Topic 8: Capital Structure in a Perfect Market, Debt & Taxes

This lecture explores the relationship between capital structure and firm value, focusing on the role of debt financing and its interaction with taxes. The notes cover concepts from BMAE chapters 16 & 17.

Key Takeaways:

- **Modigliani-Miller (MM) Propositions:**

  ○ **Proposition I:** In a perfect capital market (no taxes, transaction costs, or information asymmetry), the firm's value is independent of its capital structure. This means whether the firm borrows or individual shareholders borrow, the total firm value remains the same.
  ○ **Proposition II:** The cost of capital for levered equity is equal to the cost of capital for unlevered equity plus a premium proportional to the market value debt-to-equity ratio. This premium compensates for the increased risk faced by equity holders due to leverage.

- **WACC and Leverage:**

  ○ In a perfect capital market, the firm's WACC is independent of its capital structure and is equal to its equity cost of capital if it is unlevered.
  ○ As the firm borrows at the low cost of debt, its equity cost of capital rises, but the net effect on the firm's WACC is unchanged.

- **Interest Tax Shields:**

  ○ Interest expense is tax-deductible, creating a tax advantage for debt financing. This benefit is called the "interest tax shield".
  ○ The present value of the interest tax shield adds value to the levered firm, according to MM Proposition I with taxes.
  ○ In practice, the actual tax advantage of debt depends on both corporate and personal taxes.

- **Optimal Capital Structure:**

  ○ The optimal level of leverage balances the tax benefits of debt with the costs of financial distress (the risk of bankruptcy).
  ○ Firms tend to be under-leveraged, suggesting that the costs of financial distress are significant and outweigh the tax benefits.
  ○ However, the optimal capital structure can vary greatly across firms and industries based on their individual characteristics and circumstances.

Detailed Explanation:

- **Equity vs. Debt Financing:** The notes begin by introducing the concept of financial leverage, which refers to the relative proportions of debt and equity financing used by a firm. The notes emphasize that leverage increases the risk of equity but also potentially increases return.
- **Perfect Capital Markets:** The MM propositions hold under the assumption of perfect capital markets, which is a theoretical model where there are no market imperfections.

- **Replicating Investment Strategies:** The notes illustrate the MM Proposition I by showing how investors can replicate the cash flows of a levered firm by holding a portfolio of debt and equity of the same firm, or by borrowing to invest in an unlevered firm.
- **Leverage and Risk:** The notes explain how leverage amplifies the volatility of cash flows to equity holders, resulting in a higher required return on equity.
- **Unlevered and Levered Betas:** The effect of leverage on risk can be measured by unlevered beta (β_U), which represents the risk of the firm's assets without leverage, and levered beta (β_E), which measures the risk of equity with leverage.
- **After-Tax WACC:** The notes introduce the concept of after-tax WACC, which accounts for the tax benefits of interest expense. The formula for after-tax WACC is:

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WACC = (E/V) * rE + (D/V) * rD(1 − τc)
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Where:

   ○ E = market value of equity
   ○ D = market value of debt
   ○ V = total value of the firm (E + D)
   ○ rE = cost of equity
   ○ rD = cost of debt
   ○ τc = corporate tax rate

- **Personal Taxes:** The notes introduce the concept of personal taxes, which can reduce the value of the interest tax shield. The notes highlight that the effective tax advantage of debt depends on the combination of corporate and personal taxes.
- **Limitations of Debt Financing:** The notes discuss the limitations of debt financing, including the risk of financial distress and the fact that the tax benefits of debt are maximized when interest expense equals EBIT.

Additional Notes:

- The notes also provide examples to illustrate the concepts discussed.
- The notes discuss the concept of "franking credits", which are tax credits given to Australian equity investors to reduce double taxation.
- The notes acknowledge the complexity of accurately calculating the effective tax advantage of debt, as it is affected by various factors, including individual tax rates and investment holding periods.
- Finally, the notes emphasize that the optimal capital structure is a complex decision that involves trade-offs between the benefits of leverage and the costs of financial distress.

Overall: This lecture provides a comprehensive introduction to the relationship between capital structure, debt financing, and firm value, with a particular focus on the role of taxes. It highlights the importance of understanding the tax implications of leverage and the various factors that influence the optimal capital structure for a firm.