Firm valuation (2)

Class 7

Financial Management, 15.414

Today

Firm valuation

- Free cashflows
- Profitability, financial ratios, and terminal value

Reading

- Brealey and Myers, Chapter 12.4 – 12.6
- Wilson Lumber Co.

Firm valuation

Two approaches

- **Focus on cashflows to equityholders**
  Equity = PV of dividends
  Useful with moderate growth, constant payout ratio

- **Focus on cashflows generated by assets**
  Assets = PV of free cashflows
  More general, because cashflows may not be paid out

  Equity = assets – debt

Balance sheet

Assets	Liabilities and Equity
Current Assets	**Current Liabilities**
Fixed Assets 1. Tangible fixed assets 2. Intangible fixed assets	**Long-Term Debt**
	Shareholders' Equity

Value = PV(FCFs)

Value = Debt + PV(divs)

FCF approach

Asset value

$$\text{PV of assets} = \frac{FCF_1}{1+r} + \frac{FCF_2}{(1+r)^2} + \ldots + \frac{FCF_H}{(1+r)^H} + \frac{\text{Term. value}}{(1+r)^H}$$

Free cashflow

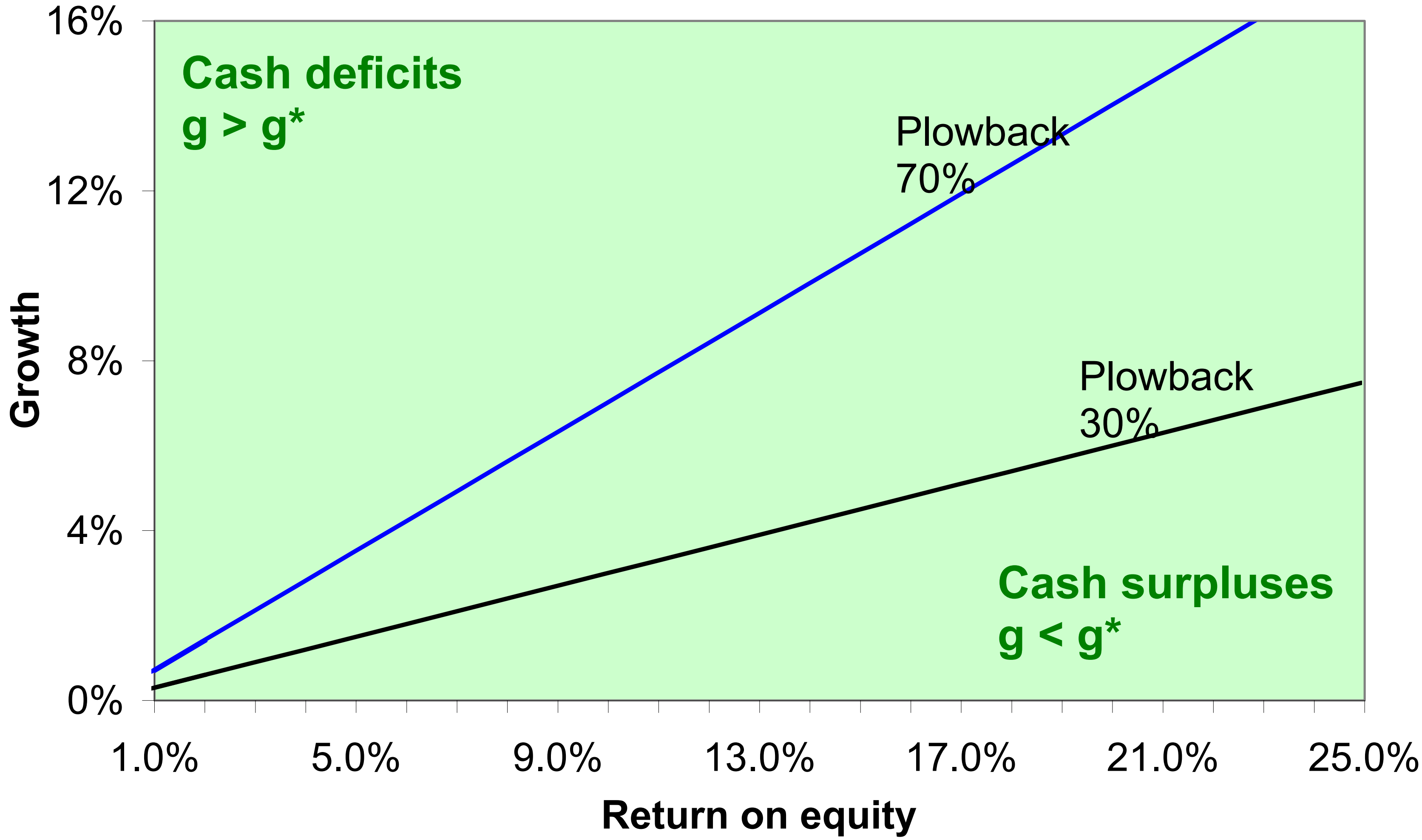
- Cash generated by the assets after all reinvestment
- FCF = EBIT (1 – τ) + depreciation – ΔNWC – CAPX
- FCF = EBIT (1 – τ) – ΔNet assets
- FCF = Operating cashflow (before interest) – CAPX

Working capital

Assets	Liabs. and equity
Current assets	**Current liabilities**
cash	accounts payable
accounts receivable	
inventory	**Long-term debt**
	bank loans
Long-term assets	bonds
equipment	
buildings	**Equity**
land	common stock
intangibles	retained earnings

Net assets = Total assets – current liabilities (excl. s-t debt)

Sustainable growth



Sustainable growth

Forecasting

- **Long-run growth = sustainable growth**
  Faster in the short run, but not forever

- **Forecast must be internally consistent**
  Growth forecasts should be consistent with payout policy and profitability

  CitiBank financial goals, 1988
  Growth: 15%
  ROE: 18%
  Payout: 30%
  Leverage ratio (debt / assets): 95%

  Are these goals feasible?

Time Warner, 1989

Warner Communications ($ million)

Cashflow projections

	1989	1990	1991	1992	1993	1994
Oper. income	$770	893	1,145	1,320	1,482	1,655
Taxes	-193	-246	-458	-528	-593	-662
After-tax income	577	647	687	792	889	993
Depreciation	228	245	270	271	271	273
Deferred taxes	-7	0	172	198	222	248
CAPX	-336	-225	-180	-177	-183	-188
Δ in NWC	5	-80	-80	-80	-80	-80
Miscellaneous	-416	-15	-5	-3	-3	-3
Free cashflow	$52	572	863	1,001	1,117	1,243

Source: Lazard Freres (advisor to Warner)

Time Warner

Firm valuation

Discount rate = 11.5%

$$\text{Firm value} = \frac{FCF_1}{1+r} + \frac{FCF_2}{(1+r)^2} + \frac{FCF_3}{(1+r)^3} + \ldots + \frac{FCF_H}{(1+r)^H} + \frac{\text{Term. value}}{(1+r)^H}$$

$$= \frac{52}{1.115} + \frac{572}{1.115^2} + \frac{863}{1.115^3} + \ldots + \frac{1{,}243}{1.115^6} + \frac{\text{T.V.}}{1.115^6}$$

Equity value = Firm value – Debt ($970 million)

Terminal value three ways
Constant growth
Multiples (financial ratios of comparable firms)
NPVGO

Terminal value 1

Constant growth

Forecasted growth after 1994 = 5%

$$\text{Terminal value} = \frac{FCF_{1995}}{r-g} = \frac{1{,}243 \times 1.05}{0.115 - 0.05} = \$20{,}079 \text{ million}$$

Is the forecast internally consistent?

Projected earnings = \$993; projected book equity = \$5,055

Reinvestment = CAPX – Depr. + ΔNWC
= 188 – 273 + 80 = –\$5 million

g* = ROE × plowback = (993 / 5,055) × (-5 / 993) = 0%

Time Warner, 1989

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Source: Lazard Freres (advisor to Warner)

Terminal value 2

Financial ratios

Multiples of comparable firms
P/E ratio
Price-to-cashflow
Price-to-sales
Market-to-book equity

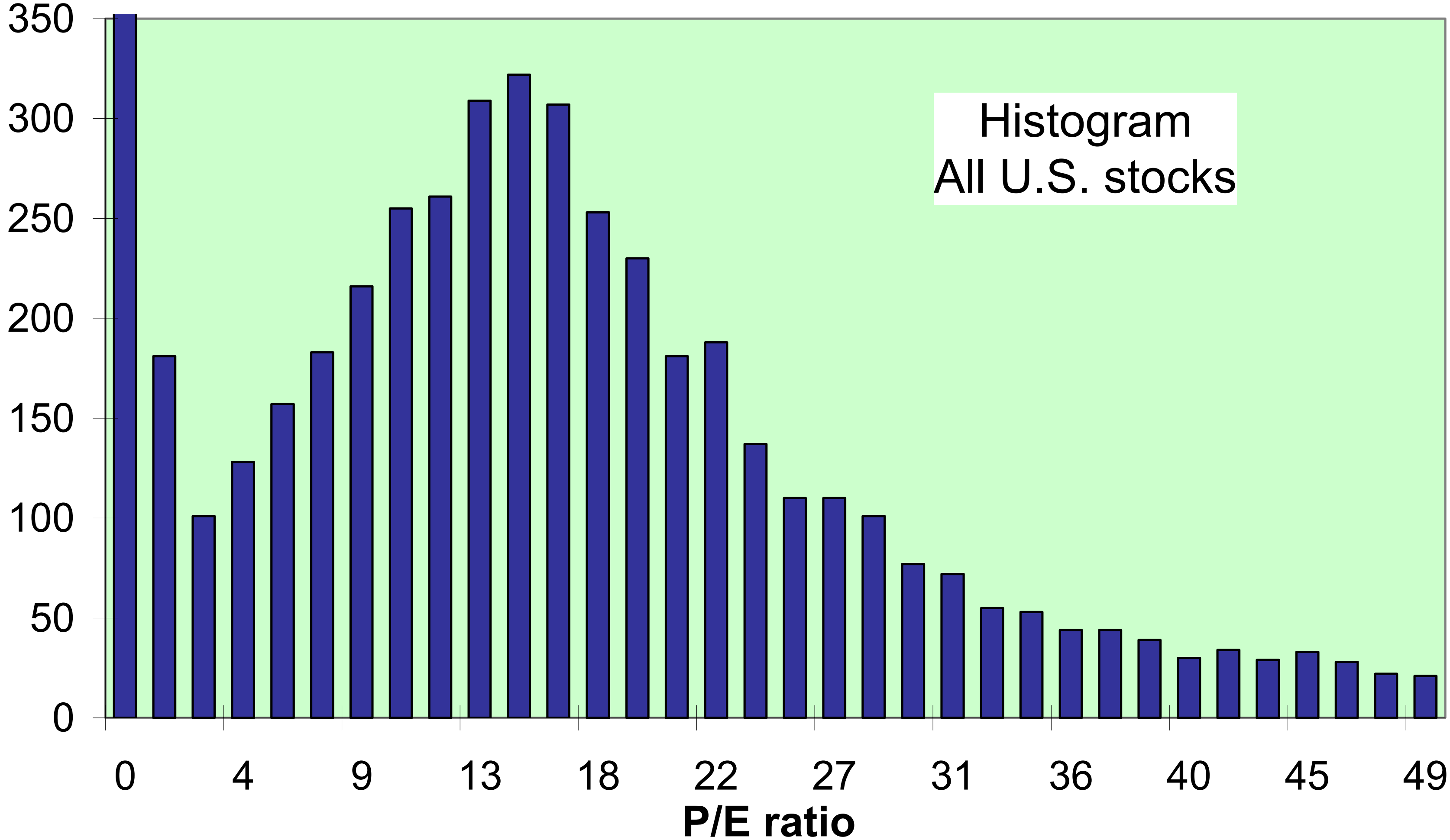
Determinants of P/E and M/B

$$P/E = \frac{1}{r} \times \left[\frac{\text{price}}{\text{price} - \text{NPVGO}} \right]$$

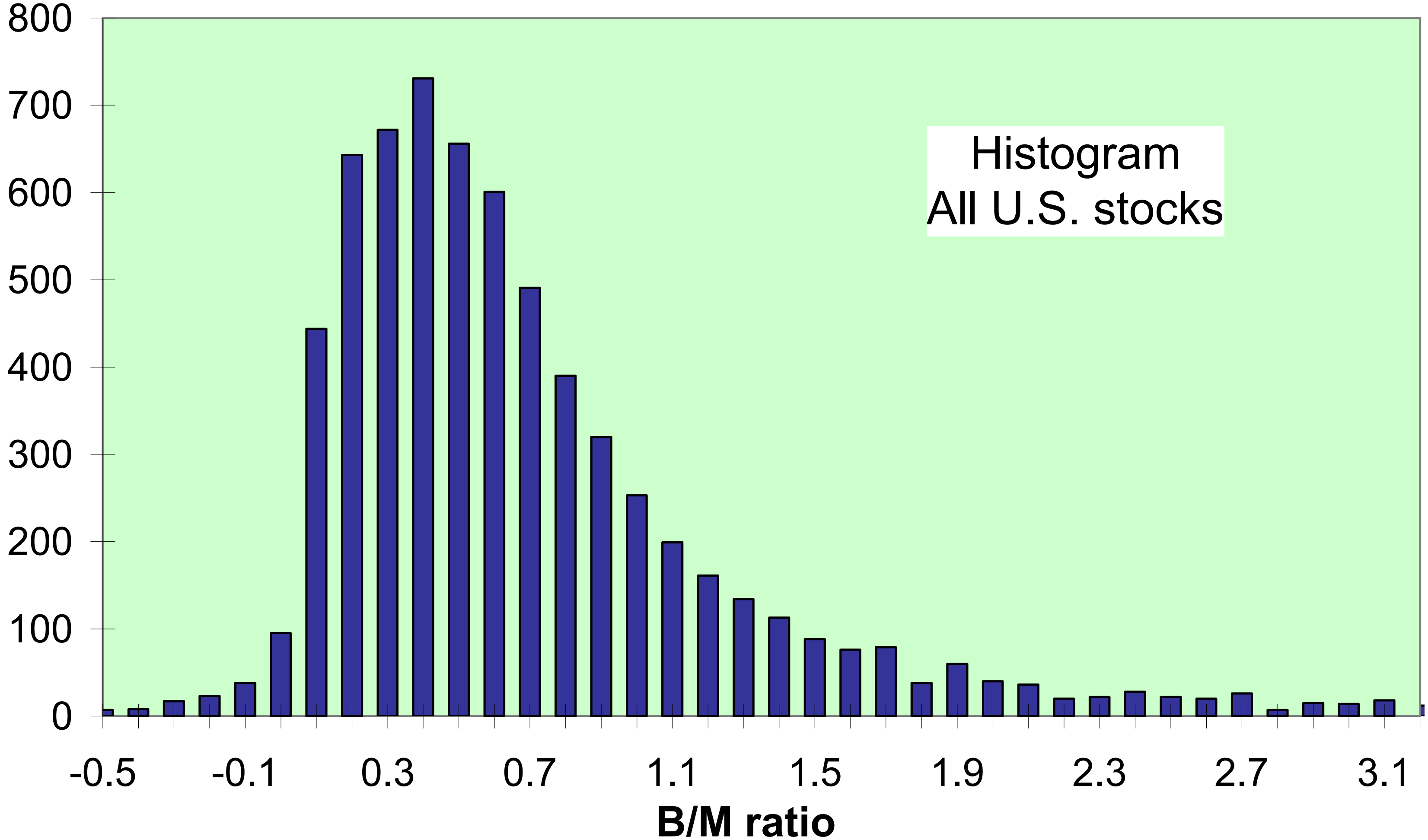
$$M/B = \frac{\text{payout}}{(r/\text{ROE}) - \text{plowback}}$$

Higher if NPVGO is large

P/E ratios, Dec. 1998



B/M ratios, Dec. 1998



Terminal value 2

Financial ratios

P/E ratio

Comparables P/E = 18

Earnings$_{1994}$ = 993 $\Rightarrow$ Terminal value = 18 $\times$ 993 = $17,874

M/B ratio

Comparables M/B = 2.79

BV$_{1994}$ = 5,055 $\Rightarrow$ Terminal value = 2.79 $\times$ 5,055 = $14,103

Terminal value 3

Zero NPVGO

How much will Warner be worth if its competitive advantage is eliminated by 1994?

(Sustainability question in strategy)

NPVGO = 0 $\Rightarrow$ Value = EPS / r

$\text{Earnings}_{1994} = 993$

Terminal value = 993 / 0.115 = \$8,635

Time Warner

Debt = $970 million

$$\text{Firm value} = \frac{52}{1.115} + \frac{572}{1.115^2} + \frac{863}{1.115^3} + \ldots + \frac{1{,}243}{1.115^6} + \frac{\text{T.V.}}{1.115^6}$$

Approach	Terminal Value	Firm Value	Equity Value	Per Share
Constant growth	$20,079	$13,522	$12,552	$65.89
P/E	17,874	12,374	11,404	59.86
M/B	14,103	10,412	9,442	49.56
Zero NPVGO	8,635	7,566	6,596	34.62

Actual offer = $70 / share

Time Inc. stock price, 1989