

Corporate Governance and Trade Credit: International Evidence from Board Reforms

Finance Working Paper N° 1002/2024
January 18, 2025

Douglas J. Cumming

College of Business, Stevens Institute of Technology

JaredDeLesile

JinLei

ZiYang

© Douglas J. Cumming, JaredDeLesile, JinLei and ZiYang 2025. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

This paper can be downloaded without charge from:
<https://www.ecgi.global/publications/working-papers>

ECGI Working Paper Series in Finance

Corporate Governance and Trade Credit: International Evidence from Board Reforms

Working Paper N° 1002/2024
January 18, 2025

Douglas J. Cumming
JaredDeLesile
JinLei
ZiYang

Abstract

Drawing on current literature, this study develops a simple external financing model and provides international evidence of the causal effects of corporate governance improvements on trade credit. We introduce an internal governance perspective, hypothesizing that weak internal governance, which fosters managerial agency problems, allows firm managers to misuse trade credit. Specifically, poor governance may lead firms to rely on supplier financing as a substitute for traditional financing when they face financing constraints, a practice the literature argues raises concerns about shifting a firm's financial burdens onto its suppliers. Using a decade of data surrounding governance-enhancing board reforms in 38 countries, our difference-in-differences analyses strongly support these predictions. We find that strengthening board oversight via exogenous reforms reduces firms' reliance on supplier financing. Improved internal governance decreases firms' dependence on supplier financing and limits the manipulation of payables through real earnings management activities, such as inventory overproduction, which affects accounts payable. We also find that the effect of internal governance reforms is most pronounced in countries with stronger external governance mechanisms, suggesting a complementary effect. Additionally, our findings show that enhanced governance leads to better investment decisions and improved firm performance, especially for financially constrained firms and those with high agency costs.

Keywords: Trade credit; board reform; board independence; accounts payable manipulation;

JEL Classification: G32; G34; G38

Douglas J. Cumming

Stevens Institute of Technology and ECGI
Steven Shulman '62 Endowed Chair for Business Leadership
Stevens Institute of Technology
e-mail: Douglas.Cumming@gmail.com

JaredDeLesile

JinLei

ZiYang

Corporate Governance and Trade Credit: International Evidence from Board Reforms[†]

Douglas J. Cumming
College of Business
Stevens Institute of Technology
dcumming@stevens.edu

R. Jared DeLisle
Jon M. Huntsman School of Business
Utah State University
jared.delisle@usu.edu

Jin Lei
Goodman School of Business
Brock University
jlei@brocku.ca

Zi Yang
Anderson School of Management
University of California Los Angeles
ziyang@g.ucla.edu

Abstract

Drawing on current literature, this study develops a simple external financing model and provides international evidence of the causal effects of corporate governance improvements on trade credit. We introduce an internal governance perspective, hypothesizing that weak internal governance, which fosters managerial agency problems, allows firm managers to misuse trade credit. Specifically, poor governance may lead firms to rely on supplier financing as a substitute for traditional financing when they face financing constraints, a practice the literature argues raises concerns about shifting a firm's financial burdens onto its suppliers. Using a decade of data surrounding governance-enhancing board reforms in 38 countries, our difference-in-differences analyses strongly support these predictions. We find that strengthening board oversight via exogenous reforms reduces firms' reliance on supplier financing. Improved internal governance decreases firms' dependence on supplier financing and limits the manipulation of payables through real earnings management activities, such as inventory overproduction, which affects accounts payable. We also find that the effect of internal governance reforms is most pronounced in countries with stronger external governance mechanisms, suggesting a complementary effect. Additionally, our findings show that enhanced governance leads to better investment decisions and improved firm performance, especially for financially constrained firms and those with high agency costs.

Keywords: Trade credit; board reform; board independence; accounts payable manipulation; internal governance; country external governance; financial constraints; supply chain stability

JEL Classifications: G32; G34; G38

[†] Lei is the corresponding author. We are grateful for the valuable comments provided by Kenneth De Beckker (discussant), Min Park (discussant), Alvaro Taboada, Zuobao Wei (discussant), seminar participants at the University of Toledo, and conference participants at the 32nd Finance Forum, the 2024 Financial Management Association International Annual Meeting, the 2025 AFRIMED Conference, the 2025 Multinational Finance Society Conference, and the 2025 European Financial Management Association Annual Meeting.

Corporate Governance and Trade Credit: International Evidence from Board Reforms

Abstract

Drawing on current literature, this study develops a simple external financing model and provides international evidence of the causal effects of corporate governance improvements on trade credit. We introduce an internal governance perspective, hypothesizing that weak internal governance, which fosters managerial agency problems, allows firm managers to misuse trade credit. Specifically, poor governance may lead firms to rely on supplier financing as a substitute for traditional financing when they face financing constraints, a practice the literature argues raises concerns about shifting a firm's financial burdens onto its suppliers. Using a decade of data surrounding governance-enhancing board reforms in 38 countries, our difference-in-differences analyses strongly support these predictions. We find that strengthening board oversight via exogenous reforms reduces firms' reliance on supplier financing. Improved internal governance decreases firms' dependence on supplier financing and limits the manipulation of payables through real earnings management activities, such as inventory overproduction, which affects accounts payable. We also find that the effect of internal governance reforms is most pronounced in countries with stronger external governance mechanisms, suggesting a complementary effect. Additionally, our findings show that enhanced governance leads to better investment decisions and improved firm performance, especially for financially constrained firms and those with high agency costs.

Keywords: Trade credit; board reform; board independence; accounts payable manipulation; internal governance; country external governance; financial constraints; supply chain stability

JEL Classifications: G32; G34; G38

1. Introduction

Globally, trade credit is a prominent source of financing for firms. Levine et al. (2018) report that, across 3,500 firms in 34 countries, accounts payable make up approximately 25% of total firm financing.¹ To illustrate the economic significance of trade credit, the U.S. Financial Accounts show that, in 2022, nonfinancial corporate entities reported \$3.44 trillion in trade payables, more than double their loans from depository institutions.² Pecking order theory suggests that firms should exhaust internally generated funds and secure external debt before resorting to trade credit (Myers and Majluf, 1984; Petersen and Rajan, 1994; Atanasova, 2007). Nonetheless, firms continue to rely heavily on trade credit, incurring substantial costs by missing early payment discounts (Petersen and Rajan, 1997).

This observed preference for trade credit prompts the question of why some firms' managers maintain seemingly unwarranted levels of accounts payable. As accounts payable often depend on strategic decisions and management practices within a firm, internal corporate governance may influence trade credit practices through working capital management. We use corporate board reform shocks across 38 countries to examine the causal effects of firm-level governance improvements on trade credit use. Additionally, we investigate external financing as a mechanism through which trade credit is affected and examine whether country-level governance affects the potency of board reform measures.

Existing literature indicates that weak internal corporate governance, characterized by low board independence, insufficient board oversight, and CEO dominance, renders firms more

¹ During our sample period from 1993 to 2012, accounts payable constitute a significant percentage of total assets for non-financial, non-utility firms: 17.8% in Italy, 16.9% in France, 16.0% in Japan, 14.7% in Canada, 14.5% in Belgium, 13.7% in Singapore, 13.1% in the United Kingdom, 11.4% in the Netherlands, and 10.8% in the United States. These proportions are consistently higher than the respective ratios of short-term debt to total assets, which are 13.2% in Italy, 8.9% in France, 14.6% in Japan, 8.4% in Canada, 9.2% in Belgium, 12.9% in Singapore, 7.7% in the United Kingdom, 8.4% in the Netherlands, and 7.9% in the United States.

² See <https://www.federalreserve.gov/releases/z1/20231207/html/s5a.htm>.

susceptible to agency problems (Dey, 2008). Pronounced managerial misalignment can lead to greater financial constraints (La Porta et al., 2000; Francis, 2011; Zhao and Shi, 2024), manifesting as difficulties in securing external financing and reduced profitability (Jensen and Meckling, 1976). Constrained firms may become credit-rationed and resort more to trade credit as an alternative to traditional financing, such as bank loans or issuing new equity or debt (Choi and Kim, 2005; Atanasova, 2007; Murfin and Njoroge, 2015; Zhang, 2019; Chen et al., 2021). Therefore, firms with weak internal governance tend to substitute traditional financing with trade credit due to its flexibility, lack of collateral requirements, and reduced market oversight (e.g., Biais and Gollier, 1997; Petersen and Rajan, 1997). This substitution effect may be exacerbated in environments with poor country-level financial systems or high dependence on external financing to fund investments.

We develop a concise economic model to show how corporate governance affects a firm's financing choices, balancing traditional loans and supplier trade credit in the presence of managerial opportunism. The model highlights a risk-averse manager's trade-off between asset diversion and governance-driven penalties. Key implications include: 1) stronger governance increases traditional borrowing while reducing supplier financing, driven by lower borrowing costs and reduced diversion; 2) enhanced governance lowers the diversion rate, further decreasing the need for supplier credit; and 3) overall borrowing costs from both sources decrease with stronger governance.

Drawing on the literature and our model, we hypothesize that firms' accounts payable levels are negatively related to the quality of their internal governance. However, establishing causality between internal governance quality and trade credit use is challenging due to their endogenous relationship. The inherent endogeneity of internal governance quality and its potential links to variables affecting trade credit utilization pose identification challenges. Moreover, trade credit use

may, in turn, influence internal governance quality.³ To address these challenges, we employ board reforms—an exogenous shock that improves internal governance and reduces agency costs—as an identification strategy to examine their effect on trade credit use.

Since the 1990s, many countries have implemented board reforms to enhance board independence, strengthen audit committees and auditor independence, and clearly delineate the roles of CEO and chairman. The impact of board reforms on improving internal governance is well-documented. Existing studies show that board reforms decrease managerial information asymmetry, lower stock price crash risk, enhance investment efficiency, and increase firm value and M&A deal synergies (Fauver et al., 2017; Hu et al., 2020; Driss, 2022; Ahmad et al., 2024; Qiu and To, 2025). This exogenous country-level policy shock to internal governance quality enables us to use a staggered Difference-in-Differences (DiD) approach to determine whether stronger internal governance causally reduces firms’ accounts payable.

Using a sample of 28,472 unique firms across 38 countries from 1993 to 2012, we find that board reforms significantly reduce firms’ use of accounts payable. This finding is robust across various estimation methods, alternative samples, and measures of trade credit. We also separately examine the impact of the three board reform components identified by Fauver et al. (2017)—board independence, audit committee and auditor independence, and separation of chairman and CEO roles—on firms’ use of accounts payable. The results for each component align with our baseline findings. Additionally, we find a strong negative ex-post effect of total debt increase on the negative association between board reforms and payables. Consistent with our model’s predictions, this finding indicates a significant substitution effect between supplier financing and

³ Biais and Gollier (1997) show that the use of trade credit can alleviate the asymmetric information between banks and firms and incorporate the private information held by suppliers about their customers, helping to align interests and reduce agency problems. Aktas et al. (2012) find that the use of trade credit provides valuable information to outside investors and improves the quality of the firm’s investments.

traditional external financing when corporate governance is improved.

In additional analyses, we find that reductions in accounts payable following board reforms are more significant for firms with weaker internal governance (e.g., lower board independence and higher agency costs) before the reforms. These results confirm that board reform policies are binding for their targeted firms. They also support our argument that accounts payable decrease because board reforms curb excessive use driven by managerial opportunism and working capital manipulation.

Next, we investigate how a country's external financing environment affects the effect of board reforms on accounts payable. A favorable financing environment (e.g., greater financial and stock market development) enables firms to decrease their reliance on accounts payable post-reform. Relatedly, we find that financially fragile firms with greater external financing needs and limited access to external finance reduce their reliance on accounts payable after reforms that mitigate credit market frictions. To further substantiate the external financing mechanism, we analyze investment and performance outcomes. Post-reform, firms—especially fragile ones—increase capital, non-capital, and total investment, indicating eased funding constraints. Return on assets also rises, particularly for high-agency-cost and financially fragile firms, demonstrating that board reforms mitigate external financing limitations and boost profitability. Consequently, this reduces overreliance on accounts payable, enabling firms to adopt a more cost-efficient financing structure.

In further analyses, we examine how external governance interacts with the effect of board reforms on accounts payable. Board reforms may be more effective in countries with strong external governance, where enforcement is robust (Bae et al., 2021; Ben-Nasr et al., 2021; Dak-Adzaklo and Wong, 2024), or in countries with weak external governance, where reforms substitute for lacking controls (Chen et al., 2020, 2022; Driss, 2022; Qiu and To, 2025). We identify a

complementary relationship between external and internal governance, where external governance is proxied by country-level formal and informal institutions. This finding suggests that board reforms are more effective at reducing excessive accounts payable in countries with solid external governance.

Finally, we explore the inventory channel, where board governance reforms enhance operational efficiency, leading to reduced inventory holdings and, consequently, lower payables. The negative relationship between board reforms and inventory holdings may stem from improved inventory management, demand forecasting, and monitoring. Enhanced governance could limit the manipulation of payables through real earnings management—for example, inventory overproduction (Roychowdhury, 2006; Järvinen and Myllymäki, 2016), where firms produce more than necessary to artificially lower the cost of goods sold. The positive link between inventory and payables arises because most firms purchase inventory on trade credit to manage cash flow and maintain liquidity. When firms increase inventory holdings to anticipate sales, they often purchase more from suppliers, resulting in a higher accounts payable balance. Additionally, suppliers are more willing to extend trade credit when firms have high inventory holdings, as inventory often serves as collateral and has lower liquidation costs for suppliers compared to traditional lenders (Choi and Kim, 2005).

Our study makes three main contributions. First, we expand the literature on the determinants of trade credit (e.g., Petersen and Rajan, 1997; Ge and Qiu, 2007; Chen et al., 2021) by examining how internal governance quality affects supplier financing in a multi-country setting. In doing so, we respond to recent calls for more research on alternative financing in international settings (Allen and Qian, 2025). We argue that weak internal governance, which fosters managerial agency problems, can lead firms to misuse trade credit. Specifically, weak governance promotes a shift in the function of payables from standard “operating” trade credit to “financial” trade credit, a

substitute for traditional capital when firms face financing constraints (Cowton and San-Jose, 2017). Our study provides causal international evidence that strengthening board oversight via exogenous reforms curbs this reliance on supplier financing in favor of traditional external financing. Furthermore, by linking the reduction in accounts payable to a concurrent decline in inventory, our findings suggest that improved governance can limit the scope for manipulation of payables through real earnings management activities, such as inventory overproduction (Roychowdhury, 2006).

Second, this research enriches the growing literature on board reform effects, including increased firm value (Fauver et al., 2017), dividend payouts (Bae et al., 2021), innovation (Amore and Bennedsen, 2016; Ahmad et al., 2023), and investment efficiency (Driss, 2022). We provide novel evidence of board reforms' causal impact on trade credit. Our results indicate reforms strengthen governance by enhancing oversight and reducing information asymmetry, thereby easing financial constraints and decreasing dependence on supplier financing (Biais and Gollier, 1997; Mateut and Chevapatrakul, 2018; Del Gaudio et al., 2022; Arca et al., 2023). These findings also respond to broader calls for research into how board characteristics shape governance outcomes, including those outlined by Bettinelli et al. (2025), who emphasize the need to examine board processes, independence, and institutional context across diverse firm settings.

Third, we contribute to the debate on the complementarity of internal and external governance. Contrary to substitution views, we find that reforms have a greater impact in countries with strong legal frameworks, supporting complementarity as argued by Bae et al. (2021), Ben-Nasr et al. (2021), and Dak-Adzaklo and Wong (2024). This suggests that reforms enhance board supervision most effectively within robust institutional environments.

Beyond reducing reliance on supplier financing, we find that board reforms enhance a firm's credit-assessment capabilities, leading to an increase in trade credit extended to customers. This

shift from net borrower to net lender status in the trade credit market suggests that improved internal governance strengthens supply-chain stability. Furthermore, we show that these financing shifts are associated with superior market-based outcomes, including significant gains in Tobin's Q and abnormal returns. These improvements are consistent with the disciplining role of board reforms in reducing agency costs and operational inefficiencies.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature and develops the testable hypotheses. Section 3 details data sources and variable construction. Section 4 presents the empirical research design and results. Section 5 offers the conclusion.

2. Literature review and hypothesis development

2.1 Firm-level corporate governance and trade credit usage

Trade credit, although ubiquitous, is costly from a capital perspective. For example, a standard payment term of 2/10, net 30, translates to an effective annual interest rate of nearly 45% if discounts are forgone (Smith, 1987; Cuñat, 2007).⁴ Thus, pecking order theory suggests that firms should exhaust internally generated funds and secure external debt before resorting to trade credit (Myers and Majluf, 1984; Petersen and Rajan, 1994; Atanasova, 2007). Nonetheless, firms continue to rely heavily on trade credit, incurring substantial costs by missing early payment discounts (Petersen and Rajan, 1997). This observed preference raises the question of why some firms' managers maintain excessive accounts payable. Drawing on agency theory and the notion that poor firm monitoring exacerbates agency problems, we posit that high usage of supplier financing is associated with weak firm governance.

Weak corporate governance exposes firms to significant challenges. Although some studies

⁴ Giannetti et al. (2011) find that the actual maturity of trade credit is often longer than the contractual maturity, and almost half of their sample firms pay at least one of their bills after the due date.

suggest that firms can benefit from adopting strong governance practices through international mergers and acquisitions, foreign ownership, or appointing foreign directors, thereby enhancing their competitiveness and performance in diverse institutional settings (Cumming et al., 2017; Aguilera et al., 2019), poor governance continues to undermine firms' legitimacy and attractiveness to global investors and partners (e.g., Picou and Rubach, 2006). As a result, it restricts opportunities for cross-listing and international expansion (Liao et al., 2022a). Beyond its implications for international expansion, weak governance also affects firms' internal structures, leading to deficiencies in oversight and accountability.

Firms with weak internal governance typically exhibit lower board independence, inferior audit quality, and CEO duality (e.g., John and Senbet, 1998; Core et al., 1999; Abbott et al., 2007; Kim and Lu, 2013; Fauver et al., 2017). This lack of robust oversight fosters an environment where unethical practices are more likely to occur. Existing literature documents that poor internal governance can lead to various forms of opportunistic or deceitful behavior, such as earnings manipulation (Klein, 2002; Xie et al., 2003; Lo et al., 2010; Cheng et al., 2016), fraudulent financial reporting (Beasley, 1996; Beasley et al., 2000; Dunn, 2004; Lennox and Pittman, 2010), asset diversion (Harris et al., 2017), stunted innovation (Amore and Bannedsen, 2016; Ahmad et al., 2023; Wang et al., 2025), and options backdating (Adam and Schwartz, 2009). Dittmar et al. (2003) also demonstrate that weak corporate governance, particularly in countries with poor shareholder protection, leads firms to hoard cash due to agency-related issues. Consequently, firms with inadequate internal governance and weak oversight may have incentives to report high levels of accounts payable on their balance sheets for signaling or opportunistic purposes (Gentry et al., 1990; Mateut and Chevapatrakul, 2018; Aktas et al., 2019; Arca et al., 2023).

Beasley (1996) suggests that a board's effectiveness depends on its ability to limit top managers' decision-making discretion. Outside directors, driven by career concerns and

reputational incentives (Jiang et al., 2016; Bryan and Mason, 2020), are typically more motivated to fulfill their oversight roles and resist collusion with managers in ways that harm shareholder interests (Fama, 1980), reducing the likelihood of financial statement fraud (Beasley, 1996).⁵ Thus, managers in firms with independent boards are disciplined by this oversight (Hazarika et al., 2012; Neville et al., 2019) and are consequently less likely to misuse supplier financing for personal gain—a practice detrimental to firm profitability and supply chain stability.

The dual role of a CEO who also serves as board chairman can impair the board’s monitoring effectiveness. Such dominance may increase the likelihood of fraudulent financial reporting (Dunn, 2004), facilitate collusion, decrease shareholder wealth (Fama, 1980), and lead to inefficient investments (Aktas et al., 2019). Therefore, separating the roles of CEO and chairman is a critical mechanism to curb managers’ self-serving activities.

While board independence and CEO-chairman separation deter managerial misconduct, strong audit quality is vital for detecting fraud and misreporting (Zhang et al., 2007; Carcello, 2009; Lennox and Pittman, 2010). Managers may misuse supplier financing for personal gain or manipulate working capital by delaying payments, creating artificial liquidity. Global scandals illustrate this: Tesco overstated profits by manipulating supplier payments, with its payables ratio surging from 12.1% to 22.4%.⁶ Satyam created \$1 billion in fictitious cash via false invoices, with its payables ratio rising from 6.6% to 14.9%.⁷ Enron also manipulated payables, delaying vendor payments and using round-trip transactions to inflate its balance sheet, with its payables ratio jumping from 7.9% to 14.9%.⁸ These cases, while not exhaustive, highlight how managers exploit

⁵ Additionally, although our study does not focus on board size per se, Bennedsen et al. (2008) offer a compelling causal framework for understanding how board structure can influence firm outcomes.

⁶ See <https://ethicsunwrapped.utexas.edu/video/tesco-cooks-the-books> and <https://www.nytimes.com/2016/09/10/business/international/tesco-britain-fraud-accounting.html>.

⁷ See <https://www.sec.gov/news/press/2011/2011-81.htm>.

⁸ See <https://www.nytimes.com/2002/02/17/business/enron-s-many-strands-finances-enron-had-more-than-one-way-disguise-rapid-rise.html>.

accounts payable for disingenuous signaling, emphasizing the need for robust audits to enhance firm transparency and prevent such practices.

High audit quality, with stringent processes and independent auditors, effectively detects anomalies in payables, reducing misstatements and misappropriation. This deters fraud and promotes more ethical management of accounts payable. Conversely, poorly monitored managers may inflate payables to signal market power (Mateut and Chevapatrakul, 2018) or attract funding by conveying positive supplier expectations (Biais and Gollier, 1997). Research shows higher payables can improve access to bank credit (Arca et al., 2023) and are sometimes viewed as value-enhancing, especially during crises (Nam and Uchida, 2019). Gao et al. (2013) also find that, in firms with poor governance, managers prefer more freedom from external monitoring and hold more internal slack. Consequently, managers are incentivized to inflate accounts payable to retain cash or boost liquidity (Gentry et al., 1990), reporting higher cash or investing in short-term opportunities. However, this can mask opportunistic behavior, such as misappropriation, and create a false impression of financial soundness, as firms appear to manage working capital efficiently.⁹

The role of board reforms in reducing agency conflicts and improving corporate governance is well-recognized by the extant literature (e.g., Hu et al., 2020; Bae et al., 2021; Driss, 2022). Board reforms enhance board oversight across many countries, reducing managerial information concealment and, consequently, information asymmetry between insiders and outsiders (Qiu and To, 2025). Reduced information asymmetry enables financial intermediaries to assess a firm's operational conditions and prospects more accurately. As a result, firms are less likely to forego positive NPV projects due to challenges in sourcing external capital (Stiglitz and Weiss, 1981).

⁹ Recent studies demonstrate that firms that are adept at managing their net working capital, as gauged by the cash conversion cycle (shorter cycles are preferred over longer cycles), tend to enjoy greater profitability, enhanced cash flows, and superior stock returns compared to those with subpar management of net working capital (e.g., Zeidan and Shapir, 2017; Wang, 2019). Increasing accounts payables decreases the cash conversion cycle, *ceteris paribus*.

With reduced pressure from credit rationing, firms can choose more affordable external financing, thus reducing their dependence on supplier financing (Biais and Gollier, 1997).

2.2 Trade credit as alternative financing

Motivated by agency theory and supporting empirical literature, we propose a concise economic model examining how corporate governance affects a firm's borrowing decisions from traditional lenders versus suppliers, considering managerial opportunism. The formal model and its implications are presented in Online Appendix A. It assumes a firm with no internal funds relies on external credit to meet fixed input requirements. In a non-rationing scenario, where traditional credit is freely available, stronger governance reduces borrowing costs and managerial diversion, increasing reliance on traditional loans and decreasing dependence on trade credit, thereby lowering total borrowing costs. In a credit-rationing scenario, where traditional lenders impose limits due to poor governance, firms rely more on trade credit. This is akin to using supplier financing as “financial” trade credit rather than the supplier's intended “operating” trade credit (Cowton and San-Jose, 2017). However, as governance improves, lenders loosen restrictions, allowing firms to shift back to traditional loans, reducing overall financing costs. The model demonstrates that in both scenarios, consistent with the empirical findings of Harris et al. (2017) and Lorca et al. (2011), better governance reduces diversion and borrowing costs, ultimately favoring traditional loans and minimizing reliance on supplier credit. Insights from empirical and theoretical studies, such as Myers and Majluf (1984), Fazzari et al. (1988), Kaplan and Zingales (1997), Gomes (2001), Lyandres (2007), and Hirth and Viswanatha (2011), underscore the importance of mitigating financing frictions. We show that governance reforms can play such a role by reducing the costliness of external capital.

While weak governance structures incentivize managerial opportunism and inflate accounts payable, they also limit access to traditional financing options, such as bank loans or equity

issuance (Molina and Preve, 2012; Petersen and Rajan, 1994, 1997). Consistent with our model, this forces firms to rely more heavily on trade credit, a more readily available funding source compared to conventional channels. Despite the potentially higher costs associated with supplier financing, capital-constrained firms view trade credit as a crucial tool to manage temporary funding shortages and mitigate limitations on raising equity (Herbst, 1974; Petersen and Rajan, 1994; Biais and Gollier, 1997). Consequently, firms with poor internal governance may become overly dependent on trade credit due to market inefficiencies and restricted access to other forms of credit.

This substitution effect may be mitigated in countries with well-developed financial systems, as a country's level of financial development is positively related to a firm's ability to secure external financing (e.g., Love, 2003; Beck et al., 2006; Ghoul et al., 2017). For instance, firms operating in a robust financial environment are more likely to obtain funding through bank loans and equity issuance (Atanasova and Wilson, 2003; Drakos and Giannakopoulos, 2011). Lenders and investors in underdeveloped financial markets may charge higher premiums or be reluctant to lend (Kjenstad et al., 2015). Board reforms that strengthen internal governance and reduce agency costs can enhance access to external financing, reducing overreliance on accounts payable. However, firms in underdeveloped financial environments may still struggle to acquire more affordable alternative financing from creditors due to limitations within the external financial system, despite internal governance improvements from board reforms. As a result, such firms often resort to supplier financing, which can be more expensive and potentially lead to supplier mistreatment. Therefore, board reforms are expected to have a more significant negative impact on accounts payable in financially developed environments.

Bernanke and Gertler (1990) suggest that financial fragility arises when firms heavily rely on external financing for investment projects. This reliance increases agency costs of financing due to issues such as information asymmetry and moral hazard, leading to investment inefficiencies and

reduced performance. Financially fragile firms may have a higher need for external financing, face greater financial constraints, endure greater demand uncertainty, and operate in highly competitive markets. Consequently, these firms may demand more trade credit, partly due to credit rationing (Atanasova, 2007; Murfin and Njoroge, 2015).¹⁰ If board reforms improve internal governance and reduce agency problems, thereby mitigating market frictions caused by agency costs, we expect the negative impact of board reforms on accounts payable to be more pronounced in financially fragile firms prior to reform.

Consistent with the literature and the model implications from Online Appendix A, if increased reliance on supplier financing drives the relationship between corporate governance and trade credit usage (i.e., an external financing mechanism), then the following hypothesis is likely to hold in a multi-country setting:

Hypothesis 1: The level of firms' accounts payable is negatively related to the quality of their internal governance, with the negative effect of corporate governance on accounts payable being more pronounced for firms in countries with well-developed country-level financial or stock markets, financially fragile firms, and firms with high agency costs.

The lack of external financing due to poor management can lead to inefficient investment (Kaplan and Zingales, 1997; Richardson, 2006; Harford et al., 2008) through misaligned managerial incentives (Bhagat and Bolton, 2019), causing managers to prioritize short-term gains over long-term value. This results in issues such as high investment-cash flow sensitivity (Almeida

¹⁰ Firms operating in competitive industries may also strategically increase their payables to avoid indirectly subsidizing the growth of their product rivals. This could happen through generous payable policies to upstream firms, as their rivals might demand trade credit from common suppliers (Freeman et al., 2025).

and Campello, 2007) and an inability to adjust investments promptly during crises (Duchin et al., 2010). These inefficiencies can further weaken firm performance (Whited and Wu, 2006; Lamont et al., 2001), ultimately eroding firm valuation.

2.3 The effect of country-level governance

According to Denis and McConnell (2003), international corporate governance mechanisms can be classified as internal or external. The relative influence of a firm's internal governance practices (e.g., board structure) and external governance infrastructure (e.g., legal systems) remains a topic of ongoing debate with significant policy implications. Some research suggests a substitution effect, where strong country-level governance mechanisms (e.g., legal frameworks) lessen the impact of board reforms (Chen et al., 2020, 2022; Driss, 2022; Qiu and To, 2025). In other words, firms with robust external governance, through regulatory oversight or active markets, may require less stringent internal governance mechanisms, such as highly independent boards or rigorous internal controls. Conversely, other studies (e.g., Bae et al., 2021; Ben-Nasr et al., 2021; Dak-Adzaklo and Wong, 2024) propose a complementary effect, arguing that board reforms enhance supervision effectiveness in countries with strong formal and informal institutions. Both perspectives suggest that internal and external governance are interrelated. Given our research design, we can test the validity of board reform shocks and their effect on trade credit. We remain agnostic about the substitutability or complementarity of external governance and propose the following hypothesis:

Hypothesis 2: External governance either strengthens or weakens the relationship between internal governance and accounts payable.

3. Sample, variable construction, and descriptive statistics

3.1 Sample selection

We collect data on major board reforms from 41 countries between 1998 and 2007, as compiled by Fauver et al. (2017), alongside firm-level annual accounting information from the Compustat North America and Global databases and macroeconomic variables from the World Development Indicators (WDI) database.¹¹ We exclude financial firms (SIC codes 6000–6999), utilities (SIC codes 4900–4999), governmental and quasi-governmental entities (SIC codes 9000–9999), and firms with negative total assets. Following Fauver et al. (2017), we restrict our sample to a [−5, +5]-year window around year 0, the year immediately before the reforms. Our baseline sample comprises 157,704 firm-year observations for 28,472 unique firms across 38 countries with non-missing values for all control variables.

3.2 Variable construction

3.2.1 Measuring trade credit.

Following prior studies (Petersen and Rajan, 1997; Cuñat, 2007; Ge and Qiu, 2007; Love et al., 2007; Giannetti et al., 2011), trade credit is defined as the Payables-to-Assets ratio, calculated as the ratio of accounts payable to total assets. This reflects the extent of trade credit a firm secures from its suppliers. In robustness checks, we adopt two alternative trade credit measures: 1) the Net Payables-to-Assets ratio, which adjusts for accounts receivable to provide a net view of trade credit utilization, and 2) the Net Payables-to-COGS ratio, offering insight into how net trade credit facilitates purchases (Zhang, 2019).

3.2.2 Measuring board reforms.

We follow Fauver et al. (2017) and construct our primary board reform measure, POST, a

¹¹ A number of studies also focus on the effect of major reforms rather than first reforms (e.g., Bae et al., 2021; Chen et al., 2022; Driss, 2022; Liao et al., 2022a; Li et al., 2023).

dummy variable equal to one in the years following the enactment of a board reform in a country and zero otherwise. Additionally, we construct alternative dummy measures based on the three components identified by Fauver et al. (2017): board independence, audit committee and auditor independence, and chairman-CEO separation.

3.2.3 Measuring control variables.

Following prior literature (Calomiris et al., 1995; Petersen and Rajan, 1997; Love et al., 2007; Shang, 2020), we include firm-specific control variables: the natural logarithm of total assets ($\text{Ln}(\text{SIZE})$), leverage level (Leverage), and asset tangibility (Tangibility) to capture the firm's access to external financing; return on assets (ROA) to reflect the firm's internal financing condition; sales growth (Sales growth) and the inventory-to-sales ratio (Inventory) to capture investment opportunities and inventory management inefficiency; and research and development investment (R&D) and the level of capital expenditures to property, plant, and equipment (Capital expenditures) to account for the firm's investment profile. Additionally, since the use of trade credit is affected by a firm's market position, we include market share (Market Share) as a control variable (Gofman and Wu, 2022). Furthermore, we control for country-level variables reflecting each nation's economic and financial development, specifically the natural logarithm of GDP ($\text{Ln}(\text{GDP})$) and GDP growth for economic development, and domestic credit use (Financial Development) and the ratio of stock market capitalization to GDP (Stock Market Size) for lending and stock market development. All variables are defined in Appendix A.

3.3 Descriptive statistics

Panel A of Table 1 reports the number of firm-year observations and unique firms per country in our baseline sample, along with the years of major board reforms implemented by country. The distribution of firms per country varies widely. Panel B details the major board-reform components and approaches by country. We note that 74% of sampled countries have undertaken reforms

related to board independence, 82% have implemented audit committee independence, and 26% have separated the CEO and chairman roles. Moreover, 53% of the countries in our sample adopted comply-or-explain reforms, while 47% implemented rule-based reforms. Panel C presents summary statistics for the variables used in our main analysis. All continuous variables are winsorized at the 1% and 99% levels. Our main dependent variable, trade credit (Payables/Asset), has a mean of 0.119 and a median of 0.085. POST has a mean of 0.565, indicating that 56.5% of firm-year observations occur post-reform. On average, firms exhibit a leverage ratio of 25.3%, sales growth of 25.3%, a market share of 5.4%, R&D expenses of 10.6%, capital expenditures of 5.9%, tangibility of 30.7%, and an ROA of 2.9%.

[Table 1 about here]

4. Empirical design and results

4.1 Regression specification

To test the causal impact of board reforms on trade credit (specifically, Hypothesis 1), we estimate the following baseline DiD regression model:

$$TC_{i,j,t} = \delta \times POST_{j,t} + \beta' X_{i,j,t-1} + \sum_i \gamma_i Firm\ dummy_i + \sum_t \theta_t Year\ dummy_t + \varepsilon_{i,t}, \quad (1)$$

where $TC_{i,j,t}$ is a trade credit measure for firm i in country j in year t , and $POST_{j,t}$ is a dummy variable indicating the post-reform period. In the baseline regression, the dependent variable is the Payables-to-Assets ratio. Our primary interest lies in the effect of major board reforms on firms' trade credit, denoted by δ . We include a set of control variables, $X_{i,j,t-1}$, to account for firm-specific and country-specific factors from the preceding year. We also include firm and year fixed effects to identify within-firm and within-year changes in trade credit between treatment and control firms following reforms. Standard errors are clustered at the firm level to correct for

heteroscedasticity and within-firm residual correlation.¹²

4.2 International board reform impacts on trade credit: Baseline results

We establish baseline results by estimating the DiD regression model in a two-way fixed effects (TWFE) form without covariates, serving as a benchmark. This approach alleviates concerns about potential violations of treatment effect homogeneity and the parallel trends assumption for time-varying covariates between treatment and control groups, as noted by Sant’Anna and Zhao (2020) and Baker et al. (2022). Specifically, Column (1) assesses the impact of board reforms on accounts payable, controlling for firm and year fixed effects. Column (2) refines the model by including firm-level control variables. Column (3) presents the baseline estimation results of Eq. (1), incorporating both firm-level and country-level control variables to account for macroeconomic heterogeneity across countries.

We find that the coefficient on POST is significantly negative at the 1% level across all three columns, supporting Hypothesis 1. Economically, the coefficients on POST in Table 2 suggest that major board reforms are associated with reductions in accounts payable relative to control firms, ranging on average from 3.4% (calculated as $-0.004/0.119$) to 5.9% (calculated as $-0.007/0.119$), relative to the sample mean of accounts payable. This finding indicates a significant reduction in firms’ reliance on accounts payable post-reform, consistent with our proposed model and Hypothesis 1.

[Table 2 about here]

4.3 Robustness of baseline results

¹² Following prior studies (Chen et al., 2020; Hu et al., 2020; Dak-Adzaklo and Wong, 2024), we cluster standard errors at the firm level also because clustering at the country level could lead to biased standard errors if some countries have fewer observations (Petersen, 2009; Abadie et al., 2023). Nonetheless, we find qualitatively similar results when clustering standard errors at higher levels. Our results are also robust to clustering standard errors by firm and year to account for potential cross-sectional and serial correlations.

In this subsection, we thoroughly examine the robustness of our findings regarding the impact of board governance reforms on firms' reliance on accounts payable.

4.3.1 Placebo test

We implement a placebo test to ensure that our baseline results are not driven by omitted time-varying covariates or confounding events, similar to Bae et al. (2021). This test randomly assigns board reform years to our sample countries and estimates the baseline regression model. The process is repeated 1,000 times. The results, depicted in Figure 1, reveal that: 1) the distribution of coefficient estimates for POST is centered around zero, suggesting that randomly generated POST values bear no significant relation to accounts payable; and 2) our baseline estimate (indicated by the red line) falls outside this distribution. These findings confirm that our baseline results are not spuriously induced.

[Figure 1 about here]

4.3.2 Dynamic DiD model

We use a dynamic DiD model to further validate the pre-reform parallel trends assumption and address potential concerns about concurrent unobservable events affecting our baseline results. Similar to Bae et al. (2021), we define dummy variables indicating whether a given year is the year of adoption (Year 1), the second year (Year 2), or the third and subsequent years (Years 3+) after the reforms, as well as the three years before the reforms (Years -2 to 0). The first three pre-reform years (Years -5 to -3) are omitted as the reference period. Results are reported in Column (1) of Panel A, Table 3.

[Table 3 about here]

The coefficient on “Years -2 to 0” is insignificant, indicating no statistically significant difference in the average level of accounts payable between treatment and control firms over the

three years immediately before the reform relative to the reference period. This supports the parallel trends assumption. In contrast, the coefficients for the post-reform periods (Year 1, Year 2, and Years 3+) are negative and statistically significant, showing that firms reduce their reliance on accounts payable following board reforms that mitigate agency problems.¹³ The magnitude of the estimated coefficients in the post-reform years also suggests that board reforms have a delayed effect, with a more substantial impact emerging from the first year and continuing into subsequent years.

4.3.3 *Stacked regression*

Staggered DiD models may yield biased estimates if early-treated firms are used as controls for later-treated firms. To avoid this heterogeneous treatment problem, we employ an event-based stacked regression approach that includes firms yet to be treated during the event window as the control group. This approach is in line with Fauver et al. (2017), Cengiz et al. (2019), and Barrios (2024).¹⁴ Like Liao et al. (2022b) and Fauver et al. (2024), we stack all the specific datasets for each treatment cohort and perform regression analysis, incorporating fixed effects controls for the firm-treatment cohort interaction and the year-treatment cohort interaction. The coefficient presented in Column (2) of Panel A produces inferences that align with those from our baseline tests.

4.3.4 *Alternative fixed effects*

¹³ As a further robustness test, we implement the Callaway and Sant’Anna (2021) estimator, which addresses potential biases in staggered Difference-in-Differences designs by using only never-treated or not-yet-treated units as clean controls. This method also provides another formal test of the parallel trends assumption. When aggregating the pre-treatment Average Treatment Effects on the Treated (ATT) across all pre-reform periods, the overall effect is -0.0001 and statistically insignificant (95% confidence interval: $[-0.0012, 0.0010]$), confirming that treated and control firms followed parallel trajectories prior to the reforms. In contrast, the aggregated post-treatment ATT is -0.0087 and statistically significant (95% confidence interval: $[-0.0138, -0.0036]$), which is highly consistent with our baseline results. For a detailed discussion and cohort-specific estimates, see Online Appendix OA.B.

¹⁴ Never-treated countries are not included in the control group because board reforms are pervasive, and it is difficult to find countries that have never had any type of board reforms that would be comparable to those that have (Fauver et al., 2017, 2024).

Column (3) of Panel A shows robust results when we further control for industry-year fixed effects to absorb the impact of unobserved industry-specific time-varying characteristics.

4.3.5 Country and year clustering

Column (4) shows consistent results when we adopt a more conservative specification by clustering standard errors by country and year. This approach accounts for potential correlations within these grouping units, which may arise from unobserved heterogeneity or time-specific shocks shared across multiple years within countries.

4.3.6 Alternative samples

We test the robustness of our baseline results using alternative samples, reported in Table 3, Panel B. In Column (1), we apply the entropy balancing method introduced by Hainmueller (2012) to ensure comparability between treatment and control groups based on covariates.¹⁵ In Column (2), we re-estimate the baseline model using a balanced sample, requiring firms to have data available for pre- and post-reform periods. In Column (3), we use a full sample without the 11-year event window limitation. In Column (4), we exclude U.S. firms, which constitute approximately one-third of our sample. In Column (5), we construct the POST variable using initial board reforms. In Column (6), we limit estimation to WorldScope firms meeting our data criteria.¹⁶ Across all six models, the POST coefficient remains negative and statistically significant at the 1% level.

4.3.7 Alternative measures of trade credit

Following the trade credit literature (e.g., Restrepo et al., 2019; Gofman and Wu, 2022), we adopt two alternative measures of accounts payable: Net Payables/Assets and Net Payables/Cost

¹⁵ The benefits of the entropy balancing method include enhanced causal inference by isolating the treatment or intervention effect from confounding factors, as well as retention of the full sample by reweighting observations to create an entropy-balanced sample.

¹⁶ Similar to Compustat Global and North America, WorldScope also offers worldwide coverage of a variety of financial metrics, but it provides more comprehensive data on companies in Europe, Asia, and emerging markets.

of Goods Sold.¹⁷ These measures reflect the net use of accounts payable by excluding credit demand from downstream firms, as firms may raise funds to extend credit to their financially constrained customers (Adelino et al., 2022). Results in Columns (1) and (2) of Panel C show that firms reduce their reliance on net accounts payable relative to accounts receivable post-reform, supporting our baseline findings.

We also calculate unexpected accounts payable (UAP) to capture abnormal accounts payable due to managerial signaling or manipulation. Specifically, UAP is defined as the difference between actual and expected accounts payable, scaled by lagged total assets (Mulford and Comiskey, 2002, p. 187; Marquardt and Wiedman, 2004; Arcas and Martí 2016). The expected value is calculated by multiplying lagged accounts payable by sales growth. Results in Column (3) indicate that firms reduce their discretionary accounts payable post-reform, supporting our hypothesis that weak governance leads to excessive accounts payable.

Overall, our results indicate that board reforms reduce reliance on supplier financing, enhancing supply chain stability.¹⁸

4.3.8 Board reform components

We examine the distinct roles of board reform components in accounts payable management. Following Fauver et al. (2017), we assess three critical components: 1) board independence, 2) audit committee and auditor independence, and 3) chairman-CEO separation. Reforms enhancing

¹⁷ As an additional robustness check (untabulated), we re-estimate the baseline model using Accounts Payable scaled by Total Liabilities (AP/LT) (Carbó-Valverde et al., 2016; Abdulla et al., 2017). This ratio captures a firm's reliance on supplier credit relative to its overall debt obligations and highlights its role as a substitute for formal debt, such as bank loans or bonds. Consistent with our baseline findings, we find a negative and statistically significant (at the 1% level) effect of board reforms on this alternative measure.

¹⁸ We also find that, following board reforms, firms significantly increase the trade credit they extend to downstream customers (measured by both the accounts-receivable-to-sales ratio and unexpected accounts receivable, UAR); see Online Appendix OA.C for tabulated results). These findings suggest that enhanced corporate governance improves a firm's credibility and credit-assessment capabilities, which in turn enhances the efficiency of inter-firm financing networks and supply-chain stability. This increase in accounts receivable aligns with prior research associating aggressive trade credit provision with higher future sales growth and operating profitability (e.g., Goto et al., 2015; Box et al., 2018). We thank an anonymous referee for this suggestion.

board independence and chairman-CEO separation strengthen oversight, reducing managers' self-serving activities and mitigating agency conflicts between management and stakeholders. Reforms related to audit committees and auditor independence improve financial reporting quality (Chen et al., 2022) and facilitate communication between the committee and internal/external auditors (Beasley et al., 2009), helping to identify and prevent opportunistic managerial behaviors. Together, these three aspects of reforms strengthen internal governance.

We re-estimate the baseline DiD model for each reform component by replacing POST with POST_INDEP, POST_AUDIT, and POST_CEOCHAIR, respectively. Each variable is a dummy equal to one for the five years following the respective reform's enactment (Fauver et al., 2017). Panel D of Table 3 presents the results. The estimated coefficients are negative and significant for all three reforms, suggesting that each reform aimed at strengthening internal governance decreases accounts payable. The result for audit reforms supports the notion that independent external auditors mitigate managers' signaling incentives.

4.3.9 Substitution of trade credit and traditional debt

Our model suggests that a reduction in agency problems and managerial misalignment leads to a substitution effect between financing options, where traditional financing replaces cost-inefficient trade credit. To test this implication, we create a binary variable that takes the value of one if a firm increases its debt level after board reforms are enacted and zero otherwise. We interact this binary variable with the POST variable in our DiD setting. A larger negative coefficient on the interaction variable compared to the POST variable would be evidence of a substitution effect. The results are presented in Table 4.

[Table 4 about here]

The coefficient for POST is -0.002 and is statistically significant at the 5% level. This

suggests that, for firms without a total debt increase after board reform, major board reforms are associated with a reduction in their Payables/Assets ratio. The coefficient for the interaction term ($POST \times \text{Total debt increase}$) is -0.003 and is also statistically significant at the 5% level. This indicates that the negative effect of board reforms on accounts payable is even stronger for firms that have experienced an increase in their total debt. The sum of the coefficients ($POST + POST \times \text{Total debt increase}$) is -0.005 ($p\text{-value} < 0.01$) indicates that the decrease in payables for firms with a debt increase is 2.5 times the decrease for firms without a debt increase in the post-reform period.

Table 4 suggests that firms with an increase in their total debt rely less on supplier financing compared to other firms post-reform. This implies that strong corporate governance mechanisms can reduce agency costs, making firms less dependent on trade credit and allowing them access to traditional financing.

4.4 The role of firm-level internal governance

Less independent boards struggle to monitor CEOs' financing and cash management decisions (Chen et al., 2015; Guo and Masulis, 2015), facilitating self-serving activities. Therefore, firms with poor board independence prior to reform are more likely to overuse accounts payable and are most affected by these reforms.

To capture board independence, we introduce two variables: 1) LOW_INDEP , a dummy variable that equals one if a firm's proportion of independent directors on the board is below the country median in the year prior to the reform, and zero otherwise; and 2) $LOW_INDEP50$, a dummy variable that equals one if the proportion is less than 50% in the year prior to the reform, and zero otherwise. We interact these two variables with $POST$, respectively, to examine reform effects. If board reforms effectively enhance internal governance and reduce accounts payable overuse, we expect significantly negative coefficients for these interactions. Results in Columns (1) and (2) of Panel A of Table 5 confirm this prediction.

[Table 5 about here]

Next, we test whether major board reforms that involve board independence (POST_INDEP) have a stronger negative effect on accounts payable for firms with weaker pre-reform board independence. Columns (3) and (4) of Panel A show negative and significant coefficients on the interaction terms, supporting the view that managers in firms with low board independence over-rely on supplier financing, and board reforms mitigate this issue by enhancing internal governance.

The *F*-statistic tests suggest that the sum of coefficients for each column is significantly less than zero at the 10% level, indicating that firms with low board independence experience a greater reduction in payables compared to other firms in the post-reform period. Firms with weak internal governance often face high agency costs. We test whether the negative effect of board reforms on accounts payable is more pronounced for firms with higher agency costs (i.e., weaker internal governance) pre-reform. Agency costs are proxied by the expense ratio (Ang et al., 2000; Chen et al., 2022), calculated as operating expenses (the sum of cost of goods sold (COGS) and selling, general, and administrative expenses (XSGA)) divided by total assets (AT).

We construct a dummy variable (HIGH_AC) that equals one if a firm's expense ratio exceeds the country median in the year prior to the enactment of major board reforms, and zero otherwise. We interact HIGH_AC with POST and each reform component (POST_INDEP, POST_AUDIT, and POST_CEOCHAIR). Results in Panel B of Table 5 show significantly negative coefficients for all interaction terms, with the sum of coefficients significantly less than zero at the 1% level. This suggests that firms with high agency costs experience a greater reduction in payables compared to other firms in the post-reform period. Overall, these findings support our argument that improvements in internal governance through board reforms reduce agency problems and help mitigate accounts payable overuse driven by managerial opportunism and signaling incentives.

4.5 The role of country-level external financial environment

We gauge the external financing environment using country-level financial development (FD) and stock market development (STOCK), following the literature (e.g., Fisman and Love, 2003; Lei et al., 2018). We construct two dummy variables: HIGH_FD and HIGH_STOCK. HIGH_FD equals one if a country's ratio of domestic credit to the private sector, as a percentage of GDP, exceeds the median for the sample countries in the year before significant board reforms, and zero otherwise. HIGH_STOCK equals one if the country's stock trading volume, as a percentage of GDP, is higher than the median for the sample countries in the year before significant board reforms, and zero otherwise.

We regress accounts payable on the interaction between POST and each measure of the external financing environment. Results in Table 6 further support Hypothesis 1. The negative and statistically significant coefficients on the interaction terms in Columns (1) and (2), along with the statistically significant *F*-statistic tests for the sum of coefficients, suggest that a more favorable external financing environment amplifies the negative effect of board reforms on firms' reliance on supplier financing.

[Table 6 about here]

4.6 The role of financial fragility

We examine the impact of board reforms on a firm's reliance on accounts payable, conditional on the firm's financial fragility, by splitting our sample based on four proxies for financial fragility: 1) external financing needs, defined as the firm-level financing gap (EFN), which is the difference between net cash flow from investing and operating activities, deflated by the book value of total assets (AT); 2) financial constraints, measured by the WW index (Whited and Wu, 2006); 3) demand uncertainty (DEMUNC), calculated as the standard deviation of annual

changes in log-sales over the previous five years, similar to Irvine et al. (2016); and 4) market competition, measured by the sales-based Herfindahl-Hirschman Index (HHI). As shown in Table 7, Columns (1) and (3) of Panels A and B, financially fragile firms rely less on supplier financing after the reforms, consistent with Hypothesis 1. This suggests that they can better tap into external financial markets for alternative financing options. No significant effect is found for less financially fragile firms. The p -values for differences between our split subsamples are significant, ranging from the 1% to the 5% level.

[Table 7 about here]

4.7 Effect of board reforms on investment

We further examine whether board reforms that mitigate agency problems and credit rationing promote firm investment and whether the effect is more pronounced for financially fragile firms.

Using a TWFE DiD framework, we regress firm investment—proxied by capital investment (Capex), non-capital investment (Non-Capex), and total investment (Total Investment)—on POST (e.g., Biddle et al., 2009; García Lara et al., 2016; Chen et al., 2017; Lei et al., 2021; Baik et al., 2024). Capex is capital expenditure (CAPX) minus cash receipts from the sale of property, plant, and equipment (SPPIV), scaled by lagged total assets (AT). Non-Capex is the sum of R&D expenses (XRD), acquisitions (AQC), and advertising expenses (XAD), scaled by lagged total assets (AT). Total Investment is the sum of Capex and Non-Capex.

The positive and significant coefficients on POST in Panel A of Table 8 indicate increased investment post-reform. Panels B and C divide the sample according to the four proxies for financial fragility: external financing needs, financial constraints, demand uncertainty, and market competition. We observe that financially fragile firms increase their investment more than less

financially fragile counterparts after the reforms. These findings suggest board reforms reduce firms' reliance on supplier financing by improving their corporate governance and access to external credit.

[Table 8 about here]

4.8 Effect of board reforms on firm performance

We next explore the impact of board reforms on operating performance and assess whether this effect varies with firms' agency costs and financial fragility. Based on our model and total borrowing cost illustrated in Figure OA.A, the total borrowing cost is expected to decline as firms rely less on high-marginal-cost supplier financing to meet their production needs. Consequently, we predict an improvement in operating performance following the reform.

Column (1) of Panel A in Table 9 shows that post-board reform, firms exhibit a notable improvement in performance as measured by Return on Assets (ROA), in line with Driss (2022). These findings highlight a performance channel through which board reforms boost operational efficiency and firm performance, thereby reducing firms' reliance on supplier financing. This relationship is evidenced by the negative and significant coefficient on ROA in our baseline results in Table 2.

If board reforms improve board independence and audit quality, which in turn reduce agency problems such as accounts payable manipulation and earnings management, we anticipate a more pronounced increase in operating performance among firms with high pre-reform agency costs. The results in Column (2) of Panel A confirm this prediction.

Consistent with our previous findings that financially fragile firms invest more and reduce accounts payable following board reforms, the positive and significant interaction terms between the POST variable and the proxies for financial fragility suggest that board reform significantly

enhances performance in firms characterized by higher financial fragility before the reform.

[Table 9 about here]

4.9 The role of country-level external governance

We now explore how external governance mechanisms affect the negative association between the quality of a firm's internal governance and its accounts payable. External governance—regulatory, market, and societal forces that can influence corporate behavior—may complement or substitute internal governance (e.g., Weir et al., 2002; Qiu and To, 2025).

To investigate the role of external governance mechanisms, we estimate models that interact the POST variable with five dummy variables representing high-quality formal and informal institutions. As detailed in our variable definitions (see Appendix A), we employ four proxies for formal institutional quality: the World Bank's Worldwide Governance Indicators (WGI), the Contract Enforcement Index (CONT_ENF), Creditor Rights (CR), and Minority Investor Protection (MIP). Specifically, WGI is the annual average of the six governance indicators: 1) voice and accountability, 2) political stability and absence of violence/terrorism, 3) government effectiveness, 4) regulatory quality, 5) rule of law, and 6) control of corruption. CONT_ENF measures the time and cost required to resolve a commercial dispute through a local first-instance court, along with the quality of judicial processes index. CR aggregates the strength of legal rights and the depth of credit information. MIP captures safeguards against directors' self-dealing as well as broader shareholder-governance protections. Finally, we proxy informal institutions using the World Values Survey's social trust score (TRUST).¹⁹ Following Bae et al. (2021), we construct the

¹⁹ In unreported robustness checks, we obtain consistent results using the Rule of Law index, one of the six dimensions of the World Bank's Worldwide Governance Indicators (WGI). This index reflects perceptions of contract enforcement, property rights, the police and courts, as well as the likelihood of crime and violence—factors that are crucial for predictable, rule-abiding behavior and investor confidence. We also obtain similar results using the creditor rights index from Djankov et al. (2007) and Bae and Goyal (2009), as well as the corrected anti-director rights index (Spamann, 2010; Driss et al., 2023).

high-institution indicators using country median values from the year prior to the enactment of the major board reform.

The results of these estimations are presented in Table 10. Across all five columns, the coefficients on the interaction terms ($POST \times HIGH_WGI$, $POST \times HIGH_CONT_ENF$, $POST \times HIGH_CR$, $POST \times HIGH_MIP$, and $POST \times HIGH_TRUST$) are negative and statistically significant. Furthermore, the F -statistics for the sum of the coefficients are significant at the 1% level in every specification, indicating that the reduction in trade-credit reliance is significantly more pronounced in countries with superior institutional quality.

[Table 10 about here]

Consistent with Hypothesis 2, these findings provide strong evidence of a complementary relationship between internal and external governance. They suggest that board reforms are most effective at curbing overreliance on supplier financing in environments where strong legal frameworks, robust creditor and shareholder protections, and high social trust facilitate the enforcement of governance standards. This supports the narrative that the marginal benefit of internal board oversight is amplified by a supportive external institutional context (e.g., Bae et al., 2021; Ben-Nasr et al., 2021; Dak-Adzaklo and Wong, 2024).

4.10 The inventory channel

In addition to the external financing channel, we empirically investigate an alternative inventory channel through which board reforms affect payables. Our baseline results in Table 2 show a positive and significant relationship between inventory holdings and payables. A high inventory-to-asset ratio indicates that a significant portion of a firm's assets is held in inventory, which may suggest inefficiencies in inventory management, potentially reducing liquidity and increasing reliance on short-term financing, such as accounts payable (Aktas et al., 2015). Stronger

governance, such as enhanced board oversight or management accountability, may foster better operational decisions by encouraging lean inventory practices to reduce holding costs (e.g., storage, obsolescence, and insurance), free up working capital, and promote efficient resource use. Consequently, we expect a significant reduction in inventory holdings for treated firms relative to control firms post-reform. The results in Table 11 confirm this prediction. Specifically, we find a negative and significant effect of board reforms on inventory, measured as total inventory, raw materials inventory, work-in-progress inventory, and finished goods inventory, each divided by the book value of total assets.

[Table 11 about here]

4.11 The effect of board reforms on operational efficiency and financial outcomes

To provide a more comprehensive understanding of how reduced trade-credit usage affects overall firm cash flows and value, we examine three key financial outcomes: operating cash flow, firm value (Tobin's Q), and abnormal returns. This analysis connects governance-driven improvements in financing structures directly to firm value creation.²⁰ Operating cash flow is scaled by total assets to measure operational efficiency (following Ball and Nikolaev, 2022; Rajgopal and Venkatachalam, 2011), while Tobin's Q (following Fauver et al., 2017) and abnormal returns (annualized buy-and-hold returns after fiscal year-end minus the corresponding annualized market return, computed from monthly returns) capture market-based perceptions of firm value and performance.

The results of these tests are presented in Table 12. We find that the coefficient on POST is positive and statistically significant across all three specifications. Specifically, board reforms are associated with increases in operating cash flow, Tobin's Q, and abnormal returns that are

²⁰ We thank an anonymous referee for this insightful suggestion.

statistically significant at the 5% level or better.²¹ These findings indicate that the disciplining effect of board reforms extends beyond trade-credit management to enhance overall firm profitability and market valuation.

[Table 12 about here]

These empirical results align with the theoretical implications of our economic model, which suggests that stronger governance reduces total borrowing costs and managerial diversion, thereby improving the firm's bottom line. By shifting away from cost-inefficient supplier financing toward more traditional external debt, reformed firms adopt a more cost-efficient financing structure that boosts operational performance.

Furthermore, we investigate whether the impact of board reforms on trade-credit reliance is more pronounced among firms with lower pre-reform operational efficiency. We partition the sample into High and Low subsamples based on the country-specific median of working-capital turnover (WCT), defined as sales divided by average net working capital. As reported in Online Appendix Table OA.D, we find a negative and statistically significant reduction in accounts payable following board reforms specifically in the Low pre-reform WCT subsample. In contrast, the effect is statistically insignificant for firms in the High WCT subsample, which already operate with lean working capital and minimal idle resources. These cross-sectional results suggest that board reforms are particularly effective at addressing pre-existing governance slack, thereby improving working-capital management and disciplining firms that previously exhibited excessive reliance on supplier financing. Collectively, the evidence in Tables 12 and OA.D supports the conclusion that board reforms mitigate agency problems and information asymmetry, leading to

²¹ Economically, for instance, the coefficient on POST of 0.323 in Column (2) suggests that treated firms experience an approximately 14.9% increase in Tobin's Q compared to control firms following major board reforms (calculated as $0.323/2.163$, relative to the sample mean of Tobin's Q).

tangible gains in firm value and operational efficiency.

5. Conclusion

Prior research highlights firms' extensive reliance on trade credit despite its often-high implicit costs. While credit rationing is a common explanation, this paper argues that a key driver is weak internal corporate governance. Our findings show that governance failures, which exacerbate managerial agency problems, lead firms to adopt questionable practices by over-relying on suppliers for financing. This practice effectively transforms trade credit's purpose from an "operating" tool for managing transactions to a "financial" substitute for traditional capital, thereby shifting the firm's financing burdens onto its supply chain partners.

We develop a model showing that better governance reduces managerial opportunism and eases access to external financing, thus decreasing the need for costly supplier credit. Using board reforms in 38 countries as a quasi-natural experiment, our staggered difference-in-differences analysis provides strong causal evidence that strengthening board functions significantly reduces firms' dependence on supplier financing. This reduction is most pronounced for firms with the weakest pre-reform governance and highest agency costs, confirming that the reforms effectively curb the questionable practice of using trade credit as a financial tool.

Our findings, which are robust across numerous tests, further suggest that these governance-driven improvements have tangible benefits. With reduced agency costs and better access to traditional financing, reformed firms increase both investment and profitability. Furthermore, our research underscores the crucial complementarity between a firm's internal controls and its external environment. Specifically, we document that board reforms are most effective at curbing the overuse of trade credit in countries with strong legal frameworks and high social trust.

References

- Abadie, A., Athey, S., Imbens, G.W., Wooldridge, J.M., 2023. When should you adjust standard errors for clustering? *Quarterly Journal of Economics* 138, 1–35.
- Abbott, L.J., Parker, S., Peters, G.F., Rama, D.V., 2007. Corporate governance, audit quality, and the Sarbanes-Oxley act: evidence from internal audit outsourcing. *Accounting Review* 82, 803–835.
- Abdulla, Y., Dang, V.A., Khurshed, A., 2017. Stock market listing and the use of trade credit: evidence from public and private firms. *Journal of Corporate Finance* 46, 391–410.
- Adam, A.M., Schwartz, M.S., 2009. Corporate governance, ethics, and the backdating of stock options. *Journal of Business Ethics* 85(1), 225–237.
- Adelino, M., Ferreira, M.A., Giannetti, M., Pires, P., 2022. Trade credit and the transmission of unconventional monetary policy. *Review of Financial Studies* 36, 775–813.
- Aguilera, R.V., Marano, V., Haxhi, I., 2019. International corporate governance: a review and opportunities for future research. *Journal of International Business Studies* 50, 457–498.
- Ahmad, M.F., Aktas, N., Cumming, D. , Xu, G., 2024. Board reforms and M&A performance: international evidence. *Journal of International Business Studies* 55(5), 616–637.
- Ahmad, M.F., Aziz, S., Dowling, M., Kowalewski, O., 2023. Board reforms and innovation. *International Review of Financial Analysis* 88, 102707.
- Aktas, N., Andreou, P.C., Karasamani, I., Philip, D., 2019. CEO duality, agency costs, and internal capital allocation efficiency. *British Journal of Management* 30, 473–493.
- Aktas, N., Bodt, E.d., Lobez, F., Statnik, J.-C., 2012. The information content of trade credit. *Journal of Banking and Finance* 36, 1402–1413.
- Aktas, N., Croci, E., Petmezas, D., 2015. Is working capital management value-enhancing? Evidence from firm performance and investments. *Journal of Corporate Finance* 30, 98–113.

- Allen, F., Qian, M., 2025. Alternative finance in the international business context: a review and future research. *Journal of International Business Studies* 56, 43–61.
- Almeida, H., Campello, M., 2007. Financial constraints, asset tangibility, and corporate investment. *Review of Financial Studies* 20, 1429–1460.
- Amore, M.D., Bennedsen, M. 2016. Corporate governance and green innovation. *Journal of Environmental Economics and Management* 75, 54–72.
- Ang, J.S., Cole, R.A., Lin, J.W., 2000. Agency costs and ownership structure. *Journal of Finance* 55, 81–106.
- Arca, P., Atzeni, G., Deidda, L., 2023. The signaling role of trade credit: evidence from a counterfactual analysis. *Journal of Corporate Finance* 80, 102414.
- Arcas, M.J., Martí C., 2016. Financial performance adjustment in English local governments. *Australian Accounting Review* 26, 141–152.
- Atanasova, C., 2007. Access to institutional finance and the use of trade credit. *Financial Management* 36, 49–67.
- Atanasova, C.V., Wilson, N., 2003. Bank borrowing constraints and the demand for trade credit: evidence from panel data. *Managerial and Decision Economics* 24, 503–514.
- Bae, K.-H., El Ghouli, S., Guedhami, O., Zheng, X., 2021. Board reforms and dividend policy: international evidence. *Journal of Financial and Quantitative Analysis* 56, 1296–1320.
- Bae, K.-H., Goyal, V.K., 2009. Creditor rights, enforcement, and bank loans. *Journal of Finance* 64, 823–860.
- Baik, D., Chen, C.X., Godsell, D. 2024. Board gender diversity and investment efficiency: global evidence from 83 country-level interventions. *Accounting Review* 99(3), 1–36.
- Baker, A.C., Larcker, D.F., Wang, C.C.Y., 2022. How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics* 144, 370–395.

- Ball, R., Nikolaev, V.V., 2022. On earnings and cash flows as predictors of future cash flows. *Journal of Accounting and Economics* 73, 101430.
- Barrios, J.M., 2024. Staggeringly problematic: a primer on staggered DiD for accounting researchers. Working Paper. Available at SSRN 3794859.
- Beasley, M.S., 1996. An empirical analysis of the relation between the board of director composition and financial statement fraud. *Accounting Review* 71, 443–465.
- Beasley, M.S., Carcello, J.V., Hermanson, D.R., Lapides, P.D., 2000. Fraudulent financial reporting: consideration of industry traits and corporate governance mechanisms. *Accounting Horizons* 14, 441–454.
- Beasley, M.S., Carcello, J.V., Hermanson, D.R., Neal, T.L., 2009. The audit committee oversight process. *Contemporary Accounting Research* 26, 65–122.
- Beck, T., Demirgüç-Kunt, A., Laeven, L., Maksimovic, V., 2006. The determinants of financing obstacles. *Journal of International Money and Finance* 25(6), 932–952.
- Ben-Nasr, H., Boubaker, S., Sassi, S., 2021. Board reforms and debt choice. *Journal of Corporate Finance* 69, 102009.
- Bennedsen, M., Kongsted, H.C., Nielsen, K.M., 2008. The causal effect of board size in the performance of small and medium-sized firms. *Journal of Banking and Finance* 32(6), 1098–1109.
- Bernanke, B., Gertler, M., 1990. Financial fragility and economic performance. *Quarterly Journal of Economics* 105, 87–114.
- Bettinelli, C., Sangermano, A., Bergamaschi, M., Bennedsen, M., 2025. Family firms' boards: a systematic review and research agenda. *Corporate Governance: An International Review* 33(5), 926–945.

- Bhagat, S., Bolton, B., 2019. Corporate governance and firm performance: the sequel. *Journal of Corporate Finance* 58, 142–168.
- Biais, B., Gollier, C., 1997. Trade credit and credit rationing. *Review of Financial Studies* 10, 903–937.
- Biddle, G.C., Hilary, G., Verdi, R.S., 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48, 112–131.
- Box, T., Davis, R., Hill, M., Lawrey, C., 2018. Operating performance and aggressive trade credit policies. *Journal of Banking and Finance* 89, 192–208.
- Bryan, D.B., Mason, T.W., 2020. Independent director reputation incentives, accruals quality and audit fees. *Journal of Business Finance and Accounting* 47, 982–1011.
- Callaway, B., Sant’Anna, P.H., 2021. Difference-in-differences with multiple time periods. *Journal of Econometrics* 225, 200–230.
- Calomiris, C.W., Himmelberg, C.P., Wachtel, P., 1995. Commercial paper, corporate finance, and the business cycle: a microeconomic perspective. *Carnegie-Rochester Conference Series on Public Policy* 42, 203–250.
- Carbó-Valverde, S., Rodríguez-Fernández, F., Udell, G.F., 2016. Trade credit, the financial crisis, and SME access to finance. *Journal of Money, Credit and Banking* 48, 113–143.
- Carcello, J.V., 2009. Governance and the common good. *Journal of Business Ethics* 89(1), 11–18.
- Cengiz, D., Dube, A., Lindner, A., Zipperer, B., 2019. The effect of minimum wages on low-wage jobs. *Quarterly Journal of Economics* 134, 1405–1454.
- Chen, R., El Ghouli, S., Guedhami, O., Kwok, C.C., Nash, R., 2021. International evidence on state ownership and trade credit: opportunities and motivations. *Journal of International Business Studies* 52(6), 1121–1158.

- Chen, R., Guedhami, O., Yang, Y., Zaynutdinova, G.R., 2020. Corporate governance and cash holdings: evidence from worldwide board reforms. *Journal of Corporate Finance* 65, 101771.
- Chen, T., Xie, L., Zhang, Y., 2017. How does analysts' forecast quality relate to corporate investment efficiency? *Journal of Corporate Finance* 43, 217–240.
- Chen, X., Cheng, Q., Wang, X., 2015. Does increased board independence reduce earnings management? Evidence from recent regulatory reforms. *Review of Accounting Studies* 20, 899–933.
- Chen, Y., Goyal, A., Zolotoy, L., 2022. Global board reforms and the pricing of IPOs. *Journal of Financial and Quantitative Analysis* 57, 2412–2443.
- Cheng, Q., Lee, J., Shevlin, T., 2016. Internal governance and real earnings management. *Accounting Review* 91, 1051–1085.
- Chod, J., Lyandres, E., Yang, S.A., 2019. Trade credit and supplier competition. *Journal of Financial Economics* 131, 484–505.
- Choi, W.G., Kim, Y., 2005. Trade credit and the effect of macro-financial shocks: evidence from U.S. panel data. *Journal of Financial and Quantitative Analysis* 40(4), 897–925.
- Core, J.E., Holthausen, R.W., Larcker, D.F., 1999. Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics* 51, 371–406.
- Cowton, C.J., San-Jose, L., 2017. On the ethics of trade credit: understanding good payment practice in the supply chain. *Journal of Business Ethics* 140, 673–685.
- Cumming, D., Filatotchev, I., Knill, A., Reeb, D.M., Senbet, L., 2017. Law, finance, and the international mobility of corporate governance. *Journal of International Business Studies* 48, 123–147.
- Cuñat, V., 2007. Trade credit: suppliers as debt collectors and insurance providers. *Review of Financial Studies* 20, 491–527.

- Dak-Adzaklo, C.S.P., Wong, R.M.K., 2024. Corporate governance reforms, societal trust, and corporate financial policies. *Journal of Corporate Finance* 84, 102507.
- Del Gaudio, B.L., Sampagnaro, G., Porzio, C., Verdoliva, V., 2022. The signaling role of trade credit in bank lending decisions: evidence from small and medium-sized enterprises. *Journal of Business Finance and Accounting* 49, 327–354.
- Denis, D.K., McConnell, J.J., 2003. International corporate governance. *Journal of Financial and Quantitative Analysis* 38, 1–36.
- Dey, A., 2008. Corporate governance and agency conflicts. *Journal of Accounting Research* 46, 1143–1181.
- Djankov, S., McLeish, C., Shleifer, A., 2007. Private credit in 129 countries. *Journal of Financial Economics* 84, 299–329.
- Dittmar, A., Mahrt-Smith, J., Servaes, H., 2003. International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis* 38, 111–133.
- Drakos, K., Giannakopoulos, N., 2011. On the determinants of credit rationing: firm-level evidence from transition countries. *Journal of International Money and Finance* 30, 1773–1790.
- Driss, H., 2022. Board governance and investment sensitivity to stock price: international evidence. *Journal of Financial and Quantitative Analysis* 58, 3027–3057.
- Driss, H., Ghoul, S.E., Guedhami, O., Wald, J.K., 2023. Governance and leverage: international evidence. *Financial Review* 58, 261–285.
- Duchin, R., Ozbas, O., Sensoy, B.A., 2010. Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics* 97, 418–435.
- Dunn, P., 2004. The impact of insider power on fraudulent financial reporting. *Journal of Management* 30, 397–412.

- Fama, E.F., 1980. Agency problems and the theory of the firm. *Journal of Political Economy* 88, 288–307.
- Fauver, L., Hung, M., Li, X., Taboada, A.G., 2017. Board reforms and firm value: worldwide evidence. *Journal of Financial Economics* 125, 120–142.
- Fauver, L., Hung, M., Taboada, A.G., Wang, E.J., 2024. Boardroom gender diversity reforms and institutional monitoring: global evidence. *Review of Accounting Studies* 29, 621–664.
- Fazzari, S.M., Hubbard, R.G., Petersen, B.C., 1988. Financing constraints and corporate investment. *Brookings Papers on Economic Activity* 1, 141–195.
- Fisman, R., Love, I., 2003. Trade credit, financial intermediary development, and industry growth. *Journal of Finance* 58, 353–374.
- Francis, J.R., 2011. A framework for understanding and researching audit quality. *Auditing: A Journal of Practice and Theory* 30, 125–152.
- Freeman, K., He, J.J., Xia, H., Yang, L., 2025. (Don't) feed the mouth that bites: trade credit spillover through common suppliers. Working Paper. Available at SSRN 4822786.
- Gao, H., Harford, J., Li, K., 2013. Determinants of corporate cash policy: insights from private firms. *Journal of Financial Economics* 109, 623–639.
- García Lara, J.M., García Osma, B., Penalva, F., 2016. Accounting conservatism and firm investment efficiency. *Journal of Accounting and Economics* 61, 221–238.
- Ge, Y., and Qiu, J., 2007. Financial development, bank discrimination and trade credit. *Journal of Banking and Finance* 31, 513–530.
- Gentry, J.A., Vaidyanathan, R., Lee, H.W., 1990. A weighted cash conversion cycle. *Financial Management* 19, 90–99.

- Ghoul, S.E., Guedhami, O., Kim, Y., 2017. Country-level institutions, firm value, and the role of corporate social responsibility initiatives. *Journal of International Business Studies* 48, 360–385.
- Giannetti, M., Burkart, M., Ellingsen, T., 2011. What you sell is what you lend? Explaining trade credit contracts. *Review of Financial Studies* 24, 1261–1298.
- Gofman, M., Wu, Y., 2022. Trade credit and profitability in production networks. *Journal of Financial Economics* 143, 593–618.
- Gomes, J.F., 2001. Financing investment. *American Economic Review* 91(5), 1263–1285.
- Goto, S., Xiao, G., Xu, Y., 2015. As told by the supplier: trade credit and the cross section of stock returns. *Journal of Banking and Finance* 60, 296–309.
- Guo, L., Masulis, R.W., 2015. Board structure and monitoring: new evidence from CEO turnovers. *Review of Financial Studies* 28, 2770–2811.
- Hainmueller, J., 2012. Entropy balancing for causal effects: a multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis* 20, 25–46.
- Harford, J., Mansi, S., Maxwell, W.F., 2008. Corporate governance and a firm’s cash holdings. *Journal of Financial Economics* 87, 535–555.
- Harris, E., Petrovits, C., Yetman, M.H., 2017. Why bad things happen to good organizations: the link between governance and asset diversions in public charities. *Journal of Business Ethics* 146(1), 149–166.
- Hazarika, S., Karpoff, J.M., Nahata, R., 2012. Internal corporate governance, CEO turnover, and earnings management. *Journal of Financial Economics* 104, 44–69.
- Herbst, A.F., 1974. Some empirical evidence on the determinants of trade credit at the industry level of aggregation. *Journal of Financial and Quantitative Analysis* 9, 377–394.

- Hirth, S., Viswanatha, M., 2011. Financing constraints, cash-flow risk, and corporate investment. *Journal of Corporate Finance* 17(5), 1496–1509.
- Hu, J., Li, S., Taboada, A.G., Zhang, F., 2020. Corporate board reforms around the world and stock price crash risk. *Journal of Corporate Finance* 62, 101557.
- Irvine, P.J., Park, S.S., Yıldızhan, Ç., 2016. Customer-base concentration, profitability, and the relationship life cycle. *Accounting Review* 91, 883–906.
- Järvinen, T., Myllymäki, E.-R., 2016. Real earnings management before and after reporting SOX 404 material weaknesses. *Accounting Horizons* 30(1), 119–141.
- Jensen, M.C., Meckling, W.H., 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3, 305–360.
- Jiang, W., Wan, H., Zhao, S., 2016. Reputation concerns of independent directors: evidence from individual director voting. *Review of Financial Studies* 29, 655–696.
- John, K., Senbet, L.W., 1998. Corporate governance and board effectiveness. *Journal of Banking and Finance* 22(4), 371–403.
- Kaplan, S.N., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? *Quarterly Journal of Economics* 112, 169–215.
- Kim, E.H., Lu, Y., 2013. Corporate governance reforms around the world and cross-border acquisitions. *Journal of Corporate Finance* 22, 236–253.
- Kjenstad, E.C., Su, X., Zhang, L., 2015. Credit rationing by loan size: a synthesized model. *Quarterly Review of Economics and Finance* 55, 20–27.
- Klein, A., 2002. Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics* 33, 375–400.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 2000. Investor protection and corporate governance. *Journal of Financial Economics* 58, 3–27.

- Lamont, O., Polk, C., Saa áRequejo, J., 2001. Financial constraints and stock returns. *Review of Financial Studies* 14, 529–554.
- Larkin, Y., Ng, L., Zhu, J., 2018. The fading of investment-cash flow sensitivity and global development. *Journal of Corporate Finance* 50, 294–322.
- Lei, J., Qiu, J., Wan, C., 2018. Asset tangibility, cash holdings, and financial development. *Journal of Corporate Finance* 50, 223–242.
- Lei, J., Qiu, J., Wan, C., Yu, F., 2021. Credit risk spillovers and cash holdings. *Journal of Corporate Finance* 68, 101965.
- Lennox, C., Pittman, J.A., 2010. Big five audits and accounting fraud. *Contemporary Accounting Research* 27, 209–247.
- Levine, R., Lin, C., Xie, W., 2018. Corporate resilience to banking crises: the roles of trust and trade credit. *Journal of Financial and Quantitative Analysis* 53(4), 1441–1477.
- Li, Q., Maydew, E.L., Willis, R.H., Xu, L., 2023. Taxes and director independence: evidence from board reforms worldwide. *Review of Accounting Studies* 28, 910–957.
- Liao, C.-H., Tsang, A., Wang, K.T., Zhu, N.Z., 2022a. Corporate governance reforms and cross-listings: international evidence. *Contemporary Accounting Research* 39, 537–576.
- Liao, R.C., Loureiro, G., Taboada, A.G., 2022b. Gender quotas and bank risk. *Journal of Financial Intermediation* 52, 100998.
- Lo, A.W.Y., Wong, R.M.K., Firth, M., 2010. Can corporate governance deter management from manipulating earnings? Evidence from related-party sales transactions in China. *Journal of Corporate Finance* 16, 225–235.
- Lorca, C., S ánchez-Ballesta, J.P., Garc á-Meca, E., 2011. Board effectiveness and cost of debt. *Journal of Business Ethics* 100(4), 613–631.

- Love, I., 2003. Financial development and financing constraints: international evidence from the structural investment model. *Review of Financial Studies* 16(3), 765–791.
- Love, I., Preve, L.A., Sarria-Allende, V., 2007. Trade credit and bank credit: evidence from recent financial crises. *Journal of Financial Economics* 83, 453–469.
- Lyandres, E., 2007. Costly external financing, investment timing, and investment–cash flow sensitivity. *Journal of Corporate Finance* 13(5), 959–980.
- Marquardt, C., Wiedman C., 2004. How are earnings managed? An examination of specific accruals. *Contemporary Accounting Research* 21, 461–489.
- Mateut, S., Chevapatrakul, T., 2018. Customer financing, bargaining power and trade credit uptake. *International Review of Financial Analysis* 59, 147–162.
- Molina, C.A., Preve, L.A., 2012. An empirical analysis of the effect of financial distress on trade credit. *Financial Management* 41, 187–205.
- Mulford, C.W., Comiskey, E.E., 2002. *The Financial Numbers Game: Detecting Creative Accounting Practices*. New York: John Wiley and Sons.
- Murfin, J., Njoroge, K., 2015. The implicit costs of trade credit borrowing by large firms. *Review of Financial Studies* 28, 112–145.
- Myers, S.C., Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13, 187–221.
- Nam, H., Uchida, K., 2019. Accounts payable and firm value: international evidence. *Journal of Banking and Finance* 102, 116–137.
- Neville, F., Byron, K., Post, C., Ward, A., 2019. Board independence and corporate misconduct: a cross-national meta-analysis. *Journal of Management* 45, 2538–2569.
- Petersen, M.A., 2009. Estimating standard errors in finance panel data sets: comparing approaches. *Review of Financial Studies* 22, 435–480.

- Petersen, M.A., Rajan, R.G., 1994. The benefits of lending relationships: evidence from small business data. *Journal of Finance* 49, 3–37.
- Petersen, M.A., Rajan, R.G., 1997. Trade credit: theories and evidence. *Review of Financial Studies* 10, 661–691.
- Picou, A., Rubach, M.J., 2006. Does good governance matter to institutional investors? Evidence from the enactment of corporate governance guidelines. *Journal of Business Ethics* 65, 55–67.
- Qiu, B., To, T.Y. 2025. Board reforms, stock liquidity, and stock market development. *Review of Corporate Finance Studies* 14(1), 261–303.
- Rajgopal, S., Venkatachalam, M., 2011. Financial reporting quality and idiosyncratic return volatility. *Journal of Accounting and Economics* 51, 1–20.
- Restrepo, F., Cardona-Sosa, L., Strahan, P.E., 2019. Funding liquidity without banks: evidence from a shock to the cost of very short-term debt. *Journal of Finance* 74, 2875–2914.
- Richardson, S., 2006. Over-investment of free cash flow. *Review of Accounting Studies* 11, 159–189.
- Roychowdhury, S., 2006. Earnings management through real activities manipulation, *Journal of Accounting and Economics* 42(3), 335–370.
- Sant’Anna, P.H.C., Zhao, J., 2020. Doubly robust difference-in-differences estimators. *Journal of Econometrics* 219, 101–122.
- Shang, C., 2020. Trade credit and stock liquidity. *Journal of Corporate Finance* 62, 101586.
- Smith, J.K., 1987. Trade credit and informational asymmetry. *Journal of Finance* 42, 863–872.
- Spamann, H., 2010. The “antidirector rights index” revisited. *Review of Financial Studies* 23, 467–486.

- Stiglitz, J.E., Weiss, A., 1981. Credit rationing in markets with imperfect information. *American Economic Review* 71(3), 393–410.
- Wang, B., 2019. The cash conversion cycle spread. *Journal of Financial Economics* 133, 472–497.
- Wang, K.T., Cui, L., Zhu, N.Z., Sun, A., 2025. Board gender diversity reforms around the world: the impact on corporate innovation. *Organization Science* 36(4), 1416–1437.
- Weir, C., Laing, D., McKnight, P.J., 2002. Internal and external governance mechanisms: their impact on the performance of large UK public companies. *Journal of Business Finance and Accounting* 29, 579–611.
- Whited, T.M., Wu, G., 2006. Financial constraints risk. *Review of Financial Studies* 19, 531–559.
- Xie, B., Davidson, W., DaDalt, P., 2003. Earnings management and corporate governance: the roles of the board and the audit committee. *Journal of Corporate Finance* 9, 295–316.
- Zeidan, R., Shapir, O.M., 2017. Cash conversion cycle and value-enhancing operations: theory and evidence for a free lunch. *Journal of Corporate Finance* 45, 203–219.
- Zhang, Y., Zhou, J., Zhou, N., 2007. Audit committee quality, auditor independence, and internal control weaknesses. *Journal of Accounting and Public Policy* 26, 300–327.
- Zhang, Z., 2019. Bank interventions and trade credit: evidence from debt covenant violations. *Journal of Financial and Quantitative Analysis* 54, 2179–2207.
- Zhao, S., Shi, B., 2024. Agency conflicts, financial constraints, and dynamic q-theory. *Economics Letters* 234, 111501.

Figure 1. Board reforms and trade credit: Placebo test

This figure plots the density of the coefficient estimates on POST from 1,000 bootstrap simulations of the baseline model used in Column (3) of Table 2. Specifically, similar to Bae et al. (2021), we first construct pseudo-board-reform years by randomly assigning board-governance-reform years to our sample countries during the sample period. We then estimate our baseline regression and repeat this procedure 1,000 times. The red line shows the baseline estimate of the effect of major board reform on trade credit in Column (3) of Table 2.

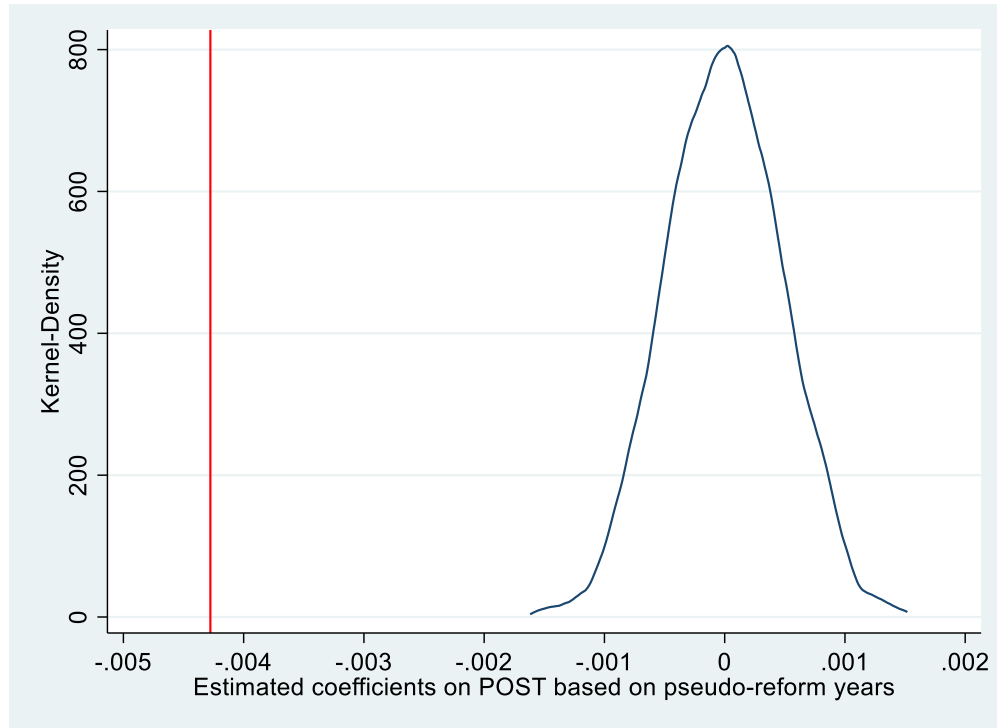


Table 1. Descriptive statistics

Panel A presents descriptive statistics and the years of the major board reforms by country (Fauver et al., 2017). Panel B reports the major board reform components by country. Panel C presents the mean, median, standard deviation, first and third quartile values, and the number of observations for key variables employed in the analysis. The baseline sample covers 157,704 firm-year observations for 28,472 unique firms from 38 countries with non-missing values for all control variables. All continuous variables are winsorized at the 1% and 99% levels. Details on the construction of all variables are provided in Appendix A.

<i>Panel A. Descriptive statistics by country</i>			
Country	No. of firm-years	No. of unique firms	Major board reform year
	(1)	(2)	(3)
Argentina	324	56	2001
Australia	8,608	1,510	2004
Austria	450	86	2004
Belgium	765	128	2005
Brazil	1,683	271	2002
Canada	7,769	1,527	2004
Chile	376	101	2001
China	5,816	1,208	2001
Colombia	114	23	2001
Czech Republic	77	18	2001
Denmark	1,055	164	2001
Finland	464	127	2004
France	3,411	736	2003
Germany	2,908	731	2002
Greece	610	195	2002
Hong Kong SAR	962	130	2005
Hungary	78	21	2003
India	11,286	2,595	2002
Indonesia	601	315	2007
Israel	834	197	2000
Italy	1,728	275	2006
Japan	21,892	3,207	2002
Malaysia	4,744	772	2001
Mexico	647	116	2001
Netherlands	1,044	195	2004
Norway	1,132	227	2005
Pakistan	822	208	2002
Peru	636	77	2005
Philippines	803	133	2002
Poland	874	247	2002
Portugal	174	50	2001
Singapore	3,526	599	2003
South Korea	1,631	375	1999
Spain	948	141	2006

Sweden	1,659	368	2006
Switzerland	1,690	233	2002
United Kingdom	9,893	1,726	1998
United States	55,670	9,384	2003
Total	157,704	28,472	—

Panel B. Major board-reform components by country

Country	Board independence	Audit committee and auditor independence	Separation of CEO and chairman	Approach of reform
	(1)	(2)	(3)	(4)
Argentina	0	1	0	Rules-based
Australia	1	1	1	Comply-or-explain
Austria	1	1	0	Comply-or-explain
Belgium	1	1	1	Comply-or-explain
Brazil	0	0	0	Rules-based
Canada	1	1	1	Rules-based
Chile	0	1	0	Rules-based
China	1	1	0	Rules-based
Colombia	0	0	0	Rules-based
Czech Republic	0	0	0	Rules-based
Denmark	1	0	0	Comply-or-explain
Finland	1	1	1	Comply-or-explain
France	0	1	0	Rules-based
Germany	1	1	0	Comply-or-explain
Greece	1	1	0	Rules-based
Hong Kong SAR	1	1	1	Comply-or-explain
Hungary	0	0	0	Comply-or-explain
India	1	1	0	Rules-based
Indonesia	1	1	0	Rules-based
Israel	1	1	1	Rules-based
Italy	1	1	0	Rules-based
Japan	0	1	0	Rules-based
Malaysia	1	1	0	Comply-or-explain
Mexico	1	1	0	Rules-based
Netherlands	1	1	1	Comply-or-explain
Norway	1	1	1	Comply-or-explain
Pakistan	0	1	0	Comply-or-explain
Peru	1	1	0	Comply-or-explain
Philippines	1	1	0	Comply-or-explain
Poland	1	0	0	Comply-or-explain
Portugal	1	1	0	Rules-based
Singapore	1	1	0	Comply-or-explain
South Korea	1	1	0	Rules-based
Spain	1	1	0	Comply-or-explain

Sweden	1	1	1	Comply-or-explain
Switzerland	0	0	0	Comply-or-explain
United Kingdom	1	1	1	Comply-or-explain
United States	1	1	0	Rules-based

Panel C. Summary statistics

Variable	Mean	Median	Std. Dev.	25th percentile	75th percentile	N
	(1)	(2)	(3)	(4)	(5)	(6)
Trade credit measures						
Payables/Assets	0.119	0.085	0.118	0.041	0.159	157,704
Main variable of interest						
POST	0.565	1.000	0.496	0.000	1.000	157,704
Firm-level control variables						
Ln(SIZE)	4.893	4.918	2.177	3.436	6.324	157,704
Leverage	0.253	0.208	0.252	0.048	0.374	157,704
Sales growth	0.308	0.076	1.181	-0.039	0.259	157,704
Market share	0.054	0.003	0.157	0.000	0.022	157,704
R&D	0.106	0.000	0.520	0.000	0.013	157,704
Capital expenditures	0.059	0.036	0.069	0.016	0.073	157,704
Tangibility	0.307	0.266	0.227	0.117	0.449	157,704
ROA	0.029	0.086	0.285	0.024	0.144	157,704
Inventory	0.125	0.093	0.129	0.014	0.189	157,704
Country-level control variables						
Ln(GDP)	28.660	28.913	1.453	27.645	30.166	157,704
GDP growth	0.035	0.035	0.024	0.018	0.045	157,704
Financial development	1.295	1.377	0.520	0.992	1.716	157,704
Stock market size	0.981	0.843	0.692	0.438	1.401	157,704

Table 2. Board reforms and trade credit: Baseline results

This table presents estimates from difference-in-difference (DiD) regressions of a firm's trade credit from its suppliers on a dummy variable (POST) that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). The dependent variable is Payables/Assets. Robust *t*-statistics clustered at the firm level are reported in parentheses. Details on the construction of all variables are provided in Appendix A.

Dependent variable: Payables/Assets	(1)	(2)	(3)
POST	-0.007*** (-8.88)	-0.006*** (-8.62)	-0.004*** (-5.16)
Ln(SIZE)		-0.009*** (-12.18)	-0.010*** (-12.73)
Leverage		0.021*** (6.80)	0.020*** (6.56)
Sales growth		0.001** (2.00)	0.001** (2.15)
Market share		0.008** (2.07)	0.010** (2.33)
R&D		-0.004*** (-2.90)	-0.004*** (-2.87)
Capital expenditures		-0.009 (-1.64)	-0.010* (-1.87)
Tangibility		-0.002 (-0.59)	-0.002 (-0.45)
ROA		-0.038*** (-13.09)	-0.037*** (-12.85)
Inventory		0.095*** (11.32)	0.094*** (11.25)
Ln(GDP)			0.040*** (5.97)
GDP growth			-0.039*** (-2.67)
Financial development			0.002 (1.09)
Stock market size			0.005*** (5.86)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	157,704	157,704	157,704
Adj. R^2	0.741	0.749	0.749

Table 3. Board reforms and trade credit: Robustness tests

This table presents estimates of robustness tests for the effects of board reforms on firms' payables. The dependent variable is Payables/Assets, which is calculated as accounts payable (AP) divided by the book value of total assets (AT). Panel A presents results using alternative regression specifications. The variable Years –2 to 0 is a dummy variable that equals one for the 3-year period leading up to the year before the reform becomes effective. The variables Year 1 and Year 2 are dummy variables that equal one if a given year is the first or second year in which the major board reform of the country becomes effective, respectively, and zero otherwise. Years 3+ is a dummy variable that equals one if a given year is the third year onward (i.e., Year 3, Year 4 and Year 5) after the major board reform of the country becomes effective, and zero otherwise. The first three pre-reform years (Years –5 to –3) of the country are omitted as the reference period. POST is a dummy variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). In Column (2), the event-based stacked regression includes not-yet-treated firms during the event window as the control group, following Barrios (2024) and Cengiz et al. (2019). The stacked regression also controls for fixed effects of the interaction of firm and treatment cohort and the interaction of year and treatment cohort. Panel B presents results using alternative sample selections. Column (1) uses an entropy-balanced sample. Column (2) uses a balanced sample that requires all firms to have observation in both pre- and post-reform periods. Column (3) uses a full sample without the 11-year window restriction. Column (4) uses a sample excluding U.S. firms. Column (5) uses the first board reforms to construct POST. Column (6) uses a sample that consists of WorldScope firms that meet the data requirement. Panel C presents results using alternative measures of trade credit. Net payables is accounts payable (AP) minus accounts receivable (RECTR), or AP minus RECT if RECTR is missing. UAP stands for unexpected accounts payable (receivable), which is the difference between the actual accounts payable and its expected value, scaled by lagged total assets. The expected value is calculated by multiplying the lagged accounts payable by the growth in sales. In Panel D, POST_INDEP (POST_AUDIT and POST_CEOCHAIR) is a dummy variable that equals one for the five years starting in the year a major board reform that covers board independence (audit committee and auditor independence, and separation of the chair and CEO positions, respectively) is effective in the country, and zero otherwise, during the 11-year window for the major reform. The regressions include the same set of controls as in Column (3) of Table 2. Robust *t*-statistics clustered at the firm level are reported in parentheses. Details on the construction of all variables are provided in Appendix A.

<i>Panel A. Alternative regression specifications</i>				
	Dynamic DiD	Stacked regression	Alternative fixed effects	Country and year clustering
Dependent variable: Payables/Assets	(1)	(2)	(3)	(4)
Years –2 to 0	-0.000 (-0.32)			
Year 1	-0.005*** (-3.48)			
Year 2	-0.006*** (-3.88)			

Years 3+	-0.010*** (-4.97)			
POST		-0.005*** (-3.93)	-0.003*** (-3.94)	-0.004** (-2.50)
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Subsumed	Yes	Yes
Year fixed effects	Yes	Subsumed	Subsumed	Yes
Industry × Year fixed effects	No	No	Yes	No
Firm × Treatment-cohort fixed effects	No	Yes	No	No
Year × Treatment-cohort fixed effects	No	Yes	No	No
No. of observations	157,704	548,224	157,704	157,704
Adj. R^2	0.749	0.707	0.750	0.749

Panel B. Alternative samples

Dependent variable: Payables/Assets	Entropy balanced	Balanced sample	Full sample	Excluding the U.S.	First board reforms	Worldscope sample
	(1)	(2)	(3)	(4)	(5)	(6)
POST	-0.004*** (-4.54)	-0.003*** (-4.14)	-0.005*** (-5.76)	-0.004*** (-3.60)	-0.004*** (-4.10)	-0.004*** (-4.79)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	157,704	116,469	294,590	102,034	132,472	149,661
Adj. R^2	0.778	0.748	0.713	0.766	0.750	0.759

Panel C. Alternative measures of trade credit

Dependent variable	Net payables/ Assets	Net payables/ COGS	UAP
	(1)	(2)	(3)
POST	-0.002** (-1.96)	-0.014*** (-2.87)	-0.003** (-2.54)
Control variables	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	157,357	141,624	157,701
Adj. R^2	0.744	0.599	0.197

Panel D. Components of major board reform

Dependent variable:	Board independence	Audit committee and auditor independence	Separation of CEO and chairman
	(1)	(2)	(3)

Payables/Assets			
POST_INDEP	-0.004*** (-5.04)		
POST_AUDIT		-0.005*** (-6.40)	
POST_CEOCHAIR			-0.007*** (-5.17)
Control variables	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	157,704	157,704	157,704
Adj. R^2	0.749	0.749	0.749

Table 4. Effect of total debt increase

This table presents the results of DiD regressions examining the effect of a total debt increase on the relationship between accounts payable and board reforms. Total debt increase is a dummy variable that equals one if the average annual total debt of a firm, comprising Current Liabilities (DLC) and Long-Term Debt (DLTT), in the post-reform period exceeds the average annual total debt in the pre-reform period within an 11-year window, and zero otherwise. The dependent variable is Payables/Assets. POST is a dummy variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). The regressions include the same set of controls as in Column (3) of Table 2. Robust *t*-statistics clustered at the firm level are reported in parentheses.

Dependent variable: Payables/Assets	(1)
POST	-0.002** (-2.08)
POST × Total debt increase	-0.003** (-2.45)
Test for the sum of coefficients = 0 [<i>p</i> -value of <i>F</i> -statistic]	-0.005 [0.000]
Control variables	Yes
Firm fixed effects	Yes
Year fixed effects	Yes
No. of observations	102,298
Adj. <i>R</i> ²	0.742

Table 5. Role of firm-level internal governance

This table presents the results of DiD regressions of trade credit on board reforms conditional on the level of pre-reform firm-level internal governance. The dependent variable is Payables/Assets. POST is a dummy variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). LOW_INDEP is a dummy variable that equals one if the proportion of independent directors on the board is lower than the country median in the year prior to the reform, and zero otherwise. LOW_INDEP50 is a dummy variable that equals one if the proportion of independent directors on the board is less than 50% in the year prior to the reform, and zero otherwise. POST_INDEP is a dummy variable that equals one for the five years starting in the year a major board reform that involves board independence is effective in the country, and zero otherwise. In Panel B, HIGH_AC is a dummy variable that equals one if a firm's expense ratio is higher than the median value of the country in the year prior to the enactment of major board reforms, and zero otherwise. POST_INDEP (POST_AUDIT and POST_CEOCHAIR) is a dummy variable that equals one for the five years starting in the year a major board reform that covers board independence (audit committee and auditor independence, and separation of the chair and CEO positions, respectively) is effective in the country, and zero otherwise, during the 11-year window for the major reform. The regressions include the same set of controls as in Column (3) of Table 2. Robust *t*-statistics clustered at the firm level are reported in parentheses.

<i>Panel A. Board independence</i>				
Dependent variable: Payables/Assets	(1)	(2)	(3)	(4)
POST	0.000 (0.08)	0.002 (1.09)		
POST × LOW_INDEP	-0.004** (-2.46)			
POST × LOW_INDEP50		-0.006*** (-3.90)		
POST_INDEP			0.001 (0.61)	0.003 (1.54)
POST_INDEP × LOW_INDEP			-0.005*** (-2.61)	
POST_INDEP × LOW_INDEP50				-0.007*** (-3.87)
Test for the sum of coefficients = 0 [<i>p</i> -value of <i>F</i> -statistic]	-0.004 [0.084]	-0.004 [0.058]	-0.004 [0.086]	-0.004 [0.084]
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of observations	18,998	18,998	18,998	18,998
Adj. <i>R</i> ²	0.847	0.848	0.847	0.848
<i>Panel B. Agency costs (AC)</i>				
Dependent variable: Payables/Assets	(1)	(2)	(3)	(4)

POST	-0.001 (-1.08)			
POST × HIGH_AC	-0.004*** (-3.23)			
POST_INDEP		0.000 (0.13)		
POST_INDEP × HIGH_AC		-0.003** (-2.36)		
POST_AUDIT			-0.002** (-2.04)	
POST_AUDIT × HIGH_AC			-0.004*** (-3.37)	
POST_CEOCHAIR				-0.000 (-0.23)
POST_CEOCHAIR × HIGH_AC				-0.009*** (-3.00)
Test for the sum of coefficients = 0 [<i>p</i> -value of <i>F</i> -statistic]	-0.005 [0.000]	-0.003 [0.012]	-0.006 [0.000]	-0.009 [0.000]
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of observations	106,935	106,935	106,935	106,935
Adj. <i>R</i> ²	0.756	0.756	0.757	0.757

Table 6. Role of country-level external financing environment

This table presents the results of DiD regressions of trade credit on board reforms conditional on the level of the pre-reform country-level external financing environment. The dependent variable is Payables/Assets. POST is a dummy variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). The level of the external financing environment is proxied by the level of a country's financial development (FD) and stock market development (STOCK). HIGH_FD is a dummy variable that equals one if the ratio of domestic credit to the private sector as a percentage of GDP exceeds the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. HIGH_STOCK is a dummy variable that equals one if the stocks trading volume as a percentage of GDP exceeds the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. The regressions include the same set of controls as in Column (3) of Table 2. Robust *t*-statistics clustered at the firm level are reported in parentheses.

Dependent variable: Payables/Assets	(1)	(2)
POST	0.002 (1.59)	0.002 (0.97)
POST × HIGH_FD	-0.006*** (-4.02)	
POST × HIGH_STOCK		-0.005** (-2.39)
Test for the sum of coefficients = 0 [<i>p</i> -value of <i>F</i> -statistic]	-0.004 [0.000]	-0.003 [0.000]
Control variables	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
No. of observations	116,469	114,971
Adj. <i>R</i> ²	0.754	0.752

Table 7. Role of firm financial fragility

This table presents the results of DiD regressions of trade credit on board reforms conditional on external financing needs, financial constraints, demand uncertainty, and market competition. The dependent variable is Payables/Assets. POST is a dummy variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). The level of external financing needs is proxied by the firm-level financing gap (EFN). The sample is partitioned into high and low subsamples according to the median values of each external financing needs proxy in each country in the year prior to the enactment of major board reforms. The degree of financial constraints is measured by the WW index (Whited and Wu, 2006). The sample is partitioned into constrained and unconstrained subsamples according to the median values of each financial constraint measure in each country in the year prior to the enactment of major board reforms. Demand uncertainty (DEMUNC) is constructed as in Irvine et al. (2016). High and low subsamples are split according to the median values of the demand uncertainty measure in each country in the year prior to the enactment of major board reforms. The level of market competition is measured by the sales-based Herfindahl-Hirschman Index (HHI). The regressions include the same set of controls as in Column (3) of Table 2. Robust *t*-statistics clustered at the firm level are reported in parentheses.

<i>Panel A. Sample splits by external financing needs and financial constraints</i>				
	EFN		WW	
Dependent variable:	(1)	(2)	(3)	(4)
Payables/Assets	High	Low	Constrained	Unconstrained
POST	-0.004*** (-3.01)	0.001 (0.74)	-0.005*** (-3.19)	-0.001 (-1.24)
<i>p</i> -value for equality of coefficients	0.003		0.035	
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of observations	51,859	55,732	54,465	61,903
Adj. R^2	0.723	0.798	0.691	0.848
<i>Panel B Sample splits by demand uncertainty and market competition</i>				
	DEMUNC		HHI	
Dependent variable:	(1)	(2)	(3)	(4)
Payables/Assets	High	Low	Low	High
POST	-0.005*** (-3.88)	-0.000 (-0.34)	-0.005*** (-4.08)	-0.000 (-0.13)
<i>p</i> -value for equality of coefficients	0.004		0.006	

Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of observations	56,108	60,338	59,288	57,181
Adj. R^2	0.711	0.816	0.749	0.758

Table 8. Board reforms and firm investment

Panel A of this table presents the results of DiD regressions of firm investment on board reforms. Firm investment is proxied by capital investment (Capex), non-capital investment (Non-Capex), and total investment (Total Investment). In Panel B, the sample is partitioned based on proxies for firm financial fragility: external financing needs (EFN), financial constraints (WW), demand uncertainty (DEMUNC), and market competition (HHI). The sample is split according to the median values of the firm financial fragility measure in each country in the year prior to the enactment of major board reforms. The regressions include the same set of controls as in Panel A. All control variables are lagged except for cash flow. Robust *t*-statistics clustered at the firm level are reported in parentheses.

<i>Panel A. Board reforms and firm investment</i>			
Dependent variable	Capex	Non-Capex	Total Investment
	(1)	(2)	(3)
POST	0.007*** (6.13)	0.007*** (5.40)	0.015*** (7.59)
Tobin's Q	0.004*** (18.88)	0.004*** (12.34)	0.010*** (18.85)
Cash flow	0.019*** (7.31)	-0.072*** (-18.76)	-0.067*** (-11.58)
Ln(SIZE)	-0.028*** (-25.67)	-0.042*** (-26.26)	-0.081*** (-35.54)
Tangibility	-0.022*** (-3.36)	0.063*** (8.80)	0.030** (2.57)
Leverage	-0.029*** (-8.11)	-0.049*** (-9.14)	-0.078*** (-9.81)
Cash	0.022*** (5.00)	0.061*** (9.13)	0.084*** (8.72)
Δ Equity	0.002*** (4.46)	-0.000 (-0.18)	0.003** (2.49)
Δ Debt	0.017*** (7.90)	0.006** (2.09)	0.023*** (5.07)
Ln(GDP)	0.045*** (4.79)	0.013* (1.76)	0.073*** (5.15)
GDP growth	0.160*** (7.42)	0.120*** (5.38)	0.273*** (7.55)
Financial development	0.003 (1.12)	0.005* (1.87)	0.013*** (2.78)
Stock market size	0.008*** (7.73)	-0.008*** (-5.84)	0.001 (0.66)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	129,380	129,380	129,380
Adj. R^2	0.479	0.539	0.479

Panel B. Sample splits by external financing needs and financial constraints

	EFN		WW	
Dependent variable:	(1)	(2)	(3)	(4)
Total Investment	High	Low	Constrained	Unconstrained
POST	0.033*** (10.16)	-0.004 (-1.22)	0.022*** (6.44)	0.002 (0.85)
<i>p</i> -value for equality of coefficients	0.000		0.000	
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of observations	43,031	47,143	44,109	50,414
Adj. R^2	0.535	0.371	0.511	0.350

Panel C. Sample splits by demand uncertainty and market competition

	DEMUNC		HHI	
Dependent variable:	(1)	(2)	(3)	(4)
Total Investment	High	Low	Low	High
POST	0.016*** (4.71)	0.009*** (3.99)	0.019*** (5.75)	0.011*** (4.14)
<i>p</i> -value for equality of coefficients	0.084		0.047	
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of observations	45,067	49,329	46,611	50,235
Adj. R^2	0.483	0.381	0.476	0.458

Table 9. Board reforms and firm performance

This table presents the results of DiD regressions of firm operating performance on board reforms conditional on agency costs (AC), external financing needs (EFN), financial constraints (WW), demand uncertainty (DEMUNC), and market competition (HHI). The dependent variable is firm performance, which is proxied by return on assets (ROA). POST is a dummy variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). HIGH_AC is a dummy variable that equals one if a firm's expense ratio exceeds the country median in the year prior to the enactment of major board reforms, and zero otherwise. The regressions include the same set of controls as in Column (3) of Table 2 except for ROA. Robust *t*-statistics clustered at the firm level are reported in parentheses.

<i>Panel A. Agency cost and external financing needs</i>			
Dependent variable: ROA	(1)	(2)	(3)
POST	0.006** (2.53)	-0.002 (-0.72)	-0.003 (-1.19)
POST × HIGH_AC		0.008*** (2.64)	
POST × HIGH_EFN			0.017*** (4.91)
Test for the sum of coefficients = 0 [<i>p</i> -value of <i>F</i> -statistic]		0.006 [0.051]	0.014 [0.000]
Control variables	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	154,137	106,658	107,479
Adj. <i>R</i> ²	0.666	0.633	0.652
<i>Panel B. Financial constraints, demand uncertainty, and market competition</i>			
Dependent variable: ROA	(1)	(2)	(3)
POST	-0.005** (-2.21)	-0.006*** (-2.63)	-0.001 (-0.47)
POST × HIGH_WW	0.017*** (5.15)		
POST × HIGH_DEMUNC		0.019*** (5.92)	
POST × LOW_HHI			0.009*** (2.92)
Test for the sum of coefficients = 0 [<i>p</i> -value of <i>F</i> -statistic]	0.012 [0.000]	0.013 [0.000]	0.008 [0.009]

Control variables	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	116,264	116,320	116,342
Adj. R^2	0.651	0.651	0.651

Table 10. Role of country-level external institutional quality

This table presents the results of DiD regressions of trade credit on board reforms conditional on the level of pre-reform country-level external institutional quality. The dependent variable is Payables/Assets. POST is a dummy variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). HIGH_WGI is a dummy variable that equals one if the World Bank's Worldwide Governance Indicators (WGI) index exceeds the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. WGI is an annual average of the six governance indicators: 1) voice and accountability, 2) political stability and absence of violence/terrorism, 3) government effectiveness, 4) regulatory quality, 5) rule of law, and 6) control of corruption. A higher WGI score indicates better governance quality. HIGH_CONT_ENF is a dummy variable that equals one if the World Bank's enforcing contracts indicator exceeds the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. The enforcing contracts indicator measures the time and cost for resolving a commercial dispute through a local first-instance court and the quality of judicial processes index. The score ranges from 0 to 100, with 100 representing the best regulatory performance. HIGH_CR (strong creditor rights) is a dummy variable equal to one if the World Bank's Getting Credit score (sum of the Strength of Legal Rights Index and Depth of Credit Information Index) exceeds the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. HIGH_MIP (strong minority investor protection) is a dummy variable equal to one if the World Bank's Protecting Minority Investors score (average of the Extent of Conflict of Interest Regulation Index and the Extent of Shareholder Governance Index, scaled to 0–100) exceeds the sample median, and zero otherwise. HIGH_TRUST is a dummy variable that equals one if the World Values Survey's (WVS) social trust score exceeds the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. The regressions include the same set of controls as in Column (3) of Table 2. Robust *t*-statistics clustered at the firm level are reported in parentheses.

Dependent variable: Payables/Assets	(1)	(2)	(3)	(4)	(5)
POST	0.003** (2.03)	0.001 (0.59)	0.001 (0.65)	-0.001 (-0.41)	0.002 (1.47)
POST × HIGH_WGI	-0.007*** (-4.59)				
POST × HIGH_CONT_ENF		-0.005*** (-2.86)			
POST × HIGH_CR			-0.005*** (-3.16)		
POST × HIGH_MIP				-0.004*** (-2.60)	
POST × HIGH_TRUST					-0.006*** (-3.80)
Test for the sum of coefficients = 0 [<i>p</i> -value of <i>F</i> -statistic]	-0.004 [0.000]	-0.004 [0.000]	-0.004 [0.000]	-0.005 [0.000]	-0.004 [0.000]

Control variables	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
No. of observations	116,469	116,469	116,469	116,469	108,574
Adj. R^2	0.754	0.754	0.752	0.752	0.755

Table 11. The inventory channel

This table presents the results of DiD regressions of inventory holdings on board reforms. The dependent variables, Inventory, INVT_RM, INVT_WIP, and INVT_FG, represent total inventory, raw materials inventory, work-in-progress inventory, and finished goods inventory, respectively, each divided by the book value of total assets (AT). POST is a dummy variable equal to one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, within the 11-year window for the major reform (Fauver et al., 2017). Robust *t*-statistics clustered at the firm level are reported in parentheses.

Dependent variable	Inventory (1)	INVT_RM (2)	INVT_WIP (3)	INVT_FG (4)
POST	-0.005*** (-7.93)	-0.005*** (-13.38)	-0.004*** (-10.84)	-0.007*** (-13.23)
Ln(SIZE)	-0.002*** (-3.90)	-0.002*** (-5.02)	-0.000 (-0.25)	-0.001** (-2.42)
Leverage	0.003* (1.77)	-0.001 (-0.96)	0.001** (1.99)	0.001 (0.85)
Sales growth	0.000 (0.43)	0.000 (0.87)	-0.000 (-1.20)	0.000 (0.95)
Market share	0.009** (2.48)	0.004* (1.75)	-0.002 (-0.90)	0.002 (0.86)
R&D	-0.004*** (-3.84)	-0.001*** (-2.67)	-0.001* (-1.66)	-0.002*** (-3.02)
Capital expenditures	-0.015*** (-4.25)	-0.001 (-0.36)	0.000 (0.30)	-0.002 (-0.66)
Tangibility	-0.017*** (-5.53)	0.006*** (4.06)	0.001 (0.89)	-0.004* (-1.94)
ROA	0.008*** (4.39)	0.002*** (2.59)	0.001** (2.03)	0.002* (1.77)
Gross margin	0.000 (1.21)	0.000 (1.43)	0.000 (1.39)	0.000** (2.02)
Foreign sales	0.002 (1.61)	0.001 (0.72)	-0.000 (-0.68)	0.001 (1.21)
Ln(GDP)	0.018*** (2.84)	0.075*** (13.27)	0.058*** (12.16)	0.112*** (11.91)
GDP growth	0.074*** (5.08)	-0.004 (-0.38)	0.002 (0.21)	-0.040** (-2.50)
Financial development	-0.007*** (-3.66)	-0.011*** (-9.31)	-0.008*** (-7.49)	-0.016*** (-8.27)
Stock market size	0.001** (2.11)	0.000 (0.51)	-0.002*** (-3.84)	0.001 (0.85)
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

No. of observations	151,068	124,012	122,999	123,734
Adj. R^2	0.867	0.767	0.733	0.777

Table 12. Board reform and financial outcomes

This table reports DiD regression results examining the effect of major board reforms on financial outcomes, proxied by operating cash flow, Tobin's Q, and abnormal returns. POST is a dummy variable equal to one for the five years starting in the year a major board reform enactment, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). Operating cash flow is measured as operating cash flow (OANCF) scaled by book value of total assets (Ball and Nikolaev, 2022; Rajgopal and Venkatachalam, 2011). Tobin's Q is calculated as total assets minus book value of equity plus market value of equity, divided by book value of total assets (Fauver et al., 2017). Abnormal return is the difference between a firm's annualized buy-and-hold return following its fiscal year-end and the corresponding annualized market return, based on monthly returns over the same period. All regressions include the same firm- and country-level controls as in Column (3) of Table 2, along with firm and year fixed effects. Robust *t*-statistics clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable construction details are provided in Appendix A.

Dependent variable	Operating cash flow (1)	Tobin's Q (2)	Abnormal return (3)
POST	0.005** (2.45)	0.323*** (13.98)	0.031*** (4.55)
Control variables	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
No. of observations	151,192	138,946	80,895
Adj. R^2	0.631	0.674	0.070

Appendix A. Variable definitions

This table provides definition of the variables used in the study.

Definitions with corresponding Compustat item names	
Trade credit measures	
Payables/Assets	Accounts payable (AP) divided by book value of total assets (AT)
Net payables/Assets	Accounts payable (AP) minus accounts receivable (RECTR), divided by book value of total assets (AT). Replace RECTR with total receivables (RECT) if RECTR is missing.
Net payables/COGS	Accounts payable (AP) minus accounts receivable (RECTR), divided by cost of goods sold (COGS). Replace RECTR with total receivables (RECT) if RECTR is missing.
UAP	Unexpected accounts payable, which is the difference between the actual accounts payable and its expected value, scaled by lagged total assets (Mulford and Comiskey, 2002, p. 187; Marquardt and Wiedman, 2004; Arcas and Martí, 2016). The expected value is calculated by multiplying the lagged accounts payable by the growth in sales. $UAP_{i,t} = \frac{AP_{i,t} - \left(AP_{i,t-1} \times \frac{SALE_{i,t}}{SALE_{i,t-1}} \right)}{AT_{i,t-1}}$
Main variable of interest	
POST	An indicator variable that equals one for the five years starting in the year a major board reform is enacted in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017).
POST_INDEP	An indicator variable that equals one for the five years starting in the year a major board reform that involves board independence is effective in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017).
POST_AUDIT	An indicator variable that equals one for the five years starting in the year a major board reform that covers audit committee and auditor independence is effective in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017).
POST_CEOCHAIR	An indicator variable that equals one for the five years starting in the year a major board reform that covers separation of the chair and CEO positions is effective in the country, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017).
Firm-level control variables	
Ln(SIZE)	Natural logarithm of the book value of total assets (AT) in millions of 2006 U.S. dollars.
Leverage	The ratio of long-term debt (DLTT) plus debt in current liabilities (DLC) to the book value of total assets (AT).
Sales growth	Change in sales (SALE) divided by one-year-lagged sales.
Market share	The ratio of the firm's sales (SALE) to total industry sales, where industry classification is based on Fama and French's 48 industries.
R&D	The ratio of R&D expenditure (XRD) to sales (SALE). If R&D

	expenditure is missing, we follow the traditional approach of setting the missing value to zero.
Capital expenditures	The ratio of capital expenditures for property, plant, and equipment (CAPX) to book value of total assets (AT).
Tangibility	Net property plant and equipment (PPENT) divided by the book value of total assets (AT).
ROA	Operating income before depreciation (OIBDP) divided by the book value of total assets (AT).
Inventory	Total inventories (INVT) divided by the book value of total assets (AT).

Country-level control variables

Ln(GDP)	The natural logarithm of country gross domestic product in constant 2015 U.S. dollars. Data source: World Bank's World Development Indicators (WDI) database.
GDP growth	The annual growth rate of gross domestic product.
Financial development	Domestic credit provided to the private sector as a percentage of GDP. Data source: World Bank's World Development Indicators (WDI) database.
Stock market size	Stocks value traded as a percentage of GDP. Data source: World Bank's World Development Indicators (WDI) database.

Other firm-level variables

Total debt increase	An indicator variable that equals one if the average annual total debt of a firm, comprising Current Liabilities (DLC) and Long-Term Debt (DLTT), in the post-reform period exceeds the average annual total debt in the pre-reform period within an 11-year window, and zero otherwise.
LOW_INDEP	An indicator variable that equals one if the proportion of independent directors on the board is lower than the country median in the year prior to the reform, and zero otherwise. Data source: BoardEx, ASSET4, and ISS.
LOW_INDEP50	An indicator variable that equals one if the proportion of independent directors on the board is less than 50% in the year prior to the reform, and zero otherwise. Data source: BoardEx, ASSET4, and ISS.
HIGH_AC	An indicator variable that equals one if a firm's expense ratio is higher than the median value of the country in the year prior to the enactment of major board reforms, and zero otherwise. Following Ang et al. (2000) and Chen et al. (2022), the expense ratio is calculated as operating expense (the sum of cost of goods sold (COGS) and selling, general and administrative expense (XSGA)), divided by the book value of total assets (AT).
EFN	A flow measure of the firm-level financing gap, calculated as the difference between net cash flow from investing activities and net cash flow from operating activities, deflated by the book value of total assets (AT).
WW index	A financial constraint index based on Whited and Wu (2006), calculated as $(-0.091 \times CF) - (0.062 \times \text{DIVPOS}) + (0.021 \times \text{TLTD}) - (0.044 \times \text{LNTA}) + (0.102 \times \text{ISG}) - (0.035 \times \text{SG})$, where CF is the ratio of cash flow (IB+DP) to total assets (AT); DIVPOS is an indicator that equals one if the firm pays cash dividends; TLTD is the ratio of the long-term debt to total assets (DLTT/AT); LNTA is the natural logarithm of total book assets

	(AT), ISG is the average sales growth in the firm's three-digit industry in each country each year; and SG is the firm's sales growth.
DEMUNC	Demand uncertainty, calculated as the standard deviation of annual changes in log-sales over the previous five years, following Irvine et al. (2016).
HHI	Sales-based Herfindahl-Hirschman Index in the 4-digit SIC industry.
Capex	Capital expenditure (CAPX) less cash receipts from the sale of property, plant, and equipment (SPPIV), scaled by lagged book value of total assets (AT).
Non-Capex	The sum of R&D expenses (XRD), acquisitions (AQC), and advertising expenses (XAD), scaled by lagged book value of total assets (AT). Missing values of XRD are replaced by zero.
Total investment	The sum of Capex and Non-Capex.
Tobin's Q	Book value of total assets (AT) minus book value of equity (CEQ) plus market value of equity ($PRCC_F \times CSHO$), scaled by the book value of total assets (AT).
Cash flow	Income before extraordinary items (IB) plus depreciation and amortization (DP), scaled by lagged book value of total assets (AT).
Cash	Cash and short-term investments (CHE) scaled by the book value of total assets (AT).
Δ Equity	The change in the sum of the book value of equity (SEQ) and the deferred taxes (TXDI), minus the change in retained earnings (RE), scaled by lagged book value of total assets (AT), following Larkin et al. (2018).
Δ Debt	The change in the total debt (DLTT+DLC) scaled by lagged book value of total assets (AT), following Larkin et al. (2018).
INVT_RM	Inventories—raw materials (INVRM) divided by the book value of total assets (AT).
INVT_WIP	Inventories—work in progress (INWIP) divided by the book value of total assets (AT).
INVT_FG	Inventories—finished goods (INVFG) divided by the book value of total assets (AT).
Gross margin	Gross profit ratio, measured as sales (SALE) minus cost of goods sold (COGS) divided by sales (SALE).
Foreign sales	An indicator variable that equals one if a firm reports foreign sales (FCA) in year t , and zero otherwise.
Operating cash flow	Operating cash flow (OANCF) divided by the book value of total assets (AT).
Abnormal return	The difference between a firm's annualized buy-and-hold return following its fiscal year-end and the corresponding annualized market return, based on monthly returns over the same period. Data source: Compustat database.
Other country-level variables	
HIGH_FD	An indicator variable that equals one if the ratio of domestic credit to the private sector as a percentage of GDP is above the sample country median in the year prior to the enactment of major board reforms, and zero

	otherwise. Data source: World Bank's World Development Indicators (WDI) database.
HIGH_STOCK	An indicator variable that equals one if the stocks trading volume as a percentage of GDP is above the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. Data source: World Bank's World Development Indicators (WDI) database.
HIGH_WGI	An indicator variable that equals one if a country's Worldwide Governance Indicators (WGI) index is above the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. WGI is an annual average of the six governance indicators: 1) voice and accountability, 2) political stability and absence of violence/terrorism, 3) government effectiveness, 4) regulatory quality, 5) rule of law, and 6) control of corruption. A higher score of WGI indicates better governance quality. Data source: World Bank's World Development Indicators (WDI) database.
HIGH_CONT_ENF	An indicator variable that equals one if a country's enforcing contracts indicator is above the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. The enforcing contracts indicator measures the time and cost for resolving a commercial dispute through a local first-instance court, and the quality of judicial processes index. The indicator is calculated as the average of the scores for Time (days), Cost (% of claim value) and Procedures (number). The score ranges from 0 to 100, with 100 representing best regulatory performance. Data source: World Bank's World Development Indicators (WDI) database.
HIGH_CR	An indicator variable that equals one if a country's Getting Credit score (sum of the Strength of Legal Rights Index and Depth of Credit Information Index) exceeds the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. A higher score indicates stronger creditor rights. Data source: World Bank's Doing Business database.
HIGH_MIP	An indicator variable that equals one if a country's Protecting Minority Investors score (average of the Extent of Conflict of Interest Regulation Index and the Extent of Shareholder Governance Index, scaled to 0–100) exceeds the sample median, and zero otherwise. Specifically, this score aggregates six sub-indices: 1) Extent of Disclosure, 2) Extent of Director Liability, 3) Ease of Shareholder Suits, 4) Extent of Shareholder Rights, 5) Extent of Ownership and Control, and 6) Extent of Corporate Transparency. A higher score indicates stronger minority investor protection. Data source: World Bank's Doing Business database.
HIGH_TRUST	An indicator variable that equals one if a country's social trust score is above the sample country median in the year prior to the enactment of major board reforms, and zero otherwise. The social trust measure is calculated as the percentage of respondents in each country choosing the option "most people can be trusted." The survey asks the question: "Generally speaking, would you say that most people can be trusted, or

that you need to be very careful in dealing with people?” The WVS offers three possible responses: i) most people can be trusted; ii) you need to be very careful in dealing with other people; and iii) I don’t know. Data source: World Values Survey (WVS) database.

Online Appendix to:
“Corporate Governance and Trade Credit: International Evidence
from Board Reforms”

- OA.A: A simple economic model of the external financing channel, incorporating managerial opportunism and internal governance, as discussed in the Introduction of the paper.
- OA.B: Callaway and Sant’Anna (2021) estimator.
- OA.C: Supply-side perspective on trade credit.
- OA.D: Cross-sectional analysis of working-capital efficiency.

OA.A: A simple economic model of the external financing channel with managerial opportunism and internal governance

We develop a model to examine how governance influences a firm's borrowing levels from traditional lenders and suppliers. The firm finances its operations through external borrowing, with trade credit (D_s) and traditional loans (D_d) as the two available sources. The model analyzes two scenarios: one where credit is freely available (non-rationing) and another where credit from traditional lenders is rationed based on the firm's governance quality.

Non-rationing scenario

For simplicity, we assume that the manager first optimizes his personal utility and subsequently optimizes the firm's profit. This sequential approach simplifies the analysis by isolating the manager's decisions regarding personal benefits from his efforts to enhance firm performance. The model also assumes that the firm lacks internal funds and must fully rely on external credit to meet a fixed input requirement ($\bar{I}$) for production. The production process is represented as $\bar{y} = A\bar{I}$, where A is the productivity coefficient. Borrowing from traditional lenders incurs a rate r_d that depends on both the size of borrowing and the firm's governance, defined as: $r_d(D_d, G) = \beta D_d/\bar{I} + \eta(1 - G)$. The first term, $\beta D_d/\bar{I}$, inspired by Chod et al. (2019), captures the linear relationship between borrowing costs and the firm's book leverage (D_d), normalized by the total required input ($\bar{I}$). The second term, $\eta(1 - G)$, reflects the impact of corporate governance (G) on borrowing costs. We assume that weaker governance (lower G) leads to higher borrowing costs because traditional lenders consider the borrowing firm's quality of corporate governance when making lending decisions. Fields et al. (2012) show that companies with high-quality boards can access bank loans at a lower cost because boards complement the monitoring role of banks, thereby reducing borrowing costs. Ashbaugh-Skaife et al. (2006) also demonstrate that weak

governance increases debt financing costs by raising the likelihood of managerial opportunism, which elevates the risk of default. Ge et al. (2012) provide international evidence that better-governed firms face more favorable price and non-price terms on bank loans. In contrast, since trade credit is often standardized within industries (Ng et al., 1999), similar to Chod et al. (2019), we assume that trade credit is offered at a fixed, industry-specific rate $r_s = s$, unaffected by governance.¹

The manager can divert funds from traditional loans for personal benefit, with the diversion rate denoted as θ . The manager's utility follows a mean-variance utility function, balancing diversion benefits against detection risks and penalties, which increase with the firm's governance quality. The utility function is:

$$U = f(\theta, G) = \mu(\theta) - \frac{\lambda}{2} \sigma^2(\theta, G) = \theta - \frac{\lambda p(G)}{2} \theta^2, \quad (\text{A.1})$$

where $p(G) > 0$ is a penalty function that is strictly positive and increases with G , reflecting higher detection likelihood and severity under stronger governance. The parameter $\lambda > 0$ denotes the manager's degree of risk aversion. Solving the manager's optimization problem yields the optimal diversion rate:

$$\theta^* = \min \left(\frac{1}{\lambda p(G)}, 1 \right). \quad (\text{A.2})$$

This result implies that stronger governance reduces the manager's incentive to divert funds by increasing the penalties associated with such behavior.

Given the manager's optimal diversion choice θ^* , the manager then determines the firm's borrowing levels to maximize the firm's profit:

¹ Chod et al. (2019) define $r_T = t \theta_T$ to represent the cumulative interest rate for trade credit over a specific time period. Since our analysis considers only a single period, we set the interest rate for trade credit to a fixed value, s .

$$\Pi = A\bar{I} - r_s D_s - r_d D_d, \quad (\text{A. 3})$$

where r_s and r_d are the costs of supplier financing and traditional debt financing, respectively, and D_s and D_d represent the amounts of credit the firm borrows from the supplier and traditional lender, respectively. The profit is maximized subject to the following financing constraint:

$$s. t. \quad D_s + D_d(1 - \theta) = \bar{I}. \quad (\text{A. 4})$$

Substituting θ^* into Eq. (A.3) and solving the first-order conditions yield the following optimal borrowing levels:

$$D_d^* = \left(\frac{s - \eta(1 - G)}{2\beta} - \frac{s\theta^*}{2\beta} \right) \bar{I} = \left(\frac{s - \eta(1 - G)}{2\beta} - \frac{s}{2\beta\lambda p(G)} \right) \bar{I}. \quad (\text{A. 5})$$

$$D_s^* = \bar{I} - (1 - \theta^*)D_d^* = \bar{I} - \left(1 - \frac{1}{\lambda p(G)} \right) \left(\frac{s - \eta(1 - G)}{2\beta} - \frac{s}{2\beta\lambda p(G)} \right) \bar{I}. \quad (\text{A. 6})$$

The comparative statics of the model provide three key implications. First, better governance reduces borrowing costs from traditional lenders by: 1) lowering r_d for a given level of leverage, which allows the firm to rely more on traditional loans, and 2) reducing the diversion rate (θ^*), which lowers inefficiencies in traditional borrowing and further increases the firm's preference for traditional loans (D_d^*). Second, improved governance reshapes the borrowing structure by reducing the firm's reliance on trade credit (D_s^*), thereby decreasing dependence on suppliers. Lastly, Figure OA.A shows that stronger governance reduces the total borrowing costs charged by both the traditional lender and the supplier, based on the equilibrium solutions. The reliance on supplier financing (traditional debt financing) decreases (increases) as the quality of governance improves.

Credit rationing scenario

When governance is poor, traditional lenders impose a borrowing limit, denoted as $D_d^{max}(G)$. Under this constraint, the firm's financing equation becomes:

$$D_s = \bar{I} - (1 - \theta^*)D_d^{max}(G) \geq \bar{I} - (1 - \theta^*)D_d^*. \quad (\text{A. 7})$$

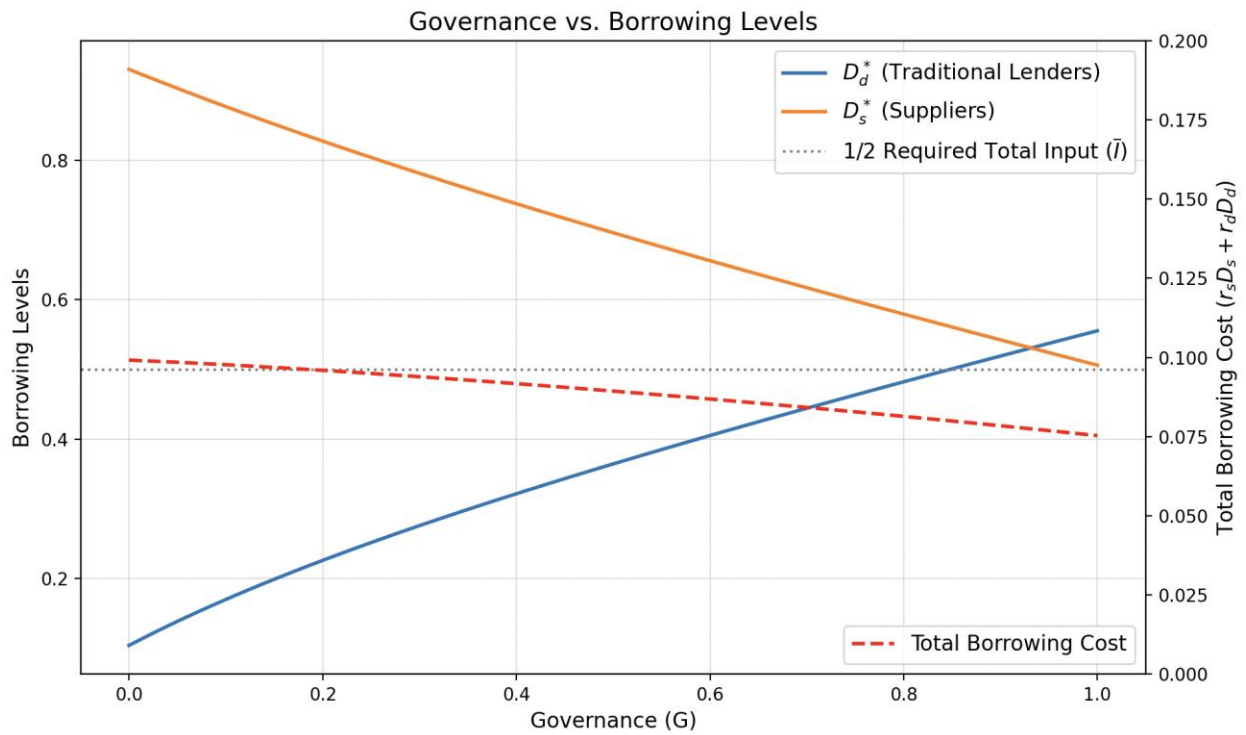
This scenario illustrates that poor governance compels the firm to rely more heavily on trade credit to meet its input requirements due to credit rationing by the traditional lender. As governance improves, lenders perceive a lower risk of diversion, which increases the borrowing cap ($D_d^{max}(G)$) and reduces the firm's dependence on supplier financing.

The profit function remains unchanged, but the borrowing constraint fundamentally alters the firm's financing structure. When D_d^* exceeds $D_d^{max}(G)$, the firm increases trade credit D_s to cover the shortfall. However, as governance strengthens, the cap on traditional loans rises, allowing the firm to shift away from higher-cost trade credit and reduce its overall financing costs.

The model demonstrates the role of governance in shaping borrowing decisions. Under non-rationing, strong governance reduces diversion and borrowing costs, leading to greater reliance on traditional borrowing. In contrast, under credit rationing, governance directly influences the availability of traditional financing, with better governance alleviating reliance on trade credit and lowering financing costs.

Figure OA.A: Model simulation

The simulation uses the following parameters: a trade credit interest rate (s) of 0.1, governance sensitivity to traditional borrowing cost (η) of 0.05, borrowing sensitivity to loan size (β) of 0.08, a fixed production input ($\bar{I}$) of 1, and a risk aversion coefficient (λ) of 3, which governs the degree of the manager's risk diversion relative to the potential penalty. The penalty function $p(G)$ is specified as $2 \times (0.5 + G)$, reflecting the increasing cost of diversion with stronger governance G . The results show that the optimal diversion rate (θ^*) decreases with higher G . As governance improves, borrowing from traditional lenders (D_d^*) rises due to lower borrowing costs, while borrowing from suppliers (D_s^*) declines, reflecting reduced reliance on trade credit. Total borrowing costs decrease with better governance, driven by the firm's shift toward more cost-efficient traditional loans. These findings underscore the critical role of governance in shaping borrowing decisions, optimizing financing structures, and minimizing overall costs.



OA.B: Callaway and Sant’Anna (2021) estimator

Recent econometric research has highlighted problems with conventional two-way fixed effects (TWFE) estimators in staggered difference-in-differences settings, where already-treated or later-treated units can serve as inappropriate controls (e.g., Callaway and Sant’Anna, 2021; Goodman-Bacon, 2021; Athey and Imbens, 2022; Borusyak et al., 2024). To address these concerns, we implement the estimator proposed by Callaway and Sant’Anna (2021), which computes cohort-time average treatment effects on the treated (ATTs) using only never-treated and not-yet-treated units as clean controls.

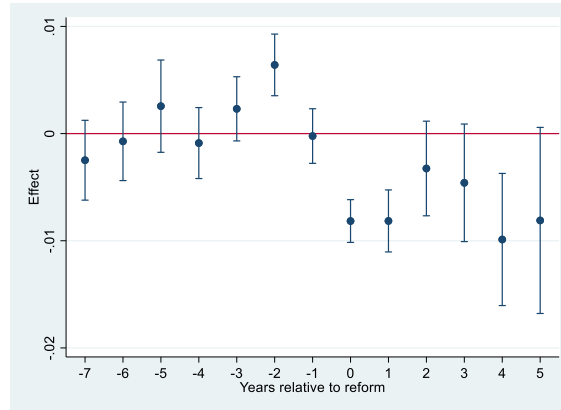
Figure OA.B presents the results. Panel (a) displays the dynamic treatment effects over the event-study window of $[-7, +5]$ relative to the first year in which a major board reform becomes effective (year 0). Most pre-reform coefficients are close to zero and statistically insignificant, and the joint test for pre-trends confirms parallel trends: the aggregated pre-treatment ATT is -0.0001 (95% CI: $[-0.0012, 0.0010]$), comfortably containing zero.² Post-reform, the effects become negative and statistically significant, indicating a sustained reduction in the use of accounts payable following the reform. The aggregated post-treatment ATT is -0.0087 and highly significant (95% CI: $[-0.0138, -0.0036]$), consistent with our baseline results.

Panel (b) reports cohort-specific ATTs (aggregating by the year a firm first becomes treated), while Panel (c) shows calendar-time ATTs, illustrating how average treatment effects vary over time relative to the control group. Across specifications, the overall ATT is economically and statistically significant: -0.006 (cohort-year aggregation) and -0.009 (calendar-year aggregation), both significant at the 1% level. These results indicate that board reforms across different cohort years and calendar years significantly reduce firms’ reliance on accounts payable.

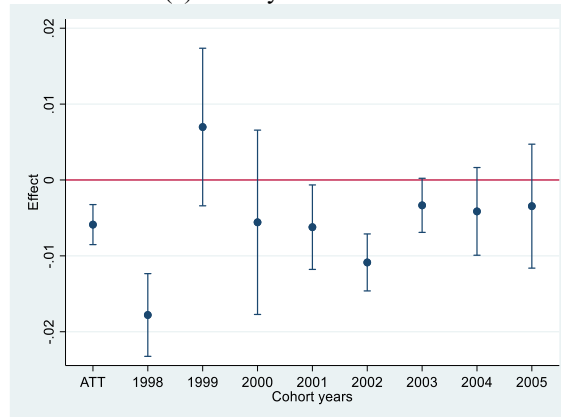
² To estimate the ATT, we use not-yet-treated firms as control firms in our full sample and a regression approach without covariates (Baker et al., 2022).

Figure OA.B: Callaway and Sant'Anna (2021) estimator

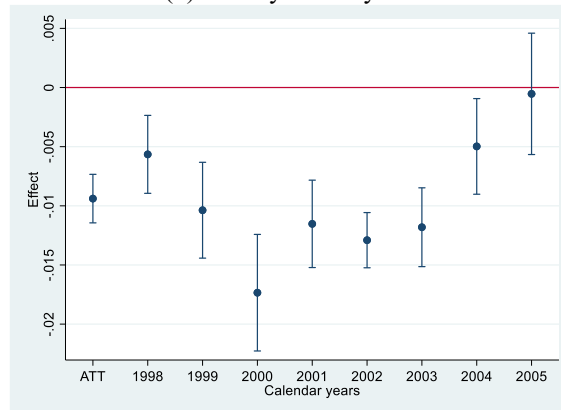
This figure plots the average treatment effect on the treated (ATT) estimated using the Callaway and Sant'Anna (2021) estimator for the effect of board reforms on trade credit. Panel (a) presents the Callaway and Sant'Anna (2021) estimates by relative time within the event window of $[-7, +5]$, where year 0 is the first year the major board reform is effective. Panel (b) depicts the Callaway and Sant'Anna (2021) ATT estimates by cohort years. Panel (c) shows the Callaway and Sant'Anna (2021) ATT estimates by calendar years. To estimate the ATT, we use not-yet-treated firms as control firms in our full sample and a regression approach without covariates (Baker et al., 2022).



(a) ATT by relative time



(b) ATT by cohort years



(c) ATT by calendar years

OA.C: Supply-side perspective on trade credit

To provide a more complete picture of how board reforms affect trade-credit markets, we examine the supply-side perspective by testing whether reformed firms become more willing and able to extend trade credit to their downstream customers. We measure trade credit provision using 1) the accounts-receivable-to-sales ratio (Receivables/Sales) and 2) unexpected (discretionary) accounts receivable (UAR). As shown in Columns (1) and (2) of Table OA.C, the coefficient on POST is positive and statistically significant in both specifications. Thus, following board reforms, firms not only reduce their own reliance on supplier financing (consistent with our main results) but also extend more trade credit to their customers. These complementary findings suggest that stronger corporate governance improves suppliers' trustworthiness and credit-assessment capabilities, shifting reformed firms from net borrowers to net lenders of trade credit. This shift is likely to enhance the efficiency of inter-firm financing networks and improve supply-chain stability. The increase in accounts receivable is also in line with prior evidence that extending more trade credit is associated with higher future sales growth, operating profitability, and stock returns (e.g., Goto et al., 2015; Box et al., 2018).

Table OA.C. Board reforms and accounts receivable

This table presents estimates of robustness tests for the effects of board reforms on trade credit focusing on the credit that firms extend to their downstream customers. The dependent variable Receivables/Sales is calculated as accounts receivable (RECTR) divided by sales (SALE), where RECTR is replaced with total receivables (RECT) if RECTR is missing. The dependent variable UAR stands for unexpected accounts receivable, which is the difference between the actual accounts receivable and its expected value, scaled by lagged total assets (Mulford and Comiskey, 2002, p. 187; Marquardt and Wiedman, 2004; Arcas and Martí 2016). The expected value is calculated by multiplying the lagged accounts receivable by the growth in sales. The regressions include the same set of controls as in Column (3) of Table 2. Robust *t*-statistics clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable construction details are provided in Appendix A.

Dependent variable	Receivables/Sales	UAR
	(1)	(2)
POST	0.006*** (4.28)	0.003*** (3.88)
Control variables	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
No. of observations	156,531	157,286
Adj. R^2	0.66	0.14

OA.D: Cross-sectional analysis of working-capital efficiency

To further investigate the operational mechanisms through which governance improvements influence trade-credit usage, we examine whether the observed reduction in accounts payable is concentrated among firms with pre-existing operational inefficiencies. We use working-capital turnover (WCT) as a proxy for this efficiency, defined as the ratio of sales to average net working capital (current assets minus current liabilities). This metric identifies firms that are less effective at generating revenue from their net investment in current assets and liabilities.

We partition the sample into High and Low WCT subsamples based on the country-specific median value in the year preceding the major board reform. The results of this triple-difference (DDD) analysis are presented in Table OA.D. For firms in the Low WCT group, the coefficient on POST is -0.005 and is statistically significant at the 1% level (t -statistic = -3.86). In contrast, the coefficient for the High WCT group is -0.001 and is statistically insignificant. The p -value for the equality of coefficients (0.020) confirms that the impact of board reforms is significantly more pronounced in the Low WCT subsample.

These results provide empirical evidence that the disciplining effect of board reforms is primarily realized in firms characterized by significant operational and governance slack. Inefficient firms, which likely use supplier credit as a costly substitute for traditional financing due to poor internal management, are compelled to optimize their working-capital structures following the improvement in board oversight. Conversely, firms that already maintained lean operational structures and efficient working-capital turnover before the reforms show no significant change in their trade-credit behavior. This analysis supports the conclusion that board reforms mitigate agency-driven financing choices and enhance overall firm efficiency.

Table OA.D. Cross-sectional test: Working capital turnover

This table reports triple-difference (DDD) regression results examining the effect of major board reforms on trade credit (Payables/Assets), conditional on pre-reform firm-level working capital turnover (WCT). POST is a dummy variable equal to one for the five years starting in the year a major board reform enactment, and zero otherwise, during the 11-year window for the major reform (Fauver et al., 2017). WCT is calculated as sales divided by average net working capital (NWC). NWC is defined as current assets (ACT) minus current liabilities (LCT), and average NWC is the mean of beginning and ending NWC for the fiscal year. High and low subsamples are partitioned based on the country-specific median WCT in the year prior to major board reform enactment. All regressions include the same firm- and country-level controls as in Column (3) of Table 2, along with firm and year fixed effects. Robust *t*-statistics, clustered at the firm level, are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: Payables/Assets	(1) High WCT	(2) Low WCT
POST	-0.001 (-1.07)	-0.005*** (-3.86)
<i>p</i> -value for equality of coefficients	0.020	
Control variables	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
No. of observations	59,599	56,097
Adj. R^2	0.795	0.711

Online Appendix References

- Arcas, M.J., Martí C., 2016. Financial performance adjustment in English local governments. *Australian Accounting Review* 26, 141–152.
- Ashbaugh-Skaife, H., Collins, D.W., LaFond, R., 2006. The effects of corporate governance on firms' credit ratings. *Journal of Accounting and Economics* 42, 203–243.
- Athey, S., Imbens, G.W., 2022. Design-based analysis in difference-in-differences settings with staggered adoption. *Journal of Econometrics* 226, 62–79.
- Baker, A.C., Larcker, D.F., Wang, C.C.Y., 2022. How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics* 144, 370–395.
- Borusyak, K., Jaravel, X., Spiess, J., 2024. Revisiting event-study designs: robust and efficient estimation. *Review of Economic Studies* 91, 3253–3285.
- Box, T., Davis, R., Hill, M., Lawrey, C., 2018. Operating performance and aggressive trade credit policies. *Journal of Banking and Finance* 89, 192–208.
- Callaway, B., Sant'Anna, P.H., 2021. Difference-in-differences with multiple time periods. *Journal of Econometrics* 225, 200–230.
- Chod, J., Lyandres, E., Yang, S.A., 2019. Trade credit and supplier competition. *Journal of Financial Economics* 131, 484–505.
- Fauver, L., Hung, M., Li, X., Taboada, A.G., 2017. Board reforms and firm value: worldwide evidence. *Journal of Financial Economics* 125, 120–142.
- Fields, L.P., Fraser, D.R., Subrahmanyam, A., 2012. Board quality and the cost of debt capital: the case of bank loans. *Journal of Banking and Finance* 36, 1536–1547.
- Ge, W., Kim, J., Song, B.Y., 2012. Internal governance, legal institutions and bank loan contracting around the world. *Journal of Corporate Finance* 18, 413–432.

- Goodman-Bacon, A., 2021. Difference-in-differences with variation in treatment timing. *Journal of Econometrics* 225, 254–277.
- Goto, S., Xiao, G., Xu, Y., 2015. As told by the supplier: trade credit and the cross section of stock returns. *Journal of Banking and Finance* 60, 296–309.
- Marquardt, C., Wiedman C., 2004. How are earnings managed? An examination of specific accruals. *Contemporary Accounting Research* 21, 461–89.
- Mulford, C.W., Comiskey, E.E., 2002. The Financial Numbers Game: Detecting Creative Accounting Practices. New York: John Wiley and Sons.
- Ng, C.K., Smith, J.K., Smith, R.L., 1999. Evidence on the determinants of credit terms used in interfirm trade. *Journal of Finance* 54, 1109–1129.

About ECGI

ECGI is an international non-profit membership organisation that provides a platform for debate and dialogue among academics, policymakers, and business leaders, with a focus on major corporate governance, ESG, and stewardship issues.

The views expressed in this working paper are those of the authors, not those of the ECGI or its members.

www.ecgi.global

ECGI Working Paper Series in Finance

Editorial Board

Editor

Nadya Malenko, Professor of Finance, Boston College

Consulting Editors

Renée Adams, Professor of Finance, University of Oxford

Franklin Allen, Professor of Finance and Economics, Imperial London

Julian Franks, Professor of Finance, London Business School

Mireia Giné, Professor of Finance, IESE Business School

Marco Pagano, Professor of Economics, Facoltà di Economia Università di Napoli
Federico II

Series Manager

Asif Malik, ECGI Working Paper Series Manager

<https://www.ecgi.global/publications/working-papers>