Why Do Firms Borrow? Is it a Need or Simply a Pursuit of Optimal Debt Ratio?

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ABSTRACT

Empirical research has been conducted on 312 proprietary companies' data, collected from their annual reports, to test the explanatory power of the Tradeoff Theory and Pecking Order theory for their borrowing behavior. Established tests, for both the theories, have been run concluding that in Pakistan the Tradeoff theory provides a better explanation of borrowing patterns of firms as compared to the Pecking Order Theory. This was especially the case for seven industries namely Automobile, Cement, Chemicals, Food, Technology, and Others. Also, the Tradeoff theory had a higher explanatory power for borrowing patterns of small and large sized firms as compared to medium-sized firms.

Keywords: Tradeoff Theory, Pecking Order Theory, Optimal debt Ratios, Capital Structure, Decisions

JEL Classifications: G32, C31, M20

INTRODUCTION

One of the longest unsolved enigmas, in capital structure research, is the reason behind the borrowing patterns of firms (Roshaiza and Azura, 2014). Firms could borrow to achieve an optimal debt ratio, as suggested by the "Tradeoff Theory", or they could be borrowing because their internal funds are not enough to finance them, as explained by the "Pecking Order Theory". The purpose of this paper is to investigate whether Tradeoff Theory or Pecking Order Theory gives a more likely explanation of the debt taking the behavior of Pakistani corporate sector. The reasons would help in explaining the capital structure choices and patterns of borrowing for firms. It would help banks and other financial institutions understand their customer preferences and choices.

These theories themselves are not models that can be tested directly, but both provide an explanation as to why firms borrow. So, the testing of these theories has mostly been done by analyzing the presence of the "symptoms" of these theories. If those symptoms (of either theory) are found to be present, then it is concluded that the theory is being followed or implemented by the firms while making debt taking decisions.

Currently, research is being conducted to test these reasons for borrowing in different countries all over the world. Support has been found for the Pecking order theory for French Firms (Atiyet, 2012), Spanish SMEs (Mira and Garcia, 2003), Chinese firms (Chen, 2004; Tong and Green, 2005) and Brazilian firms (De Medeiross and Daher, 2004). The capital structure of firms in UK, France, and Germany was found to quickly adjust towards their targeted leverage (Dang, 2013) but supporting result was not found for Ghanaian firms (Salimi and Idrisu, 2011).

Recent research indicates that the reasons for the use of debt financing are mutually exclusive for certain industries; while complementing each other in some other. Cotei and Farhat (2009) and Ogden and Wu (2012) found that these theories were not mutually exclusive for US firms. Similar results were found for Indian Companies (Mukherjee and Mahakud, 2012) and SMEs in Portugal (Serrasqueiro and Zélia, 2015). Gaud *et al.* (2005) found that explanation for the existence of both the theories could be seen in Swiss companies, with stronger support for the tradeoff theory.

In Pakistan, most research conducted has been on testing the determinants of capital structure, and their explanatory powers (Shah and Javed, 2004; Khan and Sharif, 2015; Shah et al, 2017). The Pecking order theory, tested on nonfinancial listed firms in Pakistan, was found to exist only in its weakest form (Sheikh et al, 2012), but no attempt was made to test the Tradeoff Theory.

In an attempt to bridge the gap in existing research, this paper is aimed at finding whether the Tradeoff theory, by borrowing to maintain an optimal debt ratio, or the Pecking order theory, borrowing when internal funds are enough not sufficient, presents a relevant explanation of debt taking the behavior of firms.

This study of Pakistani firms can help us understand the relevance of capital structure theories in a developing market, trying to answer the following questions (i) Do firms in Pakistan borrow to maintain an optimal capital structure? (ii) Do the firms in Pakistan borrow when internally generated financing is not enough to meet their planned expansion needs? (iii) Are the reasons for debt taking behavior robust for differences in size and industry?

The results have found firms trying to maintain their optimal debt ratios, following the tradeoff theory, especially the small and large firms and more so firms from the Automobile, Cement, Chemicals, Food, Technology and Others industry. Section 2 will give an overview of the literature. Section 3 will explain the methodology and data. Section 5 proceeds with the results. Section 6 concludes the paper with a discussion.

LITERATURE REVIEW

Theories, about the determination of the capital structure of firms, started appearing in literature in the late 60s (Modigliani and Miller, 1968). Initially, the theoretical justifications and explanations of these theories were presented. Then the empirically testing started. The main factors behind these theories were expected bankruptcy costs incurred by virtue of the failure to service the debt, taxes, transaction costs, agency

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conflicts and adverse selection (Frank and Goyal, 2007; Roshaiza and Azura, 2014).

A lot of extensions to these theories have been made over the years but these basic two reasons have been the focus of discussion throughout. The main idea behind the 'Tradeoff Theory' introduced the concept of benefits of debt, as tax savings; and costs of debt, in the form of expected bankruptcy costs, agency cost and financial flexibility. This theory proposed that the firms would opt for debt financing as long as the tax benefits of such financing were more than its costs. This implies a level of debt beyond which tax benefit would be surpassed by the bankruptcy cost and at this stage, the firm's value will be maximized. When the costs of debt financing become greater than its benefits, the firm value would fall and firms would stop taking more debt financing. This would be the optimal level of debt in the total capital invested in a firm, and companies would borrow to attain this level of debt.

The tradeoff theory provided the debt-laden capital structure of firms for many years. The theory was criticized by many researchers (Frank and Goyal, 2007). Another theory to explain the presence of debt financing in business organizations was the 'Pecking Order Theory' proposing that a firm prefers financing itself internally first, through its retained earnings. If retained earnings are not sufficient to meet its expansion plans then debt financing is opted as the second choice; and if that, also is not sufficient to meet the firm's appetite for funds then as a last resort external equity financing is raised by issuing more shares.

Research has normally been conducted on the empirical testing of these reasons. Hovakimian *et al.* (2001) reported supporting results of firms trying to adjust their debt to equity ratios towards some targeted ratios. Frank and Goyal's (2003) results did not support the pecking order theory being the correct explanation of the capital structure of the US firms, but in large companies, some signs did exist that supported pecking order theory. Adedeji (2002), found support for the existence of the pecking order theory.

Maintaining an Optimal level of Debt

The main explanation behind the trade-off theory is that firms would borrow as long as the tax benefit is higher than the expected bankruptcy cost (Miller and Modigliani, 1966; Mackie-Mason, 1990) leading to an optimal capital structure, which would be a percentage of debt in total capital. When testing these theories, it is difficult to quantify tax savings and more so the bankruptcy costs, though Hovakimian *et al.* (2012) empirically tested the trade-off theory by estimating the relationship of the probability of default with proxies of benefits of debt. Thus, the main focus in the testing of this theory has been on the optimal capital structures. Schwartz and Aronson (1967) had found that firms belonging to the same industry had similar debt ratios, which they explained as the optimal debt ratio. Other researchers used the determinants of debt financing (or debt ratios) to help estimate the optimal debt ratio of the firms.

The optimal debt ratio of a company is hypothesized to be influenced by these so-called determinants, but what is of more

interest under the trade-off theory is the adjustment of the actual debt ratios towards the optimal debt ratio where the optimal debt ratio would be one where the benefits of debt financing are equal to the cost of debt financing. Marsh (1982) used a logit model and found the probabilities of issuing debt and equity. He then compared it with the actual debt ratios to test for deviations and did the testing for a sample time period. Opler and Titman (1994) did a similar test and concluded similar results but for a cross-sectional model. The coefficient calculated for this adjustment of actual debt levels towards the optimal debt levels is called the adjustment coefficient. Research has focused on the estimation of these adjustment coefficients and their speed of adjustment (Taggart,1977; Jalilvand and Harris, 1984; Auerbach 1985). Models were estimated to test the target adjustment and the coefficients were found to be to be significant.

Canarella et al. (2014) used the unit root tests to find that the debt ratios of firms were not found to be mean reverting concluding that the tradeoff theory was not being followed.

Borrowing to Finance Internal Deficit

Shyam-Sunder and Myers (1999) introduced the model for testing the pecking order theory for firms. Myers (1984) and Myers and Majluf (1984) have explained that when a firm needs financing, it will follow an order to finance itself. It will always try to finance itself from internally generated funds first, if those funds are inadequate it will go for debt financing and issuing shares would be the last option. Thus the current levels of debt financing present in a firm would be dependent on the total requirement of funds and the availability of internal funds to finance it. The current debt levels would then be depended on a "deficit" created by the difference of funds requirement and internal funds available. Funds are mainly required for payment of dividends, capital expenditures, increase in working capital and repayment of any portion of long term debt in the current time period. The availability of internal funds are the operating cash flows, after interest and taxes.

This model was tested by Shyam-Sunder and Myers (1999) on a sample of US firms and they found results supporting the Pecking Order Theory. The same model has since been extensively applied in the literature for testing of Pecking Order Theory (Frank and Goyal, 2003; Atiyet, 2012).

METHODOLOGY

The unit of analysis for this paper are nonfinancial Pakistani firms listed on the Pakistan Stock Exchange. Out of the total 449 companies, the complete data was available for 312 companies which have been considered in the analyses.

Maintaining an Optimal Debt Level

The methodology applied has been used by Shyam- Sunder, and Myers (1999). The following model helps us test the Trade-Off Theory.

$$\Delta Debt_{it} = \alpha + \beta_1(D* - Debt_{it-1}) + \epsilon \qquad \text{Eq. (1)}$$

Where $\Delta Debt_{it}$ is the change in Debt levels of a firm over two time periods and $Debt_{it-1}$ is the debt level of the previous time

period. D* is the targeted Debt level and has been estimated as the historical mean of the debt ratios for each firm (using the last five years data); while debt ratio has been calculated as Total liabilities divided by Total Assets.

Thus, the hypothesis to be tested in Eq (1) is

$H_1 = 1 > B_1 > 0$

If the null hypothesis is rejected, we can conclude that since the change in Debt levels is dependent on the deviation of the previous debt levels from the target debt levels (as $D^* - D_{it-1}$ is deviation of debt from target debt), the companies are trying to maintain an optimum debt structure. But beta should also be less than 1 as only in that case positive adjustment would take place that would mean that borrowing is done to maintain an optimal debt.

Financing the Internal Deficit

The second part of the analysis is to test for the Pecking Order Theory. To test this, we use the relationship that a firm's debt levels are dependent on its finance deficit requirements. The model can thus be estimated as:

$$\Delta D_{it} = \alpha + \beta_1 DEF_{it} + \epsilon \qquad \text{Eq (2)}$$

Where DEF = Financing deficit would be calculated as

$$CD + CE + \Delta WC - CLTD - OPCFs \qquad \text{Eq (3)}$$

Where,

CD = Cash Dividends paid, CE = Capital Expenditure made, ΔNWC = Increase in net working capital, CLTD = Current Portion of Long term debt and OPCFs = Operating Cash Flows after interest and taxes.

According to the pecking order theory, the firm will borrow if it has a financial deficit. According to this theory, all the change in debt should be due to the financing deficit only. The hypothesis to be tested then (for Eq (2)) is

H_2 = The change in debt is dependent only on the financing deficit ($\beta_1 = 1$)

Table 1: Descriptive Statistics

	Min	Max	Mean
Debt Ratios	0.00	11.26	0.61
Total Assets (Millions Rs.)	3268		1
Change in Debt Ratio (DV)	-98.55	3.40	-0.37
Deviation from Target (IVTOT)	-98.64	56.40	-0.18
Deficit(IVPOT)	-111.14	52.99	-0.12

If the null hypothesis is rejected, one can conclude that since the change in Debt levels is solely dependent on the financing deficit, therefore the companies are following the pecking order theory. If Beta is found to be significant and different from 1, it would imply that debt financing is dependent on the deficit in financing requirements but the deficit is not the only reason for financing. Beta coming out to be negative would imply that the financing deficit would not be determining the debt financing decision or debt financing of the company would not be following the Pecking Order Theory.

Robustness checks

The tests run for the two theories has been repeated for the companies divided into industries to check if across industries the results hold true. Also, the companies have been

categorized according to different sizes. Models have been estimated separately for small, medium and large firms to see if any differences exist.

RESULTS

Descriptive Statistics

The firms belonged to 19 different industries. The industries were categorized according to the economic division set by the State bank of Pakistan. 103 companies were from the Textile Industry, 26 firms from Sugar, 25 from Chemical, 19 from Cement, 16 from Automobile, 15 from Food, 13 from Steel, 12 from Power, 10 from Technology, 9 from Glass and Pharmaceuticals each, 8 from Synthetic, 7 from Paper, 6 from Electrical Goods and Fertilizer each, 5 from Oil and Gas and 4 each from Leather and refinery. 15 miscellaneous firms were classified as others. The firms in the sample had a mean debt ratio of 0.61 while the mean total Assets of the firms were around 16 Billion Pakistani Rupees (Table 1).

Testing the Two Theories

Trade-off Theory

To test the Tradeoff Theory, the change in debt ratios for the firms was regressed on the deviation of the previous times debt ratios from the targeted debt ratios. The beta of the deviation (0.988) came out to be highly significant (p-value of 0.000), and between 0 and 1, rejecting the null hypothesis at a confidence interval of 99.9% (Table 2). The R^2 of the model came out to be 0.98, stating that 98% of the variation in the dependent variable can be explained by the independent variable. Overall, the model is a good fit as the F-ratio (25045.119) is also highly significant. Thus, we reject the null hypothesis and conclude that the Tradeoff Theory explains the borrowing patterns in Pakistani Firms.

Table 2: Regression Results for Tradeoff Theory

Industry	Beta	F- ratio	R^2
Automobile	0.675***	14.885	0.534
Cement	0.775**	10.300	0.377
Chemicals	0.792***	72.252	0.759
Food	1.003***	21488.787	0.999
Others	1.000***	6731.313	0.998
Technology	0.957***	6.622	0.885
Power Generation	- 0.406*	61.496	0.398
Leather	-0.122*	20.112	0.910

Table 3: Regression Results for Pecking Order Theory

Size	Beta	F- ratio	R^2
Small	0.998***	2.472	0.997
Large	0.380***	17.486	0.187

Pecking Order Theory

To test the Pecking Order Theory, the change in debt for the firms was regressed on the deficit created internally in the firms, by the cash outflows being more than the operating Cash Flows. The beta of the deviation came out to be highly insignificant (p-value 0f 0.148) accepting the null hypothesis at a confidence interval of 90% (Table 3). Thus, we do not reject the null hypothesis and conclude that the Pecking Order Theory does not explain the borrowing patterns in Pakistani Firms.

Robustness Checks

Industry-wise

The betas of the deviation came out to be highly significant for seven industries namely Automobile, Cement, Chemicals, Food, Others, Technology. It was somewhat significant for Leather and Power Generation at the confidence interval of 95% (Table 4). All the Betas for these industries were greater than 0 and less than 1, rejecting the null hypothesis. For Leather and Power Generation the beta came out to be negative, thus accepting the null hypotheses.

For the Pecking order theory, the beta of the deficit came out to be highly significant for only the other category. Since the Beta was not equal to 1, we accept the null hypotheses that the firms do not borrow to finance only its deficit.

Size-Wise

The betas of the deviation came out to be highly significant and between 0 and 1 for smaller and larger firms only (Table 5).

During the testing for the Pecking Order Theory, the betas of the deficit came out to be insignificant for all the three sizes of the firms.

Table 4: Regression Results Industry wise for Tradeoff Theory

	Significance	P-Value
Beta	0.988	0.000
Constant	-0.21	0.243
F- ratio	25045.119	
R^2	0.988	

$***p < 0.001, **p < 0.01, *p < 0.05$

Table 5: Regression Results Size wise for Tradeoff Theory

	Estimates	P-Value
Beta	-0.340	0.721
Constant	-2.029	0.433
F- ratio	2.108	
R^2	0.007	

$***p < 0.001, **p < 0.01, *p < 0.05$

DISCUSSION AND CONCLUSION

Models were used to test for the borrowing patterns of non-financial firms listed on the Pakistan Stock Exchange. We find in our analysis, that the tradeoff theory explains the borrowing patterns of firms in Pakistan. The firms are trying to maintain a targeted level of debt. If they borrow more, it is because their debt levels were lower than the targeted levels. If they retire debt, it is also to reach the targeted debt levels, as the debt levels were more than the targeted levels. These results are consistent with the results of Mira and Garcia (2003) for Spanish firms and Dang (2013) for European firms. Even research done in Pakistan, support these results when some determinants of the capital structure were found to support the Tradeoff Theory (Channar, 2015; Shah et al, 2017).

The tests run for the Pecking Order Theory, on the other hand, showed that the theory had no explanatory power for borrowing patterns. The debt levels were not significantly dependent on the deficits existing in the firms. This was contrary to findings by Chen (2004) and Tong and Green (2005) for Chinese firms and by Atiyet (2012) for French firms. Yet the results are supported by a recent study done in Pakistan by Sheikh et al (2012) where support for the Pecking Order theory was found only in its weakest form.

The results were further supported by industry analysis. The Tradeoff theory was found to have high explanatory power for borrowing patterns in 7 industries (Automobile, Cement, Chemicals, Food, Technology, and Others) implying that firms in these industries are trying to maintain a targeted debt ratio. The Pecking Order Theory was not found to support the borrowing patterns for any industry, meaning firms' internal deficits are not the main reasons that firms borrow money.

It was also found that smaller and larger firms were trying to maintain a targeted debt ratio supported by the tradeoff theory. The deficit in firms, on the other hand, was not found to affect their capital structure choice at all. Thus, Pecking Order Theory did not have any explanatory powers in case of the capital structure of any sized firm.

The reason for these results can be explained by the choice of managers or decision-makers in the firms who prefer borrowing to maintain their debt levels at the optimal levels as they consider it a safe level. At this level, their risks are minimized and the benefits of borrowing are maximized. They are not risk takers and would not like to move from this targeted debt levels, especially the smaller firms as it might increase their risk or benefits received might not be maximized. The firms are found not to be borrowing to finance their deficits, as they might consider it riskier, and would prefer other options of raising funds. The managerial implications of this research could be for the corporate firms helping them determine their financial needs with a better understanding of the factors that affect them. The results would also be helpful for financial institutions and policymakers like the State bank of Pakistan. The finding that firms are trying to maintain an optimal debt ratio can be beneficial for the State Bank of Pakistan when determining the Risk Acceptance Criteria (RAC) that it provides for each industry. This RAC determines a debt to equity ratio that should be maintained by firms at all points in time. If the targeted debt ratios of firms are providing efficient results, the State bank can incorporate those in making the standards for these RACs.

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