How Much Should a Firm Borrow
Chapter 19

Effect of tax shields
• A firm borrows $1,000 @ 8%. If they are in the 35% tax bracket, they can save:
  – $1,000(.08) = $80 (.35) = $28 a year in taxes (over a firm with no debt).
  – The present value of this:

\[
\text{PV (tax shield)} = \frac{80}{.35} = 235.71
\]

Interest payment = return on debt X amount borrowed
\[= r_D \times D\]

\[
= \frac{T_c (r_D \times D)}{r_D} = T_c \times D
\]

Asymmetric Information and Signaling
• Managers know the firm’s future prospects better than investors.
• Managers would not issue additional equity if they thought the current stock price was less than the true value of the stock (given their inside information).
• Hence, investors often perceive an additional issuance of stock as a negative signal, and the stock price falls.

Capital Structure & Corporate Taxes
Financial Risk - Risk to shareholders resulting from the use of debt.
Financial Leverage - Increase in the variability of shareholder returns that comes from the use of debt.
Interest Tax Shield - Tax savings resulting from deductibility of interest payments.

Capital Structure Theory
• MM theory
  – Zero taxes (chapter 18)
  – Corporate taxes
  – Corporate and personal taxes
• Trade-off theory
• Pecking order
MM Result: Corporate Taxes

- MM show that the total CF to Firm L’s investors is equal to the total CF to Firm U’s investor plus an additional amount due to interest deductibility.
- MM then show that:
  - $V_L = V_U + TD$
  - Value of firm = value if all equity-financed + $T_cD$
- If $T=40\%$, then every dollar of debt adds $40$ cents of extra value to firm.

Under MM with corporate taxes, the firm’s value increases continuously as more and more debt is used.

Miller’s Theory: Corporate and Personal Taxes

- Personal taxes lessen the advantage of corporate debt:
  - Corporate taxes favor debt financing since corporations can deduct interest expenses.
  - Personal taxes favor equity financing, since no gain is reported until stock is sold, and long-term gains are taxed at a lower rate.

Conclusions with Personal Taxes

- Use of debt financing remains advantageous, but benefits are less than under only corporate taxes.
- Firms should still use $100\%$ debt.
- Note: However, Miller argued that in equilibrium, the tax rates of marginal investors would adjust until there was no advantage to debt.
SO???

- Why don’t firms use 100% debt???

Capital Structure

Structure of Bond Yield Rates

- Theory that capital structure is based on a trade-off between tax savings and distress costs of debt.
  - MM theory ignores bankruptcy (financial distress) costs, which increase as more leverage is used.
  - At low leverage levels, tax benefits outweigh bankruptcy costs.
  - At high levels, bankruptcy costs outweigh tax benefits.
  - An optimal capital structure exists that balances these costs and benefits.
Trade Off Theory & Prices

1. Stock-for-debt exchange offers → Stock price falls

Debt-for-stock exchange offers → Stock price rises

2. Issuing common stock drives down stock prices; repurchase increases stock prices.

3. Issuing straight debt has a small negative impact.

Pecking Order Theory

- **Pecking Order Theory** - Theory stating that firms prefer to issue debt rather than equity if internal finance is insufficient.

- Firms use internally generated funds first, because there are no flotation costs or negative signals.

- MM assumed that investors and managers have the same information.

- But, managers often have better information. Thus, they would:
  - Sell stock if stock is overvalued.
  - Sell bonds if stock is undervalued.
  - Investors understand this, so view new stock sales as a negative signal.

- If more funds are needed, firms then issue debt because it has lower flotation costs than equity and not negative signals. If more funds are needed, firms then issue equity.

Implications of Pecking Order Theory

**Some Implications**:

- Internal equity may be better than external equity.

- Financial slack is valuable.

- If external capital is required, debt is better.
  (There is less room for difference in opinions about what debt is worth).

Debt Financing and Agency Costs

- One agency problem is that managers can use corporate funds for non-value maximizing purposes.

- The use of financial leverage:
  - Bonds “free cash flow.”
  - Forces discipline on managers to avoid perks and non-value adding acquisitions.

- A second agency problem is the potential for “underinvestment”.
  - Debt increases risk of financial distress.
  - Therefore, managers may avoid risky projects even if they have positive NPVs.

Empirical Evidence

- Tax benefits are important– $1 debt adds about $0.10 to value.
  - Supports Miller model with personal taxes.

- Bankruptcies are costly– costs can be up to 10% to 20% of firm value.

- After big stock price run ups, debt ratio falls, but firms tend to issue equity instead of debt.
  - Inconsistent with trade-off model.
  - Inconsistent with pecking order.

- Many firms, especially those with growth options and asymmetric information problems, tend to maintain excess borrowing capacity.

Implications for Managers

- Avoid financial distress costs by maintaining excess borrowing capacity, especially if the firm has:
  - Volatile sales
  - High operating leverage
  - Many potential investment opportunities

- If manager has asymmetric information regarding firm’s future prospects, then avoid issuing equity if actual prospects are better than the market perceives.

- Always consider the impact of capital structure choices on lenders’ and rating agencies’ attitudes.
What does capital structure theory prescribe for corporate managers?

- MM, No Taxes: Capital structure is irrelevant—no impact on value or WACC.
- MM, Corporate Taxes: Value increases, so firms should use (almost) 100% debt financing.
- Miller, Personal Taxes: Value increases, but less than under MM, so again firms should use (almost) 100% debt financing.

Do firms follow the recommendations of capital structure theory?

- Firms don’t follow MM/Miller to 100% debt. Debt ratios average about 40%.
- However, debt ratios did increase after MM. Many think debt ratios were too low, and MM led to changes in financial policies.