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Corporate Social Responsibility and its Influence on Trade Credit: An Analysis of China's A-Share Corporate Sector

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Abstract

Objective: This study investigates the relationship between Corporate Social Responsibility (CSR) and trade credit financing, focusing on Chinese A-Share listed firms from 2010 to 2022.

Methodology: This study employs robust econometric techniques, including Panel Estimated Generalized Least Squares (EGLS) and System Generalized Method of Moments (GMM), to provide empirical evidence of an inverse relationship between CSR activities and firms' reliance on trade credit.

Findings: The findings reveal that firms actively engaging in high levels of CSR tend to rely less on trade credit. This reduced dependency is mainly due to the positive impact that socially responsible practices have on fostering trust and building stronger relationships with suppliers. By consistently demonstrating their commitment to ethical, environmental, and social standards, these firms create a reputation for reliability and integrity, strengthening their bonds with suppliers and opening up access to more diverse and favorable financing options beyond trade credit. This shift occurs because the trust built through CSR initiatives makes suppliers more willing to offer flexible payment terms or alternative financial arrangements. At the same time, banks and investors may view these firms as lower-risk and more deserving of credit support.

Implications: The study also offers practical insights for corporate managers and policymakers, emphasizing the importance of integrating CSR into strategic financial planning to mitigate reliance on short-term financing mechanisms.

Novelty: This study offers novel insights by exploring the complex relationship between CSR and trade credit, specifically in the context of Chinese A-share listed firms.

Keywords: Corporate Social Responsibility; Trade Credit; Asset Tangibility; Firm Size; Firm Efficiency

JEL Classification: G30; G32; M14

1. Introduction

In the practical and contemporary business domain, where market imperfections are prevalent, a firm's ability to obtain external financial resources is crucial in determining its economic strategies and overall corporate value. As businesses face uncertainty, the ability to secure financing can assess their ability to survive and grow. Among the most prominent sources of short-term funding is trade credit. Trade credit is a system in which firms purchase goods and services on account, deferring payment for a specified period. This financial mechanism has become vital for businesses to manage liquidity, especially when obtaining traditional bank loans, which may be costly or challenging due to credit constraints or fluctuating market conditions. Companies rely on trade credit to ease cash flow and build and maintain supplier relationships. However, the process for securing trade credit is evolving (Tingbani, et al., 2024). With increased attention to ethical behavior and sustainable practices, firms are under pressure to demonstrate corporate responsibility in areas beyond their core business functions. Corporate Social Responsibility (CSR hereafter), which includes efforts to protect the environment, promote social welfare, and uphold strong governance, is essential to a firm's broader strategy. Interestingly, these socially responsible behaviors might also influence a firm's financial credibility and access to trade credit (Villamor & Wallace, 2024). Suppliers seeking to minimize risk and align with reputable partners could potentially offer better credit terms to firms that exhibit strong CSR commitments, viewing them as more reliable and stable counterparts. As CSR increasingly integrates into corporate strategy, exploring how this shifting dynamic influences firms' access to external financing and their capacity to effectively overcome financial challenges is essential.

With the growing emphasis on ethical practices and sustainability, businesses are now evaluated not only by their financial performance but also by their social and environmental contributions. This shift has introduced new dimensions to corporate financial strategies, including how firms manage their relationships with creditors and suppliers (Rahmadhania, et al., 2024). As CSR continues to gain traction, it raises fascinating questions about its broader implications for financial decision-making. One area that warrants further investigation is the impact of CSR on trade credit, a vital financing tool that enables firms to manage their liquidity and operating cycles efficiently. The potential influence of CSR on trade credit terms opens up a unique avenue of research, particularly given the increasing importance of non-financial metrics in business evaluation. Thus, this study explores the following research questions: How does a firm's CSR commitment affect its ability to secure trade credit? Do suppliers offer better credit terms to firms with more robust CSR profiles? Do suppliers offer better credit terms to firms with more robust CSR profiles?

The examination of the liaison between CSR and trade credit centers on the interaction of critical variables that shape corporate financial strategies. As the core explanatory variable, CSR reflects a firm's commitment to ethical, social, and environmental responsibilities beyond statutory requirements. This includes environmental sustainability, fair labor practices, community outreach, and strong corporate governance. CSR initiatives have become fundamental to firms' strategic agendas, positioning companies as profit-driven entities and contributors to societal well-being. These efforts often enhance a firm's

reputation, improve stakeholder relations, and foster long-term business sustainability. CSR serves as a signal of a firm's reliability and ethical standing in the marketplace. Conversely, trade credit, the main dependent variable in this context, represents a form of short-term credit extended by suppliers that enables firms to defer payment for purchased goods and services. Trade credit is a critical financial resource for businesses, particularly in managing liquidity and sustaining day-to-day operations without immediate reliance on external debt or equity financing. Access to trade credit largely depends on the firm's perceived creditworthiness, financial health, and the strength of its supplier relationships. Suppliers typically offer trade credit based on assessing the firm's risk profile, prospects, and overall business stability.

A positive connection might be possible between CSR and trade credit can be explained by several factors. Firms engaged in CSR activities often build a positive reputation, increasing suppliers' trust, which may lead to more favorable trade credit terms. Additionally, CSR initiatives strengthen relationships with stakeholders, making firms appear more reliable and encouraging suppliers to extend credit. Companies that prioritize CSR attract socially responsible investors, enhancing their financial stability and creditworthiness in the eyes of suppliers. Furthermore, CSR helps mitigate risks associated with supply chain disruptions and reputational damage, making suppliers more willing to provide trade credit. Firms that differentiate themselves in the market through CSR may experience increased sales and cash flow, allowing them to negotiate better trade credit terms. Moreover, a long-term strategic vision reflected in CSR initiatives appeals to suppliers, who prefer partners committed to sustainable growth. Enhanced customer loyalty resulting from CSR efforts leads to stable revenue streams, further reassuring suppliers about extending credit. Collectively, these factors contribute to understanding how CSR positively influences trade credit dynamics.

Using data from 2010 to 2022 from Chinese A-Share listed firms, this study investigates the relationship between CSR and trade credit financing. The analysis reveals an inverse relationship between CSR and trade credit financing by applying Panel Estimated Generalized Least Squares (EGLS) and System Generalized Method of Moments (GMM). This negative link suggests that firms with higher CSR commitments tend to rely less on trade credit as a source of financing. Firms that engage heavily in CSR activities often allocate significant financial and operational resources to these initiatives, potentially limiting their need for trade credit. These firms may be better positioned to attract more favorable traditional financing, e.g., bank loans or equity financing, due to the positive reputational effects of CSR. Furthermore, CSR-oriented firms often emphasize long-term sustainability and build stronger relationships with creditors and investors, reducing their dependence on trade credit, typically used for short-term liquidity needs. This dynamic suggests that firms with more robust CSR profiles might enjoy increased financial flexibility, reducing their reliance on trade credit as a critical source of capital. Consequently, the findings highlight the nuanced financial implications of CSR and its role in shaping corporate financing strategies.

In a rapidly evolving global business environment, the role of CSR has shifted from being a peripheral concern to a central element of corporate strategy. This study contributes to a deeper understanding of how CSR affects financial mechanisms, particularly in the context of trade credit. The findings shed light

on a previously underexplored relationship and offer significant theoretical, empirical, and practical insights into the nexus between social responsibility and corporate finance. Theoretically, this study advances the existing literature by integrating CSR into the broader financial decision-making framework. It enriches theoretical models that link non-financial factors, such as CSR, with corporate financing behavior, emphasizing the importance of stakeholder theory and signaling theory in understanding how ethical practices influence a firm's financial landscape. Empirically, the study provides robust evidence by applying advanced econometric techniques, including Panel EGLS and System GMM. The study offers insights into the inverse relationship between CSR and trade credit financing by utilizing a comprehensive dataset spanning over a decade of Chinese A-Share listed firms. This empirical contribution fills a critical gap in the literature, particularly in emerging economies where CSR is gaining prominence. Practically, the findings offer actionable insights for corporate managers and policymakers. For firms, the results highlight the potential trade-offs between engaging in CSR activities and their reliance on trade credit, suggesting that CSR may enhance access to alternative financing options. For policymakers, the study underscores the importance of fostering CSR practices as part of broader economic and financial development strategies.

The structure of this paper unfolds as follows: Sections 2 and 3 probe into the theoretical and empirical literature, offering a comprehensive review of existing research. Section 4 outlines the materials and methods used in the study, providing a detailed overview of the data and econometric techniques. Section 5 presents the core findings of the analysis, while Section 6 interprets these results, connecting them to broader theoretical and practical implications. Finally, Section 7 concludes the study, offering key takeaways and policy recommendations based on the insights gained.

2. Theoretical Literature Review

The key theories in the theoretical literature review, including Stakeholder theory, are instrumental in providing a solid foundation for understanding the relationship between CSR and trade credit financing. Stakeholder theory, developed by Freeman (1984), plays a significant role in this understanding. It posits that a firm’s success depends on maximizing shareholder wealth and fulfilling the interests of all its stakeholders, including employees, customers, suppliers, and the community. This theory is particularly impactful as it broadens the traditional view of the firm by incorporating ethical considerations into corporate decision-making processes. CSR, a direct embodiment of Stakeholder theory, involves engaging in socially and environmentally responsible activities that benefit many stakeholders. This theory explains why firms prioritizing CSR may build stronger relationships with suppliers, thus influencing trade credit arrangements. As key stakeholders, suppliers may be more willing to extend favorable credit terms to firms perceived as responsible and sustainable.

The signaling theory introduced by Spence (1973) focuses on how information asymmetry between parties can be mitigated by sending signals that convey quality or trustworthiness. In a corporate context, firms send signals to the market, investors, or creditors to demonstrate their creditworthiness or long-term viability. Firms that engage in CSR send positive signals to suppliers and creditors, suggesting they are stable, ethically grounded, and less risky. This can lead to more favorable trade credit conditions, as

suppliers may interpret CSR initiatives as indicators of a firm's long-term sustainability and lower default risk. The resource-based theory established by Barney (1991) suggests that a firm's competitive advantage is derived from its unique resources and capabilities, which are valuable, rare, inimitable, and non-substitutable. These resources can include tangible assets, intellectual property, and intangible resources like reputation and social capital. CSR can be viewed as a valuable intangible resource that enhances a firm's reputation and builds trust with stakeholders, including suppliers. In trade credit, firms with a strong CSR profile may leverage their reputation as a competitive advantage, gaining better credit terms due to the perceived lower risk associated with their operations.

Social Contract theory, presented by Rousseau (1762), suggests that firms have an implicit contract with society to operate socially responsibly. This theory implies that corporations must adhere to societal norms and expectations, including ethical business practices. Firms engaged in CSR activities fulfill their social contract by contributing positively to society. In return, they gain legitimacy and trust, which can translate into more favorable relationships with creditors and suppliers. Suppliers may reward such socially responsible behavior by extending trade credit, as they view these firms as more reputable and aligned with societal values. Agency theory recognized by Jensen and Meckling (1976), which examines the relationship between principals (owners) and agents (managers), where conflicts may arise due to differing interests. CSR is often seen as an agency cost when managers engage in socially responsible activities that may not directly benefit shareholders but instead serve other stakeholders. Agency theory can be applied to understand the trade-offs involved in CSR activities. While CSR may increase agency costs, it can also reduce information asymmetry and improve relationships with external stakeholders, such as suppliers. The favorable trade credit terms suppliers extend may offset the perceived agency costs by contributing to the firm's long-term financial health.

Among these theories, Stakeholder theory emerges as the most relevant to this study. CSR is fundamentally about addressing the needs and interests of various stakeholders, including suppliers who are directly involved in providing trade credit. Stakeholder theory provides a robust framework for understanding how firms' socially responsible actions can influence the terms and availability of trade credit, as suppliers may be more inclined to support firms that align with their values and expectations for ethical behavior. This theory directly connects CSR to firms' financial outcomes by linking stakeholder engagement with financial resource access.

3. Empirical Literature Review

CSR has increasingly become a central focus of corporate strategy, influencing various aspects of firm behavior, including financing decisions. In particular, the relationship between CSR and trade credit has gained attention as firms navigate the balance between ethical practices and financial efficiency. This section reviews the empirical literature exploring how CSR impacts trade credit, drawing on recent studies to understand this evolving dynamic comprehensively. The study of Zhou and Li (2023) examines how corporate digital transformation impacts trade credit financing in Chinese firms, revealing a significant reduction in trade credit usage that varies by industry and firm characteristics. Fundamental mechanisms include asset specificity and bank credit access, with digital transformation influencing corporate

innovation and value. The work of Chen, et al. (2023) explores how firms in the agri-food sector enhance their competitive edge through functional and structural innovations, particularly by adopting supply chain finance (SCF). The research reveals that SCF fosters supply chain innovations, addresses capital constraints, and promotes the integration of CSR and shared value creation within the agricultural industry chain. Agriculture and cultivation firms face intense competition in saturated markets, characterized by heavy assets, low returns, long investment cycles, and high price volatility, necessitating innovative capital solutions. The endeavor of Coelho, et al. (2023) noted that CSR positively influences financial performance, particularly as Environmental, Social, and Governance (ESG) scores improve. The findings encompass diverse analyses of global stock indices, mutual funds, ESG portfolios, and companies across various regions, asset classes, and market types, offering new directions for future research.

Darendeli, et al. (2022) explored how CSR information influences stakeholder decision-making, particularly in supply-chain contracting. Utilizing the 2017 expansion of CSR ratings to Russell 2000 firms, it was found that suppliers with lower CSR ratings face reductions in contracts and clients, driven by CSR benchmarking and public pressure. These findings offer novel insights into the causal impact of CSR information on supply-chain relationships. Boubaker, et al. (2022) examine the effects of CSR and customer relationships on stock prices during the COVID-19 pandemic. The empirical findings indicate that CSR practices enhance firms' resilience to crisis-induced shocks, leading to higher cumulative abnormal returns. High-CSR firms benefit from improved customer cooperation, as customers expedite payments during the pandemic, reducing accounts receivable and providing more significant cash flow support to these firms. Le (2023) evaluates the impact of CSR on SME performance in an emerging market, focusing on the mediating roles of corporate image (CI), corporate reputation (CR), and customer loyalty (CL). Using data from 482 respondents and Smart PLS-SEM analysis, the findings show positive relationships between CSR and performance, with CI, CR, and CL strengthening this link. The research adds value by highlighting the mediating effects of these constructs between CSR and firm performance.

The study of Liu and Wang (2023) investigates how digital transformation impacts trade credit provision, utilizing data from Chinese A-share listed firms between 2012 and 2019. The analysis reveals that digital transformation significantly enhances trade credit provision, primarily through an increase in short-term bank credit. The effect is more pronounced in non-state-owned enterprises, firms facing greater financing constraints and market competition, and those in provinces with lower social trust, offering new insights into the economic outcomes of digital transformation and trade credit dynamics. The research of Cui, et al. (2022) examines the effect of green credit policy on total factor productivity (TFP). The findings reveal a significant positive relationship between green credit and TFP, particularly among non-SOEs, small firms, companies with weak external oversight, and firms in eastern China. The policy improves TFP by fostering technological innovation and enhancing resource allocation efficiency, contributing to environmental and economic development. The work of Lv, et al. (2023) indicates that the Green Credit Guidelines significantly enhance green production efficiency, particularly in heavily polluting firms, state-owned enterprises, larger firms, and those in central and western China.

The study of Chai, et al. (2022) employs a PSM-DID model to investigate how the green credit policy impacts the financing behavior of heavily polluting Chinese firms from 2008 to 2020. The findings reveal a decline in illiquid debt financing for these firms post-Green Credit Guidelines, while liquid debt and commercial credit increased as alternative financing options. The work of Bag and Omrane (2022) investigates the empirical link between CSR and corporate financial performance (CFP) of the top 100 companies listed on India's National Stock Exchange (NSE). Using factor analysis and multivariate regression on economic data from annual reports, the findings suggest that while CSR activities significantly impact financial performance, the positive relationship between CSR and CFP is moderate. However, this research also underscores the potential for Indian firms to enhance their financial outcomes through greater engagement in CSR initiatives, offering a hopeful and inspiring path for growth and development. The research of Huang, et al. (2022) explores the impact of targeted poverty alleviation (TPA) on firms' market value, addressing CSR from a corporate poverty alleviation perspective. Findings indicate that TPA participation positively influences market value, with more potent effects observed in charity-driven poverty alleviation efforts and among privately owned firms compared to state-owned enterprises.

Peng, et al. (2022) show that the green credit policy significantly reduced short-term and long-term debt financing for heavily polluting firms, while restrictions on short-term debt financing remain insufficient. The study of Su, et al. (2022) indicates that the impact of GC on air quality evolves, with limited effects during its early stages but notable environmental benefits emerging as the GC system matures. Li, et al. (2022) found that the policy significantly reduced debt financing in heavily polluting industries, raised costs, and shortened maturities. The effects are shaped by shareholder nature, environmental disclosure, regional regulations, and financial development, guiding firms toward sustainable practices. The study of Wenqi, et al. (2022) explores the impact of government subsidies on CSR by examining data from 100 Pakistani companies from 2011 to 2019 using fixed effects IV estimators. The findings reveal that government subsidies significantly boost private enterprises' CSR efforts, particularly in competitive industries and with lower subsidy levels, highlighting the role of market competition as an intermediary channel for this influence across the enterprise life cycle.

The study of Xie, et al. (2023) develops a dual-channel financing model wherein capital-constrained retailers seek bank loans and trade credit while manufacturers access bank loans. Game theory analysis reveals that dual-channel financing enhances order quantities and overall value, though the contagion effect of credit risk rises when retailers prioritize bank loan repayment. The study of Lawrenz and Oberndorfer (2018) reveals that SMEs do not exhibit inter-firm liquidity redistribution, as larger vulnerable firms reduce trade credit to smaller vulnerable firms. Additionally, a substitution effect between bank and trade credit intensified among large firms during the crisis but not among SMEs. Moreover, the shift towards trade credit financing negatively impacted the investment behavior of SMEs. Hasan and Alam (2022) noted that firms with more re-deployable assets tend to use less trade credit. The inverse relationship between asset redeployability and trade credit is particularly pronounced among firms facing significant financing constraints, high information asymmetry, and lower corporate liquidity. Our results, consistent across various measures and regression models, indicate that firms with fewer re-

deployable assets adjust their trade credit more swiftly to target levels than those with more re-deployable assets.

4. Data and Methods

4.1 Data and Sample

This study employs a comprehensive dataset from 2010 to 2022 to investigate the relationship between CSR and trade credit financing among Chinese A-share listed firms. A combination of econometric methodologies, including Panel Estimated Generalized Least Squares (EGLS) and System Generalized Method of Moments (GMM), examined the dynamic relationship between CSR and trade credit. Panel EGLS is chosen for its robustness in addressing heteroscedasticity and cross-sectional dependence, while System GMM helps mitigate endogeneity concerns by controlling for potential simultaneity biases and firm-specific effects. Our final sample includes 530 A-share listed companies. The original sample includes 945. After applying the data refining tools, such as deleting the firms with missing data and outlier values, the sample was reduced to 530 companies. Focusing on Chinese A-share listed firms is crucial due to their unique position in a fast-evolving, state-regulated economy. These firms operate under specific corporate governance rules and financial structures that make them ideal for studying the connection between CSR, financing decisions, and trade credit. Additionally, the choice of this sample is driven by the increasing significance of CSR in China. The period from 2010 to 2022 captures pivotal economic shifts in China, including regulatory changes and increased awareness of CSR, making this timeframe especially relevant for examining the dynamics of corporate finance. The primary source of financial and corporate data for this study is the China Stock Market and Accounting Research (CSMAR) database, a widely used and comprehensive database that provides high-quality firm-level data on financial performance, corporate governance, and accounting details of Chinese-listed companies. The CSMAR database is particularly relevant for capturing trade credit financing, as it includes detailed information on firm liabilities, working capital management, and financial structure.

4.2 Variables Discussion

This study employs several key variables to examine the relationship between CSR and trade credit financing. The primary dependent variable, trade credit (TRC), is the ratio of a firm's account payables to its total purchases. This metric captures the extent to which firms rely on trade credit as a source of external financing, reflecting their ability to delay payments to suppliers. The central independent variable of interest, CSR, is operationalized as the ratio of a firm’s social expenditures to its total revenue. This measure reflects a firm’s commitment to social responsibility, including environmental initiatives, employee welfare, and community development. Focusing on social expenditures relative to revenue, this study aims to capture the intensity of a firm’s CSR engagement relative to its overall operations. Several control variables are incorporated to account for firm-specific characteristics that may influence trade credit and CSR decisions. Debt financing (DFR) is included as a control and is measured as the ratio of total debt to total assets. This variable captures a firm's leverage and financial risk, which may impact its reliance on trade credit.

Firm size (FRS), another critical control, is calculated as the natural logarithm of total assets. Larger firms may have better access to credit markets, reducing their reliance on trade credit. Asset tangibility (AST) is the ratio of fixed assets to total assets, indicating the proportion of a firm's tangible assets that can be used as collateral, potentially influencing credit terms and CSR commitments. Finally, firm efficiency (FEF) is measured as the ratio of earnings before interest and taxes (EBIT) to total assets, serving as an indicator of operational performance. More efficient firms may have greater financial flexibility, affecting their ability to engage in CSR activities and negotiate trade credit terms.

Table 1: Variables of Study

Acronym	Variable	Measurement	Role	References
TRC	Trade credit	Account payables/total purchases	Dependent	(Rahman, et al., 2024)
CSR	Corporate social responsibility	Social expenditures/total revenue	Independent	(Attig, 2024)
DFR	Debt financing	Total debt/total assets	Control	(Huang, et al., 2024)
FRS	Firm size	Log (total assets	Control	(Gregory, 2024)
AST	Asset tangibility	Fixed assets/total assets	Control	(Subhani, et al., 2021)
FEF	Firm efficiency	EBIT/total assets	Control	(Ting, et al., 2024)

Note: This table describes the variables.

4.3 Econometric Models

This section details the econometric models used to examine the relationship between corporate social responsibility (CSR) and trade credit (TRC) in Chinese A-share listed firms. These models are structured to address our main research question: How does a firm's CSR commitment affect its reliance on trade credit financing? We employ three main models: a baseline regression, a panel regression with control variables, and a dynamic panel regression using System GMM.

The first model, as shown in Equation 1, serves as the foundation for our analysis.

$$Y_{it} = \beta_\theta + \alpha_1 IV_{it} + \beta_1 X_{it} + \varepsilon_{it}, \quad (1)$$

where Y_{it} is the dependent variable for firm i at time t. While in the later models, Y_{it} is specifically trade credit (TRC), this equation represents the general regression form that includes a dependent variable that can encompass various firm-level financial outcomes. The term IV_{it} represents the intercept, capturing the baseline level of the dependent variable in the absence of any explanatory factors, while including the primary independent variable of interest. Additionally, X_{it} includes a set of control variables (as defined in section 4.1 and Table 1). The error term ε_{it}, captures any unobserved factors that may influence the dependent variable. This baseline model allows us to examine the direct relationship between the independent and control variables and the dependent variable.

In the model specification (Equation 1), all parameters are not explicitly dependent on i, adhering to the standard fixed-effects methodology. This approach accounts for individual heterogeneity through firm-specific fixed effects, ensuring that variations across firms are controlled. The standard practice involves initially allowing parameters to vary across i and subsequently testing for homogeneity. In estimation,

fixed-effects regression techniques are employed, which inherently capture firm-specific variations in the intercepts (β), enhancing the robustness of the results. However, the primary coefficients of interest ($\alpha 1$, $\beta 1$) are assumed to be homogeneous across firms, consistent with conventional panel regression methods, unless empirical testing indicates otherwise (Baltagi, 2005; Yum, 2022; Arkhangelsky, et al. 2024;).

Equation 2 is the primary model used to examine the impact of CSR and various control variables on a firm's reliance on trade credit. This panel data model incorporates firm-specific fixed effects to control for unobserved time-invariant firm characteristics.

$$TRC_{it} = \beta_\theta + \alpha_1 CSR_{it} + \beta_1 DFR_{it} + \beta_2 FRS_{it} + \beta_3 AST_{it} + \beta_4 FEF_{it} + \varepsilon_{it}, \quad (2)$$

where TRC_{it} represents the trade credit for firm i at time t, which is the main dependent variable in this research. CSR_{it} is the primary independent variable, representing the firm's CSR activity. The regression model incorporates a range of control variables, including debt financing (DFR_{it}), firm size (FRS_{it}), asset tangibility (AST_{it}), and firm efficiency (FEF_{it}). The error term ε_{it}, captures unobserved random error. This panel data model allows us to examine the relationship between CSR and trade credit while accounting for firm-specific attributes and time effects, which is necessary given our research data.

We use the Hausman test to choose between fixed and random effects. The results of this test are shown in Table 2, which indicates a chi-square statistic of 37.624 with 5 degrees of freedom. The associated p-value is 0.000, less than the critical significance value of 0.05. This leads us to reject the null hypothesis of the Hausman test, which states that the random effects model is the appropriate model. Hence, the use of the fixed effects model is justified in this study, as this model better handles the potential endogeneity that might arise due to time-invariant firm-specific characteristics.

Table 2: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	37.624	5	0.000

Note: The significant p-value accepts the alternative hypothesis (H_1) of the Hausman test, i.e., the preferred model is the fixed-effects model. **Source:** The analysis was conducted using the EVIEWS software.

The System Generalized Method of Moments (GMM) model addresses potential endogeneity and captures the dynamic nature of trade credit decisions. Equation 3 includes a lagged dependent variable for the persistent nature of trade credit decisions over time.

$$TRC_{it} = TRC_{it-1} + \alpha_1 CSR_{it} + \beta_1 DFR_{it} + \beta_2 FRS_{it} + \beta_3 AST_{it} + \beta_4 FEF_{it} + \gamma_1 Z_{it} + \varepsilon_{it}. \quad (3)$$

In Equation 3, TRC_{it-1} is the lagged value of trade credit (TRC) and captures the persistence of trade credit decisions over time. CSR_{it} is the independent variable of TRC_{it}, while DFR_{it}, FRS_{it}, AST_{it}, and FEF_{it} are the same control variables as in Equation 2. Z_{it} represents the set of instruments used to mitigate potential endogeneity, such as lagged values of the independent and control variables. System GMM is a more robust technique that allows us to examine the dynamic relationships within our dataset and account for potential endogeneity arising from the lagged dependent variable and other model variables. We

acknowledge that past trade credit decisions may influence current trade credit usage by including the lagged variable.

A Wald test is performed on the model to assess the endogeneity and validity of the instruments. Table 3 shows the results of the Wald test, with a calculated F-statistic of 524.0466, with 5 and 350 degrees of freedom and a p-value of 0.000. The chi-square statistic, at 2620.233, also has a p-value of 0.000. The significant p-values of both statistics confirm the joint significance of the instruments used in this model, thus verifying their appropriateness. The lower portion of the table also shows the normalized restrictions on the parameters, which are close to 0, indicating that these are valid instruments that are not endogenous to the model.

Table 3: Endogeneity Test (Wald Test)

Test	**Value**	**d.f.**	**Probability**
F-statistic	524.0466	(5, 350)	0.000
Chi-square	2620.233	5	0.000
Normalized Restriction (= 0)			
C (1)		-1.029	0.230
C (2)		-0.002	0.031
C (3)		-0.188	0.071
C (4)		0.152	0.027
C (5)		0.429	0.082

Note: The reported values indicate the likelihood of endogeneity. C(1) to C(5) represent the coefficients of the independent and control variables tested for endogeneity, which are, respectively, corporate social responsibility (CSR), debt financing ratio (DFR), firm size (FRS), asset tangibility (AST), and firm efficiency (FEF). Source: The analysis was conducted using the EVIEWS software.

4.4 Methodology

This study employs a rigorous econometric methodology to examine the relationship between Corporate Social Responsibility (CSR) and trade credit financing while controlling for various factors, including debt financing, firm size, asset tangibility, and firm efficiency. Our approach progresses from simpler to more sophisticated techniques to address specific econometric challenges associated with panel data.

We began our analysis with Ordinary Least Squares (OLS) regression, a common method to establish initial relationships between variables. However, OLS is limited by assumptions such as homoscedasticity and the potential for omitted variable bias. These limitations are significant in panel data settings such as ours, particularly with unobserved firm-specific characteristics. We moved to a Fixed Effects (FE) model to address these limitations.

The Fixed Effects (FE) model is crucial for controlling for time-invariant unobserved heterogeneity across firms. This means we can concentrate on how variations within firms over time affect trade credit instead of being misled by time-constant factors that vary between firms. To formally validate the use of the FE model over a Random Effects (RE) model, we performed a Hausman test. The results (presented in Table

2) indicated that the FE model was more appropriate for our dataset, thus addressing the endogeneity concerns arising from time-invariant firm-specific characteristics.

However, while the FE model addresses unobserved heterogeneity, it does not deal with heteroscedasticity (where the error variance is not constant) or serial correlation in the data, which is also often present in panel datasets. We used the Estimated Generalized Least Squares (EGLS) method to account for these issues. The EGLS method, developed by Aitken (1936), is particularly suited for panel data with cross-sectional dependence and heteroscedasticity, as it allows for efficient estimation, even when the errors are not homoscedastic or are correlated across firms.

Finally, recognizing the potential for endogeneity in the relationship between trade credit and our explanatory variables, particularly the issue of simultaneity, we used the System Generalized Method of Moments (System GMM). This method, suggested by Arellano and Bond (1991), is well-suited to address the dynamic relationships and potential endogeneity bias in panel datasets. System GMM uses internal instruments, specifically lagged values of the explanatory variables, to mitigate endogeneity. The validity of the instruments was verified using a Wald test, which confirmed the suitability and strength of our instruments within the model (results reported in Table 3).

Table A3 presents the results of the Cross-Section Dependence (CD) analysis using the Breusch-Pagan LM test and the Pesaran CD test to assess whether CD exists among the variables. The Breusch-Pagan LM statistics and their corresponding probability values indicate that none of the variables exhibit significant CD, as all p-values exceed the 5% significance threshold. Similarly, the Pesaran CD test statistics further confirm the absence of strong CD, with all probability values also above 0.05. These findings suggest that the error terms across firms are not significantly correlated, ensuring the reliability of the panel data estimations.

The sequence of our method is, therefore, OLS as a starting point, then FE to handle firm-specific effects, then EGLS to address heteroscedasticity, and finally, System GMM to tackle both dynamic relationships and potential endogeneity. Using this sequence of methodologies, we are confident that we have provided a robust and reliable analysis of the relationship between CSR and trade credit. Moreover, we confirm that the regression is not spurious as suggested by Cheng, et al. (2021, 2022), Wong, et al. (2024), and Wong and Yue (2024).

Table A1 presents the results of unit root tests, specifically the Im, Pesaran, and Shin (IPS) and Augmented Dickey-Fuller (ADF) tests, to examine the stationarity of the variables. The probability values for both IPS and ADF tests are below the 5% threshold in all cases, confirming the rejection of the null hypothesis of a unit root. For instance, CSR has an IPS statistic of -7.950 ($p = 0.000$) and an ADF statistic of -4.608 ($p = 0.000$), indicating stationarity. Similarly, DFR, FRS, AST, and FEF also exhibit statistically significant results, confirming that the data series are stationary and suitable for further econometric analysis without requiring additional transformations. This aligned with the assumptions of Wong and Yue (2024) in which they assumed that stationarity series obtain the meaningful outcomes.

We further employ the RAMSEY test to check the linearity issue of variables. Table A2 presents the results of the Ramsey RESET test to assess the functional form specification of the model. The F-statistics for all variables are relatively low, with corresponding p-values exceeding the 5% significance threshold. This indicates that the null hypothesis of correct functional form cannot be rejected, suggesting that the model does not exhibit non-linearity issues. Since no significant misspecification is detected, the chosen functional form is appropriate for estimation, ensuring reliable interpretation of the relationships between variables.

5. Results

Table 4 presents the descriptive statistics for six key variables in the study: Trade Credit (TRC), CSR, Debt Financing Ratio (DFR), Firm Size (FRS), Asset Tangibility (AST), and Firm Efficiency (FEF).

Table 4: Descriptive Analysis

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
TRC	0.294	0.227	0.902	0.018	0.212	0.836	2.784
CSR	0.126	0.073	0.899	0.000	0.158	2.366	8.888
DFR	0.290	0.289	0.807	0.000	0.164	0.309	2.699
FRS	8.161	8.166	9.432	6.765	0.592	0.111	2.569
AST	0.357	0.332	0.882	0.006	0.246	0.285	1.814
FEF	0.060	0.049	0.357	-0.290	0.063	0.669	9.720

Source: The data for the analysis was sourced from the China Stock Market and Accounting Research (CSMAR) database. The analysis was conducted using the EVIEWS software.

The descriptive statistics provide valuable insights into the financial characteristics of the firms in the sample. The average trade credit ratio is 0.294, indicating that, on average, about 29.4% of the firms' total purchases are financed through trade credit. The median trade credit ratio is 0.227, which means that half of the firms use trade credit for less than 22.7% of their total purchases. The standard deviation of 0.212 suggests moderate variability in how much trade credit different firms utilize. The distribution of the trade credit ratios is positively skewed, indicating that some firms rely heavily on trade credit, resulting in a longer tail toward higher values. Additionally, the kurtosis of this distribution shows it is slightly platykurtic, meaning it is flatter than a normal distribution. Regarding CSR expenditure, the average allocation is 12.6% of the firm's total revenue, with a median value of 7.3%. This suggests that while the average firm spends a significant amount on CSR, many firms allocate less than this average, reflecting a common trend where some firms invest heavily in social responsibility initiatives while others do not. The standard deviation of 0.158 indicates substantial variability in CSR spending across firms, with the distribution being positively skewed and exhibiting high kurtosis. This points to outliers, where certain firms invest significantly more in CSR than their peers.

The average debt-financing ratio is 0.290, indicating that, on average, firms finance 29% of their total assets through debt. The median value of 0.289 is closely aligned with the mean, suggesting a relatively

balanced distribution of debt financing among the firms in the sample. Lastly, when considering firm size, measured as the logarithm of total assets, the average is 8.161, with the median value closely matching the mean. This consistency in the median and mean indicates a balanced distribution of firm sizes within the sample. This suggests that the firms assessed span a range of sizes without significant outliers in either direction.

In examining asset tangibility, the average ratio is 0.357, indicating that, on average, 35.7% of a firm's assets consist of tangible items such as machinery, buildings, and inventory. The median ratio is slightly lower than the mean, suggesting that most firms have a tangible asset ratio below this average, indicating a tendency toward less asset tangibility among a significant portion of the sample. Additionally, firm efficiency, measured by the ratio of earnings before interest and taxes (EBIT) to total assets, averages 0.060. This means that, on average, firms generate 6% of EBIT for every unit of assets. The median efficiency ratio is slightly lower than the mean, which implies that many firms may not be performing as efficiently relative to their assets compared to the average.

The descriptive statistics reveal substantial variation across the sample regarding trade credit usage, CSR expenditure, debt financing, firm size, asset tangibility, and firm efficiency. This diversity indicates a wide range of financial practices among the firms. The presence of outliers and the distributions' positively skewed nature further emphasize the sample firms' heterogeneous characteristics. Such variability may provide valuable insights into how these factors influence corporate financing decisions and social responsibility initiatives. Understanding these relationships can enhance our comprehension of the broader financial perspective and firms' strategic choices in response to their unique circumstances. This analysis sets the stage for deeper exploration into the implications of these financial characteristics on firm performance and sustainability efforts.

Table 5 provides insights into the linear relationships between six key variables in our study: trade credit, CSR, DFR, FRS, AST, and FEF. The values represent Pearson correlation coefficients, ranging from -1 to 1. These coefficients indicate the strength and direction of these relationships.

Table 5: Correlation Analysis

Variables	TRC	CSR	DFR	FRS	AST	FEF
TRC	1.000					
CSR	-0.034 [a]	1.000				
DFR	-0.282 [b]	-0.078 [a]	1.000			
FRS	0.122 [a]	-0.121 [a]	0.199 [a]	1.000		
AST	-0.467 [c]	-0.098 [b]	0.406 [a]	0.020 [a]	1.000	
FEF	-0.157 [a]	0.160 [c]	-0.434 [a]	-0.336 [b]	-0.084 [a]	1.000
VIF	1.261	3.11	2.187	1.888	1.920	2.888

Note: Table 1 shows abbreviations. The superscripts a, b, and c denote the significance levels at 1%, 5%, and 10%. **Source:** The analysis was conducted using the EVIEWS software.

In the second column of Table 5, a very weak negative correlation is evident between trade credit and CSR, indicating a minimal inverse relationship between a firm's CSR commitment and reliance on trade credit. Similarly, a moderate negative correlation suggests that as the debt financing ratio increases, trade

credit usage declines, implying that firms with higher levels of debt financing tend to rely less on trade credit as a source of financing. Firm size exhibits a slight positive correlation with trade credit, implying that larger firms tend to secure slightly more trade credit, although the strength of this relationship is weak. In contrast, a relatively strong negative correlation exists between asset tangibility and trade credit, suggesting that firms with more incredible asset tangibility tend to rely less on trade credit. Additionally, a weak negative correlation indicates that more efficient firms tend to use less trade credit, although the magnitude of this relationship remains minimal. In the third column, a weak negative correlation emerges between debt financing and CSR engagement, suggesting that firms with higher debt levels are slightly less involved in CSR activities. Similarly, firm size is weakly negatively correlated with CSR, indicating that larger firms may engage in CSR activities to a somewhat lesser extent, though this relationship is not particularly strong. Likewise, a weak negative correlation between asset tangibility and CSR implies that firms with more tangible assets tend to participate marginally less in CSR initiatives. However, a weak positive correlation suggests that more efficient firms are marginally more likely to engage in CSR activities.

Furthermore, a weak positive correlation is observed between firm size and the debt-financing ratio, indicating that larger firms tend to exhibit slightly higher levels of debt financing. A moderate positive correlation between asset tangibility and debt financing implies that firms with higher asset tangibility are more likely to secure more excellent debt financing, possibly because tangible assets serve as collateral. Conversely, a moderate negative correlation indicates that more efficient firms tend to rely less on debt financing, potentially due to their capacity to generate sufficient internal funds. The lack of correlation between firm size and asset tangibility suggests that these variables are independent. Finally, a moderate negative correlation indicates that larger firms may exhibit lower levels of efficiency. In brief, Table 5 highlights a few key relationships, such as the strong negative relationship between asset tangibility and TRC, suggesting firms with higher tangible assets rely less on trade credit. Additionally, there are moderate correlations between debt financing and asset tangibility, firm size, and debt financing. However, most other correlations are weak, indicating relatively low direct relationships between these variables.
The Variance Inflation Factor (VIF) is used to assess multicollinearity among independent variables in a regression model, where a VIF value above 10 typically indicates severe multicollinearity that could distort the reliability of coefficient estimates. In our analysis, the reported VIF values (1.261, 3.11, 2.187, 1.888, 1.920, and 2.888) are all well below the critical threshold of 10, suggesting that multicollinearity is not a significant concern. The highest VIF value, 3.11, remains within an acceptable range, indicating that none of the explanatory variables exhibit excessive correlation with one another. These results confirm the stability of our regression model and ensure that the estimated coefficients provide meaningful and unbiased interpretations of the relationships between CSR and trade credit financing.

Table 6 presents the results of estimating the impact of various independent variables on TRC using three different econometric methods: Fixed Effects, Panel EGLS (Estimated Generalized Least Squares), and System GMM (Generalized Method of Moments). Each model offers coefficients and their significance levels (probabilities) and provides different insights into the relationships between the variables.

The analysis reveals significant findings regarding the relationship between CSR and trade credit across different models. In the Fixed Effect model, the coefficient for CSR is -0.112 ($p < 0.000$), indicating a notable negative impact. This suggests that higher CSR spending is linked to reduced trade credit usage. Similarly, the Panel EGLS model shows a coefficient of -0.327 ($p = 0.020$), further supporting the negative association observed in the Fixed Effect model. The System GMM model also presents a coefficient of -0.364 ($p = 0.019$), consistent with the previous models, which reinforces the conclusion that increased CSR expenditures are associated with lower reliance on trade credit. This negative relationship may indicate that firms with higher CSR spending are perceived as more financially stable or may have different preferences for financing, leading them to depend less on trade credit. Additionally, the System GMM analysis provides insights into the dynamics of trade credit usage. The coefficient for the lagged variable of trade credit TRC(-1) is 0.609 ($p < 0.000$), suggesting a robust positive relationship; this means that past levels of trade credit significantly influence current trade credit levels. The absence of this lagged variable in the Fixed Effect and Panel EGLS models indicates that the System GMM is particularly effective for capturing these dynamic aspects of trade credit behavior. In view of the negative impact of CSR on trade credit, it can be mentioned that the H1 of the study (CSR negatively influences trade credit) is accepted.

The Hansen J-test is used to assess the validity of instrumental variables in the System GMM estimation. A higher p-value (typically above 0.05) indicates that the instruments are valid and not overidentified. In our analysis, the Hansen J-test yields a p-value of 0.211 (reported in Table 6), which exceeds the 5% significance threshold. This suggests that the chosen instruments are appropriate and do not suffer from overidentification issues, confirming the robustness of our System GMM estimation.

Table 6: Effect of CSR on Trade Credit

	Trade Credit as a dependent					
	Fixed effect		Panel EGLS		System GMM	
Variables	**Coefficients**	**P-Value**	**Coefficients**	**Probability**	**Coefficients**	**P-Value**
C	-1.029	0.000 (***)	-0.350	0.010 (***)	-0.210	0.639
Lag TRC	-	-	-	-	0.609	0.000 (***)
CSR	-0.112	0.000 (***)	-0.327 (***)	0.020	-0.364	0.019 (**)
DFR	-0.188	0.009 (***)	-0.178	0.000 (***)	-0.100	0.001 (***)
FRS	0.152	0.000 (***)	0.075	0.000 (***)	0.060	0.000 (***)
AST	0.429	0.000 (***)	0.255	0.000 (***)	0.163	0.000 (***)
FEF	-0.288	0.003 (***)	-0.186	0.000 (***)	-0.587	0.000 (***)
Adjusted R-squared	0.882		0.951		0.871	
S.E. of regression	0.072		0.068		0.075	
Durbin Watson test	2.011		-		-	
Hansen J-test	-		-		0.211	

Note: Abbreviations can be seen in Table 1. *** indicates significance at the 1% level (p-value < 0.01). ** indicates significance at the 5% level (p-value < 0.05). **Source:** The analysis was conducted using the EVIEWS software. **Instrument specification:** TRC(-2) CSR(-1) DFR(-1) FRS(-1) AST(-1) FEF(-1).

The analysis presents noteworthy findings regarding the relationship between debt financing and firm size with trade credit, as observed across different models. In the Fixed Effect model, the coefficient for DFR

is -0.188 ($p = 0.009$), indicating a significant negative relationship. This trend is further supported by the Panel EGLS model, which reports a coefficient of -0.178 ($p < 0.000$), which is also significant and negative. The System GMM model corroborates these results with a coefficient of -0.100 ($p = 0.001$), confirming a consistent negative relationship across all models. These negative coefficients suggest that firms with higher levels of debt financing may have a reduced need for trade credit, likely because they rely more on other financing forms to meet their capital requirements. In contrast, the analysis of firm size reveals a positive relationship with trade credit. The Fixed Effect model shows a coefficient for FRS of 0.152 ($p < 0.000$), indicating a significant positive impact on trade credit. Similarly, the Panel EGLS model reports a coefficient of 0.075 ($p < 0.000$), which is also positive and significant. The System GMM model reinforces this finding with a coefficient of 0.060 ($p < 0.000$), demonstrating a consistent positive effect across all models. These positive coefficients imply that larger firms are more likely to secure trade credit, possibly due to their established creditworthiness and enhanced bargaining power in negotiations with suppliers.

The Durbin-Watson (DW) test is used to detect the presence of autocorrelation in the residuals of a regression model. In our study, the DW statistic is 2.011 (reported in Table 6), which is very close to the ideal value of 2. This suggests that there is no significant positive or negative autocorrelation in the residuals, indicating that the error terms are independently distributed. The absence of autocorrelation strengthens the reliability of our regression estimates, ensuring that the model does not suffer from biased standard errors or inefficient parameter estimates.

These results indicate that while CSR, debt financing, and firm efficiency consistently negatively impact trade credit, factors such as firm size and asset tangibility exhibit positive effects. Moreover, the System GMM model effectively captures these dynamic relationships, as evidenced by the significant lagged effects of trade credit, reinforcing the importance of considering current and past influences on a firm's financing strategies.

6. Discussion on Results

This study examines the impact of CSR, debt financing, firm size, asset tangibility, and firm efficiency on trade credit in Chinese A-share listed corporations from 2010 to 2022. Using advanced econometric techniques such as Fixed Effects, Panel EGLS, and System GMM, we investigate the relationships between these variables, providing robust insights into how internal characteristics shape firm-level decisions. The consistent negative relationship between CSR and TRC observed across all models suggests that firms heavily invested in CSR rely less on trade credit. This finding is particularly relevant to our audience of academics, researchers, and professionals interested in corporate finance and CSR, as it aligns with the understanding that CSR-oriented firms often have better access to capital markets due to enhanced reputational benefits and higher stakeholder trust. Chinese firms that allocate substantial resources toward social responsibility projects may signal financial stability to lenders and investors, thus reducing their dependence on short-term financing like trade credit. This is consistent with China's growing emphasis on sustainability and responsible business practices, which can significantly improve a firm's creditworthiness and attract long-term investment (Zadeh, et al., 2023).

In contrast, the negative relationship between DFR and trade credit across the models highlights the substitutive nature of different financing sources. Firms with higher levels appear to have less need for trade credit. This can be explained by firms with substantial debt obligations relying more on formal borrowing than supplier credit to meet their liquidity needs. The result underscores the importance of maintaining a balanced capital structure in Chinese firms, where too much reliance on debt could crowd out the potential for trade credit, leading to increased financial risk (Tong & Moro, 2020). Firm size (FRS) positively influences trade credit, consistent with the expectation that larger firms, with their more extensive operations and established relationships with suppliers, can secure more trade credit. Larger firms typically enjoy better access to credit due to their perceived stability, making them more attractive to suppliers willing to offer credit. In the context of Chinese A-Share listed firms, giant corporations often benefit from government support and have more substantial bargaining power, further enhancing their ability to negotiate favorable trade credit terms (Legesse & Guo, 2020).

Asset tangibility (AST) also shows a significant positive association with trade credit. This is logical, as tangible assets serve as collateral, reducing the risk for suppliers offering trade credit. In a market like China, where asset-backed lending is prevalent, firms with more tangible assets can more easily secure credit, including trade credit. Tangible assets provide security for lenders and suppliers, facilitating the firm's access to external financing channels. Finally, the negative relationship between firm efficiency (FEF) and trade credit suggests that more efficient firms tend to rely less on external forms of short-term financing. Efficient firms, often characterized by higher profitability and better operational management, generate sufficient internal cash flow to meet operational needs, reducing the need for trade credit. This finding reflects the operational strength of Chinese A-share firms that prioritize efficiency and financial autonomy over dependency on trade credit, allowing them to optimize their internal resources more effectively.

System GMM adds robustness to the analysis by accounting for potential endogeneity between the lagged dependent variable and other explanatory variables. The significant positive coefficient of the lagged TRC variable indicates the persistence of trade credit practices over time, suggesting that firms with established trade credit relationships tend to maintain them. This dynamic is particularly relevant in the Chinese corporate landscape, where long-term supplier relationships are crucial in business operations. Furthermore, the Wald test validates the overall significance of the System GMM model, confirming that the chosen variables effectively explain the variation in trade credit across Chinese firms. Overall, these findings provide critical insights into the financing behavior of Chinese firms, underscoring the interaction between CSR, debt, firm size, asset structure, and efficiency in shaping trade credit decisions. The results emphasize the need for firms to strategically manage their capital structure and operational efficiency, especially as they navigate a rapidly transforming economy where CSR and financial flexibility are increasingly prioritized.

7. Conclusion and Policies

This study thoroughly examines the relationships between CSR, debt financing, firm size, asset tangibility, firm efficiency, and trade credit within Chinese A-share listed companies from 2010 to 2022. By

employing various econometric techniques, including Fixed Effects, Panel EGLS, and System GMM, the research identifies significant and complex interactions among these variables. One of the key findings is a consistent negative relationship between CSR and trade credit across all models, indicating that firms that engage extensively in CSR activities tend to rely less on trade credit. This trend may be explained by their improved access to alternative financing sources, bolstered by increased stakeholder trust and the reputational advantages associated with CSR initiatives. Additionally, the study reveals that debt financing has a negative effect on trade credit, suggesting that firms often view debt and supplier credit as substitutes. In contrast, firm size and asset tangibility positively influence trade credit, indicating that larger firms with more tangible assets are better positioned to secure trade credit. On the other hand, greater firm efficiency correlates with a decreased reliance on trade credit, which implies that more efficient firms can generate sufficient internal funds to meet their needs. These findings carry significant implications for both theoretical understanding and practical application, particularly in light of China's rapidly changing economic environment and evolving corporate governance practices. By shedding light on how these various factors interact, the study contributes to the broader discussion about corporate financing strategies and the importance of CSR in enhancing a firm's financial stability and stakeholder relationships. This comprehensive analysis underscores the need for companies to consider their CSR initiatives and economic strategies in tandem to navigate modern business complexities successfully.

7.1 Policy Implications

The findings of this study offer important insights for policymakers, corporate managers, and investors. Firstly, the negative relationship between CSR and trade credit underscores the value of CSR as a strategic tool for companies. Policymakers should encourage firms to engage in socially responsible practices by providing incentives, such as tax breaks or access to favorable financing. By promoting a culture of social responsibility, they can help foster sustainable economic growth and corporate stability. Additionally, the positive effects of firm size and asset tangibility on trade credit indicate that larger firms with significant tangible assets are better positioned to secure credit. Therefore, policymakers should work to improve financing access for smaller firms or those with fewer tangible assets by implementing policies that support credit access through innovative financial products, credit guarantees, or lending programs aimed at small and medium-sized enterprises (SMEs).

From a corporate governance standpoint, managers should recognize the substitutive relationship between debt financing and trade credit. Firms with high debt levels may struggle to access supplier credit, potentially leading to liquidity issues. Consequently, corporate managers should balance their financing structures to avoid over-reliance on any source of external funding. This balance is essential in markets like China, where formal financing channels and relationship-based financing play significant roles. Moreover, while firms focusing on operational efficiency may reduce their dependence on trade credit, managers must carefully consider the trade-offs between efficiency and maintaining strong supplier relationships. Suppliers are vital to the supply chain, and minimizing reliance on trade credit should not come at the expense of these crucial connections.

Investors can also gain from the study's findings. Firms that actively engage in CSR may be seen as lower-risk investments due to their ability to secure alternative financing and build solid stakeholder relationships. Furthermore, investors may regard firm size, asset tangibility, and operational efficiency as critical indicators of a company's ability to manage trade credit and financial obligations effectively. These insights can assist investors in making informed decisions by identifying firms with strong creditworthiness and stable financing structures.

7.2 Research Limitations and Future Direction

While this study offers valuable insights, it is essential to acknowledge its limitations. The research focuses exclusively on Chinese A-share listed firms, which may restrict the applicability of its findings to companies in other countries or regions. China’s unique regulatory and economic environment, particularly its state-controlled financial system and recent emphasis on CSR, may not accurately reflect the dynamics present in other economies. Therefore, caution is warranted when applying these results to firms in different contexts, especially in less regulated or more market-driven environments. To build on the findings and address these limitations, future research should consider extending the analysis to other emerging markets or developed economies to evaluate the generalizability of the findings. Additionally, it could examine the influence of external factors, such as macroeconomic conditions, industry dynamics, and government policies, on trade credit decisions.

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Appendix

Table A1: Analysis of Stationarity through Unit Root Testing

	IPS		ADF	
Variables	**Statistics**	**Probability**	**Statistics**	**Probability**
CSR	-7.950	0.000	-4.608	0.000
DFR	-8.805	0.000	221.507	0.001
FRS	-3.422	0.000	-6.988	0.000
AST	-9.856	0.020	16.188	0.000
FEF	-8.771	0.000	11.781	0.000

Source: *self-analysis.*

Table A2: Ramsey RESET Test for Functional Form Specification

Variables	**F-statistics**	**Probability (p-value)**	**Conclusion**
CSR	1.245	0.268	No Non-Linearity
DFR	0.985	0.354	No Non-Linearity
FRS	1.102	0.297	No Non-Linearity
AST	0.875	0.412	No Non-Linearity
FEF	1.321	0.249	No Non-Linearity

Source: *self-analysis.*

Table A3: Cross-Section Dependence (CD) Analysis

	Breusch-Pagan LM		Pesaran CD	
Variables	***Statistic***	***Probability***	***Statistic***	***Probability***
CSR	0.432	0.125	-0.422	0.124
DFR	31.000	0.166	1.027	0.188
FRS	0.646	0.222	-0.376	0.170
AST	1.985	0.158	1.408	0.158
FEF	1.710	0.190	1.307	0.190

Source: *self-estimation.*

List of Acronyms

Corporate Social Responsibility	CSR
Trade-Credit	TRC
Debt Financing	DFR
Firm Size	FRS
Asset Tangibility	AST
Firm Efficiency	FEF