

## Human Capital and Determinants of Capital Structure: Empirical Evidence from Pakistan

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**Abstract:** The purpose of this study is to examine the relationship between human capital, capital structure determinants and leverage. Since several decades, capital structure has remained a puzzle. This study will further provide a logical explanation towards the factors affecting capital structure. Different capital structure theories (i.e. trade-off theory and pecking order theory) have been reviewed to construct proposition. Our analysis consists of 176 non-financial Pakistani companies listed on Karachi Stock Exchange over the period of 2003-2012. This study tries to investigate capital structure with a different perspective by investigating its relationship with human capital. It has been seen that there is a significant and negative relation between capital structure and human capital. Size, profitability, non-debt tax shield, liquidity and human capital remained negatively significant, whereas tangibility, growth and risk insignificant.

**Key words:** Capital structure • Leverage • Human capital • Corporate finance • Pakistan

### INTRODUCTION

Today's competitive environment has made the managers cautious and more aware about how to finance their business activities and manage capital structure. This development encourages the managers to focus on how to maximize the firm's overall value. Literature pertaining to capital structure has widely been categorized in two theories; trade-off theory and pecking order theory (Atiyet, 2012) [1]. Trade-off theory actually supports the leverage to construct capital structure by assuming leverage-benefits. Through balancing the gains from interest payments and costs of issuing debt, the most advantageous level of leverage can be achieved. Financially, debt is considered beneficial because of the debt-tax-shields that help to minimize expected tax bills and maximize the after-tax cash flows (Modigliani & Miller, 1958) [2]. Hence, trade-off theory predicts the cost and benefit analysis of debt financing to achieve optimal capital structure. On the contrary, the other prominent theory related to capital structure is pecking order theory that focuses to finance firm operations with its internally generated sources first, i.e. retained earnings rather than issuing debt and equity (external financing). Pecking order theory (Myers, 1984 [3]; Myers & Majluf, 1984 [4]) argues to minimize the firm's insiders-outsiders issues related to information asymmetry by following a particular financing

hierarchy. The theory gives a clear idea that the managers first prioritize the retained earnings to finance their activities and if they need more funds, they choose to issue debt, lastly when issuing more debt makes no sense, equity is issued.

This paper looks into a different dimension, which investigates the relationship between leverage and human capital. Human capital (HC) can be defined as a broad idea which identifies characteristics of humans which increase income. It is usually obtained to include knowledge and skills of people, attained in part through education, although can also incorporate their vitality and strength. A very few recent studies, i.e. Akyol and Verwijmeren (2013) [5] and Chemmanur *et al.* (2013) [6], have tried to investigate the relationship between leverage and human capital. These both groundbreaking studies belong to United States. Both studies tried to investigate the impact of leverage on human capital. This study tried to examine the reverse relationship, i.e. impact of human capital on leverage. As per our knowledge, no such study has until been conducted in any developing economy which investigates this kind of relationship.

**Literature:** An essential matter in corporate finance involves understanding of how firms choose their financing choices and it is apparent that there is no consensus on theories that explains a firm's perfect capital

structure (Seifert & Gonenc, 2008) [7]. Modigliani and Miller (1958) [1] initiated the first study on capital structure which hashes out that the capital structure is immaterial in a corporate world without taxes, transaction costs or other market imperfections.

**Modigliani-Miller Theorem:** This innovative study was presented by Modigliani and Miller (1958) [1] on an assumption that there is the existence of market perfection in capital market. Therefore, the market operates without transaction costs and bankruptcy costs and information is available for everyone in the market. Modigliani and Miller (1958) [1], in other words, asserted that financing decisions of firms are undertaken with identical interest rate and without tax. As a result, cost of equity is same for firms which are, both, leveraged and non-leveraged. For the non-leveraged firm, premium is included for financial risk. Ultimately, these assumptions are pointing out that value of the firm is independent to its capital structure. Modigliani and Miller (1958) first began this groundbreaking work on capital structure in the field of Corporate Finance. According to MM Theorem, in perfect capital markets no impact of leverage can be seen on firm value. This theorem documented that firm's value is not affected by debt-equity ratio.

**Trade-off Theory:** Trade-off theory by focusing on cost and benefit analysis of debt predicts that there is an optimal debt ratio which helps to maximize the value of a firm. Optimal point can be hit when the benefits of debt issuance countervails the increasing present value of costs related to more debt issuance (Myers, 2001). Major benefit of debt is to minimize the interest payments. Such benefits stimulate firms to use debt. Miller (1977) explains this simple effect gets complicated with the existence of personal taxes and sometimes with non-debt tax shields. Moreover, equity issuance means to move away from optimum therefore this can be considered as a bad news. Myers (1984) [8] further documented that they would opt to issue equity if they feel it is mispriced in market. On the contrary, investors become conscious that the equity issuance is fairly priced or mispriced. Consequently, equity issuance leads investors to react negatively and management doesn't show any interest to issue equity.

**Pecking Order Theory:** Pecking order theory, proposed by Myers (1984) [8], explains that firms most likely prefer to finance new investments, first with internally raised funds, i.e. retained earnings, then with debt and issue equity as a final resort. This theory explains the financial

decision making of the firms. According to Shyam-Sunder and Myers (1999) [9], pecking order theory anticipates the impacts of profits correctly. Whereas, according to Fama and French (2002) and Frank and Goyal (2003a) [10], the theory has few other complications as well. As currently, it is not that much helpful in managing firms financial resources.

**Human Capital Theory:** Adam Smith defined human capital as the skills (intellectual, physical and psychological) and the way an individual adapts to judge about different things (Smith, 1937) [11]. It is developed from both the experience and formal schooling (Naslmosavi *et al.* 2013) [12]. Shulutz (1961) [13] and Becker (1964) [14] presented the concept of human capital in the mainstream academic research during 1960s. Since then, it has fuelled considerable debate among researchers.

**Explanatory Variables:** With respect to explanatory variables, this study follows the literature and considers the five most commonly-used variables for determining leverage, namely (asset) tangibility, growth opportunities, profitability, non-debt tax shields and firm size (Rajan & Zingales, 1995 [15]; Lemmon *et al.* 2008) [16]. In addition, two more variables, i.e. business risk and liquidity have also been added to make the study more comprehensive and to have a closer look into capital structure decisions' phenomenon. Further description of the variables is as follows:

**Firm Size:** In determining the capital structure of a firm, size plays an important role (Booth *et al.* 2001 [17]; Abor & Biekpe, 2009) [18]. Harris and Raviv (1991) [19], Rajan and Zingales (1995) and Wald (1999) [20] provide evidence that the large firms are usually highly leveraged. In addition, the cost of debt and equity financing is inversely related to firm size. Lower expected bankruptcy costs enable large firms to take on more debts, as they have easier access to the market and can borrow at better conditions. However, negative relationship between size and capital structure has also been reported by few studies (Titman & Wessels [21], 1988; Kouki & Said, 2012 [22]).

Research conducted by Frank and Goyal (2003b), presents the evidence that size is generally consistent with trade-off theory. A little support has been found by Newman *et al.* (2011) [23] between size and pecking order theory of capital structure. A positive relationship is expected between a firm's size and leverage (Harris &

Raviv, 1990 [24]; Bevan & Danbolt, 2002 [25]; Hernadi & Ormos, 2012) [26]. To measure firm size (SIZE), natural logarithm of total assets will be used as a proxy (Chen, 2004) [27].

**Tangibility:** Tangibility is also considered as an important determinant of capital structure. According to Harris and Raviv (1991), firm's asset structure has great liquidation value. However, more collateral would result if the firm has more tangible assets. According to pecking order theory, if the firm has more tangible assets then this would help it to reduce agency cost and information asymmetry problems. Secured debt carries lower agency costs than those of unsecured debt. It has been revealed by few researchers that firm's tangibility is consistent with pecking order theory (Allen, 1995 [28]; Michaelas *et al* [29]. 1999; Amidu, 2007 [30]). According to the approach of static trade-off, firms with more fixed assets serve as collateral for new loans, favouring debt (Hijazi & Tariq, 2006) [31].

This study expects positive relation between tangibility (TANG) and leverage (Rajan & Zingales, 1995; Delcours, 2007 [32]; Chen *et al.* 2013). We use fixed assets over total assets (FA/TA) as a proxy to determine tangibility of firms (Chakraborty, 2013) [33].

**Profitability:** Chen and Chen (2011) [34] findings suggest that profitability can be considered as an explanatory variable of capital structure. Effect of profitability on leverage is equivocal. More profitable firms have sound availability of internal financial resources. This suggests that when the firms are running short of internal funds they seek for debt financing and this relates to pecking order theory (Vanacker & Manigart, 2010) [35].

The trade-off model shows that profitable firms will employ more debt, since they are more likely to have a high tax burden and low bankruptcy risk (Ooi, 1999). We expect negative relation between profitability and leverage, empirical evidence has shown that profitability is negatively correlated with debt ratios (Bevan & Danbolt, 2002). Profitability (PROF) is measured as earnings before interest and tax over total assets (EBIT/TA) as previously measured by Booth *et al.* (2001) and Tongkong (2012) [36].

**Growth:** Myers (1977) pointed out that high-growth companies will give up investment programs with a positive net present value to increase corporate value and shareholder wealth. Therefore, the company's growth opportunities have a significantly positive impact on

corporate value (King and Santor [37], 2008; Tongkong, 2012). According to trade-off theory, if companies with greater growth opportunities have more retained earnings, then, they issue more debt to maintain the target debt ratio and thus, they will tend to have a higher capital structure.

We assume that this variable is negatively correlated with capital structure decisions (Flannery and Rangan 2006). To measure growth, this study used a method that was adopted from Chen (2004), Delcours (2007) and Hernadi and Ormos (2012), i.e. by applying the geometric average of five-year sales growth to total asset growth.

**Non-Debt Tax Shield:** According to DeAgelo & Masulis (1980) [38], non-debt tax shields (NDTS) are alternates for the tax benefit of debt financing. Hence, when tax deduction increases, it decreases the tax advantage for debt financing. In accordance with pecking order theory, there is an inverse relation between NDTS and financial leverage. Moore (1986) [39] and Scott (1977) [40] present that the substantial NDTS can be an attractive collateral to help increase the leverage ratio, which supports positive relationship between NDTS and capital structure.

Different authors present different findings regarding NDTS. Shahjahanpour *et al.* (2010) [41] provided evidence on the negative relationship between the NDTS and leverage. Hernádi & Ormos (2012) reject negative impact of NDTS. Ramlall (2009) findings showed NDTS was found to be impotent.

We expect negative relationship between NDTS and leverage (Huang and Song, 2006 [42]; Hernadi and Ormos, 2012). Following Akhtar and Oliver (2009) [43], we define non-debt tax shield as total annual depreciation expense divided by book value of total assets.

**Business Risk:** As stated by Bauer (2004)' [44], volatility or business risk may be considered as the proxy for firm's risk. Leverage ratio can be less if a firm has less risky position. Therefore, generally, there is a presumption of inverse relation between capital structure and volatility. On the basis of the results presented by Hsia (1981) [45], Huang and Song (2002) state, "As the variance of the value of the firm's assets increases the systematic risk of equity decreases. So the business risk is expected to be positively related to leverage". Kim and Sorensen (1986) [46] and Huang and Song (2002) also confirm this relation. However, Bradley *et al.* (1984) [47] and Titman and Wessels (1988) demonstrated the negative relation.

This study also expects the negative relation between business risk (RISK) and leverage (Dang *et al.* 2012) [48]. Standard deviation of return on assets over three years has been used as the proxy to measure business risk (Booth *et al.* 2001; Hernadi and Ormos, 2012).

**Liquidity:** Net effect of liquidity on capital structure is unidentified and it has both the positive and negative impacts (Mouamer, 2011) [49]. Firms having high liquidity ratio may have high debt level because of their need to meet debt obligations. This suggests a positive relation between liquidity and capital structure. On the other hand, having more liquid assets, shows that these assets would be utilized as the financing source in future. Hence, this suggests negative relation between capital structure and liquidity.

This study hypothesizes negative relation between the capital structure and liquidity (de Jong *et al.* 2008) [50]. To measure liquidity, this study employs the ratio of current assets over current liabilities (Mouamer, 2011).

**Human Capital:** Although, the theoretical and empirical literature on the relation between human capital and capital structure is still rare, but there are quite a few recent studies available. The main finding of study presented by Akyol and Verwijmeren (2013) is that there is a positive relation between wages paid to the employees and leverage, which means firms with higher leverage must pay higher wages to their employees or it will be difficult for them to hire employee in a competitive labor market (Titman, 1984; Maksimovic & Titman, 1991; Berk *et al.* 2010). Furthermore, another recent study by Chemmanur *et al.* 2013 tests the theoretical propositions presented by Berk *et al.* (2010) [51]. Chemmanur *et al.* (2013) conclude that there is a significant and positive relationship between leverage and average employee pay. In addition, there is a significant and positive effect of leverage on average employee pay for those firms which are financially safe, but insignificant effect for those firms which are financially distressed. They also conclude that in nontechnology firms the impact of leverage on average employee pay is greater than in technology firms, because the employees working in nontechnology firms can be viewed as more defensible (Berk *et al.* 2010).

This study demonstrates the results obtained by investigating the impact of human capital along with other capital structure determinants on leverage and expects positive relation between human capital and leverage. Following Ting and Lean (2009) [52], human capital is measured by total salaries and wages of a firm.

*HC = Total salaries and wages of a firm*

## MATERIALS AND METHODS

On the basis of academic literature, independent variables and dependent variable have been selected. Consequently, methodology has been described here to test different hypotheses and analyze those variables empirically. To construct the model, panel data techniques will be used. Panel data consists of both the time-series elements and cross-sectional elements; time-series elements reflect the time period of the study (2003-2012) and cross-sectional element reflect non-financial companies.

$$LEV = \beta_0 + \beta_1(SIZE)_{it} + \beta_2(TANG)_{it} + \beta_3(PROF)_{it} + \beta_4(GROW)_{it} + \beta_5(NDTS)_{it} + \beta_6(RISK)_{it} + \beta_7(LIQ)_{it} + \beta_8(HC) + \varepsilon_{it}$$

Where:

LEV = Leverage ratio of a firm  
 SIZE = Size of a firm  
 TANG = Tangibility of a firm  
 PROF = Profitability of a firm  
 GROW = Growth of a firm  
 NDTS = Non-debt tax shields of a firm  
 RISK = Risk of a firm  
 LIQ = Liquidity of a firm  
 HC = Human capital of a firm

**Data:** Data was collected from State Bank of Pakistan (SBP), which publishes balance sheet analysis every year. This study excludes the financial institutions, as their financial policies differ from that of non-financial companies and financial companies themselves are the sources of financing. This study conducts the analysis of 176 non-financial listed companies of Pakistan for the year 2003 and 2012.

**Dependent Variable:** The term capital structure may be very comprehensive and may be defined and measured differently. However, from the explanation that is given above should clarify this that the measure of capital structure here in this study is leverage. Hence, it would be appropriate to discuss about the methodology employed in this study to measure capital structure.

Following Michaelas *et al.* (1999) and Haron (2014) [53], this study measures dependent variable by leverage ratio (LEV), that is, total debt to total assets.

$$\text{Leverage (LEV)} = \frac{\text{Current Liabilities} + \text{Non-Current Liabilities}}{\text{Total Assets}}$$

## RESULTS AND DISCUSSIONS

This sections hashes out the implications of empirical findings and poses the estimation results. The table below presents the summary of statistics of dependent and explanatory variables. The leverage ratio shows that 53.91 percent of the assets of the firms are financed by debt, during the period of the study, which remained higher than some other developing and G-7 countries<sup>1</sup> [54-61].

The results showed that the level of significance remained higher (Sig = 0.01), which proves that the human capital remained significantly correlated to leverage. Correlation between these two variables remained negative, which means that the increase in expenditure on human capital increased the debt level.

Table 1: Descriptive Statistics

Variable	N	Mean	Minimum	Maximum	Std. Deviation
LEV	1760	0.5391	0	1.57	0.24326
SIZE	1760	14.8333	6.15	20.12	1.9309
TANG	1760	0.496	0	1.09	0.25988
PROF	1760	0.1085	-0.77	0.93	0.1546
GROW	1760	0.1141	-1.5	1.23	0.40361
NDTS	1760	0.0387	0	0.13	0.02057
RISK	1760	0.0438	0	0.19	0.02862
LIQ	1760	1.0256	-0.91	2.62	0.49774
HC	1760	0.0508	0	0.21	0.0396

Table 2: Correlation

Variable	LEV	SIZE	TANG	PROF	GROW	NDTS	RISK	LIQ	HC
LEV	1								
SIZE	-.053*	1							
TANG	.028	-.203**	1						
PROF	-.182**	.225**	-.107**	1					
GROW	-.020	.092**	-.018	.154**	1				
NDTS	-.090**	-.043	.105**	.109**	-.009	1			
RISK	-.032	-.017	-.042	.062**	-.021	.044	1		
LIQ	-.341**	.227**	-.338**	.261**	-.027	-.008	-.012	1	
HC	-.117**	-.023	-.140**	.146**	.030	.120**	.105**	.132**	1

Dependent Variable: LEV. Asterisks denote significance level \*p<0.05; \*\*p<0.01.

Table 3: Regression Analysis (Ordinary Least Squares)

Independent Variable	Coefficient	t - Value	P - Value
SIZE	.003	.985	.325
TANG	-.091	-4.061	.000
PROF	-.136	-3.615	.000
GROW	-.011	-.847	.397
NDTS	-.758	-2.837	.005
RISK	-.221	-1.165	.244
LIQ	-.171	-14.233	.000
HC	-.368	-2.611	.009
R <sup>2</sup>	0.145		
Adj. R <sup>2</sup>	0.141		
F - Value	37.07**		0.000

Dependent Variable: LEV. Asterisks denote significance level \*p<0.05; \*\*p<0.01.

## CONCLUSION

According to empirical findings (Table 2), size, profitability, non-debt tax shield, liquidity and human capital showed negative and significant relationship with the leverage ratio, which demonstrates that the big and profitable firms having more liquid assets tend to decrease their leverage. Size showed negative correlation with leverage, which contradicts the trade-off theory and supports the findings of (Ramlall, 2009; Kouki and Said, 2012). However, tangibility, growth and risk remained insignificant.

More importantly, key contribution of this study was to examine the impact of human capital on capital structure and to explore how companies behave towards external debt financing when they spend more on their employees. In this regard, a pioneer study conducted by Hovakimian and Li (2011) tried to investigate this association, i.e. effect of HC on leverage, but remained unsuccessful to get any significant results. However, results of this study showed that the Pakistani firms which spend and invest more on their human capital tend to lessen their external debts and rely more on internally generated funds. In addition, further research is required to see the differences among results by employing Generalized Method of Moments (GMM) estimation model.

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