

Corporate Income Taxation : (c) Debt, Equity and Taxes

Consider some entrepreneur who needs to raise \$1 million to start up a business. The entrepreneur has no net worth of her own, but has developed an idea which may be very profitable. So she sets up a firm, and goes out and raises the necessary \$1 million from investors. If the entrepreneur's firm is successful, it will be worth \$10 million ; if it fails it will be worthless. (In this latter case, the entire \$1 million in start-up money will be lost.) Because of the risk, investors will need a return of at least 50 percent on their money (which they will only get if the project succeeds).

If there were no taxes, then investors would not care if they invested in debt of the firm, or in its equity. The entrepreneur could borrow the \$1 million from the investors, at an interest rate of 50 percent, or she could sell them a 15-percent interest in the firm, in exchange for \$1 million. In either case, the entrepreneur gets her \$1 million, the investors get \$1.5 million back if the project succeeds, and they get nothing back if the project fails.

In other words, in this example, the financial structure of the firm is irrelevant. It does not matter to anyone, in a world without taxes, whether this firm issues debt, or equity, or some mixture of the two. The **Modigliani–Miller theorem** of corporate finance shows that this irrelevance is true under quite general circumstances — when there are no taxes — not just in the example presented here.

Taxation changes this irrelevance. Corporations can deduct the costs of borrowing from their taxable income, but not the cost of raising equity capital. So if the entrepreneur's firm borrowed the \$1 million from the investors, then the \$500,000 in interest would be deductible from the firm's taxable income. At a corporate tax rate of 40 percent, borrowing the money would reduce the firm's tax liability by $(0.4)(500,000) = 200,000$ dollars. On the other hand, issuing equity will not give the firm any similar deduction. Therefore, the corporate income tax gives strong encouragement to corporate borrowing. If these were the only tax considerations (for example, if the investors were tax-exempt entities such as pension funds or insurance companies), corporations should be very heavily leveraged : their financial structure should be all debt and no equity.

On the other hand, investors may be subject to the **personal income tax**. The personal income tax taxes interest income in the same way as ordinary wage and salary income. The return to equity often takes the form of capital gains, which are treated much more favourably than interest income. Because of the 50 percent inclusion rate, and the advantages of deferral, the effective income tax on capital gains is much lower than that on interest income.

So personal income tax considerations mean that investors would no longer be indifferent between holding debt and equity. For example, suppose that an investor's marginal personal income tax rate on interest income was 50 percent, and his "effective" marginal personal income tax on capital gains income (taking into account the low inclusion rate and the advantages of deferral) was 20 percent. Then if he needs a net return of 50 percent in order to invest in the firm, he would have to receive interest income of \$1 million if the firm succeeds (since the \$1 million in

interest would be taxed at 50 percent, leaving him with \$500,000 in net interest income). He would be willing to accept a 16.25 percent share in the firm for his \$1 million : if the project succeeded, he could sell the shares for \$1.625 million (16.25 percent of the firm's worth of \$10 million), he would have capital gains of \$625,000, pay taxes of 20 percent of that, or \$125,000, and wind up with \$1.5 million net.

So what is best for the entrepreneur? If she issued debt, she would now have to pay out \$2 million if the firm succeeded (in interest plus principal), but would see her corporate tax liabilities reduced by \$400,000, if the corporate income tax rate were 40 percent (since the \$1 million in interest cost is deductible against the corporate income tax). That's a net payout of \$1.6 million if the project succeeds. If she issued equity, she would give up shares worth \$1.625 million if the project succeeds.

In this example, she is better using debt, since debt implies a slightly smaller net payout. But you can check that the advantage would switch to equity if, for example, the corporate income tax rate were only 30 percent.

The conclusion : whether debt or equity is better depends on the relationship among the corporate income tax rate, the personal income tax rate, and the effective personal income tax rate on capital gains. Personal income tax considerations favour equity, and corporate income tax considerations favour debt. But the choice is an all or nothing choice : for example, when the effective personal income tax rates on interest income and on capital gains are 50 percent and 20 percent respectively, then the firm should issue nothing but debt if the corporate income tax rate is more than 37.5 percent, and nothing but equity if the corporate income tax rate is less than 37.5 percent.