Determinants of Credit Rating and Optimal Capital Structure among Pakistani Banks

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Firm's credit rating and optimal capital structure are directly related. Firms with high crediting rating tend to finance more by debts. However, there is no appropriate figure available for optimal capital structure in literature. Firms mostly decide mix of debt and equity based on its operating environment. Knowing fact of high credibility among locals and lower costs associated with debts, managers prefer debts to equity. This paper used factors like profitability, liquidity, firm's size and leverage, to determine crediting rating of firms. This paper has used data from balance sheets of top twenty banks in Pakistan for last seven years. It was found that profitability and liquidity have negative impacts on credit rating of banks in Pakistan, while size and leverage being more significant have positive correlation with credit rating.

Keywords: Credit rating, Capital structure, Commercial banks.

JEL Classification: G21, G30, G32

Introduction

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A firm's capital structure is composition of its liabilities and equity. Optimal capital structure is mix of debt, preferred stock, and common equity with which firm intends to raise capital with minimum costs of capital (J. and M., 2000, Gavish and Kalay, 1983). Capital structure may be highly complex and include dozens of sources. Company's value is affected by capital structure. Under a classical tax system, tax deductibility of interest, makes debt financing valuable; that is, cost of capital decreases as proportion of debt in capital structure increases (Chowdhury and Chowdhury, 2010). There are three theories that can help to explain relevance of capital structure. Asset substitution effect: As debt to equity ratio increases, management has an increased incentive to undertake risky projects. This is because if project is successful, shareholders get all upside, whereas if it is unsuccessful, debt holders bear loss. If such projects are undertaken, there is a chance of firm value decreasing and a wealth transfer from debt holders to shareholders. Under-investment problem (or Debt overhang problem): If debt is risky (e.g., in a growth company), gain from project will accrue to debt holders rather than shareholders. Thus, management has an incentive to reject positive NPV projects, even though they have potential to increase firm value. Free cash flow: unless free cash flow is given back to investors, management has an incentive to destroy firm value through empire building and perks etc. Increasing leverage imposes financial discipline on management (Bradley et al., 1984, Titman and Wessels, 1988, Harris and Raviv, 1991, Huang and Ritter, 2009). Optimal capital structure depends on all these factors. Determination of capital structure is a complex decision that involves several factors, such as risk and profitability. Decision becomes even more difficult, in times when economic environment in which company operations presents a high degree of instability. Therefore, choice among ideal proportion of debt and equity can affect value of company. A business entity can leverage its revenue by buying fixed assets. This will increase proportion of fixed costs as opposed to variable costs, meaning that a change in revenue will result in a larger change in operating income. Most obvious risk of leverage is that it multiplies losses. A corporation that borrows too much money might face

bankruptcy during a business downturn, while a less-levered corporation might survive.

This research focuses on factors that affect capital structure and credit ratings of banks. Paper shows that how optimal capital structure can be achieved with help of credit ratings. High crediting rating simply implies that firms have lower chance of defaults. Profitability, liquidity, firm size, and leverage are factors on basis of which credit ratings will be decided and it influences optimal capital structure. An optimal capital structure captures trade-off between benefits of borrowing (tax-deductibility of interest payments) against costs associated with financial distress, and debt overhang. In case of inconsistency, firms quickly rebalance to move capital structure back to optimal level. An important implication of trade-off theory is that profitable firms use more debt to maximize tax benefit. Hence, profitability and debt should be positively related. An optimal capital structure concerns composition of liability of company, or more specifically, which is relative participation of several financing sources in composition of total obligations.

Literature *Review*

Doukas et al. (2011), examined effects of debt issuance on capital structure of firms during period of 1970-2006. They found that depending on available information and market conditions firms choose their optimal structure. Even in periods of hot-debts; firms with high debt ratio, choose to issue more debt to survive. Their findings suggest that market timing is very circular to top management. Timing considerations played an important role in financing. Firms tend to raise external funds when their cost of equity capital is temporarily low. In that research paper commercial banks were accessed and showed deposit finance acts as a commitment device. Their focus was on optimal mix of bond and deposit financing to raise capital structure. Deposit finance had potential to raise overall debt capacity of bank and increases pledge able assets. Banks with more special human capital or risky assets avoid equity financing. Debt financing could be effective for different reasons; it gave tax advantage of debt. Bank selected a debt mix where owners had an opportunity to enter into debt renegotiations exactly at a point where exogenous regulatory intervention would have occurred (Bank and Lawrenz, 2010).

Hardin Iii and Wu (2010), examined gradual change of real estate investment trust (REIT) on capital structure. REITs with banking relationships uses less secured debt and had less leverage.. Chen and Yu (2011), examined influence of FDI and export on capital structure and hypothesis was based on agency theory. It was found that MNCs behavior match with high debt ratio. Firms that deals in internationalization activities, whether they were located in developed countries or emerging economies, shows higher demands for funding as compared to firms that deals to their domestic markets. According to Chen and Yu (2011) corporations usually use more debts then equity to finance expansions. Debt component of optimal expansion financing package was a decreasing function of pre-expansion leverage ratio and was also decreasing in magnitude of expansion opportunity. Investment and financing decisions were usually interdependent and caused conflicts of interest between shareholders and bondholders. Main objective was to

identify optimal combination of equity and debt to finance an expansion project, for any given initial financial structure of firm. Additional debt helps shareholders because of tax shield and transfer of wealth from bondholders to themselves, but also hurts them because of higher expected bankruptcy costs; optimal combination balances two effects.

Sarkar (2011), decisions about determinants of capital structure were needed for definitive stages of firm's life cycle. Their study showed that how by choosing financing between large and small firm's affects firm's overall life cycle either positive or negative. Chen and Kou (2009), model showed that default risk could affect credit advancement and optimal structure of firm. Credit risk might affect firms' equity values, which in turn contributed to implied volatility smiles in equity options. Du and Suo (2007), followed a structural credit model approach to find effects of growth opportunities on leverage and debts maturity as its effects on investment and firms financing decision which directly had impact on capital structure. They examined potential interactions of corporate financing and investment decisions in presence of incentive problems. There was a positive relation between leverage and debt maturity as by hypothesis. Kim et al. (2006), took sample of Korean manufacturing firms and made a model of dynamics capital structure using a wide range of determinants and estimated optimal capital structure using a wide range of observable determinants. It was found that Non-profit organizations could finance their operations and capital investment through internal funds, external funds, or some combination of two. Static trade-off theory proposed that non-profit managers balanced costs and benefits of debt to reach an optimal leverage level, while pecking order theory suggested that managers prefer internal funds to external borrowing.

Riis Flor (2008) shows asset substitution involves agency cost due to that growth rate decreases and volatility increases. As volatility increased debt renegotiation allows equity holders to gain concessions from creditors. Hence, debt renegotiation need not improve firm value. Past paper was to analyze how trade-off theory and asset substitution interacted and affected firm's capital structure choice. Study by Flor (2011), shows firms

capital structure was influenced by environmental dynamism and economic performance and which maximized shareholder wealth. It was found that external factors might affect development of a firm's capital structure, and that choices a firm had a direct influence that firm's governance structure.

Simerly and Li (2000), showed firms make a careful contract design to save agency problems between sponsoring firms and lenders in order to avoid volatility of cash flow, financing loans and capital structure ratio. Research in capital structure focused on regularities in cross section of leverage to make difference between various theories of financing policy. Corporations which had low leverage react differently to external economic shocks from corporations with high leverage. Findings were typically evaluated in terms of comparative statics of various capital structure models. Models were supported by some evidence and challenged by other evidence. Strebulaev (2007), examined ownership structure on capital structure and firms value. Effects of ownership structure on capital structure were in context of over-investment and over-borrowing among East Asian corporations during last crisis.. Driffield et al. (2007), examined changes in product diversification and financing decisions on capital structure. Different corporate or firm financial behavior was based on changes occur in product and financial decisions and made overall capital structure.

So, this research enhances importance of profitability, liquidity, firm's size, tangibility and leverage on credit ratings. Data used in this research corresponds to balance sheet analysis of Pakistan's top 20 banks in past seven years. It reveals how these factors effects bank's credit ratings and in return optimal capital structure. When firms earn more from investment or assets its return on investment increases.

Methodology

This research determines capital structure i.e. profitability, liquidity, firm size and leverage with credit rating and vice versa. All these factors play a vital role in designing optimal capital structure of firm. Fluctuation in any of these factors can have some influence on crediting rating of firm. And

this, in long run can effect capital structure of firm. As credit rating is high it shows creditability and worthiness of firm. Investors invest in these types of firms because they know their money is secure without risk. But when credit rating of any firm is low it means its risk is more and chances of default are greater so in this case firm will be unstable.

Profitability
Firms do not prefer to borrow from other firms, when internally generated funds were available. When firms were profitable, internally generated funding from retained earnings was plentiful and could be used for operational expansion. As it was unnecessary for profitable firms to rely on funding from external sources, they should have a lower debt ratio. Internal funding was not likely to be underestimated by investors. As a result, profitability was very likely to affect debt-financing decisions.

Leverage
Hot debts markets could managed their leverage well to stay within an optimal capital structure range (Doukas et al., 2011). Those banks which wanted to attain optimal capital structure and they had more risky assets use deposit financing to a lesser extend (Bank and Lawrenz, 2010). Hardin Iii and Wu (2010), showed that REIT with banking relationship had low leverage. Investments and financing decisions caused conflicts of interest between share holder and bond holder (Sarkar, 2011).

Firm Size
Managers crafted a capital structure by keeping in mind corporate strategy and minimized risk. Firm size and leverage were likely to be positively related, particularly in larger firms because they typically had less direct bankruptcy costs and tend to diversify more, allowing a higher optimal debt capacity. Larger firms used more leverage than small firms because of relatively smaller costs of monitoring firm, as well as reduced moral hazard and adverse selection problems. By contrast, less asymmetric information within larger firms leads to less incentive to raise debt, suggesting a negative relationship. log of total assets was used as a measure of firm's size. simple correlation matrix showed that size was

positively correlated with debt ratio for most firms, and that positive correlation was consistent over all three separate sub periods (Kim et al., 2006).

Liquidity
Firm's liquidity was measured by current assets divided by current liabilities. It showed that how much firm had capability to pay off its debts. Firm growth and profitability depends on its ability to liquidate. Firms with a high level of short-term liabilities compared with long term liabilities possess ability to adjust to a new level of leverage more easily and faster than firms with a lower level of short-term liabilities. When firms were able to pay off its liabilities its profitability chart increases and had less chances of default.

For this research data have been collected from financial statements of top twenty banks including State Bank of Pakistan (SBP) and Pakistan credit rating agency. Data is secondary and descriptive. Research uses several sources of secondary data i.e. literature and annual reports of banks. After collecting whole data it is inserted in Minitab, which gives results and shows reliability and significance of variables shown in model. Focus is to find relationship between profitability, liquidity, leverage and firm size and its correlation with credit ratings. Past seven years data is used to check significance and reliability of research paper.

Results
Profitability is negatively correlated with credit rating. Liquidity is strongly significant but has negative relationship with credit rating. Leverage has positive correlation with credit rating. Among all variables firm size is more significant with positive correlation with credit rating, which means that in effectiveness of credit rating of any organization firm size plays a vital role. If firm size will grow it increases firm's creditability and investors will more rely on such firms because chances of those firms reduce due to high credit rating. Liquidity is a factor, which also has a significant effect firms creditability will increase because it has ability or has much current assets to pay short-term obligations i.e. liabilities. Mean

of credit rating, profitability, liquidity, leverage, and firm size is obtained by dividing sum of observed values by number of observations. Among all mean values of all variables size has a greater average, which means size plays a significant role in influences credit rating as compare to other variables. Median is helpful when separating data into two equal sized bins. Value of size and leverage is highly separating data and affecting more on credit rating. S.D gives an idea of how close entire set of data is to average value. Profitability and liquidity have small values of S.D which means they are tightly grouped having a precise data leverage and size have large S.D which shows their data spread out over a wide range of values so leverage and size affecting more to credit rating and close to their average values.

Table 1

Summary of Results

Variable	r	$\overline{x}$	δ	β	t	$t - sig.$
Credit Rating	-	3.89			4.68	0.00
Profitability	-.093*	0.00078	0.3145	-0.270	-2.68	0.009
Liquidity	-.390*	0.24259	0.7736	-0.333	-4.022	0.000
Leverage	.155*	10.119	6.829	-0.119	-1.191	0.237
Size	.429*	18.546	1.344	0.526	5.336	0.000
R^2	0.362					
Adjusted R^2	0.355					
F Statistics	13.485					

*Significance level <0.01

Profitability and liquidity have a **t** value i.e. -2.680 and -4.022 which shows it is negatively effecting credit rating of banks but they are significant because their values are more than 1.96 at a significance level 0.05.Leverage is not significant because of two reasons its value is less than 1.96 and it also has a negative effect on credit rating. Firm size influences credit rating more than other factors and also significant. Equation shows dependency of credit rating on constant, profitability,

liquidity, leverage and size. Other constant has positive relation with credit rating. Profitability, liquidity and leverage are negatively affecting credit rating. Most significant is firm size. Among all credit rating has low dependency on leverage because it shows very less relation with credit rating and less significant. Size is a determinant of Capital structure due to its variable credit rating will be very much affected. Results of model summary shows that R Square is 36% which means profitability, liquidity, leverage and size has 36% variation in effecting or influencing credit rating of banks. When these determinants of optimal structure will be strong it positively affects credit rating and results shows there are 25% of error.

Conclusion

Objectives of research is to find relationship between profitability, liquidity, firm size and leverage and to find which factors more contributes towards credit rating and how credit rating influences optimal structure. If firm size will grow it increases firms creditability and investors will more rely on such firms because chances of that firms reduces due to high credit rating. Liquidity also has a significant effect on firm's creditability will increase because it has ability or has much current assets to pay short-term obligations i.e. liabilities. Profitability is negatively correlated with credit rating. Liquidity is strongly significant but has negative relationship with credit rating. Leverage has positive correlation with credit rating. Among all variables firm size is more significant with positive correlation with credit rating that means that in effectiveness of credit rating of any organization firm size plays a vital role. Recent work in Commercial banks stresses role of leverage in obtaining optimal capital structure, but this research shows mix of liquidity and firm size which influences credit rating and in return optimal capital structure. Find that in optimum a credit rating of banks is positively related with liquidity and firm size. Significance level of both of them is higher than other factors i.e. profitability and leverage. Hypothesize a greater liquidity and size impact for credit rating and our results support this contention.

References

ANAND, V., ZHANG, J., ALI, G. & MAKHIJANI, H. B. 2015. Economic Performance of China (1980–2014). *Journal of Economics and Sustainable Development,* 6**,** 45-58.

BANK, M. & LAWRENZ, J. 2010. Deposit Finance as a Commitment Device and the Optimal Debt Structure of Commercial Banks. *European Financial Management***,** no-no.

BRADLEY, M., JARRELL, G. A. & KIM, E. 1984. On the existence of an optimal capital structure: Theory and evidence. *The journal of Finance,* 39**,** 857-878.

CHEN, C.-J. & YU, C.-M. J. 2011. FDI, Export, and Capital Structure. *Management International Review,* 51**,** 295-320.

CHEN, N. & KOU, S. G. 2009. CREDIT SPREADS, OPTIMAL CAPITAL STRUCTURE, AND IMPLIED VOLATILITY WITH ENDOGENOUS DEFAULT AND JUMP RISK. *Mathematical Finance,* 19**,** 343-378.

CHOWDHURY, A. & CHOWDHURY, S. P. 2010. Impact of capital structure on firm's value: Evidence from Bangladesh. *Business and Economic Horizons,* 3**,** 111-122.

DOUKAS, J. A., GUO, J. & ZHOU, B. 2011. 'Hot' Debt Markets and Capital Structure. *European Financial Management,* 17**,** 46-99.

DRIFFIELD, N., MAHAMBARE, V. & PAL, S. 2007. How does ownership structure affect capital structure and firm value? Recent evidence from East Asia1. *Economics of Transition,* 15**,** 535-573.

DU, Y. & SUO, W. 2007. Assessing credit quality from the equity market: can a structural approach forecast credit ratings? *Canadian Journal of Administrative Sciences / Revue Canadienne des Sciences de l'Administration,* 24**,** 212-228.

FLOR, C. R. 2011. Asset Substitution and Debt Renegotiation. *Journal of Business Finance & Accounting,* 38**,** 915-944.

GAVISH, B. & KALAY, A. 1983. On the Asset Substitution Problem. *The Journal of Financial and Quantitative Analysis,* 18**,** 21-30.

HARDIN III, W. G. & WU, Z. 2010. Banking Relationships and REIT Capital Structure. *Real Estate Economics,* 38**,** 257-284.

HARRIS, M. & RAVIV, A. 1991. The theory of capital structure. *the Journal of Finance,* 46**,** 297-355.

HUANG, R. & RITTER, J. R. 2009. Testing theories of capital structure and estimating the speed of adjustment. *Journal of Financial and Quantitative analysis,* 44**,** 237-271.

J., H. & M., E. 2000. *Optimal capital structure.*

KIM, H., HESHMATI, A. & AOUN, D. 2006. Dynamics of Capital Structure: The Case of Korean Listed Manufacturing Companies*. *Asian Economic Journal,* 20**,** 275-302.

RIIS FLOR, C. 2008. Capital Structure and Assets: Effects of an Implicit Collateral. *European Financial Management,* 14**,** 347-373.

SARKAR, S. 2011. Optimal Expansion Financing and Prior Financial Structure*. *International Review of Finance,* 11**,** 57-86.

SIMERLY, R. L. & LI, M. 2000. Environmental dynamism, capital structure and performance: a theoretical integration and an empirical test. *Strategic Management Journal,* 21**,** 31-49.

STREBULAEV, I. A. 2007. Do Tests of Capital Structure Theory Mean What They Say? *The Journal of Finance,* 62**,** 1747-1787.

TITMAN, S. & WESSELS, R. 1988. The determinants of capital structure choice. *The Journal of finance,* 43**,** 1-19.