

Introduction to Financing

Prepared by Dr. Sara Ahmed

Lecture 8





مجموعة جامعة
الجميع الذكية
للتعليم القابضة

MIDOCEAN
UNIVERSITY
BY EVERYONE'S SMART UNIVERSITY

Leverage and Capital Structure

Lecture 8

Prepared by
Dr. Sara Ahmed

www.midocean.ae

Topic
09

OUTLINE

- 1 The Capital Structure Question
- 2 The Effect of Financial Leverage
- 3 Capital Structure and the Cost of Equity Capital
- 4 Corporate Taxes and Capital Structure
- 5 Bankruptcy Costs
- 6 Optimal Capital Structure
- 7 Observed Capital Structures
- 8 A Quick Look at the Bankruptcy Process

Topic
09

Key Concepts and Skills

- Understand:
 - The effect of financial leverage on cash flows and cost of equity
 - The impact of taxes and bankruptcy on capital structure choice
 - The basic components of the bankruptcy process

Capital Structure

- Capital structure = percent of debt and equity used to fund the firm's assets
 - “Leverage” = use of debt in capital structure
- Capital restructuring = changing the amount of leverage without changing the firm's assets
 - Increase leverage by issuing debt and repurchasing outstanding shares
 - Decrease leverage by issuing new shares and retiring outstanding debt

Capital Structure & Shareholder Wealth

- The primary goal of financial managers:
 - Maximize stockholder wealth
- Maximizing shareholder wealth =
 - Maximizing firm value
 - Minimizing WACC
- Objective: Choose the capital structure that will minimize WACC and maximize stockholder wealth

The Effect of Financial Leverage

- “Financial leverage” = the use of debt
- Leverage amplifies the variation in both EPS and ROE
- We will ignore the effect of taxes at this stage
- What happens to EPS and ROE when we issue debt and buy back shares of stock?

Trans Am Corporation Example

Table 13.1

	Current	Proposed
Assets	\$8,000,000	\$8,000,000
Debt	\$0	\$4,000,000
Equity	\$8,000,000	\$4,000,000
Debt/Equity Ratio	0.0	1.0
Share Price	\$20	\$20
Shares Outstanding	400,000	200,000
Interest rate	10%	10%

Trans Am Corp

With and Without Debt

Table 13.2

Current Capital Structure: No Debt			
	Recession	Expected	Expansion
EBIT	\$500,000	\$1,000,000	\$1,500,000
Interest	0	0	0
Net Income	\$500,000	\$1,000,000	\$1,500,000
ROE	6.25%	12.50%	18.75%
EPS	\$1.25	\$2.50	\$3.75
Proposed Capital Structure: Debt = \$4 million			
	Recession	Expected	Expansion
EBIT	\$500,000	\$1,000,000	\$1,500,000
Interest	400,000	400,000	400,000
Net Income	\$100,000	\$600,000	\$1,100,000
ROE	2.50%	15.00%	27.50%
EPS	\$0.50	\$3.00	\$5.50

Leverage Effects

Variability in ROE

- Current: ROE ranges from 6.25% to 18.75%
- Proposed: ROE ranges from 2.50% to 27.50%

Variability in EPS

- Current: EPS ranges from \$1.25 to \$3.75
- Proposed: EPS ranges from \$0.50 to \$5.50

The variability in both ROE and EPS increases when financial leverage is increased



Example: Break-Even EBIT

EPS = for both Capital Structures

$$\frac{\text{EBIT}}{400,000} = \frac{\text{EBIT} - 400,000}{200,000}$$

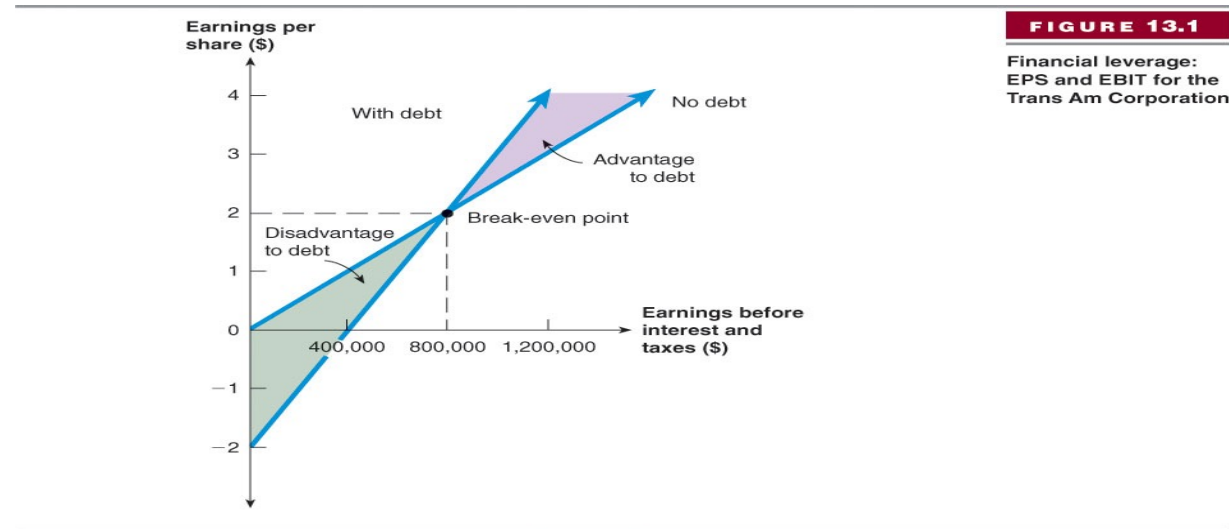
$$\text{EBIT} = \left[\frac{400,000}{200,000} \right] (\text{EBIT} - 400,000)$$

$$\text{EBIT} = 2 \times \text{EBIT} - 800,000$$

$$\text{EBIT} = \$800,000$$

$$\text{EPS} = \frac{800,000}{400,000} = \$2.00$$

Break-Even EBIT



- If we expect EBIT to be *greater* than the break-even point, then leverage is *beneficial* to our stockholders
- If we expect EBIT to be *less* than the break-even point, then leverage is *detrimental* to our stockholders

Trans Am Corp Conclusions

1. The effect of leverage depends on EBIT
When EBIT is higher, leverage is beneficial
2. Under the “Expected” scenario, leverage increases ROE and EPS
3. Shareholders are exposed to more risk with more leverage
ROE and EPS more sensitive to changes in EBIT

Example: Homemade Leverage & ROE

Proposed Capital Structure			
	Recession	Expected	Expansion
EPS	\$.50	\$ 3.00	\$ 5.50
Earnings for 100 shares	50.00	300.00	550.00
Net cost = 100 shares at \$20 = \$2,000			
Original Capital Structure and Homemade Leverage			
	Recession	Expected	Expansion
EPS	\$ 1.25	\$ 2.50	\$ 3.75
Earnings for 200 shares	250.00	500.00	750.00
Less: Interest on \$2,000 at 10%	200.00	200.00	200.00
Net earnings	\$ 50.00	\$300.00	\$550.00
Net cost = 200 shares at \$20 – Amount borrowed = \$4,000 – 2,000 = \$2,000			

TABLE 13.3

Proposed capital structure versus original capital structure with homemade leverage

Conclusion:

- Any stockholder who prefers leverage can create their own “homemade” and replicate the payoffs
- Trans Am’s capital structure is irrelevant to shareholders

Static Capital Structure Theory

- Modigliani and Miller
 - M&M Proposition I – The Pie Model
 - M&M Proposition II – WACC
- The value of the firm is determined by the cash flows to the firm and the risk of the firm's assets
- Changing firm value
 - Change the risk of the cash flows
 - Change the cash flows

Static Capital Structure Theory

Three Special Cases

- Case I – Assumptions
 - No corporate or personal taxes
 - No bankruptcy costs
- Case II – Assumptions
 - Corporate taxes, but no personal taxes
 - No bankruptcy costs
- Case III – Assumptions
 - Corporate taxes, but no personal taxes
 - Bankruptcy costs

Case I – M&M Propositions I and II

- Proposition I
 - The value of the firm is NOT affected by changes in the capital structure
 - The cash flows of the firm do not change; therefore, value doesn't change
- Proposition II
 - The WACC of the firm is NOT affected by capital structure

Case I - Equations

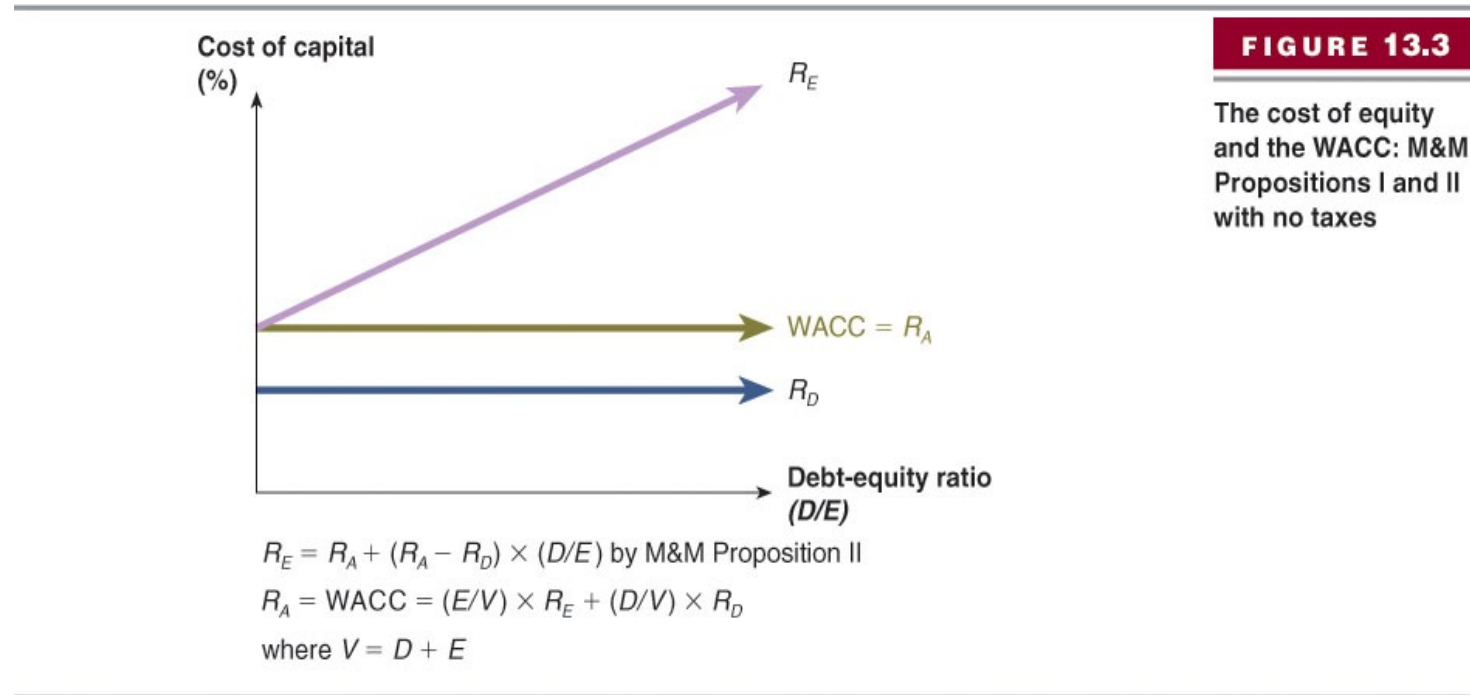
- $WACC = R_A = (E/V) \times R_E + (D/V) \times R_D$
- $R_E = R_A + (R_A - R_D) \times (D/E)$

R_A = the “cost” of the firm’s business risk
(i.e., the risk of the firm’s assets)

$(R_A - R_D)(D/E)$ = the “cost” of the firm’s
financial risk (i.e., the additional return
required by stockholders to
compensate for the risk of leverage)

M&M Propositions I & II

Figure 13.3



The change in the capital structure weights (E/V and D/V) is exactly offset by the change in the cost of equity (R_E), so the WACC stays the same.

Business and Financial Risk

$$R_E = R_A + \frac{(R_A - R_D) \times (D/E)}{1}$$

↑
Business Risk Financial Risk

- Proposition II: the systematic risk of the stock depends on:
 - Systematic risk of the assets, R_A , (business risk)
 - Level of leverage, D/E , (financial risk)

Case II – Corporate Taxes

- Interest on debt is tax deductible
- When a firm adds debt, it reduces taxes, all else equal
- The reduction in taxes increases the cash flow of the firm
- The reduction in taxes reduces net income

Case II - Example

	Unlevered U	Levered L
EBIT	1,000	1,000
Interest	0	80
Taxable Income	1,000	920
Taxes (30%)	300	276
Net Income	700	644
CFFA	700	724

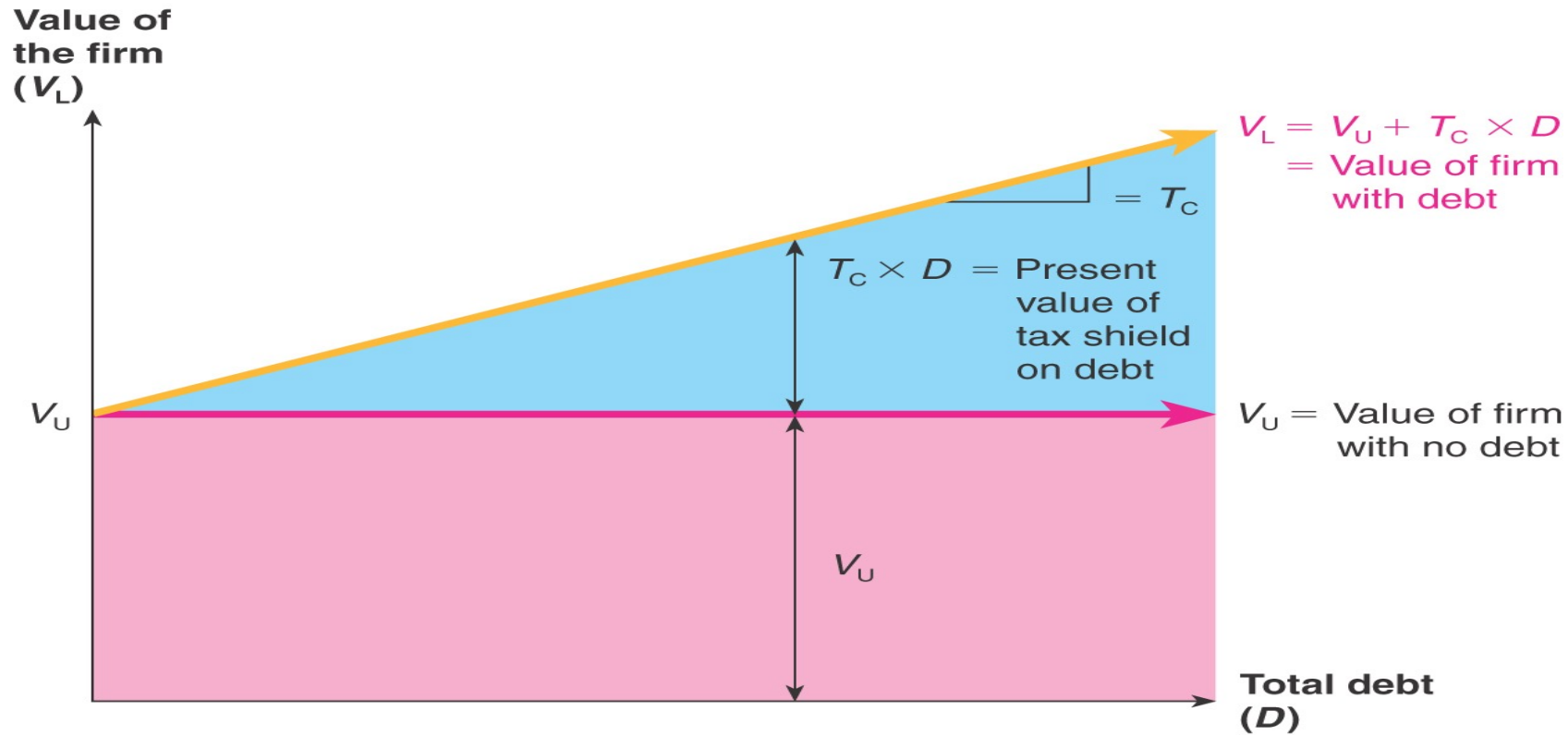
Interest Tax Shield = \$24 per year

Interest Tax Shield

- Annual interest tax shield
 - Tax rate times interest payment
 - \$1,000 in 8% debt = \$80 in interest expense
 - Annual tax shield = $.30(\$80) = \24
- Present value of annual interest tax shield
 - Assume perpetual debt
 - $PV = \$24 / .08 = \300
 - $PV = D(R_D)(T_C) / R_D = D * T_C = \$1,000(.30) = \$300$

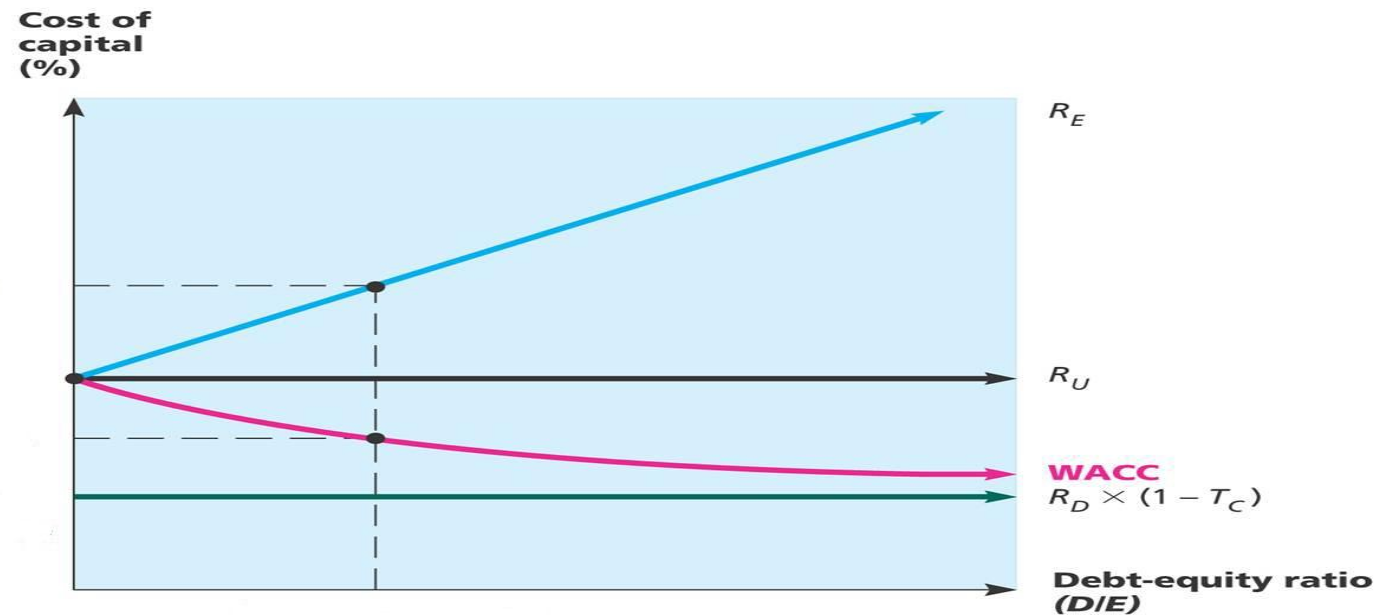
M&M Proposition I with Taxes

Figure 13.4



The value of the firm increases as total debt increases because of the interest tax shield. This is the basis of M&M Proposition I with taxes.

Case II – Graph of Proposition II



M&M Proposition I with taxes implies that a firm's WACC decreases as the firm relies more heavily on debt financing:

$$WACC = \left(\frac{E}{V}\right) \times R_E + \left(\frac{D}{V}\right) \times R_D \times (1 - T_C)$$

M&M Proposition II with taxes implies that a firm's cost of equity R_E rises as the firm relies more heavily on debt financing:

$$R_E = R_U + (R_U - R_D) \times (D/E) \times (1 - T_C)$$

M&M Summary

Table 13.4

TABLE 13.4

Modigliani and Miller
summary

I. The no-tax case

- A. Proposition I: The value of the leveraged firm (V_L) is equal to the value of the unleveraged firm (V_U):

$$V_L = V_U$$

- B. Implications of Proposition I:

1. A firm's capital structure is irrelevant.
2. A firm's weighted average cost of capital, WACC, is the same no matter what mixture of debt and equity is used to finance the firm.

- C. Proposition II: The cost of equity, R_E , is:

$$R_E = R_A + (R_A - R_D) \times D/E$$

where R_A is the WACC, R_D is the cost of debt, and D/E is the debt-equity ratio.

- D. Implications of Proposition II:

1. The cost of equity rises as the firm increases its use of debt financing.
2. The risk of the equity depends on two things: the riskiness of the firm's operations (*business risk*) and the degree of financial leverage (*financial risk*). Business risk determines R_A ; financial risk is determined by D/E .

II. The tax case

- A. Proposition I with taxes: The value of the leveraged firm (V_L) is equal to the value of the unleveraged firm (V_U) plus the present value of the interest tax shield:

$$V_L = V_U + T_C \times D$$

where T_C is the corporate tax rate and D is the amount of debt.

- B. Implications of Proposition I with taxes:

1. Debt financing is highly advantageous, and, in the extreme, a firm's optimal capital structure is 100 percent debt.
2. A firm's weighted average cost of capital, WACC, decreases as the firm relies more heavily on debt financing.

Bankruptcy Costs

- Direct costs
 - Legal and administrative costs OF LIQUIDATION
 - Enron = \$1 billion; WorldCom = \$600 million
 - Bondholders incur additional losses
 - Disincentive to debt financing
- Financial distress (DIRECT & INDIRECT COSTS)
 - Significant problems meeting debt obligations
 - Most firms that experience financial distress do not ultimately file for bankruptcy

Indirect Bankruptcy Costs

- Indirect bankruptcy costs
 - Larger than direct costs, but more difficult to measure and estimate
 - Stockholders wish to avoid a formal bankruptcy
 - Bondholders want to keep existing assets intact so they can at least receive that money
 - Assets lose value as management spends time worrying about avoiding bankruptcy instead of running the business
 - Lost sales, interrupted operations, and loss of valuable employees, low morale, inability to purchase goods on credit

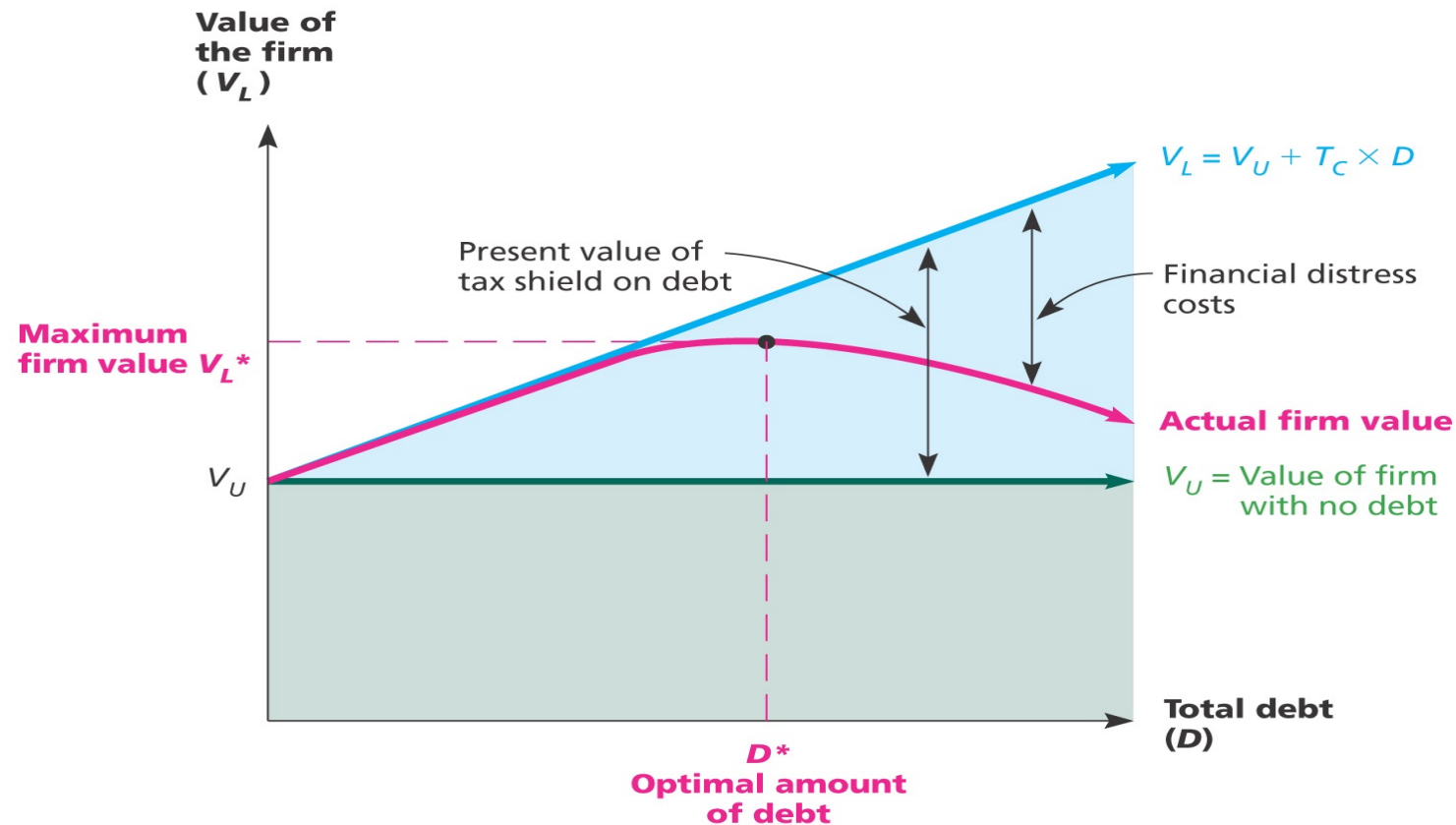
Case III

With Bankruptcy Costs

- $\uparrow$ D/E ratio $\rightarrow$ $\uparrow$ probability of bankruptcy
- $\uparrow$ probability $\rightarrow$ $\uparrow$ expected bankruptcy costs
- At some point, the additional value of the interest tax shield will be offset by the expected bankruptcy costs
- At this point, the value of the firm will start to decrease and the WACC will start to increase as more debt is added

Optimal Capital Structure (STATIC CAPITAL STRUCTURE THEORY)

Figure 13.5



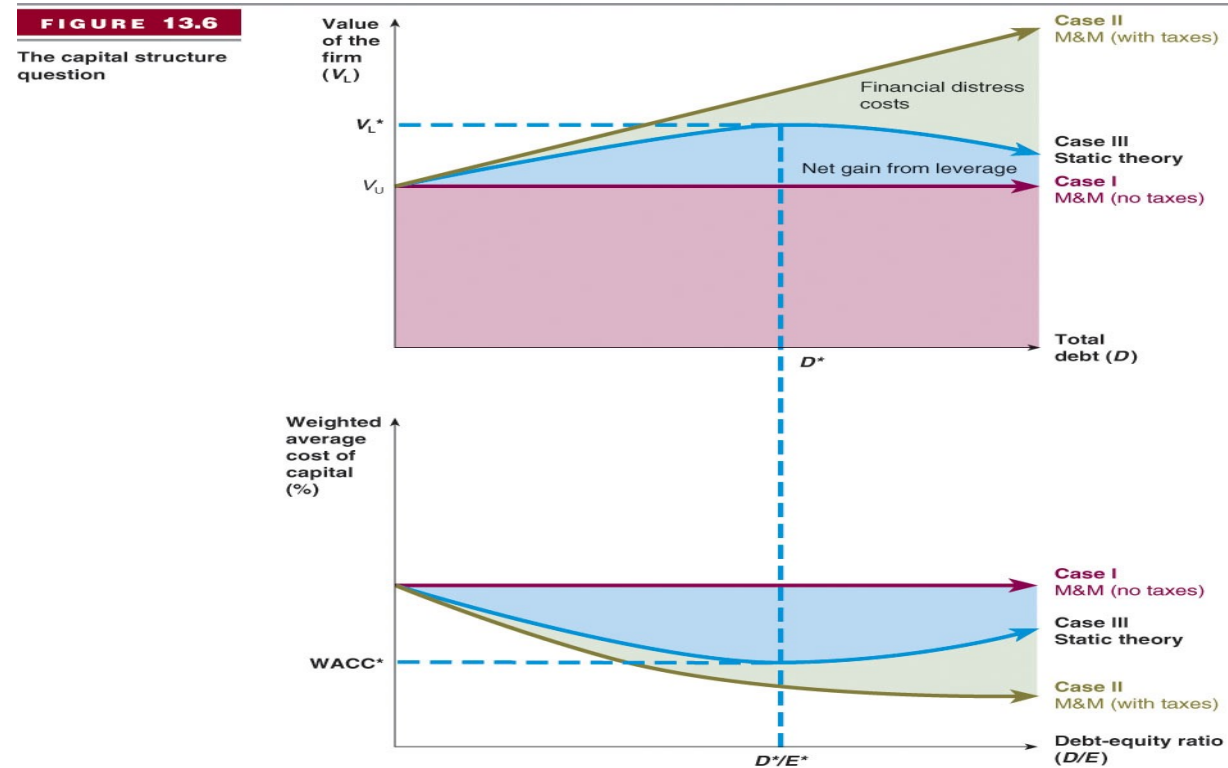
According to the static theory, the gain from the tax shield on debt is offset by financial distress costs. An optimal capital structure exists that just balances the additional gain from leverage against the added financial distress cost.

Conclusions

- Case I – no taxes or bankruptcy costs
 - No optimal capital structure
- Case II – corporate taxes but no bankruptcy costs
 - Optimal capital structure = 100% debt
 - Each additional dollar of debt increases the cash flow of the firm
- Case III – corporate taxes and bankruptcy costs
 - Optimal capital structure is part debt and part equity
 - Occurs where the benefit from an additional dollar of debt is just offset by the increase in expected bankruptcy costs

The Capital Structure Question

Figure 13.6



Case I
With no taxes or bankruptcy costs, the value of the firm and its weighted average cost of capital are not affected by capital structures.

Case II
With corporate taxes and no bankruptcy costs, the value of the firm increases and the weighted average cost of capital decreases as the amount of debt goes up.

Case III
With corporate taxes and bankruptcy costs, the value of the firm, V_L , reaches a maximum at D^* , the optimal amount of borrowing. At the same time, the weighted average cost of capital, $WACC$, is minimized at D^*/E^* .

Additional Managerial Recommendations

- Taxes
 - The tax benefit is only important if the firm has a large tax liability
 - Higher tax rate → greater incentive to use debt
- Risk of financial distress
 - The greater the risk of financial distress, the less debt will be optimal for the firm
 - The cost of financial distress varies across firms and industries

Observed Capital Structures

- Capital structure differs by industries
- Differences according to *Cost of Capital 2008 Yearbook by Ibbotson Associates, Inc.*
 - Lowest levels of debt
 - Computers = 5.31%
 - Drugs = 6.76% debt
 - Highest levels of debt
 - Cable television = 61.84%
 - Airlines = 56.30% debt

Example: Work the Web

- You can find information about a company's capital structure relative to its industry and sector using the industry center or sector analysis through Yahoo! Finance
- Click on the Web surfer to go to the site
 - Choose a company and get a quote
 - Perform sector and industry comparisons

Financial Distress Defined

- Business failure – business terminated with a loss to creditors
- Legal bankruptcy – petition filed in federal court for bankruptcy
- Technical insolvency – firm unable to meet debt obligations
- Accounting insolvency – book value of equity is negative

Financial Management & Bankruptcy

- The right to file bankruptcy has strategic value
 - Immediate “stay” on creditors
 - Ability to terminate labor agreements
 - Ability to lay off large numbers of workers
 - Ability to reduce wages
- “Workouts” and “Cram-downs”
 - Pre-packaged filings
 - Negotiated filings and extensions
 - Court-ordered plan acceptance

Quick Quiz

1. How does financial leverage effect ROE and EPS?
2. What are the three capital structure cases?
3. What are the direct and indirect costs of bankruptcy?



مجموعة جامعة
الجميع الذكية
للتعليم القابضة

MIDOCEAN
UNIVERSITY
BY EVERYONE'S SMART UNIVERSITY



Thank You

