



Article

Does Trade Credit Financing Affect Firm Performance? Evidence from an Emerging Market

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Abstract: In this study, we examine the association between interim financing and firm performance in an emerging economy. Prior research shows that firms utilize trade credit to boost their operating performance or market valuation. However, recent research on the relation between trade credit as alternative financing and firm performance provides mixed evidence. Nevertheless, limited research has been conducted in developing economies; hence, we attempt to fill this gap in the present paper. We argue that trade credit may not be attractive to external debt financing as trade credit may not contribute to business growth while external debt financing does. To test our conjecture, we employed ordinary least squares (OLS), firm fixed effects, and random effects regressions. By utilizing 1002 firm-year observations, our findings suggest a negative relationship between trade credit and firm performance. To check and control endogeneity and reverse causality issues we use instrumental variable approach (i.e., Heckman two-stage least squares regression). Our results remain robust through different measures of firm performance and trade credit. Our study provides policy implications and contributions to trade credit and firm performance literature.

Keywords: trade credit; interim financing; developing country; alternative financing; firm performance



Citation: Mahmud, Abdullah Al, Muhammad Shahin Miah, and Mohammad Rakib Uddin Bhuiyan. 2022. Does Trade Credit Financing Affect Firm Performance? Evidence from an Emerging Market.

International Journal of Financial Studies 10: 85. <https://doi.org/10.3390/ijfs10040085>

Academic Editor: Sabri Boubaker

Received: 4 September 2022

Accepted: 16 September 2022

Published: 22 September 2022

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1. Introduction

The main objective of this study is to examine the relationship between trade credit and firm performance from a financial perspective in a developing country context—Bangladesh. The primary impetus of the study rests on the ground that trade credit is an important funding source for business enterprises and thus affects firm performance (Deloof and Jegers 1999; Paul and Boden 2008; Ferrando and Mulier 2013; Cao et al. 2022). Given the substantial research on the various facets of trade credit financing in different jurisdictions, the relation between trade credit and firm performance, from the perspective of a developing country, has not been sufficiently explored (Deloof and Jegers 1999; Egbo and Ezeaku 2017). Hence, the present study attempts to fill this gap by providing empirical evidence from Bangladesh. Bangladesh is among the five fastest-growing economies in the world (Ovi 2019) and is estimated to be the 28th largest in 2030 (Haroon 2021). Hoque et al. (2016) stated that Bangladesh's leading sources of short-term capital are trade credit, bank loans, arrears, commercial paper, and NGO loans. However, Bangladesh's economy is still characterized by a lack of good governance with a heavy dominance of banks and low access to financial services for the poor (Batten and Vo 2014). Considering the setting uniqueness, our study is of high importance in the sense that trade credit and its impact on firm performance is still under-researched. Moreover, it is unclear whether trade credit relating to debt or equity financing is more attractive to business organizations as they may have multiple sources of financing.

Using a large sample of Bangladeshi listed companies over the period of 2011–2019, we find strong evidence that trade credit is negatively associated with firm performance. Specifically, we document a statistically negative association between different measures of

trade credit and the several proxy measures of firm performance in Bangladesh. Our results remain the same in both OLS and fixed effect regression analyses. We interpret our findings as evidence that firms do not depend on trade financing as part of their growth strategy, as trade financing is not found to contribute towards business revenues or net income. Next, we divide our full sample into two sub-samples (larger vs. smaller) based on the size of the business. We do not find any impact of trade credit in larger organizations, but the negative impact of trade credit is highly pronounced in smaller organizations. Our results imply that smaller organizations may have better external debt opportunities with easier terms, which is more cost effective than trade credit financing. Our main results are robust to different measures of trade credit and alternative measures of firm performance. Moreover, the possibility of endogeneity or reverse causality between trade credit financing and firm performance is also addressed through the Heckman two stage regression approach (Heckman 1976, 1979).

Our study provides several contributions. First, this paper contributes to the growing literature on the impact of trade credit on firm performance. We extend this line of research by providing an empirical example from a developing country where debt/equity financing is highly appreciated and more attractive to business enterprises. Our study complements this notion, proving a much finer and negative relation between trade credit financing and firm growth.

Second, our study contributes to the extant literature of trade credit. This is because prior research either focuses on accounts payable or receivables (i.e., single dimension), while we focus on multiple dimensions (both accounts payable and accounts receivables, trade credit channel) to see the impact of backward and forward trade credit financing and how it impacts firm growth, which provides a comprehensive picture of the possible connection between trade credit and firm profitability. Moreover, we use several proxy measures including market-based measures of firm profitability, which provides robustness in our findings. Third, our study contributes to policy making by providing quantitative evidence that financial institutions may be charging lower interest costs, and thereby trade credit financing is becoming less attractive to business enterprises. Notably, our analysis shows that trade credit is negatively contributing to firm performance, and therefore firms will be highly dependent on external debt or equity financing.

Finally, our study offers important legal implications in the sense that firms will have more legal obligations if they become less dependent on trade credit financing, as external debt or equity financing has a definite cost burden. On the other hand, trade credit financing usually develops and extends the business relation between multiple business parties (both backwards and forwards) who are related to the trade credit process.

Moreover, the present study provides empirical evidence regarding the relation between trade financing and firm performance, showing the potential of spontaneous financing compared to debt or equity financing.

The remainder of the paper is structured as follows. Section 2 discusses existing literature and provides research gaps and how this study contributes to extant literature. Section 3 describes the research design, sample selection, regression models, and variables identification etc. Section 4 presents main test results. Section 5 presents additional analyses. Section 6 provides the conclusions.

2. Literature Review

Trade credit is a strategic economic tool (Deloof and Jegers 1999; Ferrando and Mulier 2013; Astvansh and Jindal 2021). A growing body of prior literature has investigated the trade credit from multiple theoretical and empirical lenses (e.g., Ferrando and Mulier 2013; Ge and Qiu 2007; Afrifa 2015; Su and Sun 2011). In practice, trade credit is a two-pronged wing for a business firm: on the one hand, it is to provide trade credit to its subsequent business clients (forward linkage), and on the other hand, it is to get trade credit from its preceding suppliers (backward linkage). Trade credit is an essential source of short-term financing (Hasan and Alam 2022), especially in developing economies (Hill et al. 2017;

Li et al. 2016). Moreover, it also constitutes a significant part of total assets in developed countries firms (e.g., Astvansh and Jindal 2021; Mian and Smith 1992; Petersen and Rajan 1997, Pham and Huynh 2020; Aktas et al. 2012).

Trade credit has information value (Smith 1987; Li et al. 2016; Aktas et al. 2012; Rind et al. 2021). From a non-financial perspective, trade credit helps firms to ensure product quality (Long et al. 1993), smoothen the production system (Fisman 2001), build long-term rapport with customers (Summers and Wilson 2002), and provide optimal inventory management (Afrifa et al. 2021). Aktas et al. (2012) found that trade credit usage by financially sound firms may mitigate the information variability between firms' internal management (e.g., managers) and external stakeholders (such as investors). This information variability exacerbates at the time of economic contraction and leads small firms towards trade credit (Rehman 2010). Additionally, Fisman and Love (2003) argued that trade credit might work better than a formal financing system in a weak market, as trade credit providers have leverage in a few areas: information gatherings, resettlement/cancellation, and enforcement.

However, from a financial perspective, the causal link between trade credit and firm performance has not been studied enough and even produces mixed and varying results at varying levels (Deloof and Jegers 1999; Li et al. 2016; Miah et al. 2021). On the positive side, Box et al. (2018) documented the positive and significant association between a firm's future profitability and concomitant trade credit policies. They further point out that firms with more exposure to trade credit than their rivals in the same industry, with similar profiles, have more significant margins, revenues, and market shares. Su and Sun (2011) pointed out that trade credit has positive effects on private firms' performance measured by return on assets (ROA), and trade credit can relieve the tension in the cash flow chain but cannot solve the financing constraints. They suggest that trade credit is more effective in the wholesale and trading industry. The impact of trade credit investment on the profitability of the agro-food industry in the USA measured by both the market-based measure (Tobin's q) and non-market-based measure (ROI) is positive, as hinted by the finance, production, and commercial premise of trade credit. The cost-benefit analysis should get priority in the trade credit investment decision of the firms (Dary and James 2019). Afrifa (2015) provided evidence that net trade credit and trade credit channel performance is higher for larger firms and equally valid for financially constrained firms.

The positive association between trade credit and firm performance is not straightforward. Baker et al. (2020) showed that trade credit has an inverted U-shaped relationship with firm profitability in India and indicate that firms in India must consider an optimal level of trade credit to maximize their profitability. Lee et al. (2017) pointed out that when trade credit offerings made by the suppliers are at par with the industry averages, a fair business practice comes into play and favorably improves both the suppliers' and the buyers' business performance. Contrarily, any excessive trade credit policies adopted by the suppliers ultimately hamper the buyers' performance. So, managers must be cautious about the level of trade credit in comparison to the industry average. Martínez-Sola et al. (2014) argued that there is a cost-benefit trade-off in trade credit investment. While at low levels of receivables, there exists a positive relationship between trade credit and firm value, contrarily, at the high level of receivables, the relationship turns negative.

In contrast, Osichuk and Wnuczak (2022) found that although trade credit may spur short-term sales growth, the liberal trade credit policy is associated with consequential lower profit margins and the overall downfall of firm profitability. The market share of a firm is in no way influenced by the inclination of a firm to extend trade credit, as it may not be deployed as a long-term market development strategy. Farooq et al. (2021) said that firms with access to bank financing facilities for adjusting their trade credit activities perform better monetarily. Taking bank loans to expand trade credit arrangements is a sound practice that may provide shelter in case of any fluctuation in trade credit. Efficient usage of bank loans for physical business activities can intensify the financial efficiency of corporate firms. The authors suggest to corporate managers that before delivering any

trade credit terms, they should ensure the availability of bank loans because it provides a robust financial pace against any financial disturbance. [Li et al. \(2016\)](#) explored the relationship between trade credit and firm performance among Chinese firms using an instrumental variable approach to address endogeneity and became suspicious of the claim that trade credit raises firm performance.

Prior empirical works (e.g., [Pham and Pham 2020](#); [Bussoli and Conte 2020](#); [Pham and Huynh 2020](#)) explored trade credit from its two distinct forms: receivables and payables, and provided interesting results. [Astvansh and Jindal \(2021\)](#) presented evidence that the provided (given to customers) trade credit increases a firm's value but reduces the profitability, whereas received trade credit (accepted from suppliers) decreases a firm's value but increases the profitability. In sync with [Astvansh and Jindal \(2021\)](#), [Bussoli and Conte \(2020\)](#) stated that companies in Italy might augment their profitability by increasing investments in trade receivables to a more significant extent than companies in their business segment. The greater use of payables to suppliers and the higher incidence of bank debt reduces the accounts receivable's contribution to companies' profitability. [Abuhommous \(2017\)](#) noted that firms in Jordan could improve their profitability by extending more credit to the customers, which is even more valid for firms with unstable market demand. [Martínez-Sola et al. \(2014\)](#) found that managers can improve firm profitability by increasing their investment in receivables and that the effect is greater for financially unconstrained firms (larger and more liquid firms), firms with volatile demand, and for firms with bigger market shares. [Pham and Pham \(2020\)](#) concluded that trade credit through accounts receivables and account payables positively impact large businesses and negatively affect small businesses in Vietnam. This happens as the bigger businesses are ahead of the smaller ones in gathering monetary resources and market power. They further suggested that a firm should put effort into scaling up its size, and small firms should control the cost of trade credit. [Tang \(2014\)](#) found that accounts payables are positively related to the profitability of Small and Medium Enterprises (SMEs) in the Netherlands, but no clear relationship was found between accounts receivables and SMEs' profitability. Furthermore, during the financial crisis of 2008, it was found that the crisis hampers company performance. Moreover, the incidence of such a global crisis was lower (greater) for firms that reported increased trade receivables (payables) during crisis times compared to pre-crisis periods ([Kestens et al. 2011](#)).

The present study focuses on Bangladesh. Similar to many other countries, it has trade credit provision, which plays an important function of supply chain middlemen ([Emran et al. 2021](#)). In an empirical study on the agricultural value chain in India and Bangladesh, [Gautam and Faruquee \(2016\)](#) stated that around 30% of transactions in the agri-value chains of the countries take place through trade credit without any pledge. However, trade credits in Bangladesh are costlier for farmers in comparison to cash transactions and bank loans. The feed sellers can exploit farmers by imposing high trade credit costs, as they are an organized entity and they control the market by a cartel. This system is helping to increase fish production in Bangladesh, but incurs a significant level of inefficiency in the production process. The policymakers should take corrective actions on the ceilings of the trade credit costs ([Islam et al. 2020](#)).

Existing research on trade credit from a financial perspective in Bangladesh is very limited. [Siddiqua and Mahmud \(2015\)](#) found that account receivables contribute significantly to the management of corporate finance as the suppliers have cost advantages over formal financial institutions in granting credit to their customers. They further suggest that efficient dealings of receivables can accelerate the growth of the industry rapidly. Contrarily, investment in accounts receivables is not cost-free. Proper selection of customers and appropriate promotional activities are essential to ensure better sales and profit and, ultimately, business sustainability. A tight credit policy may work for slow-paying customers ([Hasan and Saha 2014](#)).

Taking the above studies together, it is unclear how trade credit financing affects the listed companies in Bangladesh, which is explored in the present study. Our study presents

a scenario from the perspective of a developing country, examining whether trade financing relating to debt/equity financing is more attractive or not. Based on the above literature, the following hypothesis is estimated:

H₁. *Trade credit is negatively associated with firm operating performance.*

3. Research Methodology

3.1. Sample

For the purpose of our study, we collect our data from different sources. For instance, we collect firm fundamentals including trade credit data from COMPUSTAT global and we hand-collect governance data from the annual reports of our sample companies. For missing variables in COMPUSTAT, we collect from annual reports. Our sample selection starts from 2011 to 2019. We exclude all financial and insurance companies as they are subject to different regulations, and it is consistent with prior accounting and finance research. We retain 1002 firm-year observations for our regression analysis to test our hypothesis. Table 1 presents the sample determination process (Panel A). Panel B shows the industry wise sample distribution. We find that our sample firms are in nine industries. The highest number of firm-year observations comes from the textile industry (18.26%), followed by the engineering industry (17.76%), the pharmaceutical industry (14.87%), and with the lowest number coming from the tannery industry in Bangladesh (3.49%).

Table 1. Sample selection.

Panel A: Sample selection		
Total number of firm-year observations from 2011 to 2019		1902
Less: Firm-year observations in the financial and utilities industries		(720)
Less: Firm-year observations dropping due to insufficient control variables		(180)
Final sample size from 2011 to 2019		1002
Panel B: Industry- and year-wise distribution		
Industry	N	%
Cement and Ceramics	97	9.68
Engineering	178	17.76
Food and Allied	87	8.68
Fuel and Power	106	10.58
IT and Services	97	9.68
Miscellaneous	70	6.99
Pharmaceuticals	149	14.87
Tannery	35	3.49
Textile	183	18.26
Total	1002	100%

3.2. Research Design

This study uses panel data, and we follow Hausman's (1978) study to decide which model (fixed effect, random effect, or pooled OLS) is appropriate for our analysis. Based on the result of Hausman's test, we find that the fixed effects regression model is more suitable (F-test = 7.70, $p < 0.0001$) for our analysis.¹

To test our hypothesis regarding the impact of trade credit on firm operating performance, we estimate the following regression model.

$$\begin{aligned}
\text{Firm Performance}_{i,t} = & \beta_0 + \beta_1 \text{TradeCredit}_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{LEV}_{i,t} + \beta_4 \text{OCF}_{i,t} \\
& + \beta_5 \text{BODSIZE}_{i,t} + \beta_6 \text{ACSIZE}_{i,t} + \beta_7 \text{BIND}_{i,t} + \\
& \beta_8 \text{INST_OWN}_{i,t} \\
& + \beta_9 \text{FIN_DISTRESS}_{i,t} + \beta_{10} \text{CA_CL}_{i,t} + \beta_{11} \text{BIG4}_{i,t} \\
& + \beta_{12} \text{DUALITY}_{i,t} + \beta_{13} \text{PPE}_{i,t} + \beta_{14} \text{CAPEX}_{i,t} + \\
& \beta_{15} \text{NWC}_{i,t} \\
& + \beta_{16} \text{LNAGE}_{i,t} + \sum \text{YEAR}_{i,t} + \varepsilon_{i,t},
\end{aligned} \tag{1}$$

where our outcome variable is firm performance, which is measured by ROA and GPRO. Return on assets (ROA) is measured as the ratio of net income to total assets of the sample firm, and GPRO is measured as the ratio of gross operating income to total assets of the sample firm. Our main variable of interest, 'TradeCredit', is one of the three different measures following prior research (*TCR_REC*, *TCR_RECR*, *TCR_CHANNEL*). We also control a list of variables including governance variables, which are firm fundamentals following prior literature for the potential influence on the relation between trade credit and firm performance. For example, prior research documents state that firm size is one of the important determinants of firm profitability, as bigger firms are usually in a privileged condition in the market, and they therefore have a higher growth and greater market valuation (Baker et al. 2020; Cao et al. 2022). Hence, we expect a positive coefficient of firm size (*SIZE*) with operating performance. We also control leverage, as external debt financing is one of the cheapest alternatives of credit financing, which is assumed to be positively associated with firm performance (Cao et al. 2022). We argue that the coefficient of leverage (*LEV*) will be positive with firm performance. Liquid capital keeps firms more confident and more resilient in times of crisis. Moreover, the availability of liquid assets increases a firm's competitive position in the market, and it is therefore positively associated with a firm's profitability (Baker et al. 2020). We argue that a firm's operating cash flow (*OCF*) is positively correlated with a firm's operating performance and growth. Hence, we expect that the coefficient of *OCF* will be positive to the operating performance. Following prior trade credit financing and firm performance literature (e.g., Hasan and Alam 2022; Miah and Bhuiyan 2022; Cao et al. 2022), we control a firm's corporate governance control variables, including board of directors' size (*BODSIZE*), size of the audit committee (*ACSIZE*), independence of board of directors (*BIND*), CEO and chairman presence in the same board (*DUALITY*), and types of shareholders, particularly the proportion of shares owned by institutional shareholders (*INST_OWN*). Prior research finds that older firms are more profitable than younger firms, as older firms get more access to external funds and greater reputation and goodwill compared to their smaller counterpart firms (Baker et al. 2020). Consistently, we control firm age (*LNAGE*), and we assume that the sign of *LNAGE* will be positive with firm performance measure (ROA, and GPRO). We also control the financial distress level, similar to prior research, such as Opler and Titman (1994), who documented that the indirect cost of financial distress is significant and has a direct impact on firm profitability. Consistently, we expect that the sign of financial distress (*FIN_DISTRESS*) with firm operating performance will be negative. In addition, we control the proportion of property, plant, and equipment to total assets (*PPE*), the ratio of capital expenditure to total assets (*CAPEX*), the ratio of current assets to current liabilities (*CA_CL*), and the net-working capital (*NWC*) on firm operating performance. Prior literature provides mixed evidence with these control variables and the signs of these variables vary in different research contexts (Miah and Bhuiyan 2022; Box et al. 2018; Tan 2012). Finally, we also control the type of the audit firm that audited the client, and its impact on firm profitability. Prior research documents that firms perform better when they are audited by one of the big four audit firms, because a high-quality audit increases a firm's reputation, thereby resulting in greater revenue and growth (Zhou et al. 2018). We expect that the sign of *BIG4* will be positive with firm operating performance in the present study. Definitions of all variables are provided in Appendix A.

4. Empirical Results

4.1. Descriptive Statistics

Table 2 presents the descriptive statistics of the regression variables used in the present paper. The mean (median) value of return on assets (ROA) is 0.051 (0.036) and the mean (median) value of gross operating income is 0.120 (0.091). The mean (median) value of trade credit (measure 1) is 0.626 (0.180), which indicates that more than 62% sample firms are involved with trade credit financing.

Table 2. Descriptive statistics.

Variable	N	Mean	Median	Sd	p25	p75	p90	Min	Max
ROA	1002	0.051	0.036	0.066	0.013	0.077	0.145	−0.123	0.28
GPRO	1002	0.12	0.091	0.121	0.053	0.15	0.243	−0.059	0.753
TCR_REC	1002	0.626	0.18	2.242	0.084	0.385	0.754	0	17.334
TCR_RECR	1002	0.287	0.165	0.438	0.081	0.326	0.562	0	2.909
TCR_CHANNEL	1002	1.189	0.278	5.177	0.144	0.508	0.868	0.005	40.549
TCP_AP	1002	0.585	0.04	3.434	0.012	0.135	0.286	0	28.183
TCP_SQRAP	1002	12.122	0.002	91.206	0	0.018	0.082	0	794.28
SIZE	1002	8.029	7.971	1.67	6.942	9.115	10.275	4.524	11.835
LEV	1002	0.084	0.023	0.137	0	0.112	0.243	0	0.702
OCF	1002	0.063	0.048	0.097	0.006	0.108	0.19	−0.168	0.373
BODSIZE	1002	2.009	2.079	0.3	1.792	2.197	2.398	1.386	2.996
ACSIZE	1002	1.297	1.386	0.223	1.099	1.386	1.609	0.693	2.197
ACIND	1002	0.349	0.333	0.149	0.25	0.333	0.5	0	1
BIND	1002	0.24	0.218	0.11	0.182	0.286	0.4	0	0.909
INST_OWN	1002	0.155	0.142	0.111	0.071	0.221	0.306	0	0.694
FIN_DISTRESS	1002	−4.065	−4.362	0.989	−4.597	−3.801	−2.989	−5.541	0.652
CA_CL	1002	2.101	1.364	2.708	1.018	2.131	3.439	0.176	20.492
BIG4	1002	0.172	0	0.377	0	0	1	0	1
DUALITY	1002	0.023	0	0.15	0	0	0	0	1
PPE	1002	0.429	0.429	0.22	0.264	0.591	0.726	0.014	0.91
CAPEX	1002	0.046	0.021	0.062	0.002	0.065	0.13	0	0.312
NWC	1002	0.04	0.042	0.216	−0.076	0.167	0.303	−0.565	0.533
LNAGE	1002	2.598	2.833	0.899	2.079	3.296	3.497	0	3.761

Table 3 presents correlation statistics for the variables used in our analysis. It shows that the firm performance (ROA) is negatively correlated with all of the measures of trade credit, which is consistent with our conjecture. In sum, it proves our hypothesis that trade credit does not boost the firm performance of listed companies in Bangladesh. Similarly, we find negative correlation between the second measure of trade credit (GPRO) with five other measures of trade credit, which justifies our baseline assumption regarding the relation between trade credit and firm performance. We find that the firm performance is positively correlated with firm size (SIZE), operating cash flow (OCF), size of the board (BODSIZE), size of the audit committee (ACSIZE), the ratio of current assets to current liabilities (CA_CL), type of audit firm (Big4), investment in capital expenditure (CAPEX), the level of current working capital (NWC), and negatively correlated with the firm's leverage (LEV), the proportion of independent directors in audit committee (ACIND), shareholding by institutional shareholders (INSTOWN), the propensity of firms financial distress (FIN_DISTRESS), the presence of CEO duality (where the position of chairman and a firm's CEO are held by one individual) (DUALITY), investment in fixed assets (PPE), and the age of a firm listed with the stock exchange (AGE).

Table 3. Correlation statistics.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
ROA	1	1																					
TCR_REC	2	−0.1	1																				
TCR_RECR	3	−0.17	0.92	1																			
TCR_CHANNEL	4	−0.07	0.91	0.83	1																		
TCP_AP	5	−0.04	0.74	0.68	0.94	1																	
TCP_SQRAP	6	−0.04	0.74	0.66	0.92	0.99	1																
SIZE	7	0.2	0.24	0.24	0.28	0.26	0.25	1															
LEV	8	−0.25	−0.05	0	−0.08	−0.09	−0.08	0.05	1														
OCF	9	0.61	−0.06	−0.16	−0.03	−0.01	−0.01	0.08	−0.11	1													
BODSIZE	10	0.08	0.09	0.05	0.13	0.14	0.12	0.38	0.21	0.11	1												
ACSIZE	11	0.14	0.02	0	0.05	0.06	0.05	0.22	−0.05	0.17	0.24	1											
ACIND	12	−0.02	0.01	0.04	0	−0.01	−0.01	0.01	0.06	−0.04	0.02	−0.29	1										
BIND	13	−0.01	−0.01	0.04	0.08	0.12	0.08	−0.06	−0.01	0	−0.22	0.01	0.32	1									
INST_OWN	14	−0.05	0.13	0.14	0.14	0.13	0.12	0.19	−0.11	−0.09	0.01	−0.08	0.15	−0.03	1								
FIN_DISTRESS	15	−0.52	−0.01	0.05	−0.04	−0.06	−0.06	−0.03	0.91	−0.27	0.14	−0.08	0.05	0.01	−0.08	1							
CA_CL	16	0.08	0.01	0.12	−0.04	−0.06	−0.05	−0.18	0.08	0	−0.19	−0.11	0	0.11	−0.06	0.03	1						
BIG4	17	0.38	−0.08	−0.1	−0.08	−0.07	−0.06	0.3	−0.11	0.24	0.3	0.17	−0.08	−0.08	−0.03	−0.2	−0.08	1					
DUALITY	18	−0.07	−0.03	−0.04	−0.03	−0.02	−0.02	−0.04	0.03	−0.05	0	−0.09	−0.05	−0.09	−0.02	0.04	−0.06	−0.02	1				
PPE	19	−0.15	−0.25	−0.25	−0.29	−0.27	−0.25	−0.04	0.16	−0.03	0.03	0.05	−0.02	−0.05	−0.09	0.18	−0.05	−0.12	0.02	1			
CAPEX	20	0.16	−0.12	−0.14	−0.11	−0.1	−0.09	0.15	0.08	0.14	0.07	0.04	0.09	0	0.02	0	−0.13	0.04	−0.05	0.29	1		
NWC	21	0.03	−0.08	0.06	−0.18	−0.21	−0.18	−0.09	0	−0.16	−0.26	−0.11	0.03	0.01	0.08	−0.02	0.51	−0.07	−0.04	−0.17	−0.14	1	
LNAGE	22	−0.06	0.02	−0.06	0.01	−0.01	0	−0.19	−0.08	−0.03	0.04	0.01	0.07	−0.03	0.07	−0.06	−0.08	−0.05	0.04	−0.19	−0.2	−0.08	1

4.2. Main Regression Results

Table 4 displays the main regression results of trade credit and firm performance. We use an accounting-based firm performance measure, i.e., return on assets (ROA), and we investigate the association between trade credit and firm performance. We use three different measures of trade credit. For instance, the first measure of trade credit (*TCR_REC*), which is the ratio of account receivables to total sales of the sample firm, the second measure of trade credit (*TCR_RECR*), which is measured as the ration of natural logarithm of one plus the ratio of account receivables to total sales, and the third measure of trade credit (*TCR_CHANNEL*), which is the ratio of the sum of total receivables and accounts payables to total revenue of the sample firm. The first three models show the results of OLS regression and last three models show the results of fixed effect regression. Model (1) shows the results of firm performance and the first measure of trade credit. The coefficient of *TCR_REC* is negatively associated with trade credit, which is statistically significant at 1% level and the result is consistent with our first hypothesis (H1). We find the same result in both OLS and fixed effect regression. However, it is contradictory with prior research (such as Ferrando and Mulier 2013; Ng et al. 1999; Deloof and Jegers 1996). For instance, Ferrando and Mulier (2013) argue that trade financing through only accounts payable is not enough; rather, account receivables can also play a significant role in a firm's profitability. Consistent with their arguments, they find that both account receivables and accounts payable are equally important for a firm's profitability. More specifically, the authors argue that management can use account receivables to increase firm performance: if the company decides to lower inventory (i.e., holding cost), they will sell their product as much as possible, thereby resulting in greater account receivables. Moreover, allowing for delayed payment can increase sales, which will eventually increase firm profitability.

However, we find a negative association between trade credit and firm performance, which displays the unique market situation prevailing in Bangladesh. The plausible reason may be the greater dependence on external funding from financing organizations, for example funding by banks or non-bank financial institution. Another reason could be lower interest charge on external funding than trade credit. Model (2) shows the results for the association between firm performance and the finer measure of trade credit (*TCR_RECR*), which uses logarithms to remove outliers in the dataset. Moreover, this measure removes possible spurious effects due to unobservable effects on the dataset. The coefficient of *TCR_RECR* is also negative and statistically significant, which suggests that trade credit is not associated with firm performance. The two measures above focus on a firm's trade receivables using the sample firms, where the third measure of trade credit covers both trade receivables and trade/account payables. This is because the third measure considers the liabilities to suppliers of raw materials of the sample companies. It is assumed that credit financing from a supplier can contribute significantly to firm profitability. Delaying suppliers' payment can be an alternative cost affecting financing, which can increase firm performance. The results of analysis are presented in column 3 of Table 4. We find that the coefficient of trade credit (*TCR_CHANNEL*) is also negative and statistically significant at the 1% level, which indicates that trade credit decreases firm performance. Returning to the control variables, we find that firm size (*SIZE*) is positively associated with firm performance, implying that larger firms tend to perform better than smaller firms, which is consistent with prior research (e.g., Cao et al. 2022). The proportion of long-term debt to total assets (*LEV*) is also positively associated with firm performance, which indicates that firms with external debt perform better than firms with lower external debt (e.g., Cao et al. 2022). The coefficient of *LEV* is positive and statistically significant at 1%, which justifies our main results that Bangladesh-listed companies are more efficient in managing external debt rather than trade credit in Bangladesh. The sign of operating cash flow (*OCF*) is also positive, which suggests that a highly liquid firm performs well, and the results remain consistent in all three measures of trade credit. Overall, it suggests that the listed firms are not efficient in managing backwards or forwards trade credit financing, and it negatively affects firm profitability. We do not find any significant impact of governance variables on

firm performance, which warrants further research on using the same setting. However, we document a negative impact between the measure of financial distress (*FIN_DISTRESS*) and firms profitability (*ROA*), which is consistent with prior research (Opler and Titman 1994; Tan 2012). We also find that firm profitability is higher (*ROA*) when they are audited by one of the big four audit firms, which is also consistent with audit fee literature (e.g., Zhou et al. 2018). It indicates that a high quality audit results in greater firm performance, which is consistent with global literature regarding audit quality and firm performance (such as, Al-Matari et al. 2017; Sayyar et al. 2015; Al Ani and Mohammed 2015). The adjusted R^2 of the regression models is between 0.73 and 0.74, which shows the model fitness and proves that our models do not suffer from the variable of omission problems.

Table 4. Regression analysis results (trade credit and firm performance based on *ROA*): OLS and fixed effect.

Panel A: <i>ROA</i> , Dependent Variable						
VARIABLES	Pooled OLS			Fixed Effect		
	ROA	ROA	ROA	ROA	ROA	ROA
<i>TCR_REC</i>	−0.002 *** [−3.92]			−0.005 *** [−4.72]		
<i>TCR_RECR</i>		−0.013 *** [−3.93]			−0.041 *** [−7.47]	−0.001 * [−1.81]
<i>TCR_CHANNEL</i>			−0.001 *** [−2.97]			
<i>SIZE</i>	0.003 *** [3.13]	0.003 *** [3.20]	0.003 *** [3.02]	−0.010 *** [−2.92]	−0.009 *** [−2.74]	−0.009 ** [−2.56]
<i>LEV</i>	0.449 *** [4.24]	0.446 *** [4.24]	0.472 *** [3.81]	0.369 *** [18.83]	0.370 *** [19.22]	0.368 *** [18.58]
<i>OCF</i>	0.220 *** [7.37]	0.216 *** [7.42]	0.219 *** [6.66]	0.100 *** [8.92]	0.092 *** [8.35]	0.100 *** [8.84]
<i>BODSIZE</i>	−0.003 [−0.72]	−0.003 [−0.69]	−0.003 [−0.57]	−0.002 [−0.33]	−0.003 [−0.47]	−0.001 [−0.13]
<i>ACSIZE</i>	0.005 [0.83]	0.005 [0.82]	0.006 [1.07]	−0.003 [−0.52]	−0.002 [−0.34]	−0.004 [−0.61]
<i>ACIND</i>	−0.002 [−0.30]	−0.002 [−0.22]	0.000 [0.02]	−0.017 * [−1.87]	−0.017 * [−1.84]	−0.017 * [−1.76]
<i>BIND</i>	0.003 [0.29]	0.005 [0.45]	0.003 [0.27]	0.017 [1.37]	0.017 [1.38]	0.020 [1.61]
<i>INST_OWN</i>	−0.015 [−1.48]	−0.014 [−1.43]	−0.013 [−1.30]	−0.008 [−0.66]	−0.009 [−0.80]	−0.006 [−0.54]
<i>FIN_DISTRESS</i>	−0.082 *** [−5.09]	−0.082 *** [−5.08]	−0.086 *** [−4.54]	−0.074 *** [−28.03]	−0.073 *** [−28.24]	−0.074 *** [−27.95]
<i>CA_CL</i>	0.001 ** [2.56]	0.002 *** [2.77]	0.001 ** [2.32]	0.001 [1.02]	0.001 [1.27]	0.001 [1.15]
<i>BIG4</i>	0.017 *** [4.12]	0.017 *** [4.21]	0.016 *** [3.88]	0.007 ** [1.98]	0.007 ** [1.99]	0.007 * [1.95]
<i>DUALITY</i>	−0.007 [−1.52]	−0.008 [−1.52]	−0.007 [−1.42]	0.007 [0.84]	0.007 [0.92]	0.007 [0.82]
<i>PPE</i>	−0.027 *** [−3.94]	−0.027 *** [−4.03]	−0.027 *** [−3.75]	−0.032 *** [−3.26]	−0.037 *** [−3.78]	−0.031 *** [−3.10]
<i>CAPEX</i>	0.030 [1.22]	0.029 [1.17]	0.027 [1.07]	−0.011 [−0.64]	−0.013 [−0.74]	−0.009 [−0.54]
<i>NWC</i>	0.002 [0.25]	0.005 [0.51]	0.003 [0.33]	−0.005 [−0.59]	−0.006 [−0.63]	−0.006 [−0.68]
<i>LNAGE</i>	−0.003 [−1.48]	−0.003 * [−1.74]	−0.003 * [−1.67]	−0.002 [−0.57]	−0.002 [−0.71]	−0.002 [−0.50]
Industry controlled	Yes	Yes	Yes	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.345 *** [−4.92]	−0.341 *** [−4.87]	−0.365 *** [−4.43]	−0.174 *** [−5.52]	−0.166 *** [−5.39]	−0.190 *** [−6.02]
Observations	1002	1002	1002	1002	1002	1002
Unnumber of firms in the panel				114	114	114
R-squared	0.74	0.75	0.74	0.59	0.60	0.58
Adj. R-squared	0.74	0.74	0.73	0.52	0.54	0.51

Table 4. Cont.

Panel B: GPRO, Dependent Variable						
VARIABLES	Pooled OLS			Fixed Effect		
	GPRO	GPRO	GPRO	GPRO	GPRO	GPRO
TCR_REC	−0.007 *** [−6.28]			−0.008 *** [−2.76]		
TCR_RECR		−0.044 *** [−7.36]			−0.061 *** [−3.97]	
TCR_CHANNEL			−0.003 *** [−5.00]			−0.001 [−0.57]
SIZE	0.005 ** [2.36]	0.005 *** [2.65]	0.005 ** [2.33]	−0.037 *** [−3.99]	−0.036 *** [−3.88]	−0.035 *** [−3.81]
LEV	0.438 *** [2.91]	0.424 *** [2.89]	0.463 *** [2.67]	0.299 *** [5.59]	0.300 *** [5.64]	0.298 *** [5.55]
OCF	0.457 *** [10.25]	0.442 *** [10.21]	0.454 *** [9.65]	0.212 *** [6.94]	0.201 *** [6.57]	0.212 *** [6.93]
BODSIZE	−0.016 [−1.60]	−0.016 [−1.61]	−0.014 [−1.39]	−0.045 ** [−2.44]	−0.046 ** [−2.52]	−0.042 ** [−2.30]
ACSIZE	0.017 [1.03]	0.017 [1.04]	0.017 [1.10]	0.015 [0.88]	0.017 [0.99]	0.015 [0.84]
ACIND	0.017 [0.64]	0.020 [0.73]	0.017 [0.62]	0.014 [0.57]	0.015 [0.61]	0.016 [0.61]
BIND	−0.012 [−0.36]	−0.008 [−0.24]	−0.004 [−0.11]	−0.002 [−0.06]	−0.001 [−0.04]	0.007 [0.19]
INST_OWN	−0.090 *** [−3.14]	−0.087 *** [−3.07]	−0.087 *** [−3.00]	−0.049 [−1.58]	−0.051 * [−1.65]	−0.047 [−1.51]
FIN_DISTRESS	−0.068 *** [−3.00]	−0.065 *** [−2.97]	−0.072 *** [−2.77]	−0.049 *** [−6.92]	−0.048 *** [−6.81]	−0.051 *** [−7.04]
CA_CL	−0.003 ** [−2.12]	−0.002 * [−1.79]	−0.003 ** [−2.12]	−0.001 [−0.72]	−0.001 [−0.60]	−0.001 [−0.67]
BIG4	0.033 *** [3.36]	0.032 *** [3.36]	0.031 *** [3.10]	0.013 [1.31]	0.012 [1.30]	0.013 [1.30]
DUALITY	0.037 [1.01]	0.037 [1.00]	0.038 [1.04]	0.075 *** [3.41]	0.075 *** [3.46]	0.074 *** [3.38]
PPE	−0.083 *** [−5.08]	−0.086 *** [−5.31]	−0.086 *** [−5.03]	−0.071 *** [−2.65]	−0.077 *** [−2.89]	−0.068 ** [−2.54]
CAPEX	0.021 [0.44]	0.013 [0.29]	0.013 [0.28]	−0.075 [−1.60]	−0.077 * [−1.65]	−0.072 [−1.53]
NWC	0.021 [1.03]	0.028 [1.41]	0.017 [0.79]	−0.046 * [−1.86]	−0.046 * [−1.89]	−0.046 * [−1.84]
LNAGE	0.003 [0.90]	0.002 [0.50]	0.002 [0.66]	0.001 [0.09]	0.000 [0.03]	0.001 [0.13]
Industry Controlled	Yes	Yes	Yes	No	No	No
Year Controlled	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.170 * [−1.69]	−0.154 [−1.57]	−0.195 * [−1.70]	0.277 *** [3.23]	0.286 *** [3.35]	0.250 *** [2.93]
Observations	1002	1002	1002	1002	1002	1002
Number of firms in the panel				114	114	114
R-squared	0.41	0.41	0.40	0.18	0.19	0.18
Adj. R-squared	0.39	0.39	0.38	0.05	0.06	0.05

***: $p < 0.01$; **: $p < 0.05$; *: $p < 0.10$.

Panel B, Table 4, shows the results of the impact of trade credit and firm performance using the second measure of firm performance. In this case, we use the gross operating income scaled by the total assets as a proxy of a firm's profitability. Similar to Panel A, we use three different measures of trade credit based on receivables only, accounts payable only, and credit channel (both account receivables and accounts payable). The first three models show the OLS regression results and the last three columns show the fixed effect regression results. Our results show that trade credit, in all cases, is negatively associated with firm profitability, which is consistent with our first measure of firm profitability. We find similar results in both the OLS and fixed effect regression models (in the first two models). The coefficient of trade credit in the third model (fixed effect) is negative, but not statistically significant. Overall, our results are consistent in both OLS and fixed effect regression analyses. In sum, it justifies our analysis in the sense that trade credit is not

boosting firm performance in Bangladesh. Rather, other forms of financing such as debt financing may be attractive based on the nature of business in the same jurisdiction. Similar to Panel A, we find that firm size (SIZE) is positively and significantly associated with firm performance, which suggests that larger firms perform better than smaller firms listed on the Dhaka Stock Exchange. We get identical results between firm performance and debt to total assets ratio (LEV) and ratio of operating cash flow (OCF). We also document a negative association between the measure of financial distress (FIN_DISTRESS) and firm performance (GPRO), which is consistent with our conjectures. In Panel B we find a negative association between firm performance and the level of institutional shareholding (INST_OWN), which indicates that that greater level of institutional ownership results in lower firm performance in Bangladeshi companies. Next, we find that firms perform better if they are audited by one of the big four audit firms, and the sign of BIG4 is positive and statistically significant at the 1% level, which is consistent with our panel A analysis. Finally, the adjusted R² of the regression models [1–3] in Panel B is between 0.38 and 0.39, which is relatively lower than our initial analysis, which supports our main analysis regarding trade credit and accounting-based performance measure (i.e., ROA).

4.3. Endogeneity Test

Heckman Two Stage Estimation

There can be a potential endogenous relationship between credit financing and firm performance. More importantly, the association between credit financing and firm performance can be affected by reverse causality and may suffer from self-selection bias due to unobserved firm characteristics or variable omission problems (Cai et al. 2016; Khanna and Palepu 2000). To address that self-selection biasness regarding affiliation with trade credit, we obtain fitted values from the following first stage regression (where trade credit measures are the dependent variables) and calculate Inverse Mills Ratio (Heckman 1979). Our main objective is to identify the determinants that are likely to affect the decision to undertake trade credit financing. In addition, to control variables from Equation (1), we add some new variables including research and development (RND), business revenue growth (GROWTH), market-to-book ratio (MBRATIO), firm level complexity measures (such as inventories (INV), and receivables (REC)), and types of audit opinion (OPINION) in our first stage regression model.

$$\begin{aligned} \text{Trade credit} = & \beta_0 + \beta_1 \text{SIZE}_{i,t} + \beta_2 \text{LEV} + \beta_3 \text{OCF} + \beta_4 \text{BODSIZE} + \beta_5 \text{ACSIZE} + \beta_6 \text{RND} \\ & + \beta_7 \text{GROWTH} + \beta_8 \text{MBRATIO} + \beta_9 \text{REC} + \beta_{10} \text{INV} + \beta_{11} \text{OPINON} \\ & + \sum \text{YEAR} + \sum \text{INDUSTRY} + e \end{aligned}$$

Our results, after incorporating inverse mills ratio (IMR) from the regression model (2), are presented in columns 2–4 (Table 5, panel A). We find that IMR is not statistically significant, which suggests that there are no endogeneity issues in our analysis between trade credit and firm performance based on ROA. However, when we run our regression models using the second measure of firm performance, i.e., GPRO, we find that IMR is statistically significant, suggesting the presence of reverse causality between our dependent variable (performance) and trade credit measures. Taking both scenarios into consideration, our results show that the signs of all trade credit measure (such as, TCR_REC, TCR_RECR, and TCR_CHANNEL) are negative and statistically significant at 1%, which is consistent with our main analysis in Table 4.

Table 5. Trade credit and firm performance: endogeneity tests.

VARIABLES	Trade Credit TC	ROA	ROA	ROA	GPRO	GPRO	GPRO
	1st Stage	Second Stage	Second Stage	Second Stage	Second Stage	Second Stage	Second Stage
Intercept	−1.856 *** [−3.66]	−0.347 *** [−4.98]	−0.341 *** [−4.88]	−0.367 *** [−4.49]	−0.157 [−1.55]	−0.129 [−1.30]	−0.184 [−1.58]
TCR_REC		−0.002 *** [−3.93]			−0.007 *** [−6.18]		
TCR_RECR			−0.013 *** [−3.90]			−0.054 *** [−7.60]	
TCR_CHANNEL				−0.001 *** [−3.00]			−0.003 *** [−4.83]
SIZE	0.151 *** [3.99]	0.003 *** [3.15]	0.003 *** [3.11]	0.003 *** [3.04]	0.003 * [1.66]	0.003 * [1.81]	0.003 [1.62]
LEV	−0.656 [−1.52]	0.447 *** [4.22]	0.446 *** [4.23]	0.469 *** [3.78]	0.452 *** [2.95]	0.436 *** [2.96]	0.478 *** [2.70]
OCF	−0.580 [−1.07]	0.218 *** [7.35]	0.216 *** [7.40]	0.217 *** [6.66]	0.470 *** [10.42]	0.459 *** [10.56]	0.466 *** [9.82]
BODSIZE	−0.053 [−0.34]	−0.004 [−0.79]	−0.003 [−0.69]	−0.003 [−0.66]	−0.014 [−1.34]	−0.013 [−1.26]	−0.012 [−1.14]
ACSIZE	−0.088 [−0.49]	0.005 [0.86]	0.005 [0.82]	0.007 [1.11]	0.015 [0.95]	0.015 [0.95]	0.016 [1.01]
ACIND		−0.002 [−0.28]	−0.002 [−0.22]	0.000 [0.04]	0.016 [0.60]	0.019 [0.73]	0.016 [0.59]
BIND		0.003 [0.24]	0.005 [0.44]	0.002 [0.20]	−0.008 [−0.23]	−0.002 [−0.06]	0.000 [0.01]
INST_OWN		−0.014 [−1.38]	−0.014 [−1.43]	−0.012 [−1.18]	−0.098 *** [−3.38]	−0.098 *** [−3.42]	−0.095 *** [−3.22]
FIN_DISTRESS		−0.082 *** [−5.08]	−0.082 *** [−5.08]	−0.086 *** [−4.52]	−0.069 *** [−3.01]	−0.066 *** [−2.99]	−0.074 *** [−2.78]
CA_CL		0.001 ** [2.57]	0.002 *** [2.77]	0.001** [2.34]	−0.003 ** [−2.18]	−0.002 * [−1.78]	−0.003 ** [−2.19]
BIG4		0.017 *** [4.15]	0.017 *** [4.14]	0.017 *** [3.91]	0.030 *** [3.04]	0.027 *** [2.76]	0.029 *** [2.86]
DUALITY		−0.007 [−1.41]	−0.007 [−1.50]	−0.006 [−1.28]	0.033 [0.93]	0.031 [0.86]	0.035 [0.96]
PPE		−0.029 *** [−4.06]	−0.027 *** [−4.01]	−0.029 *** [−3.85]	−0.069 *** [−4.37]	−0.070 *** [−4.52]	−0.073 *** [−4.28]
CAPEX		0.032 [1.26]	0.029 [1.16]	0.029 [1.12]	0.010 [0.22]	−0.007 [−0.14]	0.004 [0.08]
NWC		0.005 [0.47]	0.005 [0.50]	0.006 [0.58]	0.004 [0.19]	0.002 [0.10]	0.002 [0.10]
LNAGE		−0.003 [−1.57]	−0.003 * [−1.74]	−0.004 * [−1.78]	0.004 [1.18]	0.003 [0.90]	0.003 [0.92]
RND	−4.232 *** [−3.95]						
GROWTH	−0.438 ** [−2.34]						
MBRATIO	−0.000 [−0.06]						
REC	8.928 *** [7.83]						
INV	0.301 [0.81]						
OPINION	0.194 [0.65]						
IMR		0.003 [1.16]	0.000 [0.03]	0.004 [1.34]	−0.023 *** [−0.023 ***]	−0.035 *** [−0.035 ***]	−0.021 *** [−0.021 ***]
Industry control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1002	1002	1002	996	1002	1002	996
R-squared	0.38	0.74	0.75	0.74	0.41	0.43	0.41
Adj. R-squared	0.37	0.74	0.74	0.73	0.39	0.40	0.39

***: $p < 0.01$; **: $p < 0.05$; *: $p < 0.10$.

5. Further Analysis

5.1. Alternative Measure of Trade Credit

Prior research shows that delayed payment to suppliers can contribute to business growth and profitability (Baker et al. 2020). This is because business will require lower working capital and they can utilize their opportunities for alternative investment channels. Following Baker et al. (2020), we measure trade credit based on accounts payable (TCP) and the square of accounts payable (TCP_SQRAP), and then we regress on the firms' profitability measures (ROA and GPRO). The results of the analysis are presented in Table 5. The first two columns show the results of firm performance (ROA) and trade credit measures (TCP and TCP_SQRAP) and columns 3 and 4 show the results of second performance measure (GPRO) and trade credit measures (TCP and TCP_SQRAP). Consistent with our main analysis, it shows that trade credit is negatively associated with firm performance, which suggests that trade credit financing does not contribute to firm performance. Returning to the control variables, we find that the coefficient of external debt financing proportion (LEV) is significantly positive with both ROA and GPRO, which suggests that Bangladeshi-listed companies manage external debt financing, and they utilize external financing to boost their business compared to trade financing. This may be due to lower interest cost charged by fund providers, particularly by banks and non-bank financial institutions. Further research can extend our research by looking into the impact of external financing on firm performance, using a larger dataset and the same context.

5.2. Alternative Measure of Firm Performance

The measures of firm performance based on ROA and GPRO are not market-based measures. Both ROA and GPRO are accounting earnings-based performance indicators, although they are widely used in accounting and finance research. For robustness, we examine the relation between trade credit and firm performance based on Tobin's Q and return on equity (ROE). Tobin's Q is measured as the market value of assets plus the book value of total debt over the book value of total assets. On the other hand, ROE is measured as the proportion of net income available to shareholders divided by the number of common shares outstanding. The results show (un-tabulated) that the coefficients of trade credit measures (TCR_REC, TCR_RECR) are negative and significant at 1% level, which supports our main analysis. Moreover, it justifies our regression models, as our proxy measures are not suffering from the variable omission problems.

5.3. Trade Credit and Firm Profitability: Larger Companies vs. Smaller Companies

We investigated the relation between trade credit and firm performance for all non-financial listed companies in the Dhaka Stock Exchange (Table 6). However, it is unclear whether the role of trade credit differs between larger companies and smaller companies, as they have different types of infrastructure and a varied level of corporate governance quality. Keeping this in mind, we divide our entire sample into two samples based on median log of total assets. We assign a firm with 1 when its log of total assets is greater than or equal to median value, and 0 otherwise. Then we regress the trade credit on firm performance measure (ROA and GPRO) for both samples. We do not find any significant impact of trade credit on firm performance in larger companies and, however, we find that trade credit has a significantly negative impact on firm performance in smaller companies. This result suggests that the negative impact of trade credit on firm performance is highly pronounced in smaller companies as they have the privilege to get external funding with easier terms from different fund providers, and this is also reflected on the coefficient of leverage in our regression analysis. We get identical results (and the signs of coefficients for trade credit measures) in all models of firm profitability, which justifies our measures of trade credit and measures of firm performance (un-tabulated). All the control variables show similar signs as those we get in our main analysis.

Table 6. Impact of trade credit on firm performance (alternative measure of trade credit).

VARIABLES	ROA	ROA	GPRO	GPRO
TCP_AP	−0.001 ** [−2.43]		−0.004 *** [−4.32]	
TCP_SQRAP		−0.001 ** [−2.27]		−0.002 *** [−3.86]
SIZE	0.003 *** [2.84]	0.003 *** [2.78]	0.004 ** [2.00]	0.004 * [1.84]
LEV	0.476 *** [3.83]	0.477 *** [3.83]	0.475 *** [2.70]	0.480 *** [2.71]
OCF	0.220 *** [6.62]	0.220 *** [6.60]	0.457 *** [9.55]	0.458 *** [9.50]
BODSIZE	−0.002 [−0.48]	−0.002 [−0.52]	−0.013 [−1.22]	−0.013 [−1.29]
ACSIZE	0.006 [0.99]	0.006 [0.97]	0.016 [1.00]	0.016 [0.98]
ACIND	−0.000 [−0.05]	−0.000 [−0.00]	0.015 [0.55]	0.016 [0.60]
BIND	0.004 [0.35]	0.002 [0.19]	0.001 [0.02]	−0.006 [−0.18]
INST_OWN	−0.014 [−1.35]	−0.014 [−1.39]	−0.088 *** [−3.03]	−0.090 *** [−3.09]
FIN_DISTRESS	−0.086 *** [−4.54]	−0.087 *** [−4.54]	−0.074 *** [−2.80]	−0.074 *** [−2.79]
CA_CL	0.001 ** [2.20]	0.001 ** [2.18]	−0.003 ** [−2.24]	−0.003 ** [−2.28]
BIG4	0.017 *** [4.03]	0.017 *** [4.11]	0.033 *** [3.28]	0.034 *** [3.45]
DUALITY	−0.007 [−1.40]	−0.007 [−1.41]	0.039 [1.05]	0.039 [1.05]
PPE	−0.025 *** [−3.59]	−0.024 *** [−3.52]	−0.081 *** [−4.85]	−0.076 *** [−4.69]
CAPEX	0.029 [1.11]	0.029 [1.13]	0.016 [0.34]	0.019 [0.40]
NWC	0.004 [0.44]	0.005 [0.54]	0.019 [0.88]	0.023 [1.08]
LNAGE	−0.004 * [−1.76]	−0.004 * [−1.76]	0.002 [0.51]	0.002 [0.51]
Industry Controlled	Yes	Yes	Yes	Yes
Year Controlled	Yes	Yes	Yes	Yes
Constant	−0.366 *** [−4.42]	−0.366 *** [−4.40]	−0.201 * [−1.72]	−0.200 * [−1.70]
Observations	1002	1002	1002	1002
R-squared	0.74	0.74	0.40	0.40
Adj. R-squared	0.73	0.73	0.38	0.38

***: $p < 0.01$; **: $p < 0.05$; *: $p < 0.10$.

6. Conclusions

This paper studies the relation between trade credit and firm performance of non-financial listed companies in Bangladesh. Our results document that trade credit financing is negatively associated with firm performance, which implies that companies may enjoy external debt or equity financing with a lower cost compared to trade financing. Our results remain robust and hold when we use alternative measures of trade credit and firm performance, and when we control for omitted variables bias in our analysis. Later, to see whether the impact of trade credit financing on firm performance varies between larger and smaller companies, we divided our entire sample into two groups. Our sub-sample analysis shows that the negative impact of trade credit on firm profitability is highly pronounced

in smaller companies. However, we do not find any significant relation between firm profitability and trade credit financing in larger companies.

To conclude, we mention some potential caveats of our present study. First, our study does not present a causal relation between trade credit and firm performance. Instead, we rely on association tests to document the above relation between trade credit and firm performance. Future research can attempt to test any causal relation that exists between trade credit financing and firm performance, which will provide a more detailed picture. Second, we do not examine the impact of debt financing or equity financing on firm performance in our present study, which could provide a better comparative picture with trade credit financing. Rather, we focus only on trade credit, covering both account payables and account receivables and how they impact firm profitability. Future research can extend our research by including both forms of financing (trade credit and debt/equity) in a similar context to provide persuasive inferences. Third, we acknowledge the possibility of some unknown omitted factors that may have influenced our empirical analysis. Despite these limitations, this study, to the best of our knowledge, is the first study in Bangladesh to examine the impact of interim financing on firm profitability of non-financial listed companies in Bangladesh. Regulatory bodies, fund providers (banks and non-bank financial institutions) and other stakeholders will benefit from the outcome of the present study. Our study extends the understanding that firms are not getting attractive credit financing compared to debt financing, which is of high importance to fund providers and banking organizations in developing countries. Moreover, it presents a unique environment where public companies prefer external debt financing compared to interim credit financing. Future researcher can extend our research to see the impetus of external debt financing. More importantly, future research can explore whether any tendency not to repay external debt works as a motivation to acquire loans from banking and other financial organizations, because credit financing is mandatory to repay, and it is largely dependent on a firm's reputation.

Author Contributions: Conceptualization, A.A.M. and M.S.M.; methodology, M.R.U.B.; software, M.S.M.; validation, M.S.M., A.A.M., and M.R.U.B.; formal analysis, M.S.M.; investigation, A.A.M.; resources, A.A.M. and M.S.M.; data curation, A.A.M.; writing—original draft preparation, M.R.U.B.; writing—review and editing, A.A.M. and M.S.M.; visualization, A.A.M.; supervision, A.A.M.; project administration, M.S.M.; funding acquisition, A.A.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The datasets used and/or analyzed during the present study are available from the corresponding author upon reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Variable Definition

Variable Definition Notation	Description
ROA	Ratio of income before extraordinary items divided by total assets of the firm (Box et al. 2018).
GPRO	Gross operating income is divided by total assets (Baker et al. 2020).
TCR_REC	Ratio of account receivables to total sales (Baker et al. 2020).
TCR_RECR	Natural logarithm of one plus the ratio of account receivables to total sales (Cao et al. 2022).
TCR_CHANNEL	The ratio of the sum of total receivables and accounts payable to total revenue of the firm.
TCP	Ratio of payables to total sales of the firm (Baker et al. 2020).
TCP_SQRAP	The square of total accounts payable, following Baker et al. (2020)
SIZE	Natural logarithm of total assets of firm (Cao et al. 2022).
LEV	Ratio of total debt scaled by total assets of the firm (Cao et al. 2022)

OCF	The ratio of cash flow from operating activities to total assets (Cao et al. 2022).
BODSIZE	Natural logarithm of the number of board members (Miah and Bhuiyan 2022).
ACIND	The total number of independent directors scaled by the total number of directors on the audit committee.
ACSIZE	Natural logarithm of the number of members in the audit committee (Miah and Bhuiyan 2022).
BIND	The total number of independent directors scaled by the total number of directors on the board.
INST_OWNS	The proportion of shareholding by institutional shareholders (Miah and Bhuiyan 2022).
FIN_DISTRESS	Financial distress is measured using the adjusted Zmijewski (1984) score.
CA_CL	The ratio of current assets to total current liabilities.
BIG4	A score of 1 if the firm is audited by one of the big four audit firms, and a score of 0 otherwise (Miah and Bhuiyan 2022; Zhou et al. 2018).
DUALITY	Equals 1 if an individual holds the position of CEO and chairperson and otherwise 0.
PPE	Percentage of property, plant, and equipment (PPE) to total assets of the company (Miah and Bhuiyan 2022).
CAPEX	Measured as the ratio of capital expenditure to total assets (Box et al. 2018).
NWC	Measured as the ratio of current assets minus current liabilities minus cash and marketable securities to total assets (Miah and Bhuiyan 2022).
LNAGE	Natural log of a firm's listing age (e.g., Chok and Sun 2007; Mak and Kusnadi 2005).

Note

- ¹ Husman's test (1978) shows that $\chi^2(17) = 124.95$, and $\text{Prob} > \chi^2 = 0.0000$, which suggests that the fixed effects model is more appropriate than the random effects model for the analysis.

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