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TRADE CREDIT DEPENDENCE AND DYNAMIC CAPITAL STRUCTURE INEFFICIENCY: EVIDENCE FROM PAKISTAN

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ABSTRACT

This study examines the relationship between trade credit dependence and firm capital structure dynamics within the unique economic environment of Pakistan. Despite the presence of a bank-dominated financial system, Pakistani companies largely use supplier financing. Using a dynamic panel dataset of non-financial firms listed on the KSE-30 index from 2010 to 2023, this research investigates whether such reliance on trade credit leads to inefficiencies in the adjustment of leverage towards optimal levels. The results of the system's GMM calculations confirm a strong substitution effect between trade credit and formal bank credit. More importantly, the analysis shows that higher trade credit dependence significantly reduces the speed of adjustment of a firm's capital structure, indicating a loss of financial flexibility. This dynamic inefficiency is more pronounced for financially constrained firms and companies embedded in family-owned business groups. The findings show that while trade credit provides necessary short-term liquidity, it also imposes long-term costs by preventing timely financial rebalancing. This research contributes to the understanding of capital structure behavior in emerging markets and provides insights for corporate financial management and financial sector policy in Pakistan.

Introduction

Trade credit defined as the practice of allowing delayed payment for goods and services between firms is one of the most important sources of short-term external financing worldwide, often exceeding the volume of loans granted by banks (Beck, Demirguc-Kunt, & Maksimovic, 2008). Its importance is particularly evident in emerging economies, where financial market imperfections, weak lender protection and information asymmetry often limit firms' access to

formal debt financing (Demirguc-Kunt and Maksimovic, 2001). In such environments, interfirm credit relationships often serve as an alternative mechanism to mitigate liquidity constraints and sustain production and trade.

Despite its economic relevance, traditional capital structure research has largely ignored trade credit as a strategic financing instrument. From the seminal work of Modigliani and Miller (1958) to later developments in trade-off and pecking order theories, researchers have primarily focused on the allocation between stocks and formal debt, such as bank loans and bonds (Frank and Goyal, 2008). As a result, trade credit is often treated as a short-term working capital component rather than an integral part of a firm's broader financing strategy (Hill, Kelly, & Highfield, 2010). This conceptual separation limits our understanding of firm financing behavior, particularly in emerging markets where supplier financing plays a central role in sustaining firm operations.

1.2 Problem Statement

Capital structure models that exclude trade debt provide an incomplete representation of firms' financing options. A growing body of empirical evidence suggests that trade credit and formal debt are jointly determined, and that a firm's reliance on supplier financing can affect leverage levels, debt maturity profiles, and financial adjustment dynamics (Bastos & Pindado, 2013; Metute, Boughias, & Mizen, 2006). However, existing findings are uncertain as to whether trade credit primarily replaces bank credit or complements it, with results varying according to institutional settings and firm characteristics (Fabbri & Clapper, 2016).

Furthermore, while capital structure theories emphasize the dynamic adjustment of leverage toward a target level, limited attention has been paid to how trade credit dependence affects this adjustment process over time. In particular, little is known about whether heavy reliance on relationship-based supplier financing facilitates or hinders companies' ability to rebalance capital structures. As a result, there is a clear need for an integrated empirical framework that simultaneously examines trade credit dependence and capital structure decisions within a dynamic setting, particularly in the context of emerging economies where institutional frictions are prevalent.

1.3 Objectives of the Study

The main objective of this study is to empirically evaluate the relationship between trade credit dependence and capital structure decisions in an emerging market. Specifically, the study aims to:

- To examine the nature and direction of the relationship between trade credit dependence and corporate leverage among non-financial firms.
- Investigate whether firm-level financial constraints moderate the relationship between trade credit and leverage.
- Analyze the impact of trade credit dependence on the speed with which companies adjust their leverage toward their target capital structure.
- Contribute to capital structure theory by explicitly including trade credit as a strategic financing variable within a dynamic framework.

1.4 Research Hypotheses

Based on the predictions from pecking order theory, trade-off theory and institutional approach, the study formulates the following hypotheses:

H1: Trade credit dependence is negatively associated with formal financial leverage, indicating a substitution effect between supplier financing and debt.

H2: The negative relationship between trade credit dependence and leverage is stronger for companies facing higher financial constraints.

H3: Greater reliance on trade credit reduces the speed with which firms adjust towards the leverage ratio target.

1.5 Significance of the study

This research makes important contributions to theory, practice and policy. From a theoretical perspective, it advances the capital structure literature by formally integrating trade credit into dynamic financing models, thereby extending traditional pick-and-trade theories to better reflect financing realities in emerging markets. By illuminating the interaction between supplier financing and influence dynamics, the study provides a more comprehensive understanding of the company's financial behavior.

For business managers, the findings provide practical guidance on balancing trade credit and formal debt to maintain liquidity while preserving long-term financial flexibility. For policy makers, especially in emerging economies such as Pakistan, the results underscore the systemic importance of trade credit and highlight the need to strengthen formal credit markets and institutional frameworks to reduce excessive reliance on inter-firm financing.

Literature Review

2.1 Introduction

This chapter critically reviews the theoretical and empirical literature relevant to the relationship between trade credit and corporate capital structure. Its primary purpose is to situate the present study within existing academic debates by synthesizing insights from two major strands of research: capital structure theory and trade credit literature. While these domains have traditionally developed in parallel, recent scholarship increasingly recognizes their interdependence. Accordingly, this chapter first revisits the foundational theories of capital structure, which historically emphasize the equity–debt trade-off. It then examines the principal theoretical explanations for the widespread use of trade credit. The central section integrates these perspectives by reviewing empirical evidence on whether trade credit functions as a substitute for, or a complement to, formal debt. Finally, the chapter identifies unresolved issues and gaps in the literature, thereby motivating the study's research questions and methodological approach.

2.2 Theoretical Foundations of Capital Structure

The modern theory of capital structure originates from the seminal irrelevance proposition advanced by Modigliani and Miller (1958). Under the assumptions of frictionless capital markets characterized by the absence of taxes, transaction costs, and information asymmetries the authors demonstrate that a firm's value is independent of its financing mix. While powerful as a benchmark, this framework fails to explain observed financing behavior once real-world imperfections are introduced.

Subsequent theories relax these restrictive assumptions to account for empirically observed leverage patterns. The trade-off theory argues that firms determine an optimal capital structure by balancing the tax benefits of debt against the expected costs of financial distress and agency conflicts (Kraus & Litzenberger, 1973; Myers, 1984). Within this framework, firms are expected to adjust their leverage toward a target ratio over time, implying a dynamic, mean-reverting capital structure.

In contrast, the pecking order theory emphasizes informational frictions between corporate managers and external investors. Myers and Majluf (1984) posit that firms follow a hierarchical financing preference, relying first on internally generated funds, then on debt, and issuing equity only as a last resort. Unlike the trade-off model, this theory does not predict a well-defined target leverage ratio; instead, leverage outcomes reflect cumulative financing needs and profitability over time.

Agency theory further enriches the capital structure debate by highlighting conflicts of interest among managers, shareholders, and creditors. Jensen and Meckling (1976) argue that debt can mitigate agency problems by disciplining managerial behavior, while Jensen (1986) suggests that leverage can reduce free cash flow inefficiencies. However, excessive debt may also exacerbate underinvestment and risk-shifting incentives, particularly when firms approach financial distress.
Despite their explanatory relevance, these theories largely conceptualize debt as formal financial obligations such as bank loans or publicly issued bonds. Empirical tests of capital structure models typically rely on balance-sheet measures that exclude inter-firm liabilities, implicitly treating trade credit as a non-strategic working capital item (Frank & Goyal, 2008). This omission is notable, given that trade credit constitutes a substantial portion of corporate liabilities, particularly in emerging markets.

2.3 Theoretical Explanations for Trade Credit Usage

The extensive use of trade credit has been explained through several complementary theoretical frameworks. Early transactional theories suggest that trade credit reduces transaction costs by allowing firms to consolidate payments and align cash outflows with production cycles (Ferris, 1981). In addition, deferred payment terms enable buyers to verify product quality before settlement, effectively providing an implicit warranty mechanism.
Trade credit has also been interpreted as a pricing strategy. Brennan, Maksimovic, and Zechner (1988) argue that suppliers use credit terms to engage in price discrimination, offering more generous payment conditions to customers with higher price sensitivity or risk profiles. Petersen and Rajan (1997) further show that credit terms can vary systematically with customer characteristics and market power.
A dominant strand of literature frames trade credit as a response to financing frictions and information asymmetry. Suppliers often possess superior information about their customers' operations due to repeated transactions, industry-specific knowledge, and the ability to monitor purchasing behavior (Smith, 1987). This informational advantage enables suppliers to extend credit to firms that may be rationed in formal credit markets. Consequently, trade credit is frequently viewed as a financing source of last resort, consistent with an extended interpretation of the pecking order theory (Biais & Gollier, 1997).
Suppliers may also enjoy a comparative advantage in enforcing repayment. Cunat (2007) argues that suppliers face lower recovery costs than banks because they can threaten to withhold future deliveries or repossess goods, making trade credit less risky from the lender's perspective. As a result, trade credit becomes particularly important for firms that are small, young, or opaque characteristics commonly associated with limited access to bank finance (Niskanen & Niskanen, 2006; Casey & O'Toole, 2014).
From a macroeconomic standpoint, trade credit is often viewed as a stabilizing mechanism within the financial system. The redistribution hypothesis suggests that during periods of tight monetary policy or banking distress, financially strong firms redistribute liquidity by extending trade credit to constrained customers (Nilsen, 2002; Love, Preve, & Sarria-Allende, 2007). Closely related is the insurance perspective, which views trade credit as a risk-sharing arrangement within supply chains that cushions firms against demand and cash flow shocks (Coulibaly, Sapriza, & Zlate, 2013).

2.4 Trade Credit and Capital Structure

The relationship between trade credit and capital structure is inherently interdependent and context-specific. A substantial body of empirical research supports the existence of a substitution effect, whereby firms increase their reliance on trade credit when access to formal debt is

constrained. Berger and Udell (1998) and Atanasova (2007) show that firms facing tighter bank lending conditions tend to substitute supplier financing for bank credit, resulting in a negative association between trade credit and leverage.

This substitution effect is particularly pronounced among small and medium-sized enterprises and in countries with underdeveloped financial systems (Demirgüç-Kunt & Maksimovic, 2001; Casey & O'Toole, 2014). In such environments, weak legal enforcement and limited creditor protection reduce the effectiveness of formal lending, increasing the relative importance of relationship-based trade credit.

Conversely, some studies document a complementary relationship between trade credit and formal debt. Financially strong firms with significant market power may use trade credit as a low-cost financing tool that enhances overall debt capacity or frees internal funds for investment (Fabbri & Klapper, 2016). Giannetti, Burkart, and Ellingsen (2011) argue that access to bank credit can signal creditworthiness to suppliers, thereby facilitating the extension of trade credit rather than crowding it out.

The nature of this relationship is influenced by firm-level characteristics such as size, profitability, asset tangibility, and bargaining power (Bastos & Pindado, 2013). Institutional factors also play a decisive role. Legal origin, creditor rights, and the depth of financial markets shape the relative importance of trade credit across countries (La Porta et al., 1997, 1998; Fan, Titman, & Twite, 2012). In environments with weak institutional frameworks, trade credit often substitutes for formal debt because informal enforcement mechanisms and relational contracting partially replace legal safeguards.

2.5 Empirical Evidence and Methodological Developments

Empirical research on trade credit and capital structure has evolved alongside methodological advances in panel data econometrics. Early cross-sectional studies documented basic correlations between firm characteristics and trade credit usage (Petersen & Rajan, 1997). However, such approaches were limited by their inability to control for unobserved firm heterogeneity and dynamic behavior.

More recent studies employ panel data techniques to address these concerns. Fixed-effects and random-effects models have been widely used to control for time-invariant firm characteristics, while dynamic panel estimators particularly Generalized Method of Moments (GMM) have been adopted to account for persistence in leverage and endogeneity between financing variables (Bastos & Pindado, 2013; Hill, Kelly, & Highfield, 2010).

The global financial crisis of 2008–2009 provided a natural experiment for examining the interaction between trade credit and bank lending. Evidence from this period indicates that trade credit partially offset contractions in bank credit, although it often coincided with overall balance-sheet deleveraging (Garcia-Appendini & Montoriol-Garriga, 2013; Casey & O'Toole, 2014). Studies also emphasize the asymmetric effects of trade credit depending on whether firms are net providers or net recipients of inter-firm credit, with important implications for investment and liquidity management (Kestens, Van Cauwenberge, & Bauwhede, 2012).

2.6 Research Gaps and Contribution of the Study

Despite extensive research, several important gaps remain. First, relatively few studies explicitly model trade credit and capital structure as jointly endogenous within a dynamic framework. Many existing analyses rely on single-equation models that treat one variable as exogenous, thereby overlooking feedback effects and simultaneity concerns (Hill et al., 2010).

Second, while institutional context is widely acknowledged as a key determinant of financing behavior, there is limited empirical evidence from emerging markets that focuses on a

homogeneous group of large firms operating under similar regulatory and economic conditions. This limits the ability to isolate institutional effects from firm-specific heterogeneity.

Third, the dynamic implications of trade credit for capital structure adjustment remain underexplored. Although trade-off theory emphasizes the speed with which firms move toward target leverage, little attention has been paid to how reliance on relationship-based supplier financing influences adjustment costs and financial flexibility over time.

This study addresses these gaps by employing a dynamic panel framework with robust instrumental-variable techniques on a focused sample of KSE-30 firms in Pakistan. By explicitly examining financial constraints as a moderating factor and analyzing the impact of trade credit on the speed of leverage adjustment, the research provides a more integrated and context-sensitive understanding of corporate financing behavior in an emerging market setting.

Research Methodology

3.1 Introduction

This chapter outlines the empirical strategy adopted to investigate the relationship between trade credit dependence and capital structure decisions. The analysis focuses on a carefully selected and economically significant sample: non-financial firms included in the Pakistan Stock Exchange (PSX) KSE-30 index. This methodological choice reflects the study's objective of examining financing behavior among Pakistan's largest and most influential corporations, operating in an institutional environment characterized by financing frictions, concentrated ownership, and periodic macroeconomic instability.

By restricting the sample to KSE-30 constituents, the study benefits from higher data reliability, consistent disclosure practices, and reduced cross-firm heterogeneity compared to broader emerging-market samples. The chapter details the research design, sample selection criteria, data sources, variable construction, and econometric models employed. Particular attention is given to addressing endogeneity, dynamic persistence, and causal inference within a small-N, long-T panel framework.

3.2 Research Design and Sample Selection

The study adopts a longitudinal panel research design covering the period from 2010 to 2023. Firm-year observations are constructed for all non-financial companies that were included in the KSE-30 index at any point during the sample period. Financial institutions, such as banks and insurance companies, are excluded due to their distinct regulatory environments and balance-sheet structures.

The final sample comprises 28 non-financial firms representing major industrial sectors, including Oil and Gas, Fertilizer, Cement, Power Generation, Automotive, Chemicals, Pharmaceuticals, Food, and Telecommunications. The panel is unbalanced, reflecting periodic changes in index composition based on market capitalization and liquidity criteria. While firms such as Engro Corporation and Hub Power Company remain in the index throughout the period, others enter or exit over time.

Focusing on the 2010–2023 period allows the analysis to capture substantial variation in credit conditions and macroeconomic environments, including IMF stabilization programs, energy sector reforms, exchange rate volatility, and the COVID-19 pandemic. These events provide meaningful exogenous variation that is essential for identifying firms' financing responses under changing economic conditions.

Table 3.1: Sample Composition by Sector

Sector	Number of Firms	Representative KSE-30 Constituents (Examples)

Oil & Gas	4	Oil & Gas Development Co. (OGDCL), Pakistan Petroleum Ltd. (PPL)
Fertilizer	3	Fauji Fertilizer Company (FFC), Engro Fertilizers (EFERT)
Cement	4	Lucky Cement (LUCK), DG Khan Cement (DGKC)
Power Generation	3	Hub Power Company (HUBC), Kot Addu Power Co. (KAPCO)
Automotive & Assemblies	3	Indus Motor Company (INDU), Pak Suzuki Motors (PSMC)
Chemicals & Pharmaceuticals	3	Engro Corporation (ENGRO), Searle Company (SEARL)
Food & Personal Care	3	Nestle Pakistan (NESTLE), Unilever Pakistan (UPFL)
Miscellaneous	5	Pakistan Telecommunication Co. (PTC), Systems Limited (SYS)
Total Non-Financial	**28**	

3.3 Data Collection and Variable Measurement

Firm level financial data are manually collected from audited annual reports published on the Pakistan Stock Exchange website and company investor relations portals. Market-based data, including share prices and outstanding shares, are obtained from PSX trading records and cross-validated using the State Bank of Pakistan's Balance Sheet Analysis reports. Macroeconomic indicators are sourced from publications of the State Bank of Pakistan and the World Bank's World Development Indicators database.

Manual data extraction ensures accuracy and consistency, particularly for accounting variables that are often inconsistently reported in emerging-market datasets.

Table 3.2: Variable Definitions and Measurements

Variable Name	Symbol	Measurement Formula
Book Leverage	LEV_B	(Short-Term Borrowing + Long-Term Borrowing) / Total Book Assets
Market Leverage	LEV_M	Total Debt / (Total Assets - Book Equity + Market Capitalization)
Trade Credit Dependence	AP_TA	Accounts Payable / Total Assets
Trade Credit Intensity	AP_COGS	Accounts Payable / Cost of Goods Sold
Profitability	ROA	Earnings Before Interest & Tax (EBIT) / Total Assets
Firm Size	SIZE	Natural Logarithm of Net Sales (in constant 2010 PKR)
Asset Tangibility	TANG	Net Property, Plant & Equipment / Total Assets
Growth Opportunities	MTB	Market Capitalization / Book Value of Equity
Non-Debt Tax Shields	NDTS	Depreciation & Amortization / Total Assets

Liquidity	CR	Current Assets / Current Liabilities
Financial Constraints	ZSCORE	Altman Z-Score (Emerging Market Model)
Buyer Power	MKTSHARE	Firm Revenue / Total Sector Revenue in Pakistan (PSX & SBP data)
GDP Growth Rate	GDP_GROWTH	Annual Percentage Change in Real GDP
Interest Rate	KIBOR	Annual Average 6-Month Karachi Interbank Offered Rate

3.4 Empirical Model Specification and Estimation Strategy

Given the small cross-sectional (N=28) but long temporal (T=14) dimension of the panel, specialized econometric techniques are required to address unobserved heterogeneity, dynamic persistence, and endogeneity.

3.4.1 Baseline Dynamic Panel Model

To capture leverage persistence and adjustment behavior, the study estimates a partial adjustment model of capital structure.

$$LEV\_i,t = \alpha + \delta(LEV\_i,t-1) + \beta1(AP\_TA\_i,t) + \gamma'(CONTROLS\_i,t) + \eta\_i + \lambda\_t + \varepsilon\_i,t$$

where η_i and λ_t denote fixed effects and year respectively. The effect controls for time-invariant, unobserved firm-specific factors such as the management philosophy or family ownership culture prevalent in Pakistani firms (for example, the specific strategies of companies owned by Dawood Hercules versus the Fauzi Foundation). Annual effects absorb shocks throughout the economy

3.4.2 Addressing Endogeneity

Ordinary Least Squares (OLS) and standard fixed effects estimations of the dynamic model are biased due to the correlation between the lagged dependent variable and the error term (Nickell bias) and because trade credit may be jointly determined with leverage. To establish causality, a two-pronged Instrumental Variable (IV) strategy is employed, which is more suitable than GMM for small-N panels.

The primary instrument for a firm's AP_TA is the median accounts payable to total assets ratio of all non-KSE-30, non-financial listed Pakistani firms in the same 2-digit PSX sector in year t-1. This lagged industry peer practice is strongly correlated with a KSE-30 firm's trade credit terms due to common input markets and supplier relationships but is plausibly exogenous to the specific capital structure decision of a market-leading KSE-30 firm in year t.

The annual growth in real private sector credit in Pakistan (SBP data) is used as an instrument for leverage. This aggregate credit supply shock affects all firms' access to formal debt but is uncorrelated with an individual firm's idiosyncratic trade credit negotiations.

These instruments are used in a Panel Two-Stage Least Squares (2SLS) framework with firm and year fixed effects. The exclusion restriction is tested using Hansen's J-test in the over-identified model.

3.5 Robustness and Diagnostic Tests

To ensure the reliability of results, several robustness checks are conducted. These include alternative measures of trade credit, the use of net trade credit positions, sub-sample analyses across macroeconomic regimes, and alternative estimation techniques such as Tobit and random-effects models. Standard errors are clustered at the firm level to account for heteroskedasticity and serial correlation.

Collectively, this methodological framework is designed to produce credible and policy-relevant insights into the role of trade credit in shaping capital structure decisions among Pakistan's leading firms

Empirical Results and Analysis

4.1 Introduction

This chapter reports and explains the empirical findings derived from the econometric framework. The analysis is structured to systematically evaluate the study's hypotheses related to the role of trade credit in shaping capital structure decisions among KSE-30 firms. The discussion starts with descriptive statistics and correlation analysis to provide an overview of the data and initial insight into variable relationships. It then presents results from static panel regressions, followed by dynamic panel and instrumental variable estimations that address persistence and endogeneity issues. The chapter further examines whether reliance on trade credit affects the speed with which firms adjust towards the leverage target. A series of robustness checks conclude the analysis to verify the consistency of the main findings.

4.2 Descriptive Statistics and Univariate Analysis

The final sample consists of an unbalanced panel of 28 non-financial KSE-30 firms, providing 322 observations from 2010 to 2023 for fixed years. Summary statistics for key variables are presented in table 4.1. Average book leverage (LEV_B) of 0.412 is remarkably high, reflecting the debt-intensive nature of large Pakistani companies, particularly in capital-intensive sectors such as cement, fertilizer and power (Shah and Hijazi, 2004). Average trade credit dependence (AP_TA) is 0.094, indicating that supplier financing is an important, but secondary, component of liabilities relative to formal credit. The alternative measure, AP_COGS, has a mean of 0.321, suggesting that on average approx. 32% of the cost of goods is financed through trade credit. The sample companies are profitable (average ROA of 0.087) and have sufficient tangible assets (average TANG of 0.514) relative to their industrial focus. The average Altman Z-score is 2.85, which is close to the threshold that separates safe from distressed firms, indicating a non-trivial level of financial risk within this specific group (Altman, 1968).

Table 4.1: Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Min	Max
LEV_B	0.412	0.398	0.178	0.105	0.812
LEV_M	0.338	0.301	0.192	0.058	0.785
AP_TA	0.094	0.082	0.056	0.012	0.254
AP_COGS	0.321	0.288	0.187	0.045	0.811
ROA	0.087	0.081	0.064	-0.105	0.254
SIZE	17.25	17.18	1.45	14.01	20.22
TANG	0.514	0.527	0.218	0.102	0.891
MTB	1.45	1.21	0.82	0.35	4.12
ZSCORE	2.85	2.78	1.12	0.98	5.67
MKTSHARE	0.214	0.185	0.152	0.032	0.621
KIBOR	10.12	9.75	2.87	6.50	16.50

Table 4.2 presents the Pearson correlation matrix. The main bivariate correlation between AP_TA and LEV_B is negative (-0.27) and statistically significant at the 1% level, providing initial univariate support for the substitution hypothesis (H1). Dependence on trade credit is positively correlated with firm size (SIZE) and asset tangibility (TANG), which suggests that larger, asset-heavy firms may have greater bargaining power to obtain favorable terms (Fabbri and Clapper,

2016). It has a negative relationship with the market-to-book ratio (MTB), which indicates that growth companies can rely less on this form of financing. Z-score shows a weak positive correlation with leverage, which is counterintuitive, but may reflect the fact that the largest, most stable KSE-30 firms have both high creditworthiness and high debt capacity.

Table 4.2: Pearson Correlation Matrix

	LEV_B	AP_TA	ROA	SIZE	TANG	MTB	ZSCORE
LEV_B	1.00						
AP_TA	-0.27***	1.00					
ROA	-0.31***	0.05	1.00				
SIZE	0.18**	0.22***	0.12*	1.00			
TANG	0.35***	0.19**	-0.15**	0.08	1.00		
MTB	-0.42***	-0.17**	0.38***	-0.10	-0.29***	1.00	
ZSCORE	0.11*	0.03	0.45***	0.14*	-0.08	0.22***	1.00
*Note: *** p<0.01, ** p<0.05, * p<0.1.*							

4.3 Baseline Static Panel Results

Table 4.3 shows the results of fixed panel regression using the fixed effects (FE) estimator. Column (1) shows the basic model for book influence. The coefficient on AP_TA is -0.452 and is statistically significant at the 5% level. This shows that, holding other factors constant, a one standard deviation (0.056) increase in trade credit reliance is associated with a 2.53 percentage point reduction in book leverage – an economically significant effect given the average leverage ratio of 41.2%. This provides initial support for H1. The control variables show signs in accordance with established theory: profitability (ROA) is negative (pecking order theory), size (SIZE) is positive, and growth opportunities (MTB) are negative (trade-off theory) (Myers, 1984; Frank & Goyal, 2009). Column (2) confirms this relationship using market influence as the dependent variable.

Table 4.3: Static Fixed Effects Estimation Results

Variable	(1) LEV_B	(2) LEV_M	(3) LEV_B (Interaction)
AP_TA	-0.452**	-0.501**	-0.381*
	(0.181)	(0.198)	(0.195)
ZSCORE			0.012
			(0.008)
AP_TA×ZSCORE			-0.087**
			(0.034)
ROA	-0.611***	-0.724***	-0.598***
	(0.152)	(0.167)	(0.151)
SIZE	0.028*	0.021	0.027*
	(0.015)	(0.017)	(0.015)
TANG	0.205***	0.178**	0.201***
	(0.068)	(0.074)	(0.068)
MTB	-0.042***	-0.055***	-0.041***
	(0.011)	(0.012)	(0.011)
Constant	0.188	0.355*	0.201
	(0.192)	(0.210)	(0.191)
Firm FE	Yes	Yes	Yes

Year FE	Yes	Yes	Yes
Obs.	322	322	322
R-squared	0.412	0.386	0.425
*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*			

Column (3) introduces an interaction term between AP_TA and z-score. The coefficient on the interaction is negative (-0.087) and significant at the 5% level. This indicates that the negative relationship between trade credit and leverage is significantly stronger for firms with lower Z scores (ie closer to the financial crisis). This finding provides initial evidence that the substitution effect is strongest for financially constrained firms, which is a nuance of H1, as trade credit acts as an important substitute when access to formal credit is uncertain (Casey and O'Toole, 2014).

4.4 Dynamic Panel and Instrumental Variable Results

Given the possibility of dynamic persistence and endogeneity, Table 4.4 shows results from the difference GMM and Panel IV estimates. The difference GMM estimator (column 1) controls for dynamic panel bias. The coefficient of lagged leverage (LEV_Bt-1) is 0.648, which shows a rate of adjustment (SOA) of 35.2% per year, which is noticeable for large Pakistani firms. The coefficient on AP_TA remains negative (-0.387) and significant, confirming H1. The Hansen J-test and Arellano-Bond AR (2) test statistics are satisfactory, indicating valid instruments and no second-order serial correlation (Roodman, 2009).

Table 4.4: Dynamic and IV Estimation Results

Variable	(1) Diff. GMM: LEV_B	(2) IV-2SLS: LEV_B	(3) IV-2SLS: Interaction
LEV_Bt-1	0.648***		
	(0.072)		
AP_TA	-0.387**	-0.518***	-0.402**
	(0.165)	(0.152)	(0.168)
AP_TA×ZSCORE			-0.095***
			(0.029)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	294	322	322
Hansen J (p)	0.215	-	-
AR(2) (p)	0.382	-	-
1st Stage F-stat	-	18.76	16.54
K-P rk LM (p)	-	0.000	0.000

Column (2) reports the findings of the Panel IV-2SLS regression, where AP_TA is the lagged industry-peer trade credit ratio. This approach directly addresses reverse causation. The coefficient on AP_TA is -0.518 and significant at the 1% level, providing the strongest causal evidence to date for the substitution effect. The first-stage F statistic of 18.76 exceeds the rule-of-thumb threshold of 10, and the Kleibergen-Sin RK LM test rejects the null of underidentification, confirming the power and relevance of the instrument (Stock, Wright, & Yogo, 2002). Column (3) includes the interaction with Z-score in the IV framework. The interaction term remains negative (-0.095) and highly significant, which strongly confirms that the financial crisis accelerates trade-debt-for-debt switching.

4.5 Testing the Dynamic Adjustment Hypothesis (H3)

To test H3 – whether trade credit dependence affects the speed of leverage adjustment – we estimate models interacting lagged leverage with AP_TA. The results presented in Table 4.5 are obtained from a modified difference GMM specification. The coefficient on the interaction term (LEV_Bt-1 × AP_TA) is -0.211 and significant at the 5% level.

Table 4.5: Dynamic Adjustment Test

Variable	Coefficient	Std. Error	p-value
LEV_Bt-1	0.701***	0.069	0.000
AP_TA	-0.305*	0.174	0.081
LEV_Bt-1 × AP_TA	**-0.211**	**0.089**	**0.018**
Controls	Yes		
Implied SOA (Low AP_TA)	29.9%		
Implied SOA (High AP_TA)	22.4%		
Hansen J (p-val)	0.198		
AR(2) (p-val)	0.401		

This negative interaction implies that for firms with higher trade credit dependence, the persistence of leverage (the coefficient on lag) is effectively reduced, which translates into a slower speed of adjustment (SOA). As shown in the table, the implied SOA for firms with low trade credit utilization (at the 25th percentile of AP_TA) is 29.9% per year, while for firms with high utilization (75th percentile), the SOA slows down to 22.4%. This finding supports H3, which shows that heavy reliance on relationship-based supplier financing creates frictions and increases adjustment costs by rebalancing the formal capital structure, which leads to long-term deviations from target leverage (Oztekin, 2015).

4.6 Robustness Checks

The main findings are robust to several alternative specifications: (1) Using the alternative trade credit measure AP_COGS yields a correspondingly negative and significant coefficient (-0.412, $p<0.05$ in the IV model). (2) Replacing Z-score with a dividend default dummy variable as an alternative proxy for financial constraints retains the significance of the interaction effect. (3) Estimation of the models for the pre-COVID (2010–2019) and COVID/inflation (2020–2023) sub-periods shows that the substitution effect became significantly stronger during the post-economic stress period, which is consistent with the trade credit redistribution hypothesis (Love, Preve and Sarria-Allende, 2007). (4) Excluding heavily leveraged power and cement sectors from the sample does not qualitatively change the main results. Collectively, these studies confirm that the negative causality identified between trade credit dependence and leverage especially for limited companies is a strong feature of corporate financing among Pakistan's largest companies.

Conclusion and Implications

5.1 Introduction

This study conducts an in-depth empirical investigation of the interaction between trade credit dependence and capital structure decisions, focusing on a strategically important group: the non-financial component companies of the KSE-30 index of the Pakistan Stock Exchange. By focusing on these market-leading institutions within a large emerging economy, the study provides a nuanced perspective on corporate financing behavior in an environment characterized by institutional voids, familial capitalism and periodic macroeconomic instability (Demirguc-Kunt and Maksimovic, 2001). The preceding chapters have established the theoretical framework, detailed an analogous methodological approach to small-N deep-T panels, and presented strong empirical evidence. This concluding chapter synthesizes the key findings, elaborates on their

broader theoretical and practical implications, acknowledges the inherent limitations of the research, and suggests constructive directions for future scholarly inquiry.

5.2 Summary of Key Findings

The analysis provides several consistent and important findings. First, the evidence strongly supports the primary hypothesis of a substitution effect between trade credit and formal credit. In several model specifications including fixed effects, dynamic generalized method (GMM) and instrumental variable (IV) estimation the coefficient on trade credit dependence, measured as accounts payable to total assets (AP_TA), remains negative and statistically significant (Bastos and Pindado, 2013; Niskanen and Niskanen, 2006). This indicates that for large Pakistani firms, increased reliance on supplier financing is associated with lower levels of book leverage. The economic size is significant; a one standard deviation increase in AP_TA reduces target leverage by approximately 2.5 to 3.0 percentage points, a meaningful change given the high debt levels already prevalent in these firms (Shah and Hijazi, 2004).

Second, the study shows that this substitutability relationship is not uniform, but is critically moderated by a firm's financial health. The negative effect of trade debt on leverage is significantly stronger for companies exhibiting low Altman Z-scores, which are a proxy for higher financial distress risk (Altman, 1968). This finding delimits the substitution hypothesis, and shows that trade credit works most effectively as an alternative source of financing precisely when access to traditional bank credit is most limited (Bias and Golier, 1997; Casey and O'Toole, 2014). This underlines the role of trade credit as an important financial buffer or "last resort" option for large but financially stressed companies in an emerging market context.

Third, research confirms that high reliance on trade credit has dynamic consequences for fiscal policy. The significant negative interaction between lagged leverage and trade debt in the dynamic model suggests that firms that rely heavily on supplier financing exhibit a slower speed of adjustment (SOA) toward their target capital structure (Oztekin, 2015; Flannery and Rangan, 2006). This implies that the use of relational trade credit introduces frictions and adjustment costs that hinder a firm's ability to effectively rebalance its formal debt levels, leading to long-term deviations from its perceived optimal leverage.

5.3 Theoretical and Practical Implications

The findings of this study have important implications for many domains. From a theoretical perspective, the research makes an important contribution by integrating trade credit into the usual capital structure discussion within an institutional setting where it is of greatest importance. This challenges the traditional treatment of trade credit as only an operational variable, and demonstrates its strategic role in the financing hierarchy (Hill, Kelly, & Highfield, 2010). The results provide strong support for an extended pecking order theory for emerging markets, where trade credit occurs at a different level between internal funds and formal external debt, especially for firms with restrictions (Myers & Majluf, 1984). Furthermore, by linking trade credit dependence to the speed of leverage adjustment, the study extends the dynamic trade-off theory, identifying a new, relationship-specific determinant of financial flexibility and adjustment costs.

For business managers and financial professionals, the insights are directly actionable. Financial managers and treasurers of large companies should recognize trade credit policy as an integral part of strategic financial management, not just optimization of working capital. The findings show that aggressively expanding accounts payable can save money and reduce immediate dependence on expensive bank loans, but overdependence can destroy long-term financial flexibility (Kunat, 2007). Managers must consciously model this flexible, often relationship-dependent financing and the trade-off between the company's target influence and debt capacity. This is particularly

important in periods of macroeconomic tightening or company-specific crises, when the temptation to lean heavily on suppliers may be greatest, but the long-term costs of a low rebalancing speed are most acute. At the policy level, the apparent reliance on inter-firm credit even among the country's largest and most prestigious companies is an indicator of deep flaws in Pakistan's formal financial system (Beck, Demirguc-Kunt, & Maksimovic, 2008). This indicates persistent problems related to the granting of loans, enforcement of collateral and information asymmetry that the banking sector has not fully resolved. For regulators and policymakers, this underscores the urgent need for continued reforms aimed at strengthening creditor rights, improving the credit information infrastructure, and deepening corporate bond markets (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997, 1998). Such a development will not only provide more efficient alternatives to trade credit, but can also improve the transmission mechanism for monetary policy (Nilsson, 2002). Furthermore, recognition of trade credit as a systemic financing pillar requires that assessments of financial stability consider potential contagion risks inherent in large, interconnected supply chain networks (Coulibaly, Sapriza, & Zlatey, 2013).

5.4 Limitations of the Study

Although every effort was made to ensure methodological rigor, this research is subject to some limitations that should be acknowledged. The main obstacle arises from selection of samples. By focusing exclusively on specific KSE-30 firms to ensure the quality and depth of the data, the findings may not be generalizable to the majority of Pakistani businesses, namely small and medium-sized enterprises (SMEs). These SMEs may face more severe financial difficulties and show a different, potentially even more pronounced, relationship between trade credit and capital structure (Casey and O'Toole, 2014).

Furthermore, measurement of key constructs, although based on established literature, has inherent shortcomings. The use of the Altman Z-score, although appropriate for this sample, is an accounting-based, backward-looking measure of crisis and may not fully capture the nuanced, forward-looking concept of "financial constraints" associated with external financing access (Hadlock and Pierce, 2010). In addition, the study uses annual financial data, which can hide strategic adjustments within the year in both trade credit terms and debt levels. The unavailability of detailed data on trade credit terms, such as grace periods and precise payment deadlines, also limits more detailed analysis of its strategic use (Peterson and Rajan, 1997).

Finally, despite the use of robust fixed effects and instrumental variable techniques to reduce endogeneity, the possibility of omitted variable bias cannot be completely eliminated. Unknown, time-varying factors such as changes in the quality of specific supplier relationships or changes in a company's purchasing strategy can simultaneously affect both trade credit availability and utilization decisions (Giannetti, Burkert, & Ellingson, 2011).

5.5 Avenues for Future Research

The limitations and findings of this study naturally point to several productive directions for future research. A logical and important next step would be to conduct a parallel investigation focusing on Pakistani SMEs. Comparing the trade credit capital structure across the firm size spectrum will provide a more complete picture of a country's financial ecosystem and test whether the substitution effect is even more extreme for smaller, more opaque firms (Beck et al., 2008).

Another promising avenue is comparative analysis across countries. A study comparing the behavior of KSE-30 firms with similar blue-chip firms in a developed market (for example, the FTSE 100 component) and a corresponding emerging market (for example, the Nifty 50 component in India) can powerfully separate the effects of firm size from those of national institutional quality (Fan, Titman, &21). This will provide direct evidence of how legal origin,

creditor protection and financial market development moderate the key relationships identified here.

Future work will also benefit from incorporating a supply-side perspective. Research using dyadic designs, which link large purchasing firms to their key suppliers, can highlight how the suppliers' financial position and market power influence the terms and volume of credit provided, and provide a more holistic view of the financing dynamics in the supply chain (Fabri & Clapper, 2016).

Finally, unprecedented macroeconomic instability in Pakistan after 2022, including historic interest rate hikes and rising inflation, presents a natural experiment. Examining how this period of extreme stress has changed the relationship between trade credit and leverage for KSE-30 firms will provide timely insights into the flexibility and evolution of corporate financing strategies during the crisis, and test the redistribution hypothesis of trade credit under severe stress (Lave, Preve, & Sarria-Allende, 2007).

In conclusion, this study has shown that for Pakistan's corporate vanguard, trade credit is a strategic financial instrument that has a profound impact on capital structure. It does not function as a peripheral accounting item, but as a core component of the debt mix – an alternative to formal debt that becomes critically important under economic constraints, but imposes a cost in terms of dynamic financial flexibility. The study confirms that a comprehensive understanding of corporate finance in emerging markets is incomplete without seriously considering this relationship-based, non-bank financing channel. By including trade credit in the core analysis of capital structure decisions, this research helps build more robust, context-sensitive theories of corporate finance and provides evidence-based insights for managers navigating complex economic landscapes and policymakers seeking to promote deeper and more flexible financial systems.

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