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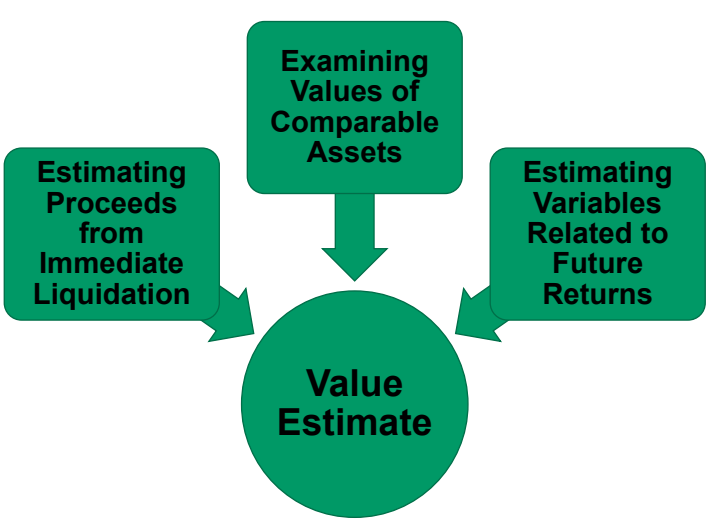
FINANZAS BURSATILES APLICADAS

PROF. GABRIEL B. PARREÑO. CFA , CIIA

VALUATION

1

VALUATION



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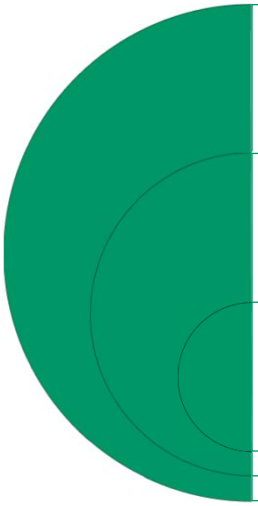
INTRINSIC VALUE



Asset Value Given a Complete Understanding of an Asset's Characteristics

"True" or "Real" Value

Not Always Equal to Market Price

3

ASSET MISPRICING

Efficient Market Theory:

- **Intrinsic value = Market price**

$V_E - P = (V - P) + (V_E - V)$

- **Sources of perceived mispricing**
  - **Market error**
  - **Analyst error**

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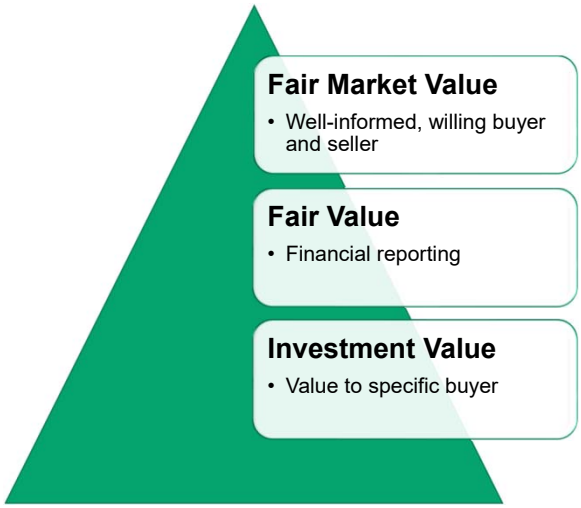
OTHER DEFINITIONS OF VALUE



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USES OF EQUITY VALUATION

Stock Selection	• Is the stock under- or overvalued?
Inferring Market Expectations	• What does the security price say about expectations?
Evaluating Corporate Events	• What is the effect on firm value from a merger?
Fairness Opinions	• Is the value paid for the firm fair?

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USES OF EQUITY VALUATION

Evaluating Business Strategies	• What is the effect on firm value of a new strategy?
Communicating with Analysts and Shareholders	• How is firm value being affected?
Appraising Private Businesses	• What is the value of a private firm?
Compensation	• What is the value of equity compensation?

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THE VALUATION PROCESS

1. Understanding the Business
   - Industry and competitive analysis
   - Financial statement analysis
2. Forecasting Company Performance
   - Forecast sales, earnings, dividends, and financial position
3. Selecting the Appropriate Valuation Model
   - Base selection on company characteristics

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THE VALUATION PROCESS

4. Using Forecasts in a Valuation

Use judgment in valuation application

5. Applying the Valuation Conclusions

Investment recommendations	Valuation opinions	Strategic decisions

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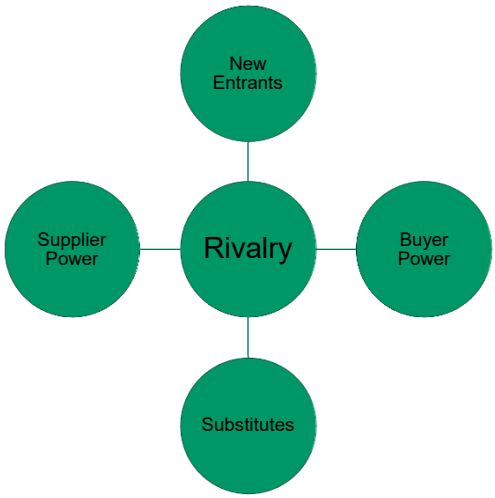
UNDERSTANDING THE BUSINESS: INDUSTRY ANALYSIS (PORTER'S COMPETITIVE ADVANTAGE)



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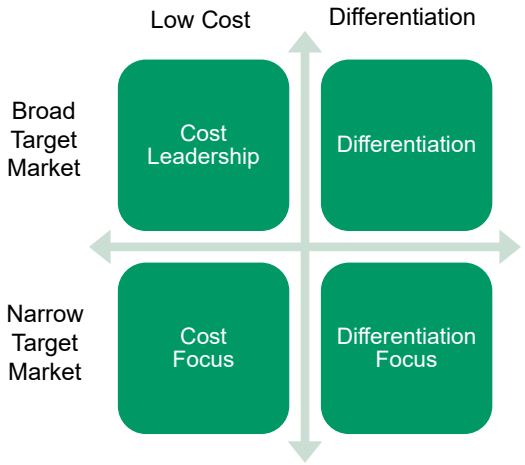
UNDERSTANDING THE BUSINESS: COMPETITIVE ANALYSIS



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ISSUES IN FINANCIAL STATEMENT ANALYSIS

- Nonnumerical Analysis
- Regression to the Mean
- Mature Firms vs. Start-Ups
- Sources of Information
- Quality of Earnings

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VALUATION MODELS

Absolute Valuation Models	Relative Valuation Models

• Present value models
  • Dividend discount models
  • Free cash flow to equity
  • Free cash flow to the firm
  • Residual income
• Asset-based models
	• Price ratios
	  • Price-to-earnings ratio
	  • Price-to-book-value ratio
	  • Price-to-cash-flow ratio
	• Enterprise value multiples

CHOOSING A VALUATION MODEL

- What are the characteristics of the company?
- What is the availability and quality of data?
- What is the purpose of the valuation?

OTHER VALUATION MODEL ISSUES

- Sum-of-the-Parts Valuation
- Sensitivity Analysis
- Situational Adjustments

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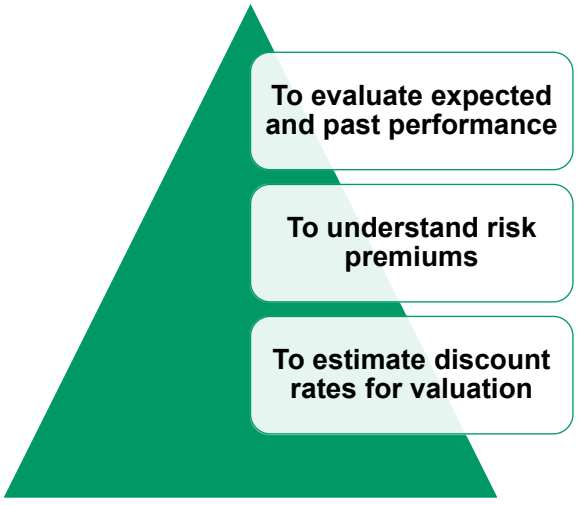
WHY FOCUS ON RETURN CONCEPTS?



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HOLDING PERIOD RETURN

$$r = \frac{D_H + P_H}{P_0} - 1$$

$$r = \frac{D_H}{P_0} + \frac{P_H - P_0}{P_0}$$

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OTHER RETURN CONCEPTS

- Required Return
- Return from Convergence of Price to Intrinsic Value
- Discount Rate
- Internal Rate of Return

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EQUITY RISK PREMIUM

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EQUITY RISK PREMIUM ESTIMATES

- Historical Estimates
- Forward-Looking Estimates
  - Gordon growth model estimates
  - Macroeconomic model estimates
  - Survey estimates

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ISSUES FOR USING HISTORICAL EQUITY RISK PREMIUM ESTIMATES

- Length of Sample Period
  - Balancing long-term and short-term considerations
- Geometric vs. Arithmetic Mean
  - Geometric more accurately reflects future value
- Choice of Risk-Free Return
  - On-the-run long-term Treasuries
- Survivorship Bias
  - Using returns from surviving firms artificially inflates estimates of return
- Strings of Unusual Events

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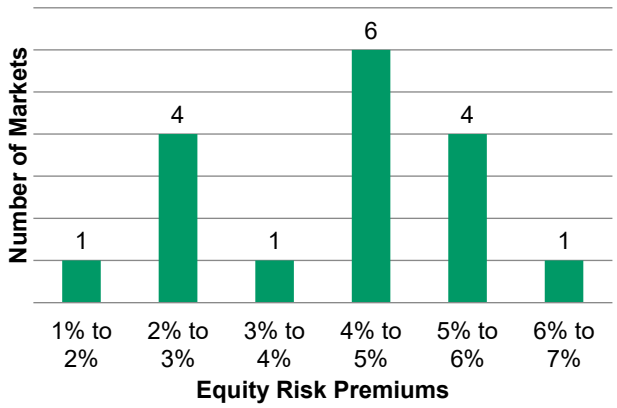
HISTORICAL EQUITY RISK PREMIUM ESTIMATES



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FORWARD-LOOKING EQUITY RISK PREMIUM ESTIMATES

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FORWARD-LOOKING EQUITY RISK PREMIUM ESTIMATES

Macroeconomic Model Equity Risk Premium (ERP)

$$\text{ERP} = (1+\text{EINFL})(1+\text{EGREPS})(1+\text{EGPE}) - 1 + \text{EINC} - R_F$$

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EXAMPLE: FORWARD-LOOKING EQUITY RISK PREMIUM

Yield on treasury bonds	3.8%
Yield on Treasury inflation-protected securities	1.8%
Expected growth in labor productivity	1.5%
Expected growth in labor supply	1.0%
Expected growth in the P/E	0.0%
Expected dividend yield	2.7%
Return from reinvestment of income	0.1%

EXAMPLE: FORWARD-LOOKING EQUITY RISK PREMIUM

$$\text{Expected Inflation} = \frac{1 + \text{Treasury Bond Yield}}{1 + \text{TIPS Yield}}$$

$$\text{Expected Inflation} = \frac{1 + 0.038}{1 + 0.018} - 1 = 2.0\%$$

EXAMPLE: FORWARD-LOOKING EQUITY RISK PREMIUM

$$\text{Real earnings growth} = \text{Labor productivity} + \text{Labor supply growth}$$
$$= 1.5\% + 1.0\%$$
$$= 2.5\%$$

$$\text{Expected income} = \text{Dividend yield} + \text{Reinvestment return}$$
$$= 2.7\% + 0.1\%$$
$$+2.8\%$$

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EXAMPLE: FORWARD-LOOKING EQUITY RISK PREMIUM

Macroeconomic model equity risk premium

$$=$$

$$\text{ERP} = (1 + \text{EINFL})(1 + \text{EGREPS})(1 + \text{EGPE}) - 1 + \text{EINC} - R_F$$

$$=$$

$$(1 + 0.02)(1 + 0.025)(1 + 0) - 1.0 + 0.028 - 0.038$$

$$=$$

$$3.5\%$$

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ESTIMATING THE REQUIRED RETURN ON AN EQUITY INVESTMENT

Capital Asset Pricing Model

Multifactor Models

- Fama–French model
- Pastor–Stambaugh model
- Macroeconomic models
- Statistical models

Build-Up Method

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CAPITAL ASSET PRICING MODEL (CAPM)

$$E(R_i) = R_F + \beta_i[E(R_M) - R_F],$$

- Where
  - $E(R_i)$ = Required return on equity for security *i*
  - R_F = Current expected risk-free return
  - β_i = Beta of security *i*
  - $E(R_M)$ = Expected return on the market portfolio
  - $E(R_M) - R_F$ = Equity risk premium

- Assumptions
  - Investors are risk averse
  - Investment is based on mean–variance optimization
  - Relevant risk is systematic risk

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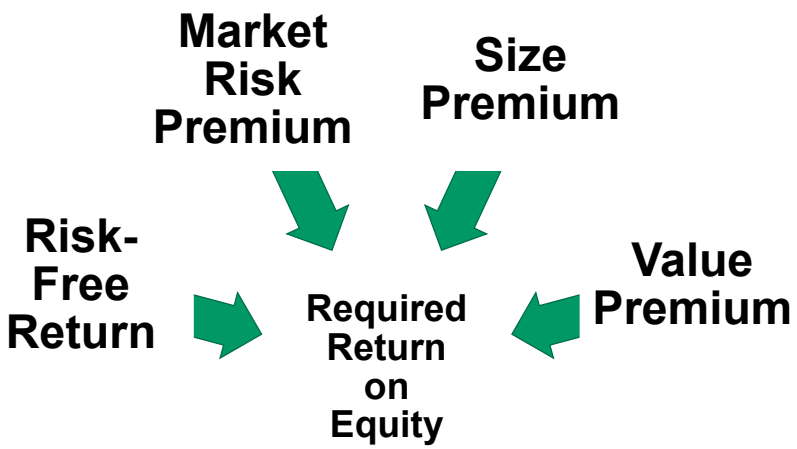
BETA ESTIMATION ISSUES

Choice of Market Index	• S&P 500 and NYSE Composite are common choices in the United States
Length & Frequency of Data	• Five years of monthly data is most common choice
Adjusted Betas	• Betas move towards 1.0 over time
Thinly Traded and Private Firms	• Adjust comparable betas for leverage

MULTIFACTOR MODELS: FAMA–FRENCH MODEL



FAMA–FRENCH MODEL

$$r_i = R_F + \beta_i^{\text{mkt}}\text{RMRF} + \beta_i^{\text{size}}\text{SMB} + \beta_i^{\text{value}}\text{HML},$$

- where
  - SMB = The return to small stocks minus the return to large stocks
  - β^{size} = The sensitivity of security *i* to movements in small stocks
  - HML = The return to value stocks minus the return to growth stocks
  - β^{value} = The sensitivity of security *i* to movements in value stocks

PASTOR–STAMBAUGH MODEL

$$r_i = R_F + \beta_i^{\text{mkt}}\text{RMRF} + \beta_i^{\text{size}}\text{SMB} + \beta_i^{\text{value}}\text{HML} + \beta_i^{\text{liq}}\text{LIQ},$$

- where
  - LIQ = The return to illiquid stocks minus the return to liquid stocks
  - β^{liq} = The sensitivity of security *i* to movements in illiquid stocks

EXAMPLE: FAMA–FRENCH MODEL

Risk-free rate	3.0%
Equity risk premium	5.0%
Beta	1.20
Size premium	2.2%
Size beta	0.12
Value premium	3.8%
Value beta	0.34

EXAMPLE: FAMA–FRENCH MODEL

$$r_i = R_F + \beta_i^{mkt}\text{RMRF} + \beta_i^{size}\text{SMB} + \beta_i^{value}\text{HML}$$
$$= 3\% + 1.20(5\%) + 0.12(2.2\%) + 0.34(3.8\%)$$
$$= 10.56\%$$

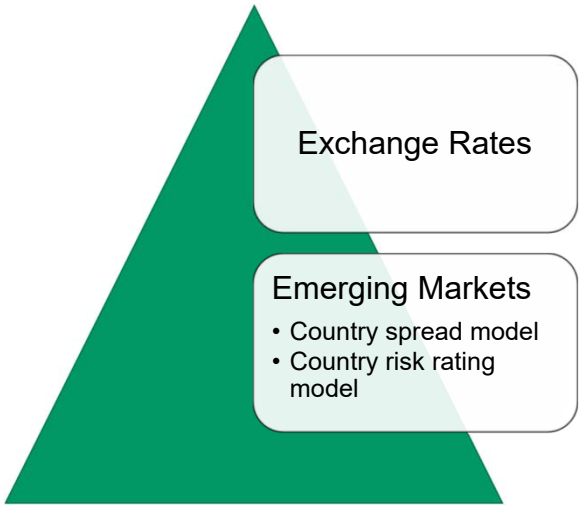
BUILD-UP METHODS

Required Return on Equity

- Risk-Free Rate
- Equity Risk Premium
- Other Risk Premiums
- Other Risk Discounts

- **For Private Firms**
  - Typical risk premiums
    - size
    - firm-specific risk
  - Other risk premiums
    - marketability
    - control
- **Bond Yield plus Risk Premium Method**
  - Useful if firm has public debt
  - YTM on long-term debt + risk premium

INTERNATIONAL CONSIDERATIONS FOR REQUIRED RETURNS



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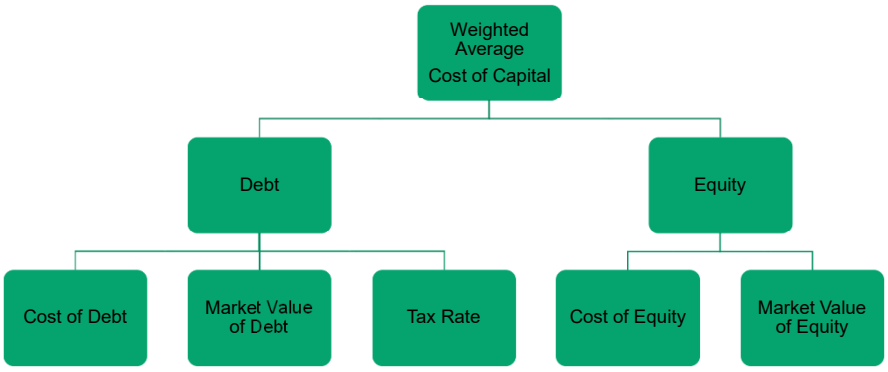
WEIGHTED AVERAGE COST OF CAPITAL



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WEIGHTED AVERAGE COST OF CAPITAL

$$\frac{\text{MVD}}{\text{MVD}+\text{MVCE}} r_d (1 - \text{Tax Rate}) + \frac{\text{MVCE}}{\text{MVD}+\text{MVCE}} r_e,$$

- **Where**
  - MVD = Current market value of debt
  - MVCE = Current market value of common equity
  - r_d = Before-tax cost of debt (which is transformed into the after-tax cost by multiplying it by 1 – Tax rate)
  - r_e = Cost of equity

EXAMPLE: WEIGHTED AVERAGE COST OF CAPITAL

Risk-free rate	3.0%
Equity risk premium	5.0%
Beta	1.20
YTM of long-term bond	6.1%
Long-term debt/Total capital at market value	40%
Tax rate	30%

EXAMPLE: WEIGHTED AVERAGE COST OF CAPITAL

$$r_e = R_F + \beta_i[E(R_m) - R_F]$$
$$r_e = 3\% + 1.2(5\%) = 9.0\%$$

$$\text{WACC} = \frac{\text{MVD}}{\text{MVD} + \text{MVCE}} r_d (1 - \text{Tax Rate}) + \frac{\text{MVCE}}{\text{MVD} + \text{MVCE}} r_e$$

$$= 0.40(6.1\%)(1 - 0.30) + 0.60(9.0\%)$$
$$= 7.11\%$$

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CHOICE OF DISCOUNT RATE

Cash Flows to the Firm	• WACC
Cash Flows to Equity	• Required return on equity
Nominal Cash Flows	• Nominal discount rates
Real Cash Flows	• Real discount rates

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DISCOUNTED DIVIDEND VALUATION

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DISCOUNTED CASH FLOW MODELS

- Dividend Discount Models
- Free Cash Flow Models
  - Free cash flow to the firm
  - Free cash flow to equity
- Residual Income Models

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CHOICE OF DISCOUNTED CASH FLOW MODELS

Dividend Discount Models	• History of dividend payments • Dividends related to earnings • Noncontrolling perspective
Free Cash Flow Models	• Small or zero dividends • Positive cash flow related to earnings • Controlling perspective
Residual Income Models	• Small or zero dividends • Negative free cash flows • High-quality accounting disclosures

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VALUING COMMON STOCK USING A MULTI-PERIOD DDM

$$V_0 = \sum_{t=1}^{n} \frac{D_t}{(1+r)^t} + \frac{P_n}{(1+r)^n}$$

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EXAMPLE: VALUING COMMON STOCK USING A MULTPERIOD DDM

	0	1	2	3
D		$1.00	$1.05	$1.10
P				$20.00

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EXAMPLE: VALUING COMMON STOCK USING A MULTPERIOD DDM

$$V_0 = \frac{\$1.00}{1.10} + \frac{\$1.05}{1.10^2} + \frac{\$21.10}{1.10^3}$$

$$V_0 = \$17.63$$

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VALUING COMMON STOCK USING THE GORDON GROWTH MODEL

$$V_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

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EXAMPLE: VALUING COMMON STOCK USING THE GORDON GROWTH MODEL

Risk-free rate	3.0%
Equity risk premium	6.0%
Beta	1.20
Current dividend	$2.00
Dividend growth rate	5.0%
Current stock price	$24.00

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VALUING COMMON STOCK USING THE GORDON GROWTH MODEL

$$\text{CAPM: } r = 3\% + 1.2(6\%) = 10.2\%$$

$$V_0 = \frac{\$2.00(1+0.05)}{0.102-0.05} = \frac{\$2.10}{0.102-0.05} = \$40.38$$

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EXAMPLE: VALUING PREFERRED STOCK

$$V_0 = \frac{\$2.00}{0.102-0} = \$19.61$$

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EXAMPLE: CALCULATING THE IMPLIED GROWTH RATE USING THE GORDON GROWTH MODEL

Using the previous common stock example and the current stock price of $24, what is the implied growth rate?

$$\$24 = \frac{\$2.00(1+g)}{0.102-g}$$

$$2.448 - 24g = 2.00(1+g)$$

$$-26g = -0.448$$

$$g = 1.72\%$$

CALCULATING THE IMPLIED REQUIRED RETURN USING THE GORDON GROWTH MODEL

$$V_0 = \frac{D_1}{r-g}$$

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

EXAMPLE: CALCULATING THE IMPLIED REQUIRED RETURN USING THE GORDON GROWTH MODEL

Using the previous common stock example and the current stock price of $24, what is the implied required return?

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

$$r = \frac{2.10}{24} + 0.05$$

$$r = 8.75\% + 5\% = 13.75\%$$

PRESENT VALUE OF GROWTH OPPORTUNITIES

$$V_0 = \frac{E_1}{r} + \text{PVGO}$$

$$\text{PVGO} = P_0 - \frac{E_1}{r}$$

PRESENT VALUE OF GROWTH OPPORTUNITIES

$$V_0 = \frac{E_1}{r} + \text{PVGO}$$

$$\frac{P_0}{E_1} = \frac{1}{r} + \frac{\text{PVGO}}{E_1}$$

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EXAMPLE: PRESENT VALUE OF GROWTH OPPORTUNITIES

Stock price	$80.00
Expected earnings	$5.00
Required return on stock	10%

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EXAMPLE: PRESENT VALUE OF GROWTH OPPORTUNITIES

$$\text{PVGO} = P_0 - \frac{E_1}{r}$$

$$\text{PVGO} = \$80 - \frac{5}{0.10} = \$30$$

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EXAMPLE: PRESENT VALUE OF GROWTH OPPORTUNITIES

$$\frac{P_0}{E} = \frac{1}{r} + \frac{\text{PVGO}}{E}$$

$$\frac{P_0}{E} = \frac{1}{0.10} + \frac{30}{5}$$

$$16 = 10 + 6$$

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USING THE GORDON GROWTH MODEL TO DERIVE A JUSTIFIED LEADING P/E

$$V_0 = \frac{D_1}{r - g}$$

$$\frac{P_0}{E_1} = \frac{D_1 / E_1}{r - g}$$

$$\frac{P_0}{E_1} = \frac{1 - b}{r - g}$$

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USING THE GORDON GROWTH MODEL TO DERIVE A JUSTIFIED TRAILING P/E

$$V_0 = \frac{D_0(1 + g)}{r - g}$$

$$\frac{P_0}{E_0} = \frac{D_0(1 + g)/E_0}{r - g}$$

$$\frac{P_0}{E_0} = \frac{(1 - b)(1 + g)}{r - g}$$

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EXAMPLE: USING THE GORDON GROWTH MODEL TO DERIVE A JUSTIFIED P/E

Stock price	$50.00
Trailing earnings per share	$4.00
Current dividends per share	$1.60
Dividend growth rate	5.0%
Required return on stock	9.0%

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EXAMPLE: USING THE GORDON GROWTH MODEL TO DERIVE A JUSTIFIED LEADING P/E

$$\frac{P_0}{E_1} = \frac{1 - b}{r - g}$$

$$\frac{P_0}{E_1} = \frac{\$1.60/\$4.00}{0.09 - 0.05} = 10.0$$

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EXAMPLE: USING THE GORDON GROWTH MODEL TO DERIVE A JUSTIFIED TRAILING P/E

$$\frac{P_0}{E_0} = \frac{(1-b)(1+g)}{r-g}$$

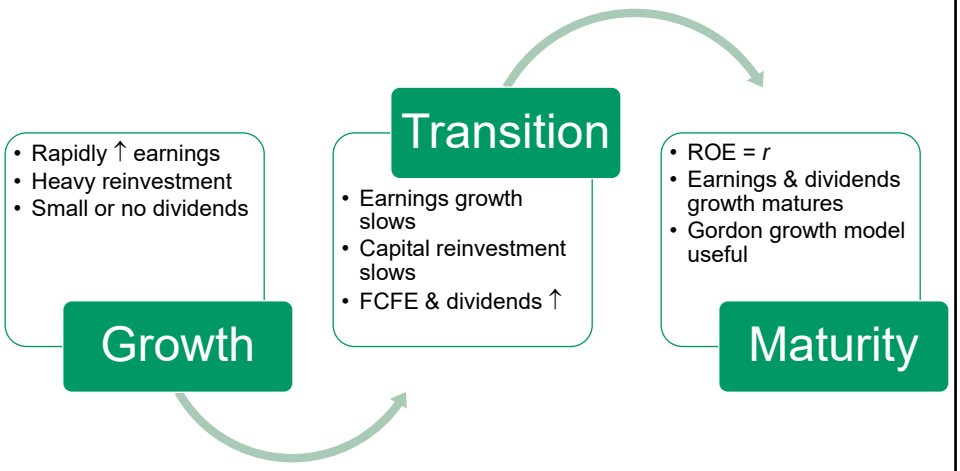
$$\frac{P_0}{E_0} = \frac{(\$1.60/\$4.00)(1.05)}{0.09-0.05} = 10.50$$

$$\text{Actual P/E} = \$50.00/\$4.00 = 12.50$$

ISSUES USING THE GORDON GROWTH MODEL

Strengths	Limitations
Simple and applicable to stable, mature firms	Not applicable to non-dividend-paying firms
Can be applied to entire markets	*g* must be constant
g can be estimated using macro data	Stock value is very sensitive to *r* – *g*
Can be applied to firms that repurchase stock	Most firms have nonconstant growth in dividends

CHOICE OF DISCOUNTED CASH FLOW MODELS



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GENERAL TWO-STAGE DDM

$$V_0 = \sum_{t=1}^{n} \frac{D_0 (1+g_S)^t}{(1+r)^t} + \frac{D_0 \times (1+g_S)^n \times (1+g_L)}{(1+r)^n \times (r-g_L)}$$

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EXAMPLE: GENERAL TWO-STAGE DDM

Current dividend = $2.00
Growth for next three years = 15 percent
Long-term growth = 4 percent
Required return = 10 percent

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EXAMPLE: GENERAL TWO-STAGE DDM

Step 1: Calculate the first three dividends:

- D1 = $2.00 x (1.15) = $2.30
- D2 = $2.30 x (1.15) = $2.6450
- D3 = $2.6450 x (1.15) = $3.0418

Step 2: Calculate the year 4 dividend:

- D4 = $3.0418 x (1.04) = $3.1634

Step 3: Calculate the value of the constant growth dividends:

- V3 = $3.1634 / (0.10 – 0.04) = $52.7237

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EXAMPLE: GENERAL TWO-STAGE DDM

$$V_0 = \frac{\$2.30}{1.10} + \frac{\$2.6450}{1.10^2} + \frac{\$3.0418}{1.10^3} + \frac{\$52.7237}{1.10^3}$$

$$V_0 = \$46.17$$

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EXAMPLE: GENERAL TWO-STAGE DDM

- Using the previous example, now we'll use the trailing P/E to determine the terminal value
- The D4 is $3.1634
- Assume also that the projected P/E is 13.0 in year 4 and that the firm will pay out 60 percent of earnings as dividends
- Year 4 earnings are then $3.1634 / 0.60 = $5.2724
- The stock price in year 4 is then $5.2724 × 13 = $68.54

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EXAMPLE: GENERAL TWO-STAGE DDM

$$V_0 = \frac{\$2.30}{1.10} + \frac{\$2.6450}{1.10^2} + \frac{\$3.0418}{1.10^3} + \frac{\$3.1634 + \$68.54}{1.10^3}$$

$$V_0 = \$55.54$$

TWO-STAGE H-MODEL

$$V_0 = \frac{\left[D_0 \times (1 + g_L)\right] + \left[D_0 \times H\left(g_S - g_L\right)\right]}{r - g_L}$$

EXAMPLE: TWO-STAGE H-MODEL

Current dividend	$3.00
g_s	20%
g_L	6%
H	5
Required return on stock	10%
Current stock price	$120

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EXAMPLE: TWO-STAGE H-MODEL

$$V_0 = \frac{\left[D_0 \times (1+g_L)\right] + \left[D_0 \times H\left(g_S - g_L\right)\right]}{r - g_L}$$

$$V_0 = \frac{\left[\$3 \times (1+0.06)\right] + \left[\$3 \times 5\left(0.20 - 0.06\right)\right]}{0.10 - 0.06}$$

$$V_0 = \$79.50 + \$52.50 = \$132.00$$

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SOLVING FOR THE REQUIRED RETURN USING THE TWO-STAGE H-MODEL

$$r = \left\{ \left(\frac{D_0}{P_0} \right) \left[\left(1 + g_L\right) + H \times \left(g_S - g_L\right) \right] \right\} + g_L$$

$$r = \left\{ \left(\frac{3}{120} \right) \left[\left(1 + 0.06\right) + 5 \times \left(0.20 - 0.06\right) \right] \right\} + 0.06 = 10.40\%$$

EXAMPLE: THREE-STAGE MODEL

- Firm pays a current dividend of $1.00
- Growth rate is 20 percent for next two years
- Growth then declines over six years to stable rate of 5 percent
- Required return is 10 percent
- Current stock price is $50

THREE-STAGE MODEL

Assumes three distinct growth stages:

- First stage of growth
- Second stage of growth
- Stable-growth phase

H-model can be used for last two stages if growth declines linearly

THREE-STAGE MODEL EXAMPLE

$$V_0 = \frac{\$1\times(1.20)}{1.10^1} + \frac{\$1\times(1.20)^2}{(1.10)^2} + \frac{\$1\times(1.20)^2\times\left(\frac{6}{2}\right)\times(0.20-0.05)}{(1.10)^2\times(0.10-0.05)} + \frac{\$1\times(1.20)^2\times1.05}{(1.10)^2\times(0.10-0.05)}$$

$$V_0 = \$1.09 + \$1.19 + \$10.71 + \$24.99 = \$37.98$$

ESTIMATING THE GROWTH RATE

Industry or Macroeconomic Average

$g = b \times ROE$

- DuPont formula
- ROE = r
- ROE = industry ROE

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THE SUSTAINABLE GROWTH RATE

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THE DUPONT MODEL

$$\text{ROE} = \left(\frac{\text{Net income}}{\text{Total assets}}\right)\left(\frac{\text{Total assets}}{\text{Shareholders' equity}}\right)$$

$$\text{ROE} = \left(\frac{\text{Net income}}{\text{Sales}}\right)\left(\frac{\text{Sales}}{\text{Total assets}}\right)\left(\frac{\text{Total assets}}{\text{Shareholders' equity}}\right)$$

$$g = \left(\frac{\text{Net income} - \text{Dividends}}{\text{Net income}}\right) \times \left(\frac{\text{Net income}}{\text{Sales}}\right) \times \left(\frac{\text{Sales}}{\text{Total assets}}\right) \times \left(\frac{\text{Total assets}}{\text{Equity}}\right)$$

EXAMPLE: DUPONT MODEL

Net profit margin	5.00%
Total asset turnover	1.5
Equity multiplier	2.0
Retention ratio	60%

EXAMPLE: DUPONT MODEL

$$g = \left(\frac{\text{Net income} - \text{Dividends}}{\text{Net income}}\right) \times \left(\frac{\text{Net income}}{\text{Sales}}\right) \times \left(\frac{\text{Sales}}{\text{Total assets}}\right) \times \left(\frac{\text{Total assets}}{\text{Equity}}\right)$$

$$g = (0.60) \times (5\%) \times (1.5) \times (2.0)$$

$$g = 9.0\%$$

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MARKET-BASED VALUATION: PRICE AND ENTERPRISE VALUE MULTIPLES

Presenter
Venue
Date

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VALUATION INDICATORS

- Price Multiples
- Enterprise Value Multiples
- Momentum Indicators

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METHODS FOR PRICE & ENTERPRISE VALUE MULTIPLES

1) Method of Comparables

- Economic rationale is the law of one price

2) Method Based on Forecasted Fundamentals

- Reflects firm fundamentals and future cash flows

Justified Price Multiples

- Can be determined using either method

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PRICE-TO-EARNINGS MULTIPLE RATIONALES & DRAWBACKS

Rationales

- EPS is driver of value
- Widely used
- Related to stock returns

Drawbacks

- Zero, negative, or very small earnings
- Permanent vs. transitory earnings
- Management discretion for earnings

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PRICE-TO-EARNINGS MULTIPLE DEFINITIONS

Trailing P/E

- Uses last year's earnings
- Preferred when forecasted earnings are not available

Forward P/E

- Uses next year's earnings
- Preferred when trailing earnings are not reflective of future

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EXAMPLE: FORWARD P/E

Stock price	$20.00
2011:Q1 EPS	$0.18
2011:Q2 EPS	$0.25
2011:Q3 EPS	$0.32
2011:Q4 EPS	$0.35
2011 Fiscal year forecast	*$1.10*
2012:Q1 EPS	$0.43
2012:Q2 EPS	$0.48
2012:Q3 EPS	$0.50
2012:Q4 EPS	$0.59
2012 Fiscal year forecast	*$2.00*

EXAMPLE: FORWARD P/E

1) Forward P/E based on EPS for the next 4 quarters:

EPS for the next 4 quarters = $\$0.35 + \$0.43 + \$0.48 + \$0.50 = \$1.76$

Forward P/E based on EPS for the next 4 quarters = $\$20 / \$1.76 = 11.4$

2) Forward P/E based on EPS for the NTM (next 12 months):

EPS for the NTM = $\left(1/12\right)\$1.10 + \left(11/12\right)\$2.00 = \$1.925$

Forward P/E based on EPS for the NTM = $\$20 / \$1.925 = 10.4$

EXAMPLE: FORWARD P/E

3) Forward P/E based on the current fiscal year's EPS:

EPS for the current fiscal year = $1.10

Forward P/E based on EPS for the current fiscal year = $20 / $1.10 = 18.2

4) Forward P/E based on the next fiscal year's EPS:

EPS for the next fiscal year = $2.00

Forward P/E based on EPS for the next fiscal year = $20 / $2.00 = 10.0

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ISSUES IN CALCULATING EPS

- EPS Dilution
- Underlying Earnings
- Normalized Earnings
- Differences in Accounting Methods

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EXAMPLE: UNDERLYING EARNINGS

Reported EPS from previous four quarters	$4.00
Restructuring charges	$0.10
Amortization of intangibles	$0.15
Impairment charge	$0.20
Stock price	$50.00

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EXAMPLE: UNDERLYING EARNINGS

P/E based on reported earnings = $50 / $4.00 = 12.5

Reported core earnings = $4.00 + $0.10 + $0.15 + $0.20 = $4.45

P/E based on reported core earnings = $50 / $4.45 = 11.2

Underlying earnings = $4.00 + $0.20 = $4.20

P/E based on underlying earnings = $50 / $4.20 = 11.9

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EXAMPLE: NORMALIZED EARNINGS

Year	*EPS*	*BVPS*	*ROE*
2010	$0.66	$4.11	16.1%
2009	$0.55	$3.67	15.0%
2008	$0.81	$2.98	27.2%
2007	$0.73	$2.12	34.4%
2006	$0.34	$1.61	21.1%

2011 stock price $24.00

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EXAMPLE: NORMALIZED EARNINGS

1) Method of historical average EPS

$$\text{Average (normalized) EPS} = \frac{(\$0.66 + \$0.55 + \$0.81 + \$0.73 + \$0.34)}{5} = \$0.618$$

$$\text{P/E} = \$24.00 / \$0.618 = 38.8$$

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EXAMPLE: NORMALIZED EARNINGS

2) Method of average ROE

$$\text{Average ROE} = \frac{(16.1\% + 15.0\% + 27.2\% + 34.4\% + 21.1\%)}{5} = 22.8\%$$

$$\text{Average (normalized) EPS} = \text{Average ROE} \times \text{Current equity book value per share}$$
$$\text{Average (normalized) EPS} = 22.8\% \times \$4.11 = \$0.937$$

$$P / E = \$24.00 / \$0.937 = 25.6$$

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JUSTIFIED FORWARD P/E FROM FUNDAMENTALS

$$V_0 = \frac{D_1}{r - g}$$

$$\frac{P_0}{E_1} = \frac{D_1 / E_1}{r - g}$$

$$\frac{P_0}{E_1} = \frac{1 - b}{r - g}$$

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JUSTIFIED TRAILING P/E FROM FUNDAMENTALS

$$V_0 = \frac{D_0(1+g)}{r-g}$$

$$\frac{P_0}{E_0} = \frac{D_0(1+g)/E_0}{r-g}$$

$$\frac{P_0}{E_0} = \frac{(1-b)(1+g)}{r-g}$$

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EXAMPLE: JUSTIFIED FORWARD P/E FROM FUNDAMENTALS

Retention ratio	0.36
Dividend growth rate	4.0%
Required return on stock	10.0%

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EXAMPLE: JUSTIFIED FORWARD P/E FROM FUNDAMENTALS

$$\frac{P_0}{E_1} = \frac{1 - b}{r - g}$$

$$\frac{P_0}{E_1} = \frac{1 - 0.36}{0.10 - 0.04} = 10.7$$

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EXAMPLE: JUSTIFIED P/E FROM REGRESSION ON FUNDAMENTALS

$$\text{Predicted P/E} = 11.5 + (2.2 \times \text{DPR}) + (-0.03 \times \text{Beta}) + (16.2 \times \text{EGR})$$

Values for subject firm

Dividend payout ratio	0.40
Beta	1.20
Earnings growth rate	6.00%
Actual P/E	15.0

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EXAMPLE: JUSTIFIED P/E FROM REGRESSION ON FUNDAMENTALS

$$\text{Predicted P/E} =$$

$$11.5 + (2.2 \times \text{DPR}) + (-0.03 \times \text{Beta}) + (16.2 \times \text{EGR})$$

$$= 11.5 + (2.2 \times 0.4) + (-0.03 \times 1.2) + (16.2 \times 0.06)$$

$$= 13.3$$

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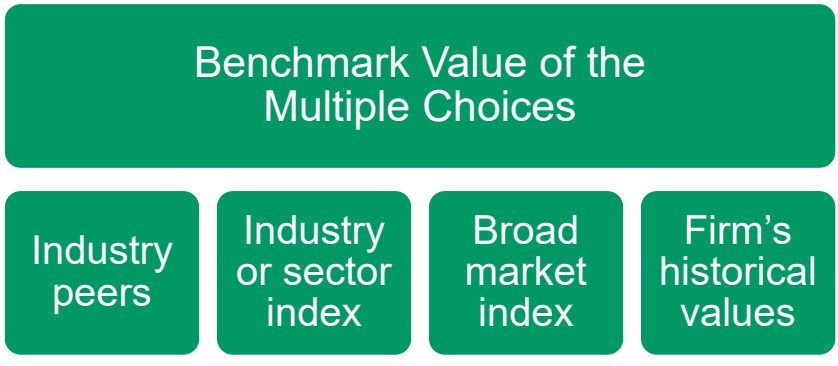
METHOD OF COMPARABLES



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METHOD OF COMPARABLES USING PEER COMPANY MULTIPLES

- Law of one price
- Risk and earnings growth adjustments
- PEG limitations:
  - Assumes linear relationship
  - Does not account for risk
  - Does not account for growth duration

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EXAMPLE: METHOD OF COMPARABLES USING P/E AND PEG

Values for subject firm	
Five-year EPS growth rate	8.0%
Consensus EPS forecast	$4.50
Current stock price	$28.00
Values for peer group	
Median P/E	9.00
Median PEG	1.60

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EXAMPLE: METHOD OF COMPARABLES USING P/E AND PEG

P/E = $28.00 / $4.50 = 6.2

PEG = 6.2 / 8.0 = 0.78

Intrinsic value = 9.0 × $4.50 = $40.50

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METHOD OF COMPARABLES USING INDUSTRY AND MARKET MULTIPLES

- Industry or Sector Index
  - Mean vs. median
  - Check industry valuation against market
- Broad Market Index
  - Adjust for differences in fundamentals & size
  - Use relative values on a historical basis

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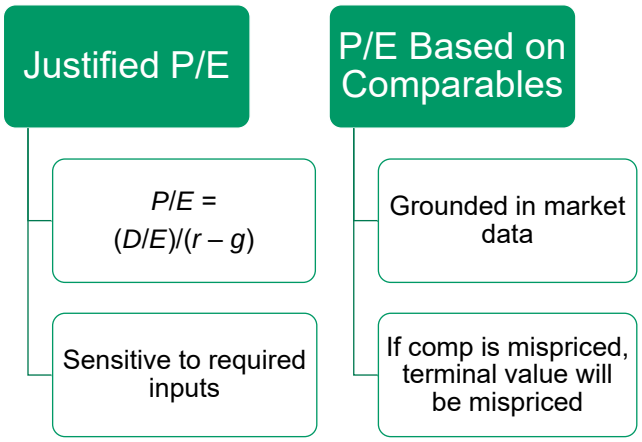
METHOD OF COMPARABLES
VALUING THE MARKET

- Fed Model: Earnings Yield vs. T-Bond Yield
  - Does not account for inflation correctly
  - Relationship between earnings yield & interest rates is nonlinear
  - Small rate Δs $\rightarrow$ large Δs in P/E
- Yardeni Model

METHOD OF COMPARABLES
USING OWN HISTORICAL MULTIPLES

- Rationale: Regression to the Mean
- Approaches:
  - Average of four middle values over past 10 years
  - Five-year average trailing P/E
- Potential Problems from Changes in
  - Firm business
  - Firm financial leverage
  - Interest rate environment
  - Economic fundamentals
  - Inflationary environment

USING P/ES FOR TERMINAL VALUE



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EXAMPLE: USING P/ES FOR TERMINAL VALUE

Values for subject firm	
Required rate of return	11.0%
EPS forecast for year 3	$2.50
Values for peer group	
Mean dividend payout ratio	0.40
Mean ROE	8.0%
Median P/E	9.00

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EXAMPLE: USING P/ES FOR TERMINAL VALUE USING GORDON GROWTH MODEL

$$D_3 = EPS_3 \times \text{Dividend payout ratio}$$
$$D_3 = \$2.50 \times 0.40 = \$1.00$$

$$\text{Retention ratio} = 1 - \text{Dividend payout ratio}$$
$$\text{Retention ratio} = 1 - 0.40 = 0.60$$

$$g = \text{Retention ratio} \times ROE$$
$$g = 0.60 \times 8\% = 4.8\%$$

$$V_3 = \frac{D_3(1+g)}{r-g} = \frac{\$1.00(1+0.048)}{0.11-0.048} = \$16.90$$

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EXAMPLE: USING P/ES FOR TERMINAL VALUE USING COMPARABLES

$$V_3 = P/E \times EPS_3$$

$$= 9.0 \times \$2.50 = \$22.50$$

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