

Determinants of Capital Structure in Pakistan

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Abstract

In financial management, capital structure is a systematic method for financing the operating activities through equity, debt or combination of the both. It is also referred to as a degree of debt in the capital arrangement of a business. However, it is a significant and an important decision for corporate firms. The business operations are significantly dependent on managing the cost of capital which is determined through capital structure of an organization. Hence, the objective of designing capital structure strategy is for reducing the borrowing cost and maximizing returns from acquired capital which has been acquired from various resources. The main purpose of our study is to empirically investigate the determinants of capital structure in the context of Pakistan. The balanced panel data set of our study is constructed using annual reports for 30 non-financial firms listed at Pakistan Stock Exchange for the period 2008 to 2017. We utilized Ordinary Least Squares estimation technique to estimate the econometric model. The empirical findings present that profitability and tangibility are key determinants for capital structure of firms in Pakistan. Moreover, tangibility has positive association with leverage. It shows that creditors are attracted by firms having high tangible assets. It is due to sureness for reclamation of their loans. On the other hand, profitability showed negative association with leverage. It implies that more profitable firms do not take external debts due to availability of cash reserves that they created from profits. Further, our study suggests the relevance of theories namely trade-off static theory and pecking order theory for identifying the determinants of capital structure in Pakistan.

Keywords: Capital structure, Firm-specific factors, Ordinary Least Squares (OLS).

JEL Codes: D22, F65

1. INTRODUCTION

Capital structure of a company is made up of the relative proportion of funds from two major sources namely debt and equity [see, Nasimi (2016), Khemiri and Noubbigh (2018) and Nasimi and Nasimi (2018)]. The cost of debt determines profitability of an organization which shall link up with sustainability of business in the long-run. Hence, capital structure plays vital role in managing the cost of capital. Therefore, we can expect that an optimum capital structure is achieved at lower cost of capital. However, management of an organization is exclusively responsible for managing the growth and operations of business. This activity is performed using various sources of funds. The debts which are secured by organizations come in two broad forms that are bonds and the long-term notes payable [for more see, Schepens (2016)]. On the other hand, equity position is strengthened through allocation of common stocks, retained earnings and preferred stocks. This carves the entire capital structure of an organization. Hence, modeling of capital structure is merely designed to deal with the financial matters of organizations which will determine the level of debt shall be borne by organizations.

Firm's capital structure is an integral portion of organizational financial management and requires focusing on the debt position of an organization from asset and equity position [see, Serghiescu and Vaidean (2014)]. It describes on how companies raise fund for acquiring investment opportunities or expanding their operating activities. Hence, the major goal of designing capital structure strategy is reducing borrowing cost and maximizing the returns from acquired capital which has been acquired from various resources. In the financial management, the choice of capital structure has tremendous importance among many other decisions. This is at the center of many other assessments in the area of corporate finance. Therefore, the primary aim of financial managers is to minimize cost of capital and hence increase wealth of stockholders. According to Nasimi (2016), "one of the major objectives of the corporate financial managers is to ensure lower cost of capital and thus maximization of shareholders' wealth".

The debate on capital structure can be traced back to the predictions proposed in pioneering work of Modigliani and Miller (1958) that in perfect capital market, the aggregate market value of firm is self-determining of its capital structure. Accordingly, equity and debt are perfect substitutions. However, once the supposition of perfect capital markets is relaxed, the choice of capital structure becomes an essential factor for defining firms' value. This fortified the development of different theories on capital structure choice and their

empirical analysis. Though it is now widely accepted that decision for choice between equity and debt strongly depends on firm-specific factors, the empirical suggestions are varied and often confusing which makes it difficult to understand.

Abundant empirical studies^[1] have been conducted on how activities of businesses are financed which are typically predominant in the United States and other developed markets [for instance see, Titman and Wessels (1988), Harris and Raviv (1990), Rajan and Zingales (1995), Ooi (1999), Colombo (2001), Bevan and Danbolt (2002), Mazur (2007), Viviani (2008), Crnigoj and Mramor (2009), Qiu and La (2010), Hussainey and Aljifri (2012), Bartoloni (2013), Gottardo and Moisello (2014), Drazenovic and Kusanovic (2016), Tchorek *et al.* (2017), Kumar *et al.* (2017) and many more].

Booth *et al.* (2001) in their relative empirical study on capital structure choice for firms from ten developing economies confirmed that determinants of capital structure taken from developing economies are similar to those in developed countries. Additionally, empirical studies on developing countries such as Chen (2004), Omet and Nobanee (2001) have established that there are similarities in determinants of capital structure for both, developed and developing economies. Contrary, several empirical researches concluded that empirical and theoretical evidences vary with changing economies and business sectors [for more details, see Zeitun and Tian (2014)].

Sheikh and Wang (2011) presented three famous capital structure theories namely trade-off, pecking order theory, and agency cost theory are supportive to determinants of capital structure in Pakistan. Moreover, firm size, profitability, tangibility, earnings volatility and liquidity are the key factors that determine the capital structure choice in manufacturing firms listed at Karachi Stock Exchange. Similarly, Shah and Kausar (2012) identified that profitability, tax, liquidity and size are the main determinants of capital structure for leasing companies in Pakistan. Also, Nasimi and Nasimi (2018) states that an organization's performance is sensitive to capital structure choice, and hence, the type of capital structure a firm adopts has significant influence on its profitability.

Numerous empirical and theoretical researches have been directed to identify the key factors that determine capital structure of firms, taking empirical evidences from various countries across different stock markets. However, several studies have reported positive relationship whereas some have shown negative association; and few studies observed insignificant influence. Therefore, the problematic question is still present on what key factors actually determine the capital structure choice in Pakistan. Through this study, we accomplish the explicit objective which is mentioned as below in the form of a question:

➤ *What are the key determinants of capital structure for non-financial firms in Pakistan?*

Though, Pakistan is undergoing numerous crises such as financial instability, political instability, and economy instability. These have adversely affected the firms and have raised the level of risk. Therefore, an empirical analysis for factors that determine capital structure is important to investors, researchers, policy makers and academics. The current study is an attempt to provide an empirical analysis on factors that determine the capital structure of firms in Pakistan. The analysis is supported through evidences which will be acquired from non-financial firms. Basic dynamics of business are assessed from the perspective of manufacturing firms which provides an understanding of capital structure of organizations operating in Pakistan. Further, findings of other researchers and theoretical views of the topic are aligned for explanation of the topic. This provides an assessment of key factors which act as key determinants of capital structure choice. The annual data is collected from financial statements of 30 non-financial firms that are listed at Pakistan Stock Exchange (PSX) during the period from 2008 to 2017.

2. LITERATURE REVIEW

This section presents the most relevant theoretical and empirical literatures on determinants of capital structure across various economies. Reviewing literature on the subject provides guidance on key factors that determine the capital structure around the globe.

2.1 Determinants of Capital Structure: Theoretical Foundation

The determination of optimal capital structure has been a controversial matter in the field of corporate finance. The topic can be traced back to pioneering work of Modigliani and Miller (hereafter MM) who developed a mathematical model for identifying the optimal capital structure in firms. In their most debatable studies of Modigliani and Miller (1958), MM suggested that market value of a firm is independent of the structure of capital a firm adopts. Thus, they concluded that in the absence of both, corporate and personal taxes, levered and unlevered firms have same total market value. In their subsequent work Modigliani and Miller (1963), MM incorporated the corporate tax into their study model. However, MM witnessed that levered firms exhibited a higher total market value as compared to unlevered firms. This suggested that the extra value was amount of tax shield on debt which is equivalent to the sum of present value of tax shields. Hence, the inclusion of debt into the capital structure of a firm tends to raise the total market value of firm. Similarly, Miller (1977) included

personal tax into their studies of 1963. He modified their model by considering the personal tax on two sources of income which were holding of shares and debt securities. The study showed that gain in the levered firm was zero. Hence, the results depicted their original work of 1958 and thus suggested that the optimal capital structure can be determined only at macro level.

The most famous investment theories, including static trade-off theory, pecking order theory and the agency theory, have explained the determinants of capital structure [see, Sheikh and Wang (2011)]. The static trade-off theory proposes that an optimal capital structure can be achieved by analyzing the marginal cost and benefit from each marginal unit of finance. Moreover, the theory suggests that optimal capital structure is obtained by combining differential levels of both debt and equity source of funding that equates the marginal cost and benefits [for more see, Myers (1977) and Harris and Raviv (1991)]. In static trade-off theory, the optimal capital structure is achieved by equating the marginal benefits which is derived from the tax savings on debts to the marginal costs which is derived from bankruptcy cost. Conversely, the pecking order theory defines the financing preferences of firms due to the presence of the asymmetry information [see, Myers and Majluf (1984)]. Under the pecking order theory, investment opportunities are firstly financed by using the internal financing that is the retained earnings. Once, the internal source of funding is exhausted, firms prefer external source. Consequently, firms prefer lower risk debts over the issuance of new equity in external source funding. However, in pecking order theory the need for external financing is a major key factor for alteration in debt ratios [see, Shyam-Sunder and Myers (1999)].

The pecking order theory which is also known as the information asymmetry theory has two major assumptions. First, according to informational asymmetry, managers are well aware of business operations than the outside investors. So therefore, when managers decide to issue new equity for funding new projects, the outside investors always consider it as signal that firms' performance, which is evidenced by the managers, is not good and the issuance of new equity is over-valued and therefore this will decline in share prices. Second, pecking order theory undertakes that managers are custodians of the shareholders' wealth and therefore they act in interest of shareholders to achieve overall management objective of maximizing wealth of existing shareholders. Therefore, in order to achieve this goal they will let go off projects even with positive net present value, however, accepting the projects that requires issuance of undervalued equity to new investors at high issuing cost will disadvantage the existing stockholder [see, Agca and Mozumda (2003)].

On the other hand, agency theory defines the relationship between shareholders (the owners or principals) and the agents (the managers or executives). In the business hierarchy, managers are considered as guardians of shareholders' wealth. Agency theory attempts to resolve the issues that arise from unaligned objectives of the principal and agents. Hence, the conflict of interest among managers and shareholders results into agency cost. The managers are tempted by large levels of free cash flows, hence, they get deviated from objective of maximizing shareholders' wealth via dividends. Instead, they invest in the investment opportunities to increase their control over the business [see, Jensen (1986)]. The agency problems that arises among stockholders and lender may be severe in small size firms as compared to large size firms [see, Ang (1992)]. This implies that in small firms ownership is concentrated and shareholders are involved in running of business; and hence, this reduces the agency problems. Thus, these firms will have lower levels of debt in their capital structure.

2.2 Determinants of Capital Structure on Developed Countries

Titman and Wessels (1988) examined the explanatory power of theories on the determinants of the capital structure for the US firms. The study sample consists of 469 manufacturing US firms for period covering 1974 to 1982. The findings of the study showed that debt levels are negatively associated with the nature of the business. It also showed that the transaction cost is an important determinant of the capital structure for US firms. However, short-term debt has negative association with the firm size which is majorly due to higher transaction costs borne by the small size firms for the issuance of long-term financial instruments. Further, the results showed insignificant impact of non-debt tax shield, future growth, collateral value and volatility.

Harris and Raviv (1990) analyzed the impact of debt levels on the investors' information regarding the business and their capability to superintend the management. The study developed static model which included once-and-for-all choice of the debt levels. The static model of the study is extended into dynamic model which comprised of capital structure evolution and the total payments made to debt holders over the time. The study postulated that the managers are unwilling for providing information to the investors. Moreover, the study suggested that the debt is a managing device to discipline the managers as they always do not perform in the interest of the investors or shareholders. Further, information on debt can be used by the investors to analyze the operational activities and to make informed decisions about the liquidation of business.

Rajan and Zingales (1995) examined the factors if they have influence on the firms' capital structure in other countries that appears to have influence on the capital structure of US firms. The study dataset comprised of data on G-7 countries namely Canada, France, Germany, Italy, Japan, United Kingdom and United States during the period from 1987 to 1991. The findings of the study proposed that the factors, which were identified

in the previous studies to have influencing power on the capital structure of firms in the US, have explanatory power across various economies in the G-7. Hence, at the aggregate levels there are similarities in the leverage level of the firms across G-7 countries. However, Germany and the United Kingdom showed lower levels of leverage.

Voulgaris, Asteriou and Agiomirgianakis (2004) explored the factors that define the capital structure of firms in Greece. The study sample comprised of 75 large-sized enterprises (LSE) and 143 small and medium-sized enterprises (SME) during the period 1988 to 1996. The findings of the study showed differences are present in the capital choice of the two groups. Moreover, the study showed that debt increased with the firm size. Similarly, leverage increased with the growth opportunities. Contrary, leverage showed negative correlation with the profitability which supports the prediction of pecking order theory. Further, the study showed that profitability is the key determinant for the capital structure of both group of firms in Greece.

Mazur (2007) examined the determinants of the capital structure in the Polish firms. The prime objective of the study is to identify whether the pecking order theory or the static trade-off theory best defines the capital structure of the firms that are listed at the Warsaw Stock Exchange (WSE). The dataset of the study is constructed from the financial statements of 238 companies for the period of 5 year from 2000 to 2004. The results showed that profitable firms with larger liquidity ratios prefer internal generated funds over the debt which supports the pecking order theory. Further, the results showed negative relationship of size and asset structure with debt ratio. This implies that there is lower problems of information asymmetry in the large firms having higher fixed assets. The results showed no evidence on the relevance of business risk and dividend policy for explaining the capital structure of Polish firms. Thus, the study concluded that pecking order theory is more appropriate and relevant in capital choice of firms in Poland.

Viviani (2008) explored the factors that determine the capital structure of wine industry in France. The data for the study is collected from the financial statements of 410 wine companies during the period 2000 to 2003. The findings of the study showed negative influence of cash, profitability, non-debt tax shield, age and asset turnover on the short term debt. Further, the results showed positive effect of growth on all three measures of leverage. However, firm size and business risk showed no significant impact on the capital structure of sample firms. Moreover, the results of the study are supported by the pecking order theory.

Crnigoj and Mramor (2009) investigated the factors that determine the capital structure of corporations in Slovenia. The data for the study is collected from the financial statements of the non-financial Slovenian firms during the period from 1999 to 2006. The empirical findings showed negative influence of tangibility, profitability, earning volatility, employee-governed behavior, and equity capital per employee on the leverage decisions of the Slovenian firms. However, growth and firm size showed positive association with the capital structure for the sample firms. The study concluded that the explanatory power of the determinants for the capital structure changes in Slovenia due to the transition in the financial behavior of firms and the economic system.

Drazenovic and Kusanovic (2016) investigated the determinants of capital structure in European countries. Particularly, they examined the effect of pension funds, macroeconomic stability, savings, income, investment funds, and development in banking sector, institutional quality, and privatization on stock market. The unbalanced panel dataset of the study comprised of data for Hungary, Poland, Croatia, Slovakia, Czech Republic, and Slovenia for period from 1995 to 2010. The study used capitalization ratio as dependent variable whereas the explanatory variables were investment fund asset to GDP, life insurance premium to GDP, pension funds, privatization index, indicator of banking institution, consumer price index, GDP growth, saving rate, and heritage index. The findings of the study showed that there is positive relation between growth and financial development in the study selected countries. Moreover, it showed that the development of financial system and institutional investors (that are not banks) are led by the relationship that exists between financial intermediaries and banks. Furthermore, it showed that the equity market capitalization led by the development of investment fund and insurance ensured the casual relationship of non-bank intermediaries and capital market. It also showed that capital markets can be developed via different transformations such as privatization and merging capitalized savings and pension together.

Nasimi (2016) studied the determinants of capital structure for firms listed at New York Stock Exchange. The study panel data is constructed using five-year data from 2010 to 2014 for 15 information and technology (IT) firms listed at the S&P 500 index. The study showed that tangibility has significant positive effect whereas other explanatory variables showed insignificant impact. Therefore, in the context of United States the capital structure of IT firms is best described by tangibility. The study concluded that the IT firms with higher tangibility prefer more debt in their capital structure.

Martellini, Milhau and Tarelli (2018) examined the capital structure decisions and the debt structure decisions for the continuous-time environment. In particular, the study aimed to perform qualitative analysis to examine capital structure decisions, that is, whether the firms prefer equity or debt. Further, the study intends to inspect debt structure decision, that is, whether the firms choose fixed rate, floating rate or the inflation linked

debt. The findings of the study showed that debt management has significant influence for the capital structure decisions. The study suggests that optimization of both debt and capital structure increases the value of firm.

2.3 Determinants of Capital Structure on Developing Countries

Bhaduri (2002) attempted to examine the capital structure issues in the context of India. The study sample comprised of 363 manufacturing firms retrieved from nine industries during the period from 1990 to 1995. The findings showed that the optimum capital structure choice in India is significantly influenced by the firm-specific and industry-specific factors namely cash flow, firm size, growth, and uniqueness. The results are in line with various existing theories of capital structure. Further, the results provided the indication of cost restructuring in the sample firms. Moreover, differential cost adjustments are observed for long term and short term borrowings. However, short term borrowings exhibited higher speed of cost adjustment for the capital structure as compared to the long term borrowings.

Amidu (2007) attempted to analyse the capital structure determinants in the developing country. The study data is collected for 19 banks during the period from 1998 to 2003. The findings showed that size, profitability, sales growth, tax and assets structure have influence on the capital structure of banks in Ghana. Further, it showed that banks used short term debt as a major source of funding their investment opportunities. This implies the critical role of short term financing over the long term financing for the Ghanaian banks.

Eldomiaty (2008) attempted to examine the determinants of the capital structure for firms in Egypt. The study uses the partial adjustment autoregressive model for capturing adjustment speed of the long term and short term debt to the targeted level. The data of the study is collected from the financial statements of 99 firms listed at Egypt Stock Market during the period covering 1998 to 2004. The results of the study showed statistically significant coefficients which determines the validity of the model. However, when the debt ratio was split into long term and short term debt, the findings showed that the Egyptian firms used both types of leverage in their capital structure but long term debt is comparatively used more than the short term debt. The findings showed that the determinants of pecking order theory of capital structure, which are profitability and growth, has explanatory power for the sample firms. Similarly, the determinants of trade-off theory of capital structure, which are debt to equity ratio, bankruptcy risk, and tax, have influence on the leverage decisions of the firms in Egypt. However, the results showed no evidence on the influence of the assumptions of the free cash flow theory for the capital structure of Egyptian firms. Hence, the study concluded that two theories, that is pecking order theory and trade-off theory, has the explanatory power for the leverage decision of the firms in Egypt.

Karadeniz, Kandir, Balcilar and Onal (2009) examined the factors that affects the capital structure of lodging firms in Turkey. The panel data of the study is comprised of five lodging firms that are listed at Istanbul Stock Exchange (ISE) during the period from 1994 to 2004. The results of the study showed negative association of debt ratio with the profitability, effective tax rates, and tangibility. However, the non-debt tax shield, commercial trade, growth, free cash flow and firm size appeared to have no influence on the capital structure decisions of Turkish lodging companies. The results are partly supported by the pecking order theory, however, complete support of neither pecking order theory or trade-off theory is evidenced for the Turkish firms.

Lemma and Negash (2014) investigated role of firm-specific characteristics, institutional factors, macroeconomic and industry indicators for the capital choice in the context of developing economies. The sample of the study is obtained from 986 non-financial firms that are listed at nine African countries including Ghana, Egypt, Botswana, Kenya, Morocco, Mauritius, South Africa, Tunisia and Nigeria for the period of 10 years during 1999 to 2008. The findings of the study showed that profitable firms adjust their capital structure fastly. The results also indicated that not only pecking order theory but the information asymmetry theory is also supportive to the capital structure decision in the developing countries. Further, the results showed that the influence of growth, size, gap between targeted and observed leverage ratio are merely dependent on the measurement of leverage ratio. The results also showed that the capital structure adjustment is faster in firms that are exposed to high risk.

Sofat and Singh (2017) studied the determinants of manufacturing firms' capital structure that are listed at Bombay Stock Exchange. The study sample consisted of 91 firms for the period during 2003 to 2012. The findings of the study showed that business risk, return on asset and asset composition has positive influence on debt ratio whereas debt service capacity and firm size showed negative impact on debt ratio. This implies that asset composition, return on asset and business risk significantly determines the capital structure of firms listed at Bombay Stock Exchange. However, insignificant influence of firm size and debt service capacity shows that these variables do not determine the capital structure of firms listed at Bombay Stock Exchange. Thus the study concludes that the Indian firms' financing behavior can be understand with the trade-off theory, pecking order theory, and agency theory as the results of the study were in consistent with these theories.

Sheikh and Qureshi (2017) examined the capital structure determinants for firms listed at Karachi Stock Exchange. The sample of the study consisted of Islamic and conventional commercial banks. The unbalanced panel data of the study is constructed using data of 5 Islamic banks and 20 conventional commercial banks for

period during 2004 to 2014. The findings of the study showed that Islamic banks do not prefer debt. It also showed the profitability of conventional banks over the Islamic banks. But conventional banks do not have more fixed operating assets and growth as compared to Islamic banks. Furthermore, the findings of the study for conventional commercial banks showed that bank size and volatility in earnings are positively related to book leverage whereas tangibility, profitability, and growth are negatively related. In case of Islamic banks, it showed that bank size is positively related to leverage book whereas profitability and tangibility are adversely related. Thus the study concludes that both types of banks have different structure of capital that varies from non-financial firms.

Boateng *et al.* (2017) studied to examine how capital structure of Chinese firms are affected by the internal corporate governance. The sample of the study is constructed using data of 2386 firms listed at Shanghai and Shenzhen Stock Exchange for period during 1998 to 2012. The findings of the study revealed that long term debt is statistically influenced by ownership and independent directors. Furthermore, investigation on ownership factors of firms, the study showed that ownership has adverse effect on debt ratio.

Nasimi and Nasimi (2018) studied the decision of Pakistani firms in construction their capital structure. The balanced panel data of the study is constructed using data for 20 non-financials listed at PSX for period during 2009 to 2015. The findings of the study revealed that debt-to-equity has no significant impact on return on asset and net profit margin whereas significant impact on return on equity. On Contrary, debt to total assets showed significant influence on return on assets and net profit margin whereas insignificant influence on return on equity. This implies that capital structure has effect on the profitability of the firms. Hence, the firm managers should adopt a strategy to examine the effects of debt prior to adjusting the levels in capital structure.

Khemiri and Noubbigh (2018) studied the determining factors of capital structure in Sub Saharan African firms. The study sample consists of 206 firms listed at South Africa, Nigeria, Kenya, Ghana, and Zimbabwe for period during 2006 to 2016. The empirical results of the study were estimated using system GMM technique. The findings of the study revealed a U-shaped association between leverage and profitability of firms listed at Sub Saharan African countries. This implies that findings of the study showed consistency with trade-off theory and pecking order theory. Thus the study concluded that macroeconomic factors and prior debt are significant determinants of the debt levels.

2.4 Determinants of Capital Structure

In order to achieve the objective of study, we formulate below hypotheses based on the theoretical and empirical literatures. In particular, the study focuses on two renowned capital structure theories namely pecking order theory and the trade-off theory.

2.4.1 Profitability

In accordance with the pecking order theory, the profitable firms hold internal cash flows as compared to the firms that are less profitable. This indicates that these firms prefer internal financing over the issuance of debt. On contrary, the trade-off theory states that those firms which are more profitable incorporate more debt in their capital structure to benefit from the tax shields. Both theories provided the evidence on the significance of profitability for the leverage decisions. However, each theory provided differential signs of association. Similarly, large strand of empirical literature has proposed a negative relationship between profitability and leverage [See Viviani (2008), Talberg *et al.* (2008), Sheikh and Wang (2011), Shah and Kausar (2012), Chen *et al.* (2014), Sheikh and Qureshi (2017), and Khemiri and Noubbigh (2018)]. Therefore, based upon the empirical evidences we postulate that profitability has negative impact on leverage.

Hypothesis 1: Profitability has a negative significant impact on the leverage.

2.4.2 Firm Size

The trade-off theory presents a positive impact of firm size on the leverage ratios of firms. This indicates that large size firms issue more debt to finance their projects as compared to small size firms. This is majorly due to their access to the capital markets which provides them an edge to benefit from the low borrowing cost.

On contrary, the pecking order theory states a negative relationship of firm size and leverage ratios. According to the theory, large size firms retain more cash reserves in the balance as compared to their counterpart small size firms and hence they use the internal cash flows for financing the available opportunities.

Likewise, large strand of empirical studies supports the trade-off order theory [see, Feidakis and Rovolis (2007), Talberg *et al.* (2008), Shah and Kausar (2012), Hussainey and Aljifri (2012), Chen *et al.* (2014), Sheikh and Qureshi (2017) and many more. Therefore, we postulate a positive relationship for the firm size and leverage.

Hypothesis 2: Firm size has a positive significant impact on the leverage.

2.4.3 Growth

The trade-off theory presents a negative influence of growth for leverage decisions. This shows that firms with high growth opportunities rely less on debt financing. This is majorly because high growth opportunities mean higher probability for financial distress. On the other hand, pecking order theory states positive association of growth opportunities and leverage ratios. It states that firms with high growth opportunities have easy access to

the financial markets for the external financing as compared to firms with less growth opportunities. Empirical literatures that provided negative impact of growth opportunities on the leverage includes Alipour *et al.* (2015), Talberg *et al.* (2008), Nasimi (2016), and many others. So therefore, we postulate a negative impact of growth on the leverage ratios.

Hypothesis 3: *Growth has a negative significant impact on the leverage.*

2.4.4 Tangibility

The pecking order and trade-off theory provide positive influence of tangibility on leverage decision of firms. This implies that firms with higher tangible assets attract more creditors. This is majorly due to the confidence of the creditors on these firms for the recovery of their loans. Thus, we can conclude that higher tangible firms incorporate more debt in their capital structure.

A large number of empirical studies have also found positive relationship. For instance, see the empirical studies of Mouamer (2011), Noulas and Genimakis (2011), Shah and Kausar (2012), Lemma and Negash (2013), Chen *et al.* (2014), Nasimi (2016), Sheikh and Qureshi (2017) and many others. Hence, we postulate positive association of tangibility and leverage.

Hypothesis 4: *Tangibility has a positive significant impact on the leverage.*

2.4.5 Earning Volatility

Both theories, pecking order theory and the trade-off theory, agree on the negative impact of earning volatility for the capital structure. This implies that firms with higher earnings volatility are highly exposed to the probability for getting bankrupt due to incapability for the repayment of debt and interest amount.

A huge number of empirical literature on the capital structure choice of firms is present for both developing and developed economies and have found negative correlation of earning volatility with the leverage ratios [see, Crnigoj and Mramor (2009), Sheikh and Wang (2011), and many others]. Therefore, we develop negative association between earning volatility and the leverage.

Hypothesis 5: *Earning volatility has a negative significant impact on the leverage.*

2.4.6 Non-debt Tax Shield

The trade-off theory has proposed negative impact of non-debt tax shield for leverage. This shows that firms with greater non-debt tax shield prefer internal source financing and limit their access to the capital markets for financing. Similarly, pecking order theory provides negative association of non-debt tax shield and the leverage. Empirical literatures, supporting the pecking order and trade-off theory, include Huang and Song (2006), Viviani (2008), Lemma and Negash (2013), Nasimi (2016), and many more. Thus, we develop negative association of non-debt tax shield and the leverage.

Hypothesis 6: *Non-debt tax shield has a negative significant impact on the leverage.*

3. RESEARCH METHODOLOGY

In this section we present research methodology which is adopted to identify the determinants of capital structure for non-financial firms listed at Pakistan Stock Exchange.

3.1 Empirical Model

In order to achieve the objective of our study, we constructed the below empirical model for analysis:

$$\text{Leverage}_{it} = \beta_0 + \beta_1 \text{Profitability}_{it} + \beta_2 \text{FirmSize}_{it} + \beta_3 \text{Growth}_{it} + \beta_4 \text{Tangibility}_{it} + \beta_5 \text{EarningVolatility}_{it} + \beta_6 \text{TaxShield}_{it} + f_i + f_t + \varepsilon_{it} \quad (1)$$

where leverage^[3] is dependent variable. β_0 is the coefficient of intercept. β_1 to β_6 are the coefficients of slope. f_i and f_t are firm-fixed and year-fixed effects. ε_{it} is error term.

3.2 Estimation Technique and Data

After fulfilling the assumptions for testing the relationship between variables, we applied multiple linear regression model. We have used Ordinary Least Squares (OLS) method in our study. Additionally, Redundant Likelihood Test^[4] and Hausman Test^[5] are used to choose an appropriate effect from common, fixed or random effect. We have used secondary source data. Also, convenient sampling technique is utilized to draw study sample. Our sample comprises of 30 non-financial firms. The balanced panel data of our study are collected from annual reports during the period 2008 to 2017.

Table 1 shows measurement of variables used in our study. The variables are followed from empirical studies including Handoo and Sharma (2014), Chen (2004), and Nasimi (2016). We have used leverage as dependent variable. Also, we have used six explanatory^[2] variables namely, profitability, firm size, growth, asset tangibility, earning volatility and non-debt tax shields.

4. EMPIRICAL RESULTS

In this section we present empirical results. We present descriptive statistics that reveals the characteristics of

data used in our study. Also, we present correlation analysis which determines the linear dependency among variable. Finally, we present results from regression analysis.

4.1 Descriptive Statistics

Descriptive statistics provide summary of data. It presents mean, median, standard deviation, minimum and maximum values, skewness, and kurtosis that reveals the data characteristics [see, Nasimi, Nasimi and Khurshid (2018)]. Table 2 shows that firm size variable has the highest value of mean. It shows a mean value of 22.93177. Net debt tax shield has a least mean value of 0.106925. Similarly, firm size shows highest median value of 22.82233 and net debt tax shield has lowest median value of 0.027733. However, we can see that tangibility has highest standard deviation of 37.01481 and leverage has the lowest standard deviation of 0.197099.

We observe that there is enough standard deviation in the variables that makes it good for purpose of studying the determinants of capital structure for Pakistani firms.

Table 2 Descriptive statistics

	EV	FSZ	G	LEV	NDTS	OP	TANG
Mean	0.287	22.932	1.978	0.289	0.107	0.319	2.625
Median	0.056	22.822	0.017	0.280	0.028	0.129	0.447
Maximum	5.616	26.247	546.395	1.060	24.319	56.882	641.573
Minimum	0.011	18.550	-0.922	0.002	-2.314	-0.450	0.034
Std. Dev.	1.005	1.360	31.556	0.197	1.409	3.279	37.015
Observations	300	300	300	300	300	300	300

4.2 Correlation Analysis

Correlation represents the linear relationship among the variables. The correlation analysis shows the strength and direction of association [see, Nasimi (2016)]. The most relevant measure of correlation is the Pearson's correlation coefficient [see, Nasimi, Nasimi and Basit (2018)]. It ranges between +1 and -1. However, +1 shows the perfect positive correlation among variables, where, -1 shows perfect negative association exists. And 0 means there is no linear association among variables. Moreover, correlation analysis helps in identifying multicollinearity problems among variables. Table 3 shows the correlation matrix for all variables. We can observe that problem of multicollinearity^[6] does not seem to be present in our study variables.

Table 3 Correlation matrix

	EV	FSZ	G	LEV	NDTS	OP	TANG
EV	1.0000	0.1166	0.3071	-0.0336	0.3004	0.3023	0.3061
FSZ		1.0000	-0.1858	0.0286	-0.1902	-0.1809	-0.1863
G			1.0000	0.0268	0.8946	0.7982	0.7994
LEV				1.0000	0.0338	0.0108	0.0253
NDTS					1.0000	0.8740	0.7952
OP						1.0000	0.8291
TANG							1.0000

4.3 Regression Analysis

Regression analysis investigates the dependency of dependent variable on explanatory variables. It measures the change in dependent variable to change in explanatory variables. Precisely, it measures values of increase/decrease in dependent variable when explanatory variables are varied. Table 4 shows the results of Hausman test. The p-value of cross section random is greater than 0.05 which shows that random effect is an appropriate.

Table 4 Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random effect	7.900385	5	0.1618

Table 5 presents the random effect regression analysis results. We observe that tangibility has a positive significant coefficient of 0.039828 with the p-value of 0.0000. It shows that tangibility has high significant impact on leverage. It implies that a unit increase in tangibility will increase the leverage by 0.039828 units on average. This finding of our studies is in support of many empirical studies such as Mouamer (2011), Noulas and Genimakis (2011), Shah and Kausar (2012), Lemma and Negash (2013), Chen *et al.* (2014), Nasimi (2016). Operating profit has a negative coefficient of 0.464301 with the p-value of 0.000. It shows that there is adverse

relationship between profit and leverage. A unit increase in operating profit will decrease the level of debt by 0.464301 units. The studies among many others that showed negative impact of profitability on leverage include Viviani (2008), Talberg *et al.* (2008), Sheikh and Wang (2011), Chen *et al.* (2014), Sheikh and Qureshi (2017) and Khemiri and Noubbigh (2018). Net debt tax shield has a positive coefficient 0.018390 with the p-value of 0.7225. It shows that imperative association prevails among net debt tax shield and leverage. A unit increase in net debt tax shield will increase the level of debt by 0.018390. This finding is in according to the empirical findings of Lemma and Negash (2013). Growth has a positive coefficient of 0.000609 with the p-value of 0.9237. It implies that a unit increase in growth will increase leverage by 0.000609 units, on average. The finding supports the empirical findings of Noulas and Genimakis (2011). Firm size has a negative coefficient of 0.027626 with the p-value of 0.0640. It shows that a unit increase in firm size will decrease the leverage by 0.027626 units on average. This finding is according to many empirical studies including Sofat and Singh (2017), Nasimi (2016), and Alipour *et al.* (2015). Earning volatility has a negative coefficient of 0.006988 with p-value of 0.8125. It implies that a unit increase earnings volatility will decrease the leverage by 0.006988 units. Among many other empirical studies, we find that Crnigoj and Mramor (2009) and Sheikh and Wang (2011) also have shown negative association of earnings volatility and leverage. We observed that operating profit and tangibility have high significant but differential impact on leverage. Hence, operating profit and tangibility are the key determinants of the capital structure in the context of Pakistan.

Furthermore, we see that R-squared has a value of 0.131416. It explains the percentage change in dependent variable to change in independent variables. This shows that 13 percent change in leverage has been explained by explanatory variables. However, Adjusted R-squared shows if a new variable is added to the model then the R-squared adjusts to 11.36 percent. Moreover, we see F-statistic value of 7.389 with the p-value of 0.000. It implies that econometric model is good fitted for purpose of study.

4.3.1 Robustness Check

We have applied the robust least squares approach developed by Huber (1973) for the robustness check which indicates that results are not affected on how empirical model is estimated. Table 6 presents the robustness check for the empirical results of our study. We found that the results are qualitatively same.

5. CONCLUSION AND DISCUSSION

The aim of our study is to empirically examine the key factors that determine capital structure of firms in Pakistan. In order to do so, we constructed a balanced panel data of 30 non-financial firms that are listed at Pakistan Stock Exchange during 2008 to 2017. We utilized OLS estimation technique. Additionally, Hausman Test and Redundant Likelihood Tests are used to choose an appropriate effect from common, fixed or random effect.

5.1 Conclusion

We observe that tangibility has positive association with leverage. It implies that firms with higher tangible assets attract more creditors. It is due to the confidence of creditors for reclamation of their loans. Thus, we can conclude that higher tangible firms incorporate more debt in their capital structure. This supports trade off and pecking order theory. This finding of our studies is in support of many empirical studies such as Mouamer (2011), Noulas and Genimakis (2011), Shah and Kausar (2012), Lemma and Negash (2013), Chen *et al.* (2014), Nasimi (2016), and many others.

Operating profit has a negative relationship with leverage. It indicates that profitable firms prefer internal finance as compared to external source of financing. This supports the pecking order theory which states that profitable firms hold more cash as compared to less profitable firms. The studies, among many others, that showed negative impact of profitability on leverage include Viviani (2008), Talberg *et al.* (2008), Sheikh and Wang (2011), Chen *et al.* (2014), Sheikh and Qureshi (2017) and Khemiri and Noubbigh (2018).

Net debt tax shield and growth have positive association with leverage. Firm size has negative relationship with leverage. This finding is according to many empirical studies including Sofat and Singh (2017), Nasimi (2016), and Alipour *et al.* (2015). Earning volatility has negative relationship with leverage. This indicates that firms with higher earnings volatility get bankrupt due to inability for the repayment of debts. It supports pecking order theory and trade off theory. Among many other empirical studies, we find that Crnigoj and Mramor (2009) and Sheikh and Wang (2011) also have shown negative association of earnings volatility and leverage.

Assessment of the firm-specific characteristics that determine the capital structure choice is advantageous to the concerned parties that revolutionize the actions which strengthens their competitive station in the business. The current study provides the many significances. First, findings of the current research are momentous for gauging the effect of organizational capital structure from perspective of firms listed at Pakistan Stock Exchange. The appraisal of capital structure of an organization operating in diverse business sectors have been conducted by many researchers and demonstrated interlink between debt ratios and determinant factors of capital structure [see, Acaravci (2015)]. Additionally, the determinants and associated circumstances changed due to industry and

economic situations which prevail within the industry. Hence, our study provides a varying viewpoint for measuring a different aptitude of industry segment with the organizational structures. Secondly, findings of our research provides as a point of reference in literature for Pakistani firms. It supports the future researchers in understanding more clearly the importance of capital structure for organizations.

Lastly, our research study is aimed and destined at understanding the varying opinions regarding the capital structure choice. Through findings of our research study, implication of debt ratio on the basis of which dissimilarities in developed and underdeveloped economies are evaluated. The organizational decisions vary with the variable factors which imply that a single policy cannot be appropriate for all organizations. The variation in the practices of organizations is centered on the industry situations and these determinants of industry. However, this particular influence of determinant on organizations' performance fluctuates when sector is altered. Though, in our study it is evaluated from perspective of non-financial firms for providing future researchers with an understanding of change about organizational operations decision.

5.2 Recommendations

Our study is a contribution to world of research. We recommend future researchers to include more factors in the econometric model. Particularly, we recommend including variables such as debt to equity ratio and interest coverage as measurement of capital structure. We also recommend increasing the time period for a larger sample of firms would provide better results.

Notes:

- [1] See, Modigliani and Miller (1958), Myers (1977), Titman and Wessels (1988), Rajan and Zingales (1995), and Hall, Hutchinson and Michaelas (2004).
- [2] According to Gujarati and Porter (2009) explanatory and independent are used interchangeably.
- [3] Leverage, debt ratio and capital structure have been used interchangeably.
- [4] In panel data model, Likelihood Ratio Test is applied to distinguish between common effects model and fixed effects model. In this case, the Likelihood Ratio Test has below hypothesis:
H₀: Common Effect is preferred due to higher efficiency.
H₁: Fixed Effect is preferred as least consistent.
- [5] In panel data model, Hausman Test is applied to distinguish between fixed effects model and random effects model. In this case, the Hausman Test has below hypothesis:
H₀: Random Effect is preferred due to higher efficiency.
H₁: Fixed Effect is preferred as least consistent.
- [6] The problems of multicollinearity occurs for coefficients of correlation at threshold of 0.90 [Gujarati (2003)].

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APPENDICES

Table 1 Measurement of variables

Variables	Code	Measurement
Debt Ratio	LEV	Ratio of book value of total debt to total assets
Profitability	OP	Ratio of EBITDA to total assets
Firm Size	FSZ	Natural Logarithm of total assets
Growth	G	Percentage change in Sales ratio
Asset Tangibility	TANG	Ratio of fixed assets to total assets
Earning Volatility	EV	Standard deviation of net income ratio
Tax Shield	NDTS	Ratio of depreciation and amortization to total assets

*EBITDA = Earnings before interest, tax, depreciation and amortization

Table 5 Random Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.965107	0.340855	2.831430	0.0050
Earning Volatility	-0.006988	0.029432	-0.237425	0.8125
Firm Size	-0.027626	0.014858	-1.859330	0.0640
Growth	0.000609	0.006346	0.095887	0.9237
Non-debt Tax Shield	0.018390	0.051734	0.355464	0.7225
Operating Profit	-0.464301	0.075582	-6.143027	0.0000
Tangibility	0.039828	0.009330	4.268961	0.0000
Effects Specification				
			S.D.	Rho
	Cross-section random		0.155486	0.6392
	Idiosyncratic random		0.116811	0.3608
Weighted Statistics				
R-squared	0.131416	Mean dependent var	0.066870	
Adjusted R-squared	0.113629	S.D. dependent var	0.124859	
S.E. of regression	0.117552	Sum squared resid	4.048780	
F-statistic	7.388442	Durbin-Watson stat	0.952125	
Prob(F-statistic)	0.000000			

Table 6 Robustness check

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Constant	-0.106092	0.192068	-0.552369	0.5807
Earning Volatility	-0.019019	0.011703	-1.625080	0.1041
Firm Size	0.018924	0.008414	2.249041	0.0245
Growth	-0.003519	0.009680	-0.363571	0.7162
Non-debt Tax Shield	0.078291	0.079126	0.989440	0.3224
Operating Profit	-0.476624	0.079042	-6.030027	0.0000
Tangibility	0.042648	0.011808	3.611828	0.0003
Robust Statistics				
R-squared	0.112227	Adjusted R-squared	0.094048	
Rw-squared	0.145793	Adjust Rw-squared	0.145793	
Akaike info criterion	235.3696	Schwarz criterion	265.5637	
Deviance	8.919423	Scale	0.198821	
Rn-squared statistic	40.73104	Prob(Rn-squared stat.)	0.000000	
Non-robust Statistics				
Mean dependent var	0.289310	S.D. dependent var	0.197099	
S.E. of regression	0.185880	Sum squared resid	10.12353	