A Review on the Relevance and Impact of Borrowing and Taxes to Firm Value

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Abstract
This paper provides a critical review on the relevance and impact of capital structure decisions and its tax implications on firm value. We provide a brief look at the fundamental theoretical predictions from a basic framework established in the literature. Furthermore, we discuss the implications of one of the most important market imperfections: taxes. This is driven by the tax shield provided by debt issues as well as the impact income taxes at the personal investor level. The empirical literature does provide reasonable evidence to support the framework. However, further studies highlight that it remains puzzling why managers are reluctant to increase debt levels to reduce firms’ tax burden given that the potential savings remain largely underutilized in practice. The evidence in the empirical literature provides contention which questions the fundamental framework of the theory as it remains unresolved as to whether debt issues do have a net marginal tax benefit to firm value.

Keywords: Borrowing, Firm value, Taxes

1. Introduction
This paper provides a critical review on the impact of borrowing by managers and taxes on firm value. It provides a background of the literature in the area of capital structure, taxes and its impact on firm value. Our paper provides a brief guide to understanding the importance of the debt equity ratio on firm value which serves as an essential reading for researchers and students interested in the area.

Every company will try to ensure that its business activities run a smooth manner. In order to grow and invest in positive ‘Net Present Value’ (NPV) projects that are planned, the company would need capital. This view is based on the assumption that the firm is run by rational managers and managers are acting in the best interests of shareholders. This can be done
from several different possibilities ranging from internal sources to external sources. The availability of internal funds would depend on the profitability of the company to generate earnings and also the pay-out policy that is practised by the management. This would allow the company to draw the needed funds from what is known as the retained earnings. Another possible option is to acquire the funds from outside the company. Adopting this option however, requires the company to be confronted with the choice of raising capital through the issue of debt or equity.

The decision making would be based on many different factors such as the cost of capital and other financial considerations as well as non-financial considerations. Once this is decided, the firm can then implement its new projects based on the risk (discount factor) and return relationship, which is derived from the choice of capital that is used to finance the project. In the long run, the decision made would affect the value of the company as project viability is based on the cost of capital. Ownership structure also is dependent on the choice of capital structure. Equity and retained earnings reflect ownership by shareholders. Debt on the other hand is owned by the debt-holders. The means of providing returns to capital suppliers are distinct. On one hand, shareholders are rewarded for providing financing via the possibilities of dividends or even capital gains through appreciation of the value of the shares which is dependent on the value of the firm. On the other hand, debt-holders are paid obligatory interest payments.

Our paper proceeds as follows: the next section introduces the basic concept of capital structure and firm value. Following that, we discuss the relevance of capital structure and taxes to firm value. Lastly, we provide a discourse on the impact of capital structure and taxes on firm value

2. The Basic Concept of Capital Structure and Firm Value

The considerable interest for research in this area can be said to have started to develop since the seminal papers by MM (Franco Modigliani and Merton Miller) in 1958 and 1963. In their first paper, Modigliani and Miller (1958) argue that the value of the firm did not depend on its capital structure. Firm value was irrelevant to the composition of financing used to raise capital to fund projects. MM believed the value of the firm was determined purely by its cash flows from projects or in other words real assets and not the way it chooses to raise capital.

In stating their arguments, MM relied on the perfect market assumptions which are that
there are no transaction costs, there is no information asymmetry, there are no taxes and capital markets are perfectly competitive, where there are many buyers and sellers. The objective set out by the authors was to build an investment function which would allow the decision to accept an investment opportunity or not, depending on precisely who happens to be the owners of the firm at the moment. This brought about the development of their first proposition which states that the market value of a firm at any given time is independent of its capital structure. This value is given by discounting future cash flows at the expected rate of return. Thus the average cost of capital of a firm would be completely independent of its capital structure. Therefore in equilibrium:

\[ V_i \equiv (E_i + D_i) = \frac{\bar{X}_i}{p_{ki}} \]  

where \( V_i \), is the market value of firm \( i \), \( E_i \), is the market value of equity of firm \( i \), \( D_i \), is the market value of debt of firm \( i \), \( \bar{X}_i \), is the expected return of firm \( i \) and \( p_{ki} \), is the discount factor of firm \( i \). The market value of firm \( i \) \( (V_i) \), which is given by the left hand side of the formula in equation (1) is equals to the market value of the equity, \( (E_i) \), of firm \( i \) and the market value of the debt, \( (D_i) \), of firm \( i \). This is given by capitalizing the expected return, \( (\bar{X}_i) \), of firm \( i \) at the appropriate rate given by \( p_{ki} \). The equation can be reshuffled to solve for the cost of capital:

\[ \frac{\bar{X}_i}{(E_i + D_i)} \equiv \frac{\bar{X}_i}{V_i} = p_{ki} \]  

It can be seen from equation (2) which is known as MM’s Proposition I, that the average cost of capital, \( p_{ki} \), of any firm is independent of its capital structure and the value of a firm is unaffected by the composition of the capital structure. In other words, \( V_{Li} = V_{Uj} \), the value of a levered firm \( i \), \( (V_{Li}) \), is the same as the value of an unlevered firm \( j \), \( (V_{Uj}) \). This clearly shows that what matters for the value of a firm are its cash flows, not how the cash flows are distributed in between its claimants. In perfect capital markets, leverage just redistributes the cash flows between the interest holders of the firm without affecting the cash flow per se.

MM further state that in the event of inequalities in the values of two firms in the same equivalent risk class, investors would buy and sell shares and bonds in the these two firms to in such a way to exchange the earning potentials of the firms until equilibrium is reached and erode all the differences in the values of such firms. This arbitrage process would ensure that the proposition holds no matter what the choice of financing used by the firm. Investors would be
offsetting any gains firms made by using leverage by making use of personal homemade leverage.

Based on this first proposition, MM derive what is come to be known as Proposition II in the study of corporate finance which concerns the rate of return of equity of firm $i$ ($k_{ei}$) in a company which has a certain amount of debt in its books. This proposition states that the expected return is a linear function of leverage, where the required return increases in line with the debt-to-equity ratio. This can be expressed as:

$$
k_{eli} = k_{uj} + \left( k_{uj} - k_{di} \right) \frac{D_i}{E_i}$$

(3)

where $k_{ei}$, is the required rate of return of equity of firm $i$, $k_{uj}$, is the required rate of return of an unlevered firm $j$, $k_{di}$, is the cost of debt for firm $i$, $D_i$, is the market value of debt for firm $i$ and $E_i$, is the market value of equity of firm $i$. The above expression shows that the expected return of a shareholder, ($k_{eli}$), of a levered company has a premium over the expected return of a shareholder for a company financed purely by equity. This premium is given by the difference between $k_{uj}$ and $k_{di}$, (which is the difference between the cost of capital for an unlevered firm and the cost of debt) multiplied by the debt to equity ratio. Thus, any gain accrued from the usage of leverage (due to debt being a cheaper source of financing) is lost in exact proportion due to the increase in cost of equity. The rationale for this is quite simple in the sense that the shareholders would now require a higher level of return due to the increase in the level of risk borne by the shareholder as compared to a shareholder of a company with pure equity financing. This risk adjustment which is required by the shareholders increases in proportion with the amount of debt.

Another important contribution made in this paper is through the development of their third proposition known as Proposition III. This proposition states that a company must only invest in projects if the rate of return exceeds the cost of capital. This means that the investment function would be unaffected by the mixture of financing used. Thus a company which uses leverage has the same average cost of capital as a firm which does not use leverage (given that they are in the same equivalent risk class). Whatever gains made from the use of cheap borrowed funds is offset by the increase in cost of raising equity capital.

The relation between cost of equity, cost of debt and the average cost of capital for a firm can be expressed in the following graph based on Proposition I & II of MM:
Figure 1: The relationship between Cost of Debt, Cost of Equity and Average Cost of Capital according to MM 1958

These propositions are different from the traditional in two distinctive ways. The first is that the value of the firm and the cost of capital are independent of its capital structure. Under the traditional view, debt is seen as a cheaper source of financing. Thus a firm is able to lower its average cost of capital by introducing debt. Secondly, MM iterate that there is no definite optimal point of firm value. This is clearly against the traditional view where a company’s value is maximised at a certain level where the benefit of debt as a cheaper source of financing is greater than the cost of bankruptcy. According to MM, one debt-to-equity ratio is as good as another. There is no optimal point in maximising firm value. Firm value is purely dependent on the future cash flows in its books. The distinction of the traditionalist view and that of MM can be expressed graphically as follows:

Figure 2: Distinguishing the difference between MM View and Traditional View
Thus, MM propose an alternative view of looking at the relationship between capital structure and firm value. These propositions generally look at the theoretical aspect of financing and provide the theoretical framework for further development in the study of capital structure. It can be said that most studies from that point in the literature draw from this framework.

3. Relevance of Capital Structure and Corporate Taxes To The Firm Value

In another seminal paper, Modigliani and Miller (1963), MM relaxed one of the main assumptions in their earlier model. They investigated the causality relationship between corporate tax and choice of capital structure. The authors include the impact of corporate taxes and the deductibility of interest from profits before tax. After taking this into account, the difference in the MM view and the traditionalist one is narrowed. However, MM firmly state that the tax advantage of debt is the only permanent one giving effect to the choice of capital structure. The reason for this argument was the accounting method where interests are paid to debt-holders from profits before computing for taxation and dividends are paid to shareholders from profit after taking into account the tax payable.

MM modified their earlier two propositions to include the effect of corporate tax. Proposition I would now state that a firm with leverage has a higher value compared to a firm without leverage. The increase in value is given by the tax shield provided by the tax deductibility of interest payments. This shows the tax advantage of debt and makes leverage beneficial to corporations. The first Proposition is modified to take the tax shield into account and thus can be expressed as follows:

\[ V_{Li} = V_{Uj} + T_{Ci}(D_i) \]

where \( V_{Li} \), is the market value of a levered firm \( i \), \( V_{Uj} \), is the market value of an unlevered firm \( j \), \( T_{Ci} \), is the effective corporate tax rate of firm \( i \) and \( D_i \), is the market value of debt of firm \( i \). Equation (4) thus shows that the value of the levered firm \( i \) \( (V_{Li}) \) is greater than the value of an unlevered firm \( j \) \( (V_{Uj}) \) in the exact amount given by the tax savings generated from interest payments (the equation is derived by assuming the perpetuity of debt).

The second proposition after taking into consideration of corporate taxes, states that the cost of equity increases in a linear fashion in relation to leverage but by a smaller factor given by \( 1 - T_{Ci} \), (one minus the effective corporate tax rate for firm \( i \)). This is still fundamentally different from the traditional view in the sense that the traditional view states that cost of equity
capital is completely independent of leverage. Proposition II can be stated in the below equation:

\[ k_{eU} = k_{Uj} + (1 + T_{Cj}) \left( k_{Uj} - k_{dU} \right) \frac{D_i}{E_i} \]  

(5)

The advantage of the firm value of a levered firm that makes use of debt capital over an unlevered firm is given in the graphical form as below:

**Figure 3: Advantage of a Firm with Debt over a firm without Debt**

Based on the second Proposition, the relationship between cost of capital, cost of equity and cost of debt can be best seen in the following graphical form:

**Figure 4: Average cost of capital after considering tax advantage of debt**
Therefore, the paper provides an important contribution to the literature by relaxing one of the assumptions of perfect capital markets which is corporate taxes. This provides an interesting development in the area of capital structure as it allows future researchers to look at the impact of taxes on leverage as well as by relaxing other assumptions of perfect capital markets.

4. Impact of Taxes on Capital Structure

The seminal work by Modigliani and Miller (1963) recognised the importance of corporate taxes on capital structure decisions. When firms issue debt, they are given a tax shield because interest is deducted before taxes are calculated. Thus in the presence of corporate taxes, MM showed that the value of the firm would rise with higher leverage ratios. However, investors in the firm are also subject to taxes on their income from their investments. In most countries debt interest is a deductible expense for the firm but is taxed as income when the debt-holders receive them. Furthermore, in most countries dividends on the other hand receive a different treatment where they are taxed twice. Taxes on dividend income from the investors’ perspective differ from the corporate tax rate or even the interest tax rate. The rate may also differ among different investor groups. Miller (1977) argues that a firm will issue debt until the corporate tax savings are equal to the personal tax loss. This would create an equilibrium where both rates are not controlled by the firm and thus the tax rate determines the level of debts.

Miller proposed the value of the levered firm to be as follows:

$$V_L = V_U + \left[ 1 - \left( \frac{T_{Ci}}{1-T_p} \right) \frac{(1-T_e)}{(1-T_p)} \right]$$

where $T_{Ci}$ is the effective corporate tax rate for firm $i$, $T_e$ is the equity tax rate and $T_p$ is the personal tax rate of the investor. The value of the interest payments received by the investor is given by $(1-T_p)$ and the value of the dividends received by the equity holders would be subject to tax twice, which is given by $(1-T_e) (1-T_c)$. The above shows that if there are no personal taxes or $T_p = T_e$ than the value of the levered firm is once again as specified by the earlier prediction by MM in 1963. The implication from the inclusion of personal taxation into the effect of firm value to the investors is that if the tax on the interest income ($T_p$) is larger than the corporate tax rate ($T_c$) and equity tax rate ($T_e$), there is no net advantage of debt and in certain circumstances can even be negative. The net tax advantage (NTA) the firm would be able to capture in every dollar paid out as interest compared to dividends based on Miller’s equilibrium is as below:
\[ NTA = (1 - T_p) - (1 - T_c)(1 - T_e) \]  \hspace{1cm} (7)

As long as \( NTA > 0 \), then investors would favour interest income over dividends. Thus to maximise firm value, the company would have the incentive to issue debt over equity.

The firm however has many other deductibles in practise besides the interest expenses which lead to lower effective tax rates. DeAngelo and Masulis (1980) incorporate the non-debt-tax-shields (NDTS) such as depreciation and investment tax credits into the initial analysis and argue that \( T_c \) is not a constant rate given by the statutory rate. They show that \( T_c \) decreases because the NDTS reduce the tax benefit of interest payments. Based on this argument, firms with large NDTS would have less incentive to issue debt capital. Hence, there is a direct negative relationship between the marginal rate of corporate tax savings and the amount of debt is issued because additional debt would cause the marginal benefit from debt to decrease or even be totally lost. Given this, the optimal level of debt is reached when the marginal benefit is equals to the marginal personal tax disadvantage.

Increasing firm value by issuing debt also causes the firms to face several others costs namely the financial distress costs. Brennan and Schwartz (1978) show how bankruptcy and corporate taxes interact to impact the relationship between capital structure and valuation. Issuing debt is found to have two simultaneous effects on the firm. The first being it increases the tax savings as long as the firm survives, but ironically the second it reduces the probability of the firm to survive. The analysis shows that if the tax savings is greater than the increase in probability of failing, then it is beneficial for the firm to issue debt and is thus considered as a positive NPV action. The opposite also holds true which leads to debt issuance being detrimental to firm value. This trade-off implies that debt issuance increase value the most for firms with the lowest business risk, debt with longer maturity causes a decrease in the optimal leverage point and also if the firm becomes riskier, then the optimal leverage point is also reduced. Mayer (1986) further shows that firms exhaust the tax benefit of debt before they approach the point of bankruptcy. This happens because firms are allowed to carry forward losses in form of tax credits but are not able to claim refunds immediately.


The literature discussed above shows that adding debt to an unlevered firm adds value to the firm. Masulis (1980) examines the exchange offers made by the firm where one security is
offered and another is immediately retired to evaluate the change of capital structure to firm value assuming that the investments are constant. The prediction that debt increasing exchange offers increase firm value due to increase in tax deductions is found to be true. A 1% increase in leverage increases equity value by 7.6% and a 1% decrease in leverage leads to a reduction in equity value by 5.4%. It is further found that when common stock and preferred stock is substituted with debt which would result in an increase in tax deductions, there are large stock price increases. Masulis (1983) further shows that the relationship between debt issues and stock returns by regressing stock returns with the change of debt levels in exchange offers. The coefficient is found to be 0.40 showing that tax savings of debt has a significant impact of firm value and the personal taxes are lower compared to corporate tax rates. This also implies that the costs of issuing debt to be quite low.

The exchange offer of traditional preferred stock for monthly income preferred stock (MIPS) also is an indicator of the tax benefit to firms when issuing leverage. The MIPS interest payments are tax deductible similar to interest payments on regular debt and the dividends on preferred stock are taxed twice, similar to the dividends on common stock. Thus, when corporations issue MIPS to retire preferred stock, firms gain from the tax deductibility of the interest payments from MIPS. Engel et al (1999) compare MIPS yield to the traditional preferred stock yield and find that the tax benefit of MIPS is $0.28 per dollar of the total value of the issue. Irvine and Rosenfeld (2000) use abnormal announcement returns to estimate the tax benefits of MIPS to be about $0.26. Since MIPS and preferred stock are similar in legal context and should theoretically have the same information content, these studies are able to conclusively show the positive effects of tax on firm value.

Fama and French (1998) test the impact of tax savings from debt on firm value directly by regressing $V_L$ directly on debt interest, dividends and a proxy of $V_U$ where a positive coefficient on interest would show the tax benefit of debt. They find that the coefficient to be either negative or insignificant showing that debt tax benefits do not have an effect on firm value. The authors argue that interest provides information about earnings that is not otherwise captured by their controls for $V_U$. Thus, $V_U$, is measured with error and the negative value is due to some other costs of debt. Kemsley and Nissim (2002) switch the variables by moving the earnings variable (which is a proxy for $V_U$) to the left hand side and $V_L$ to the right hand side. They model Earnings Before Interest and Taxes (EBIT) on $V_L$ and debt to find a debt coefficient
that is negative. This shows that debt contributes value to the firm. The coefficient is also found to change through time to reflect changes in statutory tax rates. To evaluate the marginal benefit gained from issuing debt, Graham (2000) simulates interest deduction benefit functions and uses them to estimate the tax-reducing value of each incremental dollar of interest expense. This simulation is done based on the understanding that the marginal benefit of adding more debt declines as more debt is added. This study estimates the tax benefit of debt to be about 10% during 1980-1994 in the US. If personal taxes are taken into account, this estimate drops to about 8%. This implies that large tax benefits of debt appear to remain unexploited by the firm and more profitable firms are cautious against using debt as a financing option.

Further empirical evidence is provided by Graham (1996) who looks at debt levels and finds that firms’ effective marginal tax rate has a positive and significant effect on leverage. Rajan and Zingales (1995) also argue that the tax deductibility of interest payments influences leverage levels. An international study by Graham (2003) looks at the capital structure of domestic and international firms. The author finds that firms with high tax rates use tax more extensively relative to firms with low tax rates to take advantage of the tax savings of interest payments. Based on the survey response from managers of 16 different European countries, Bancel and Mittoo (2004), managers tend to consider preserving financial flexibility, interest payment tax shields and volatility of earnings when issuing debt. Frank and Goyal (2003) further the argument by providing evidence that profitable firms tend to issue more debt.

Given that personal tax cost of interest income are large compared to tax on dividend income, Miller (1977) proposes an equilibrium that explains why companies appear to be underleveraged and do not fully exploit the tax benefit of debt as discussed in detail above. Graham (1996) finds that firms for which the net advantage is the largest use the most debt and identifies a negative relation between debt and personal tax. Campello (2001) finds that firms that do not pay dividend (firms are assumed to have investors with high tax rates) and increased debt ratios in response to personal tax reduction relative to corporate tax rates. Firms paying high levels of dividends (which are assumed to have investors with low or zero tax rates) are found to reduce debt usage relative to other firms in such situations.

A firm that has non-debt tax shields (NDTS) would rely less on debt as a tax shield which adds value to the firm. Thus, NDTS would act as a substitute for interest deductions implying a negative relationship to debt use. Bradley et al (1984) regressed firm specific debt-to-
value ratios on NDTS and surprisingly find that debt is positively related to NDTS. NDTS however only affect debt decisions to the extent that they affect the marginal tax rate of a firm. If the firm is modestly profitable then the NDTS will have a sufficient impact to affect the marginal tax rate and thus have an impact on the debt policy. Further insight is provided by MacKie-Mason (1990), who finds that tax-exhausted firms substitute away from debt when non-debt tax shields are high by interacting NDTS with a variable that identifies firms which are nearing a point where the trade-off between interest and NDTS are important. Bhaduri (2002) also argues that NDTS are substitutes for tax savings from debt. Thus the author iterates that firms with large amounts of NDTS tend to be less leveraged. Pittman (2002) further segregates firm age and shows that younger firms tend to rely on investment tax shields rather than debt tax shields.

Some contention in the literature is provided by Frama and French (1998). The authors do not find any statistical evidence to support the notion that debt has a net tax advantage a discussed above. Kremp, Stoss and Gerdesmeier (1999) provide further contention as the authors find that leverage has a negative correlation with the effective tax rate. A plausible explanation for this is the model is capturing effect of reverse causality where firms with low levels of leverage pay higher effective tax rates. In order to control for such effects of causality, Antoniou, Guney and Paudyal (2008) utilize a dynamic model of leverage (two-step system Generalized Movement of Moment (GMM)) in their model. However the authors still find a negative correlation and contend that it remains puzzling why firms do not increase leverage levels to minimize taxes. One plausible reason is proposed by Graham and Tucker (2006) where firms do not find incremental tax savings from interest deductions attractive enough due to other tax shelter tax activities. The authors show that annual tax savings from other legal fillings not captured in financial statements to be quite large, thus reducing the marginal benefit of issuing more debt. Shivdasani and Stefanescu (2010) further the argument by showing that pension contributions which are also tax deductible and are about a third of the total interest deductions. Their findings cast further doubt on the argument. These studies suggest that future studies should include activities which are not captured in the balance sheet in order to avoid a misspecification of the benefit of tax deductibility of interest payments. However, after taking these issues into account, the possible tax benefit from increasing leverage remains large. Thus, although the empirical studies discussed above may shed some light on the issue, but overall the
puzzle remains.

6. Conclusion

Our paper reviews the relevant of capital structure and the impact of taxes on firm value. We provide a summary of the theoretical development in the area and provide a short discourse on the empirical literature which tests the framework. We discuss the framework in a perfect capital market as proposed by Modigliani and Miller (1958). This provides the building blocks in understanding the capital structure dividends which in theory is irrelevant to firm value. After relaxing the assumption of a world without corporate taxes, Modigliani and Miller (1963) propose that almost 100% of capital structure should be composed of debt. Given that this is not evidenced at firm level, Miller (1977) attempts to fill the gap in the literature by proposing an equilibrium which takes into account personal taxes. This equilibrium to a certain extent proposes that capital structure can be composed of any debt to equity ratio. Furthermore, our paper looks at the empirical literature that generally finds support for the tax savings of debt. However the literature also finds that NDTS can act as an alternative to debt issues. We also find that several papers which content the notion of tax savings from interest tax deductibility. Thus, it remains puzzling whether leverage has a net tax advantage and if it does, why managers are reluctant to maximise this tax shield. Our paper highlights this gap in the literature which we delegate to future researchers in providing more insights to resolving this puzzle.

References


