SUMMARY OF THEORIES IN CAPITAL STRUCTURE DECISIONS

Herczeg Adrienn
University of Debrecen Centre of Agricultural Sciences
Faculty of Agricultural Economics and Rural Development
herczega@agr.unideb.hu

Abstract Defining the optimal capital structure is a critical decision for any organization. This decision is important not only because of the need to maximize returns, but also because of the impact such a decision has on an organization’s ability to deal with its competitive environment. There are many theories for this theme, but all the same, researchers have not found the optimal capital structure. In Hungary the capital structure of enterprises changed significantly since 1990, but it is true, that their decisions about the capital can not fit with neither theoretical appeal totally. There is no universal theory of the debt-equity choice, and no reason to expect one.

Keywords capital structure, Modigliani Miller, enterprises

JEL classification: M40

1. Introduction

In traditional corporate finance, the objective in decision making is to maximize the value of the firm. A narrower objective is to maximize stockholder wealth. When the stock is traded and markets are viewed to be efficient, the objective is to maximize the stock price. “Stock price maximization, firm value maximization and stockholder wealth maximization is not the same. Stock price maximization is the most restrictive of the three objective functions. It requires that managers take decisions that maximize stockholder wealth, that bondholders be fully protected from expropriation, that markets be efficient and that social costs be negligible. Stockholder wealth maximization is slightly less restrictive, since it does not require that markets be efficient.” (Damodaran, 1994)

Firm value maximization is the least restrictive, since it does not require that bondholders be protected from expropriation. Thus, when we make the argument that an action by a firm (such as investing or financing) increases firm value, this increase in firm value will necessarily translate into increasing stockholder wealth and stock price only if the more restrictive assumptions hold. Conversely, an action that increases the stock price in a world where the less restrictive assumptions do not hold, may not necessarily increase firm value.

As the Figure 1. shows, all other goals of the firm are intermediate ones leading to firm value maximization, or operate as constraints on firm value maximization. The objective of maximizing stock prices is a relevant objective only for firms which are publicly traded. For firms which are not publicly traded, the objective in decision making is the maximization of firm value. Since firm value is not observable and has to be estimated, what private businesses will lack is the feedback, sometimes unwelcome, that publicly traded firms get when they make major decisions. (Damodaran, 1994)
In this way, one of the most important issues in corporate finance is responding "How do firms choose their capital structure?". Locating the optimal capital structure have for a long time been a focus of attention in many academic and financial institutions that probe into this area. This is comprehensible as there is a lot of money to be made advising firms on how to improve their capital structure.

There are many methods for the firm to raise its required funds, the most basic instruments are stocks or bonds. The mix of the different securities is known as its capital structure, so it can be defined as the combination of debt and equity used to finance a firm. And the target capital structure is the ideal mix of debt, preferred stock and common equity with which the firm plans to finance its investments.

2. Modigliani and Miller Proposition I-II /No tax scenario/
The greatest breakthrough in theory of optimal capital structure came with Modigliani and Miller’s theorem, which specifies conditions under which various corporate financing decisions are irrelevant. Essentially, they hypothesized that in perfect markets, it does not matter what capital structure a company uses to finance its operations. They theorized that the market value of a firm is determined by its earning power and by the risk of its underlying assets, and that its value is independent of the way it chooses to finance its investments or distribute dividends. The assumptions of MM proposition I are the followings:

- Homogeneous expectations
- Homogeneous business risk
- Perpetual cash flows
- Perfect capital market
  - Perfect competition (every one is a price taker)
  - Firms and investors can borrow and lend at the same rate

Figure 1. The classical objective function
Source: Damodaran, 1994
Equal access to all relevant information
No transaction cost (taxes or bankruptcy costs)
(Modigliani – Miller, 1959)

In this circumstances MM Proposition I. concerns about the irrelevancy of the value to capital structure. The value of the levered firm - $V_L$ – must be equal to the value of the unlevered firm. (Figure 2.) $V_U$. ($V_L=V_U=\frac{EBIT}{WACC}=\frac{EBIT}{K_E}$)

![Figure 2. Modigliani and Miller Proposition I-II. (no tax scenario)](source: Bélyácz, 1997, 20.p.)

MM Proposition II. implies that, the higher the debt-equity ratio, the higher the expected turn on equity. ($R_E=R_A+(R_A-R_D)(D/E)$)

Now let:

$R_E$ = the expected return on equity, or the cost of equity
$R_A$ = the expected return when the company is all-equity financed

$R_D$ = the interest rate, or the cost of debt
$D$ = debt
$E$ = equity

3. Modigliani and Miller Proposition I-II /with taxes/

Of course, in the real world, there are taxes, transaction costs, bankruptcy costs, differences in borrowing costs, information asymmetries and effects of debt on earnings. The earnings after interest payments are taxable in the real world. And this is one of the most important reasons for firms to use debt financing. Modigliani and Miller made a correction in 1963, when the first imperfection was introduced: corporate taxes (Modigliani-Miller, 1963).

This proposition recognizes the tax benefit from interest payments - that is, because interest paid on debt is tax deductible, issuing bonds effectively reduces a company's tax liability. Paying dividends on equity, however, does not. Thought of another way, the actual rate of interest companies pay on the bonds they issue is less than the nominal rate of interest because of the tax savings (Modigliani-Miller, 1963).
MM showed that when corporate taxes are included, the value of the levered firm is equal to the value of an unlevered firm plus the present value of the tax shields associated by debt: \( V^L = V^U + tD \), where \( t \) is the corporate tax rate. In this way the optimal capital structure that maximizes the value of a firm consists of 100% debt. I illustrate this theory in Figure 3.

In summary, the MM I theory without corporate taxes says that a firm's relative proportions of debt and equity don't matter; MM I with corporate taxes says that the firm with the greater proportion of debt is more valuable because of the interest tax shield. In comparing the two theories, the main difference between them is the potential benefit from debt in a capital structure, which comes from the tax benefit of the interest payments.

\[ \text{Figure 3: Modigliani and Miller Proposition I-II. (with tax)} \]
\[ \text{Source: Bélyácz, 2001, 537.p.} \]

4. Baxter - Bankruptcy costs

As we have seen, in a world without transactions costs risky debt does not affect on the value of the firm. When bankruptcy costs are taken into consideration, things are beginning to look differently.

This third step in capital structure theory was first suggested by Baxter and later modified by others. In this way, bankruptcy costs are introduced. Now the value of the firm in bankruptcy is reduced by the fact that payments must be made to third parties other than bond- or shareholders. Trustee fees, legal fees, and other costs of reorganization or bankruptcy are deducted from the net asset value of the bankrupt firm and from the proceeds that should go to bondholders. (Harvey, 1995)

These "dead weight" losses associated with bankruptcy cause the value of the firm to be less than it would have been otherwise, namely the value based on the expected cash
flows from operations. And since the change of going bankrupt is higher when a firm is financed with more debt, there are costs involved with debt financing. The tradeoff between the tax advantage of debt and bankruptcy costs associated with debt results in an optimal capital structure, the so called balancing theorem (Figure 4.).

\[
V_L = V_U + TD
\]

Financial distress costs

actual firm value

value of firm with no debt

optimal amount of debt

Figure 4: The optimal capital structure according to the balancing theorem

5. Later developments in the theorems
The next step in capital structure theory was the introduction of personal taxes in 1977. Miller showed that, again, a "nothing matters" situation arises when you combine corporate and personal taxes. Since capital gains are not taxed, but interest is taxed at the personal level, for the investor, who ultimately determines the market value of a company, there might even be a tax disadvantage to debt financing. (Allen, 1991) Then in 1976, a new strand of literature was started by Jensen and Meckling. They introduced the so called agency theory –see Figure 5.- in the world of corporate finance, which relaxes the assumption of no conflict of interest between different parties, especially management, shareholders and debtholders. In particular, managers do not always act in the interest of the shareholders and consequently the goal is not always to maximize the value of the company. The paper shows that, based on these agency problems and without assuming taxes or bankruptcy costs, an optimal capital structure can be explained.
In 1977 Ross introduced the existence of asymmetric information in capital structure theory. Assuming that managers have more information about the expected returns of the company than outside investors, he argued that bigger financial leverage can be used by managers to signal an optimistic future of the firm. (Fama, 1984)

Since the late seventies, until the late eighties, virtually all research concerning capital structure issues has been concerned with agency and/or asymmetric informational issues. Since the middle of the eighties, interrelations between financing and investment decisions (Titman, 1984) and capital structure choices in relation to takeovers (Harris and Raviv, 1988) have been studied. In particular, in Harris and Raviv managers are assumed to want always to continue the firm's current operations even if liquidation of the firm is preferred by investors. In Stulz (1990), managers are assumed to want always to invest all available funds even if paying out cash is better for investors. In both cases, it is assumed that the conflict cannot be resolved through contracts based on cash flow and investment expenditure. Debt mitigates the problem in the Harris and Raviv model by giving investors (debt holders) the option to force liquidation if cash flows are poor. Capital structure is determined by trading off these benefits of debt against costs of debt. In Harris and Raviv, the assertion of control by investors through bankruptcy entails costs related to the production of information, used in the liquidation decision, about the firm's prospects. The cost of debt in Stulz's model is that debt payments may more than exhaust “free” cash, reducing the funds available for profitable investment.

Diamond (1989) and Hirshleifer and Thakor (1989) show how managers or firms have an incentive to pursue relatively safe projects out of reputational considerations. „Diamond’s model is concerned with a firm's reputation for choosing projects that assure debt repayment. There are two possible investment projects: a safe, positive NPV project and a risky, negative NPV project.” (Harris-Raviv, 1988)

The risky project can have one of two payoffs ( "success" or "failure"). Both projects require the same initial investment which must be financed by debt. A firm can be of three, initially observationally equivalent types. One type has access only to the safe project, one type has access only to the risky project, and one type has access to both. Since investors cannot distinguish the firms ex ante, the initial lending rate reflects their beliefs about the projects chosen by firms on average. Returns from the safe project suffice to pay the debtholders (even if the firm is believed by investors to have only the risky project), but returns from the risky project allow repayment only if the project is successful.

And apart from the theoretical literature hundreds of papers try to empirically test all the different capital structure theories.
7. Conclusion

We can see above how many theories exist for defining the optimal capital structure. Proposition I of MM has become the first step in capital structure theory and it is sometimes called the 'irrelevance' theorem. It states that, as an implication of equilibrium in perfect capital markets, the value of a firm is independent of its capital structure. The second step was also made by MM in 1963, when corporate taxes are introduced in the model, 100% debt financing is optimal. The third step in capital structure theory was first suggested by Baxter in 1976 and later formalized by others. Now, bankruptcy costs are introduced. The tradeoff between the tax advantage of debt and bankruptcy costs associated with debt results in an optimal capital structure, the so called balancing theorem.

Despite these theoretical appeals, researchers in financial management have not found the optimal capital structure.

References

6. Hirshleifer, David and Anjan V. Thakor, 1989, Managerial reputation, project choice and debt, Working paper 14–89, Anderson Graduate School of Management at UCLA.