Interrelationship between taxes, capital structure decisions and value of the firm: A panel data study on Indian manufacturing firms

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Abstract:

Since the development of efficient proxies for taxes, many researchers have proved the existence of impact of tax on financing decisions. The ultimate aim of each business decision is to enhance the value of the firm; hence it is important to study the tax implications of financing decisions on the firm's value. In this study an attempt is made to study the interrelationship between taxes, financing decisions and value of the firm. A panel data of 188 Indian manufacturing firms over a period from 1990 to 2013 is employed to assess the relationship. Unlike the results of Fama and French (1998), the analyses undertaken in this study is able to capture the tax effects of debt. It shows clearly that companies consider partial consequences of employing debt and justify the higher use of debt. This study brings forth the empirical evidence that the personal tax implications flowing through financing decisions contribute towards forming perceptions of the investors and thus may affect the firm value in the opposite direction.

Keywords: debt, equity, dividends, firm value, corporate tax, personal tax, panel data, fixed effects model

JEL Codes: C 23, G32, G38

1. Introduction:

Tax consequence of different sources of finance forms one of the important considerations in firm's financing decisions. Since interest paid on debt is tax deductible at the corporate level,

hence debt appears to be a relatively cheaper source of finance. A company that has debt in the capital structure is expected to have a higher value (Modigliani 1963). But in 1977, Miller contradicted that firms pass out the debt - tax benefits to creditors through high interest rates to pay off for the personal tax disadvantage of debt. Therefore, different combinations of personal tax on interest, dividend and capital gain may affect the pricing of firm's stock in various ways. Over the decades a lot of researchers from developed countries have rigorously studied the corporate tax advantage of debt but the role of personal taxes is highly underestimated. Similarly, there is an extensive theoretical literature on optimal capital structure. However, there is lack of conclusive empirical evidence on a relation between tax implications of various sources of finance and firm value.

In India, like other emerging economies, this area is highly under-researched. There is not much empirical evidence revealing whether companies have any value maximising target capital structure or not. This is still an open question that whether it is only the corporate tax effect of debt or net effect of corporate and personal taxes that drives the value of the firms in India. Through this paper, an attempt is made to fill this gap by studying the interrelationship between taxes, capital structure decisions and value of the firm.

The income tax in India is levied on the taxable income of all the entities in accordance with the provisions of Income Tax Act, 1961. Interest on debt is deductible from the profits of business and is eligible for tax deduction. At the personal level, returns from debt accrue in the form of interest and that from equity in the form of dividend and capital gains. Progressive tax rate structure is applicable on the income of an individual investor and a flat rate of tax is applicable on the income of corporate investor. The Indian tax policies have undergone multiple changes over a period of time. During the period from 1989 to 1992, all the three forms of return were taxable in the hands of the individual investor at the rate applicable to him/her according to his/her tax bracket and in the hands of corporate investor at the applicable flat rate. Hence at the personal level, there was no advantage of investing in debt over equity or vice versa. Over a period of time, certain tax provisions were introduced which created differences in the tax treatment of the different forms of return in the hands of the investor. These changes led to variation in investor's net marginal benefit from investment in debt and equity in different time periods. This might have had an impact on investor's preference between debt and equity.

Through this paper, it is proposed to study the interrelationship between taxes, financing decisions and value of the firm by adopting the models proposed by Fama and French (1998) by using panel data regression analysis. The models are selected after an in-depth review of existing literature, which is discussed in detail in the next section. The authors in their research carried out cross sectional regression analysis. They find a negative relation between interest (proxy for debt) and the firm value, on which the authors express that "imperfect controls for profitability probably drive the negative relations between debt and value and prevent the regressions from saying anything about the tax benefits of debt". Kemsley and Nissim (2002) point out that one of the important reasons behind confusing results is the presence of certain unobservable effects which might be correlated with interest. Through the current study an attempt is made to address this shortcoming by employing panel data regression analysis with firm fixed effect. Accordingly, the data is analyzed for 188 Indian manufacturing companies for a period from 1990-2013. The results are evaluated along the lines of assumptions and hypothesis, framed according to the Indian tax rules and policies and changes therein.

Section 2 undertakes an in-depth review of literature, section 3 discusses the Indian tax system in detail. Section 4 describes the model and the sample followed by the discussion on research methodology in section 5. Section 6 states assumption and hypothesis. In section 7 empirical findings are discussed followed by conclusion in section 8.

2. Review of literature:

This section is further divided into three parts. The first part reviews those researches which discuss the impact of corporate taxes on value; the second part discusses the literature on personal taxes and value of the firm; and the third part discusses the literature on the interrelationship between taxes, capital structure decisions, and value of the firm.

2.1. Corporate taxes and firm value

Masulis (1980) analyses the exchange offers made by firms through the 1960s and 1970s. In exchange offers the practice was to retire one security for another and, thus, the author argues that in those offers there was mainly a change in the capital structure, while investment was not affected. The basic assumption in this study was that the firms' capital structure was far

from being optimum. Thus, he found a direct relationship between change in leverage and value of the firm. If the exchange increased the leverage for a firm, the value increased and vice versa.

Myers (1984) comment on the assumptions made by Masulis (1980) for being unrealistic. The increase in leverage should not always increase the value of the firm, especially when the increase in leverage leads to moving away from the optimal capital structure. Graham, Hughson and Zender (1999) also support Myers' view.

Andrade and Kaplan (1998) found out that the cost of default was around 20% of the value of the firm whenever it was calculated after the default. Other authors note that the historic occurrence of default was low and thus the cost of debt was underestimated and, hence, Graham's view of under-leveraged firms was not very appropriate.

Graham (2000) derives marginal benefit functions by simulating interest deductions and by integrating under those functions. The author tries to approximate the reduction in the amount of tax at different levels of interest deductions as marginal tax benefit is a declining function of interest deductions. Thus, the author relates the incremental change in the value of the firm with the incremental change in interest deduction. The author reports that the tax benefits of debt amount to around 9-10% of the value of the firm and, thus, suggests that the firms in US are generally under-levered and coined the term 'money left on the table' by these firms. It is further noted in the research that if personal taxes are also considered, then the benefits are squeezed by around one-third.

Lemon and Zender (2001) identified costs which are associated with trade off (such costs that are not directly associated with debt employment) and are large enough to set off the expected benefits associated with more debt employment and, thus, shows that the firms may in fact not be under-levered. A research work by Minton and Wruck (2001) also promotes the same idea.

Mc Donald (2001) shows the tendency of the firms of giving up interest deductions as they write put or purchase calls on their shares. This activity of firms is similar to borrowing, with the only difference in the nature of the cash flows which leads to the inability of the firms to avail the tax deduction benefit. The authors, thus, reflect that the firms can actually increase the value by employing debt instead.

Almieda and Phillipon (2007) reflect that the 'money left on the table' as proposed by Graham (2000) is roughly equal to the cost of distress. The author employs credit default spreads to calculate the risk neutral probabilities of default. The reason behind using credit default spreads is that in good times it is difficult to estimate such costs as distress is a feature of bad times when marginal utility of money is high. These risk neutral probabilities are then utilized to calculate the expected cost of distress and, thus, the author suggest that benefits of debt are overestimated.

Graham and Tucker (2006) examined 44 tax shelter filings and found that there is a huge difference in the taxable income reported in the income tax filings and that in the financial statements. The income reported to tax authorities was much lower as compared to the income reported to other stakeholders due to certain other deductions which were equal to around 9% of the asset value. This may contribute towards the researches reporting firms being underleveraged and giving a false impression that value can be increased.

2.2. Personal taxes and firm value

Graham (2013) undertakes a detailed discussion about the assumptions that are hidden in researches testing the effect of personal taxes on capital structure decisions of firms. In these researches it is assumed that there is a marginal investor of each firm, depending upon its dividend payout ratio. Further, he states that this marginal investor owns both debt and equity and, thus, is the price setter for both types of securities. The assumptions are quiet unrealistic. But these assumptions become necessary in the light of the fact that the precise information regarding composition and tax status of investors is not available. Despite the obstacles, researchers have tried to identify the impact of personal taxes (investor's preference based on their net benefit) on firm value.

The impact of personal taxes has been tested mainly in the case of bonds. Poterba (1989) finds that the difference between the yield of taxable and non taxable bonds is equal to the highest statutory tax rate. Thus, according to him, the assumptions made by the investors are appropriate. But later, Green (1993) points out that there is also a possibility of receiving some return on taxable bonds in the form of capital gains and hence such bonds may not be fully taxable.

To quote some more examples in favour of the assumptions made are research by Auerbach (1985). The author finds proof that investors match their tax status with the dividend price

ratios of firms and thus form clienteles. Similarly, Seida and Wempe (2000) analyses the response of the investors to the 1986 tax reforms in the US. The investors realized their gains as they predicted a rise in the capital gain tax rate in such reforms. Another research on the same lines is that of Lang and Shackelord (2000). The author finds and reports that when information regarding lowering of capital gain tax was released, a boost occurred in the stock prices for firms which had the lowest dividend yield.

2.3. Researches testing the impact of corporate taxes, personal taxes and firm value

Masulis (1983) analysed the effect of changes in leverage and debt levels caused by exchange offers and recapitalization on firm value and stock returns. The author analysed 133 successfully completed exchange offers that occurred in the US during the period 1963 to 1978. The total sample includes 14 recapitalizations and 119 issuer exchange offers. These actions do not entail changes in the cash flows and, thus, would be able to capture the exclusive relationship between leverage and firm value. The author concludes that changes in leverage positively affected the change in the stock price and that the relationship between firm value and firm debt levels was found to be positive. The, evidence was in support of the optimal capital structure theory.

Fama and French (1998) set up a model wherein they tried to control for profitability by using the variables earnings, investment, and research and development so as to isolate the tax effects inherent in interest and dividend. They made various variations to the basic model to capture the effects. The authors assumed negative pricing effect in dividends and positive sign for interest (debt) but could not find the results as expected and their model could not prove the stated hypothesis. Also, for dividends they document that there is a possibility of dividends are capturing the effects of profitability left by other variables.

They found a negative relation between leverage and value, indicating that there are no net tax benefits of leverage and their results seem to support the Miller's hypothesis. They suggest two possible causes for the same; one is the Miller's tax effects and the other one is the agency problem that higher leverage and risky changes in leverage are not welcome by the investors, thus explaining the negative sign on the leverage variables.

Goldstein, Ju, and Leland (2001) endeavoured to find out that whether the debt issuance decision is a static or a dynamic choice. The authors investigate its implications for optimal leverage ratios and extent of tax benefits of debt. The authors employ only debt increasing

instances, ignoring debt reducing incidences and to support their argument say that due to the presence of transaction costs, the management is reluctant to decrease the debt cap. The authors propose a dynamic capital structure model where resulting optimal debt levels are found similar to those in reality and they find that dynamic models show that firms have larger tax benefits than what is predicted by static models; similarly they gave their argument in favour of upward restructuring.

Kemsley and Nissim (2002) tried to solve the issues present in the research work of Fama and French (1998). The authors regressed earnings before interest and tax (EBIT) on the value with debt and debt variable, but the problem with this research work is that it may capture the effect of debt on earnings rather than the effect of earnings on debt.

Chen and Gong (2012) tested the relationship between corporate taxes and market value and found a negative relationship between the two. The authors presented empirical evidence in the support of the non-linear relationship between corporate tax rates and market leverage and suggested that the trade off theory explains leverage decisions better. By using the estimates of MTR by Blouin, Core, and Guay (2010), the authors suggest that the taxes would be positively related to the value only to an extent and support the idea of a non-linear relationship between the two. The researchers also adjusted the MTR to account for personal tax disadvantage but there is no difference in the results achieved, leading to a conclusion that personal tax disadvantage is not large enough to affect the corporate tax disadvantage of debt.

The researchers have employed various methods to test the effects of capital structure on a firm's value, but the effects of personal and corporate taxes have been judged separately. There are very few cross sectional researches which have tested the effect of corporate and personal taxes taken together, which is the biggest challenge for the researchers to achieve. For the current study, the models proposed by Fama and French (1998) have been employed.

3. The Indian Tax Policies

The income tax in India is levied on the taxable income of all the entities in accordance with the Income Tax Act, 1961. The Income Tax Department is governed by Central Board of Direct Taxes (CBDT). CBDT is a part of the Department of Revenue under the Ministry of Finance, Government of India.

The Income tax act of 1961 covers a wide range of taxes and has undergone multiple changes in the last 50 years. Listed below are the relevant tax provisions.

i. Corporate income tax rate

ii. Tax on interest income

iii. Tax on dividend income

iv. Tax on long term capital gain

In India, interest paid on debt is deductible from the profits of business and is eligible for tax deduction. Hence at the corporate level, the tax advantage of debt is equal to the corporate income tax rate provided that the company earns enough to justify all the interest deductions. In India, corporate income tax rate is not progressive in nature and a flat rate is applicable to all business entities. The corporate income tax rate has undergone various reductions; it has been reduced from 50% in 1989-90 to 30% in 2010-11.

At the personal level, progressive tax rate structure is applicable to an individual investor and a flat rate is applicable to a corporate investor. Returns from debt accrue in the form of interest and that from equity in the form of dividend and capital gains. During the period from 1989 to 1992, all the three forms of return were taxable in the hands of the individual investor at the rate applicable to him/her according to his/her tax bracket and in the hands of corporate investor at the applicable flat rate. Thus, at the personal level, there was no advantage of investing in debt over equity or vice versa. Over a period of time, certain tax provisions were introduced which created differences in the tax treatment of the different forms of return in the hands of the investor.

In India, interest (return on debt) is tax deductible at the corporate level but is taxable in the hands of the investor according to his tax bracket. Since 1989, a lot of changes have occurred in the personal tax rates also, during the period 1989-1992, there were four slabs with the tax rate applicable to the highest slab being 50%. In the current scenario there are three slabs with the highest tax rate being 30%.

Dividend income was taxable in the hands of the investor till the year 1997. After that a Dividend Distribution Tax (DDT) was introduced, according to which a company distributing

dividends had to pay tax to the government. The amount of tax to be paid is a fixed percentage of dividends being distributed to the investors. Thus, despite the fact that at the personal level an investor may be completely tax exempt, his dividend income was reduced by the amount of tax paid by the company. The DDT was withdrawn for the year 2002-2003, but was reintroduced from the year 2003-2004 and is applicable till date. The rate of DDT has been revised from time to time.

The tax on long term capital gains (LTCG) accrues in the hands of the investor when he/she holds the security for more than a year. In the previous year 1992-1993, LTCG tax was introduced, according to which irrespective of the tax rate applicable to the individual, a flat charge of 20% was applicable on the long term capital gains earned by an assessee. The rule continued and remained same till the year 2003-2004. In the year 2004-2005, a Securities Transaction Tax (STT) was introduced according to which a minor tax rate of 0.125% was chargeable on the total amount of the transaction each time a security was bought or sold. In accordance with the relevant section, the assessee who pays the STT is exempt from the long term capital gain tax.

These changes form the basis for applicability of a particular assumption or hypothesis during a time period. In the next section the model and the sample are discussed.

4. The model and the sample

To study the interrelationship between taxes, financing decisions and value of the firm, the models proposed by Fama and French (1998) are employed. The model was constructed by the authors assuming that the market value of the firm is equal to an all equity no dividend firm plus the tax effects associated with interest and dividend payments. The authors presume that if the earning and investment variables account for all the information about the expected net cash flows in financing decisions, the coefficient on financing variables would reveal the tax effects.

In line with the propositions of Fama and French (1998), in this analysis it is expected that after controlling for investor sentiments related to the earnings and future growth prospects, the coefficients on the dividend and interest variables would only capture the personal choice

of the investor. It is presumed that the personal choice of the investor would depend upon the difference in the net after tax return from two sources of finance.

In line with the above mentioned work, two indicators for dependent variables (value of the firm) are employed in the regression analysis. One of the measures is spread of the value over cost, where value is the market cap and cost is the total assets (book value); another variable is a two year change in spread. The explanatory variables include past, current and future values of earning, investment (assets), research and development expenditure, dividend and interest. All the variables used in the study are scaled down by total assets.

4.1. The Model

Fama and French (1998) employ eight models with minor differences to test the relationship between taxes and value of the firm. In this study the following four models are adopted to undertake the proposed analyses.

$$MKRET_{it} = \alpha + \beta_1 PAT_{it} + \beta_2 BCHPAT_{it} + \beta_3 FCHPAT_{it} + \beta_4 BCHTA_{it} + \beta_5 FCHTA_{it} + \beta_6 RD_{it} + \beta_7 BCHRD_{it} + \beta_8 FCHRD_{it} + \beta_9 INT_{it} + \beta_{10} BCHINT_{it} + \beta_{11} FCHINT_{it} + \beta_{12} DIV_{it} + \beta_{13} BCHDIV_{it} + \beta_{14} FCHDIV_{it} + \beta_{15} FCHMCAP_{it} + (\sum \lambda_j D_j) + \varepsilon_{it} \quad (1)$$

$$MKRET_{it} = \alpha + \beta_1 PBT_{it} + \beta_2 BCHPBT_{it} + \beta_3 FCHPBT_{it} + \beta_4 BCHTA_{it} + \beta_5 FCHTA_{it} + \beta_6 RD_{it} + \beta_7 BCHRD_{it} + \beta_8 FCHRD_{it} + \beta_9 INT_{it} + \beta_{10} BCHINT_{it} + \beta_{11} FCHINT_{it} + \beta_{12} DIV_{it} + \beta_{13} BCHDIV_{it} + \beta_{14} FCHDIV_{it} + \beta_{15} FCHMCAP_{it} + (\sum \lambda_j D_j) + \varepsilon_{it} \quad (2)$$

$$BCHMKRET_{it} = \alpha + \beta_1 BCHPAT_{it} + \beta_2 FCHPAT_{it} + \beta_3 BCHTA_{it} + \beta_4 FCHTA_{it} + \beta_5 BCHRD_{it} + \beta_6 FCHRD_{it} + \beta_7 BCHINT_{it} + \beta_8 FCHINT_{it} + \beta_9 BCHDIV_{it} + \beta_{10} FCHDIV_{it} + \beta_{11} FCHMCAP_{it} + (\sum \lambda_j D_j) + \varepsilon_{it} \quad (3)$$

$$BCHMKRET_{it} = \alpha + \beta_1 BCHPBT_{it} + \beta_2 FCHPBT_{it} + \beta_3 BCHTA_{it} + \beta_4 FCHTA_{it} + \beta_5 BCHRD_{it} + \beta_6 FCHRD_{it} + \beta_7 BCHINT_{it} + \beta_8 FCHINT_{it} + \beta_9 BCHDIV_{it} + \beta_{10} FCHDIV_{it} + \beta_{11} FCHMCAP_{it} + (\sum \lambda_j D_j) + \varepsilon_{it} \quad (4)$$

Where:

i = firm 1 to 188, and,

t = year 1992 to 2011.

j = firm 2 to 188

i. $MKRET_{it}$ = Market return for firm i in year t (current year)

ii. $BCHMKRET_{it}$ = Change in market return from year (t-2) to t for firm i

iii. PAT_{it} = Profit after tax but before interest for firm i in year t

iv. $BCHPAT_{it}$ = Change in profit after tax from year (t-2) to t for firm i

v. $FCHPAT_{it}$ = Expected change in profit after tax from year t to (t+2) for firm i

vi. PBT_{it} = Profit before tax for firm i in year t (current year)

vii. $BCHPBT_{it}$ = Change in profit before tax from year (t-2) to t for firm i

viii. $FCHPBT_{it}$ = Expected change in profit before tax from year t to (t+2) for firm i

ix. $BCHTA_{it}$ = Change in total assets from year (t-2) to t for firm i

x. $FCHTA_{it}$ = Expected change in total assets from year t to (t+2) for firm i

xi. RD_{it} = Research and development expenditure for firm i in year t

xii. $BCHRD_{it}$ = Change in research and development expenditure from year (t-2) to t for firm i

xiii. $FCHRD_{it}$ = Expected change in research and development expenditure from year t to (t+2) for firm i

xiv. INT_{it} = Interest expense for firm i in year t

xv. $BCHINT_{it}$ = Change in interest expense from year (t-2) to t for firm i

xvi. $FCHINT_{it}$ = Expected change in interest expense from year t to (t+2) for firm i

xvii. DIV_{it} = Dividend expense for firm i in year t

xviii. $BCHDIV_{it}$ = Change in dividend from year (t-2) to t for firm i

xix. $FCHDIV_{it}$ = Expected change in dividend from year t to (t+2) for firm i

xx. $FCHMCAP_{it}$ = Expected change in market capitalization from year t to (t+2) for firm i

xxi. D_i is a dummy variable for each firm to add cross sectional fixed effects

xxii. ε_{it} is a stochastic error term

The dummy variables have been added to include cross sectional fixed effects in the model. Since the model has intercept term α , the number of dummy variables in the model will be 1 less than the total number of firms. Therefore, subscript j= 2,3,.....number of firms

The first two models regress market return on past, current and future values of earnings, investment and financing variables, and the next two models regress two year change in market return on the past and future values of the above mentioned items. Models 1 and 3 control for after tax profits, whereas the other two models control for pre tax earnings (in all the models earnings imply earnings before interest). Formulas for all the variables are presented in Appendix.

4.2. The sample size and the time period

For the purpose of this analysis, data on 188 manufacturing firms is employed for a period from 1990 to 2013. The basis of choosing the sample for above analyses is the uninterrupted data availability on market value of firm. Since a longer time period was required, hence only those firms are considered for which the complete data was available beginning from 1990 till 2013. It is important to mention here that regression analysis is undertaken from the period 1992 to 2011 because the models include change variables also, hence additional two years past and future data sets were required. On the basis of introduction/amendment of important tax policies, the total sample period is divided into three sub periods that is from 1992-1997, 1998-2005 and 2006-2011.

5. Research Methodology

Using all the identified variables explained in Section 4.1 above, least square panel data regression analysis, with firm fixed effects (wherever applicable) is undertaken.

A test based on the techniques proposed by Im Pesaran and Shin and Levin Lin and Chu is employed to test whether the series are stationary or not. The choice for these tests is due to the fact that the panel under the current study is of the type where N > T and is based on the study by Choi (2001). All the variables are found to be stationary at level. To test for presence of multicollinearity amongst the variables, cross correlation matrix is used. No multicollinearity was found amongst the variables. White (1980) period method is employed to obtain heteroskadastic-consistent standard errors.

6. Assumptions and Hypotheses

In employing the model proposed by Fama and French (1998), the underlying assumptions are: That all the information contained in net cash flows is captured; the future and past values of the variables proxy for expected net cash flows are available; two year expected change in market cap proxy for other effects on market value are available; after controlling for other effects, the coefficients on interest and dividend variables will capture the tax effects on value of the firm.

6.1. Underlying Assumptions

To undertake this analysis certain assumptions are made which are listed below:

Assumption 1: The tax rate applicable to the debt or equity return, when chargeable in the hands of the investor, is the tax rate applicable to the highest income slab as per Indian Income Tax Act.

Assumption 2 (a): The shareholder is also the debenture holder,

The debenture holder is also presumed to be the equity shareholder and since an investor would compare his/her return after tax on investment either in debt and equity, therefore, the hypothesis would be based on investor's advantage in investing in debt or equity.

Alternatively

Assumption 2 (b): The shareholder and debenture holders are separate from each other.

Under this assumption the relationship of dividend and interest with value would be determined independently.

In this case the propositions of Brennan and Schwartz (1984) and Miller and Scholes (1978) are taken into consideration and thus it is expected that the coefficient on the dividend variable would depend upon the tax rate on dividend in comparison to the capital gain for the shareholder. If the tax on dividend is greater than the tax on capital gain, then dividend would bear a negative sign else dividend would bear a positive sign.

According to the Indian tax code, even after considering the tax rate applicable to the highest tax slab as the debenture holder's tax incidence, there is always a positive tax advantage associated with the issuance of debt as the corporate tax rate is always greater or equal to the tax rate applicable to the highest income slab of the individual. In case the tax rate on corporate income is greater than the assumed personal tax liability, the variable might turn out to be insignificant but, under this assumption, the coefficient would never bear a negative sign.

6.2. Hypotheses[1]

The following hypothesis would be tested to understand the tax implications of financing decisions on the value of the firm:

6.2.1. Hypothesis based on assumptions employed

Assumption 1, in the Indian context, implies that net after tax return on equity is greater than the net after tax return on debt since 1993, when long term capital gain was introduced. Thus, the hypotheses that follow from assumption 1 and 2(a) are as follows:

$H_{0,1}$: There is a positive relationship between dividend and the value of the firm.

$H_{0,2}$: There is a negative relationship between interest and the value of the firm.

Under assumptions 1 and 2(b) the following hypothesis would follow:

$H_{0,3a}$: There is a negative relationship between dividend and the value of the firm.

$H_{0,3b}$: There is a positive relationship between dividend and the value of the firm.

During the times when tax on dividend is greater than tax on capital gain, hypothesis 3a would follow and in the opposite circumstance, hypothesis 3b would follow.

[1] The hypotheses are based on the sign of the coefficient of the independent variable in the regression model.

Hypothesis related to interest is as follows:

$H_{0,4}$: There is a positive relationship between interest and the value of the firm.

6.2.2. Hypothesis based upon different variables employed to control for the impact of earnings on firm value

Fama and French (1998) had controlled both for profit after taxes and profit before taxes as this does make a difference and in their study have compared the relationship between leverage and firm value under both the Modigliani (1963) and Miller (1977) assumptions. The implications that follow from their work are summarized in the table 1 below:

Table 1: Comparison of implications that flow from the assumptions made by Modigliani and Miller (1963) and Miller (1977) about the effect of taxes on firm value under two different cases; the difference lies in the measure (PAT or PBT) used to control for earnings.

Variable used for controlling the effects of earnings on firm value	**Profit before tax (same for levered and unlevered firm)**	**Profit after tax (same for levered and unlevered firm)**
According to the theory proposed by Millers (1977)	No relation between debt and value	Levered firms have lower value (higher the interest paid lower would be the value of the firm)
According to the theory proposed by Modigliani (1963)	Levered firms have higher value because of the corporate tax advantage.	No relation between debt and value

As it is mentioned by De Mooij (2011) that it is important to include the impact of personal taxes, therefore, for the present study the tax implications of leverage would be tested only according to the theory proposed by Miller (1977) under the two different cases. According to Miller's proposition, firms that employ higher debt have lower value. Hence, the following null hypotheses follow under two different scenarios:

Case I: When the effect of earnings on firm value is controlled through PAT.

$H_{0,5}$: There is a negative relationship between interest and the firm value.

$H_{0,6}$: There is a positive relationship between dividend and the firm value.

Case II: When the effect of earnings on firm value is controlled through PBT.

$H_{0,7}$: There is a no relationship between interest and the firm value.

$H_{0,8}$: There is a no relationship between dividend and the firm value.

6.2.3. Hypothesis based upon difference in the dependent variable

The change in market return to proxy for the firm value in place of market return is expected to capture the unexpected effects of information not known two years before. In this study also, an attempt is made to account for these effects and, thus, the following hypothesis:

$H_{0,9}$: There is difference in the results when change in market return is regressed in place of market return.

6.2.4. Hypothesis for the sub periods

The total period for analysis from 1992-2011 has been divided into the following three sub periods on the basis of timing of tax law changes. These changes have been described in section 3 above.

- 1992-1997
- 1998-2005
- 2006-2011

Table 2 shows the hypotheses for aggregate and sub periods in the summary form under assumptions 2(a) and 2(b) described above.

Table 2: Hypothesised relationship between tax effects expected to be captured through interest and dividend variables and value of the firm.

Year	Relationship between tax effects of interest and firm value	Relationship between tax effects of dividend and firm value
Assumption 2(a)		
1992-2011	Negative	Positive
1992-1997	Negative	Positive
1998-2005	Negative	Positive
2006-2011	Negative	Positive
Assumption 2(b)		
1992-2011	Positive	Positive
1992-1997	Positive	Investor is Indifferent so insignificant or negative
1998-2005	Positive	Positive
2006-2011	Positive	Positive

Under the two assumptions described above, the difference in the tax impacts of interest is very clearly shown in Table 2. When the shareholder is also the debenture holder, his after tax return from equity is higher in comparison to debt. Hence, under this assumption, interest is expected to have a negative sign and under another assumption, as personal taxes do not completely wipe out the corporate tax advantage of debt, higher debt is expected to add to the wealth of the shareholders and, therefore, interest variable is expected to have a positive impact on the value of the firm.

Under both the assumptions, dividend is expected to have a positive sign. Under the first assumption [2(a)], return on equity in comparison to debt would be higher and under the second assumption, as tax on dividend was always lower than the tax on capital gain (except during the period 1992-1997), it is expected that there is a positive relationship between dividend and value of the firm. During the period 1992-1997, based on assumption 1, it was

hypothesized that either there will be no effect of dividend on firm value or it would have a positive sign.

In the next section, empirical findings are discussed.

7. Empirical findings

Tables 3 to 6 present the regression results and are placed in appendix at the end of the chapter. The discussion on the results is divided into four sections:

i. Results of aggregate analysis over the total sample period;

ii. Comparative analyses of regressions controlling for profit after tax and profit before tax;

iii. Comparative analyses of difference in regressions results on the basis of difference in dependent variable;

iv. Results of analysis over the sub periods.

7.1. Results of aggregate analysis over the total sample period

7.1.1. Results for tax effects captured through interest variables

- **Current year interest variable (INT):**

Coefficients on current year interest variable, whenever significant, are positive. This result is in line with the alternate assumption [2(b)]. Positive coefficient on the current year interest variable also shows the presence of net tax advantage of debt which has an effect of increasing the value of the firm, as due to the presence of debt the managers are able to generate higher earnings per share for the shareholders.

Another view and justification for the presence of positive coefficients is inferred from the interpretation of results arrived at by Fama and French (1998). Accordingly, the positive coefficient on the current year interest variable is understood to capture the effects of earnings which may have been left by other variables.

- **Change in interest from past two years (BCHINT)**

It is observed that whenever significant, the results are in line with the primary assumption [2(a)], accordingly the coefficient on this variable is negative. This suggests that an increase in interest is perceived negatively by the investors. This may happen due to two reasons. One reason originates from the primary assumption made in this study. In line with this assumption, as the investor is able to fetch a higher net after tax return on equity, he would prefer equity over debt.

Also, increase in debt increases the probability of financial distress in low times. Thus the results show the importance of marginal tax advantage of debt. The results clearly bring out the importance of precise calculation of tax advantage associated with debt and therefore, the negative perception of the investor with the inappropriate increase in debt.

- **Expected change in interest over the next two years (FCHINT)**

Forward change in interest is not found to be significant in any of the regressions, this shows that expected increase or decrease in leverage does not affect the current market price of the firm.

On the basis of the above discussion, we may say that current year interest variable captures the advantages generated at the corporate level and change variable captures the sentiments of the investors. Future possibilities of increase in debt do not affect the market value of the firm.

7.1.2. Results of tax effects captured through dividend variable

- **Current year dividend variable (DIV)**

Under both the assumptions, the tax law in relation to dividend is such that it is expected to positively affect the market value of Indian companies. As hypothesized, current year dividend variable contains a positive coefficient whenever it is found to be significant.

- **Change in dividend from past two years (BCHDIV)**

Change in dividend from the past value also bears the positive sign, whenever it is found significant.

- **Expected change in interest over the next two years (FCHDIV):**

Expected change in dividend is not found significant in any of the regressions except one and bears the positive coefficient.

Hence, dividend variable is always in line with the hypothesis made.

7.2. Comparative analyses of regression models controlling for variables profit after tax and profit before tax

According to Miller's proposition, if the effects of earnings on firm value are controlled through profit before tax, then there should not be any relation between financing variables and firm value. But if the effects are controlled through profit after tax then the levered firms are expected to have lower value.

Our results do not differentiate between control for PAT or PBT. Except the minor difference in the value of the coefficients there is no other difference between the two types of regressions.

7.3. Comparative analyses of difference in regressions results on the basis of difference in dependent variable

Market return is regressed on all current, past and future variables, and change in market return variable is regressed on only past and future variables. The results suggest that current and past interest variables and current and expected dividend variables significantly affect the market return. Only past dividend variables significantly affect the change in market return. Interest does not affect the change in market return in any of the regressions.

7.4. Results of analysis over the sub periods

Current interest variable and backward change in interest variable are found significant in only those equations that regress market return; interest variables were not found significant in equations regressing change in market return. Amongst all the sub periods, the variable was not found significant during the period 1998-2005. The reason behind such a result is due

to the fact that during this period the aggregate debt was near constant, therefore, interest or changes in interest may not have affected the value of the firm during this period. Future interest variable is not found significant in any regression analyses.

In the equations regressing market return, current dividend variable is found significant only during the period 2006-2011. Past dividend variable is not found significant in any of the regressions and future dividend variable is not found significant in any of the sub period regressions. In the equations regressing change in market return, past dividend variable is not found significant only during the period 1992-1997 and future dividend variable is not found significant in any of the regression analyses.

8. Conclusion

Unlike the findings of Fama and French (1998), the results suggest that interest and dividend variables are able to capture the impact of tax effects on the value of the firm. The result in tables 3 and 4 column A, B and D reflects that employment of more debt is perceived negatively by the investors and affects the value of the firm negatively. The results indicate that firms may justify the higher use of debt by focussing on the statutory corporate tax rate or marginal tax advantage of debt, but reduced benefit due to change in tax policies affecting the net return of the investor affects the investor sentiments negatively which is reflected through the value of the firm. No difference is found between regressions controlling for PAT or PBT. There is a difference in results when the change in market return is regressed in place of market return on the relevant variables, i.e., the results suggest that current year market return does capture the impact of tax effect but change in market return does not capture the tax effects. Hence, researchers are advised to employ the current year market return or firm value to test the impact of tax effects associated with financing variables on the value of the firm. This study highlights the role of personal taxes in determining the value of the firm and the financing decisions. The results support the view that researchers and managers must take into account net tax effects of financing decisions. The results arrived at by this research is a major contribution to the existing knowledge as no cross sectional or panel study could clearly test and prove the tax effects of financing decisions on the value of the firm. This study also provides the empirical evidence and highlights the importance of personal taxes in determination of the capital structure and value of the firm.

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Appendix

A. Tables for regression results

Table 3: Regression results of Model 1

Years	1992-2011	1992-1997	1998-2005	2006-2011
Effects Specification	**Cross-section fixed (dummy variables)**	**Cross-section fixed (dummy variables)**	**Cross-section fixed (dummy variables)**	**Cross-section fixed (dummy variables)**
Dependent variable	$MKRET_{it}$			
C	-0.21896** (0.099072)	-0.73969* (0.285315)	-0.01334 (0.094581)	0.057353 (0.142547)
PAT_{it}	0.586912 (0.60748)	5.031791** (2.086115)	0.476047 (0.66928)	0.82066 (0.69509)
$BCHPAT_{it}$	0.961345* (0.240307)	-0.3035 (0.80242)	0.442295 (0.308853)	0.067305 (0.22)
$FCHPAT_{it}$	0.792789 (0.416027)	1.760429** (0.846955)	0.599793 (0.536619)	0.622938 (0.320707)
$BCHTA_{it}$	0.244294** (0.120453)	0.495012** (0.212179)	0.157905 (0.103682)	0.025917 (0.071933)
$FCHTA_{it}$	0.620637* (0.121213)	0.317859 (0.207499)	0.881036* (0.271817)	0.544093* (0.07532)
RDit	-13.6297 (10.794)	-63.2683* (22.04768)	14.02788 (11.33433)	-28.2587 (21.31798)
$BCHRD_{it}$	12.57765* (4.387624)	41.60032* (11.67642)	-1.62976 (4.958048)	18.46545 (11.92137)
$FCHRD_{it}$	-3.72062 (4.839047)	-21.12 (11.73527)	-2.36655 (4.083225)	-2.05377 (9.075948)
INT_{it}	6.018094* (1.321796)	8.532627* (3.028287)	-0.77317 (1.660146)	5.253619** (2.312749)
$BCHINT_{it}$	-2.5307* (0.823658)	-4.16454** (1.864118)	-0.24126 (0.702354)	-2.66394** (1.074499)
$FCHINT_{it}$	0.755724 (0.722454)	1.373441 (1.381699)	-0.94262 (1.042672)	-0.2702 (0.976111)
DIV_{it}	9.982* (3.682441)	23.0236 (12.94998)	1.119028 (3.19835)	10.48369** (5.070414)
$BCHDIV_{it}$	-0.43035 (3.779088)	-5.15973 (11.43632)	1.536973 (3.23925)	-0.00577 (3.054529)
$FCHDIV_{it}$	2.243003** (0.985097)	9.075678 (6.710133)	-0.37843 (0.926656)	0.646755 (1.993016)
$FCHMCAP_{it}$	-0.23117* (0.072537)	-0.22231* (0.077241)	-0.31776* (0.053339)	-0.41209* (0.048743)
R-squared	0.666554	0.77497	0.813149	0.909306
Adjusted R-squared	0.647618	0.725829	0.784138	0.889501
F-statistic	35.2*	15.77015*	28.02857*	45.91176*

Note: * Significant at 1% level, ** significant at 5 % level, standard errors are shown in parenthesis.

Table 4: Regression results of Model 2

Years	1992-2011	1992-1997	1998-2005	2006-2011
Effects Specification	**Cross-section fixed (dummy variables)**	**Cross-section fixed (dummy variables)**	**Cross-section fixed (dummy variables)**	**Cross-section fixed (dummy variables)**
Dependent variable	$MKRET_{it}$			
C	-0.217617** (0.09842)	-0.74024* (0.285144)	-0.01584 (0.095233)	0.068581 (0.141827)
PBT_{it}	0.620248 (0.612096)	5.108063** (2.095288)	0.664361 (0.680532)	0.673164 (0.6649)
$BCHPBT_{it}$	1.035035* (0.23292)	-0.31586 (0.803136)	0.48736 (0.318859)	0.146897 (0.209593)
$FCHPBT_{it}$	0.849308** (0.431283)	1.791159** (0.849244)	0.69428 (0.545142)	0.567383 (0.325207)
$BCHTA_{it}$	0.237575** (0.117987)	0.491262** (0.211213)	0.144527 (0.104263)	0.022248 (0.071056)
$FCHTA_{it}$	0.617027* (0.120447)	0.315251 (0.208105)	0.875308* (0.268971)	0.550242* (0.076095)
RDit	-13.20352 (10.81427)	-63.2281* (22.0327)	14.07051 (11.24299)	-28.2134 (21.24724)
$BCHRD_{it}$	12.32857* (4.399278)	41.58811* (11.68045)	-1.64234 (4.910218)	18.48327 (11.89683)
$FCHRD_{it}$	-3.756327 (4.81986)	-21.1348 (11.73248)	-2.46292 (4.067912)	-2.1691 (9.085208)
INT_{it}	5.959873* (1.327483)	8.459708* (3.037408)	-0.84818 (1.644047)	5.180969** (2.31099)
$BCHINT_{it}$	-2.456038* (0.82539)	-4.12449** (1.868261)	-0.17591 (0.697054)	-2.58943** (1.095386)
$FCHINT_{it}$	0.722225 (0.718828)	1.36151 (1.382002)	-0.97943 (1.037742)	-0.25303 (0.965749)
DIV_{it}	9.919198* (3.689468)	22.90618 (12.96877)	0.942897 (3.143702)	10.53015** (5.080483)
$BCHDIV_{it}$	-0.44433 (3.769429)	-5.13867 (11.43711)	1.482336 (3.211671)	-0.02844 (3.045169)
$FCHDIV_{it}$	2.207177** (0.985231)	9.031365 (6.685282)	-0.48242 (0.93572)	0.662174 (1.99953)
$FCHMCAP_{it}$	-0.231208* (0.072694)	-0.22257* (0.077151)	-0.31793* (0.05338)	-0.41167* (0.049015)
R-squared	0.667074	0.77515	0.813649	0.909186
Adjusted R- quared	0.648167	0.726047	0.784715	0.889354
F-statistic	35.28239*	15.78637*	28.12099*	45.84475*

Note: * Significant at 1% level, ** significant at 5 % level, standard errors are shown in parenthesis.

Table 5: Regression results of Model 3

Years	**1992-2011**	**1992-1997**	**1998-2005**	**2006-2011**
Effects Specification	**Cross-section fixed (dummy variables)**	**No Effects**	**Cross-section fixed (dummy variables)**	**Cross-section fixed (dummy variables)**
Dependent variable	$BCHMKRET_{it}$			
C	-0.00345 (0.038763)	-0.14119** (0.071868)	-0.03126 (0.044072)	0.109131** (0.050503)
BCHPATit	0.782688 (0.449697)	3.26203* (1.201557)	0.764484 (0.526107)	-0.021 (0.351646)
$FCHPAT_{it}$	0.058152 (0.349367)	0.447168 (0.749438)	0.752158 (0.484415)	-0.1871 (0.310258)
$BCHTA_{it}$	-0.16436 (0.134238)	0.13028 (0.21294)	-0.05097 (0.16753)	-0.31768 (0.201524)
$FCHTA_{it}$	0.463031* (0.137161)	0.072766 (0.206019)	0.653101** (0.287258)	0.712848* (0.094061)
$BCHRD_{it}$	8.905014 (5.937004)	18.79135** (9.35211)	14.16933 (10.98664)	2.034382 (8.668413)
$FCHRD_{it}$	-2.72572 (4.847847)	-2.26382 (8.473267)	-5.87761 (5.5464)	10.42972 (10.54779)
$BCHINT_{it}$	0.889305 (0.934112)	-1.02318 (2.065649)	0.075721 (0.873844)	1.976787 (1.939323)
$FCHINT_{it}$	0.073342 (0.645003)	0.19387 (1.468216)	0.38109 (1.037707)	0.641242 (1.12879)
$BCHDIV_{it}$	9.519518* (3.348316)	17.60231 (12.84773)	7.604146** (3.688786)	8.596367* (3.117356)
$FCHDIV_{it}$	2.67133 (2.138773)	11.86572 (8.721616)	0.667631 (1.89826)	-0.07143 (1.580018)
$FCHMCAP_{it}$	-0.13238 (0.074698)	-0.02049 (0.06631)	-0.20492* (0.055029)	-0.51011* (0.056203)
R-squared	0.197843	0.141423	0.2858	0.583363
Adjusted R-squared	0.153241	0.13296	0.177439	0.494564
F-statistic	4.435765*	16.71134*	2.63747*	6.569484*

Note: * Significant at 1% level, ** significant at 5 % level, standard errors are shown in parenthesis.

Table 6: Regression results of Model 4

Years	**1992-2011**	**1992-1997**	**1998-2005**	**2006-2011**
Effects Specification	Cross-section fixed (dummy variables)	No Effects	Cross-section fixed (dummy variables)	Cross-section fixed (dummy variables)
Dependent variable	$BCHMKRET_{it}$			
C	-0.00264 (0.038604)	-0.14084** (0.071699)	-0.02606 (0.043464)	0.110651** (0.050795)
BCHPBTit	0.852683 (0.47835)	3.277093* (1.199551)	0.985797 (0.557626)	0.009794 (0.37457)
$FCHPBT_{it}$	0.012319 (0.370393)	0.435167 (0.751856)	0.837433 (0.49302)	-0.24366 (0.325022)
$BCHTA_{it}$	-0.1722 (0.133035)	0.127824 (0.211568)	-0.07489 (0.163636)	-0.32113 (0.198299)
$FCHTA_{it}$	0.465048* (0.136628)	0.073387 (0.205003)	0.647101** (0.286098)	0.712868* (0.093816)
$BCHRD_{it}$	8.888448 (5.912099)	18.80905** (9.349188)	14.50882 (10.99446)	2.010592 (8.585619)
$FCHRD_{it}$	-2.80949 (4.841442)	-2.26528 (8.469943)	-5.91079 (5.51227)	10.22306 (10.54256)
$BCHINT_{it}$	0.936253 (0.913185)	-1.02457 (2.065736)	0.25005 (0.869352)	1.940326 (1.852959)
$FCHINT_{it}$	0.06091 (0.648376)	0.199146 (1.472778)	0.433482 (1.035001)	0.610905 (1.125203)
$BCHDIV_{it}$	9.494126* (3.335609)	17.59973 (12.84342)	7.388997** (3.662695)	8.555803* (3.104338)
$FCHDIV_{it}$	2.687087 (2.144943)	11.86507 (8.725374)	0.564554 (1.899901)	-0.06138 (1.574995)
$FCHMCAP_{it}$	-0.13167 (0.074629)	-0.02038 (0.066385)	-0.2059* (0.05498)	-0.50891* (0.05629)
R-squared	0.198515	0.141619	0.287762	0.5836
Adjusted R-squared	0.153951	0.133159	0.179699	0.494851
F-statistic	4.454568*	16.73841*	2.662896*	6.575887*

Note: * Significant at 1% level, ** significant at 5 % level, standard errors are shown in parenthesis.

B. Formulas

1. Current year market return (MKRET):

$$MKRET = (Market\ Value_t - Total\ assets_t)/Total\ Assets_t$$

2. Change in market return from past two years (BCHMKRET):

$$BCHMKRET = [(Market\ Value - Total\ assets)_t - (Market\ Value - Total\ assets)_{t-2}]/Total\ Assets_t$$

3. Profit after tax but before interest (PAT):

$$PAT = Profit\ after\ tax_t/Total\ Assets_t$$

4. Change in profit after tax from the past two years (BCHPAT):

$$BCHPAT = (Profit\ after\ tax_t - Profit\ after\ tax_{t-2})/Total\ Assets_t$$

5. Expected two year change in profit after tax (FCHPAT):

$$FCHPAT = (Profit\ after\ tax_{t+2} - Profit\ after\ tax_t)/Total\ Assets_t$$

6. Profit before tax (PBT):

$$PBT = Profit\ before\ tax_t/Total\ Assets_t$$

7. Change in profit before tax from the past two years (BCHPBT):

$$BCHPBT = (Profit\ before\ tax_t - Profit\ before\ tax_{t-2})/Total\ Assets_t$$

8. Expected two year change in profit before tax (FCHPBT):

$$FCHPBT = (Profit\ before\ tax_{t+2} - Profit\ before\ tax_t)/Total\ Assets_t$$

9. Change in total assets from the past two years (BCHTA):

$$BCHTA = (Total\ assets_t - Total\ assets_{t-2})/Total\ Assets_t$$

10. Expected two year change in total assets (FCHTA):

$$FCHTA = (Total\ assets_{t+2} - Total\ assets_t)/Total\ Assets_t$$

11. Current year expenditure on research and development (RD):

$$RD = Research\ and\ development\ expenditure_t/Total\ Assets_t$$

12. Change in research and development expenditure from the past two years (BCHRD):

$$BCHRD = (Research\ and\ development\ expenditure_t - Research\ and\ development\ expenditure_{t-2})/Total\ Assets_t =$$

13. Expected two year change in research and development expenditure (FCHRD):

$$FCHRD = (Research\ and\ development\ expenditure_{t+2} - Research\ and\ development\ expenditure_t)/Total\ Assets_t$$

14. Current interest expense (INT):

$$INT = Interest\ expense_t / Total\ Assets_t$$

15. Change in interest expense from the past two years (BCHINT):

$$BCHINT = (Interest\ expense_t - Interest\ expense_{t-2}) / Total\ Assets_t$$

16. Expected two year change in interest expense (FCHINT):

$$FCHINT = (Interest\ expense_{t+2} - Interest\ expense_t) / Total\ Assets_t$$

17. Current year dividend expense (DIV):

$$DIV = Dividend\ expense_t / Total\ Assets_t$$

18. Change in dividend from the past two years (BCHDIV):

$$BCHDIV = (Dividend\ expense_t - Dividend\ expense_{t-2}) / Total\ Assets_t$$

19. Expected two year change in dividend (FCHDIV):

$$FCHDIV = (Dividend\ expense_{t+2} - Dividend\ expense_t) / Total\ Assets_t$$

20. Expected two year change in market cap (FCHMCAP):

$$FCHMCAP = (Market\ value_{t+2} - market\ return_t) / Total\ Assets_t$$

Here t represents the current year.