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Profitability



- Net profit is not a relevant measure of profitability. Higher profits are often accompanied by an increase in size of the balance sheet.
- A larger balance sheet means more capital needed to finance the firm's activities and a lower ratio *profit-to-capital employed*

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MEASURES OF PROFITABILITY

- **Return on sales (ROS)**

EBIT/sales or Earnings after tax/sales

- **Return on assets (ROA)**

EBIT/total assets or Earnings after tax/ total assets

- **Return on invested capital (ROIC)**

EBIT/invested capital

- **Return on equity (ROE)**

Earnings after tax/owners' equity

ROE is the most comprehensive measure of profitability.

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RETURN ON INVESTED CAPITAL (ROIC)

- ✓ Measure of efficiency in the use of total resources;
- ✓ Operational performance measure;
- ✓ Not sensitive to leverage;
- ✓ Return for all investors (shareholders and creditors);
- ✓ Used for comparison of firms with the same business risk;
- ✓ Used in planning and management control.

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RETURN ON EQUITY (ROE)

- Measures the firm's profitability from the perspective of the owners. Their investment is the firm's equity capital. Their reward is the firm's net profit. ROE is sensitive to leverage.

$$\text{Return on equity (ROE)} = \frac{\text{Earnings after tax (EAT)}}{\text{Owners' equity}}$$

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RETURN ON EQUITY

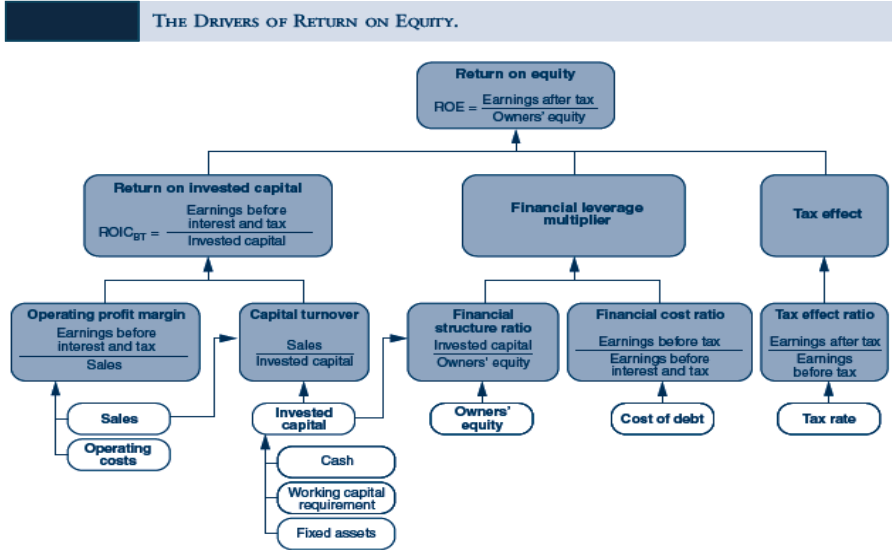
THE DRIVERS OF OPERATING PROFITABILITY (DuPont Model)

$$\begin{aligned}
 \text{ROE} &= \frac{\text{EAT}}{\text{Owners' equity}} \\
 &= \underbrace{\frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Invested capital}}}_{\text{Operating profitability ROIC}_{\text{BT}}} \times \underbrace{\frac{\text{EBT}}{\text{EBIT}} \times \frac{\text{Invested capital}}{\text{Owners' equity}}}_{\text{Financial leverage multiplier}} \times \underbrace{\frac{\text{EAT}}{\text{EBT}}}_{\text{Tax effect}}
 \end{aligned}$$

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RETURN ON EQUITY PUTTING IT ALL TOGETHER: THE STRUCTURE OF A FIRM'S PROFITABILITY



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RETURN ON EQUITY & INDUSTRY

THE STRUCTURE OF RETURN ON EQUITY FOR FIVE FIRMS IN DIFFERENT SECTORS

Firm ²	Operating Profit Margin ³ (1)	Capital Turnover ⁴ (2)	Return on Invested Capital ⁵ (3) = (1) × (2)	Financial Leverage Multiplier ⁶ (4)	Pre-Tax Return on Equity ⁷ (5) = (3) × (4)	Tax Effect ⁸ (6)	Return on Equity ⁹ (7) = (5) × (6)
1	37.2%	2.04	75.9%	0.82	62.3%	72.7%	45.3%
2	27.5%	0.95	26.1%	1.57	41.0%	80.5%	33.0%
3	20.8%	0.91	18.9%	1.72	32.5%	66.7%	21.7%
4	9.8%	2.86	28.0%	1.20	33.6%	77.4%	26.0%
5	5.6%	3.51	19.7%	1.60	31.5%	65.3%	20.6%

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FINANCIAL LEVERAGE

- Financial leverage magnifies a firm's business risk

EFFECT OF FINANCING ON PROFITABILITY FOR DIFFERENT LEVELS OF EBIT.				
Alternative Levels of Pre-tax Operating Profit	Profitability of the Firm with 100% Equity Financing		Profitability of the Firm with 50% Equity Financing	
	EBIT	ROIC _{BT}	ROE _{BT}	ROE _{BT}
\$14 million	14%	14%	14%	18%
\$10 million	10%	10%	10%	10%
\$8 million	8%	8%	8%	6%

- How does financial leverage work?

$$ROE = ROIC_{BT}(1 - T_c) + [ROIC_{BT} - \text{Cost of debt}](1 - T_c) \times \frac{\text{Debt}}{\text{Owners' equity}}$$

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OTHER MEASURES OF PROFITABILITY

- EARNINGS PER SHARE (EPS)

$$\text{Earnings per share (EPS)} = \frac{\text{Earnings after tax}}{\text{Number of shares outstanding}}$$

- THE PRICE-TO-EARNINGS RATIO (P/E)

$$\text{Price-to-earnings ratio (P/E)} = \frac{\text{Share price}}{\text{Earnings per share}}$$

- THE MARKET-TO-BOOK RATIO

$$\text{Market-to-book ratio} = \frac{\text{Share price}}{\text{Book value per share}}$$

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MEASURING VALUE CREATION

- Value is created by a firm if its *market value* (equity plus debt) is higher than its capital employed (capital that equity holders and debt holders have invested). The difference is called **market value added (MVA)**

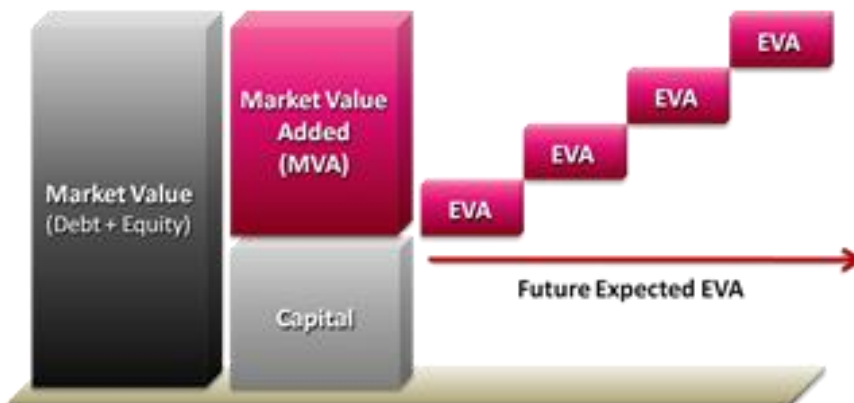
$$\text{Market value added (MVA)} = \text{Market value of capital} - \text{Capital employed}$$

- MVA measures value creation or destruction **at a particular point in time**. The change in MVA during a period measures value created or destroyed **during that period of time**.

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MEASURING VALUE CREATION



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MEASURING VALUE CREATION

ESTIMATING MARKET VALUE ADDED

ESTIMATING THE MARKET VALUE OF CAPITAL

The market value of capital can be obtained from financial markets for firms whose equity and debt capital are publicly traded and can be estimated for non traded.

ESTIMATING THE AMOUNT OF CAPITAL EMPLOYED

A firm's capital employed is measured from its balance sheet. However, since accounting estimates of capital employed are *biased* by accounting conventions, some adjustments are necessary.

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MEASURING VALUE CREATION

INTERPRETING MARKET VALUE ADDED

MAXIMIZING THE MARKET VALUE OF CAPITAL DOES NOT NECESSARILY IMPLY VALUE CREATION

Suppose InfoSoft retains €M15 of profit and borrows €M5 to invest in a €M20 project with a present value of expected EVAs of -€M4. Although its market value has increased, it has destroyed €M4 of value.

- Before investment:

Market value (equity plus debt) = €M500

Capital employed = €M380

So that: MVA = €M120

- After investment:

Market value (equity plus debt) = €M516

Capital employed = €M400

So that: MVA = €M116

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MEASURING VALUE CREATION INTERPRETING MARKET VALUE ADDED

MVA INCREASES WHEN THE FIRM UNDERTAKES POSITIVE NET PRESENT VALUE PROJECTS

- A investment project NPV is the difference between the present value of its future expected cash flows and the amount of capital spent to finance it.
- The present value of future cash flows is the market value of a firm's capital and the amount of capital invested is the firm's capital employed.
- MVA is thus the sum of NPVs of all the past and current projects the firm has undertaken and is undertaking
- *Saying that a firm has raised (reduced) its MVA is the same as saying that it has invested in positive (negative) NPV projects*

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MEASURING VALUE CREATION A LOOK AT THE EVIDENCE

Top Value Creators	Market Value of Capital	Capital Employed	Value created (MVA)
1. Apple Inc.	506.3	135.1	371.2
2. Google Inc.	330.6	49.3	281.3
3. Exxon Mobil	529.6	300.0	229.6
4. Wal-Mart Stores Inc.	340.5	160.3	180.2
5. Johnson & Johnson	249.3	104.2	145.1
6. Procter & Gamble Co.	277.7	133.6	144.1
7. General Electric Co.	302.0	170.4	131.6
8. AT&T Inc.	356.2	267.4	88.8
9. Chevron Corp.	272.2	200.0	72.2
10. Berkshire Hathaway	292.4	221.8	70.6

Bottom Value Destroyers	Market Value of Capital	Capital Employed	Value created (MVA)
492. Patterson Companies Inc.	5.0	2.2	2.8
493. Hudson City Bancorp Inc.	5.0	2.6	2.4
494. Flir Systems Inc.	4.3	1.9	2.4
495. First Solar Inc.	4.1	4.2	-0.1
496. People's United Financial Inc.	4.2	4.8	-0.2
497. Assurant Inc.	4.8	5.4	-0.6
498. Goodyear Tire & Rubber Co.	3.0	13.3	-10.3
499. Ford Motor Co.	2.7	33.5	-30.8
500. General Motors Co.	-42.6	37.1	-79.7

FIGURES IN BILLIONS \$

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IDENTIFYING THE DRIVERS OF VALUE CREATION

VALUE CREATION, OPERATING PROFITABILITY, COST OF CAPITAL, AND GROWTH OPPORTUNITIES

- A firm's capacity to create value depends on:

1) After-tax return on invested capital:

$$\text{ROIC} = \frac{\text{EBIT} \times (1 - \text{Tax rate})}{\text{Invested capital}} = \frac{\text{NOPAT}}{\text{Invested capital}}$$

-EBIT: earnings before interest and tax

-Invested capital: cash + WCR + net fixed assets

-NOPAT: net operating profit after tax

2) Weighted average cost of capital:

$$\text{WACC} = K_d \times (1 - \text{Tax rate}) \times \% \text{ of debt} + K_e \times \% \text{ of equity}$$

3) Its ability to grow

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IDENTIFYING THE DRIVERS OF VALUE CREATION

VALUE CREATION, OPERATING PROFITABILITY AND COST OF CAPITAL

- Accounting profits are measures of performance derived from income statements that do not account for the amount of invested capital used to generate those profits.
- Economic profits account for both: accounting profits and use of invested capital. The most frequently used economic profit is **Economic Value Added (EVA)**.

$$\text{EVA} = (\text{ROIC} - \text{WACC}) \times \text{Invested capital}$$

clearly shows that a positive **return spread** implies a positive EVA, which implies value creation

- **The objective of value creation is not maximizing operating profitability (ROIC) but maximizing the return spread (ROIC-WACC)**

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IDENTIFYING THE DRIVERS OF VALUE CREATION

VALUE CREATION, OPERATING PROFITABILITY AND COST OF CAPITAL

$$\text{Market value added} = \frac{(\text{ROIC} - \text{WACC}) \times \text{Invested capital}}{\text{WACC} - \text{Growth rate}}$$

Says that a firm creates value only if its expected ROIC is higher than firm's cost of capital. Growth alone does not necessarily create value.

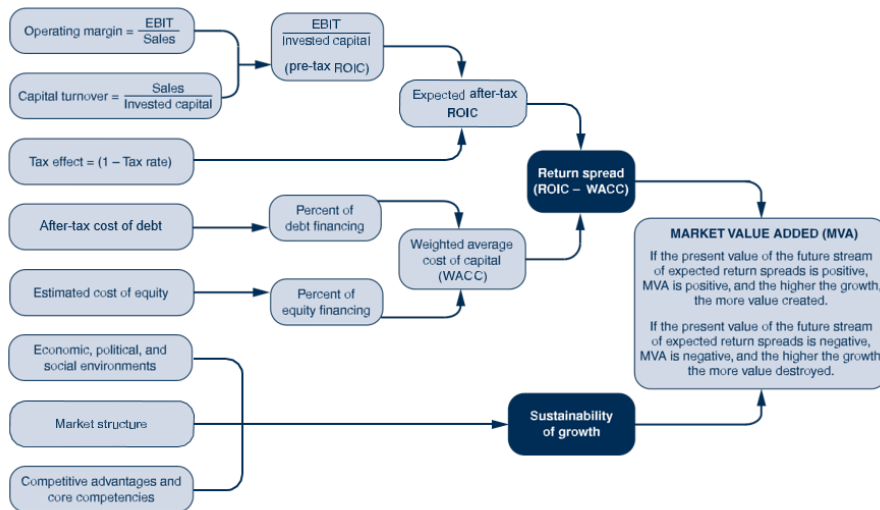
Firm	Expected Growth Rate	Expected ROIC	Estimated WACC	Invested Capital	Market Value Added	Is Value Created?
A	7%	10%	13%	\$100	$\frac{-3\% \times \$100}{13\% - 7\%} = -\50	No
B	4%	13%	10%	\$100	$\frac{+3\% \times \$100}{10\% - 4\%} = +\50	Yes

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IDENTIFYING THE DRIVERS OF VALUE CREATION

LINKING VALUE CREATION TO ITS FUNDAMENTAL DETERMINANTS



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SELF-SUSTAINABLE GROWTH

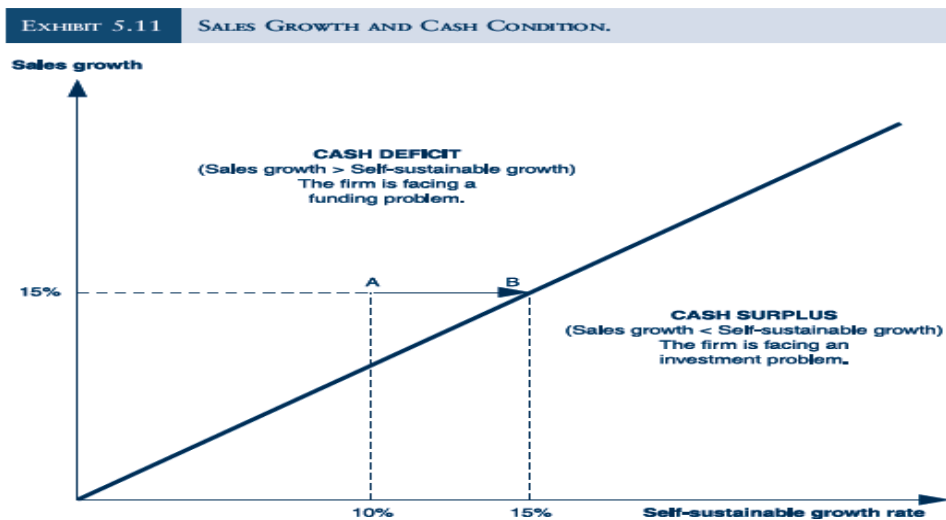
- A firm's **self-sustainable growth rate (SGR)** is the maximum rate of growth in sales a firm can achieve without issuing new shares or changing either its operating policy (same operating profit and capital turnover) or its financing policy (same debt-to-equity ratio and dividend payout)

$$\text{Self-sustained growth rate} = \text{Retention rate} \times \text{ROE}$$

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SELF-SUSTAINABLE GROWTH RATE



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Risk

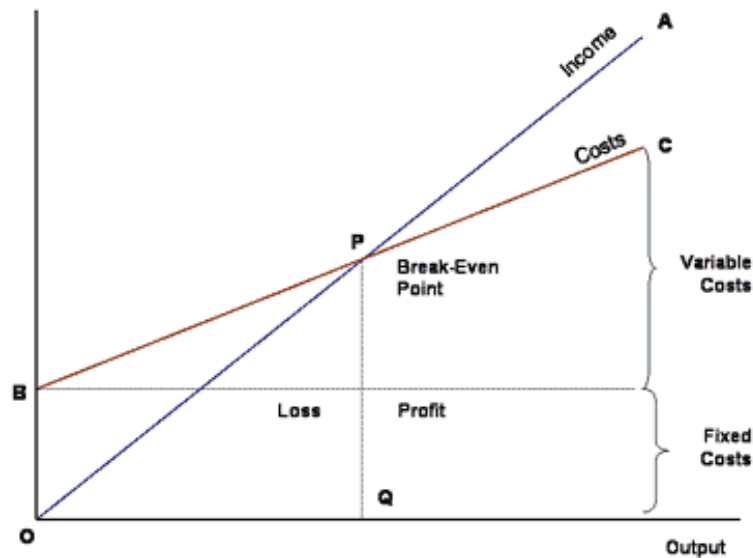
The probability of variance in future cash-flows. Includes business risk (volatility of EBIT) and financial risk (volatility of EAT).

Techniques for risk assessment:

- Statistical measures (variance, standard deviation);
- Ratios based on financial statements;
- Scoring techniques;
- Capital Asset Pricing Model.

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Business risk (Break-even-point)



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Business risk

Break-even point: Level of sales necessary to achieve EBIT=0

$$V_o^* = \frac{\text{Fixed costs}}{\% \text{ CM}} \quad \% \text{ CM} = \frac{\text{Contribution margin}}{\text{Sales}}$$

$$Q_o^* = \frac{\text{Fixed costs}}{p - VCu} \quad \begin{array}{l} p - \text{Sales price per unit} \\ VCu - \text{Variable unitary costs} \end{array}$$

Operational leverage: EBIT's elasticity when facing changes in sales

$$\text{Op Lev} = \frac{\text{Sales} - \text{Variable costs}}{\text{EBIT}}$$