

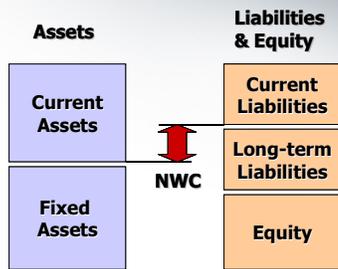
Capital Structure



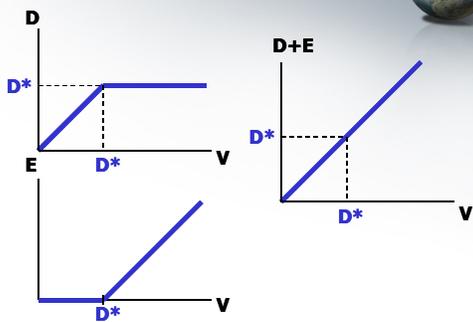
Topics

- Debt vs. Equity
- Contingent Claims
- MM Proposition
 - Capital structure without taxes
 - Capital structure with taxes
- Financial Distress
 - Bankruptcy costs
 - Indirect financial distress costs
- Bankruptcy

Balance-sheet Model of the Firm



Contingent Claims



The Modigliani-Miller (MM) Assumptions



- Homogeneous expectations.
- All firms are in same risk class.
- Perpetual cash flows, no growth in cash flows.
- Perfect capital markets:
 - Perfect competition – everyone is a price taker
 - Firms and investors can borrow and lend at the same risk-free rate
 - Equal access to all relevant information
 - No transaction costs (no taxes, no bankruptcy costs, no agency costs)

The MM Capital Structure Propositions



Modigliani-Miller Proposition I (No Taxes)

- The value of the unlevered firm is the same as the value of the levered firm, that is $V_L = V_U$.

The MM Capital Structure Propositions



Modigliani-Miller Proposition II (No Taxes)

$$r_s = r_o + \frac{B}{S}(r_o - r_b)$$

where,

r_b is the interest rate, also called the cost of debt.

r_s is the expected return on equity, also called the *cost of equity* or the *required return on equity*.

r_o is the required return on unlevered equity, or the cost of capital for all-equity firms.

B is the value of debt.

S is the value of stock or equity.

Example of MM Propositions I & II



Investment Alternative

Initial investment = \$5,000
 EBIT = \$1,000 forever
 $r_0 = 10\%$ = Required return on unlevered equity

Financing Alternatives

	Unlevered	Levered
Equity S	\$5,000	\$4,000
Debt B ($r_B = 5\%$)		\$1,000
Cash Flows		
EBIT	\$1,000	\$1,000
- Interest		
EBT		
- Tax (0%)		
Net income		
$CF(B + S)$		

Example of MM Propositions I & II



Proposition I (no-tax): $V_L = V_U$

$$V_U = S_U = (\text{EBIT})/r_0 =$$

$$V_L = B + S_L = [\text{Int} + (\text{EBIT} - \text{Int})]/r_0 =$$

→ $S_L = V_L - B =$

→ Capital structure is irrelevant in an MM world without corporate taxes

Example of MM Propositions I & II



Proposition II (no-tax): $r_s = r_0 + (B/S)(r_0 - r_B)$

$r_0 =$

$r_s =$

The MM Propositions with Taxes



The MM Proposition I & II (With Corporate Taxes)

$$V_L = V_U + T_C B$$

$$r_s = r_0 + (B/S_L) (1 - T_C) (r_0 - r_B)$$

where,

V_L = Value of the levered firm

V_U = Value of the unlevered firm

T_C = Corporate tax rate

S_L = Mkt value of the levered equity (value of unlevered equity $S_U = V_U$)

B = Market value of the debt

r_0 = Required return on unlevered equity (after corporate taxes, if any)

r_s = Required return on equity

r_B = Required return on corporate debt

Example of MM Propositions with Taxes



Investment and financing alternatives

After-tax cost of capital for unlevered firm $r_0 = 10\%$
 corporate tax rate $T_C = 34\%$

Cash Flows	Unlevered	Levered
EBIT	\$1,000	\$1,000
- Interest		
EBT		
- Tax (34%)		
Net income		
→ $CF(D + E)$		

Example of MM Propositions with Taxes



Proposition I: $V_L = V_U + T_C B$

$$V_U = S_U = (EBIT(1 - T_C)) / r_0 =$$

$$V_L = V_U + T_C B =$$

$$\rightarrow S_L = V_L - B =$$

Proposition II: $r_s = r_0 + (B/S) (r_0 - r_B) (1 - T_C)$

$$r_0 =$$

$$r_s =$$

Example of MM Propositions with Taxes



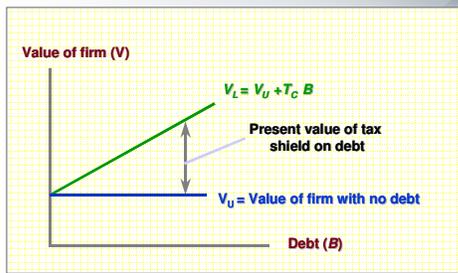
Confirmation:

$$V_L = B + S_L = r_B B/r_B + (EBIT - r_B B)(1 - T_c)/r_{SL}$$

$$WACC = (B/V_L)(1 - T_c)r_B + (S_L/V_L)r_s$$

$$V_L = EBIT(1 - T_c)/WACC$$

Firm Value with Taxes



Financial Distress



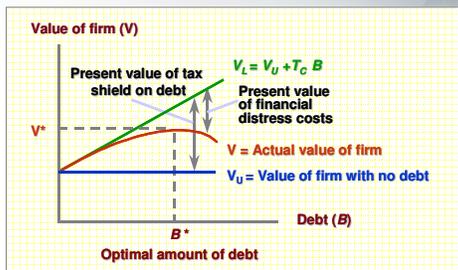
- Economic distress is a result of poor operating performance that leads to possible liquidation.
- Financial distress results from leverage in a firm's capital structure. It occurs when the firm has trouble meeting its fixed obligations because of insufficient cash flows.

Financial Distress



- Financial distress costs include direct costs (such as legal and administrative fees in bankruptcy), and indirect costs that may come from
 1. lower sales or higher factor costs due to the inability to do business with customers and suppliers on favorable terms,
 2. difficulty getting credit,
 3. distraction of management, and
 4. inefficient investment policy due to information asymmetry about firm's prospects.

Firm Value w/ Financial Distress Costs



Responses to Financial Distress



- Asset Restructuring
 1. Sell major assets
 2. Merge with another
 - a. Risk reduction through the coinsurance effect
 - b. Retain the value of tax-loss carryforwards
 3. Reduce capital spending and R&D
- Financial Restructuring
 4. Issuing new securities
 5. Negotiating with banks and other creditors
 6. Exchanging equity for debt
 7. Filing for bankruptcy

Bankruptcy



- **Bankruptcy:** The reorganization or liquidation of a firm that can not pay its debts.
- **Workout:** Agreement between a company and its creditors establishing the steps the company must take to avoid bankruptcy.
- **Liquidation:** Sale of bankrupt firm's assets.
- **Reorganization:** Restructuring of financial claims on failing firm to allow it to keep operating.

Bankruptcy Liquidation



- **Chapter 7** of the Federal Bankruptcy Reform Act
- **Liquidation**
 - means termination of the firm a going concern
 - involves selling the assets of the firm for salvage value.
 - The proceeds, net of transaction costs, are distributed to creditors in order of established priority.

Bankruptcy Liquidation



- **Straight Liquidation Procedure**
 1. A petition (voluntary/involuntary) is filed in a federal court.
 2. A trustee-in-bankruptcy is elected by the creditors to take over the assets of the debtor corporation.
 3. The trustees will attempt to liquidate the assets.
 4. When the assets are liquidated, assets - net of administrative costs - are distributed among the creditors.
 5. If any, remaining assets are distributed to shareholders.

Absolute Priority Rule



- The priority rule in liquidation: **APR**
- 1. Administrative expenses
- 2. Unsecured claims arising after the filing of an involuntary bankruptcy petition
- 3. Wages, salaries and commissions
- 4. Contributions to employee benefit plans
- 5. Consumer claims
- 6. Tax claims
- 7. Secured and unsecured creditors' claims
- 8. Preferred stockholders' claims
- 9. Common stockholders' claims

Absolute Priority Rule



- The **absolute priority rule** states that senior claims are fully satisfied before junior claims receive anything.
- Deviation from the rule:
 - Secured creditors
 - Expectation: Full payout
 - Reality: Full payout in 92% of cases
 - Unsecured creditors
 - Expectation: Full payout
 - Reality: Violation in 78% of cases
 - Equityholders
 - Expectation: No payout
 - Reality: Payout in 81% of cases

Bankruptcy Reorganization



- **Chapter 11** of the Federal Bankruptcy Reform Act
- Chapter 11 is designed to keep the firm alive and operating and to protect the value of its assets while a plan of reorganization is worked out.
- During this period, other proceedings against the firm are halted and the company is operated by existing management or by a court-appointed trustee.

Bankruptcy Reorganization Procedure



1. A petition (voluntary/involuntary) is filed in a federal court.
2. A federal judge either approves or denies the petition. If approved, a time for filing proofs of claims and of shareholders is set.
3. The corporation is given 120 days to submit a reorganization plan.
4. Creditors and shareholders are divided into classes. A class of creditors accepts the plan if two-thirds of the class (in dollar amount) and one-half of the class (in number) have indicated approval.
5. After acceptance by creditors, the plan is confirmed by the court.
6. Payment in cash, property, and securities are made to creditors and shareholders. The plan may provide for the issuance of new securities.

Bankruptcy vs. Private Workout



- Why formal bankruptcy?
 - Firms that need a temporary cash: Debtor in possession debt
 - Interest on prebankruptcy unsecured debt stops accruing in formal bankruptcy.
 - Equityholders can usually hold out for a better deal.
 - A firm with complicated capital structure will have more trouble putting together a private workout.
 - Incomplete information regarding a cash flow shortfall: Temporary or permanent?
