Chapter 4
Measuring Corporate Performance

Financial Management (DOM1047)

Preview

- How can we judge whether managers are doing a good job at adding value?
  - We need measures of value added.
  - We use financial ratios calculated from the firm's financial statements

Outline

- Value and Value Added
- Measuring Market Value and Market Value Added
- Economic Value Added
  - Accounting Rate of Return
- Measuring Efficiency
- The Du Pont system
- Measuring Financial Leverage
- Measuring Liquidity

Outline (continued)

- Calculating Sustainable Growth
- Interpreting Financial Ratios
- The Role of Financial Ratios
  - Transparency

Value and Value Added (4.1)

- How financial ratios help to understand value added?
  - Financial ratios are easy to calculate.
  - There are so many financial ratios.
  - We need to understand how these ratios connect to the ultimate objective of value added for shareholders.

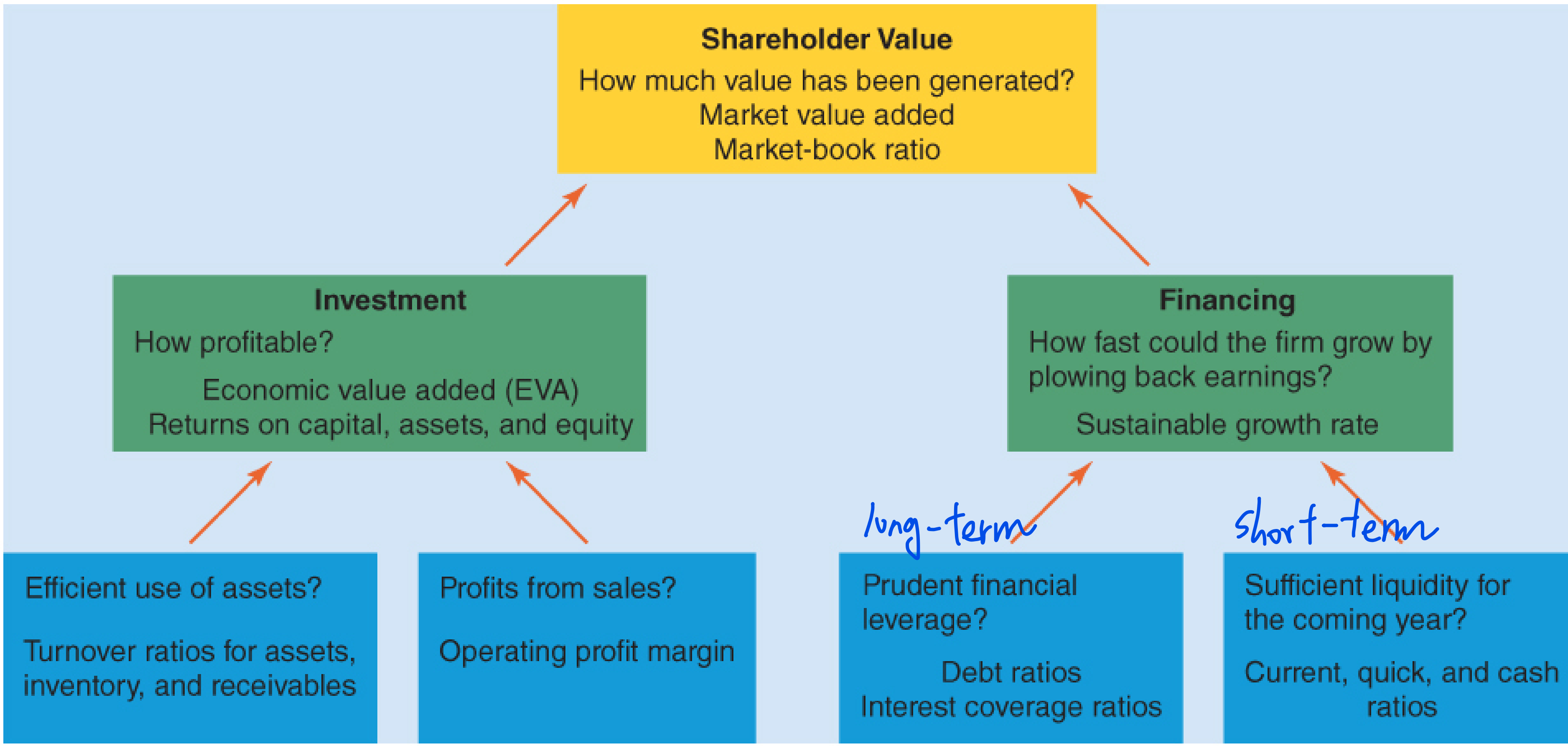
Value and Value Added (continued)

- Shareholder value depends on good investment decisions and financial decisions.
- Investment decisions are evaluated by asking several questions
  - How profitable are the investment (relative to the cost of capital)?
  - How should profitability be measured?
  - What does profitability depend on?

Value and Value Added (continued)

- Financial decisions are evaluated by asking:
  - Is the available financing sufficient?
  - Is the financial strategy prudent?
  - Does the firm have sufficient liquidity?

Organization Chart for Financial Ratios



Market Value and Market Value Added (4.2)

- Market value, market capitalization, or market cap:
  - Total market value of equity, equal to share price times number of shares outstanding.
- Market value added (MVA)
  - The difference between market value and the amount of money that shareholders have invested.
  - Market capitalization minus book value of equity.
- Why is it useful?

M/B ratio : arket-to-book ratio = 48,623/19,393 = 2.-

Market Value and Market Value Added (continued)

- Home Depot's stock closed 2009 at a price of $28.73 per share.
  - With 1,693 million shares outstanding.
  - Thus, the market capitalization of Home Depot in 2009 would be $28.73*1,693 = $48,623 million.
  - The book value of equity would be $19,393 million according to the balance sheet.
  - The MVA was 48,623 – 19,393 = $29,230 million
  - The stockholders contributed about $19 billion and ended up with $49 billion, a nearly $30 billion accumulation.

BALANCE SHEET OF HOME DEPOT
(Figures in $ milions)

Assets	2009	2008	Liabilities and Shareholders' Equity	2009	2008
Current assets			Current liabilities		
Cash and marketable securities	1,421	519	Debt due for repayment	1,020	1,767
Receivables	964	972	Accounts payable	8,185	8,221
Inventories	10,188	10,673	Other current liabilities	1,158	1,165
Other current assets	1,327	1,198	Total current liabilities	10,363	11,153
Total current assets	13,900	13,362			
Fixed Assets			Long-term debt	8,662	9,667
Tangible fixed assets			Deferred income taxes	319	369
Property, plant, and equipment	37,345	36,223	Other long-term liabilities	2,140	2,198
Less accumulated depreciation	11,795	9,989			
Net tangible fixed assets	25,550	26,234	Total liabilities	21,484	23,387
Intangible asset (goodwill)	1,171	1,134	Shareholders' equity:		
Long-term investments	33	36	Common stock and other paid-in capital	6,390	6,133
Other assets	223	398	Retained earnings	13,588	12,452
			Treasury stock	$ (585)	(808)
Total Assets	40,877	41,164	Total shareholders' equity	19,393	17,777
			Total liabilities and shareholders' equity	40,877	41,164

$$\text{Market Value Added} = [\text{Share Price} \times \text{Shares Outstanding}] - \text{Equity}_{\text{Book Value}}$$

TABLE 4.3

	Market Value Added	Market-to-Book Ratio		Market Value Added	Market-to-Book Ratio
ExxonMobil	148,502	1.81	Home Depot	26,941	1.78
Walmart	121,364	1.94	Lowe's	9,702	1.37
Google	110,566	7.71	FedEx	9,231	1.51
Coca-Cola	93,745	3.63	Dow Chemical	3,382	1.06
Johnson & Johnson	83,997	2.14	JCPenney	−4,653	0.62
AT&T	27,080	1.11	Xerox	−9,128	0.57

- **Market-to-book ratio** = Market value / Book value
  - It measures how much value has been added for each dollar that shareholders have invested.
- Consider AT&T and Home Depot
  - Similar MVA, Different Market-to-Book Ratio
  - Why? AT&T has larger MV and BV

Market Value and Market Value Added (continued)

- Note that market value can be a noisy measure.
  - About how well the corporation's management is performing.
- 3 reasons:
  - Market value reflects investors' expectations in the future.
  - Market value fluctuates due to factors outside managers' control.
  - No market value for private firms and divisions.

Economic Value Added and Accounting Rate of Return (4.3)

- Economic value added (EVA) is after-tax operating income minus a charge for the cost of capital employed.
  - This also called residual income.
  - It’s the profit after deducting all costs, including the cost of capital.
  - Total capitalization is the sum of long-term debt and shareholders’ equity.

$$\boxed{\text{Economic Value Added} = \text{Operating Income* - [Cost of Capital} \times \text{Total Capitalization]}}$$

Economic Value Added and Accounting Rate of Return (continued)

- For Home Depot, the cost of capital is 7.5%
  - In 2008, its total capitalization is 9,667 + 17,777 = $27,444 million.
    - The dollar cost of capital would be 27,444*0.075 = $2,058 million
  - The after-tax operating income (不含稅盾的利息) would the sum of net income and after-tax interest:
    - 2,661 + 676*(1 – 0.35) = $3,100 million
  - The 2009 EVA would be $1,042 million

ROC = 3,100 / 27,444

INCOME STATEMENT OF HOME DEPOT, 2009		
	$ million	% of sales
Net sales	66,176	100.0
Cost of goods sold	43,764	66.1
Selling, general & admininstrative expenses	15,907	24.0
Depreciation	1,806	2.7
Earnings before interest and income taxes	4,699	7.1
Interest expense	676	1.0
Taxable income	4,023	6.1
Taxes	1,362	2.1
Net income	2,661	4.0
Allocation of net income		
Dividends	1,525	2.3
Addition to retained earnings	1,136	1.7

(要求的報酬)

TABLE 4.4	1. Operating income*	2. Cost of Capital, %	3. Total Capitalization	4. EVA = 1 − (2 × 3)	ROC, %, = 1 ÷ 3
ExxonMobil	28,641	5.8	182,424	17,586	15.7
Walmart	15,396	5.2	129,374	8,639	11.9
Johnson & Johnson	11,952	7.1	73,778	6,638	16.2
Coca-Cola	7,093	5.5	35,643	4,943	19.9
Google	6,577	12.0	16,483	4,788	39.9
FedEx	952	6.4	17,954	–241	5.3
JCPenney	465	6.5	12,234	–330	3.8
Dow Chemical	2,638	5.7	56,129	–526	4.7
Xerox	712	9.6	21,326	–1,091	3.3
AT&T	16,779	8.2	250,440	–3,760	6.7

- Consider Coca-Cola and Google
  - Similar EVA, Different Return on Capital
  - Why? 風險係較不同

Economic Value Added and Accounting Rate of Return (continued)

- EVA comparisons are more useful if focused on operating income.
- It is a better measure of a company's performance than is accounting income.
  - Accounting income is calculated after deducting all costs except the cost of capital.
  - Thus, EVA recognizes that companies need to cover their opportunity costs before they add value.

Economic Value Added and Accounting Rate of Return (continued)

- Accounting rates of return
  - Also called book rates of return.
  - Other things equal, the more assets a manager has, the greater chance in generating a large EVA.
  - Thus, measures on profits per dollar of assets are necessary.
- 3 common measures
  - Return on capital (ROC); Return on equity (ROE); Return on assets (ROA)

Economic Value Added and Accounting Rate of Return (continued)

- Return on capital (ROC)
  - After-tax operating income divided by total capitalization
    - For Home Depot, using 2008's figures, ROC can be 3,100 / 27,444 = 11.3%
    - It is better to use the average total capitalization:
    - ROC = 3,100 / [(27,444 + 28,055)/2] = 11.2%

Calculating ROC

$$\frac{1964}{23346} = 8.4\%$$

Lowe's Income Statement	2009
Net sales	**47,220**
Cost of sales	30,757
Gross margin	**16,463**
Expenses:	
Selling, general and administrative	11,688
Store opening costs	49
Depreciation	1,614
Interest - net	287
Total expenses	**13,638**
Pre-tax earnings	**2,825**
Income tax provision	1,042
Net earnings	**1,783**

tax ratio $= \frac{1042}{2825}$

1+2 = total capital

$\frac{1+2+3+4}{2}$: average total capital

Net Income + After-tax interest

$= 1783 + 287 \times \left(1 - \frac{1042}{1825}\right)$

$= 1964$ (After-tax Operating income)

Assets		2009	2008
Current assets:			
Cash and cash equivalents	$	632	245
Short-term investments		425	416
Merchandise inventory - net		8,249	8,209
Deferred income taxes - net		208	105
Other current assets		218	215
Total current assets		**9,732**	**9,190**
Property less acc. depreciation		22,499	22,722
Long-term investments		277	253
Other assets		497	460
Total assets	**$**	**33,005**	**32,625**

Liabilities and Shareholders' Equity		2009	2008
Current liabilities:			
Short-term borrowings	$	-	987
Current maturities of long-term debt		552	34
Accounts payable		4,287	4,109
Accrued comp./employee benefits		577	434
Deferred revenue		683	674
Other current liabilities		1,256	1,322
Total current liabilities		**7,355**	**7,560**
Long-term debt, excl. current maturities		3. 4,528	1. 5,039
Deferred income taxes - net		598	599
Other liabilities		1,455	1,372
Total liabilities		**13,936**	**14,570**
Shareholders' equity:		-	-
Common stock - $.50 par value		729	735
Capital in excess of par value		6	277
Retained earnings		18,307	17,049
Acc. other comprehensive income		27	(6)
Total shareholders' equity		4. **19,069**	2. **18,055**
Total liabilities and shareholders' equity	**$**	**33,005**	**32,625**

Economic Value Added and Accounting Rate of Return (continued)

- Return on assets (ROA)
  - After-tax operating income divided by total assets
    - For Home Depot, using 2008's figures, ROA can be 3,100 / 41,164 = 7.5%
    - We can also use the average total assets:
    - ROA = 3,100 / [(41,164 + 40,877)/2] = 7.6%
  - Just like ROC, here we use after-tax operating income to ask how profitable the firm would have been if it were all-equity financed.

Calculating ROA

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Economic Value Added and Accounting Rate of Return (continued)

- Return on equity (ROE)
  - Net income divided by shareholders' equity
    - For Home Depot, using 2008's figures, ROE can be 2,661 / 17,777 = 15.0%
    - We can also use the average equity:
    - ROE = 2,661 / [(17,777 + 19,393)/2] = 14.3%

$$ROE = \frac{\text{Income}}{\text{Equity}} = \underbrace{\frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}}}_{\text{ROA}} \times \frac{\text{Assets}}{\text{Equity}}$$

Calculating ROE

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Measuring Efficiency (4.4)

- We have seen impressing numbers of Home Depot.
  - What factors contribute to the firm's profitability?
  - We like to measure its efficiency.
- Asset turnover ratio shows how much sales are generated by each dollar of total assets.
  - Sales / Total assets = 66,176 / 41,164 = 1.608
  - Sales / Average total assets = 66,176 / [(40,877 + 41,164)/2] = 1.613

Calculating Asset Turnover Ratio

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Measuring Efficiency (continued)

- Inventory turnover shows how fast the inventories are sold.
  - Cost of goods sold / Inventory = 43,764 / 10,673 = 4.1
  - The **average days in inventory** = Inventory / daily cost of goods sold = 10,673 / (43,764/365) = 89
    - It shows that in average, the inventory is sold in 89 days

Measuring Efficiency (continued)

- Receivable turnover.
  - Sales / Receivable = 66,176 / 972 = 68
    - This ratio would be high when customers are quick to pay.
  - The average collection period = Receivable / average daily sales = 972 / (66,176/365) = 5.4
    - It shows that in average, the receivable payment is collected in 5.4 days.

The Du Pont System (4.5)

边際獲利 (下降有可能是因為成本無法降低, sales ↓)

- Profit margin measures the proportion of sales that finds its way into profits.
  - Profit margin = Net income / Sales = 2,661 / 66,176 = 4.0%
    - Note that part of revenue by sales must be paid to lenders.
  - Operating profit margin = After-tax operating income / Sales = 3,100 / 66,176 = 4.7%

Calculating Operating Profit Margin

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The Du Pont System (continued)

- The Du Pont formula shows that ROA equals the product of asset turnover and operating profit margin:

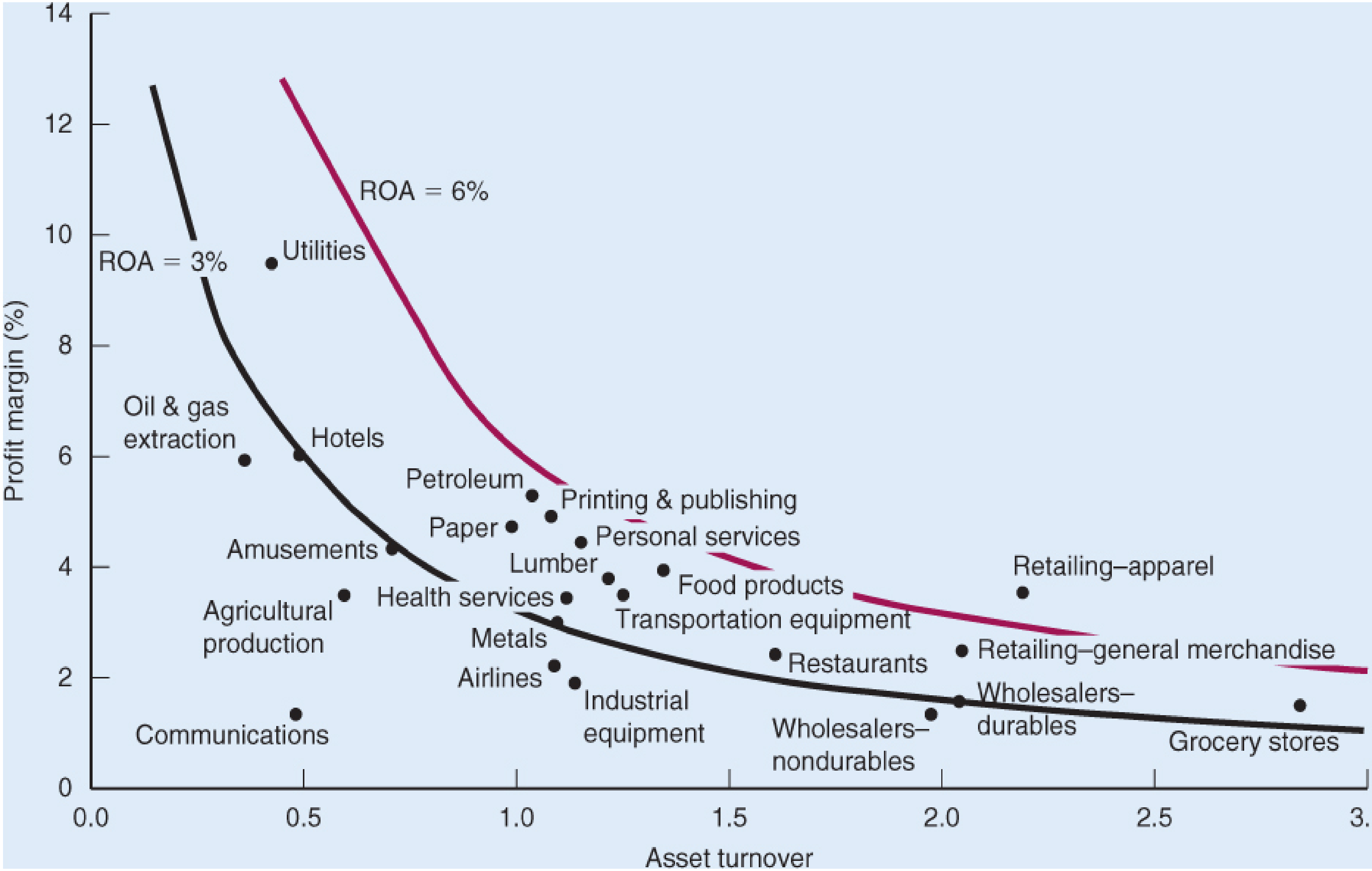
$$\mathrm{ROA} = \frac{\text{After - tax Operating Income}}{\text{Assets}}$$

$$= \underbrace{\frac{\text{Sales}}{\text{Assets}}}_{\text{Asset Turnover}} \times \underbrace{\frac{\text{After - tax Operating Income}}{\text{Sales}}}_{\text{Operating Profit Margin}}$$

The Du Pont System (continued)

- Based on Du Pont formula, we can see the case of Home Depot: $0.75 = 1.61 \times 0.047$
- It is a useful way to understand a firm's strategy.
  - A retailer may strive for high turnover at the 薄利多銷 expense of a low profit margin (Wal-Mart strategy).
  - It may seek a high profit margin even if that results in low turnover (Bloomingdales strategy).
  - We would prefer both high measures, but life isn't that easy!

23 industries, 1990-2004



Financial Leverage (4.6)

- Leverage ratios measure how much financial leverage the firm has taken on.
- Debt ratios:
  - Long-term debt ratio = Long-term debt / (Long-term debt + Equity) = 8,662 / (8,662 + 19,393) = 31%
  - Long-term debt-equity ratio = Long-term debt / equity = 8,662 / 19,393 = 45%
    - The long-term debt ratio for the average U.S. manufacturing company is about 30%.

Financial Leverage (continued)

- Total debt ratio = Total liabilities / Total assets = 21,484 / 40,877 = 53%
  - This can be useful if the firm is a regular short-term borrower.
- Times interest earned ratio = EBIT / Interest = 4,699 / 676 = 7.0
  - It measures the extent to which interest obligations are covered by earnings.
- Cash coverage ratio = (EBIT + Depreciation) / Interest = (4,699 + 1,806) / 676 = 9.6

Calculating Times Interest Earned Ratio

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When Equity Multiplier gets larger, the firm use more amount of debt.

The Du Pont System (re-visit)

(Think of $A = \underbrace{L}_{\text{debt}} + E$)

- The Du Pont formula shows that ROE equals the product of ROA and 2 other items:

Equity multiplier = Leverage ratio

$$\text{ROE} = \frac{\text{Net Income}}{\text{Equity}} = \overbrace{\frac{\text{Assets}}{\text{Equity}}}^{\text{Leverage ratio}} \times \overbrace{\frac{\text{Sales}}{\text{Assets}}}^{\text{Asset Turnover}} \times \underbrace{\frac{\text{After - tax Operating Income}}{\text{Sales}}}_{\text{Operating Profit Margin}} \times \underbrace{\frac{\text{Net Income}}{\text{After - tax Operating Income}}}_{\text{Debt burdern}}$$

Liquidity (4.7)

- Credit analysts and bankers look at several measures of liquidity to ensure the firm to have enough cash in its operation.
- Net working capital to total assets ratio = Net working capital / Total assets = 3,537 / 40,877 = 9%
- Current ratio = Current assets / Current Liabilities = 13,900 / 10,363 = 1.34

Liquidity (continued)

- Quick (Acid Test) ratio = (Cash + Marketable Securities + Receivables) / Current Liabilities = (1,421 + 964) / 10,363 = 0.23
  - This ratio focuses on the ability about how most liquid assets can cover liabilities.
- Cash Ratio = (Cash + Marketable Securities) / Current Liabilities = 1,421 / 10,363 = 0.14

Sustainable Growth

- How do we know if the amount of financing that is available for investment and growth to a firm is enough?

1525 2661

- Payout ratio = Dividends / Earnings = 57%
- Plowback ratio = (Earnings – Dividends) / Earnings = 43%

1136 2661

- Sustainable growth ratio = (Earnings – Dividends) / Equity = Plowback ratio × ROE = 0.43 × 0.15 = 6.5%

※ P/E ratio 本益比

Interpreting Financial Ratios (4.8)

- Next slide summarizes Home Depot’s ratios
- Some ratios can be apparently trouble.
  - For example, negative value added
- For others, there is no right level for.
  - How can we evaluate these ratios?
- The ratios can be compared with industry norms, industry leaders, or close competitors.
- These ratios can also be interpreted through time.

Performance Measures		
Market value added ($ millions)	market value of equity − book value of equity	29,230
Market-to-book ratio	market value of equity ÷ book value of equity	2.5
Profitability Measures		
Return on assets (ROA)	after-tax operating income/total assets	7.5%
Return on capital (ROC)	after-tax operating income/(long-term debt + equity)	11.3%
Return on equity (ROE)	net income/equity	15.0%
EVA* ($ millions)	after-tax operating income − cost of capital × capital	1,042
Efficiency Measures		
Operating profit margin	after-tax operating income/sales	4.7%
Asset turnover	sales/total assets at start of year	1.61
Fixed-asset turnover	sales/fixed assets at start of year	2.42
Receivables turnover	sales/receivables at start of year	68.1
Average collection period (days)	receivables at start of year/daily sales	5.36
Inventory turnover	cost of goods sold/inventory at start of year	4.10
Days in inventory	inventories at start of year/daily cost of goods sold	89.0
Leverage Measures		
Long-term debt ratio	long-term debt/(long-term debt + equity)	30.9%
Long-term debt-equity ratio	long-term debt/equity	44.7%
Total debt ratio	total liabilities/total assets	52.6%
Times interest earned	EBIT/interest payments	6.95
Cash coverage ratio	(EBIT + depreciation)/interest payments	9.62
Liquidity Measures		
Net working capital to assets	net working capital/total assets	0.09
Current ratio	current assets/current liabilities	1.34
Quick ratio	(cash + marketable securities + receivables)/current liabilities	0.23
Cash ratio	(cash + marketable securities)/current liabilities	0.14
Growth Measures		
Payout ratio	dividends/earnings	0.57
Sustainable growth	(1 − payout ratio) × ROE	6.5%

Financial ratios for major industry groups, 2009

A × B = C

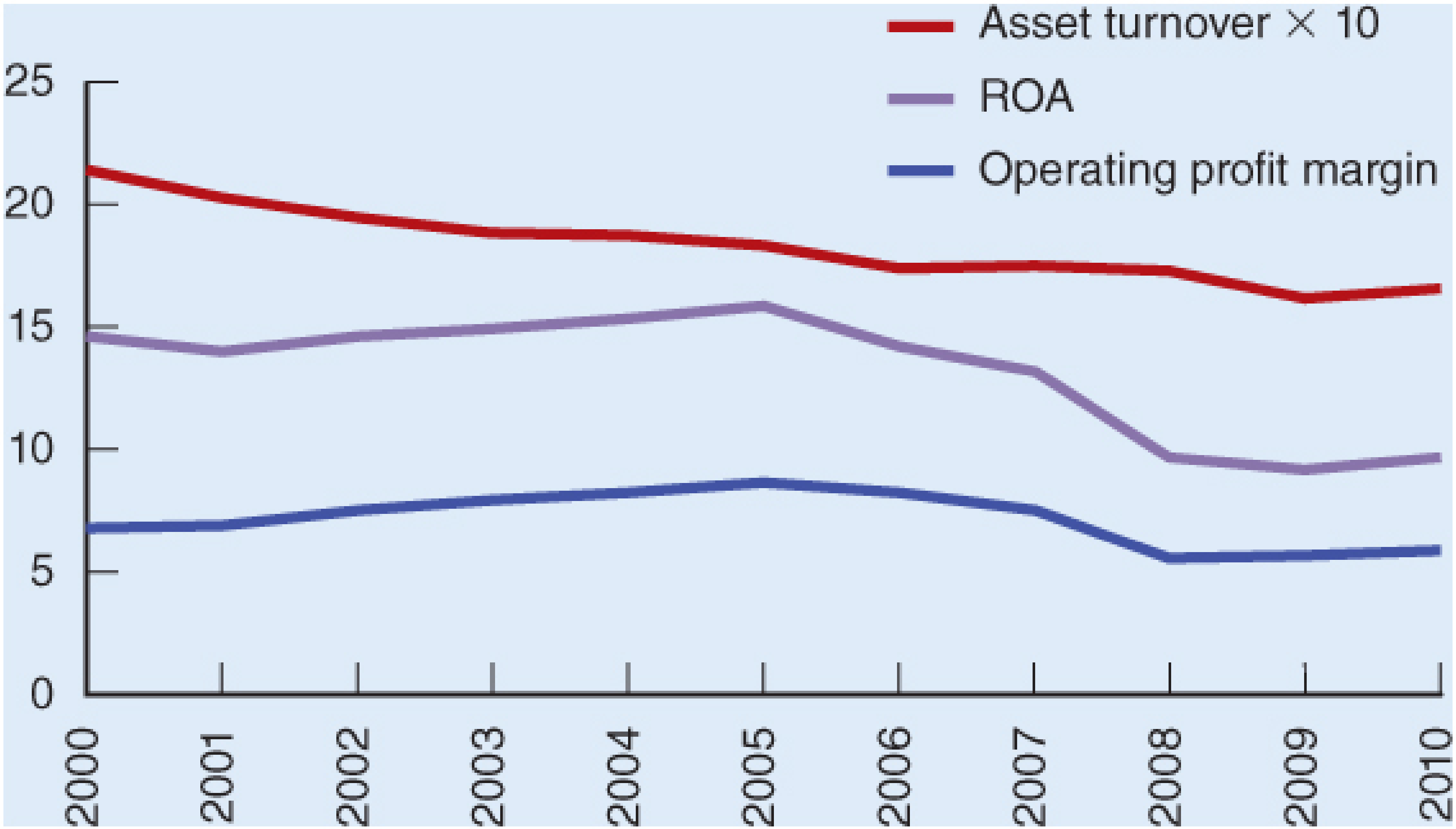
	LT Debt Assets	Interest Coverage	Current ratio	Quick ratio	Asset Turnover	Profit margin (%)	Return on Assets (%)	Return on Equity (%)	Payout Ratio
All Manufacturing	0.22	2.58	1.43	1.03	0.77	5.19	4.02	12.94	0.43
Food Products	0.28	3.74	1.40	0.84	1.19	7.99	9.52	18.09	0.47
Clothing	0.21	9.60	1.39	0.54	2.01	6.99	14.04	22.48	0.09
Beverage & Tobacco	0.27	3.95	1.15	0.52	2.82	3.20	9.04	−4.43	−0.54
Chemicals	0.26	2.62	1.36	1.04	0.48	9.04	4.34	22.12	0.36
Drugs	0.24	3.19	1.56	1.28	0.38	11.00	4.20	26.08	0.29
Machinery	0.18	2.83	1.32	0.90	0.70	6.15	4.33	8.55	0.66
Electrical	0.12	4.30	1.10	0.72	0.59	8.02	4.75	9.55	0.54
Motor Vehicles	0.20	−0.24	0.99	0.77	0.98	−0.42	−0.41	−25.25	−0.24
Computer and Electronic	0.16	3.26	1.94	1.64	0.59	4.92	2.91	16.29	0.08
Paper	0.32	2.68	1.27	0.90	0.89	7.96	7.09	13.38	0.47

Source: Authors' calculations using data from U.S. Department of Commerce, *Quarterly Financial Report for Manufacturing, Mining and Trade Corporations*, March 2010. Available at **http://www.census.gov/econ/qfr/current/qfr_pub.pdf**

Financial ratios compared with key competitor

	Home Depot	Lowe's
Performance Measures		
Market value added ($ millions)	27,666	16,181
Market-to-book ratio	2.43	1.85
Profitability Measures		
Return on assets (ROA)	7.5%	6.0%
Return on capital (ROC)	11.3%	8.5%
Return on equity (ROE)	15.0%	9.9%
EVA* ($ millions)	1,042	145
Operating profit margin	4.7%	4.2%
Efficiency Measures		
Asset turnover	1.61	1.45
Fixed-asset turnover	2.42	2.06
Receivables turnover	68.1	219.6
Average collection period (days)	5.36	1.66
Inventory turnover	4.10	3.75
Days in inventory	89.0	97.4
Leverage Measures		
Long-term debt ratio	30.9%	19.2%
Long-term debt-equity ratio	44.7%	23.7%
Total debt ratio	52.6%	42.2%
Times interest earned	6.95	10.84
Cash coverage ratio	9.62	16.47
Liquidity Measures		
Net working capital to assets	0.09	0.07
Current ratio	1.34	1.32
Quick ratio	0.23	0.17
Cash ratio	0.14	0.14
Growth Measures		
Plowback ratio	0.43	0.78
Sustainable growth	6.5%	7.7%

Home Depot financial ratios over time



Role of Financial Ratios (4.9)

- When firms are highly leveraged, their bonds receive a lower rating.
  - This relation can be easily supported by financial ratios and become a key input to investment/financial decisions.
- When a firm is transparent, its financial statements are trustworthy and have no misleading numbers.
  - That is, managers are making up good facts.
  - Example of Enron: the special-purpose entities (SPEs)

Financial Ratios and default risk

Table 4.9

	Three-Year (2002–2004) Medians						
	AAA	AA	A	BBB	BB	B	CCC
A. EBIT interest coverage multiple	23.8	19.5	8.0	4.7	2.5	1.2	0.4
EBITDA interest coverage multiple	25.5	24.6	10.2	6.5	3.5	1.9	0.9
Funds from operations/total debt (%)	203.3	79.9	48.0	35.9	22.4	11.5	5.0
Free operating cash flow/total debt (%)	127.6	44.5	25.0	17.3	8.3	2.8	(2.1)
Total debt/EBITDA multiple	0.4	0.9	1.6	2.2	3.5	5.3	7.9
Return on capital (%)	27.6	27.0	17.5	13.4	11.3	8.7	3.2
Total debt/(total debt + equity) (%)	12.4	28.3	37.5	42.5	53.7	75.9	113.5
B. Historical 5-year default rate (%)	0.2	0.6	0.6	2.3	5.9	12.9	28.0

Note: EBITDA is earnings before interest, taxes, depreciation, and amortization. Standard & Poor's and Moody's, the two largest credit rating agencies, use slightly different labels for rating classes. For example, S&P's BBB rating is equivalent to Moody's Baa, BB is equivalent to Ba, and so on.
Source: Panel A—Corporate Rating Criteria, Standard & Poor's, 2006. Reproduced by permission of Standard & Poor's, a division of The McGraw-Hill Companies, Inc. *Panel B*—Edward Altman, "The Importance and Subtlety of Credit Rating Migration," *Journal of Banking and Finance* 22 (1998), pp. 1231–1247.