An Investigation of Financial Leverage Influences on the Financial Performance of Chemical Sector Listed Companies in Pakistan

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Abstract

The objective of this study is to find out how financial leverage influences the financial performances of the chemical sector listed companies in Pakistan. The economic data of 18 listed companies in the chemical industry has been included in this study. Financial leverage is used as an independent and profitability, assets turnover, Tobin q, and Liquidity are used as dependent variables. Unit root test is applied for data stationery and all the variables stationary at level. The Hausman test is applied to select the appropriate model, the random effect model is found as the suitable model, and hypotheses are tested by regression analysis. This study found a significant negative influence of financial leverage on Profitability, while there is no significant influence on Tobin Q, Assets Turnover, and Liquidity. This study suggests that financial managers should include a minimum portion of leverage in the combination of capital structure to boost profitability and the market value of the firm; asset efficiency and liquidity are not relevant to the financial leverage for chemical sector companies in Pakistan.

Keywords*:* Financial Leverage, Profitability, Tobin Q, Liquidity, Assets Turnover

Introduction

We are living in the age of globalization, where businesses are required to compete with local companies as well as international corporations. Therefore, financing decisions play a vital role in any industry to sustain and improve financial performance. Every business need finances to invest in capital budgeting and working capital management. Long-term financing is usually required for capital budgeting, such as acquiring fixed assets (Rahman et al., 2020). According to Lestari (2021), financial leverage describes a firm's ability to borrow, which is used to increase the firm's total returns because borrowing funds provide strength to capital structure, which ultimately increases the firm's financial position.

There are two basic ways to get long-term financing: first one is "Equity Financing and the second one is "Debt Financing". The firms must pay a cost to get financing, such as dividends, which is the cost of equity funding, and interest, which is the cost of liability financing. The more usage of debt financing means the high financial leverage, and the less practice of debt financing means low leverage. High financial leverage results in high fixed costs, which could negatively affect the company's profit (Investopedia, 2017). Financial leverage can explain as a company or investor is utilizing the money borrowed from others. The purpose of financial leverage for firms

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is to know the ratio of debt in their capital structure and how much a business employs debt to acquire its assets (Rehman, 2013). Financial leverage means a volume of debt in the "capital structure." As you can see on one side of the statement of financial position, financial leverage is on the right side (Peavler, 2016).

It is noticeable that every firm has the option of using more equity or more debt financing. The part of equity consists of ordinary shares, capital, and reserves. By debt, we indicate all non-current term borrowings, including "loans, debentures, and preference shares." However, one question is raised: Which type of capital structure is more appropriate than the other? The benefits and the costs of each type of structure determine which one is more suitable for a company. The chemical sector in an economy is essential for the growth of any country's economy. The chemical sector is used to convert raw materials into unlimited types of products for industries and direct consumers (Chemical Society of Pakistan, 2012).

According to the Chemicals Sector Study, (2021), the chemical sector of Pakistan contributes around 4.5% to the country's exports, and its share in imports is around 12%. The chemical industry of Pakistan is one of the oldest industries of Pakistan, which is based on making many products and chemicals to meet the needs of the local marketplace and exporters as well (Bushra, 2011). In Pakistan, the chemical industry is rife in systematized, unorganized sectors. Chemicals are worth approximately Rs. 550-600 billion. Approximately 17 percent of the total import bill is accounted for by chemical imports. Over 70,000 different articles are consequently transformed for industry and the daily use of individuals through Pakistan's efficient framework for exports and imports of chemical-oriented supplies. Tactfully, imports are significantly higher than exports. Pakistan must improve its chemical sector exports in order to grow its economy. The policy should be based on its resources, not dependent on imports (Rida, 2011).

Literature Review

The first theory was established in the early 1950s era by Modigliani and Miller. Modigliani (1958) described that capital structure has a non-significant proposition. They also discovered that a perfect market does not reflect any leverage level that a company uses to finance its events. Modigliani and Miller (1963) further define that asset risk and Profitability examine the firms' market value and that the firm's market value is an independent way to finance their investments or distributions of dividends.

After that, Mr. Durand David proposed the Net income approach (NI) in 1959. According to Durrand (1959), the structure of capital is relevant to the value of a firm, and companies can enhance their value by increasing the obligations in their capital structure. After that, he proposed another approach, the net operating income approach (NOI). A capital structure approach argues that the weighted average cost of capital (WACC) and the worth of an entity are unrelated because companies are needed to maintain their cost of capital. This approach also described that if companies include more debt financing in their capital structure, they will also increase the return of shareholders as dividends to satisfy their shareholders (Pandey & Prabhavathi, 2016; Abubakar, 2021) concluded that there is no significant influence of financial leverage on a firm's financial performance, which means capital structure is an irrelevant factor in financial performance.

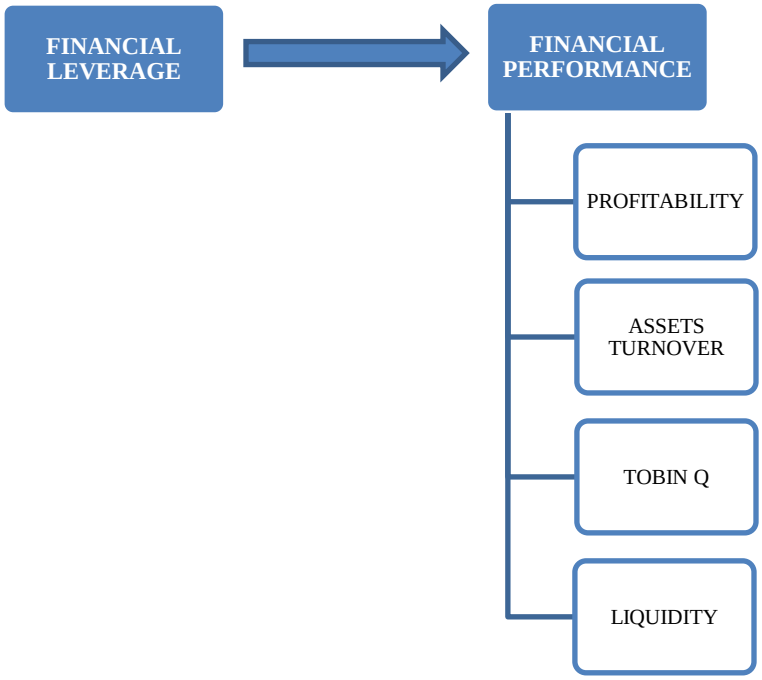
In 1963, Ezra Soloman introduced the traditional approach, which suggests that every company must plan to optimize its WACC and enhance the value of the firm's marketable assets. He further described that there is an identifiable and understandable boundary to use debt as leverage. If the debt goes beyond that identifiable boundary, it will create an adverse effect, and the firm's value

will go down (Keshar, 2004). Agency costs increase due to the relationships between stockholders and bosses and those among liability holders and stockholders (Jensen & Meckling, 1976).

Myers and Majluf (1984) narrated the pecking order theory. They described that there are three methods of financing: the first is internal way, financed by retained profits; the second is debt financing; and the third and final one is financed by allotting of new shares. A company should acquire finance from sources, then through borrowings, and if both sources are not available, then drive new equity. Sunder and Myers (1999) further described that according to the pecking order theory, businesses would try to manage liquefied assets with the proper courtesy to the appropriate capital. The latest research by (Rahman et al., 2020; Lestari, 2021) concluded that businesses should focus more on internal resources to decide capital structure than other sources. The results of their research found that if firms use more debt in the capital structure, it creates a positive impact on firms' Profitability and financial performances.

After consideration of various research, the financial leverage is selected as the independent variable, and the debt over equity ratio is used to measure the "Leverage." Leverage describes the choice of debt over equity (Schmuckler, 2004), and according to (Khan & Jain, 2004), the debit over equity ratio has its importance from the creditor's eyes, owners' point of view, and firm. There are many indicators of financial performance, but after reviewing the extensive literature, this study includes Profitability (return on assets), Liquidity, asset turnover, and Tobin q as indicators of firms' financial performances, and these all are the dependent variables of this study. According to Lestari, (2021), return on assets is one of the best measures of Profitability. According to Ross et al. (2003), the high worth of Tobin's Q designates substantial growing opportunities and improved performance. According to Sarani and Shahadan (2012), financial leverage is a significant Liquidity factor. Assets are one of the significant drivers in clarifying the capital structure within the businesses (Charalambakis & psychoyios, 2012). The conceptual framework of this study is as follows:

Figure 1: Conceptual Framework



Financial Leverage on Profitability (ROA)

According to Lestari (2021), return on assets is one of the measures of profitability and it determined that financial leverage has a significant positive effect on profitability. Their research further described that higher debt in the capital structure is better for firms' financial performance (Towo, 2022; Ravindran & Kengatharanb, 2021; Iqbal & Usman, 2018) also found the significant impact of financial leverage on profitability. Rehman (2013) researched to discover the relationship between financial leverage and the financial performances of the sugar industries listed companies in Pakistan, and the result of his study found that there is a positive relation between debt-to-equity ratio and profitability. Ameen and Shahzadi (2017) examined the impact of capital structure on firms' profitability; they included cement sector data and used the return on assets ratio to measure profitability. The analysis results have shown that equity debt has a significant negative impact on ROA, which means if a firm decreases its leverage, the profitability will also decrease. Javed et al. (2015) researched the topic of financial leverage effects on the firm's financial performance, and they used the assets return ratio as the performance measure in their study. Their study found that the measure of debt over equity and the ratio, the non-current debt over equity, is negatively related to ROA and ROE. Subarea (2010) stated that the victory of the organization is contingent on its Profitability and Profitability, and it is helpful to assess the ability of the corporation to create more returns as compared to its expenditures and any other types of costs that occur during a specific period. Ahsan et al. (2014) found a significant negative relation between asset return and debt to equity. Banerjee and De (2015) lead research to determine the impact of capital structure on the financial performances of the Indian listed businesses. The results of this study revealed that it has a significant negative impact of financial leverage on firms' profitability.

H1: There is a significant impact of financial leverage on profitability.

Financial Leverage on Tobin's Q

Ross et al. (2003) state that the high value of Tobin's Q designates substantial growth opportunities and improved performance, i.e., high market value equated to its replacement cost. Compared to low-growth companies, high-growth companies tend to reduce information irregularity for attaining funds. Because of lower cash flows and funds accessibility, low-growth firms have low Q financial limitations in gaining money for investments (Aivazian, 2005; McConnell & Servaes, 1990). Amidu (2007), Singhania and Seth (2010) conclude that a firm's investment has an adverse impact. Odit and Chittoo (2008) and Jiming et al. (2010) also revealed that the growth of firms hurts a business's investment. Chadha and Sharma (2015) studied capital structure and company performance in India. The results found that there is an insignificance association between financial leverage and performance; hence, they found that there is an impact of leverage on the asset return of Indian manufacturing firms. Results further described no significant relation between Tobin q and leverage; hence, financial leverage has an insignificant influence on Tobin q on the manufacturing firms. According to Fattah (2020) and Hasan et al. (2014), there is no significant connection between debt to equity and Tobin q. Their study also used Assets Return, Tobin Q, and Return on Equity as firms' financial performance indicators.

H1: There is a significant impact of financial leverage on Tobin Q

Financial Leverage on Liquidity

Ngatimo et al. (2021) stated that Liquidity measures a company's ability to fulfill current liability about current assets. They used the current ratio as a measure of the firms' liquidity. According to them, the high ratio of Liquidity can increase the firm financial performance. Their study found a significant influence of financial leverage on Liquidity for listed companies in the food sector in Indonesia.

According to Sarani & Shahadan, (2012), financial leverage is a significant Liquidity factor. Gweyi et al. (2013) described in their research paper regarding financial leverage determinants, and the findings of their research revealed that there is a significant association between Liquidity and leverage with a 95% confidence level. Deesomsak et al. (2004) found an adverse relation between debt to equity and Liquidity and a positive relation found by Senan et al. (2021). Javed et al. (2015) researched the effects of Financial Leverage on the Performance of Firms, and they used the ratio of return on assets as the extent of performance in their study. The results of their study found that Liquidity shows a positive significant relation with return on assets. Their study included the 154 textile firms' data period from 2006 to 2011. According to Palombini and Nakamura (2012), higher leverage maintains lower Liquidity. Taleb et al. (2010) explain that the debt of a company is a significant antecedent of its working capital.

H1: There is a significant impact of financial leverage on Liquidity

Financial Leverage on Assets Turnover

A ratio that demonstrates the value of a business's sales or revenue and the value of its assets is called an assets turnover ratio. It is the maker of effectiveness with which an organization is conveying its assets to create income. In this manner, the asset turnover ratio can be the basis of an organization's performance. The influence of financial leverage on a firm's performance may be harmful or positive. Several articles have been published to analyze the impact of ATO on financial leverage or capital structure. According to Charalambakis and Psychoyios (2012), Assets are essential drivers for identifying the capital structure within the companies. The purpose of their

study is to assess the influence of "Assets turnover" on financial leverage. The ratio of Asset turnover is "net sales divided by total assets," and it describes how efficiently the firms' assets have been utilized for generating sales or revenue (Muritala, 2012). Chadha and Sharma (2015) focused on capital structure and firm performance and found an adverse impact on asset turnover. The study conducted by Azam and Eldomiaty (2008) and Gaurav and Agrawa (2022) both found a significant negative relation between leverage ratio and asset turnover.

H1: There is a significant impact of financial leverage on Assets Turnover

Research Methodology

This study includes 18 companies in the chemical sector that are listed on the Pakistan Stock Exchange (PSX). The fifteen-year data from 2007 to 2021 was taken from the website of the State Bank of Pakistan (Sbp) and companies' financial statements. It is the descriptive type of research because it describes the influences of the independent variable on the dependent variable. This paper includes quantitative data in the method of financial ratios, and data has been taken from secondary sources; therefore, this is called secondary research. Unit root test is used for data stationery, and Hausman test is used for regression analysis. All the data has been analyzed by using E-views.

There are one dependent and four independent variables included in this study. This research article is conducted to recognize the impact of the explanatory variable on the dependent variable, and the linear regression model is appropriate for it, as defined by Lithmee (2018). Therefore, the regression model is applied to test hypotheses. As this study has only one independent variable, a simple linear equation is made, but due to four dependent variables, there is created four different simple linear equations for hypothesis testing.

The linear equations of the study are as follows:

ROA = $\propto + FL\ \mu_1 + c$

LQ = $\propto + FL\ \mu_2 + c$

TQ = $\propto + FL\ \mu_3 + c$

ATO = $\propto + FL\ \mu_4 + c$

Table 1: Variable short form and proxy

Short Form	Name of Variable	Proxy
FL	Financial Leverage	Total Debt/Total Equity
ROA	Return on Assets	Net Income/Total Assets
LQ	Liquidity	Current Assets/Current Liabilities
TQ	Tobin Q	Total No. of Shares x Market price of stock/Total Assets Value
ATO	Assets Turnover	Net Sales/Total Assets

Data Analysis and Results

Unit Root Test

The test of unit root is applied to identify one or more-unit roots in a time series; it provides more suggestion of non-stationary (Gujarati, 2004). Data stationery is recommended for panel data (Eric, 2021). This study applies the balanced panel data and data stationery has confirmed by using the Fischer Chi Square (PP) test. This experiment has been applied to all variable. The null hypothesis

of the test is that data has unit out though alternative hypotheses describe that the data has been unit root". The unit root test results are given below:

Table 2: Panel Unit Root

Method	DTE		PF		LIQ		TQ		AT	
	Level	First	Level	First	Level	First	Level	First	Level	First
LLC	0.009	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.011	0.000
IPS	0.564	0.067	0.543	0.032	0.234	0.000	0.234	0.001	0.113	0.000
ADF	0.456	0.021	0.675	0.009	0.321	0.002	0.213	0.007	0.134	0.000
PP	0.234	0.000	0.657	0.033	0.024	0.000	0.541	0.024	0.146	0.000

Note: DTE = Debt to Equity; PF = Profitability; LIQ = Liquidity; TQ = Tobin's Q; AT = Asset Turnover

The table 2 is showing the result of unit root test of independent variable debt to equity. The result indicates that the debt-to-equity variable is stationary at 5% (0.05) significance level because the value of the Fischer Chi Square (PP) test is > 0.05, which suggests the refusal of the null hypotheses approving of, alternative hypothesis. Therefore, data about that variable have a non-unit root and it is stationary. The result indicates that the profitability variable is stationary at a 5% (0.05) significance level because the value of PP test is less than 0.05. The result indicates that the liquidity variable is stationary at a 5% (0.05) significance level because the value of PP test is less than 0.05. The result indicates that the Tobin q variable is stationary at a 5% (0.05) significance level because the value of PP test is less than 0.05. The result indicates that the assets turnover variable is stationary at a 5% (0.05) significance level because the value of the PP test is less than 0.05.

Hausman Test

The Hausman test is applied to classify the effects between the fixed model and the random model. The null hypothesis of it is that the "random model is best fit" and the alternative stated that the "fixed model is best fit". If the p-value (probability) is < 0.05, it shows that the null hypothesis is not rejected and the "random model is suitable". If the p-value (probability) is more than 0.05 it means that the null hypothesis is not accepted or reject therefore the "fixed model is suitable" (Guajarati, 2004). As this study has only one independent variable, therefore, a simple linear equation is created but due to four dependent variables, there is created four different simple linear regression models for testing of hypothesis. The regression analysis is the analyzed by random effects model in this study because the Hausman test suggests that the random model is appropriate for all four linear regression models. There are four linear regression models in this study and all four models are separately tested by the Hausman test. The results of the Hausman test are given below.

Table 3: Hausman Test

Test Summary	Chi-Sq. Statistic	Prob.
Cross-section random (PF)	4.123456	0.3243
Cross-section random (LIQ)	6.563454	0.1245
Cross-section random (TQ)	9.245670	0.0112
Cross-section random (AT)	4.356780	0.4322

Note: PF = Profitability; LIQ = Liquidity; TQ = Tobin's Q; AT = Asset Turnover

The table 3 is showing the result of the Hausman test and the results are showing that the random-effects model is best fit for the above model because the variables included PF, LIQ, and AT, value of probability is higher than 0.05. On the other hand, the result is showing that the fixed-effects model is best fit for the above model because the value of probability of TQ is less than 0.05

Regression Analysis

Regression analysis explains the influence of the independent variable on the dependent variable, interval scale is concurrently investigated. It involves multiple regression weightiness or slope estimations. It is problematic and challenging to diagnose how an explanatory variable (independent variable) disturbs a dependent variable. When explanatory variables are also regarding each other, the regression weightiness of one explanatory variable is affected by the regression weightiness of another. If the probability value is less than 0.05 on a 95% confidence level it means that explanatory variable has a significant influence on the dependent variable and the coefficient value shows the effects of the explanatory variable on the dependent variable (Gujarati, 2004). As there is one independent variable and more than on dependent variables therefore simple regression model will be applied to test hypothesis as defined by (Lithmee, 2018).

Table 4: Regression Analysis

Variable	PF	LIQ	AT	TQ
Coefficient	-1.206072	-0.98782	-0.58762	-0.87673
t-Statistic	-2.670520	-0.89578	-0.99112	-0.57893
R-Square	0.225665	0.28790	0.25698	0.46543
F-statistic	7.595052	9.99087	4.28734	9.78902

DTE = Debt to Equity; PF = Profitability; LIQ = Liquidity; TQ = Tobin's Q; AT = Asset Turnover

The table 4 is showing the results of regression analysis. The results showing that there is negative relationship between profitability and debt to equity as the t statistics value is -2.6. The value of R-square is 0.22 which is showing that the debt to equity is 22% explaining to profitability. The value of probability (F-statistics) is less than 0.05 which consider that the model is fit for prediction. The results showing that there is no relationship between liquidity and debt to equity because the probability value is higher than 0.05. The value of R-square is 0.28 which is showing that the debt to equity is 28% explaining to liquidity. The value of probability (F-statistics) is less than 0.05 which consider that the model is fit for prediction. The results showing that there is no relationship between assets turnover and debt to equity because the probability value is higher than 0.05. The value of R-square is 0.25 which is showing that the debt to equity is 28% explaining to assets turnover. The value of probability (F-statistics) is less than 0.05 which consider that the model is fit for prediction. The results showing that there is no relationship between liquidity and debt to equity because the probability value is higher than 0.05. The value of R-square is 0.46 which is showing that the debt to equity is 46% explaining to liquidity. The value of probability (F-statistics) is less than 0.05 which consider that the model is fit for prediction. The results revealed that there is negative impact of DET on PF, which means that increases in DET decreases the PF.

Conclusion

This paper is conducted to examine the influences of financial leverage on firm financial performance. The financial leverage ratio equity debt is used as the independent variable, and the

Profitability, Liquidity, Tobin q, and assets turnover are used as dependent variables, which are included as methods of the firm financial performance. The regression result of the first model in Chapter Four shows that financial leverage has a significant adverse impact on Profitability. According to the result, if a company increases the leverage ratio or increases the level of debt in its capital structure, it will be the cause of a decrease in the Profitability of the company. The results are similar to Towo (2022), Ravindrana and Kengatharanb (2021), Iqbal and Usman (2018), Ameen and Shahzadi (2017), Banerjee and De (2015), and Hasan et al. (2014) as they also used the return on assets ratio to measure profitability and the results of their studies also have shown that debt over equity ratio has an adverse and significant impact on ROA which means if the firm decreases its leverage, the profitability will also decrease.

The regression result of the second model in Chapter Four shows that financial leverage has a significant adverse impact on the Tobin Q ratio. The result of this model shows that if the company increases the debt level or increases the financial leverage ratio, the market value of the firm will decrease. These findings are similar to the findings of (Fattah, 2020) (Aivazian, 2005; McConnell & Servaes, 1990) also found adverse of Tobin Q. Amidu (2007) and Singhania and Seth (2010) conclude that a firm's investment has a negative impact on leverage. These results are opposite to Senan et al. (2021) and Hasan et al. (2014), which found insignificant affiliation between debt to equity and Tobin q. The study takes Roa, Tobin Q, and Roe as financial performance parameters.

The regression results of the third model in Chapter Four show that financial leverage has no significant influence on Liquidity. The results of the model show that the amount of financial leverage does not affect the liquidity position of the firm. It means the companies in the chemical sector need to be using long-term debt to fulfill short-term investment requirements. In contrast, the effects of debt to equity on Liquidity is adverse, which is similar to Azam and Eldomiaty, (2008) findings in term of adverse effects but opposite in term of significant impact. The findings of this research are also similar to those of Deesomsak et al. *(*2004). They found an adverse relation between debt to equity and Liquidity and a positive relation between Senan et al. (2021).

The regression result of the fourth and last model in chapter four shows that financial leverage has a significant negative effect on Asset turnover. The finding of this model describes that when the leverage ratio increases, it decreases the assets turnover of the company because of its negative association between them. These findings are similar to those of Gaurav and Agrawa (2022) and Azam and Eldomiaty, (2008). They also originate that financial leverage (debt ratio) has significant adverse relation with asset turnover.

This article examines the financial leverage influences on PSX list chemical sector firms' financial performances. Financial leverage is the explanatory variable of the study, which is measured by the debt-to-equity ratio. Profitability, Assets turnover, Liquidity, and Tobin Q are independent variables of the study that are used as firm performance indicators. The data of eighteen listed companies of the chemical sector were included in this study, and the website of sbp, pxs, and financial statements of the companies has taken data. Firstly, the unit root test is applied to ensure the stationary of the data and that all the variables are stationary at the level. After that, the Hausmant test is applied to select the appropriate model, and the results of the Hausman test suggest that a random model is suitable for the data after finding the suitable model regression is analyzed. The results of regression found that financial leverage has a significant adverse impact on a firm's Profitability. It means if the financial leverage increases, it will result in a decrease in Profitability. While Assets Turnover, Tobin Q, and liquidity have no significant impact on financial leverage. It suggests that the assets performance, relationship of intrinsic value market

valuation of the firms, and liquidity are irrelevant to financial leverage in chemical sector listed companies.

Limitations and Future Research

This study only included chemical sector listed companies' data, and the unlisted companies' data were not included. Therefore, the results could differ for unlisted companies or after including unlisted companies' data. This study only includes four variables to measure firms' financial performance and included 15 years of data, while the inclusion of more variables of financial performances and increment in data period could enhance the scope of this study and provide better results.

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