

Recitation VI

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Today's Recitation: Capital Structure.

I. MM Thm: Capital Structure Irrelevance.

II. Taxes and Other Deviations from MM.

I. MM Theorem.

- A company is considering undertaking a project which requires \$10 million in initial funding (e.g. the project will incur \$10 million in costs before it becomes profitable).

↪ Of course, the \$10 million question is: should you undertake the project?

↪ But we're not there yet. In principle, undertaking a project involves other decisions that could be important.

↪ So here's a \$1 million question: if you go forth with this project, how should you finance it?

↪ Well, there are lots of financing options: common stock, preferred stock, debt (tons of debt options), bank loans, internal cash, etc. Is one financing mix better than the others?

- The mix of securities that are issued to finance a firm's projects is its capital structure.

I. Continued...

- Is financing really a million dollar question?
↔ Easiest to think of this in a frictionless market (FM) context...

- What's a FM? It's a market with the following features...
 - No taxes.
 - No transactions costs.
 - Investors and firms have access to the same financing technologies at the same cost.
 - Symmetric information.
 - Operating and financing decisions are independent.

- Wow! Lots of assumptions and all of them are unrealistic. Why do we care about this context?
↔ Because it gives a simple answer to the financing question and will give us framework to think of more realistic refinements later.

I. Continued...

- **MM Theorem**: If markets are frictionless, the firm's financing mixture of debt and equity does NOT affect its value (i.e. capital structure is irrelevant).

↪ Suggests that the financing decision is actually a \$0 question.

↪ The only reason the financing question would be important would be if it affected firm value. MM says it doesn't.

- **Intuition**: Investors shouldn't be willing to pay a premium for a more or less levered version of a firm because they can accomplish this leverage or undo it themselves under the same terms as the firm (by borrowing on their own account). Why pay a premium for something you can do yourself for free?

I. Continued...

- However, someone might respond: " But how can firm value not change? The cost of equity is higher than the cost of debt, so levered firms should have a cost of capital that is closer to the cost of debt (i.e. a lower cost of capital) and, as a result, should be more valuable."
↔ What's wrong with this argument?

I. Continued...

- **Remember:** Leverage changes the firm's cost of equity (and maybe even the cost of debt). Only frictions can make capital structure affect the value of the firm.

↪ Why? As debt becomes a larger fraction of firm value, equity, which still picks up most of the cashflows risk, does so with a smaller value. The total premium on this risk is the same as with an unlevered firm, but now this premium is apportioned over a smaller amount of equity value. Hence, the premium per unit of equity value (i.e. cost of equity) goes up. In other words, the cost of equity increases with higher leverage.

↪ Likewise, as a company increases its leverage, its debt can eventually become risky (i.e. default risk can increase).

↪ MM says that these costs increase just enough to keep the firm's cost of capital constant across all possible leverage ratios.

I. Continued...

- **Intuition:** Think of a CAPM-style argument: All assets and portfolios are priced using a common framework (the security market line). Since the firm's operating decisions are independent of its financing decisions, the underlying cash-flow risks of the firm do not depend on its capital structure. This means that, irrespective of the capital structure decision, the firm should have the same value.

II. Taxes and Other Deviations From MM.

- Corporate Taxes: Recall that interest payments on debt are tax deductible while payments to investors via dividends are not.

↔ There is a debt tax-shield, but no corresponding dividend (or equity) tax-shield.

- What happens when we take this asymmetric tax treatment into account?

↔ Can think of this in the MM framework with a simple refinement.

↔ Who has a claim on the pre-tax cashflows of the firm?

↔ If the firm issues both debt and equity, clearly the debtholders and equityholders have some sort of claim on these pre-tax CFs.

↔ The government also has a claim. In fact, if accounting profits are high, it's claim can be quite large.

II. Continued...

- With corporate taxes, think of the MM theorem holding, but that the value of the firm is shared between debtholders, equityholders, AND the government.

↔ In this case, what is the goal of capital structure?

↔ Minimize the value of the governments stake.

↔ Likewise, maximize the value of debt tax-shields.

- How do we calculate the PV of these tax-shields?

II. Continued...

- **Big Picture:** Considering only the corporate tax rate seems to suggest that issuing as much debt as possible is optimal. This maximizes the value of all tax-shields and minimizes the government's share of firm value.

↪ This is just as simple an answer as MM. Does it miss something too?

- **Other issues...**

- ★ **Personal Taxes:** There's also a difference in tax treatment between income earned on debt through interest payments (taxed as income) and income earned on equity through stock price appreciation (taxed as capital gains).

↪ These can negate all the tax advantage of debt. You can even find a tax advantage of equity in some cases.

II. Continued...

↔ Since different people don't necessarily fall in the same income tax bracket, they may have different relative preferences for debt and equity.

↔ Some firms can issue debt to cater to investors in low income tax brackets (e.g. pension funds), while other choose to issue more equity to cater to investors in high income tax bracket.

↔ **Main point:** Tax issue doesn't need to favor debt.

★ **Costs of Financial Distress:** Companies that issue a lot of debt have higher risks of entering financial distress. This is costly because it entails wasteful spending, can force firms to forgo good investments that need financing, and can even encourage firms to take one inefficient investments.

II. Continued...

↪ **Wasteful Spending:** For instance, bankruptcy can involve enormous costs (e.g. lawyers fees, reorganization proceedings, etc).

↪ However, if the probability of bankruptcy is small when you actually issue the debt, this shouldn't drastically increase your cost of debt.

↪ **Forgo Good Investments:** A firm in financial distress will have difficulty raising money (especially through equity) for new projects, even if they're profitable.

↪ Why? Because some of the projects profits will have to go to repay the creditors. It doesn't go back to the new investors. In other words, a project that is profitable for the firm doesn't need to be profitable for new investors.

↪ This is called the debt overhang problem.

II. Continued...

↪ **Take Bad Investments:** If a firm has some cash to spare but is nearing bankruptcy, it might want to 'swing for the fences' on a negative NPV project that has a small chance of being a great success.

↪ Why? Because if the project fails, nothing has really changed from the perspective of shareholders (the firm still goes bankrupt) while, if it succeeds, the firm might no longer go bankrupt and shareholders can retain some value.

↪ This is called the risk shifting problem.

II. Continued...

- Investors holding debt are weary of the risk shifting and debt overhang problem and, as a result, require a higher cost of debt when debt levels become too high.

↔ This points to the idea that there might be an optimal leverage ratio that balances the tax advantages and the costs of financial distress associated with debt.

↔ This optimal capital structure might differ from industry to industry? Why?

↔ This is called the static trade-off theory of capital structure.

II. Continued...

- Other perspectives...

★ **Pecking Order Theory:** No target capital structure. Choose the cheapest form of financing available to you every time you need to raise capital. Based on asymmetric information, POT says that firms prefer issuing information-insensitive instruments (like internal cash or riskless debt) before information-sensitive ones (like risky debt or equity).

★ **Market Timing Theory:** Assumes that the firm's stock isn't always priced fairly by the market, but that this reflects investor sentiment instead of asymmetric information. As a result, companies issue equity to raise capital when their stock is overvalued by the market. Likewise, they issue debt when the stock is undervalued.