

Corporate Finance, Module 17: "Capital Structure"

Modigliani and Miller Intuition

(The attached PDF file has better formatting.)

Question: Why is the Modigliani and Miller proposition such a big deal? It says that debt policy does not matter in perfect capital markets (no taxes, transaction costs, or the like). Who ever said that it matters?

Answer: Before Modigliani and Miller published their paper on debt policy, everyone assumed that the firm's value depended on the debt policy. Suppose that

- ! The Canaan Winery is capitalized with \$200,000 to buy a vineyard and a wine press.
- ! The Winery's average income is \$40,000 a year, or a 20% return on the investment. (The vineyard and wine press do not depreciate.)
- ! Wine-making is competitive, so the 20% return is the proper return on the assets.

Question: Where does the Canaan Winery get the funds to buy the vineyard and wine press?

Answer: Let's assume first that the Winery is a corporation with no debt and 200,000 shares at \$1 a share. We examine the effects of changing debt policy.

Noah, the CFO of the Canaan Winery, is offered a \$100,000 business loan at a 10% yield. This is reasonable; bank loans are usually 6 or 7 percentage points lower than the return required by investors. Noah reasons as follows:

- ! Suppose we take the loan and buy back 100,000 shares at \$1 a share. The investors get \$1 per share for half of their shares. They now have \$100,000 and 100,000 shares.
- ! Our expected annual income is still \$40,000. We pay \$10,000 a year in debt expenses (interest costs), and the investors get \$30,000.
- ! The investors require a 20% return. If they are getting an annual return of \$30,000, their investment must be worth \$150,000, since $\$30,000 / 20\% = \$150,000$.
- ! The investors' total wealth is now \$100,000 (cash) + \$150,000 (shares) = \$250,000. Their wealth has increased \$50,000 because of the bank loan.

Question: The reasoning sounds goods; what's wrong with it?

Answer: The reasoning *sounds* so good that Modigliani and Miller spent three years after their paper was published to convince other analysts that this reasoning is mistaken. Let's look at their arbitrage argument.

Let's change the scenario. Instead of taking the loan from a bank, Noah takes the loan *from the investors who own the stock*. The Winery takes a \$100,000 loan from the investors and buys back half the stock.

The investors don't even notice that anything has changed. They gave a \$100,000 loan to the Winery and they received back \$100,000 in cash (the share repurchase). Each year, they get \$40,000 in cash: \$10,000 as the interest on the debt and \$30,000 as their stockholder dividends. Nothing has changed, except that we call some of the cash *interest payments* instead of stockholder dividends.

But if the value of the Canaan Winery is now \$150,000, the investors' wealth has increased from \$200,000 of stock to \$150,000 of stock plus a \$100,000 loan (a bond). We can't make \$50,000 appear by changing the words we use to speak of the cash flow.

Question: But what is wrong with the reasoning?

Answer: If the wealth of the investors has not changed, the firm is worth to them \$100,000, not \$150,000. Since the expected annual income (after interest payments) is \$30,000, the required return to shareholders must now be 30%, not 20%.

Question: Does this assume that the chance of the firm's bankruptcy has not changed?

Answer: The chance of bankruptcy is relevant because the shareholders are not liable for the debt of the corporation except to the extent of their investment. One might think that the chance of bankruptcy increases because the firm must now make interest payments each year. If the higher chance of bankruptcy causes the debt to be worth only \$50,000, then the value of the stock is worth \$150,000.

This is not correct; we mention it only because bankruptcy costs play a large role in later modules. If taking a loan increases the chance of bankruptcy, the creditors charge a higher interest rate, and the market value of the loan stays \$100,000. The value of the stock does not change from \$100,000.

{In other postings, we show *why* the required return to investors has increased – because their risk is higher if the Winery is partly capitalized by debt. For the final exam, you must derive the returns on debt, equity, and assets from each other, and you must derive the betas of debt, equity, and assets from each other. When we include taxes and tax shields, the situation changes; these are modules 18 and 19.}