POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

Volume 2, Issue 4, 2024

Received: 13 November 2024
Accepted: 13 December 2024
Published: 20 December 2024

DETERMINANTS OF CORPORATE CAPITAL STRUCTURE: EVIDENCE FROM PSX LISTED MANUFACTURING SECTOR FIRMS IN PAKISTAN

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ABSTRACT

This study is an exploratory endeavor to investigate the determinants of capital structure by selecting a simple random sample of 50 manufacturing sector listed firms on PSX during a three-year period beginning in 2021 and ending in 2023, using the panel data approach. Ten independent variables and one dependent variable (leverage) were investigated with OLS regression analysis. The findings of this study show that firm size and liquidity are key predictors of capital structure in Pakistan's corporate manufacturing sector enterprises across the study period. Other characteristics, such as dividend payout ratio, sales growth, non-debt tax shield, return on assets, profitability, tangibility, tax rate, and uniqueness, have had little or no influence on the leverage of Pakistani manufacturing sector enterprises over the study period.

Keywords: *Regression analysis, Leverage, Capital structure, Listed firm*

ISSN (E): 3006-7030 (P) : 3006-7022

INTRODUCTION

Investors offer funds for investment to the firm in the form of several forms of cash flow claims. Each investor category faces a distinct form of risk, and as a result, each demands a different projected return in order to fund the firm. The needed rate of return represents the investor's opportunity cost of investing in other possibilities with equivalent risk. Shareholders make the decision to accept or reject investment in new initiatives. Only initiatives with higher estimated wealth are accepted. The cost of capital is the minimum risk-adjusted rate of return required to satisfy stockholders. An investment choice cannot be made without knowing the cost of capital. A firm can select an appropriate capital structure that comprises common stock, preferred stock, warrants, convertible bonds, and so on. All of these diverse financial claims contribute to the firm's capital structure. Capital restructuring occurs when a company replaces one type of capital structure with another while leaving its assets unaltered. To determine the impact of capital restructuring on the total value of the firm, it is critical to understand how the market values various capital structures. The firm's value is determined by how the market values the new debt and equity. Most firms have low debt-to-equity ratios. In fact, most businesses employ less debt than equity funding. Most firms pay substantial taxes, and the corporate tax has been a significant source of government revenue. Changes in financial leverage impact corporate value. Masulis (1980) conducted an important study on the impact of capital structure changes on stock prices. He discovered that changes in financial leverage projected to result in a corporate debt tax shield are associated with stock price movements. Second, a choice to increase leverage might have a negative impact on shareholders, indicating that the corporation is not

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following a shareholder wealth maximization policy or that it has a high bankruptcy cost effect. What affects the firm's debt-to-equity ratio? Kester (1986) demonstrates that accounting profitability is an important determinant of capital structure for US enterprises. The more profitable a company is, the less debt it incurs.

However, companies with a large proportion of intangible assets and growth potential require less debt. Some academics also believe that fixed assets are acquired with debt because they may be used as collateral for borrowing from the market at competitive rates, hence asset structure in a company becomes a role in determining capital structure, particularly long-term debt (Andika & Sedana, 2019).

Emerging economies are gradually approaching the debt levels of developed countries. Nonetheless, the findings from established economies cannot be applied to the capital structure of emerging economies unless enterprises in both markets use the same techniques when selecting capital structures. According to researchers, the country's legislative framework and corporate governance status have a substantial impact on the drivers of capital structure. It is consequently critical that rising economies should not be combined as a group. Each country should be seen as a unique emerging economy. The state of development of Pakistani industry following the enactment of the Company Act-2017, as well as the active role of the SECP (Security and Exchange Commission of Pakistan) in regulating capital markets in Pakistan, is my motivation to investigate the determinants of capital structure for Pakistani manufacturing sector firms in this new scenario The review of literature suggest that capital structure varies from industry to industry as also between firms in the same industry based on the set of characteristic of firm. This represents a gap in the existing literature and provides a purpose for this study to focus on a particular industry, manufacturing sector industry which is the back bone of any economy. Pakistan is experiencing a high rate of inflation during this period of study, companies finding it hard to borrow because of high cost of debt makes the capital structure study more exciting.

1. Literature Review

Following Modigliani and Miller's (1958) work, various theories were created to broaden the scope of their analysis of market imperfections (conflicts of interest, information asymmetry, frictions, etc.). The following is a quick discussion of the theories underlying corporate debt financing behavior.

Agency Theory

Agency theory approaches what affects capital structure, by adding another set of costs to non-marketed claims, known as agency costs. Managers are not acting in the best interests of investors; they are at least concerned with their own well-being. The impulse to use the firm's cash flow for personal gain is kept in check by employing resources to monitor and bond the managers. A distinct financial structure with a different distribution of managerial ownership. Agency costs include the interrelationships between managers' incentives and the expense of monitoring their operations.

Asymmetric information or signaling approach

The essence of information is that strong-form efficiency does not exist, and insiders in the firm have unique knowledge that the market or outsiders do not have. Hence the term asymmetric information. If future prospects look promising, a company may choose to raise its debt-equity ratio or even create financial slack. Myers and Majulf (1984) use a different approach: corporations will issue stock when it is overvalued. Issuing debt may enable the company to avoid undervalued equity.

Theory of financing hierarchy

This hypothesis proposes that corporations choose to use retained earnings to fund investment opportunities. If external finance is required, managers prefer debt to common equity. The last option is to issue new equity.

Theory of market timing

The idea proposes that managers issue shares when they believe stock prices are significantly higher than their intrinsic value. There is no

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insider information in this belief. Just a different perspective than the market consensus.

Trade – off Theory

The MM-model assumes no bankruptcy expenses. Bankruptcy frequently causes a company to sell assets for a lower price than they would be worth if the company continued to operate. The threat of insolvency generates financial hardship costs. Customers, suppliers, and staff abandon ship. As a result, the high penalty of bankruptcy discourages businesses from incurring excessive debt. Bankruptcy carries a significant cost of financial difficulty. The emergence of trade-off theory of leverage recommends that enterprises should weigh the advantages of debt financing (Tax Deductibility of Interest Expense). According to the trade-off theory, the value of a levered firm equals the value of an unlevered firm plus the tax shield minus the estimated cost of financial crisis.

2. Research methodology

This is an empirical study aiming to analyze the determinants of capital structure of Pakistani companies listed on the PSX (Pakistan Stock Exchange) in the industrial sector against the backdrop of the aforementioned capital structure theories.

Objectives

1. How do manufacturing enterprises in Pakistan make finance decisions?
2. Which capital structure theory best applies to Pakistani companies?

Data source

The random sample covers cross-sectional data for 50 businesses listed on the Pakistan Stock Exchange (PSX) from 2021 to 2023. The analysis relied on accounting data. Only companies with data for all of the variables and all three years were considered. The collected data was tabulated, processed, and interpreted using E-Views.

The Statistical Analysis

Model Specification

$$D/A = \alpha + \beta 1x1 + \beta 2x2 + \beta 3x3 + \beta 4x4 + \beta 5x5 + \beta 6X6 + \beta 7x7 + \beta 8x8 + \beta 9x9 + \beta 10x10 + \varepsilon$$

x1=DPO, x2=GRO, x3=LIQ, x4=NDTS, x5=ROA, x6=PRO, x7=SIZ, x8=TAN, x9=TR, x10=UNI

This study used descriptive statistical analysis, classical assumption tests, influence analysis using multiple linear regression analysis, correlation among variables, F test, and t tes,t fixed effects approach to panel data to identify the determinants of capital structure. Panel data estimation delivers more robust impacts of the independent variables on the dependent variable. The analysis was conducted using the E-Views application.

Explanatory variables and Hypothesis development

The selection of variables has been done after a thorough study of other exploratory efforts both in India and Pakistan, most of the authors have found roles of these variables as determinants of capital structure in their empirical researches. Results of course change with different samples, time periods, definition of leverage and regions. Very little work has been done in Pakistan on this topic. This study could provide a policy guideline for financial planners in the manufacturing sector of Pakistan.

D*ependent variable*

Leverage (LEV) is a financial ratio calculated in this study by dividing the book value of all debt by the book value of all assets. It is also known as the debt ratio. Rajan and Zingales (1995), Bhaduri (2002), Gracia and Mira (2008), Handoo and Sharma (2014), and many others have all employed this ratio to calculate leverage in their research works.

Independent variable

Divide the dividend per share by the earnings per share to get the dividend payout ratio (DPO). Businesses with high leverage ratios typically give shareholders a smaller share of their profits, most likely to stabilize the dividend policy. In 1989, Allen and Mizuno discovered a negligible correlation between leverage and the dividend payout ratio.

H01: Leverage and the company's dividend payout ratio are unrelated.

Growth (GRO) is computed as the percentage increase in sales from the previous year to the

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current year. This variable was employed by AlKhatib (2012) and Fauzi et al. (2013) in their capital structure studies. There is conflicting empirical evidence regarding the relationship between leverage and growth. Growth and leverage were found to be significantly correlated negatively by Rajan & Zingales (1995) and Barclay (1995).

H02: Leverage and the firm's growth are unrelated.

In this study, total current assets divided by total current liabilities yields liquidity (LIQ). Investors do not appreciate a high current ratio. Eldomaity (2008), de Jong et al. (2008), Rasoolpur (2012), Handoo and Sharma (2014), and numerous other researchers have employed this as an independent variable in their capital structure studies. However, Rsoolpur discovered a substantial negative correlation between leverage and liquidity.

H03: Leverage and the firm's liquidity are unrelated.

Depreciation expense is divided by total assets to determine the non-debt tax shield (NDTS). One low-cost and alternative way to lessen the tax burden is through depreciation. In their capital structure research, Huang and Song (2006), Delcoure (2007), and Chakraborty (2010) employed this variable.

H04: Leverage and a company's non-debt tax shield are unrelated.

The ratio of net income to total assets after interest and taxes is known as return on assets, or ROA. The efficiency with which the company has used its assets to produce earnings determines this ratio.

H05: The return on assets of a firm is not correlated with its leverage.

In this study, profitability (PRO) is defined as the ratio of total assets to EBIT (earning before interest and taxes). In their studies on the factors influencing capital structure, Alkhatib (2012), Handoo and Sharma (2014), and Oztekin (2015) also made use of this variable. According to Myers (1984), profitable businesses will use retained earnings financing instead of debt financing. The opinion of Myers is further supported by Rajan and Zingles (1995) and Tong and Green (2005).

H06: Leverage and a company's profitability are unrelated.

The logarithm of assets is used in this study to determine the firm's size (SIZ). Due to their higher credit ratings, larger businesses are typically able to acquire more debt funding than smaller businesses. Therefore, it is projected that the capital structure of larger enterprises will contain more debt. Since many analysts track the shares of larger companies, there is a lower likelihood of larger companies being valued incorrectly. Larger companies may turn to greater equity funding as a result of knowledge asymmetry. While Baven and Danbolt (2000) discovered a strong negative link between size and leverage, Rajan and Zingales (1995) found a favorable association. There are numerous other studies that address this subject.

H07: Leverage and the size of the company are unrelated.

In this study, the ratio of fixed assets to total assets is used to measure tangibility (TAN). Because these fixed assets could be used as collateral to obtain loans at a reduced cost, companies with a greater tangibility ratio are probably more indebted. Bradly et al. (1984), Rajan and Zingales (1995), and numerous others have established a positive correlation between debt and tangibility. Some academics nonetheless claim that organizations with bigger levels of fixed assets are prone to turn to equity financing

H08: There is no relation between firm's tangibility and leverage.

In this study, the tax rate (TR) is determined by dividing the tax expense by the pre-tax earnings. Given the cost of financial crisis as indicated by trade-off theory, companies in higher tax brackets are likely to use more debt in their capital structure and benefit from the interest tax shield.

H09: Leverage and the firm's tax rate are unrelated.

In this study, uniqueness (UNI) is determined by dividing net sales by cost of goods sold. Rasoolpur (2012) and Bradley et al. (1984) discovered a strong inverse link between leverage and originality. Through R&D efforts, specialized services, employee talent, innovation, and being the first to develop and market new items that are in great demand in the markets, businesses may make a difference.

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H0:10 Leverage and the firm's uniqueness are unrelated.

4. Results and discussion

4.1Descriptive statistical analysis

Table 1 below shows that there are 150 observations (3*50). The minimum value of leverage is 0.0, while a maximum value of 0.53367 and an average value of 0.204501 and standard deviation of 0.150073.

TABLE 1 Descriptive statistics

	DPO	GRO	LEV	LIQ	NDTS	PRO	ROA	SIZ	TAN	TR	UNI
Mean	0.42	0.34	0.20	1.81	0.03	0.16	0.09	7.88	0.46	0.31	0.72
Median	0.33	0.25	0.22	1.38	0.03	0.15	0.09	7.87	0.46	0.30	0.72
Maximum	2.79	2.40	0.53	15.21	0.19	0.41	0.24	9.15	0.91	1.88	1.03
Minimum	0.00	-0.81	0.00	0.42	0.00	-0.19	-0.18	6.54	0.02	0.00	0.19
Std. Dev.	0.49	0.40	0.15	1.52	0.02	0.09	0.07	0.51	0.18	0.21	0.15
Skewness	1.91	1.75	0.15	5.24	4.11	-0.04	-0.25	0.23	-0.03	2.77	-0.98
Kurtosis	8.56	9.27	1.84	42.38	34.30	4.48	4.20	3.18	2.51	21.48	4.84
Jarque-Bera	284.66	321.54	8.98	10378.40	6544.96	13.78	10.58	1.53	1.55	2325.68	44.96
Probability	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.47	0.46	0.00	0.00
Sum	63.61	50.57	30.68	271.48	4.25	23.41	13.69	1181.77	69.55	46.32	108.50
Sum Sq. Dev.	35.22	23.90	3.36	345.10	0.05	1.16	0.67	39.49	5.01	6.80	3.35
Observations	150	150	150	150	150	150	150	150	150	150	150

4.2 Classical assumption test

Table 2 shows the correlation matrix of the variables. All the correlation coefficients are less than 0.4 except the correlation coefficient of ROA(return on assets) & PRO (Profitability) which is 0.877579, indicating that there is no serious problem of multicollinearity in this model. DPO, LIQ, NDTS, PRO,ROA and TR show less than 10% negative correlation with the leverage. However SIZ, TAN, TR and UNI are low positively correlated with the leverage. Some independent variables are also showing negative correlation with other independent variables. LIQ is negatively correlated with NDTS, SIZ, TAN and TR. Likewise GRO is negatively correlated with LIQ, NDTS, TAN (insignificant) and TR. Also PRO is negatively correlated to SIZ, TAN and UNI. Similarly DPO is negatively correlated with NDTS, SIZ, TR and UNI (insignificant). Going forward ROA is negatively correlated to SIZ, TAN,TR &UNI. Furthermore UNI is negatively correlated to SIZ, TAN & TR. Other variables show low positive correlation among each other.

TABLE 2 Correlation Matrix

	LEV	DPO	GRO	LIQ	NDTS	PRO	ROA	SIZ	TAN	TR	UNI
LEV	1										
DPO	-0.096	1									
	0.243										
GRO	0.065	0.121	1								
	0.429	0.141									
LIQ	-0.380	0.040	-0.055	1							
	0.000	0.631	0.500								
NDTS	-0.056	-0.087	-0.126	-0.160	1						
	0.493	0.291	0.125	0.051							
PRO	-0.218	0.351	0.011	0.034	0.079	1					

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	0.007	0.000	0.899	0.681	0.340						
ROA	-0.334	0.341	0.074	0.167	0.068	0.878	1				
	0.000	0.000	0.366	0.041	0.406	0.000					
SIZ	0.242	-0.048	-0.048	-0.151	-0.125	0.057	0.151	1			
	0.003	0.558	0.560	0.064	0.126	0.486	0.064				
TAN	0.279	-0.245	-0.013	-0.321	0.128	0.275	0.287	0.144	1		
	0.001	0.003	0.874	0.000	0.118	0.001	0.000	0.079			
TR	-0.059	-0.031	-0.051	-0.160	0.109	0.164	0.064	0.166	0.043	1	
	0.473	0.703	0.539	0.050	0.183	0.046	0.434	0.042	0.600		
UNI	0.124	-0.030	-0.043	-0.304	0.100	0.296	0.341	0.081	0.170	0.045	1
	0.131	0.714	0.598	0.000	0.223	0.000	0.000	0.323	0.037	0.581	

4.3.*1 Multiple regression analysis*

***T*able 3 below presents the results of regression analysis in the form of equation**

Y= -0.622177 +0.016207 x1 +0.024435x2 -0.013726x3 -0.027157x4 -.469234x5 -0.243292x6 +0.150841x7-0.14228x8 – 0.44807x9 -0.263496x10+ei

TABLE 3 Fixed Effect Firm Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.622177	0.625616	-0.994503	0.3226
DPO	0.016207	0.020469	0.791797	0.4306
GRO	0.024435	0.020675	1.18182	0.2404
LIQ	-0.013726	0.008027	-1.710007	0.0907
NDTS	-0.027157	0.519968	-0.052227	0.9585
ROA	-0.469234	0.357011	-1.314338	0.1921
PRO	-0.243292	0.2308	-1.054123	0.2946
SIZ	0.150841	0.076506	1.971608	0.0517
TAN	-0.14228	0.133761	-1.063687	0.2903
TR	-0.044807	0.046266	-0.968454	0.3354
UNI	-0.263496	0.197875	-1.331629	0.1863

Discussion

Most of the variables like DPO,NDTS, ROA, PRO, TAN, TR and UNI have low negative but insignificant relationship with the leverage. These results are consistent with the results obtained by other researchers as well. Titman and Wessels (1988) and Allen and Mizuno (1989) found NDTS negative but insignificantly related to leverage. Allen & Mizuno (1989) also found DPO as insignificantly related to leverage. larryLi, Silvia Z. Islam(2019) found profitability, tangibility and growth opportunities not related to leverage. Handoo and Sharma (2014) however found most of these variables significantly related to leverage in Indian Manufacturing firms quoted on BSE(Bombay Stock exchange).

The analysis also shows that LIQ(Liquidity) is negatively but, significantly ($p < 10\%$) correlated to leverage. The similar result was obtained by Raoolpur (2012) in an empirical research on a large size sample of Indian Manufacturing companies. However (Ozkan 2001) argues that firms with higher liquidity ratios are in a better position to meet debt servicing and are expected to have more debt in their capital structure. Handoo and Sharma(2014) however found that liquidity is significantly related to leverage.

The variable SIZ (log Assets) has a significantly positive($p<5\%$level of significance) correlation with leverage, indicating the size of the firm as a significant determinant of capital structure in the Pakistani context for the period of this study. Many researchers have found size as significant for determining capital structure. Rajan and Zingales (1995) Shah and Hijazi (2004) and Rafiq et al. (2008) found positive relationship between size and leverage. Some researchers however argue that large firms' shares are rightly priced so

large firms will use greater equity financing compared to smaller firms.

Coefficient of determination

Table 4 below indicates adjusted Rsqure as 0.793184 which means that the influence of the independent variable to the dependent variable is about 79% whereas 0.206816 or about 21% is influenced by other variables which were not included in this study. The value of F Statistics is10.68556 which is significant(<1%) which indicates robustness of the model. All the goodness of fit test Akaik info, Schwarz criterion, Hannan-Quinn criterion indicate the explanatory power of the model used. Also Durban Watson value of 2.034816 indicates no multicollinearity problems whatsoever.

TABLE 4 Effects Specification

R-squared	0.875078	Mean dependent var	0.204501
Adjusted R-squared	0.793184	S.D. dependent var	0.150073
S.E. of regression	0.068249	Akaike info criterion	-2.242138
Sum squared resid	0.419211	Schwarz criterion	-1.037884
Log likelihood	228.1604	Hannan-Quinn criter.	-1.752888
F-statistic	10.68556	Durbin-Watson stat	2.034816
Prob(F-statistic)	0		

CONCLUSION

Empirically reliable theories include some form of leverage targeting, however important questions from various studies ask 1) Does firm's leverage ratio matters at each point in time? 2) Over a longer period of time, is a firm's specific leverage ratios of secondary importance? Therefore the challenge is to identify the factors that effectively determine the capital structure. A good theory will help us predict the behavior of the firm in deciding capital structure in real life working.

Following the enactment of Companies Act 2017 and introduction of capital market oriented reforms, financial liberalization has changed the operating environment by giving more flexibility to Pakistani firms under the vigilance of SECP. This provides firms with a leeway to freely choose capital structures. It is observed that liquidity and size of the firm determine the capital structure of the Pakistani manufacturing sector firms for the period under study. Dividend pay-out ratio, Growth in sales, Non-debt tax shield, Return on assets, Profitability, Tangibility, Tax rate and Uniqueness are not significant in affecting the capital structure of Pakistani listed manufacturing firms for the period under study. This study has used the book value weights in determining various financial variables, market value weights are relatively instable. The adjusted R squared value of 79% however indicates robustness of the model.

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