



The Impact of Liquidity, Interest Rate, and Exchange Rate on the Capital Structure of Firms: Evidence from the Sugar Sector of Pakistan

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ARTICLE INFO	ABSTRACT
Submission: May 16, 2026 Revised: May 30, 2026 Accepted: June 12, 2026 Available Online: June 25, 2026 Keywords: Firms Liquidity, Exchange Rate, Interest Rate, Capital Structure, Sugar Sector, Pakistan Corresponding author: Fenhas Adeel Email: fenhasadeel@gmail.com	This study examines into how the capital structure of businesses in Pakistan's sugar industry is affected by interest rates, liquidity, and exchange rates. The study's secondary data, which spans 50 firm-year observations, was gathered from the annual reports of specific sugar firms and other macroeconomic sources. The debt-to-total-assets ratio was used to assess capital structure, and the current ratio was used to assess liquidity. Interest rates and currency rates were calculated using the annual State Bank of Pakistan policy rate and the average PKR/USD exchange rate, respectively. To investigate the associations between the variables, multiple linear regression analysis, Pearson correlation, and descriptive statistics were used with SPSS. The findings show that the regression model as a whole is statistically significant ($F = 2.911$, $p = 0.044$). With an adjusted R^2 of 0.105 and an R^2 of 0.160, the model's explanatory power is quite poor. Liquidity is one of the independent factors that significantly affects capital structure ($\beta = -0.398$, $p = 0.005$), indicating that enterprises with more liquidity are less dependent on debt financing. On the other hand, interest rates ($p = 0.880$) and exchange rates ($p = 0.916$) have no statistically significant impact on capital structure. The results show that enterprises' reliance on external debt is lessened by internally available cash, which supports the Pecking Order Theory. The study finds that while interest rate and currency rate variations have little effect on financing decisions throughout the study period, liquidity is a crucial factor in determining capital structure in Pakistan's sugar industry. Corporate managers, investors, and legislators can utilize these data to better understand the variables influencing businesses' financing decisions.

Introduction

Background of the Study

The combination of debt and equity used to fund a company's operations and expansion is referred to as its capital structure (Myers, 2001). Macroeconomic factors including interest rates, financial market liquidity, and exchange rate swings affect the choice of financing (Titman & Wessels, 1988). These aspects are especially important in developing economies like Pakistan because of the frequent changes in policy, currency fluctuations, and liquidity issues that businesses confront (Naceur & Omran, 2011). Examining capital

structure dynamics is appropriate since the sugar industry, a significant contributor to Pakistan's agricultural GDP, operates in a highly leveraged context and is susceptible to financial market conditions.

Pakistan's economy depends heavily on the sugar business, which creates jobs and boosts agricultural revenue. For businesses in this industry, capital structure choices—the proportion of debt to equity financing—are critical because they impact both profitability and financial stability. How businesses decide between debt and equity financing can be strongly impacted by external economic factors including interest rates, liquidity positions, and currency rate variations. This study looks at how various firm-level and macroeconomic variables impact the capital structure of Pakistani sugar industry companies over a ten-year period. In an industry marked by significant volatility and seasonal reliance, managers, investors, and legislators can make better financing decisions by comprehending these dynamics.

Current Situation of the Problem

Interest rates fluctuate as a result of Pakistan's periodic monetary policy changes to curb inflation, which impacts the cost of borrowing for businesses (SBP, 2024). While ongoing exchange rate swings affect the cost of imported goods and foreign currency debt servicing, restrictive liquidity circumstances make it difficult for businesses to get short-term financing (Khan & Qayyum, 2007). Due to these macroeconomic constraints, sugar mills are experiencing underinvestment and financial difficulties as a result of worries about the best capital structure choices.

Few studies in Pakistan have examined how macroeconomic variables like interest rates, exchange rates, and business liquidity impact financing decisions in the sugar industry, despite the significance of capital structure in determining firm performance. There is still a need for specific information on how these three important determinants affect debt composition over a longer time horizon, as prior research has mostly concentrated on larger samples with shorter time spans or incorporated additional variables.

Significance of the Study

This study contributes to the existing body of knowledge by examining the influence of macroeconomic factors on the capital structure decisions of firms operating in Pakistan's sugar industry. It offers useful insights into how changes in interest rates, liquidity, and exchange rates affect corporate financing behaviour. The findings may support policymakers in assessing the financial impact of economic and monetary policies and provide practical guidance for managers in developing financing strategies that are better suited to changing economic conditions and periods of financial uncertainty.

Objective of the Study

1. To examine the impact of firm liquidity on capital structure.
2. To examine the impact of interest rates on capital structure.
3. To examine the impact of exchange rate movements on capital structure.

Research Hypotheses

H1: Firm liquidity has a significant effect on the capital structure of firms in Pakistan's sugar sector.

H2: Interest rates have a significant effect on the capital structure of firms in Pakistan's sugar sector.

H3: Exchange rate movements have a significant effect on the capital structure of firms in Pakistan's sugar sector.

Research Question

- How do liquidity, interest rate, and exchange rate effect the capital structure of firms in Pakistan's sugar sector?

Literature Review

Introduction

Over the past few decades, capital structure theory has undergone significant change, incorporating the impact of more general macroeconomic conditions and going beyond the conventional theoretical frameworks of the Trade-off Theory and the Pecking Order Theory. The Pecking Order Theory contends that firms prioritise internal financing over external sources due to information asymmetry, whereas the Trade-off Theory proposes that firms determine an optimal capital structure by weighing the tax benefits of debt against the costs of financial distress (Baskin, 1989; Frank & Goyal, 2009). Even while these firm-level theories are still essential for understanding financing behaviour, current research acknowledges that external economic factors also influence capital structure choices. The cost and accessibility of external finance are directly impacted by shifts in interest rates, liquidity circumstances, currency rates, inflation, and

general economic stability. In order to reduce finance costs and increase firm value, businesses constantly modify their financing strategies in response to shifting macroeconomic situations (Frank & Goyal, 2009).

Additionally, empirical research indicates that corporate leverage is heavily influenced by macroeconomic factors, especially in developing nations where financial markets are more susceptible to changes in the economy. While good liquidity circumstances facilitate access to external funds and promote leverage, higher interest rates make borrowing more expensive and deter businesses from extensively depending on debt financing. Similarly, by impacting debt and cash flows denominated in foreign currencies, exchange rate volatility can have a substantial impact on the financing choices made by businesses involved in international commerce. Businesses frequently implement more cautious financing practices during uncertain economic times by lowering leverage and relying more on internal resources to reduce financial risk. Therefore, compared to classical theories alone, an integrated approach that incorporates firm-specific characteristics with macroeconomic causes offers a more thorough explanation of capital structure decisions (Booth et al., 2001; De Jong, Kabir, & Nguyen, 2008).

Liquidity and Capital Structure

A company's ability to fulfil short-term obligations is reflected in its liquidity. Because internal finances are less expensive and hazardous, companies with greater liquidity typically rely less on external loans (Opler et al., 1999). When internal finances are insufficient, liquidity limitations frequently compel businesses to issue more debt, raising financial risk (Shleifer & Vishny, 1992).

The ability of a company to satisfy its short-term financial obligations using its existing assets without interfering with regular business operations is referred to as liquidity. The current ratio, quick ratio, and cash ratio are frequently used to measure it. Because it affects a company's reliance on outside funding, liquidity is regarded in corporate finance as a critical factor in determining capital structure. Businesses that have enough liquid assets can fund internal investment opportunities, which eliminates the need for debt financing (Myers & Majluf, 1984).

The Pecking Order Theory and the Trade-off Theory primarily describe how liquidity and capital structure are related. The Pecking Order Theory states that companies prefer internal financing sources over external debt and equity because internal finances decrease information asymmetry between investors and management and involve lower transaction costs. Consequently, there is a negative correlation between liquidity and leverage since companies with strong liquidity are anticipated to rely less on debt financing (Myers & Majluf, 1984; Baskin, 1989).

The Trade-off Theory, on the other hand, contends that companies with more liquidity are better able to pay principal and interest. As a result, lenders view these businesses as less dangerous, allowing them to borrow money at reduced rates. Therefore, in order to take advantage of the tax shield that comes with debt while keeping a manageable level of financial distress risk, such enterprises may expand debt financing (Modigliani & Miller, 1963; Frank & Goyal, 2009). The link between liquidity and capital structure is still a crucial topic in corporate finance research because of the conflicting predictions of these theories.

A substantial amount of empirical research has looked at how liquidity affects capital structure choices made by businesses. Highly liquid companies typically maintain lower leverage since they rely more on internally generated funds than external borrowing, according to Ozkan's (2001) analysis of UK enterprises. These results corroborate the Pecking Order Theory, which contends that companies with plenty of liquid assets steer clear of needless debt borrowing.

Similar findings were made by Deesomsak, Paudyal, and Pescetto (2004), who looked at businesses in a number of Asia-Pacific nations and found a strong inverse association between leverage and liquidity. According to their research, companies with better liquidity positions favoured internal financing, which led to lower debt ratios.

Additional evidence was shown by Lipson and Mortal (2009), who demonstrated that companies with more liquid stock typically have lower leverage and are more inclined to finance investments through equity rather than debt. They contended that increased market liquidity makes equity financing more appealing than borrowing since it lowers the cost of issuing equity.

Rashid and Mahmood (2017) examined non-financial companies listed on the Pakistan Stock Exchange and discovered a significant negative correlation between leverage and stock market liquidity. According to their findings, companies with more liquid shares depend less on debt funding since issuing equity becomes comparatively less expensive.

Businesses that operate in more liquid stock markets typically maintain lower levels of leverage, according to more current worldwide data from Vo and Ellis (2019). However, they discovered that the degree of investor protection in each nation and the institutional environment have an impact on how strong this association is.

The majority of empirical research indicates that there is a negative correlation between capital structure and liquidity, meaning that companies with greater liquidity have lower debt levels and rely more on internal funding. However, some research shows favourable

correlations in particular institutional contexts, indicating that firm characteristics, the evolution of the financial market, and macroeconomic circumstances all influence how liquidity affects leverage.

Interest Rate and Capital Structure

The cost of borrowing is determined by interest rates. The trade-off theory states that corporations replace debt with equity when interest rates rise because the after-tax advantage of debt diminishes (Modigliani & Miller, 1958; 1963). Higher interest rates lower leverage ratios, according to empirical data, especially in capital-intensive businesses (Arcand et al., 2012).

Because interest rates have a direct impact on borrowing costs and business financing choices, they are among the most important macroeconomic factors influencing capital structure. The expense that businesses experience when receiving debt financing from capital markets or financial institutions is represented by the interest rate. Interest rate fluctuations impact the relative appeal of debt and equity financing, which in turn affects a company's ideal capital structure (Frank & Goyal, 2009).

The Trade-off Theory and the Pecking Order Theory are the main theories that explain how interest rates and capital structure are related. The Trade-off Theory states that businesses look for the best capital structure by weighing the anticipated costs of financial crisis against the tax benefits of debt. Low interest rates make debt less expensive, which motivates businesses to use more leverage to take advantage of tax shelters. On the other hand, as interest rates rise, borrowing becomes more expensive, making debt financing less appealing and pushing businesses to rely more on equity or retained earnings (Modigliani & Miller, 1963; Frank & Goyal, 2009).

In a similar vein, the Pecking Order Theory contends that businesses should prioritise internal funding over debt and equity. Businesses may use debt financing when internal funds are insufficient, but rising interest rates make borrowing more expensive and discourage businesses from issuing debt. As a result, when borrowing costs increase, businesses may decide to delay investments or look for other sources of funding (Myers & Majluf, 1984; Myers, 1984).

Interest rates are a crucial macroeconomic element impacting company financing decisions, as acknowledged by contemporary capital structure literature. The availability of external financing and borrowing costs are affected by changes in credit market circumstances, inflation expectations, and monetary policy. In order to optimise financing costs and increase company value, businesses constantly modify their leverage in reaction to changes in interest rates. By taking into account external economic conditions when making finance decisions, this macroeconomic viewpoint enhances conventional capital structure theories.

The effect of interest rates on businesses' capital structure choices in both established and emerging economies has been the subject of numerous empirical investigations. Frank and Goyal (2009) contended that shifts in borrowing costs had a substantial impact on businesses' financing decisions and highlighted macroeconomic factors, such as interest rates, as crucial determinants of corporate leverage. According to their research, businesses typically cut back on debt financing when interest rates rise since the advantages of leverage are diminished by rising borrowing costs.

Booth, Aivazian, Demirgüç-Kunt, and Maksimovic (2001) examined businesses in 10 developing nations and discovered that capital structure choices are heavily influenced by macroeconomic factors, especially inflation and interest rates. According to their research, companies that operate in high-interest economies typically keep less leverage since debt financing becomes more costly.

According to De Jong, Kabir, and Nguyen's (2008) analysis of businesses in 42 different nations, leverage is significantly influenced by macroeconomic variables unique to each nation, such as interest rates. They discovered that businesses in economies with high interest rates were less likely to use debt financing than businesses in stable financial settings with comparatively lower borrowing costs.

Businesses actively modify their financing choices in reaction to changes in interest rates, according to Yang, Davis, and Leatham's (2001) empirical investigation of the effect of interest rate risk management on corporate capital structure. According to their results, companies that are subject to interest rate fluctuations should carefully manage their debt structure to lower financing costs and financial risk.

After reviewing current empirical studies on capital structure, Graham and Leary (2011) came to the conclusion that, in addition to firm-specific traits, macroeconomic factors, such as interest rates, have a major impact on corporate leverage. They underlined that since monetary policy and credit market circumstances have an impact on both the cost and availability of debt financing, financing decisions should be examined in the context of the larger economy.

Overall, empirical data points to a strong inverse link between capital structure and interest rates. Lower interest rates promote debt financing by lowering the cost of capital, while higher interest rates typically deter businesses from growing leverage due to increased borrowing costs. But the strength of this connection varies by nation, sector, and state of the financial markets.

Exchange Rate and Capital Structure

The exchange rate is a crucial macroeconomic factor that has a big impact on capital structure choices made by businesses, especially those that trade internationally or have assets and obligations denominated in other currencies. Changes in exchange rates have an impact on borrowing costs, cash flows, export competitiveness, and the value of foreign debt, all of which have an impact on how much debt and equity businesses employ to finance their operations. As a result, changes in exchange rates now have a significant role in determining capital structure in both established and emerging economies (Frank & Goyal, 2009).

The Pecking Order Theory and the Trade-off Theory provide an explanation of the connection between capital structure and currency rates. The Trade-off Theory states that businesses balance the tax advantages of borrowing against the costs of financial crisis in order to determine the ideal amount of debt. Depreciation of exchange rates raises the value of foreign-denominated debt in domestic currency, which raises financial risk and the anticipated expenses of bankruptcy. In order to maintain an ideal capital structure, businesses may therefore rely less on loan financing and more on equity financing (Modigliani & Miller, 1963; Graham & Leary, 2011).

In a similar vein, the Pecking Order Theory contends that due of knowledge asymmetry, businesses favour internal finance over external financing. External borrowing becomes more costly and hazardous due to exchange rate volatility, which raises uncertainty about future cash flows and debt servicing expenses. As a result, companies that are subject to exchange rate swings are more inclined to fund investments with equity and retained earnings as opposed to debt (Myers & Majluf, 1984).

Exchange rate fluctuations have an impact on businesses through both direct and indirect channels, according to contemporary capital structure studies. The value of foreign currency obligations and interest payments are directly impacted by changes in exchange rates. They have an indirect impact on export earnings, import expenses, profitability, and businesses' access to global financing markets. Therefore, whereas exchange rate volatility promotes cautious financing strategies with less leverage, exchange rate stability enhances enterprises' borrowing capability. By acknowledging the significance of external economic conditions in business finance decisions, this macroeconomic viewpoint expands on conventional capital structure theories.

The relationship between changes in exchange rates and capital structure in both developed and emerging economies has been the subject of numerous empirical research. According to Booth, Aivazian, Demirgüç-Kunt, and Maksimovic (2001), macroeconomic factors, such as currency rate conditions, have a major impact on the leverage decisions made by businesses in developing nations. According to their research, exchange rate fluctuation raises financial risk, which deters excessive borrowing.

De Jong, Kabir, and Nguyen (2008) examined businesses in 42 nations and found that capital structure choices are heavily influenced by macroeconomic factors unique to each nation, such as exchange rate conditions. According to their findings, businesses that operate in economies with stable exchange rates typically keep more leverage than businesses that deal with more volatile currencies.

Exchange rate risk has a major impact on capital structure decisions, according to Panda and Nanda's (2015) investigation of Indian non-financial enterprises. Because exchange rate depreciation raised the cost of servicing foreign currency debt, companies with higher exposure to foreign exchange risk maintained lower debt ratios. According to the study's findings, businesses actively modify their financing plans to reduce exchange rate risk.

Exchange rate depreciation has a significant impact on businesses with foreign currency-denominated liabilities, according to Bleakley and Cowan's (2003) analysis of businesses in Latin American economies. They discovered that during times of currency depreciation, companies with large amounts of foreign debt become more financially susceptible, which prompts them to lower leverage and rely more on equity financing.

Graham and Leary (2011) further contended that when assessing capital structure, firm-specific variables should be taken into account in addition to macroeconomic factors, such as changes in exchange rates. According to their analysis, businesses constantly modify their leverage in reaction to exchange rate uncertainty, especially in developing nations where exchange rate volatility is comparatively high.

Overall, empirical data points to a generally negative correlation between capital structure and exchange rate volatility. In order to lessen financial risk and avoid the increased debt-servicing burden brought on by currency depreciation, businesses exposed to higher exchange rate volatility typically maintain lower levels of leverage. However, the degree of this relationship varies based on the stability of the nation's financial system, hedging strategies, and the international exposure of businesses.

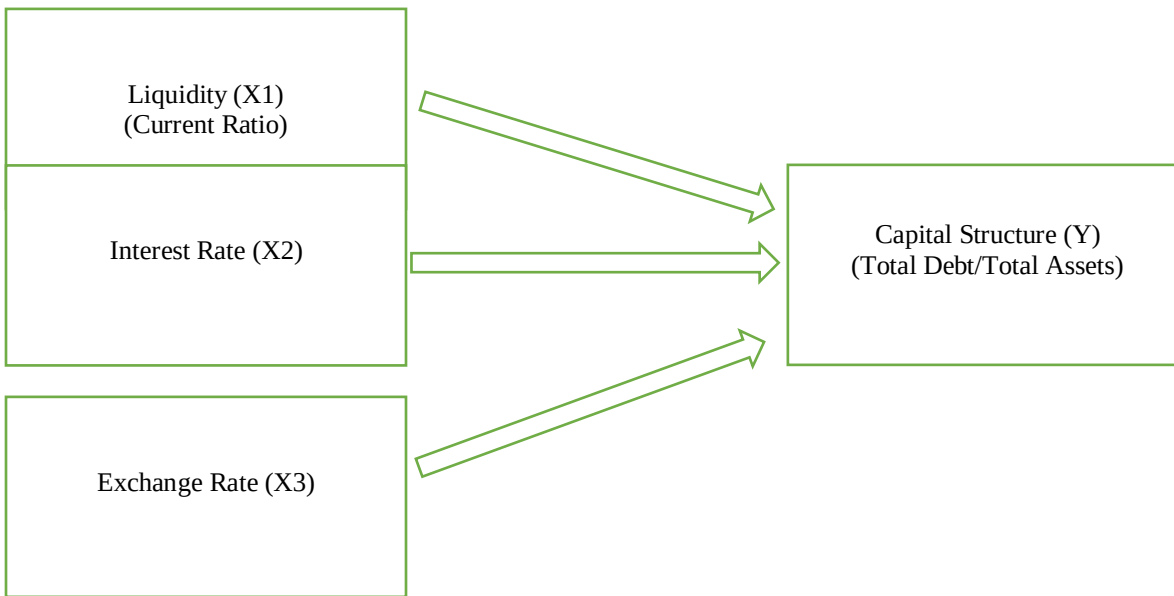
The actual cost of servicing foreign currency debt is impacted by fluctuations in exchange rates

According to Baele et al. (2004), a devaluation can increase leverage ratios and the risk of financial distress by raising the local currency cost of foreign liabilities. Exchange rate volatility causes businesses to modify their capital structures in order to protect themselves from possible losses, according to studies conducted in emerging economies (Madura & Ngo, 2007).

According to Velasco (2017), a unique leverage ratio and the real exchange rate may have an impact on lending limitations. According to the study, exchange rate uncertainty affects foreign commerce over an extended period of time but appears to have little effect in the short term (Nguyen & Do, 2020). Size provides a moderating influence on the relationship between profitability, tangibility, liquidity, and capital structure efficiency, and this moderation is strong in large firms, according to research by Submitter, Sari, Siska, and Sulastri (2019). According to L. Chen and S. Chen (2011), the moderator variable that influences the link between leverage and profitability is firm size. The moderating effect takes place in the first step. Firm leverage is positively impacted by firm size, according to Mirza (2015). According to Muigai and Muriithi's (2017) analysis of capital structure, company size significantly moderates the relationship between financial instability and corporate capital structure.

Al-Hunnayan (2020) discovered that the leverage has a negative correlation with the company's tangibility and competitiveness and a positive correlation with its size. Interest rate laws and achieving transparency were studied by Li, Krause, Qin, Zhang, Zhu, Lin, and Xu (2018). The study's conclusion shows that business leverage is increased by earnings transparency, and further research suggests that this kind of shock happens to raise the cost of debt financing. Guo and Zhao (2017) looked at the capital structure determinants and found a positive relationship between size and tangibility, despite the fact that information disclosure can lessen the impact of interest rates on the capital structure. Conversely, the determinants are negatively impacted by Non-Debt Tax Shield and profitability.

Conceptual Framework



Research Methodology

Introduction

This chapter explains the methods used to analyze the impact of independent variables (interest rate, liquidity, exchange rate) on the dependent variable (capital structure) in the sugar sector of Pakistan.

Research Design

A quantitative correlational research design are used to assess relationships between macroeconomic variables and capital structure. Panel data regression techniques are appropriate for analyzing time-series cross-section data across multiple firms.

Data Collection

Data were collected from annual financial statements of listed sugar companies and secondary sources such as the State Bank of Pakistan, Pakistan Bureau of Statistics, and Bloomberg for macroeconomic variables. The period of study will cover 10 years (e.g., 2014–2023).

Sample Size

The sample will consist of 05 sugar firms listed on the Pakistan Stock Exchange (PSX) with complete financial data for the selected period.

Statistical Analysis

Descriptive statistics, correlation analysis, and linear regression analysis were used in this study to examine the impact of the independent variables on the dependent variable in a comprehensive manner. Descriptive statistics were applied to summarize and describe the main characteristics of the data, including measures such as mean, standard deviation, frequencies, and percentages, in order to provide a clear overview of the distribution and nature of the variables. Correlation analysis was then conducted to determine the strength and direction of the relationship between the independent and dependent variables, helping to identify whether the association was positive or negative and how strongly the variables were related to each other. Furthermore, linear regression analysis was employed to assess the extent to which the independent variables influenced the dependent variable, estimate the magnitude and significance of the effect, and evaluate the predictive power of the model. Together, these statistical techniques provided a detailed and systematic approach for analyzing the relationships among the variables and drawing meaningful conclusions from the data.

Operational Definitions, Variables and Measurement

Variable	Type	Operational Definition	Measurement	Formula
Capital Structure	Dependent	The proportion of a firm's total assets financed through debt	Debt Ratio (DR)	Total Debt / Total Assets
Interest rate	Independent	The annual benchmark policy rate set by the State Bank of Pakistan, representing the cost of borrowing in the economy	Annual SBP Policy Rate	Percentage (%)
Exchange rate	Independent	The annual average value of the Pakistani Rupee (PKR) against the US Dollar (USD), representing the domestic currency price of one US Dollar	Annual Average PKR/USD Exchange Rate	PKR per USD
Liquidity	Independent	A firm's ability to meet its short-term financial obligations using its current assets.	Current Ratio	Current Assets / Current Liabilities

Results

Statistics

Capital Structure (Debt/TA)

N	Valid	50
	Missing	0

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Liquidity (CA/CL)	50	.067767088224869	2.890702179949350	1.262902629219871	.691367066440004	.443	.337	-.178	.662
Exchange Rates	50	101	280	152.40	59.634	1.121	.337	-.010	.662
Interest Rates	50	5.75	22.00	10.6500	4.94640	1.149	.337	.446	.662
Capital Structure (Debt/TA)	50	.000000000000000	.619562885377619	.225468369291438	.179128517046654	.602	.337	-.727	.662
Valid N (listwise)	50								

The descriptive statistics for the sample of 50 observations show that Liquidity (CA/CL) ranges from approximately 0.07 to 2.89, with a mean of 1.26 and a moderate standard deviation of 0.69, indicating variability in firms' short-term liquidity positions. The Exchange Rate (PKR/USD) varies widely between 101 and 280, averaging 152.40, reflecting significant currency fluctuations over the study period. Interest Rates range from 5.75% to 22%, with a mean of 10.65% and considerable variation (SD = 4.95), demonstrating changes in borrowing costs. The dependent variable, Capital Structure (Debt/TA), shows a mean leverage ratio of 0.23 with values ranging up to about 0.62, indicating that firms have varying degrees of debt financing. Skewness values near 0.4 to 1.1 for the variables suggest some moderate right skewness, especially for exchange and interest rates, but kurtosis values near zero imply distributions are relatively normal, supporting the validity of regression assumptions.

Correlations

		Liquidity (CA/CL)	Exchange Rates	Interest Rates	Capital Structure (Debt/TA)
Liquidity (CA/CL)	Pearson Correlation	1	.069	.085	-.392**
	Sig. (2-tailed)		.636	.556	.005
	N	50	50	50	50
Exchange Rates	Pearson Correlation	.069	1	.893**	.045
	Sig. (2-tailed)	.636		.000	.756
	N	50	50	50	50
Interest Rates	Pearson Correlation	.085	.893**	1	.040
	Sig. (2-tailed)	.556	.000		.783
	N	50	50	50	50
Capital (Debt/TA)	Pearson Correlation	-.392**	.045	.040	1
	Sig. (2-tailed)	.005	.756	.783	
	N	50	50	50	50

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis reveals a significant negative relationship between Liquidity (CA/CL) and Capital Structure (Debt/TA) ($r = -0.392$, $p = 0.005$), indicating that firms with higher liquidity tend to use less debt relative to their total assets. There is no significant correlation between Exchange Rates and capital structure ($r = 0.045$, $p = 0.756$), nor between Interest Rates and capital structure ($r = 0.040$, $p = 0.783$), suggesting these macroeconomic variables do not have a direct linear association with leverage in this sample. Notably, Exchange Rates and Interest Rates are highly positively correlated ($r = 0.893$, $p < 0.001$), which indicates potential multicollinearity between these two predictors, a factor that should be considered in regression modeling. Overall, liquidity emerges as the key variable inversely related to capital structure, while exchange and interest rates show limited direct correlation.

Regression

Variables Entered/Removed^a			
Model	Variables Entered	Variables Removed	Method
1	Interest Rates , Liquidity (CA/CL), Exchange Rates ^b		Enter
a. Dependent Variable: Capital Structure (Debt/TA)			
b. All requested variables entered.			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.399 ^a	.160	.105	.169487123121386
a. Predictors: (Constant), Interest Rates , Liquidity (CA/CL), Exchange Rates				

The Model Summary indicates that the regression model has a correlation coefficient (R) of 0.399, suggesting a weak to moderate relationship between the independent variables (interest rate, liquidity, and exchange rate) and the dependent variable (capital structure). The R Square value of 0.160 shows that these independent variables collectively explain 16.0% of the variation in the capital structure of firms, while the remaining 84.0% is explained by other factors not included in the model. The Adjusted R Square of 0.105 indicates that, after adjusting for the number of predictors and sample size, the model explains 10.5% of the variation in capital structure. The Standard Error of the Estimate (0.169) reflects the average prediction error of the regression model, with lower values indicating better predictive accuracy.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.251	3	.084	2.911	.044 ^b
	Residual	1.321	46	.029		

Total	1.572	49
a. Dependent Variable: Capital Structure (Debt/TA)		
b. Predictors: (Constant), Interest Rates , Liquidity (CA/CL), Exchange Rates		

The ANOVA results show that the overall regression model is statistically significant ($F = 2.911$, $p = 0.044$), indicating that the independent variables—Liquidity, Interest Rates, and Exchange Rates collectively explain a significant portion of the variance in the dependent variable, Capital Structure (Debt/TA). With a p-value below 0.05, the model reliably predicts changes in capital structure among firms in the sugar sector. However, given the moderate F-value, the model explains the variation to a modest degree, suggesting that other factors might also influence capital structure beyond the included variables.

Coefficients a

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance VIF
1	(Constant)	.324	.078		4.148	.000	
	Liquidity (CA/CL)	-.103	.035	-.398	-2.936	.005	.992 1.008
	Exchange Rates	9.518E-5	.001	.032	.106	.916	.203 4.934
	Interest Rates	.002	.011	.046	.151	.880	.202 4.947

a. Dependent Variable: Capital Structure (Debt/TA)

The regression results indicate that Liquidity has a statistically significant negative impact on the capital structure of firms in the sugar sector ($B = -0.103$, $p = 0.005$), suggesting that as liquidity (current assets to current liabilities) increases, firms tend to use less debt relative to total assets. In contrast, Exchange Rates ($B = 0.000095$, $p = 0.916$) and Interest Rates ($B = 0.002$, $p = 0.880$) do not have a significant effect on capital structure in this model, as their p-values are well above the conventional 0.05 threshold. The collinearity diagnostics show low multicollinearity for liquidity ($VIF = 1.008$), but higher VIF values near 4.9 for exchange rates and interest rates, indicating some multicollinearity concerns with these two variables. Overall, liquidity appears to be the key macroeconomic factor influencing capital structure decisions in this context.

Collinearity Diagnostics a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Liquidity (CA/CL)	Exchange Rates	Interest Rates
1	1	3.677	1.000	.01	.01	.00	.00
	2	.228	4.015	.00	.64	.02	.03
	3	.079	6.810	.85	.34	.01	.06
	4	.016	15.333	.14	.00	.97	.90

a. Dependent Variable: Capital Structure (Debt/TA)

The collinearity diagnostics indicate some multicollinearity concerns, particularly involving Exchange Rates and Interest Rates. The condition index for dimension 4 is 15.333, which is above the commonly used threshold of 15, suggesting potential collinearity issues. Variance proportions for Exchange Rates (0.97) and Interest Rates (0.90) in this dimension are very high, indicating that these two variables share much of the same variance and may be causing multicollinearity. In contrast, Liquidity and the constant have low variance proportions in this dimension, implying they are less affected. Overall, while liquidity appears independent, the strong correlation between exchange rates and interest rates could distort the reliability of their coefficient estimates and should be addressed, possibly by variable transformation or exclusion.

Hypothesis	Decision	Reason
H1: Firm liquidity has a significant effect on capital structure.	Accepted	$p = 0.005 (< 0.05)$
H2: Interest rates have a significant effect on capital structure.	Rejected	$p = 0.880 (> 0.05)$

H3: Exchange rate movements have a significant effect on capital structure.

Rejected

p = 0.916 (> 0.05)

Conclusion

This study used multiple regression analysis based on a sample of 50 firm-year observations to investigate the effects of interest rates, liquidity, and currency rates on the capital structure of businesses in Pakistan's sugar industry. The results show that the regression model is statistically significant ($F = 2.911$, $p = 0.044$), indicating that changes in businesses' capital structure may be explained by the chosen macroeconomic variables taken together. With an R^2 of 0.160 and an adjusted R^2 of 0.105, the model's explanatory power is limited, meaning that other firm-specific or macroeconomic factors account for the remaining variation in capital structure, with the variables included in the model accounting for about 10.5% of the variation.

Liquidity and capital structure were shown to be significantly correlated negatively ($r = -0.392$, $p = 0.005$), suggesting that companies with greater liquidity typically rely less on debt funding. This conclusion was further supported by the regression results, which showed that liquidity significantly impacted capital structure negatively ($\beta = -0.398$, $p = 0.005$). The Pecking Order Theory, which contends that businesses with adequate internal resources favour internal financing over external loans, is supported by this finding.

On the other hand, it was discovered that during the study period, interest rates ($\beta = 0.046$, $p = 0.880$) and exchange rates ($\beta = 0.032$, $p = 0.916$) had no statistically significant impact on the capital structure of sugar companies. These results imply that the sampled enterprises' financing decisions were not significantly impacted by changes in borrowing costs and exchange rates. One rationale is that while making capital structure decisions, companies in Pakistan's sugar industry can be more dependent on firm-specific financial constraints than on immediate macroeconomic shifts.

Overall, the analysis finds that, out of all the factors looked at, liquidity is the most significant factor influencing capital structure. While interest rates and currency rate fluctuations had little effect on financing decisions in the Pakistani sugar industry over the study period, the findings offer empirical evidence that maintaining high liquidity minimises enterprises' reliance on external debt.

RQ) How do liquidity, interest rate, and exchange rate effect the capital structure of firms in Pakistan's sugar sector?

Answer) Liquidity has a significant negative effect on the capital structure of firms in Pakistan's sugar sector, whereas interest rates and exchange rates do not have a statistically significant effect.

Limitations of the Study

Despite the valuable insights provided, several limitations must be acknowledged:

1. **Sample Size and Scope:** The study only included "05 sugar firms" listed on the Pakistan Stock Exchange, which is a relatively small sample size. A broader sample could provide more generalizable results for the entire sugar sector in Pakistan or other industries.
2. **Time Period:** The study period spans (2014-2023), which captures a particular economic climate, including periods of inflationary pressures and currency volatility. The findings might not apply universally across different periods or under different macroeconomic conditions.
3. **Exclusion of Other Variables:** While this study focused on liquidity, interest rates, and exchange rates, other factors like "firm size, profitability, and industry-specific conditions" might also influence capital structure decisions but were not included in this analysis.
4. **Cross-Sectional Data:** The study relied on annual data, which may not fully capture the dynamic, real-time changes in macroeconomic conditions or firm-level adjustments to capital structure decisions. A more granular approach (e.g., monthly or quarterly data) might yield more accurate results.

Future Recommendation

To build on the findings of this study, future research could focus on the following:

1. **Expand the Sample Size:** Future studies should consider increasing the sample size to include more firms across different sectors or regions to improve the robustness and generalizability of the results.
2. **Incorporate More Variables:** Including additional variables like firm size, profitability, tax policy, or market conditions could provide a more comprehensive understanding of the factors influencing capital structure decisions. The role of government policy and regulatory changes should also be considered.

3. **Use Longitudinal Data:** Future studies could adopt a longitudinal approach to examine how capital structure decisions evolve over time in response to changing macroeconomic conditions. This would allow for a better understanding of causality and dynamic adjustments in the capital structure.
4. **Focus on Firm-Specific Factors:** Further research can explore how firm-specific characteristics such as ownership structure, managerial risk aversion, and growth opportunities interact with macroeconomic factors to influence capital structure.
5. **Comparative Studies:** Comparative studies between different industries or countries with similar economic conditions could help to understand the broader applicability of the findings. For example, comparing the sugar industry with other agricultural sectors or manufacturing industries could highlight unique sector-specific dynamics.

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