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# Extension of determinants of capital structure: Evidence from Pakistani non-financial firms

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**This study tried to determine the influence of set of explanatory variables on the capital structure determination for Pakistani non-financial firms by using panel data. This study also finds the applicability of two capital structure theories (pecking order theory and trade-off theory) in Pakistani non-financial sector. This study used five previously studied variables (profitability, size, growth, tangibility of assets, non-debt tax shield), and added three new variables (tax, liquidity and payout), which were not used previously in Pakistani context. This research used data from 336 non-financial firms over the period of 5 years (2005-2009). This study used fixed effect random model regression analysis to analyze determinants of capital structure. The results showed that industry type play important role in determining capital structure. The results showed that out of eight variables five (size, tangibility of assets, non-debt tax shields, liquidity and payout) are statistically significantly related to leverage, remaining three are statistically insignificantly related with leverage. Two expected relation are accepted while six are rejected after empirical analysis. This study identifies that industry type, liquidity and payout ratio play important role, whereas tax does not play important role in identifying capital structure Pakistani non-financial firms.**

**Key words:** Determinants, capital structure, pecking order theory, trade-off theory.

## INTRODUCTION

One of the important decisions that firms managers are concerned with is relating capital structure. The capital structures of financial and non-financial firms are different because of different nature of operations and financial conditions. All non-financial firms are mainly associated with production, therefore, their main requirement for capital is to acquire production facilities such as buildings, machineries, equipment and raw material.

Numbers of theories are presented relating capital structure, starting point is considered as Irrelevance theory, presented by Millers and Modigliani (1958).

Millers and Modigliani (1958) argued that external borrowing has no effect on firm's value. Irrelevance theory assumes certain conditions; later on researchers found that all assumptions have significant effect on capital structure determination. Two main theories, that is, Pecking order theory (POT) and Trade-off theory (TOT) play important role in determining capital structure. This study investigated the impact of both POT and TOT in determining capital structure of non-financial firms. POT assumes that firms meet their capital requirement through internal funds use first, before going for external borrowing and equity issuance. POT also argued that the firms do not have any target leverage ratio (Mayers and Majluf, 1984; Mayers, 1984). Therefore firms use following capital preferences, that is, accumulated earnings, short term borrowing, long term borrowing and equity issuance in order to meet their capital requirements (Donaldson, 1961). According to TOT, firms assume target debt ratio by balancing the costs and

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**Abbreviations:** POT, Pecking order theory; TOT, Trade-off theory.

benefits of equity and debt. The TOT assumes that target debt ratio maximizes the firm value and reduces external claims (Titman, 1984).

Over the last ten years numerous studies have been conducted on capital structure determinants, but most studies were based on developed countries data (Mira, 2002; Frank and Goyal, 2002; Bevan and Danbolt, 2002; Daskalakis and Psillaki, 2005; Mazur, 2007; Elsas and Florysiak, 2008; Serrasqueiro and Ragao, 2009).

There are also studies conducted by using developing countries data (Kester, 1986; Allen and Mizuno, 1989; Diranyeh, 1992; Bennett and Donnelly, 1993; Kunt and Maksimovic, 1994; Lasfer, 1995; Panday, 2001; Ak-Sakran, 2001; Omet and Nobanee, 2001; Al-Hayjneh, 2001; Bhaduri, 2002; Fattouh, 2003; Chen, 2004; Bauer, 2004; Bauer, 2004; Delcoure, 2007; Teker et al., 2009; Chakraborty, 2010).

In Pakistan limited work had been done relating determinants of capital structure. Shah and Hijazi (2004) had done initial work on determinants of capital structure. Later on, previous work was extended by Shah and Khan in 2007 by using panel data regression analysis and new variables. Hajazi and Tariq (2006) conducted study by using cement industry data, and Rafiq et al. (2008) worked on Chemical industry data. Waliullah and Nishat (2008) worked on the dynamics of capital structure.

This study added three (tax, liquidity, payout ratio) new determinants of capital structure for Pakistani non-financial firms.

This study used eight firm level determinants of capital structure on the basis of previously used variables, less commonly used variables and most importantly on the basis of availability of data for maximum number of non-financial firms. Other variables can also be used but the data for most of variables is missing. Therefore only those variables are used for which complete data is available.

## LITERATURE REVIEW

### Previous studies conducted in developing countries

According to 'Irrelevance theory' of presented by Millers and Modigliani (1958), studies relating capital structure are divided into two groups, that is, capital structure determinants and effects of capital structure on firm's value.

This study relates to the first group. Myers (1977) proved a significant relation between operating risk and leverage. Ferri and Jones (1979) used four determinants of capital structure, that is, business risk, industry type, operating leverage and firm size. The results proved that firm size and operating leverage are significantly related to leverage. The previous research of Carleton and Silberman (1977) and Marsh (1982) showed that independent variables including fixed assets, growth

opportunities, operating risk, firm size, and non-debt tax shields were positively related with leverage. Variables such as expenditures of advertisement, research and development, insolvency, volatility of earnings, profitability, and uniqueness of products were negatively related with leverage.

In 1981 Aggarwal ignored industry type as variable and used growth rate, international risk and profitability and showed that they are not significantly related with leverage. Aggarwal argued that country effect is an important factor in determining capital structure. According to Park (1998) national culture can also be used as an independent variable.

Myres and Majluf (1984) proved that capital structure is positively correlated with firm size, while profitability can either be negative or positively related to leverage. De Angelo and Masulis (1980) analyzed non-debt tax shield as determinant and argued that non-debt tax shield like depreciation is replicable by tax deduction of interest payments. Kim and Sorensen (1986) proved that non-debt tax shield is negatively associated with leverage, but researches by Homaifar et al. (1994) and Ozkan (2001) proved significant positive relation between non-debt tax shields and leverage. By using dividend policy Smith and Warner (1979) showed a significant relation among dividend policy and capital structure.

Kester (1986) had conducted a comparison study between U.S and Japanese firms; he showed that profitability is significantly negatively related to leverage. Allen and Mizuno (1989) by using book and market value of Japanese companies found a negative association between leverage and profitability. Rajan and Zingales (1995) conducted research by using G7 countries data for comparing the capital structure and its factors. They concluded that the results of almost every sample country were similar but some were different due to some other factors like taxation policies and insolvency or bankruptcy. They also observed that determinants of capital structure for U.S (tangible assets; size, profitability and growth) were of same importance for the rest of other developing countries.

Kunt and Maksimovic (1994) used ten developing countries sample and found that liquidity, assets, and industry effects were more significantly related than firm size, firm growth and tax effects. These results also proved that leverage is negatively related to net fixed assets, suggesting inefficiency in long-term debt market working in developing countries. Booth et al. (2001) also used ten developing countries data. They used assets tangibility, average tax rate, size, business risk, profitability as independent variables. The results showed that the more profitable the firm having free internal cash flow, the lower the debt ratio. Booth et al. (2001) argued that the variables affecting the leverage in developed countries have the same significant affect on the debt ratio in developing countries. The long-term borrowings in developing countries were lower than those of developed

countries due to the agency costs of borrowing are high in developing economies.

Bennett and Donnelly (1993) conducted a study by taking UK firms into consideration and showed that capital structure decision is effected by profitability, assets structure, non-debt tax shield and size. In addition Homaifar et al. (1994) proved that inflation is positively related to leverage.

In India, Bhaduri (2002) found that assets structure, uniqueness, firm size, growth, and cash flows significantly influence the capital structure of firms. They proved that small size firms are mainly more dependent on short-term borrowing whereas the large firms are more dependent on long-term borrowing.

Deesomsak et al. (2004) proved that liquidity, firm size, share price performance and non-debt tax shield play influencing role in determining the leverage level in the Australian and Eastern Asian firms. The results proved that these four variables were positively related with leverage. In most countries firm size and capital structure were positively related.

Huang and Song (2005) used that data from Chinese market and empirically proved that leverage was negatively associated with managerial shareholdings, non-debt shields, firm growth opportunities, profitability, where as positively associated with tangibility of assets and firm size. Fattouh et al. (2005) showed that profitability, firm size, non-debt tax shields and tangibility of assets were positively related to leverage.

Delcours (2007) conducted study by using Central and Eastern European countries data. In this study Delcours showed that non-debt tax shield, assets tangibility and taxes were positively related to leverage, where as negative exist between leverage and profitability. Teker et al. (2009) analyzed the Turkish firm's data and found that return on assets, tangibility of assets were statistically significantly positively associated with the firms leverage. Shahjahanpour et al. (2010) does not used the most commonly used variables but used variables that were not often used, these variables are product uniqueness, dividend policy, non-debt tax shields, liquidity, and effective tax rate.

In recent study in India, Chakraborty (2010) found that profitability, size of firms and uniqueness are positively related to leverage, where as assets tangibility and non-debt tax shields are positively related to leverage. The study showed contradicting results relating growth opportunity as two models used given the opposite results. In Pakistan Shah and Hijazi (2004) used four explanatory variables (growth, profitability, tangibility and size). In 2007 Shah analyzed textile industry data and used three explanatory variables (size, tangibility and profitability). In Pakistan Hajizi and Tariq (2006), Shah and Khan (2007), Rafiq et al. (2008), and Walliulah and Nishat (2008) used profitability, tangibility, size, growth, volatility of earning, and non-debt tax shields as explanatory variables in their studies.

## **Firms level determinants of capital structure**

This study used eight firm level determinants of capital structure on the basis of previously used variables, less commonly used variables and most importantly on the basis of availability of data for maximum number of non-financial firms. There are many other variables that can be used to determine the capital structure of non-financial firms of Pakistan such as research and development expenses (R and D), but the problem is availability of R and D data for all firms. Therefore in this study only those variables are selected for which majority of firms had data.

### ***Profitability***

There exist two opposite views relating relationship between profitability and leverage. POT assumes that firm first uses its accumulated earnings and then goes for external financing. Therefore most profitable firms uses internal financing (Myers, 1984), results in reducing the firm leverage level. As a result POT assumes negative relationship between leverage and profitability.

Long and Malits (1985), Baskin (1989), Michaelas et al. (1999), Al-Sakran (2001), Doberz and Fix (2003) and Chen (2004) have empirically proved negative relation between leverage and profitability.

Studies conducted by using Pakistan firm's data by Shah and Hijazi (2004), Shah (2007), Hajazi and Tariq (2006), Shah and Khan (2007), Rafiq et al. (2008), Walliulah and Nishat (2008) empirically proved negative relationship between leverage and profitability.

According to TOT, firms are expected to have stable cash flows, and are having more debt serving capacity. The increase in debt and stable cash flows provides more benefits as interest payments are tax deductible, results in reduction in cost of capital. Jensen (1986) argued that firms with free cash flows and expected stable cash flows should get benefit of leverage. The increase level of leverage provides reduction in tax payments and prevents the blockage of free cash flow, resulting in increase in liquidity for firm. Hence TOT assumes positive relationship between leverage and profitability.

### ***Size***

POT assumes that there is negative relation between firm size and leverage. The larger size more information will be disclosed by firms to the outsiders as compared to the small sized firms. Larger firms with less asymmetry of information may issue equity more than external financing (Rajan and Zingales, 1995). The small firms with asymmetry of information would not be able to raise equity because of undervaluation of equity, and no collateral for long term debt, as a result short term debt can be used

by small firms. Mazur (2007) and Chakraborty (2010) proved empirically negative relationship between leverage and firm size.

According to TOT larger firms are well diversified, having stable cash flows and their chances of bankruptcy are less as compared to small firms. Therefore larger firms prefer leverage and are having high level of leverage (Mayers and Majluf, 1984). Due to the large size, high level of fixed assets, economics of scale, stable cash flow and creditworthiness larger firms have the bargaining power over lender and can borrow at relatively lower rate (Marsh, 1982).

Scott (1972), Carleton and Silberman (1977), Marsh (1982), Mayers and Majluf (1984), and Wiwattanakantang (1999) found empirically positive relation between firm leverage and firm size. Studies conducted by using Pakistan firms data by Shah and Hijazi (2004), Rafiq et al. (2008), Hajazi and Tariq (2006), Shah and Khan (2007), and Walliulah and Nishat (2008) empirically proved positive relation between leverage and firm size, where as Shah (2007) found negative relation between leverage and firm size.

### **Growth**

POT assumes that growing firm requires high capital; internal funds are insufficient to meet requirements, and so firms use external borrowing. This results increase in level of leverage.

Hence POT assumes positive relationship between leverage and growth (Drobez and Fix, 2003). Marsh (1982) argued that the firms having high growth opportunity are having high debt ratio. The firms with higher growth opportunity may invest in high risk projects, increasing the chances of bankruptcy and lowering the opportunity of growth to zero (Myers, 1984; Harris and Raviv, 1990). This makes creditor reluctant to lend funds at lower rates or for long term (Mayers, 1977). To full fill capital needs firms can use short term debt or convertible bonds, resulting in positive relationship between short term debt or leverage and growth. Marsh (1982); and Cassar and Holmes (2003) have proved empirically positive relation between leverage and firm growth.

Studies conducted using Pakistan firms data by Shah and Hijazi (2004), Shah (2007), Hajazi and Tariq (2006), Shah and Khan (2007), Rafiq et al. (2008), Walliulah and Nishat (2008) empirically proved negative relationship between leverage and firm growth.

### **Tangibility of assets**

Fixed assets play important role in leverage level of firms. The firms with higher level of fixed assets have higher tendency of external borrowing by keeping fixed assets as collateral.

The firms having fixed assets would keep fixed assets as collateral with the lender. On default, tangible assets would be seized, preventing firms from bankruptcy or from incurring agency costs. Thus, firms having fixed assets would more actively use leverage because of fewer chances of bankruptcy and hence positive relationship exists between leverage and fixed assets.

Berger and Udell (1998) argued that lending by the banks depend on the collateral provided by the firms. Similarly, firms having fixed assets can borrow at lower rates because of their ability to provide assets as collateral (Jensen and Meckling, 1976). This reduces the risk bearded by the lenders and increased firms debt level. The firms having high level of fixed assets would prefer to borrow by using tangible assets as collateral because of high equity issuing costs and asymmetry of information makes the issued equity undervalued (Scott, 1977). Feri and Jones (1979), Titman and Wessels (1988), and Chakraborty (2010) supported empirically the positive relation between leverage and tangible assets.

Studies conducted using Pakistan firms data by Shah and Hijazi (2004), Shah (2007), Hajazi and Tariq (2006), Shah and Khan (2007), Rafiq et al. (2008) and Walliulah and Nishat (2008) empirically proved positive relation between leverage and tangibility of assets.

### **Non debt tax shields**

The non-debt tax shield reduces the level of earnings, which results in the reduction of expected level of interest tax savings and reduces the advantage of using high debt financing. If the firm has non-debt tax shield advantage, then they can rely on them, because of bankruptcy costs of increasing debt or chance of losing any debt tax advantage (De Angelo and Masulis, 1980).

TOT suggests the greater use of debt to take advantage of the interest tax shields, hence a positive relation is suggested between tax and debt, but here it is assumed that if firm has non-debt tax shield then it should be used, which makes the lower interest tax benefit for firms having high debt. Therefore, TOT assumes a negative relationship between leverage and non-debt tax shields. Many researchers have suggested that depreciation deduction and investment tax credits can be used as non-debt tax shields and they can be used as alternative to the interest deduction benefit of the debt financing. Most of studies had found negative relationship between leverage and non-debt tax shields (Huang and Song, 2006). Shahjahanpour et al. (2010) and Chakraborty (2010) found positive relationship between leverage and non-debt tax shields.

### **Tax**

Mayers and Majluf (1963) argued that firms would finance entirely through external financing because of tax

deductions of interest payments, however this assumption would not apply if debt is interest free. According to TOT with the increase in effective tax rate external borrowing of firm increases.

Therefore, a positive relationship exists between leverage and effective tax rate.

MacKie (1990), Huang and Song (2006), and Shahjahanpour et al. (2010) proved positive relationship between tax and leverage.

### Liquidity

There are two opposite views relating the relationship between liquidity and leverage.

According to TOT the more liquid firm would use external financing due to their ability of paying back liabilities and to get benefit of tax-shields, resulting in positive relationship between liquidity and leverage.

POT assumes that the more liquid firm would use first its internal funds and would decrease level of external financing, resulting in negative relation between liquidity and leverage. Most studies have found the negative relationship (Mazur, 2007; Shahjahanpour et al. 2010). In this study negative relationship between liquidity and leverage is expected.

### Payout ratio

Dividend policy is mainly ignored in empirically studies in determining the capital structure.

Beattie et al. (2004), and Frank and Goyal (2004) found that dividend policy proved to be very important determinant in their analysis.

The dividend payment by the firms decreases the level

of internal funds, resulting in the increase in demand for external financing. This results in positive relationship between leverage. POT also supports the positive relationship, but this theory disagrees when there are sufficient internal funds with the firm. So according to POT, firm should first use its internal sources then should go for borrowing. Beattie et al. (2004) argued that growth opportunity and profitability are closely associated with the firm dividend policy of firms. When firm pay dividend to shareholders its internal funds decreases, resulting in lowering of funds for investment. When firm is expecting growth then it would adjust its dividend payout in such way that it would have sufficient funds for investment. In this study dummy variable is used for payout ratio. In Pakistan firms do not pay dividend every year therefore the number of firms paying dividend each year of time period under consideration becomes very small, for this reason dummy variable was used. This enables more firms to qualify for analysis. In this study "1" was assign to the firms paying dividend in given year and "0" was assign to the firm's not paying dividend. Shahjahanpour et al. (2010) found positive relationship between payout ratio and leverage. The Table 1 shows the measurement and expected signs of the independent variables.

## MATERIALS AND METHODS

In this study panel data regression analysis was used to determine relationship between leverage and eight independent variables. The panel data consist of both time series (5 years data) and cross sectional data (non-financial firms). This study analyzed 336 non-financial firms (cross sectional units) over five years, as same five years data is collected for all firms this type of panel is known as balanced panel.

Fixed effect approach and random approach are used in the panel data regression analysis. This study used fixed effect model regression analysis. The model with eight variables is given as:

$$LVG_{it} = \beta_1 + \beta_2 PRO_{it} + \beta_3 SZ_{it} + \beta_4 GRW_{it} + \beta_5 TNG + \beta_6 NDTs_{it} + \beta_7 TAX + \beta_8 LIQ + \beta_9 PYOUT + \mu_{it} \quad (1)$$

Where  $\beta_1$  = intercept (has constant value),  $\beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ , = the slope of coefficients,  $\mu_{it}$  = error term,  $i$  = cross sectional unit,  $t$  = time period, LVG = Leverage, PRO = Profitability, SZ = Size, GRW = Growth, TNG = Tangibility of assets, NDTs = Non-debt tax shields, TAX = Tax, LIQ = Liquidity, PYOUT = Payout ratio.

### Data and sample size

Panel data was used in this study. For each non-financial firm data was collected from State bank of Pakistan publication "Balance Sheet Analysis of Joint Stock Companies Listed on Karachi Stock Exchange 2004-2009".

Out of 417 non-financial firm's data given in 2009, 336 firms had fulfilled the data requirement of this study.

The sample size of this study was 336 non-financial firms with 5 years of data.

## EMPIRICAL ANALYSIS

### Descriptive analysis

The Table 2 shows the descriptive statistics of leverage and eight independent variables. The leverage had a mean (median) value of 0.702196 (0.660151), indicating that the total assets of non-financial firms are 70.2196% are financed through leverage. Remaining less than 30% are financed through equity. The percentage of debt is high as compared to the equity because most of the non-financial firms are capital intensive and require high level of investments in fixed assets, machineries etc to start operations.

Profitability had a mean (median) of 0.070631 (0.069629), indicates that non-financial firms earns

**Table 1.** Variables, their measures and expected signs.

Determinant	Measures	Expected sign
Leverage	total debt/ total assets	
Profitability	profit before tax / total sales	-
Size	logarithm of total sales	+
Growth	percentage change in total sales	-
Assets tangibility	fixed assets or tangible assets / total assets	+
Non-debt tax shields	depreciation + amortization/ total assets	-
Tax	total tax / earnings before tax	-
Liquidity	current assets/ current liabilities	-
Payout ratio	Dummy variable used, 0 for no dividend payment, 1 for dividend payment	+

**Table 2.** Descriptive statistics of dependent and independent variables.

Variable	Mean	Median	Maximum	Minimum	Standard deviation
Leverage	0.702196	0.660151	9.117647	-0.128405	0.504954
Profitability	0.070631	0.069629	26.51903	-14.66667	0.87021
Size	7.27849	7.253364	13.32562	-0.510826	1.792523
Growth	4.772331	6.14169	70.7381	-0.987024	4.252983
Tangibility	0.510154	0.528738	0.992392	0	0.220479
Non-debt tax shields	0.036249	0.032974	0.546608	0	0.026289
Tax	0.156664	0.080493	51.24062	-34.66667	1.958385
Liquidity	1.501608	0.9505	95.55	-0.143	3.892494
Payout	0.379023	0	1	0	0.485288

7.0631% profit before tax on their total sales. The profit before tax is lower because of the greater use of leverage. The interest payments are already deducted before tax. Size registered the mean (median) of 7.27849 (7.253364), showing that there is 727.849% of increase in total sales of firms. This high percentage is mainly because of the inflation and increasing prices of goods.

Growth had a mean (median) of 4.772331 (6.14169) indicating that the sales of firms has increased by 477.2331% each year. The reason for the growth of firms is same as the size, that is, prices of the products had increased considerably over time.

Tangibility had a mean (median) of 0.510154 (0.528738), showing that of total assets 51.0154% are fixed assets as non-financial firms are mainly concerned with the production of goods, therefore they require machinery, equipments infrastructure etc for their operations. Therefore non-financial firms having most of their assets as fixed assets, whereas financial firms are more concerned with liquidity, hence they are having large portion of assets as current assets.

Non-debt tax shield had a mean (median) of 0.036249 (0.02974), indicating that 3.2974% of total assets are accounted to depreciation each year. This 3% value is high because as discussed before that non-financial firms had almost 52% investment in fixed assets. This shows that non-financial firms can rely on depreciation as non-

debt tax shield, because it reduces the earning before tax. Hence, less taxable income firm would be having, resulting in low tax payments.

Tax had a mean (median) value of 0.156664 (0.080493), registering that 15.664% of earning before tax is paid as tax by non-financial firms. This percentage is lower as compared to other countries, because most of the firms in Pakistan show negative earnings by implicitly showing higher values of raw material, lowering sales etc.

Liquidity had a mean (median) value of 1.501608 (0.9505), indicating that the firms had capital to pay back their current liabilities. After paying their liabilities they still had 0.501608 of excess current assets. This shows that firms meeting easily the current portion of their long term liabilities and had excess cash for their operations.

Payout (measured through dummy variable, 1 for the firms paying and 0 for not paying dividend in given year) had a mean value of 0.379023, indicating that 37.9023% of firms paid dividend to their shareholders, where as remaining firms do not paid dividend because of negative earnings and accumulation of earnings for new projects.

### Correlation matrix

The Table 3 shows the summary of correlation co-efficient between leverage and eight independent variables. The sign in the table indicates the relationship between

**Table 3.** Correlation matrix.

	Leverage	Profitability	Size	Growth	Tangibility	Non-debt tax shields	Tax	Liquidity	Payout
Leverage	1								
Profitability	-0.048831	1							
Size	-0.196232	0.083717	1						
Growth	-0.119977	0.052206	0.4307	1					
Tangibility	0.189672	-0.066344	-0.187415	-0.206692	1				
Non-debt tax shields	0.144883	-0.044437	-0.022943	-0.079963	0.350686	1			
Tax	-0.020018	0.003967	0.07534	0.046746	-0.029632	0.001277	1		
Liquidity	-0.143564	0.291325	-0.149532	0.023241	-0.271997	-0.151116	0.000626	1	
Payout	-0.267809	0.098308	0.398932	0.335655	-0.313433	-0.05511	0.060857	0.050505	1

the variables. Positive sign indicates the positive relationship whereas negative sign indicate the negative relationship. The table indicated that leverage is negatively related with the profitability. This shows that firms leverage level increases with the fall in profitability. This relation is supported by POT.

The co-efficient of correlation between leverage and size is -0.196232 indicating the negative relationship. This result shows that as the firm size increases, its demand for leverage decreases. POT supports the negative relationship between leverage and size. The reason for negative relation is that large size firms accumulate earnings and uses it to finance new projects. Due to the asymmetry of information and good reputation large firms prefer to issue equity.

Leverage is negatively correlated with growth indicating that the leverage requirement of firms decreases as the total sales increases. The coefficient of correlation between leverage and tangibility had a value of 0.189672, showing a positive relation. This means that as the fixed assets increases leverage level also increases. The main reason for this relation is that the financial institutions prefer lending to firms having high

level of assets and can provide assets as collateral.

The table shows a positive relation between leverage and non-debt tax shields. This result indicates that leverage level increases with non-debt tax shields. This result is opposite to TOT. The correlation co-efficient between leverage and tax had a value of -0.020018, showing a negative relation between leverage and tax. This result is also contradicting with TOT and previous studies findings.

Leverage and liquidity had a negative correlation co-efficient. This indicates that with the decrease in liquidity external borrowing of the firm increases. The negative relationship supports the POT. The negative sign means that as the firm utilize all of its accumulated capital then it borrows from outside to meet short term obligations and operating capital requirement.

The table shows that leverage and payout are negatively correlated, indicating that as firms pays earnings as dividend, and then they full fill their requirements from external borrowing. The relationship of size, tangibility, non-debt tax shields, liquidity, payout with leverage are empirically confirmed by fixed effect model where as

remaining three gives opposite results.

#### Fixed effect model results

To empirically analyze the relationship between leverage and eight independent variables, panel data fixed effect model approach is used. Results of fixed effect model are given Table 4. The Table 4 shows that R-squared value is 0.176603 indicating that 17.6603% variance in dependent variable (leverage) can be explainable through eight independent variable used.

The result shows that the five variables are statistically significantly related to the leverage. The table also shows that the intercept does not change significantly over time as the t-statistics value for D\_2006, D\_2007 and D\_2009 are less than two, where as for D\_2008 t-statistics is higher than two. The table shows that the industrial classification does matter in determining the capital structure of firms, as the t-statistics value of all the industrial are significantly high. This shows that industry type is one of the important factors in determining the capital structure of firm. Previous study of Shah and Khan (2007)

**Table 4.** Fixed effect model results.

Variable	Coefficient	Standard Error	t-Statistic	Prob.
Profitability	0.011685	0.013757	0.849414	0.3958
Size	-0.021098	0.008257	-2.554998	0.0107
Growth	0.002073	0.005613	0.369391	0.7119
Tangibility	0.279347	0.058538	4.772081	0
Non-debt tax shields	1.601033	0.474597	3.373458	0.0008
Tax	0.000542	0.00584	0.092823	0.9261
Liquidity	-0.012191	0.003176	-3.838542	0.0001
Payout	-0.175844	0.027776	-6.330849	0
D_2006	0.057738	0.035347	1.633458	0.1026
D_2007	0.059054	0.035704	1.654017	0.0983
D_2008	0.085717	0.035829	2.392431	0.0168
D_2009	0.058255	0.035654	1.633925	0.1025
D_TEXTILE	0.670281	0.065203	10.27998	0
D_CHEMICAL	0.556261	0.061472	9.048975	0
D_ENGINERRING	0.689003	0.062184	11.08009	0
D_SUGARNALLIED	0.869406	0.064528	13.47323	0
D_CEMENT	0.503799	0.080093	6.290178	0
D_FUELNENERGY	0.680027	0.078186	8.697562	0
D_TRANSPORTATION	0.792579	0.091627	8.650011	0
D_TOBACCO	1.824259	0.130586	13.96977	0
D_JUTE	0.587983	0.128641	4.570722	0
D_VANASPETI	0.783382	0.129698	6.040041	0
D_MIS	0.638457	0.05818	10.97385	0
R-squared	0.176603			
Adjusted R-squared	0.165657			

**Table 5.** Summary of results.

Determinant	Predicted signs by theories	Expected sign	Observed sign
Profitability	-(POT), +(TOT)	-	+
Size	-(POT), +(TOT)	+	-
Growth	+(POT), -(TOT)	-	+
Assets tangibility	+(POT), +(TOT)	+	+
Non-debt tax shields	-(TOT)	-	+
Tax	+(TOT)	-	+
Liquidity	-(POT), +(TOT)	-	-
Payout ratio	+(POT)	+	-

had found insignificant relation between capital structure and industrial classification. This is one of the main finding of this study that there exist a statistically significant relationship between capital structure and industrial classification. In this study paper and board industry is taken as intercept. The detail result of each variable is given below.

### **Profitability**

The Table 5 shows that the coefficient value between leverage and profitability had a value of 0.011685,

indicating a positive relationship. The relationship is statistically insignificant with t-statistics value of 0.849414 and p-value of 0.3958. This result rejects the expected relationship between leverage and profitability for this study. This result indicates that with the increase in profitability of firms, leverage level raises. The positive relationship is supported by TOT. The argument for the relation is that with the increase in profitability, firm ability to pay back loan increases. With profitability, goodwill and status of the firm improves in market. Agency and information asymmetric costs decreases and firms are having free cash flows to meet their obligations. Similarly



an interest payment also reduces taxable income, resulting in less tax payments. Previous studies such as Ooi (1999) proved positive relationship between leverage and profitability.

### **Size**

The results show that a negative relationship between leverage and size with the co-efficient value of -0.021098. This relation is statistically significant with t-statistics value of -2.554998 and p-value of 0.0107. This result rejects the expected relation sign between leverage and size.

The result indicates that with the increase in size of firm, its leverage level decreases. This result is in line with POT, which also suggests the negative relationship between leverage and size. The large size firm has more free cash flows, accumulated earnings and does not require to disclose any information to the outsiders in case of equity financing. The other main reason of preferring equity is that with good reputation of large size firms and free cash flows outsiders expect the increase in value of firm. This results in overvaluation of firm equity. Thus firms get benefit of overvalued equity by issuing new equity. Previous studies have also proved negative relationship between leverage and size (Mazur, 2007).

### **Growth**

The co-efficient value between leverage and growth had opposite result as was expected in this study, as indicated by the value 0.002073. The relationship is statistically insignificant with t-statistics value of 0.369391 and p-value of 0.7119. This result rejects the expected sign of relationship between leverage and growth. The result suggests that with the percentage increases in total sales, leverage level of the firm also raises. The positive relation between leverage and growth is also supported by POT.

### **Tangibility of assets**

The results show a statistically significant positive relation between leverage and tangibility of assets with co-efficient value of 0.279347, t-statistics value of 4.772081 and p-value of 0. The result indicates that with the increase in tangible assets leverage level of the firm raises. The results accept the expected positive signs for this relationship. The firms with high level of fixed assets can keep assets as collateral while getting loans. Financial institutions also prefer firms that can provide collateral. As a result, the leverage level of firms rises. Previous studies conducted in Pakistan also found positive relationship between leverage and tangibility of assets.

### **Non-debt tax shields**

The table shows that non-debt tax shields is positively and statistically significantly related with the leverage having co-efficient value of 1.601033, t-statistics value of 3.373458 and p-value of 0.0008. This result rejects the expected relationship for this variable.

The result suggests that with the increases in non-debt tax shields leverage also increases. The argument for positive relation can be that most of Pakistani firms try to reduce the tax payments.

To do so they generally implicitly record the increase in raw materials costs, show lower sales etc. the use of both non-debt tax shields and leverage reduces the taxable income of the firm. First non-debt tax shields reduces the operating income, and then interest payments are deducted from operating income, leaving small earning before tax.

### **Tax**

The results indicate that tax is positively and insignificantly related with leverage, having co-efficient value of 0.000542, t-statistics value of 0.092823 and p-value of 0.9261. The result accepts the expected positive relationship between leverage and tax. Previous study conducted by Shahjahanpoor et al. (2010) also found positive relation. The positive relation is also supported by TOT. The result indicates that with the increase in tax rate leverage level also increases. As interest payments are tax deductible, therefore firm uses more debt to reduce earnings before tax. As the earning before tax decreases, taxable income reduces resulting in reduction of tax payments.

### **Liquidity**

The result indicates a statistically significant negative relationship between liquidity and leverage with co-efficient value of -0.012191, t-statistics value of -3.838542 and p-value of 0.0001. The result accepts the expected negative relationship between leverage and liquidity. Previous studies conducted by Mazur, 2007 and Shahjahanpoor et al. (2010) also found negative relationship. POT also supports the negative relationship. The result suggests that more liquid firm would reduce the level of leverage by using their own earnings and accumulated earnings.

### **Payout ratio**

The result suggests that payout is negatively and statistically associated with leverage. The co-efficient value for relation is -0.175844, having t-statistics value of -6.330849

and p-value of 0.

This result rejects the expected sign for relationship. In this study dummy variable is used for payout. The result indicates that with payout, leverage level decreases. The reason for decrease is that Pakistani firms mainly do not pay dividend to their shareholders because of negative earnings and accumulation of earnings for new projects or investments.

Firms only pay dividend when they are having excess of earnings after meeting their internal current and future funds demand. As the internal earnings are enough, therefore after paying dividend, firms still maintain capital. This is the main reason for negative relationship.

## Conclusion

This study aims at adding new determinants of capital structure literature for Pakistani non-financial firms by using the book leverage as dependent and set of eight variables including three variables (tax, liquidity and payout ratio) checked for first time for Pakistani firm's data. This study used panel data for 336 non-financial firms over the period of 2005-2009.

This study investigates that POT and TOT, to what extent explains the Pakistani non-financial firm's capital structure determinants.

The results showed that out of eight variables five (size, tangibility of assets, non-debt tax shields, liquidity and payout) are statistically significantly related to leverage, indicating that, these five variables play important role in determining the capital structure of Pakistani non-financial firms. The remaining three are statistically insignificantly related with leverage. Two expected relation are accepted while six are rejected after empirical analysis. The results show that industrial type play very important role in determining capital structure of Pakistani non-financial firms. The results showed that negative relation of size, liquidity and positive relation of growth with the leverage are in consistent with the POT. Similarly the positive relation of profitability and tax are in consistent with the TOT.

## LIMITATIONS AND FUTURE RESEARCH

This research used Pakistani non-financial firm's data, so the results of this study could not be generalized in any other sector of Pakistan economy (banks, service sector etc) or in any other country non-financial firms. Future studies can be conducted by using the data from other sectors of Pakistan economy or other developing country non-financial data. Similarly, this study uses the book leverage as dependent variable and eight explanatory variables. Future research can include the market leverage and other explanatory variables.

Future studies can be conducted to investigate the influence of risk on non-financial firms.

## REFERENCES

- Aggarwal R (1981). International Differences In Capital Structure Norms: An Empirical Study Of Large European Companies. *J. Manage. Int. Rev.*, 21: 75-88.
- [Allen DE, Mizuno H \(1989\). The Determinants of Corporate Capital Structure: Japanese Evidence. \*J. Appl. Econ.\*, 21: 569-585.](#)
- Al-Sakran S (2001). Leverage Determinants In The Absence Of Corporate Tax System: The Case Of Non-Financial Publicly Traded Corporation In Saudi Arabia. *J. Manage. Financ.*, 27(10): 58-86.
- [Baskin J \(1989\). An Empirical Investigation of the Pecking Order Hypothesis. \*Financ. Manage.\*, 18: 26-35.](#)
- Beattie V, Goodacre A, Thomson SJ (2004). Diversity And Determinants Of Corporate Financing Decisions: Survey Evidence. Working Paper University of Stirling.
- [Bennett M, Donnelly R \(1993\). The Determinants Of Capital Structure: Some UK evidence. \*Br. Account. Rev.\*, 25: 43-59.](#)
- Berger AN, Udell GF (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *J. Bank. Financ.*, 22: 613-74.
- [Bhaduri S \(2002\). Determinants of Corporate Borrowing: Some Evidence from the Indian Corporate Structure. \*J. Econ. Financ.\*, 26: 200-215.](#)
- [Booth L, Aivazian V, Demircuc-Kunt A, Maksimovic V \(2001\). Capital Structure In Developing Countries. \*J. Financ.\*, 56: 87-130.](#)
- [Carleton Willard T, Silberman IH \(1977\). Joint Determination Of Rate Of Return And Capital Structure: An Econometric Analysis. \*J. Financ.\* 32: 811-821.](#)
- [Cassar G, Holmes S \(2003\). Capital Structure and Financing of SMEs: Australian evidence. \*J. Account. Financ.\*, 43: 123-147.](#)
- [Chakraborty I \(2010\). Capital Structure In An Emerging Stock Market: The Case Of India. \*J. Res. Int. Bus. Financ.\*, 24: 295-314.](#)
- [Chen JJ \(2004\). Determinants Of Capital Structure Of Chinese-Listed Companies. \*J. Bus. Res.\*, 57: 1341-1351.](#)
- De Angelo H, Masulis R W (1980). Optimal Capital Structure Under Corporate And Personal Taxation. *J. Fin. Econ.*, 8: 3-29.
- [Deesomsak R, Paudyal K, Pescetto G. \(2004\). The Determinants Of Capital Structure: Evidence From The Asia Pacific region. \*J. Multi. Financ. Manage.\*, 14\(5\): 387-405.](#)
- [Delcours N \(2007\). The Determinants Of Capital Structure In Transitional Economies. \*J. Int. Rev. Eco. Financ.\*, 16: 400-415.](#)
- Donaldson G (1961). Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determinants of Corporate Debt Capacity. Working paper Division of Research Harvard Business School Harvard University Cambridge MA.
- Dorbetz W, Fix R (2003). What are the Determinates of the Capital Structure? Some Evidence for Switzerland. Working paper: 4/03. WWZ/Department of Finance.
- [Fattouh B, Pasquale S, Laurence H \(2005\). Capital Structure in South Korea: A Quantile Regression Approach. \*J. Dev. Econ.\*, 76: 231-250.](#)
- [Ferri MG, Jones W H \(1979\). Determinants of Financial Structures: A New Methodological Approach. \*J. Financ.\*, 34\(3\): 631-644.](#)
- Frank MZ, Goyal VK (2004). Capital Structure Decisions: Which Factors Are Reliably Important? EFA 2004 Maastricht Meetings Paper No. 2464: Tuck Contemporary Corporate Finance Issues III Conference Paper.
- [Harris M, Raviv A \(1991\). The Theory of Capital Structure. \*J. Financ.\* 46: 297-355.](#)
- Hijazi ST, Tariq YB (2006). Determinants of capital structure: A case for Pakistani Cement Industry. *Lah. J. Econ.*, 11(1): 63-80.
- [Homaifar G, Ziets J, Benkato O \(1994\). An Empirical Model Of Capital Structure: Some new evidence. \*J. Bus. Financ. Account.\*, 21\(1\): 1-14.](#)
- Huang SG, Song F M (2005). The Determinants of Capital Structure: Evidence from China. *J. China Econ. Rev.*, pp. 1-23.
- Jensen M (1986). Agency Costs of Free Cash Flow Corporate Finance and Takeovers. *Am. Econ. Rev.*, 76: 323-329.
- Jensen M, Meckling W (1976). Theory of the Firm: Managerial Behavior Agency Costs and Capital Structure. *J. Financ. Econ.*, 3: 305-360.
- [Kester WC \(1986\). Capital And Ownership Structure: A Comparison Of United States and Japanese Manufacturing Corporations. \*Financ.\*](#)

- [Manage., pp. 5-16.](#)
- [Kim WS, Sorenson EH \(1986\). Evidence On The Impact Of The Agency Costs Of Debt On Corporate Debt Policy. J. Financ. Q. Anal., 21\(2\): 131-144.](#)
- Kunt A, Maksimovice V (1994). Capital Structure in Developing Countries: Evidence from Ten Countries. Working Paper the World Bank Policy Research Paper, p. 1320.
- Long M, Malitz L (1985). The Investment Financing Nexus: Some Empirical Evidence. Mid. Corp. Financ. J., 3: 53-59.
- MacKie M, Jeffrey K (1990). Do Taxes Affect Corporate Financing Decisions? J. Financ., 45(5): 1471-93.
- [Marsh P \(1982\). The Choice between Equity and Debt: An Empirical Study. J. Fin. 37: 121-144.](#)
- [Mazur K \(2007\). The Determinants of Capital Structure Choice: Evidence from Polish Companies. J. Int. Atl. Econ. Res., 13: 495-514.](#)
- [Michaelas N, Chittenden F, Poutziouris P \(1999\). Financial Policy And Capital Structure Choice In UK SMEs: Empirical evidence from company panel data. Small Bus. Econ., 12: 113-130.](#)
- Modigliani F, Miller MH (1958). The Cost of Capital Corporate Finance and the Theory of Investment. J. Am. Econ., Rev. 48: 261-275.
- [Myers SC \(1977\). Determinants of corporate borrowing. J. Financ. Econ., 5: 147-75.](#)
- Myers SC (1984). The Capital Structure Puzzle. J. Financ., 39(3): 575-592.
- Myers SC, Majluf N S (1984). Corporate Financing and Investment Decisions When Firms have Information that Investors do not have. J. Financ. Econ., 13(2): 187-221.
- [Ooi J \(1999\). The Determinant of Capital Structure: Evidence on UK Property Companies. J. Prop. Invest. Financ., 17\(5\): 464-480.](#)
- [Ozkan A \(2001\). Determinants of Capital Structure and Adjustment to Long Run Target: Evidence from UK Company Panel Data. J. Bus. Financ. Account., 28\(1/2\): 175-198.](#)
- Pandey IM (2001). Capital Structure and Firm Characteristics: Evidence from an Emerging Market. Indian Institute of Management Ahmedabad Working Paper.
- Park H (1998). The Effect of National Culture on the Capital Structure of Firms. Int. J. Manage., 15: 204-211.
- Rafiq M, Iqbal A, Atiq M (2008). The Determinants of Capital Structure Of The Chemical Industry in Pakistan. Lah. J. Econ., 13(1): 139-158.
- [Rajan RG, Zingales L \(1995\). What Do We Know About Capital Structure? Some Evidence from International Data. J. Financ. 50\(5\): 1421-1460.](#)
- [Scott DE \(1972\). Evidence on the Importance of Financial Structure. J. Fin. Manage. 1: 45-50.](#)
- Shah A, Hijazi T (2004). The Determinants of Capital Structure of Stock Exchange-Listed Non-Financial Firms In Pakistan. Pak. Dev. Rev., 43: 605-618.
- Shah A, Khan S (2007). Determinates Of Capital Structure: Evidence From Pakistani Panel Data. Int. Rev. Bus. Res. Paper, 3(4): 265-282.
- Shahjanhanpour, A Ghalambor, Aflatooni A (2010). The Determinants Of Capital Structure Choice In The Iranian Companies. Int. Res. J. Financ. Econ., 56: 167-178.
- Smith CW, Warner JB (1979). On Financial Contracting: An Analysis of Bond Covenants. J. Financ. Econ., 7: 16-117.
- Teker D, Ozlem T, Ayca T (2009). Determinants of Capital Structure for Turkish Firms: A Panel Data Analysis. Int. Res. J. Financ. Econ., 29: 179-187
- [Titman S \(1984\). The Effect of Capital Structure on The Firm's Liquidation Decision. J. Financ. Econ., 13: 137-52.](#)
- [Titman S, Wessels R \(1988\). The Determinants of Capital Structure Choice. J. Financ., 43: 1-19.](#)
- Waliullah, M Nishat (2008). Capital Structure Choice in an Emerging Market: Evidence from Listed Firms in Pakistan. Paper presented in 21st Australian Finance and Banking Conference.
- [Wiwattanakantang Y \(1999\). An Empirical Study on the Determinants of Capital Structure of Thai Firm. J. Pac. Bas. Financ., 7: 371-403.](#)