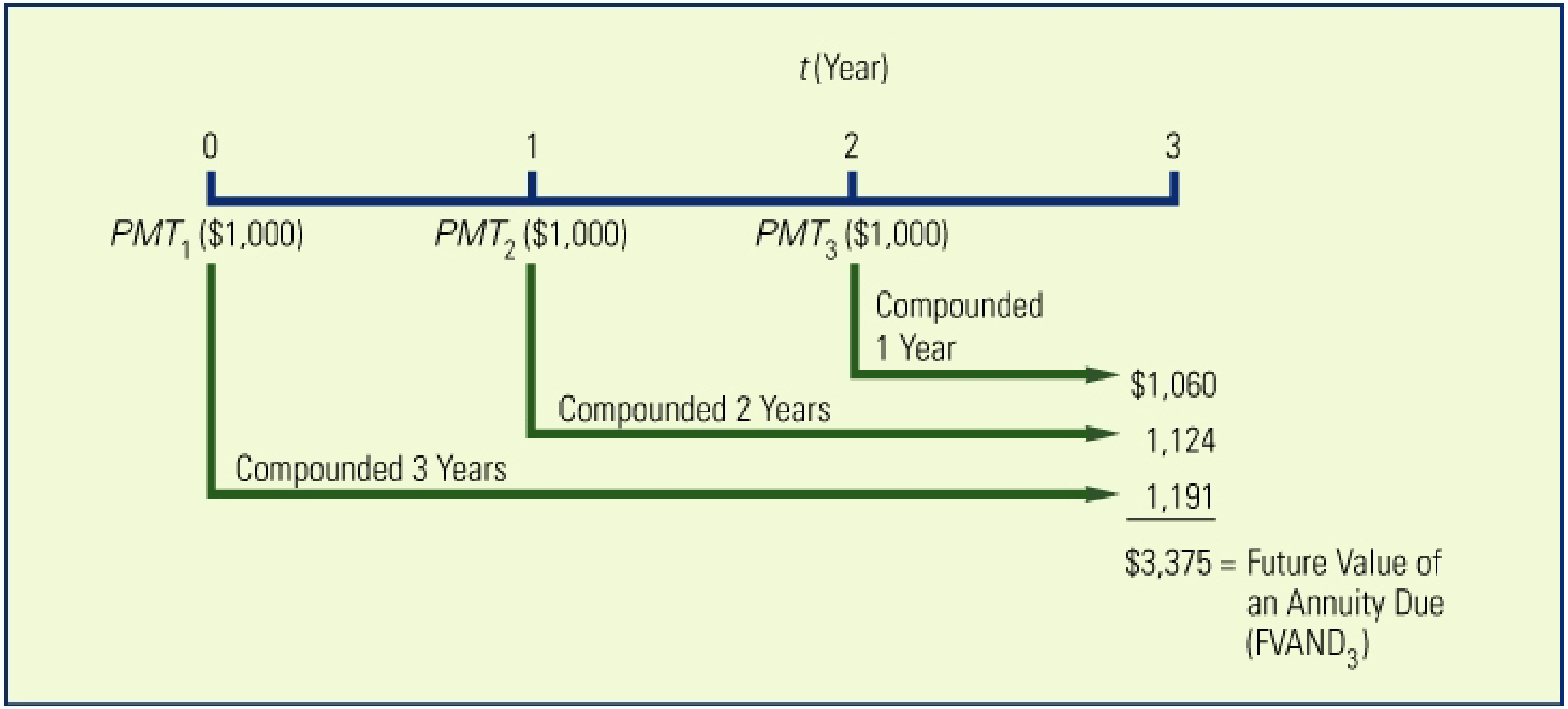


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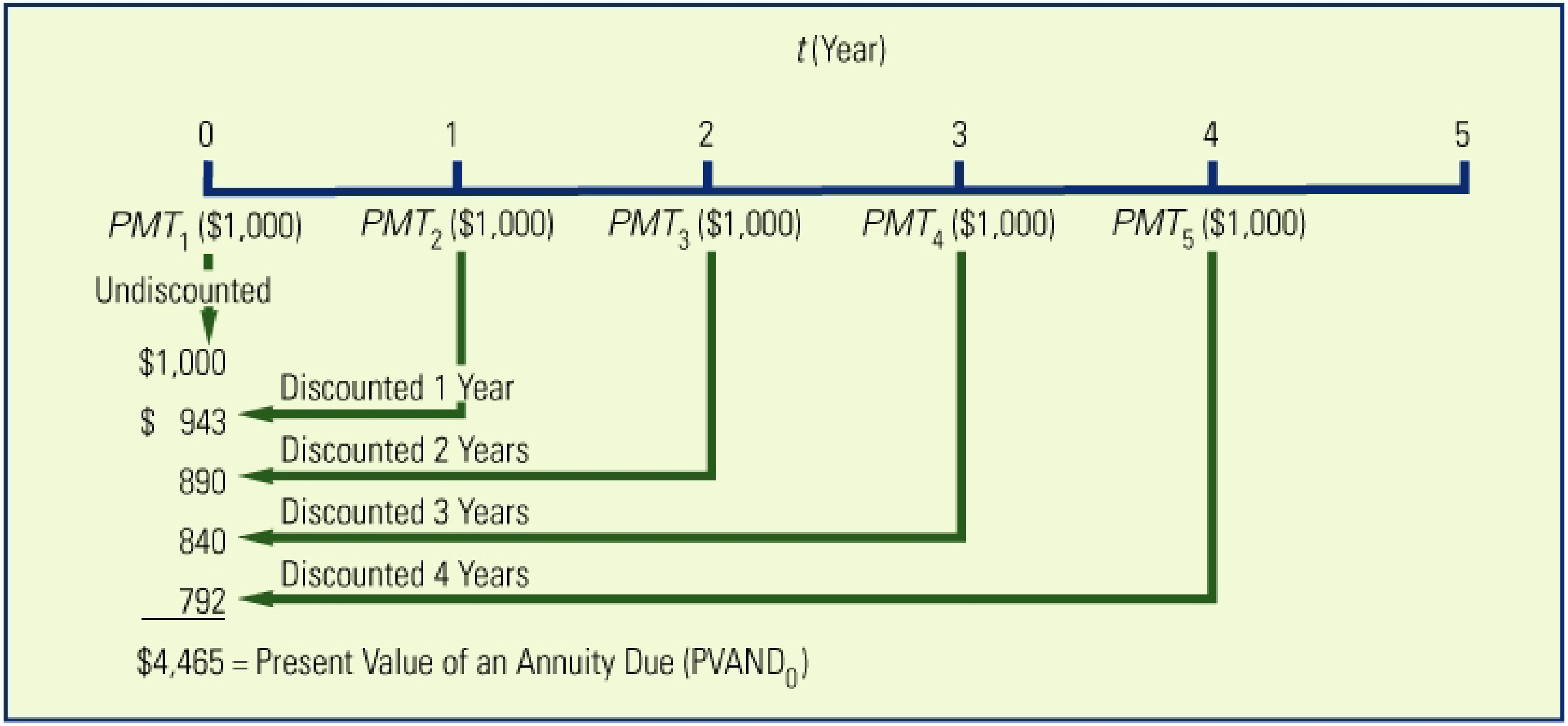
Figure 4.7

Timeline of a Present Value of an Annuity Due
(*PMT* = \$1,000; *i* = 6%; *n* = 5)



3) Deferred annuity

- Deferred annuity: an annuity begins more than one year in the future

- $PVAN_0 = PMT\left[\dfrac{1-(1+i)^{-n}}{i}\right](1+i)^{-m}$

  $= PMT\,(PVIFA_{i,n})(PVIF_{i,m})$ *Formula*

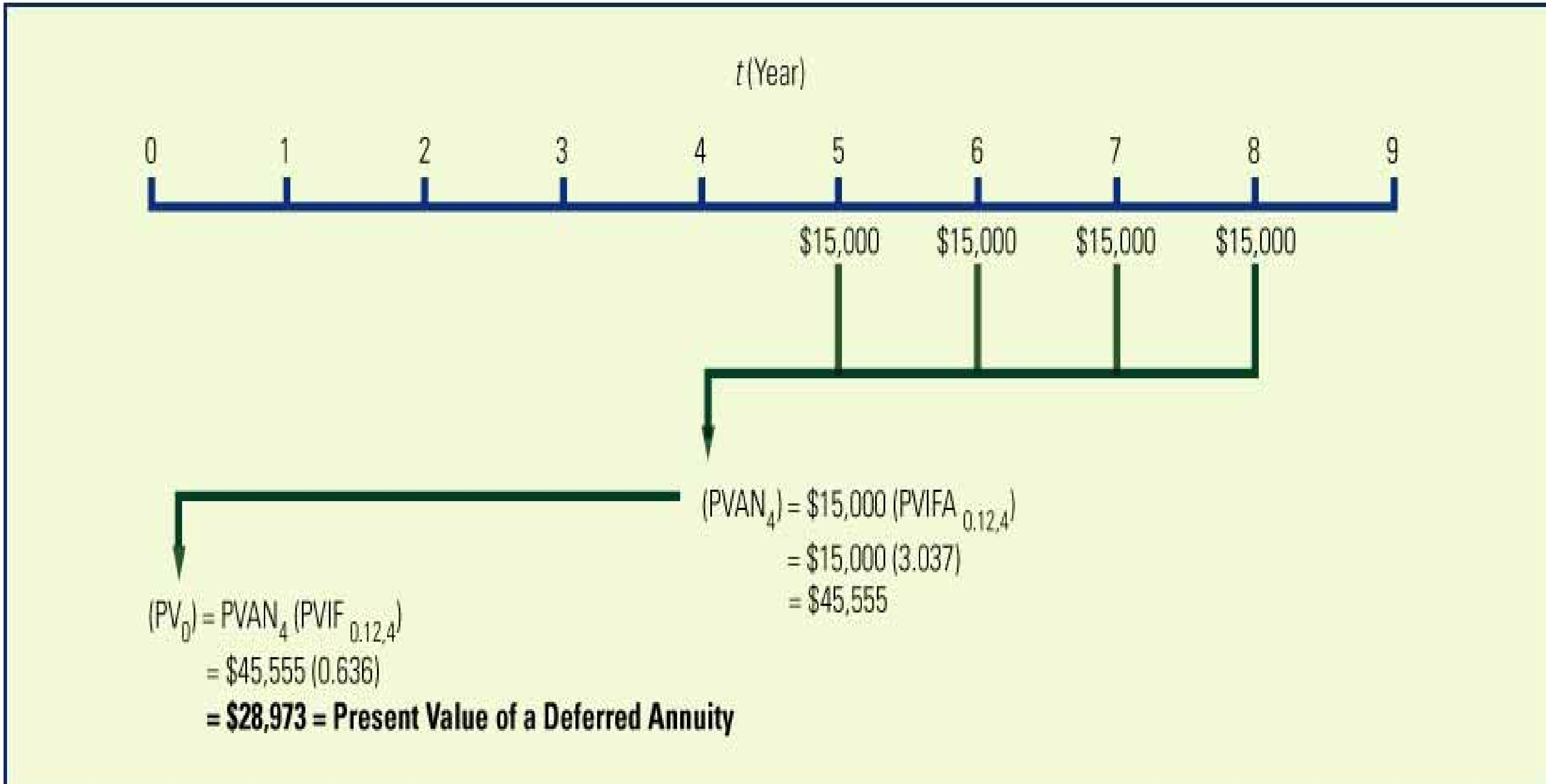
  m = deferred period

- $PVAN_0 = PMT\left[\dfrac{1-(1+i)^{-(m+n)}}{i} - \dfrac{1-(1+i)^{-m}}{i}\right]$

  $= PMT[\,(PVIFA_{i,m+n}) - (PVIFA_{i,m})]$ *Formula*

Figure 4.8

Timeline of a Deferred Four-Year Annuity
(i = 12%)



4) Perpetuity

- Perpetuity: a financial instrument that promises to pay an equal cash flow per period forever / an infinite series of annuity

- $PVPER_0 = PMT \sum_{t=1}^{n} (1+i)^{-t} = PMT \left[\frac{1-(1+i)^{-n}}{i} \right]$

  $n \to \infty, \ (1+i)^{-n} \to 0$

$$PVPER_0 = \frac{PMT}{i}$$ *Formula*

Example: preferred stock dividends

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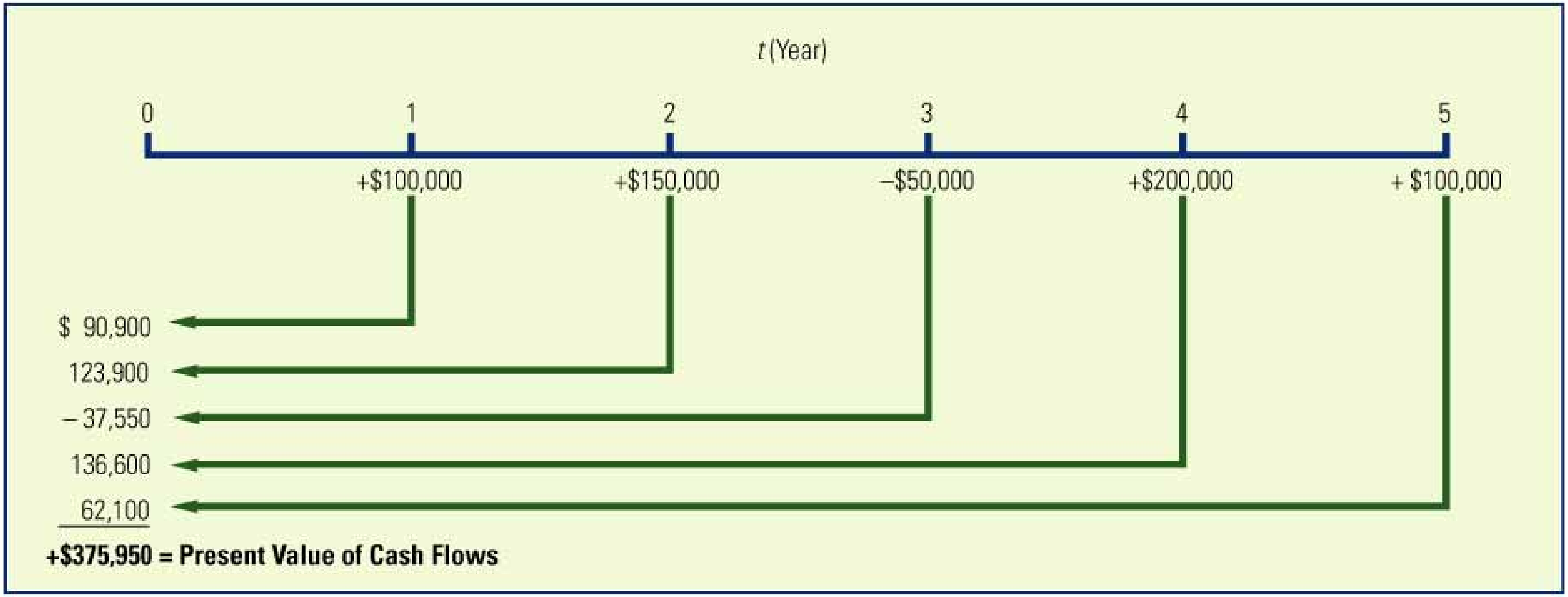
4. Uneven payment

- PV of an uneven payment stream (useful in capital budgeting)
  - take individual payment present values and add them up

Figure 4.9

Timeline of a Present Value of Unequal Payments (i = 10%; n = 5)



Chapter 6

Fixed-Income Securities: Characteristics

and Valuation

Introduction

1. Characteristics of long-term debt
2. Valuation of assets
3. Bond valuation
4. Characteristics of preferred stock
5. Valuation of preferred stock

1. Characteristics of long-term debt

- Types of long-term debt
  - Mortgage bonds secured
  - Debentures unsecured

    Subordinated and unsubordinated
  - Convertible Bond
  - Warrant Bond
  - Floating Rate Bond
  - Income bonds

...continued

- U.S. government debt securities
  - U.S. Treasury bills S-T

    Maturities of 3, 6, and 12 months

    Minimum denominations of $10,000

    Sold at a discount from maturity value
  - Treasury notes and bonds L-T

    Notes 1–10 year maturity

    Bonds 10–30 year maturity

- Features of long-term debt
  - Indenture: contract between firm and lender
  - Trustee: ensures compliance with covenants
  - Call feature: option to redeem a debt issue before its maturity date at a call price
  - Sinking fund: gradual payback of principal
  - Equity-linked debt:convertible/warrants
  - Size: Public offering
  - Coupon rates Fixed/Floating/Zero Coupon
  - Maturity – normally between 20~30 years

- Advantages and disadvantages

Issuing firm

Advantages

- Tax deductibility of interest
- Financial leverage can increase EPS
- Ownership is not diluted

Disadvantages

- Increased financial risk
- Indenture provisions restrict firms' flexibility

Investor

Advantages

- low risk

Disadvantages

- They do not participate in any increased earnings
- The real interest receipts decreased due to inflation.

...continued

- Bond ratings:

  申请—调查—分析—评价—公布

Quality	**S & P’s**	**Moody’s**	
Highest	AAA	Aaa	高质量
High	AA	Aa	
Upper Medium	A	A	投资级
Medium	BBB	Baa	
Junk	BB,B,CCC,CC,C	Ba,B,Caa,Ca,C	不合标准
Default	D		

...continued

– 等级评价的依据和方法：财务指标体系
  衡量违约风险的财务指标
  债券等级评价财务指标

– 证券等级评价的作用和原理：为什么等级评价可防范违约风险？

2. Valuation of Assets

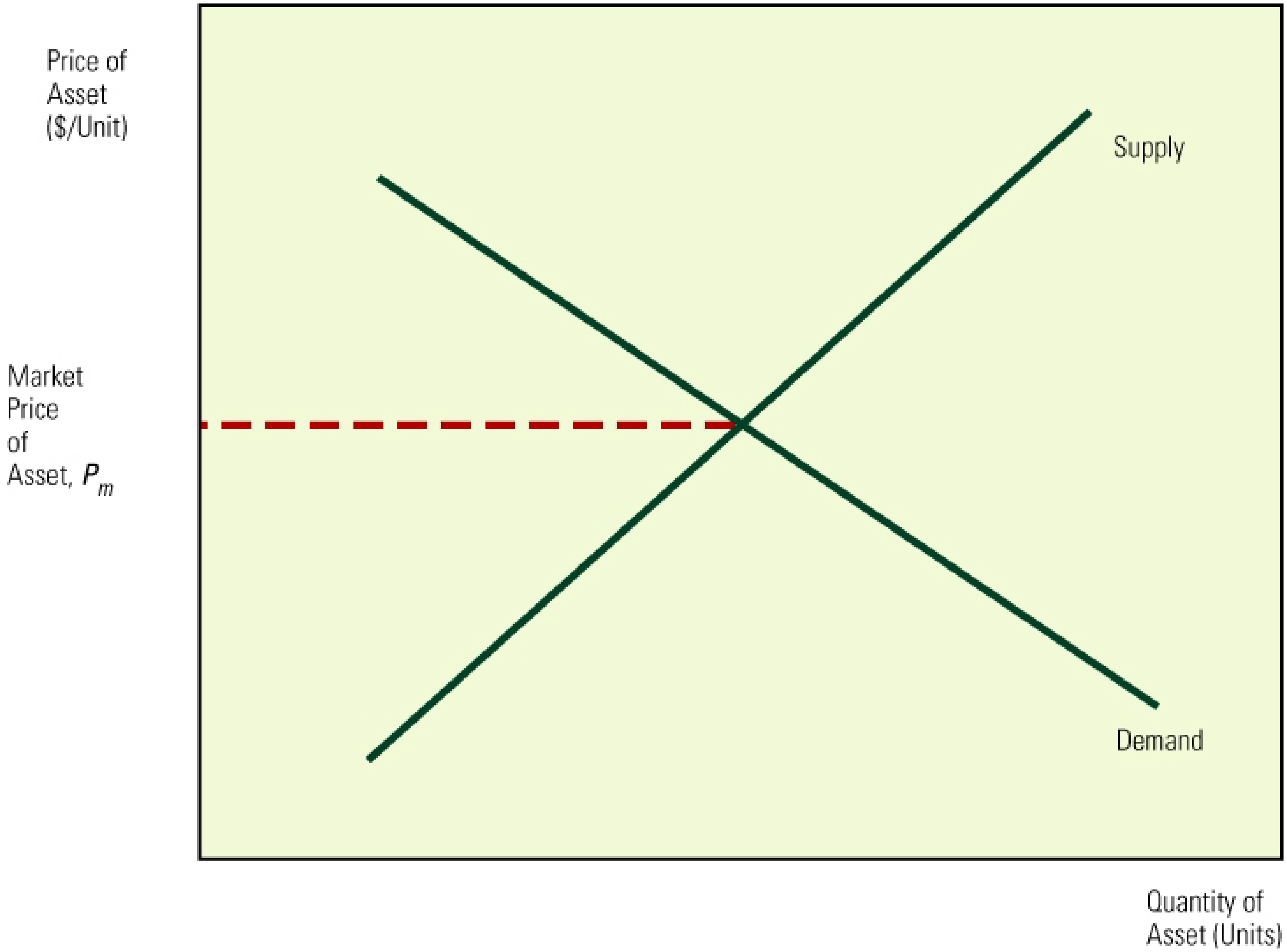
- Based on the expected future benefits over the life of the asset
- Future benefits = cash flows (CFs)
- Capitalization of cash flow method
  - PV of the stream of future benefits discounted at an appropriate required rate of return *i*

$$V_0 = \sum_{t=1}^{n} \frac{CF_t}{(1+i)^t}$$

Market Value of an Asset

- Buyers and Sellers may have different opinions of an asset's value based on their assessments of potential cash flows and required rates of return
- Market price of an asset is determined by interaction of supply and demand
- Market Price is the value placed on the asset by the marginally satisfied buyer and seller who make the transaction

Figure 6.1
Market Price of an Asset



Market equilibrium and Market price

- Market Equilibrium
  - expected rate of return = required rate of return
- Market Disequilibrium
  - expected rate of return <> required rate of return
- The security's Market Price represents a **consensus** judgment as to the security's value or worth

3. Bond Valuation

- **Bonds having finite maturity dates**

$$P_0 = \sum_{t=1}^{n} \frac{I}{(1+k_d)^t} + \frac{M}{(1+k_d)^n}$$

$$= I(PVIFA_{k_d,n}) + M(PVIF_{k_d,n})$$

Based on capitalization [present value] of Cash Flows

• I = interest payment (= i*M)

•M = principal payment

Note: **k** is required rate of return, which may change depending on the market. The coupon rate **i** will not change at all.

Figure 6.2
Cash Flows from an AT&T Bond

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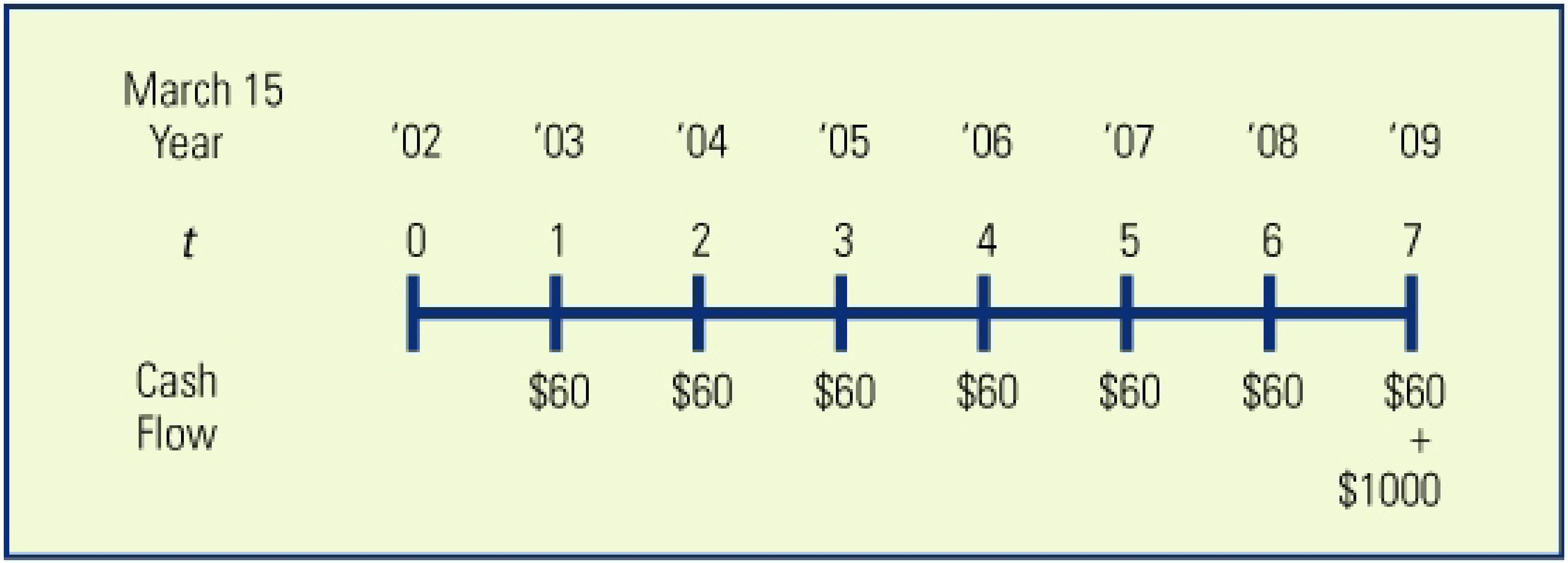


- **Semiannual interest payments**

$$P_0 = \sum_{t=1}^{2n} \frac{I/2}{(1+k_d/2)^t} + \frac{M}{(1+k_d/2)^{2n}}$$

- **Perpetual Bond**
  - a bond issued without a finite maturity date (perpetuity)，No obligation to repay the principal

$$P_0 = \frac{I}{k_d}$$

- **Zero Coupon Bonds**
  - pay no interest over their life, the only payment is the principal payment at maturity

$$P_0 = \frac{M}{(1 + k_d)^n}$$ formula

$$P_0 = M \, (\text{PVIF}_{\ k_d, n})$$ table

- **Yield to Maturity (YTM)**
  - the discount rate that equates the present value of all expected interest payments and repayment of principal from a bond with the present bond price

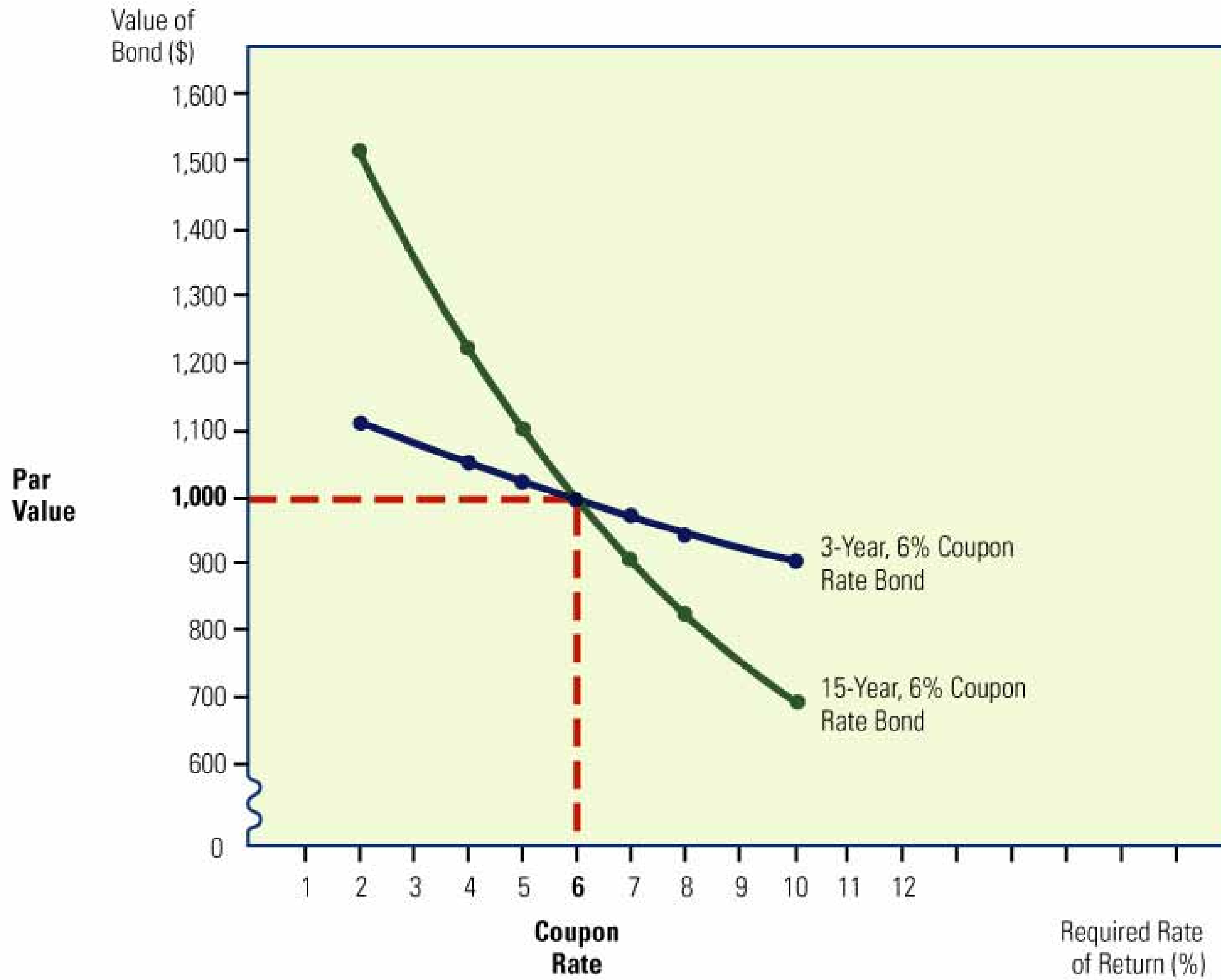
- **Bond prices and Market interest rates**
  - There is an **inverse** relationship between a bond's value, P_0, and its required rate of return, k_d.
  - If k_d > i, then bond trades at a *discount*

    If $k_d < i$, then bond trades at a *premium*
  - If bond is held until maturity, then there will be no risk to principal

- **Long Term vs. Short Term Bonds**
  - The variation in market price of a bond is known as **interest rate risk**
  - A change in k_d changes the value of a long-term bond more than the value of a short-term bond
  - Duration

Figure 6.3
Relationship Between the Value of a Bond and the Required Rate of Return

...continued



课堂案例分析讨论

4：Calculating Yields for Johnson & Johnson’s Debt

计算名义收益率（YTM）和实际收益率（APY）

4. Characteristics of preferred stock

- An intermediate claim order position between C/S and L-T debt
- Part of equity while increasing financial leverage
- Dividends on P/S are **not** tax deductible.
- Preference over C/S with regard to claim on earnings and assets
- Dividends can **not** be paid on C/S unless the preferred dividend for the period has been paid.

Features of preferred stock

- Selling price
- Par value
  - assigned value
- Adjusted rate P/S
- Cumulative
  - dividends carry over if not paid
- Participation
- Maturity
  - perpetual
- Call feature
  - call option before maturity at call price, normally with a call premium
- Voting rights
  - nonvoting

Advantages and disadvantages

- Advantages
  - Flexible [dividends payment]
  - Can increase financial leverage
  - Corporate tax advantage

    Example: insurance companies
- Disadvantages
  - High after-tax cost

    Dividends are not tax deductible for the issuer firm

5. Valuation of preferred stock

- Preferred stocks are often treated as perpetuities with a value equal to the annual dividend divided by the required rate of return

$$P_0 = \frac{D_p}{k_p}$$

  - D_p = Dividend per period
  - K_p = required rate of return

Chapter 7

Common stock: characteristics,valuation

and issuance

Introduction

1. Characteristics of common stock
2. Valuation of common stock
3. Applications of the general dividend valuation model
4. Issuance of common stock

1. Characteristics of common stock

- Common stock (C/S) is the permanent long-term financing of a firm
  - Has no maturity date
- Represents the true residual ownership of a firm
  - Residual claim on earnings and assets
- Stockholders elect the board of directors
  - Have voting rights

1) Balance sheet accounts associated with C/S

- Stockholder's Equity
  - Includes preferred stock and common stock
- Par value of C/S – assigned value
- Contributed capital in excess of par
  - Additional paid in capital
  - Difference between par and issue price
- Common stockholder's equity
  - Includes common stock at par value, contributed capital in excess of par, and retained earnings

- Book value per share

$$\frac{\text{common stockholder's equity}}{\text{weighted average number of common shares outstanding}}$$

- Basic or the unadjusted EPS

$$\frac{\text{Net income-}D_p}{\text{weighted average number of common shares outstanding}}$$

2) Rights of Common Stockholders

- Dividend rights
  - share equally in distribution of dividends
- Asset rights
  - residual claim after all other securities
- Preemptive rights
  - right to share proportionately in new stock issues
- Voting rights
  - Right to vote on stockholder matters, such as selection of the board of directors

Voting for the Board of Directors

- Majority voting
  - requiring more than 50 percent of the votes to elect a director
- Cumulative voting
  - Shareholders may concentrate votes on a few candidates
- Proxy
  - signing over your voting rights to someone else, normally to management

3) Features of Common Stockholders

- C/S classes
  - Voting and nonvoting
  - Specific ownership
- Stock dividends
  - Transfer from R/E account to the C/S and additional paid-in capital accounts
- Stock repurchases
  - Disposition of excess cash
  - Financial restructuring
  - Future corporate needs
  - Reduction of takeover risk
- Stock splits
- Reverse stock splits

4) C/S Advantages and Disadvantages

- Advantages
  - Flexible – dividends are not fixed obligations
  - Reduce financial leverage
  - Lower weighted cost of capital in heavily in debt companies
- Disadvantages
  - Diluted Earnings Per Share (should be temporary if funds are invested wisely)
  - Expensive (high issuance costs)

2. Valuation of common stock

- Capitalized value [PV] of the stock's expected stream of cash flow during holding period
- One-period dividend valuation model

$$P_o = \frac{D_1}{1+k_e} + \frac{P_1}{1+k_e}$$

- Multiple-period dividend valuation model

$$P_0 = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \ldots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

...continued

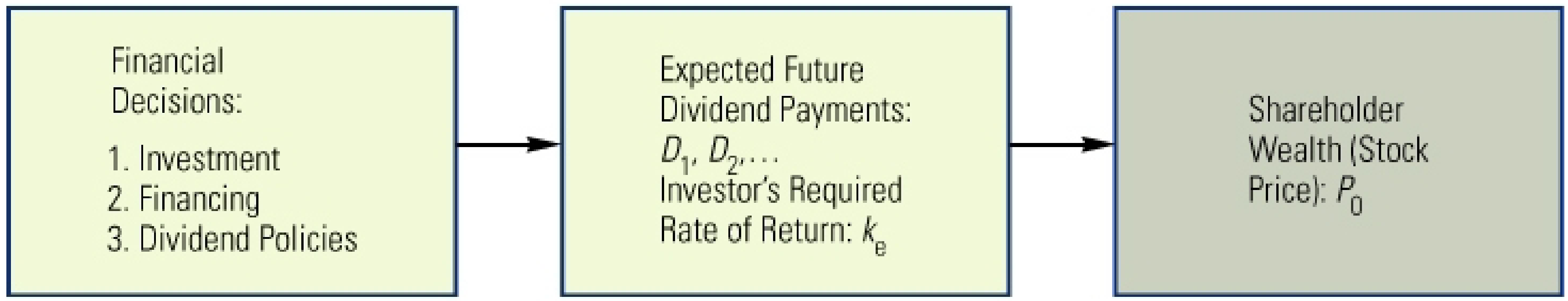
- A general dividend valuation model

$$P_n = \sum_{t=n+1}^{\infty} \frac{D_t}{(1+k_e)^{t-n}}$$

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k_e)^t}$$

Figure 7.1

Relationship Between Financial Decisions and Shareholder Wealth



3. Applications of the general dividend valuation model

- Zero growth dividend valuation model
  - Behaves just like a perpetuity
  - Dividends assumed to be fixed
  - $g = 0$ (g = growth rate of dividends)

$$P_0 = \sum_{t=1}^{\infty} \frac{D}{(1+k_e)^t} = \frac{D}{k_e}$$

...continued

- Constant growth dividend valuation model
  - *Assume* $k_e > g$ (k_e *expected rate of return*)
  - $D_t = D_0 (1 + g)^t$

$$P_0 = \sum_{t=1}^{\infty} \frac{D_0(1+g)^t}{(1+k_e)^t} = \frac{D_1}{k_e - g} = \frac{D_0(1+g)}{k_e - g} (k_e > g)$$

$$k_e = \frac{D_1}{P_0} + g$$

...continued

k_e= expected dividend yield+ price appreciation yield (g, expected growth rate in dividends)

g = ROE*(1- dividend payout ratio)

= ROE* retention ratio

...continued

- Nonconstant growth dividend valuation model
  - 模型：设在m期内股利增长率为g_1，而m期后以g_2增长
  - P_0= present value of expected dividends during period of nonconstant growth +present value of the expected stock price at the end of the nononstant growth period(P_m)

$$P_0 = \sum D_0(1+g_1)^t/(1+K_e)^t + P_m/(1+K_e)^m \quad (t=1 \text{ to } m)$$

$$P_m = \sum D_0(1+g_2)^t/(1+K_e)^t = D_{m+1}/(K_e - g_2)$$

$$P_0 = \sum D_0(1+g_1)^t/(1+K_e)^t + D_{m+1}/(1+K_e)^m(K_e - g_2)$$

$$P_0 = \frac{D_1}{K_e - g_1}\left[\frac{(1+K_e)^m - (1+g_1)^m}{(1+K_e)^m}\right] + \frac{D_1(1+g_1)^{m-1}(1+g_2)}{(K_e - g_2)(1+K_e)^m}$$

...continued

- Steps to find P_0:

a) Find the PV of the dividends during the above-normal growth period (if two or more above-normal growth periods continue with the PV of the second)

b) Find the value of the C/S at the end of the above-normal growth period （constant dividend growth model）

c) Discount the answer in b) to the present time

d) Sum steps a) and c) to find P_0

...continued

– 若g2未知，为了简化计算，设公司在m年后，转变为一家"普通公司"，即其市盈率等于市场平均市盈率（Mg），其每股收益为En，则

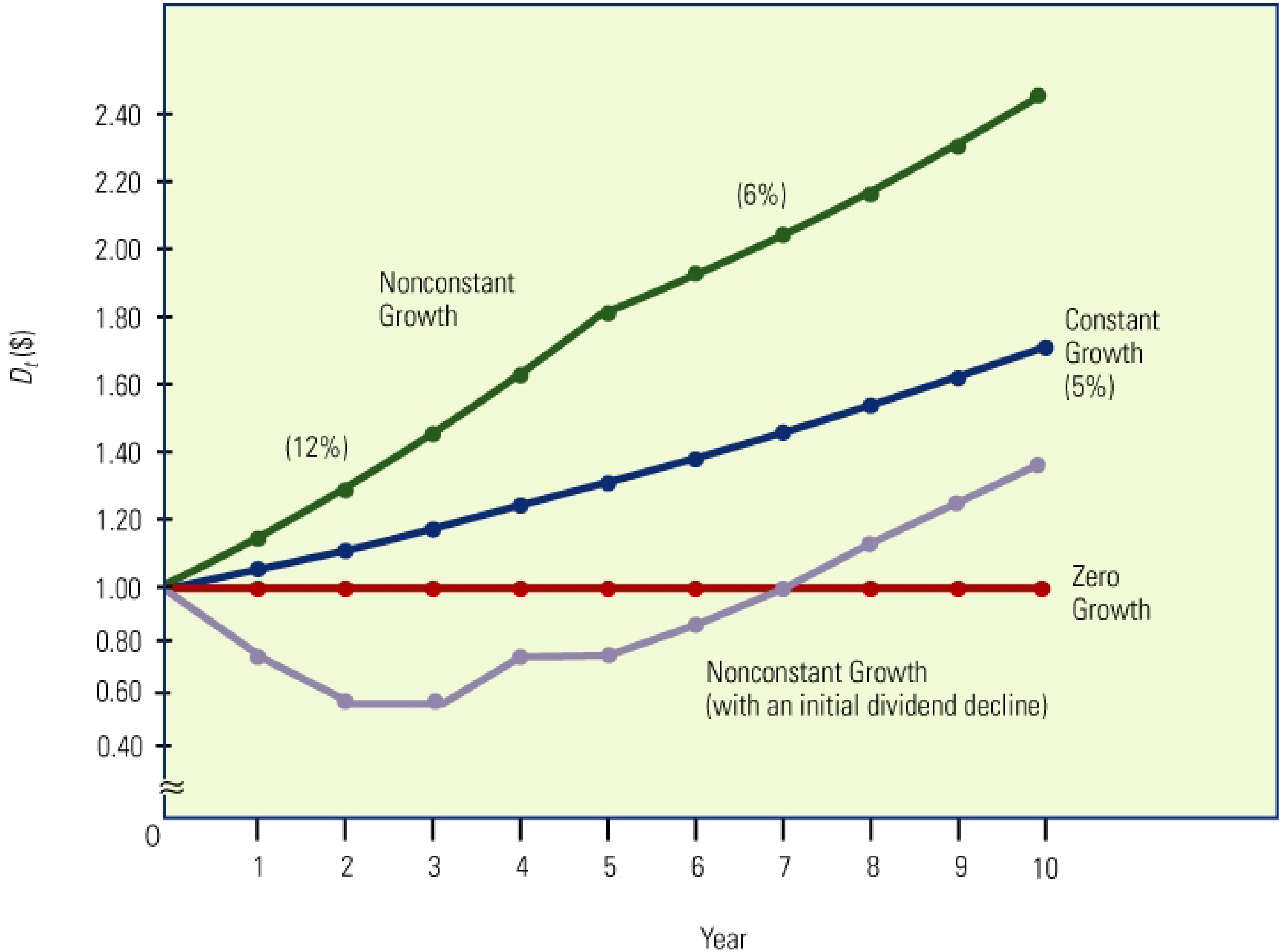
$$P_n = Mg \times E_n \qquad\qquad E_n = E_1(1+g_1)^{n-1}$$

$$P_0 = \frac{D_1}{K_e - g_1}\left[\frac{(1+K_e)^n - (1+g_1)^n}{(1+K_e)^n}\right] + \frac{Mg \times E_1(1+g_1)^{n-1}}{(1+K_e)^n}$$

课堂案例分析讨论

5：IBM公司的股票定价

Figure 7.2
Dividend growth pattern



...continued

- reasons for valuation
- factors considered
- V = P/E * Normal earnings

4. Issuance of common stock

- Investment Banking
  - Long-range financial planning
  - Timing of security issues
  - Purchase of securities
  - Marketing of securities
  - Arrangement of private loans and leases
  - Negotiation of mergers

...continued

- How Are Securities Sold?
  - Public cash offering
    - Selling securities through investment bankers to the public
  - Private or direct placement
    - Placing a security issue with one or more large investors
  - Rights offering
    - Selling C/S to existing stockholders

...continued

- Issuance Costs
  - Direct Issuance Costs
    - Underwriting spread
    - Legal and Accounting Fees
    - Cost of Registration and Printing costs
  - Other Issuance Costs
    - Management time
    - Underpricing new equity
    - Stock price declines

...continued

- Registration Requirements
  - Securities Act of 1933
  - Securities Exchange Act of 1934
  - Any interstate security issue over $1.5 million and having a maturity greater than 270 days is required to register the issue with the SEC.
  - Provide all buyers of the new security with a final copy of the prospectus

Chapter 5

Risk and Return

Introduction

1. Meaning of Risk and Return
2. Measurement of Risk
3. Risk-return Relationship
4. Investment Diversification and Portfolio Analysis

1. Meaning of Risk and Return

- Return
  - Expected return: The benefits an investor anticipates receiving from an investment.
  - Expected rate of return: the weighted average of all possible returns where the returns are weighted by the probability that each will occur
  - Required rate of return: the minimum rate of return necessary to attract an investor to purchase or hold an asset

...continued

- Risk
  - the possibility that actual future returns will deviate from expected returns
  - the potential variability of returns from a project or portfolio of projects

2. Measurement of Risk

- Probability distributions
  - A serious of possible outcome and the probability that each outcome will occur

$$0 \leq P_i \leq 1$$

$$\sum_{i=1}^{n} P_i = 1$$

...continued

Rate of Return

Situation	Probability	Government Bond	Company Bond	Project 1	Project 2
Depression	0.05	8.0 %	8.0 %	-3.0 %	-2.0 %
Recession	0.20	8.0	8.0	6.0	9.0
Normal	0.50	8.0	9.0	11.0	12.0
Growth	0.20	8.0	10.0	18.5	15.0
Boom	0.05	8.0	12.0	19.5	26.0
	1.00				

...continued

- Expected value
  - based on forecasts of possible returns and associated probabilities
    - probability weighted average of all possible returns
    - actual return may be higher or lower than expected return

$$\bar{r} = \sum_{j=1}^{n} r_j p_j$$

Project 2:

$$\bar{r} = \sum_{j=1}^{n} r_j p_j = R_1(P_1)+R_2(P_2)+R_3(P_3)+R_4(P_4)+R_5(P_5)$$

$$=(-2.0\%)(0.05)+9.0\%(0.20)+12\%(0.50)+$$

$$15\%(0.20)+26.0\%(0.05)$$

$$= 12.0\%$$

...continued

- standard deviation (σ)
  - an absolute measure of risk
  - an appropriate measure of total risk when comparing two equal-sized investments
  - the higher the std. deviation, the greater the uncertainty about the return

$$\delta = \sqrt{\sum_{j=1}^{n} (r_j - \bar{r})^2 \cdot p_j}$$

Project 2:

$$\delta = \sqrt{\sum_{j=1}^{n} (r_j - \bar{r})^2 \cdot p_j}$$

= [(-2.0% − 12.0%)^2 × 0.05+(9.0% − 12%)^2 × 0.20+(12% − 12%)^2 × 0.50 +(15% − 12%)^2 × 0.20+(26% − 12%)^2 × 0.05] $^{1/2}$

= (0.00232) $^{1/2}$ = 0.04817 ≈ 4.82%

NOTE:衡量原则

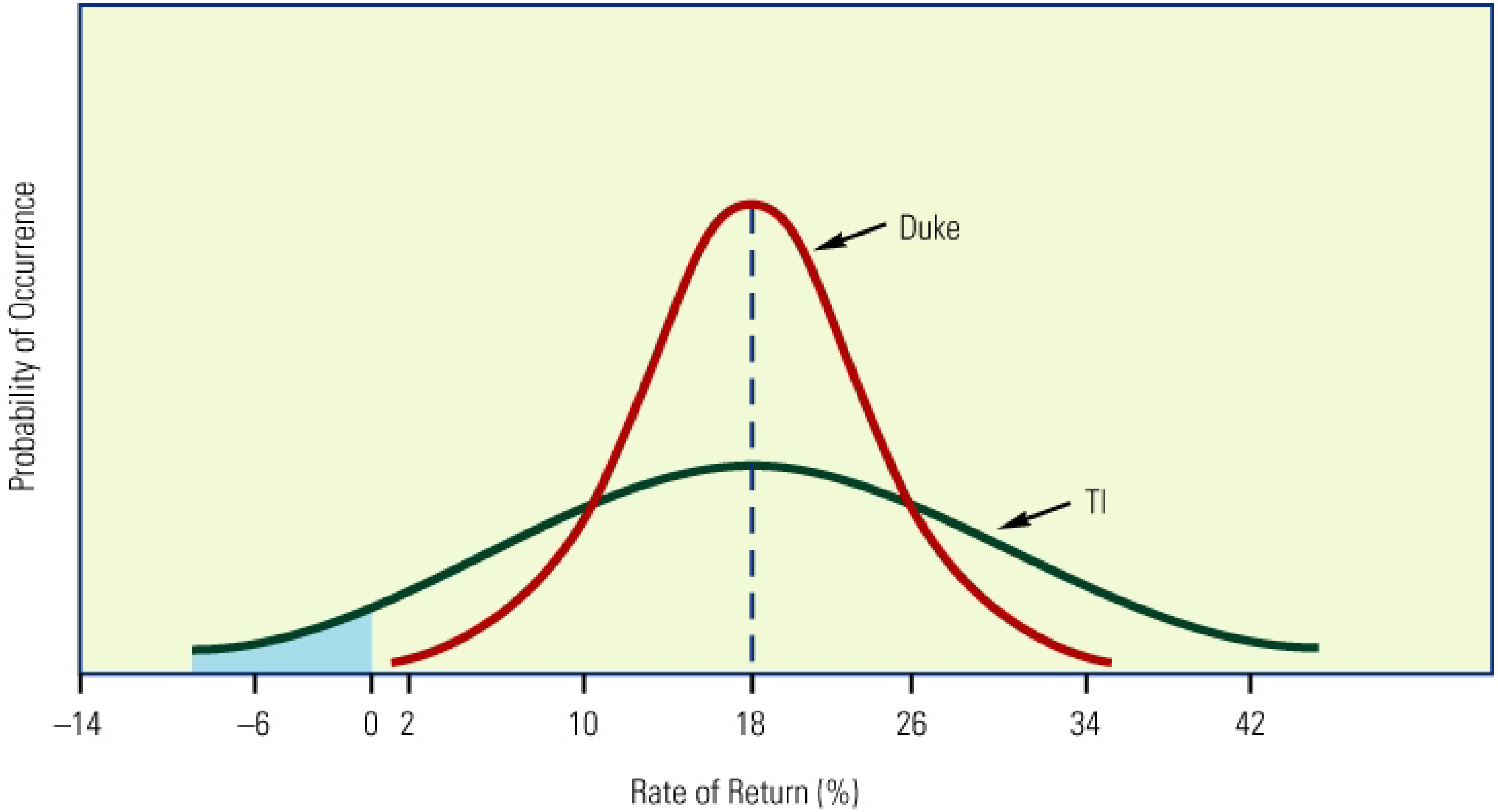
在标准差相同情况下，期望值越高，风险越小。这说明在同样的范围内，收益率的一般水平较高，因此风险较小。

若期望值相同，对期望值的偏离程度越大，代表性就越小;偏离程度越小，则代表性就越强。即标准差越大，风险越大；标准差越小，风险越小。从图像看，图像越陡，风险越小，图像越平坦，风险越大。

Figure 5.1

Continuous Probability Distributions for the Expected Returns from Investments in the Duke and TI Stocks

...continued



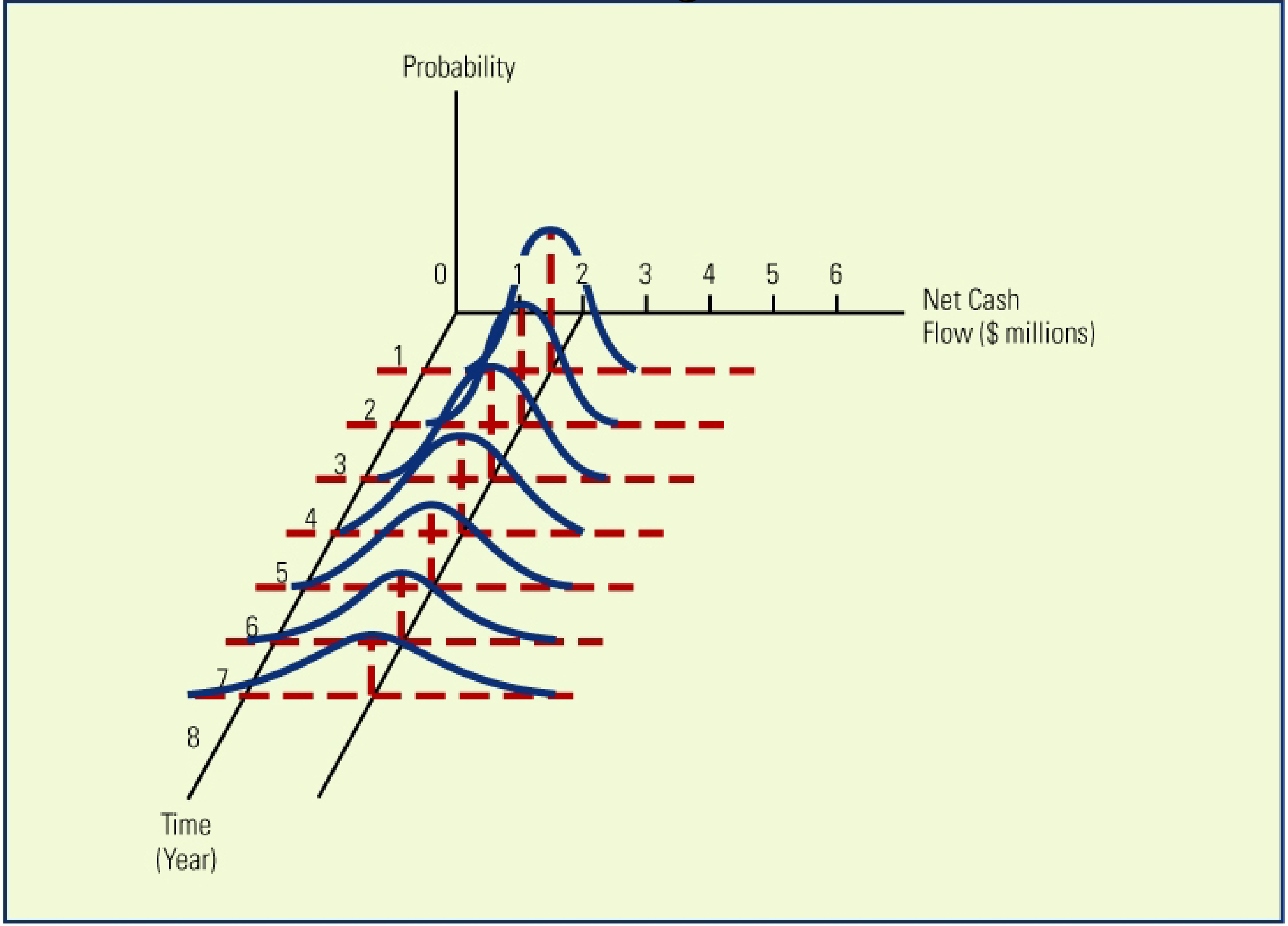
- Coefficient of Variation
  - an relative measure of risk
  - an appropriate measure of total risk when comparing two investment projects of different expected returns
  - 将标准差标准化，度量单位收益率的风险

$$\delta = \sqrt{\sum_{j=1}^{n} (r_j - \bar{r})^2 \cdot p_j}$$

Figure 5.2

Risk of a Project over Time: Tandy Corporation

Risk is an increasing function of time



3. Risk-return Relationship

- Required rate of return = risk-free rate of return + risk premium
  - Required rate of return is determined in the financial marketplace and depends on the supply of funds available as well as the demand for those funds
- r_f = real rate of return + expected inflation premium
  - Real rate of return: the return that investors would require from a security having no risk of default in a period of no expected inflation
  - Expected inflation premium: compensates investors for the loss of purchasing power due to inflation

...continued

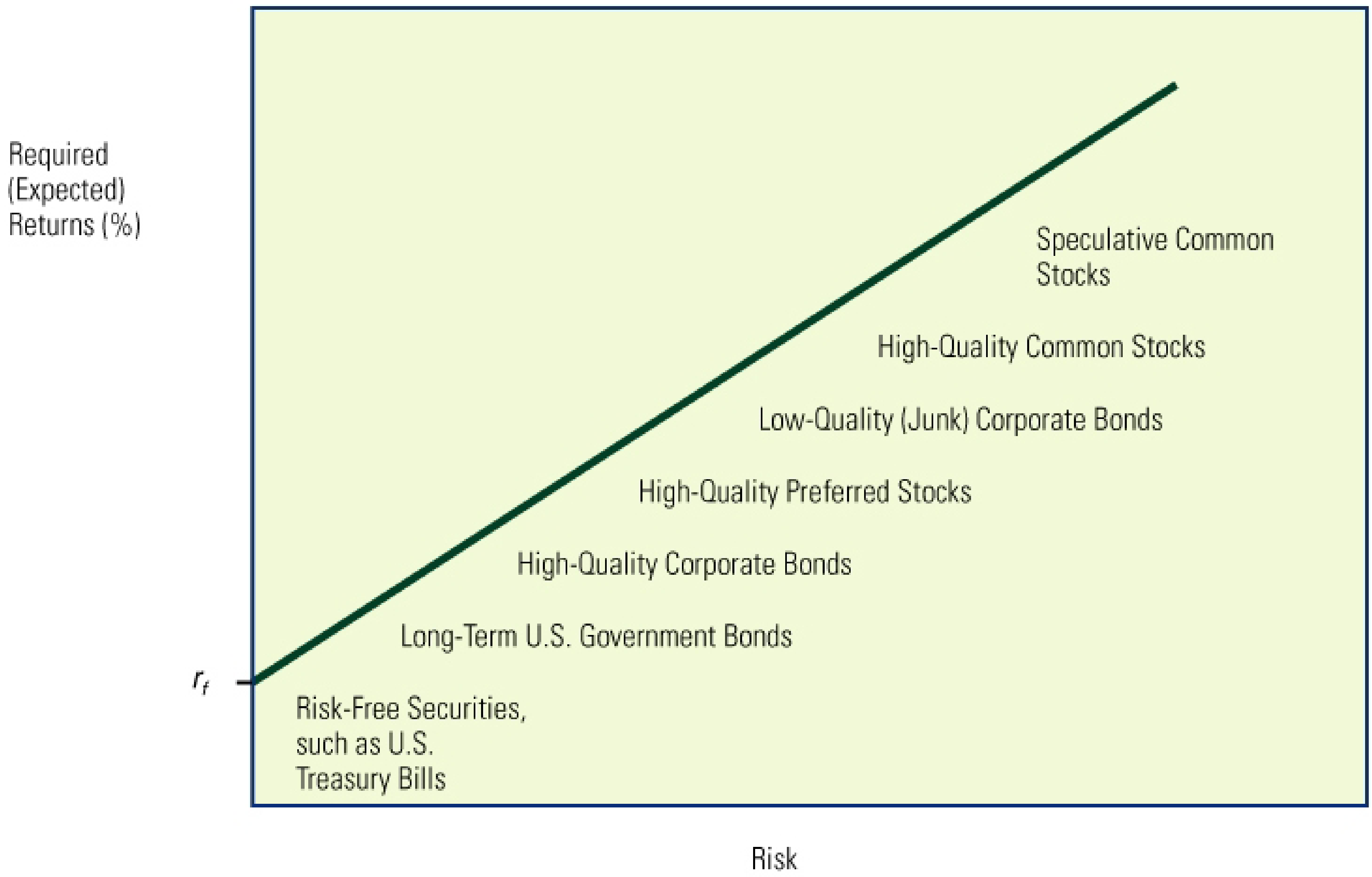
- risk premium = maturity risk premium+default risk premium+seniority risk premium+marketability risk premium
  - maturity risk premium: Term structure of interest rates: in general, the yield curve has been upward sloping more often than it has been downward sloping(expectation theory/liquidity theory/market segmentation theory)
  - default risk: claim on the risk that interest and principle will not be paid as promised in the bond debenture
  - seniority risk premium: the claim on the company’s assets
  - Marketability: Liquidity, whether traded quickly and without a significant loss of value

...continued

- Business and financial risk
  - Business risk: variability in operating earnings over time
  - Financial risk: additional variability in a company's EPS due to leverage
  - They are reflected in the default risk premium

Figure 5.3
Conceptual Risk-Return Relationship

...continued



4. Investment Diversification and Portfolio Analysis

- 投资组合的思想
  - 传统投资组合的思想——Native Diversification
  - 现代投资组合的思想 ——Optimal Portfolio
  - 贡献者(Pioneers)
    - 托宾：1981年诺贝尔经济学奖。哈佛博士，耶鲁教授。主要贡献：流动性偏好、托宾比率分析、分离定理。
    - 马柯维茨：1990年诺贝尔经济学奖。曾在兰德工作。主要贡献：投资组合优化计算、有效疆界。
    - 夏普：1990年诺贝尔经济学奖。曾在兰德工作。UCLA博士，华盛顿大学、斯丹福大学教授。主要贡献：CAPM。
    - 林特勒：美国哈佛大学教授。主要贡献：CAPM

...continued

- 代表作（Classic Papers）
  - Harry Markowitze,“Portfolio Selection,”,JOF,1952.
  - William Sharp,“Capital Asset Pricing: A Theory of Market Equilibrium Under Condition of Risk,” JOF, 1964.
  - John Lintner,“The Valuation of Risk Assets & Selection of Risky Investments in Stock Portfolio & Capital Budget,” RE&S, 1965.
  - James Tobin,“Liquidity Preference as Behavior toward Risk,” RES,1958.

...continued

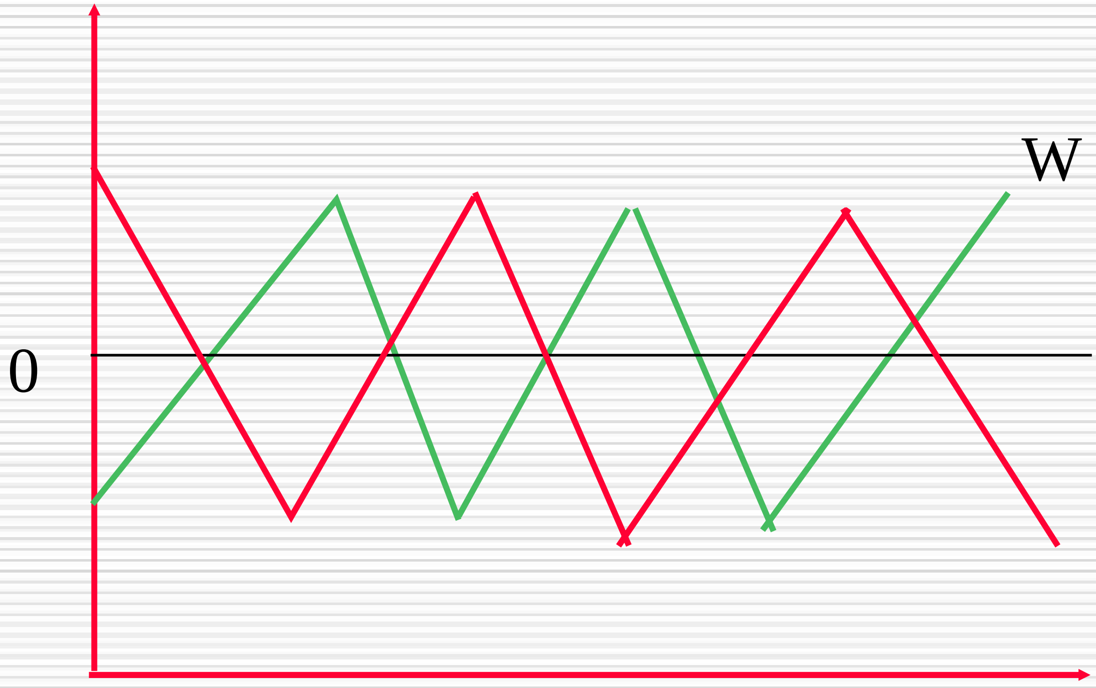
- 投资组合理论价值和应用价值
- 现代组合理论研究综述
  - 国外研究
  - 国内研究

- Investment diversification and risk

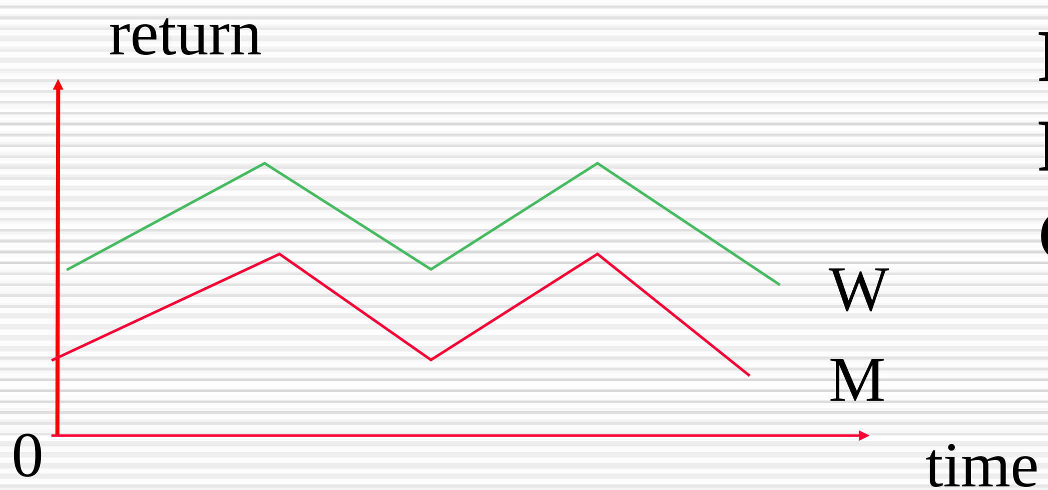
i) Return

Perfect Negative Correlation

ρ **= -1**



ii)



Perfect Positive Correlation

ρ = +1

iii) -1< ρ < +1 投资组合可以减少风险，但不能完全消除风险。

事实上，上市的股票之间存在正相关，但非完全正相关，相关系数大约在 +0.5 < ρ < +0.7之间。

Figure 5.4

Illustration of (a) Perfect Positive, (b) Perfect Negative, and (c) Zero Correlation for Two Investments

...continued

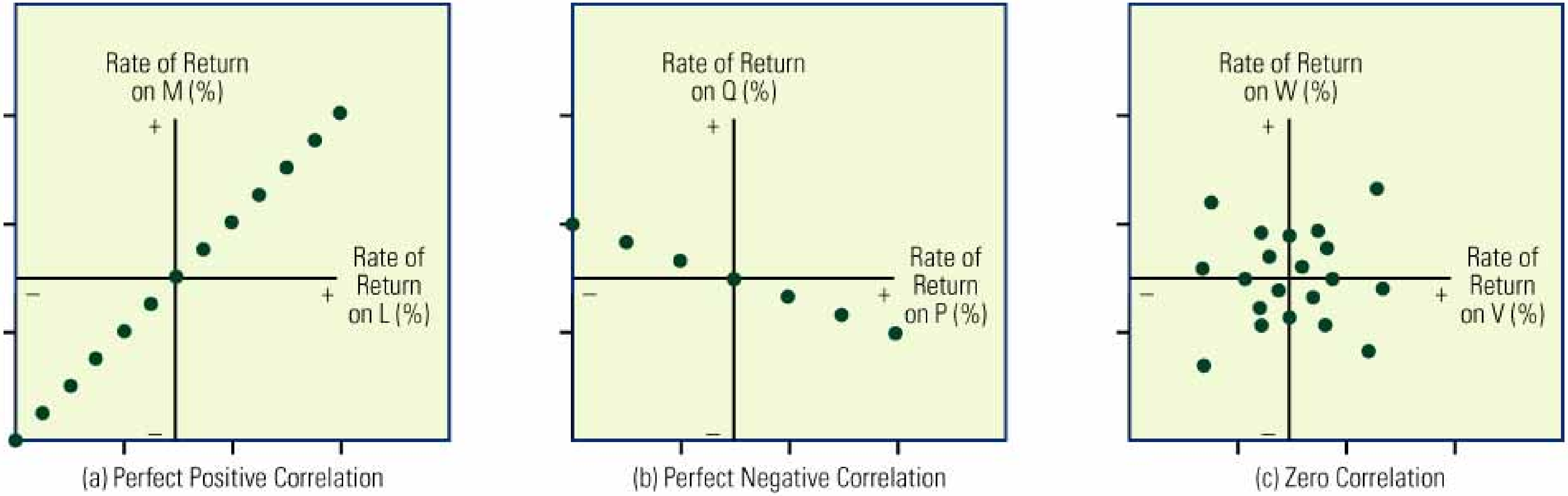
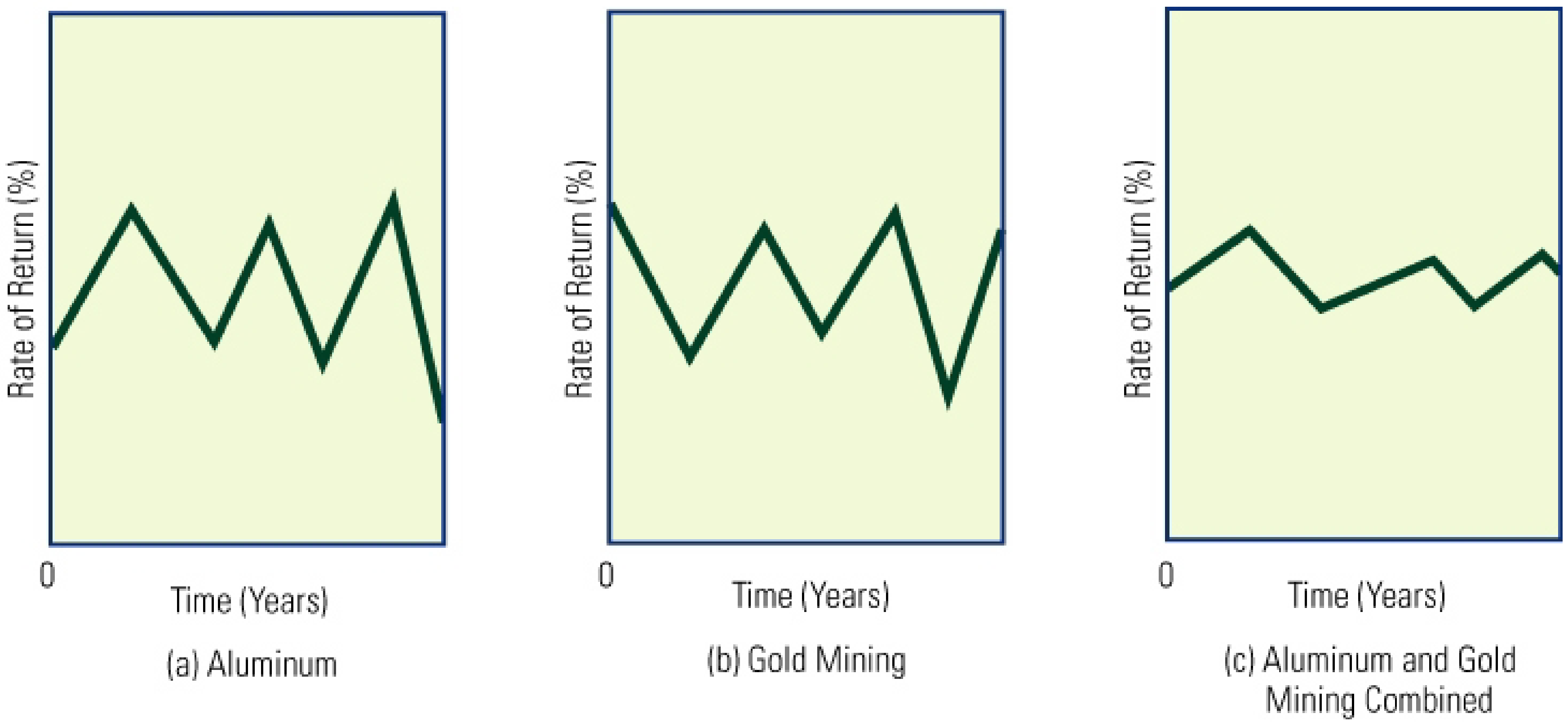


Figure 5.5
Illustration of Diversification and Risk Reduction: Alcoa

...continued



- Measurement of portfolio risk
  - Expected returns from a portfolio
    - Weighted average of individual securities in the portfolio

$$r_p = \sum_{i=1}^{n} w_i r_i$$

$$\sum_{i=1}^{n} w_i = 1$$

$$0 \le w_i \le 1$$

...continued

– Portfolio risk

$$\sigma_p = \sqrt{\sum_{i=1}^{n} (r_{pi} - \overline{r_p})^2 w_i}$$

$$\sigma_p = \sqrt{w_A{}^2 \sigma_A{}^2 + w_B{}^2 \sigma_B{}^2 + 2 w_A w_B \rho_{AB} \sigma_A \sigma_B}$$

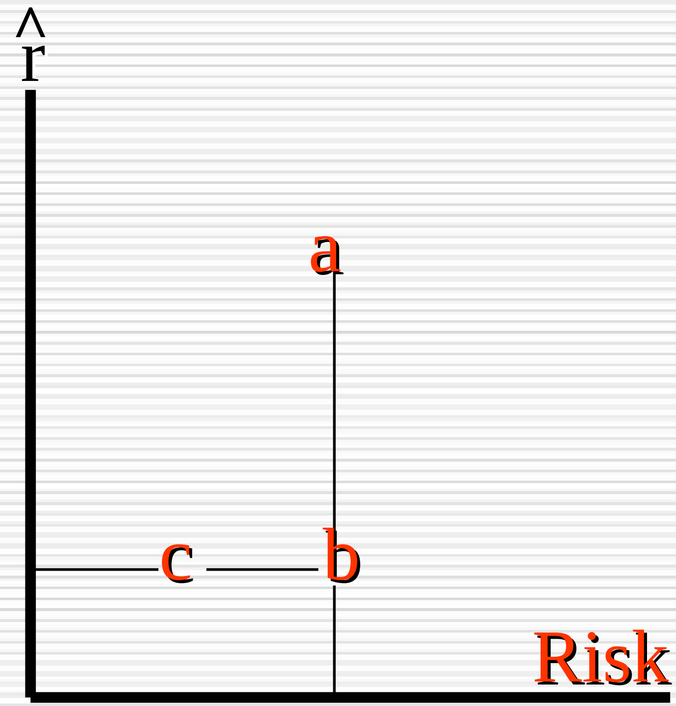
...continued

- Efficient portfolios and the capital market line
  - Relationship between portfolio expected return and risk under different correlation coefficient
  - Portfolio opportunity set: Feasible set
  - Efficient portfolios: Portfolio frontier
  - Optimal portfolio: depends on the investor' attitude toward risk

Efficient Portfolio

Has the highest possible return for a given sd

Has the lowest possible sd for a given expected return



a and c are preferred to b

a and c are efficient

– Capital market line: CML
  - If investors are able to lend and borrow money at the risk-free rate

$$r_p = r_f + \frac{r_m - r_f}{\sigma_m} \cdot \sigma_p$$

  - Lending + Investment in market portfolio
  - Borrowing + Investment in market portfolio

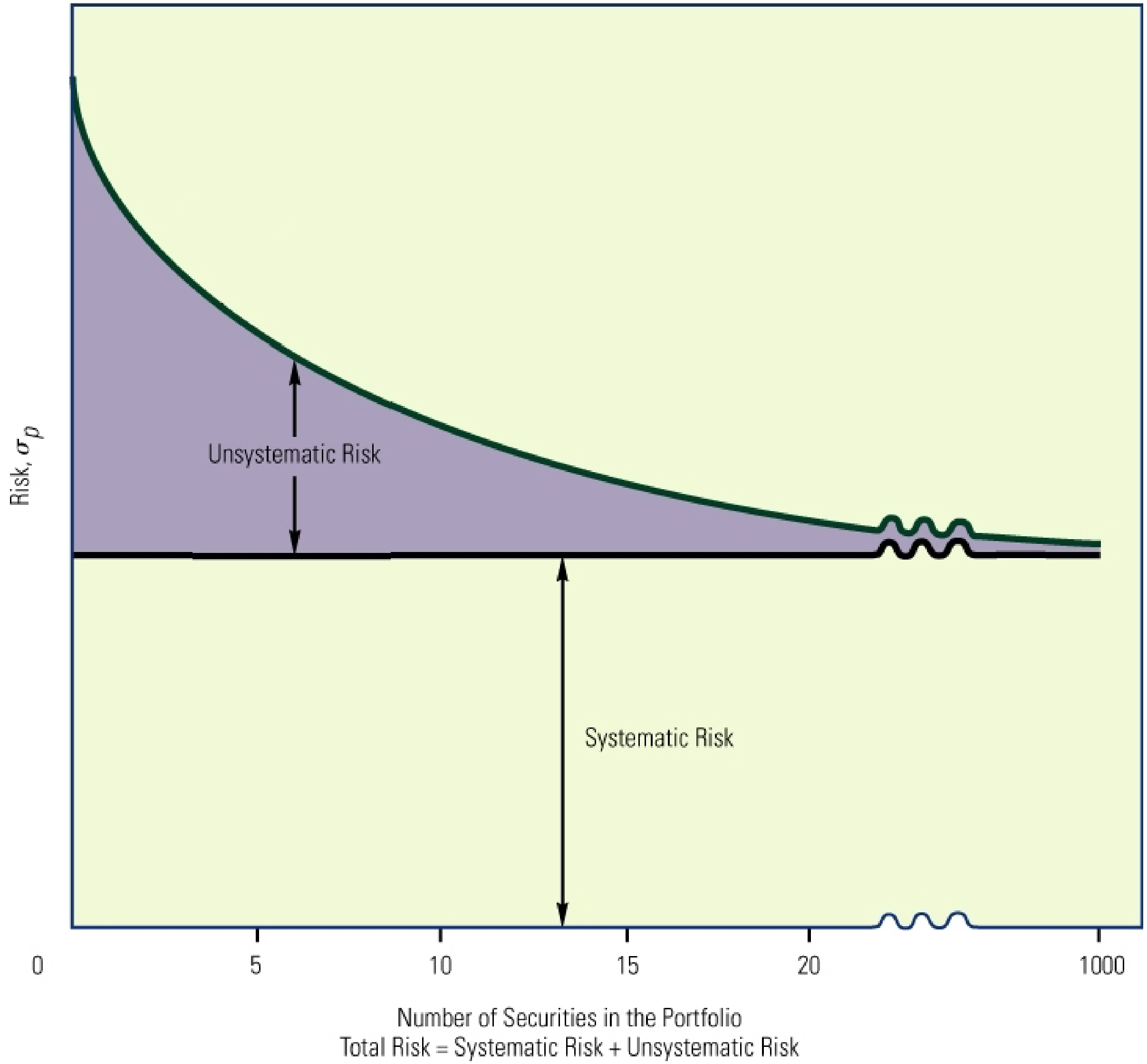
5. Portfolio risk and the capital asset pricing model(CAPM)

- Systematic and unsystematic risk
  - Systematic risk: caused by factors affecting the market as a whole /undiversifiable risk
    - interest rate changes
    - changes in purchasing power(inflation)
    - change in business outlook
  - Unsystematic risk: caused by factors unique to the firm/ diversifiable risk
    - Strikes
    - government regulations
    - management's capabilities
  - Only Systematic Risk is Relevant

Figure 5.6

Unsystematic Risk and Portfolio Diversification

...continued



- β : a measure of systematic risk
  - Beta is determined from the slope of the regression line---the characteristic line between the market return and the individual security's return
  - Beta is a measure of the volatility of a security's returns relative to the returns of the market as a whole

$$\beta_j = \frac{\text{Covariance}_{j,m}}{\text{Variance}_{j,m}} = \frac{\rho_{jm}\sigma_j\sigma_m}{\sigma_m^2} \qquad \beta_p = \sum_{j=1}^{n} w_j \beta_j$$

Table 5.1
Interpretation of Selected Beta Coefficients

…continued

TABLE 5.7 Interpretation of Selected Beta Coefficients

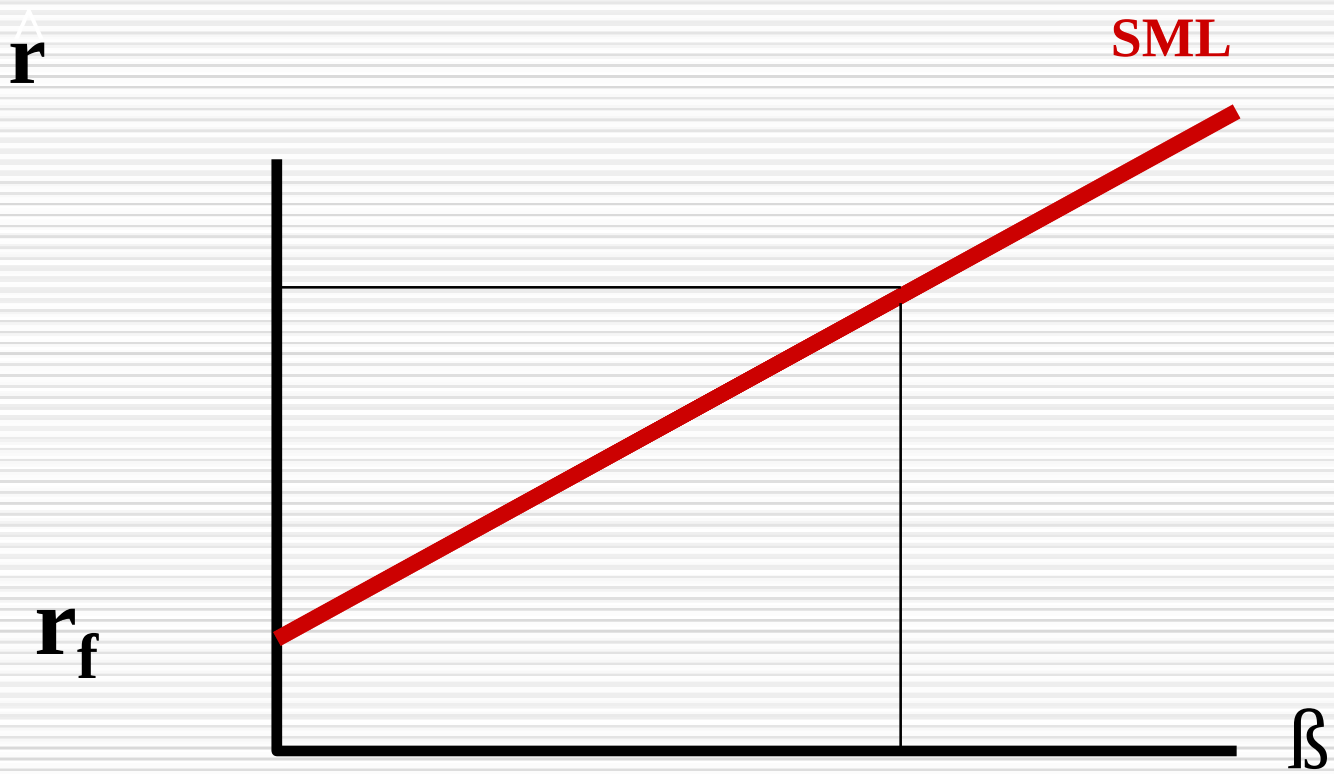
Beta Value	Direction of Movement in Returns	Interpretation
2.0	Same as market	Twice as risky (responsive) as market
1.0	Same as market	Risk equal to that of market
0.5	Same as market	Half as risky as market
0	Uncorrelated with market movements	No market-related risk
−0.5	Opposite of market	Half as responsive as market but in the opposite direction

- Security market line
  - CAPM: a theory that can be used to determine required rates of return on financial or physical assets
  - express the relationship between the required returns from a security and the systematic risk of that security

$$k_j = \overline{r_f} + \overline{\theta_j}$$

  - Security market line and Beta

$$k_j = \overline{r_f} + \overline{\theta_j} = \overline{r_f} + \beta_j(\overline{r_m} - \overline{r_f})$$


$\hat{r}$
SML
r_f
ß

...continued

– Slope of security market line : $r_m - r_f$

will increase or decrease

- with uncertainties about the future economic outlook(f.e. inflation)
- with the degree of risk aversion of investors

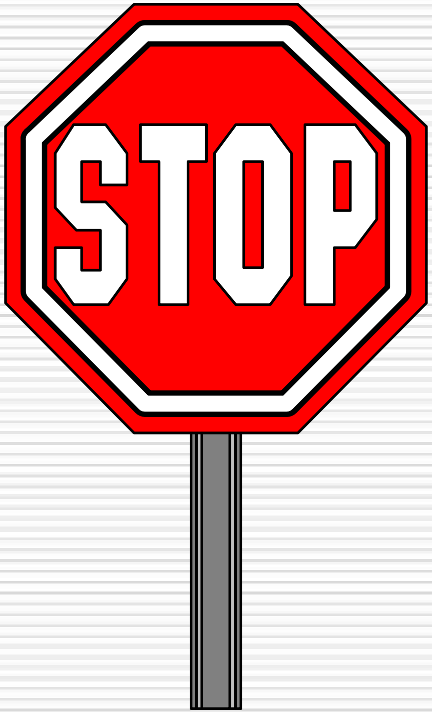
- CAPM Assumptions
  - Investors hold well-diversified portfolios
  - Competitive markets
  - Borrow and lend at the risk-free rate
  - Investors are risk averse
  - No taxes
  - Investors are influenced by systematic risk
  - Freely available information
  - Investors have homogeneous expectations
  - No brokerage charges

...continued

- Major Problems in the Practical Application of the CAPM
  - Estimating expected future market returns
  - Determining an appropriate rf
  - Determining the best estimate of ß
  - Investors don’t totally ignore unsystematic risk
  - Required returns are determined by macroeconomic factors
  - Betas are frequently unstable over time

课堂案例分析讨论

6：基金开元—— 精选个股、重仓持有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