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ORIGINAL ARTICLE

Reliably Important Factors of Capital Structure Decisions: A Case of Panel Data Analysis of Non-Financial Firms

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ABSTRACT

The main purpose of this paper is to investigate the determinants of leverage. Panel data was used for analysis and data were collected from the financial statement analysis of the non-financial firms listed at KSE for the period of eleven years. Leverage is used as dependent variable while profitability, size, tangibility, growth and liquidity used as independent variables in this paper. The results depicted that profitability, liquidity, tangibility, and size are found determinants of capital structure while growth opportunity have no influence in choice of capital structure. The results are also consistent with the studies of different researchers like Rajan and Zingales (1995); Booth et al. (2001); Friend and Lang (1988), Titman and Wessels (1988) and Kester (1986) Modigliani and Miller (1958).

***Key words**: Leverage, profitability, liquidity, growth opportunities, tangibility and size JEL Classification: G31, G32, L16, L25*

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INTRODUCTION

The prophecy of the Model presented by Modigliani and Miller is extensively acknowledged that in perfect market the value of firm is not dependent upon its capital structure, and according to their model debt and equity are wonderful substitutes for each other. However by relaxing the assumption of perfect capital market the choice of debt and equity becomes an imperative feature for organizations. The above feature of debt and equity section force to study the theories for this valuable concern. There are different interpretation of this selection of debt and equity for the trade off capital structure. The said issue investigated by developed countries like US and others and concluded a few results by using their countries data but little attention is given from the developing countries side to focus such important concern for the betterment of the organization. The most popular researchers Rajan and Zingales (1995); Booth et al. (2001); Antoniou et al. (2002) conducted a research studies to investigate the choice of capital structure by followed the formulated process of the choice of debt and equity developed in theories for organizations in developed countries markets and not found solid and authentic evidence regarding the choice of capital structure. The following study is concern with the specific area of Asian market which is important region with respect to the economic growth prospects and surprising according to the best knowledge of author that not enough research has been so far conducted for the above mentioned choice of debt and equity in this region.

This paper contributes to the literature by investigating the determinants of debt and equity in a specific part of the Asian region like Pakistan. In accounting practice, corporate control and corporate governance required financial decision making in the field of financial management. Since a seminal research of Modigliani and Miller (1958), the issue of capital structure has generated enormous interest in the midst of financial researchers like Harris & Raviv (1991), provide a new development after 1990 by Mayers (2003), for the need of theoretical studies acknowledged two models name the static trade off model and pecking order theory of capital structure. The studies presented by different researchers, such as Bradley et al. (1984), Titman and Wessels (1988), Wiwattanakantang (1999), and Wald (1999), have conducted studies with concern to the determinants of capital structure. The paper is managed as follows. Section two reviews the literature for determinants of corporate capital structure Section three consists the methodology used for the determination of capital structure section four consists of data and findings discussion section five consists of concluding discussion of the study.

LITERATURE REVIEW

There are many studies that have been conducted by different researchers to investigate the Proxies as determinants of capital structure in organizations. There are many theoretical and empirical evidence provide the list of determinants of capital structure like profitability, tangibility, liquidity, growth opportunities, tax, non-debt tax shields, volatility and size of the firms. The literature about determinants of capital structure from the past studies is as under:

PROFITABILITY

The past studies suggest that the firms having high rate of profitability try to get more loans because of corporate tax benefit of the leverage. On the other side pecking order theory not recommend the option of get more loans it suggests organizations to use internal funds first and then move to get loans and finally issue of equity of the firm for required need of organization. Since Modigliani and Miller (1958), no dependable forecast has been received about the correlation of profitability and capital structure. Jensen (1986), and Williamson (1988), explain debts and ensure the payment of profit so high debt can contain the direction of the management. Chang (1999) concluded in his study that the firms having high profitability tend to use fewer loans. Theoretical studies of Friend and Lang (1988), Titman and Wessels (1988) and Kester (1986) show that leverage has negative relationship with profitability of firms. On the other hand this relationship is not a one sided some have results that leverage and profitability are positively correlated but not significant like Rajan and Zingales (1995), Wald (1999), Booth et al. (2001) and Wiwattanakantang (1999) and Long and Maltiz (1985).

LIQUIDITY

Liquidity is used by different researchers as proxy for determinant of capital structure. The opinion about it is not one sided some have concluded that the firm have more liquidity prefer to use less loans and meet the financial needs and some have concluded that the firm have more liquidity get more loans because of good paying capacity of short term obligations Ozkan, (2001). According to the perception of the pecking order theory, firms with more liquidity prefer to borrow less. On the other hand, trade-off theory favors the positive relationship between liquidity and leverage. Friends and Lang (1988) found negative relationship between liquidity and leverage of the firm. Deesomsak et al. (2004), Lcke and Lygen (2011) and Sbeiti (2010) also confirm the negative association between liquidity and leverage. Ozkan (2001) used current assets to current liabilities as measure for liquidity.

TANGIBILITY

The general perception of theories about the relationship between capital structure and

tangibility is positive. Jensen and Meckling (1976) stated in their paper on agency cost, ownership and capital structure that if a firms have more fixed assets then these assets can be used as collateral, for loans so high tangibility is associated with high leverage. Williamson (1988) found positive correlation between tangibility and capital structure. Harris & Raviv (1991) depicted positive relationship between leverage and tangibility in their studies. The empirical studies of Long and Maltiz (1985), Wald (1999), Marsh (1982) and Rajan and Zingales (1995) and Friend and Lang (1988) also confirm the prediction that tangibility have positive relationship with leverage however, the long term portion of the debt is more concern with tangibility.

SIZE

Marsh (1982) argued in his paper that large firms often select long term loans options, where small organizations choose short term debt options. Marsh also argues that large firms have ability to take benefit of economies of scale in availing the option in issue of long term debts. Fama and Jensen (1983) explained that the large organizations provide more information as compared to smaller organizations to investors. Rajan and Zingales (1995) also argue in his paper that larger firms provide more information to the investors than smaller firms. The overall perception is that larger firms which have less asymmetric information problem using more equity and fewer debts mean lower leverage. Poitevin (1989), Noe (1988), Narayanna (1988), Stulz (1990) and Harris and Raviv (1990) found positive relationship between size and leverage of the firms. Wald (1999) found that large organizations in Germany have fewer trends to use more debts. Booth et al. (2001) and Wald (1999) also depicted that leverage is positively correlated with size of company.

GROWTH OPPORTUNITIES

Hypothetical papers generally advocate growth opportunities are unenthusiastically related with leverage. On one hand, as Jung, Kim and Stulz (1996) represent in their studies if management pursues growth objectives, management and other concern stakeholders especially shareholders interests tend to coincide for organizations with better investment options. But for organizations missing investment options, debt serves to bind the agency cost managerial diplomacy as recommended by Jensen (1986) and Stulz (1990). The findings of Berger, Ofek, and Yermack (1997) also corroborate the disciplinary role of debt. On the other hand, debt also has its own agency cost. Myers (1977) argues that high-growth organizations may perhaps clutch additional authentic options for opportunity investment than low-growth Organizations. If high-growth firms require superfluous equity financing to keep fit such options in the future, a firm with stupendous debt may relinquish this opportunity because such an investment successfully transfers wealth from stockholders to debt holders. So firms with high-growth prospect may not issue debt in the first place and leverage is expected to be negatively related with growth opportunities. Berens and Cuny (1995) also squabble that growth implies momentous impartiality financing and low leverage. Pragmatic studies such as Booth et al. (2001), Kim and Sorensen (1986), Smith and Watts (1992), and Wald (1999) predominately prop up theoretical prophecy; the only immunity is Kester (1986). There are different proxies for growth opportunities. Wald (1999) uses a 5-year average of sales growth. Titman and Wessels (1988) use capital investment scaled by total assets as well as research and development scaled by sales to proxy growth opportunities.

RESEARCH METHODOLOGY

This study uses data from the annual reports of 112 listed companies for the period of fourteen years covering 1998-2011. The data were collected from statistical department of State Bank of Pakistan which actually based on U.S. GAAP approach of Accounting. The manufacturing sector of Pakistan in lieu of energetic industrial strength in Pakistan, so the sample do well in capturing comprehensive leverage in the country. Since the financial

position of financial sector (banks, insurance companies and investments trusts) representing conspicuously different configuration from those of nonfinancial listed firms. The firms having missing observations for any variable in the equation during the period of 1998-2011 are excluded from sample.

VARIABLES

With respect to the objectives of research the following are dependent and explanatory variables

Table: Measurement of variables

Variables	Measurement
Dependent Variables	
Leverage	ratio of total debts to total assets of the firm
Independent Variables	
Profitability	ratio of profit after tax to total assets of the firm
Liquidity	ratio of current assets to current liabilities of the firm
Tangibility	ratio of fixed assets to total assets
Growth Opportunities	ratio of change in fixed assets
Size of Firm	Nature Log of Total Assets

ECONOMETRICS MODEL

The sample contains data across firms and over time, the panel data method is employed. The basic regression model can be specified as follows:

$Y_{it} = \beta_0 + \beta_1 (X_{it}) + u_{it}$

Where i indicate the cross-section dimension and t denotes the time dimension, and "B_0" represent the constant of this model. Y_{it} represent the dependent variable called Leverage which is defined ratio of total debts to total assets of the firms. The β_1 is coefficient of value of explanatory variables. X_{it} is main independent variable of this study which consists of different determinants of the firms. The leverage is measured in three different parameters. Three methods, Pooled OLS, Fixed Effects and Random Effects, are used.

The first choice is made between Pooled OLS and Fixed Effects Methods on the basis of following equation:

$LNY_{it} = \beta_0 + \beta_1 LN (X_{it}) + u_{it}$

Where Y_{it} is natural logarithm of leverage in firm- "I" for the year- "t" and (X_{it}) is natural logarithm of determinants for firm- "I" for the year- "t". The t represents the error term. Pooled Ordinary Least Square method is relatively restraining due to that additional insight can be achieved through inclusion of fixed and random effects methods for estimation. The fixed effect model make possible different constant for each section. The applicability of fixed effect model has been tested by using Standard F test. The null hypothesis is that all the constants are same and therefore common constant model can be used.

$F= \{(R^2FE - R^2CC)/N-1\}/ \{(1- R^2FE)/(NT-N-K) \}$

If calculated value is greater than F critical value, we reject the hypothesis that all constants are same. In fixed effect model the cross sectional effect is captured through dummy Di which represents the companies.

$LNY_{it} = \beta_0 + \beta_1 LN (X_{it}) + \sum D_i + u_{it}$

An alternative method of estimation is random effect model which assumes that the constants for each section are not fixed but are random. Fixed effect model assumes that each company differs in its intercept term whereas random effect model assumes that each company differs in error term.

$LNY_{it} = \beta_0 + \beta_1 LN (X_{it}) + (v_i + u_{it})$

The choice between fixed effect and random effect model is made through Hauseman Test (1978). That is based on the idea that under the hypothesis of no correlation, both OLS

and GLS are consistent and OLS is inefficient, while under the alternative, OLS is consistent but GLS is not.

$H = (\beta^{FE} - \beta^{RE})' [(Var(\beta^{FE}) - Var(\beta^{RE})]-1(\beta^{FE}- \beta^{RE}) \sim \chi^2(k)$

If the value of H statistic is large, the difference between estimates is significant, so null hypothesis that random effect model is consistent is rejected and fixed effect estimators are used. If the value of H statistics is small then random effect estimators is more appropriate.

RESULTS AND DISCUSSION

Table 1: Panel Data Analysis: Common Effect Model

	Common Effect		**Fixed Effect**	
Variable	Coefficient	Prob.	Coefficient	Prob.
C			1.487509	0.0000
Profitability	-0.646021	0.0000	-0.806810	0.0000
Liquidity	-0.045450	0.0000	-0.362021	0.0000
Tangibility	-0.360396	0.0000	-0.046660	0.0000
Size	0.025964	0.1472	-0.026274	0.2253
Growth	-0.056051	0.0046	-0.070073	0.0001
R-squared	0.745638		0.796933	
Adjusted R-squared	0.743663		0.778131	
F-Statistic		0.0000	42.38446	0.0000
Durbin-Watson stat	2.064093		1.902518	
No. of observations	650		650	

It is clear that there are three different methods of estimation called Common Constant, Fixed Effect and Random Effects models. The above table represents the results of Common Constant estimation and which is also considered as most restrictive procedure for estimation. It is necessary to test the fixed and random effects models as well to obtain the better results. The null hypothesis is that all constants are same is tested by using Standard F-test. Here calculated value of is greater than F-critical tabulated value at 95% confidence level so null hypothesis is rejected. Therefore Fixed effect model is better model to test the above equation.

Finally, In order to make a choice between Fixed Effect Model and Random Effect Model, Hausman test has been applied and results are reported in Table 2: as below.

Table 2: Correlated Random Effects: Hausman Test

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	34.573481	5	0.0000

The table two indicate that the value of H statistics is high which shows that different between estimates is significant at α=0.05.Therefore null hypothesis is rejected means that random effect model is not consistent due to that fixed effect estimators are considered most appropriate.

FIXED EFFECT RESULTS

The results show that the value of the adjusted R square is approximately 78% which explained that size, profitability, tangibility, liquidity and growth show around 78% variation in the leverage. The outstanding unpredictability in the leverage is due to some

other variables which are not included in the model. The finding of this study predicted negative relationship between leverage and size of the firm and statistically insignificant and favoring the results of (Kester, 1986), (Kim - Sorensen, 1986) and (Titman - Wessels, 1988) while differing from the findings of Huang and Song (2002), Hijazi and Tariq (2006) Rajan and Zingales (1995) and Friend and Lang (1988). The pecking order theory depicted a negative correlation between size and leverage of firms where trade off theory predicted positive association between size and leverage Frank & Goyal (2005). The empirical findings of this study depicted the negative correlation between leverage and tangibility of the firm but significant where the findings of Booth et al. (2001) and Huang and Song (2002) also confirm the negative association of leverage and tangibility of the firm. Different studies (Titman - Wessels, 1988), Rajan and Zingales (1995) and Friend and Lang (1988) found positive relationship in their studies. The trade off theory predicted that leverage and tangibility are positively correlated where the pecking order theory of capital structure favoring the negative relationship of leverage and tangibility. According to the predication of theory the results of this study favoring the results of pecking order theory of capital structure.

The results also predicted negative correlation between profitability and leverage of the firm. The following researchers also found the same relationship (Kester, 1986), (Titman - Wessels, 1988), (Myers, 1984; Myers and Majluf, 1984) (Acaravcı, 2004; Allen, 1991; Barton and Gordon, 1988; Chen, 2004; Pandey, 2004; Sayılgan et al., 2006; Tong and Green, 2005; Wiwattanakantang, 1999) Huang and Song (2002), Rajan and Zingales (1995), (Booth et al., 2001), and Friend and Lang (1988), Sabir and Malik (2012), Ahmed et al (2010), Hijazi and Tariq (2006). The pecking order theory suggested that there is negative association between profitability and leverage. The results of this study not favoring the positive relationship of trade off theory of capital structure between leverage and profitability. The finding this paper investigate a negative but significant association between leverage and growth opportunities which are supporting to the empirical findings of (Kester, 1986), (Kim - Sorensen, 1986) and (Titman - Wessels, 1988) and Rajan and Zingales (1995). But the (Kester, 1986) and Huang and Song (2002) found positive relationship between leverage and growth opportunities. The results also explained that there is negative relationship between liquidity and leverage of the firm where the finding of the (Ozkan, 2001), Friends and Lang (1988) also support these finding in their paper. Deesomsak et al. (2004), Lcke and Lygen (2011) Saddour, (2006) and Sbeiti (2010) also confirm the negative association between liquidity and leverage. The results are supporting the findings of pecking order theory of capital structure while differing from the results of trade-off theory of capital structure.

CONCLUSION

Empirical studies of corporate sectors have discussed and indentified firm different features which are considered most prominent determinants of firm financing choices. On the other hand at the same time financial economists have been powerless to arrive at harmony in interpreting these pragmatic results. The focus of this research on selected non financial firms that boost up our ability to illustrate unequivocal presumption about the reasons that which are the most determinants of capital structure. The inspiration for the said area linked with the contribution of different researchers like Rajan and Zingales (1995); Booth et al. (2001); Friend and Lang (1988), Titman and Wessels (1988) and Kester (1986), Modigliani and Miller (1958), The aim of this study was to investigate the determinants of capital structure of selected non financial firms listed at Karachi Stock Exchange (KSE) of Pakistan. Capital structure is used as dependent variable while profitability, liquidity, growth opportunities, tangibility and size are used as independent variables. The results of this study depicted that profitability; liquidity, tangibility, and growth opportunities are to be found determinants of capital structure in the non

financial selected firms. The size is only variable which have no influence on the leverage of firms according to the empirical results of this study.

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