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DETERMINANTS OF CAPITAL STRUCTURE: A STUDY OF FERTILIZER INDUSTRY OF PAKISTAN

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ABSTRACT

The capital structure of a firm determines the ability to raise the capital of the firm by impacting market price and earnings per share for the shareholder. Capital structure is a mixture of debt and equity such that to choose from different options available to the organization for financing its assets. Higher leverage implies an increase in total earnings of the firm due to the excess of earnings on borrowing than the interest payment on debts. Both in financial and non-financial sectors, researchers find it interesting to determine the attributes that impact capital structure The current study aims at investigating the relationship of profitability, size, growth, and tangibility with leverage and their significance in determining the capital structure of the firm by using the data from 2010-2019, of the fertilizer industry in Pakistan by considering all six firms in the industry, listed in Pakistan stock exchange; namely, Engro Fertilizers; Fatima Fertilizers, Fauji Fertilizer Corporation, Fauji Fertilizer bin Qasim Ltd and Pak Arab Fertilizer. Hausman specification test is applied to check the appropriation of model among fixed and random effect. The findings revealed

the significance of all the variables. Profitability, size, and tangibility were found negatively correlated while growth was found to be positively correlated with leverage. **JEL code: G32**

INTRODUCTION

Pakistan is an agricultural country and its agricultural growth is mainly dependent on the fertilizer sector. According to various reports, there has always been a supply deficit for fertilizer. Over the last few years, with technological advancement and increase on the side of market players, the production of fertilizer has gone to six million tons annually. This has surpassed the local consumption. The demand for fertilizers has also increased because of the awareness and literacy among the farmers, that it can result in higher yields, and in return, it will provide them higher income. The selection of fertilizer industry is made for the current study is due to its importance in the agriculture sector since it is considered as the backbone of agriculture; wows for an increase in investment in the sector owing to its growing demand in the market.

The aim of this research is to see whether the determinants that are used in this study provide any explanation for choosing a capital structure (CS). The variables that we are using in this study to check the relation with leverage and their significance in determining the capital structure are profitability, firm size, growth, and tangibility. Since the capital structure is to choose from different options available to the organization for financing its assets. A firm can choose between different levels of debt and equity or alternate financial arrangements. From debt options it can choose or combine term fixed certificates (TFCs); it can issue bonds that bears a cost in terms of interest payments to its bondholders and have a maturity; it can opt for bank loans or go for lease-financing for its fixed assets or either it could go for equity financing through the issuance of shares which also bears the cost in terms of broker's commission and underwriter's fee. All this is being done to increase the market worth of the firm so that the most important financial goal of the firm could be achieved that is the increasing of shareholder's investment, which can differ with respect to the company's capital structure. This has resulted in different theories with respect to capital structure which attempts to explain the disparity in the capital structure of the firm across geographic regions and time. In contrast to this, empirical evidence is also sometimes not coherent in substantiating a specific principle of capital structure.

Furthermore, this is one of the immense important decisions of any corporate finance is consideration about its capital structure amongst the many other aspects like capital budgeting and working capital management. These may involve mergers, the policy of dividends, projects, short- and long-term securities, procurements, and so on. A variety of finance combinations a firm can opt to finance its overall assets to maximize its value, which is referred to as capital structure. Capital structure plays an important role to define the total market worth of any firm. Type of industry business and its procedures are the main factors that provide a mixture of financing choices to a firm. The objective of this study is to find out the determinants of capital structure in the fertilizer industry of Pakistan. This study may reveal unique characteristics of capital structure, which may not be visible in a combined analysis.

This study is aimed to identify the impact of assets tangibility, size of the firm, growth, and profitability over-leverage and is restricted to the fertilizer sector by including all six companies listed on the Pakistan stock exchange for the period of 2011-2018. The reason for focusing Pakistan's fertilizer industry apart from its importance in the agriculture of Pakistan is to check whether the industry displays a unique selection of factors for the capital structure by comparing the results of the study conducted by Afzal & Hussain (2011) on the sugar industry and Hijaz & Tariq (2006) who analyzed 445 companies listed in the Pakistan Stock Exchange.

Background of Fertilizer Sector in Pakistan

The sector of agriculture of Pakistan plays a very major role in the economy by contributing 18.9 percent of the GDP (Gross Domestic Product) and accommodates 42.3 percent of the labor force. The population of Pakistan is growing at a rate of 2.4 percent annually as per the report published by the Sixth Population and Housing Census. The demand for agricultural products has also increased with the increase in population. Over the period the Pakistani government has taken steps to develop this sector like efficient water utilization, crop diversification, reducing finance cost, availability of cheap electricity for tube wells, the reduction in pesticide prices, subsidy for fertilizer, and credit enhancement.

LITERATURE REVIEW

The paper is based on the assumptions of two foundational theories regarding the capital structure; the pecking order (Myers and Majluf, 1984) and static trade-off theory (Modiglian & Miller, 1958; 1963). Pecking Order theory focuses on the utilization of funds available within the firm born by operations of the firm (Bashir & Awan, 2016). Due to internal funds are comparatively low costs than debts when debts are at a lower cost than new issuance of shares or bonds. Nha et. al (2016) found profitability to be negatively correlated with leverage, which endorses the assumption of pecking order theory. Tran & Ramachandran (2006) and Nguyen et al. (2012) witnessed profitability as a significant determinant for the capital structure.

(Raheman, Zulfiqar, and Mustafa (2007) investigated the connection between capital structure and profitability. The information from the 94 non-financial related firms for a period of six years (1999-2004) was used by employing regression and correlation analysis and found equity and company's size significant positively, while debt impacted negatively on the profitability of firms. Aurangzeb & Haq (2012) revealed profitable firms have a greater capacity to pay interest expense which allows those firms to increase their debt portion of the capital structure, resulting in greater tax-shield which endorses pecking theory. The size of the firm has been studied in earlier studies on capital structure as a traditional variable (Yang, Albaity, & Hassan, 2015). It is found to be a significant determinant of the firm's capital structure in varied perspectives (Rajan & Zingales 1995; Harris & Raviv 1991; Bevan & Danbolt 2002) and is considered as an inverse proxy for the chances of occurring for bankruptcy (Pettit & Singer 1985). Moreover, larger firms have more opportunities to use debt financing than smaller firms, as per the tradeoff theory (Titman & Wessels 1988). Furthermore, Diamond (1989) asserts that

big firms can acquire more debt financing at a lower cost because of their reputation in the financial market (La Rocca et al. 2009). Similarly, Frank & Goyal (2003) concluded that only large firms use pecking order theory; Rajan & Zingales (1995) revealed that firm size causes leverage to be increased.

The argument given by Jensen and Meckling (1976) confirmed that firms having fewer assets to be kept as collateral for debt financing, agency cost of debt financing, and moral hazards increases (La Rocca et al. 2009). It can be said that those firms which do not have more assets to keep as collateral may abuse the bondholder's interest by switching to riskier projects from safer projects (Booth et al. 2001). Moreover, such firms are forced to issue shares instead of debt, or either they are required to pay a high rate of interest. Tangible assets are considered to be more valuable than intangible assets in the case of default, so bondholders could ask for lower risk premiums. Tangible assets help in reducing the concerns on the abuse of insider resources. Collateral plays a very important role in those countries where creditor protection is comparatively weak (La Porta et al. 1998) and it is generally recognized that creditor protection is weak in emerging economies.

Tran & Ramachandran (2006) witnessed in their studies that growth is positively correlated with leverage, which means that with the increase in growth the leverage will also move upward.

There is a contradiction in theoretical predictions that how profitability influences firms' leverage (Nguyen and Ramachandran, 2006). Tradeoff theory forecasts that there are high chances that firm profitability gets more benefits from higher tax advantages of debt that may influence them to further levered with minimum financial distress risk.

Trade-off Theory is being supported by growth rate as it is indirectly associated with total debt and long-term debt ratio. Firms with high growth prospects are likely to have inverse relations because of their limited debt utilization.

For capital structure, tangibility is the most common determinant. Many studies have confirmed a positive relation between leverage and tangibility. Nguyen et al. (2012) and Nha et al.(2016) suggested that firms having higher tangibility are in a condition to collateralized more assets and raise more debt financing, this also states that comparatively tangible assets are of more value than intangible assets. Furthermore, if the firm has more tangible assets then the firms are in a greater position to acquire loans, thus increasing the firm's ability to increase its borrowings. Nevertheless, it was revealed by Nguyen et al. (2012) that Vietnamese firms operating in the trade and service sector rely less on capital structure and prefer greater working capital to run the firm's operations.

The literature suggests that organizations with elevated levels of asset tangibility assert to bring down risk for lenders; in this manner, asset tangibility is required to be positively identified with influence (Titman & Wessels, 1988; Rajan & Zingales, 1995; Frank & Goyal, 2009). Agency

theory proposes that organizations with high leverage are hesitant to invest and, thus, to move wealth from debt holders to equity holders. As an outcome of this potential wealth move, money lenders require insurance as the utilization of made sure about debt can reduce this issue. Consequently, firms incapable to give security must compensation higher interest on debt, or be constrained, to give equity. Furthermore, as bigger firms are more averse to confront budgetary distress, size and tangibility are relied upon to have a positive influence on leverage.

METHODOLOGY

The study used panel data, of all six fertilizer companies listed with Pakistan stock exchange (PSX); namely Engro fertilizer, Fatima fertilizer, Fauji fertilizer corporation, Fauji fertilizer bin Qasim Ltd, Pak Arab fertilizer. The data has been extracted from financial statement analysis of the financial sector published by the State Bank of Pakistan from the published annual reports of respective banks for nine years that is, from 2010 to 2019. Descriptive statistics and regression analysis is done on STATA SE 16 version.

FIGURE-1 THEORETICAL FRAMEWORK

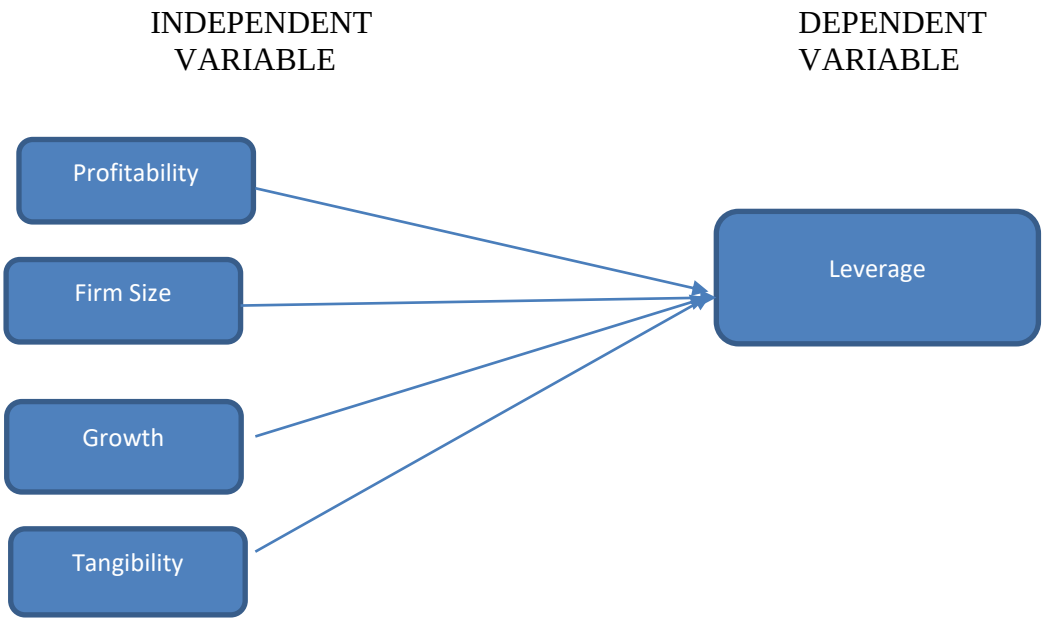

Table 1 Variables used in the study justified by the literature

Variables	**Proxy**	**Used by other Researchers**
Dependent Variable		
Leverage	Total debt/total assets	Mubeen et al. (2016)
Independent Variables		

Profitability	Profit before tax/total assets	Shah and Hijazi (2005) and Rajan and Zingales (1995)
Firm size	Natural log of total assets	Kouser et al. (2011)
Growth	%Δ in total assets	Mubeen et al. (2016)
Tangibility	Fixed assets/total assets	Zhang et al. (2018)

Statistical Model:

$$\boldsymbol{LG = \beta_0 + \beta_1 PF + \beta_2 SZ + \beta_3 GR + \beta_4 TG + \mathcal{E}}$$

Where,

$\boldsymbol{LG}$ = Leverage

$\boldsymbol{PF}$ = Profitability

$\boldsymbol{SZ}$ = Size of the firm

$\boldsymbol{GR}$ = Growth

$\boldsymbol{TG}$ = Tangibility of assets

Hausman specification test is used to select which estimation model to choose from the random effect and fixed-effect model.

Hypothesis for Hausman Test

Null hypothesis: Random effect model is appropriate

Alternate hypothesis: Fixed effect model is appropriate

If the value of chi-square is less than 0.05 then the null hypothesis is rejected and it implies that the random effect model is appropriate.

DATA ANALYSIS

Table-2 Descriptive Statistics

	Leverage	**Profitability**	**Firm Size**	**Growth**	**Tangibility**
Obs	49	49	49	49	49
Mean	0.6730	0.1363	18.1260	0.1143	0.4928
St. Dev	0.1037	0.1464	0.4040	0.3546	0.2721
Min	0.4572	-0.1002	17.2498	-0.6690	0.0044
Max	0.9250	0.5972	18.8597	2.2529	0.9125

Table-2 shows descriptive statistics of the variable used. The total number of observations is 49, for ten years except for Pak Arab fertilizer whose data is available for nine years. The descriptive statistics revealed the least dispersion in leverage and highest dispersion in size of the firm.

Fixed and Random Effect Model and Hausman Test

Table 3 and 4, reflects the results of fixed and random effect model estimation respectively. Table 4 shows the value of probability less than 0.05 (0,0318) implies that the null hypothesis is rejected implies random effect model is more appropriate in the case of profitability.

Table 3 Fixed Effect Model Estimation

Leverage	**Profitability**	**Firm Size**	**Growth**	**Tangibility**	**_cons**
Coef.	-0.5678	-0.0603	0.0536	-0.1212	1.8970
Std. Err.	0.0939	0.0304	0.0250	0.0509	0.5529
T	-6.0500	-1.9800	2.1500	-2.3800	3.4300
P>t	0.0000	0.0540	0.0380	0.0220	0.0010
[95% Conf.	-0.7576	-0.1218	0.0031	-0.2241	0.7795
Interval]	-0.3780	0.0012	0.1041	-0.0182	3.0146

Table- 4 Random Effect Model Estimation

Leverage	Profitability	Firm size	growth	tangibility	_cons	sigma_u	sigma_e
Coef.	-0.3883	-0.0288	0.0745	-0.2421	1.3598	0	0.0561
Std. Err.	0.0736	0.0273	0.0309	0.0405	0.4925		
Z	-5.2700	-1.0600	2.4100	-5.9700	2.7600		
P>|z|	0.0000	0.2910	0.0160	0.0000	0.0060		
[95% Conf.	-0.5326	-0.0825	0.0140	-0.3216	0.3946		
Interval]	-0.2440	0.0247	0.1350	-0.16261	2.3250		

Table-5 Hausman Test Results

		Profitability	Firm Size	Growth	Tangibility
(b)	Fe	-0.5678	-0.0603	0.0536	-0.1212
(B)	Re	-0.3883	-0.0289	0.0745	-0.2421
(b-B)	Difference	-0.1795	-0.0314	-0.0209	0.1209
sqrt(diag(V_b -V_B))	S.E.	0.0583	0.0134	.	0.0309

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
The profitability of the fertilizer sector is found to have a negative value for coefficient (-.5678) implies an inverse correlation between profitability and leverage with significant t values. The result is consistent with the study conducted by Mahira (2011) which revealed that profitability is negatively correlated with leverage. In contrast to the results, tradeoff theory forecasts that there are high chances that firm profitability gets more benefits from higher tax advantages of debt that may influence them to further levered with minimum financial distress risk. Profitability is a robust factor of disagreement among the two theories of capital structure i.e. statistic tradeoff theory (STT) and pecking order theory (POT). The pecking order theory assumes that higher

earnings will lead to an increased internal source of funds i.e. higher retained earnings and the firm will choose to finance its investment projects and cover future growth plans for this internal source. On the contrary static tradeoff, theory suggests that with higher earnings the firm will issue more debt security as it can easily cover the finance cost and also reducing the tax burden. Therefore the pecking order theory expects a negative relationship between leverage and profitability, whereas the static tradeoff theory expects a positive relationship between profitability and leverage. The results reveal the value of the coefficient of size came out to be -.0603, with significant t values. The result endorses the existing literature (Titman & Wessels, 1988; Rajan & Zingales, 1995; Shah & Khan, 2007). Growth has come out to be a significantly positively related variable in the study with the coefficient value of 0.054. Similar results have been found in the study conducted on the cement industry by Farrukh & Asad (2017). The result also confirms the results of Tran & Ramachandran (2006) and Nha et al. (2016). The coefficient for tangibility is -0.12116, with significant t values, confirms the Pecking order theory that leverage decreases with tangibility and profitability.

CONCLUSION

This study investigates the capital structure determinants of fertilizer sector firms of Pakistan. Hausman test was applied to find out which estimation model is appropriate among random effect model and fixed-effect model to find out the determinants of capital structure of six firms in the fertilizer industry of Pakistan listed in the Pakistan stock exchange. The study uses the leverage of the firm as a dependent variable; calculated by taking the total debt of the firm divided by the total assets of the firm. The explanatory variables used are profitability, size of the firm, growth, and tangibility.

The findings reveal profitability is a highly significant factor for the capital structure of the firm having a negative relationship with the leverage of the firm. The size of the firm came out to be negatively related to the leverage implies the big size of the firm does not call for higher leverage in the case of the fertilizer industry of Pakistan. Tangibility appears to have impacted leverage but not positively. The growth of the firm seems to be the important player for increasing the leverage as is revealed to have a positive significant relationship with leverage. It is suggested that in future study robustness could be increased by conducting a survey on the financial managers of the corporations. Personal characteristics of the financial managers like personal risk-bearing factors may have an impact on the capital structure or financing decision of a firm. In case of management wants to maintain control of the firm; the firm will prefer debt over equity financing. All these things could be found out in the survey results. The future scope of this study is to add more variables in the study will enhance more understanding of the determinants of capital structure.

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