

Trade Credit and Firm Efficiency: Evidence from Chinese Manufacturing Firms

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ABSTRACT: Our work focuses on the impact of trade credit financing on firm efficiency exploiting a sample of Chinese manufacturing listed firms for the period 2004 to 2018. We find that that trade credit significantly improves firm efficiency. This positive association is stronger in firms located in regions with higher levels of social trust, during periods with higher economic policy uncertainty and in times of economic downturn. We reveal three economic mechanisms underlying our baseline findings: alleviating financial constraints, mitigating agency conflicts, and reducing transaction costs.

KEYWORDS: Trade credit, Firm efficiency, Data envelopment analysis, China

JEL Classification: D21, G32, M11

1 Introduction

Trade credit is one of the most important informal short-term financing sources for firms in emerging markets (Wang et al., 2019; Wu et al., 2014). Suppliers have comparative advantages over financial institutions in that they can collect private information and are thus more willing to lend to their customers. Past theoretical and empirical research has highlighted the key role of trade credit as a financing resource (e.g., Cunat, 2007; Rui & Lai, 2015) and explored its determinates (e.g., Hasan & Habib, 2019; Wu et al., 2014). More recent studies focus on the consequence of trade credit financing and investigate the role of trade credit on corporate operations by looking at the influence of trade credit financing on firms' growth (Ferrando & Mulier, 2013) and performance (Martínez-Sola et al., 2014). Building on such work, our analysis explores the links between trade credit and firm efficiency in China.

We argue that firms who take advantage of trade credit are associated with higher efficiency. Trade credit compensates for the shortage of capital and alleviates financial constraints when firms do not have access to institutional financing. In addition, the use of trade credit provides strong incentives for suppliers to engage in monitoring activities, thereby mitigating agency conflicts. Furthermore, trade credit lessens transaction costs by setting out long-term agreements on the number of payments and deliveries in advance. Financial constraints, agency conflicts and transaction costs are three important constraints on a firm's overall efficiency. However, trade credit is a costly external financing source because of the risks associated with the potential default of buyers and the provision of liquidity insurance (Cunat, 2007). The high cost of trade credit may

compromise a firm's ability to optimally manage their assets. Moreover, trade credit is not detached from moral hazards that may lead to inefficient resource allocation (Agostino & Trivieri, 2019). Consequently, the relation between trade credit financing and firm efficiency remains an open question.

China, today the world's largest emerging market, provides an ideal setting to examine our research question for two reasons. First, it is well known that trade credit financing is pervasive in the Chinese market (Wang et al., 2019). Financial constraints, caused by the lack of robust economic institutions (such as the adequate enforcement of inefficiencies contracts or an otherwise imperfect financial system), have always restricted the development of enterprises in China (Cull et al., 2009). Formal financing channels, such as bank loans, are not sufficient to support growth and expansion (Du et al., 2012). As a result, trade credit has become an important instrument of additional external financing. Given the prevalence of trade credit financing in the Chinese capital market, the country provides us with a 'high-power' testing ground in order to examine the role of trade credit financing for corporations. Second, despite the overall rapid growth of the country's economy, there is large variation in individual firms' efficiency rates (Cull et al., 2017). The coexistence of an imperfect financial system, weak legal system and issues with firm efficiency makes China an interesting case study to compare and contrast with the extant literature on institutions, finance and growth (Allen et al., 2005). Given that trade credit financing is prevalent in developed markets and other emerging markets, our results can shed light on these under-researched domains.

Using a sample of Chinese A-share listed manufacturing firms for the period 2004 to 2018, we find that trade credit is indeed positively associated with firm efficiency. Interestingly, the positive association is stronger when firms are located in provinces with higher levels of ‘social trust’, a finding that is consistent with recent research implying that social trust facilitates the role of trade credit in business transactions (e.g., Wu et al., 2014). Furthermore, the impact of trade credit on firm efficiency intensifies during periods of heightened economic policy uncertainty (EPU) as well as times of economic downturn. This supports the assumption that trade credit financing plays an amplifying role at moments when firms have a greater need for external finance sources.

Next, we test the empirical relevance of the proposed mechanism in our chosen setting. Following the mediation framework proposed by Baron and Kenny (1986), we observe a negative association between trade credit and mediating variables (including financial constraints, agency cost and transaction costs). Further, the positive impact of trade credit on firm efficiency persists after adding mediating variables to our empirical specification. Collectively, we find supportive evidence for our proposed mechanisms.

This study makes several contributions. First, we extend the stream of established studies focused on the implications of trade credit and then provide insights into how the use of trade credit financing improves firm efficiency. Two studies are closely related to our work. The first is by Agostino and Trivieri (2019), who focus on small and medium-sized manufacturing firms in Italy to investigate the relationship between trade credit and technical efficiency. However, instead of technical efficiency, the focus of our study is firms’ overall operational efficiency. In addition, we focus on listed

firms, i.e. large manufacturing firms in China, to investigate the relation between trade credit and firm efficiency, providing supplementary evidence for emerging markets. The second study is by Wang and Kong (2019), who use non-listed Chinese manufacturing firms to examine the relationship between trade credit and firm productivity. Given the differences between non-listed and listed firms in China in terms of information disclosure, financing behaviours and corporate operation structures, it is essential to expand on past work by focussing on listed firms.

Second, our study explores additional channels through which trade credit financing promotes firm efficiency. We find that over and above financial constraints (e.g., Shi et al., 2020; Wang & Kong, 2019), there are two further channels: the mitigation of agency conflicts and the reduction of transaction costs. Our work provides empirical evidence to show in real terms the key monitoring role of suppliers in trade credit financing and on improving firm efficiency, which has previously been presented as theoretical arguments only (Agostino & Trivieri, 2014; Burkart & Ellingsen, 2004). In addition, our findings highlight the vital role of trade credit in the creation of favourable relations with business partners, thereby leading to the reduction of transaction costs and the general improvement of firm efficiency.

Finally, our study extends evidence on the relation between trade credit and firm efficiency by examining socioeconomic variations. Revealing the influence of trade credit in various contexts, our analyses complement the findings that the impact of trade credit can be moderated by considering social capital, such as social trust, economic policy uncertainty and the business cycle. The effect of trade credit financing on firms

can be improved by considering these socioeconomic factors.

This paper is organized as follows. Section 2 summarizes the related literature and proposes our hypotheses. Section 3 describes the methodology of our empirical study, including data, variable constructions and empirical specifications. Section 4 reports our empirical results, organized into the three main economic channels identified above. Section 5 displays some cross-sectional analyses. Section 6 presents our further tests and robust checks. Section 7 concludes the paper.

2 Literature Review and Hypothesis Development

The importance of trade credit as a major source of short-term financing has been widely documented both theoretically and empirically (Cunat, 2007; Nilsen, 2002). Archival studies have accumulated evidence to demonstrate that there is a complementary relationship between trade credit and bank loans (e.g., Lin & Chou, 2015; Nilsen, 2002), while some studies suggest that firms are more likely to respond to trade credit financing when they have little access to more traditional bank loans (e.g., Du et al., 2012; Huang et al., 2011).

Given that trade credit is an important external financing resource, researchers have also investigated the determinants of trade credit. For example, Wu et al. (2014) find that private firms in regions with higher levels of social trust use more trade credit from their suppliers. Kong et al. (2020) find that executives' social connections, such as a CEO's hometown connections, can increase their access to trade credit. Other determinates, such as firm-level characteristics (e.g., Andrieu et al., 2018) or the effects

of a financial crisis (Belghitar et al., 2021), have also been investigated in terms of their impact on trade credit financing.

Recent research investigating the economic implications of trade credit shows that it can be specifically considered a tool to improve overall firm performance, by mitigating any financial constraints imposed upon it (Martínez-Sola et al., 2014), thus contributing to product quality and reducing production risks (e.g., Davis & Hyndman, 2018). Other studies suggest that trade credit has a positive influence on firm productivity (Wang & Kong, 2019), growth (Ferrando & Mulier, 2013) and technical efficiency (Agostino & Trivieri, 2019).

In this study, we explore how firms' overall efficiency is influenced by financing sources by examining the relationship between trade credit and firm efficiency. We hypothesize that the use of trade credit financing has a positive impact on firm efficiency through three channels. The first of these is the *financial constraints channel*. Trade credit relaxes financially constrained firms, freeing them up to obtain external capital (Lin & Chou, 2015), and promoting their optimal assets managements (Agostino & Trivieri, 2019). Trade credit may help to avoid investment or capital shortages, decrease interruptions in production, and generally smooth out the production process. In addition, it may reduce financial constraints which affect a firm's access to tangible and intangible resources and its efficient use of both (Wang & Kong, 2019), thus improving firm efficiency accordingly.

The second channel, the *agency conflict channel*, suggests the importance of the monitoring role of suppliers as mitigators of agency conflicts. Debt financing acts as a

control mechanism in the relationship between managers and shareholders within agencies by exposing managers to more frequent monitoring activities (Anginer et al., 2019). In the case of trade credit, suppliers have strong incentives to engage in monitoring activities, to be sure to recover the credit provided. Moreover, they have an informational advantage vis à vis banks (Agostino & Trivieri, 2014; Burkart & Ellingsen, 2004). Consistent with these arguments, Aktas et al. (2012) find that the use of trade credit complements standard governance mechanisms by limiting opportunistic behaviors by managers.

The last channel is related to transaction costs (the *transaction cost channel*). Transactions theory suggests that trade credit allows for a reduction in the precautionary money holdings that firms retain because of uncertain cash flows, thereby promoting a more effective management of net money accumulations (Ferris, 1981), which is conducive to an overall reduction in transaction costs. Trade credit financing facilitates access to resources (material, services), the lack of which delays payments (Bougheas et al., 2009), so that the firm can improve its efficiency. Moreover, previous studies have found that trade credit reduces transaction costs because it separates goods exchange from money exchange and thus maintains the stability of long-term partnerships between suppliers and customers (e.g., Cunat, 2007; Rui & Lai, 2015). As transaction costs plays a central role in determining firm efficiency (e.g., Ketokivi & Mahoney, 2020), we expect that trade credit should encourage firm efficiency by decreasing transaction costs.

Based on the above discussion, we develop the following hypotheses:

H1: Trade credit financing is positively associated with firm efficiency.

H2: Trade credit promotes firm efficiency by attenuating financial constraints, mitigating agency conflicts and decreasing transaction costs.

3 Data and Methodology

3.1 Data

Our sample comprises all A-share manufacturing companies listed on the Shanghai and Shenzhen Stock Exchanges for the period 2004 to 2018. The sample period begins in 2004 because there are considerable missing data on trade credit before then. All data are obtained from the China Stock Market & Accounting Research (CSMAR) database and from the National Bureau of Statistics of China. We focus on the manufacturing industry given the importance of manufacturing firms for the national economy is particularly pronounced in China (World Bank, 2019), and the fact that trade credit financing is more common among manufacturing firms than non-manufacturing ones.¹ We further exclude firms flagged with ST or *ST.² The final sample used includes 18,663 observations.

3.2 Key Variables

3.2.1 Dependent Variable: Firm Efficiency

We use Data Envelopment Analysis (DEA) approach and measure firm efficiency by exploiting the model proposed by Banker et al. (1984) (known as the BBC-DEA)

¹ World Bank: <https://data.worldbank.org/indicator>.

² ST firms refer to listed firms with two consecutive years of losses and they are given special treatment by China Securities Supervision and Management Committee. *ST firms are these with three consecutive years of losses and face the risk of being delisted.

since it is a sound measure of data-orientated performance evaluation when multiple inputs and multiple outputs are present (Cook et al., 2014).³ BBC-DEA works under variable returns to scale (VRS) assumption. VRS assumption indicates that the return to scale of decision making units (DMUs) may be either increasing, constant or decreasing, and it is the most widely used for DEA analysis (Bayar et al., 2018). Given a specific set of inputs and outputs, the DEA model compares each firm to its best practice peers (by industry, year or globally) and calculates an efficiency score with a range of zero to one. A firm is classified as fully efficient (efficiency score=1) if it lies on the best practice frontier. It means that it produces the most outputs given a certain level of inputs, whereas a firm is classified as inefficient (efficiency score<1) when it does not. Under this framework, firm efficiency is measured by firms' ability to maximize output given a certain level of inputs (output oriented) or to minimize inputs given a certain level of outputs (input oriented). Firms with more outputs for a given level of inputs or with less inputs for a given level of outputs are more efficient.

Following prior studies, we estimate firm efficiency for the Chinese manufacturing sector according to the following set of inputs and outputs:

For inputs, we follow the literature (e.g., Brandt et al., 2012; Chen & Guariglia, 2013) and include labor and capital in our estimation. Both labor and capital are two

³ Compared to the stochastic frontier analysis (SFA), we choice DEA+OLS method in our main analyses for two reasons. First, unlike SFA, DEA does not require the specification of the functional form of the frontier, and it is flexible to multi-product industries (Fall et al., 2018). Since manufacture industry in our sample includes several sub-sectors, DEA is more suitable to our setting. Second, compared to SFA, DEA model has advantages in bringing lower mean absolute deviation and lower median absolute deviation (Banker et al., 2019). Although DEA is a nonparametric method, the score from DEA can be used in parametric analysis (e.g., Agostino & Trivieri, 2019). Therefore, two-stage method, DEA plus OLS, is a more common method in prior studies to investigate the driver of firm efficiency (Banker & Natarajan, 2008; Fall et al., 2018).

production factors in the adjusted Harrod-Domar model of economic growth proposed by Solow (1956). In addition, DMUs may consume not only inputs from the outsiders, namely labour and capital, but also intermediate products like raw material to produce the final outputs (Lewis et al., 2013). As such, we include intermediate inputs (proxied by raw materials and leased assets) in our analysis, following Devicienti et al. (2017).

For outputs, we use revenue (sales in our dataset) to capture firms' performance since all input items contribute to the production of revenue (Bayar et al., 2018). Given a certain level of inputs, firms with higher revenue are associated with a higher efficiency score under the DEA framework. We also include total profit as outputs, considering that a large revenue does not necessarily imply a large profit (Li et al., 2017). Including both revenue and profit in our estimation can improve the efficiency of DEA model because the model can automatically adjust each weight based on our sample (Lee & Choi, 2010).

3.2.2 Independent Variable: Trade Credit Financing

Following prior studies (e.g., Ferrando & Mulier, 2013; Hasan & Habib, 2019; Wu et al., 2014), we measure trade credit financing as the ratio of total payables to total assets (*TC*). The total payables include the sum of accounts payable, notes payable and accounts received in advance.

3.2.3 Control Variables

In line with similar studies (e.g., Agostino & Trivieri, 2019; Bayar et al., 2018; Shi et al., 2020), we introduce a set of control variables, including: firm size, the ratio of liabilities to assets, the ratio of fixed assets to total assets, annual growth rate of sales,

market to book value, average payroll of employees, the shareholding of the largest stockholder, the number of executives, short-term bank loans, government subsidies and state-ownership. All financial variables are winsorized at 1% and 99%. All variable descriptions are presented in Online Appendix A1.

3.3 Regression Models

We use the following panel regression model to explore the relationship between trade credit financing and firm efficiency,

$$Efficiency_{i,t} = \beta_0 + \beta_1 TC_{i,t-1} + Controls_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where i and t specify the firm and year respectively. All variables are defined in Online Appendix A1. We include firm and year fixed effect in our regression. To alleviate the impact of reverse causality, all independent variables lagged one period are included in the regressions.

4 Empirical Results

4.1 Descriptive Statistics

Table 1 presents the descriptive statistics of our key variables. The minimum value of *Efficiency* is 0.038 and the maximum value is 1, indicating that production efficiency varies from firm to firm. The mean of *TC* is 0.165 and the standard deviation is 0.110, suggesting that separate companies differ in their approaches to trade credit financing. In sum, our sample includes enough variation to warrant exploring the association between trade credit financing and firm efficiency.

[Insert Table 1 near here]

The Pearson and Spearman correlation matrix (Online Appendix A2) reveals that *TC* is significantly and positively related to a firm's efficiency scores, providing a preliminary support for H1.

4.2 Baseline Results

The regression results for the relationship between *TC* and *Efficiency* are presented in Table 2. Column (1) presents results from a simplified version of our regressions without the control variables. Column (2) includes all control variables. The coefficient on *TC* is 0.282 and is significant at the 1% level, suggesting trade credit financing has a positive impact on firm efficiency as estimated via DEA. It also indicates that one standard deviation increase in trade credit leads to a 13.371% ($0.282 \times 0.110 / 0.232$) increase in overall firm efficiency. Collectively, these findings are all consistent with Hypothesis 1.

[Insert Table 2 near here]

4.3 Economic Channels

In this section, we explore three channels that are conducive to the improvement of firm efficiency by having access to trade credit: alleviating financial constraints, decreasing agency cost, and reducing transaction costs. According to the mediation analysis procedure proposed by Baron and Kenny (1986), we further supplement the following specifications:

$$Channel_{i,t} = \beta_0 + \beta_1 TC_{i,t-1} + Controls_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

$$Efficiency_{i,t} = \beta_0 + \beta_1 TC_{i,t-1} + \beta_2 Channel_{i,t-1} + Controls_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

where *Channel* refers to the mediating variables, including financial constraints, agency

cost, and transaction costs.

4.3.1 Financial Constraint Channel

We use the KZ score, proposed by Kaplan and Zingales (1997), to proxy a firm's financial constraints.⁴ The mediating effect of financial constraints are reported in Columns (1) and (2) in Table 3. In Column (1), the coefficient on *TC* is negative and statistically significant, suggesting that trade credit is helpful to alleviate financial constraints for manufacturing firms. In Column (2), the coefficient on financial constraints is significantly negative, implying that financial constraints are negatively associated with firm efficiency. These results indicate that firms with better access to trade credit are more likely to be more efficient thanks to their financial constraints been alleviated.

4.3.2 Agency Conflict Channel

Following previous literature (Chhaochharia et al., 2012), we use the ratio of capital expenditure to total assets to measure agency cost (*AC*), and execute the mediation analysis.⁵ The results are presented in Columns (3) and (4) in Table 3. The coefficient on *TC* in Column (3) is negative and significant, implying that trade credit financing reduces agency cost. After including both agency cost and trade credit in our equation, the coefficient on *TC* is 0.249 and significant in statistics. Overall, our results suggest that the use of trade credit financing helps to mitigate agency costs and thus

⁴ In an untabulated analysis, we re-estimate the KZ index using our sample and construct the new KZ index to carry out the robustness check. We also use SA index as an alternative measure of financial constraints. Despite these changes, all results remain the same.

⁵ In untabulated results, we also use the expense ratio as the proxy for agency cost, measured as the sum of administrative and sales expenses scaled by revenues or the administrative expenses scaled by revenues (Du, 2013). Our results remain the same.

improve firm efficiency.

4.3.3 Transaction Cost Channel

The measure of transaction costs (*Transaction*) is taken as management expenses scaled by total assets. The results are presented in Columns (5) and (6) in Table 3. The coefficient on *TC* in Column (5) and Column (6) are all significant, suggesting that trade credit also improves firm efficiency by reducing transaction costs, consistent with our initial expectations.

[Insert Table 3 near here]

We also follow Hasan and Habib (2019) and investigate the direct and indirect effects of trade credit on firm efficiency. The results are shown in Online Appendix A3. The results reveal that trade credit affects firm efficiency both independently and collectively, through the three channels identified.

5 Cross-sectional Analyses

To further understand the variations in the benefit of trade credit financing on firm efficiency, we investigate additional factors, including social trust, economic policy uncertainty, and macroeconomic conditions. We include the interaction term between independent variable (*TC*) and the moderating variables in our specification.

5.1 Social Trust

Prior studies document that social trust reduces opportunistic behavior in transactions and amplifies the role of trade credit in business transaction (e.g., Wu et al., 2014). As such, we anticipate that the impact of trade credit on firm efficiency

should be more pronounced in regions with higher levels of social trust.

We follow prior literature and use the trust indicator based on the survey “Chinese Enterprise Survey System” conducted in 2001, to measure the province-level social trust (*Trust*).⁶ Column (1) in Table 4 reports the results. The coefficient on the interaction term between trade credit and social trust is 0.001 and significant at the 5% level, indicating that social trust has a positive moderating effect on the relation between trade credit financing and firm efficiency.

5.2 Economic Policy Uncertainty

Economic policy uncertainty has significant impact on the use of trade credit financing. During periods with heightened EPU, firms have less access to bank loans, and the relative importance of trade credit increases: the positive impact of trade credit on firm efficiency should be more pronounced when EPU is higher.

We choose the EPU index proposed by Baker et al. (2016) to measure overall policy uncertainty in a given economy. Specifically, we use the arithmetic average of the monthly EPU index over the previous 12 months as an annual EPU index. A higher value indicates higher levels of economic policy uncertainty. Our measure, *EPU*, is a dummy variable that equals 1 if annual EPU index is larger than the median value, and 0 otherwise. The results are presented in Column (2) of Table 4. The interaction term is positive and statistically significant, consistent with our expectation.

⁶ Social trust at the provincial level is calculated based on the responses of managers to the question: “According to your experience, could you list in order the top five provinces where enterprises are the most trustworthy?”. The top-ranking province is assigned the highest score of five; the second top-ranking province is assigned a score of four; and so on. For each province, we follow the approach from Wu et al. (2014) and calculate the average social trust score. A higher average score means greater trustworthiness. More details about the calculation method can be found in Wu et al. (2014).

5.3 Business Cycle

The impact of trade credit on firm performance is closely related to wider macroeconomic conditions. In a period of economic upturn, banks tend to increase credit supply to the economy, leading to wider credit availability and fewer financial constraints for firms. However, in times of economic downturn, firms have to turn to trade credit to access external funds and thus the role of trade credit is magnified. Therefore, we anticipate trade credit to be more significant for firm financing at times of economic downturn.

We apply a Hodrick-Prescott filter (Hodrick & Prescott, 1997) to measure the business cycle. Our construction and extracted components are based on the regression of annual GDP growth rate from the period 1987 to 2018. Our measure, *Cycle*, equals 1 if the component is a positive number, and 0 otherwise. The results are reported in Column (3) of Table 4, consistent with our expectations.

[Insert Table 4 near here]

6 Further Tests and Robustness Checks

6.1 SOE versus Non-SOE

We extend our analysis by evaluating whether the state ownership of a firm impacts our baseline findings. On the one hand, compared to state-owned enterprises (SOEs), non-SOEs have less access to bank loans in China (e.g., Ru, 2018), so that the role of trade credit may be more important for non-SOEs. On the other hand, market power is positively associated with trade credit financing (Dass et al., 2015), so that SOEs may

have greater access to trade credit by exploiting their strong position.

We partition our sample into two groups: SOEs and non-SOEs. A listed firm is classified as an SOE if the government is its ultimate controlling shareholder, and as a non-SOE otherwise. Intriguingly, we find similar results between the two subsamples (Online Appendix A4), suggesting that the role of trade credit in improving firm efficiency is important for both SOEs and non-SOEs alike.

6.2 Endogeneity Threats

Although all independent variables lagged one period are incorporated in our regressions to alleviate concerns associated with simultaneity and reverse causality, our baseline findings may still be driven by time-invariant unobserved or omitted factors. To further address these issues, we conduct several tests to mitigate endogeneity threats. The details of each method are presented in Online Appendix A5.

In a nutshell, the results consistently suggest that endogeneity threats are unlikely to be spuriously responsible for our baseline findings. For example, we continue to find supportive evidence on the impact of trade credit on firm efficiency when using the matched sample from generalized propensity score approach. In addition, the results from an impact threshold for a confounding variable approach suggest that our findings are robust enough to be able to withstand problems related to omitted variables. Further, using the China Commercial Credit Environment Index as our instrumental variable, our results are consistent with baseline findings. Finally, we use all control variables to construct heteroscedasticity-based instrument and our results remain the same.

6.3 Robustness Checks

We also execute several robustness checks. For brevity, the detailed results of each test are reported in Online Appendix A6. In a nutshell, we find that our results remain unchanged when we use Truncated regression and Tobit regression. In addition, we continue to find supportive evidence under alternative measures of trade credit and alternative measures of firm efficiency. Furthermore, our results survive after considering alternative measures of moderator variables.

7 Conclusion

We examine the relation between trade credit financing and firm efficiency, relying on a sample of Chinese manufacturing listed firms for the period 2004 to 2018. We find that firms with more trade credit financing are associated with higher overall levels of efficiency and that trade credit affects firm efficiency via three main economic mechanisms: relieving financial constraints, decreasing agency costs, and reducing transaction costs. The positive association between trade credit and firm efficiency is stronger in firms located in provinces with a higher level of social trust, during periods of heightened EPU, and during periods of economic recession. Our findings have several implications for both firms and policy makers.

The evidence suggests that firms may consider relying more on trade credit to facilitate their production and operations. The moderating effect of social trust on our findings suggests that firms need to pay adequate attention to building and maintaining their reputation, thereby gaining such trust. In addition, firms might adjust their trade credit policy according to changes in the macro-economic environment, including

factors such as economic policy uncertainty and shifts in the business cycle. During periods of heightened EPU or economic downturn, firms could increase their use of trade credit financing to shore up their liquid assets in response to the threat of potential negative macroeconomic shocks.

Our evidence also suggests that social trust is an important informal system: a sound business environment with solid social trust allows for the use of trade credit financing that in turn supports production and promotes efficiency rates. However, it is difficult to cultivate trust in a world characterised by uncertainty. A key role for policymakers is to work towards maintaining stable and consistent economic policies in order to create a sustainable business operating environment.

Our findings are subject to the peculiarities of China. Future studies may consider exploring whether the association between trade credit and firm efficiency holds true in other emerging markets. In addition, since alternative DEA models have recently been developed, these can be used to check the robustness of our results.

Acknowledgments

We are grateful for the constructive comments from Yezhou Sha (the editor) and three anonymous referees. We also thank Xiaoyi He (the discussant) and the participants of the “2021 International Conference on Prevention of Financial Risks” for their valuable comments.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the National Natural Science Foundation of China (Grant No. 71703127, No. 71872022 and No. 72272018), the Fundamental Research Funds for the Central Universities (Grant No. 2022CDSKXYJG007) and the China Postdoctoral Science Foundation (Grant No. 2022M710511).

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Trade credit and firm efficiency: evidence from Chinese manufacturing firms

Tables 1-4

Table 1. Descriptive statistics.

Variable	N	Mean	SD	Min	Median	Max
<i>Efficiency</i>	11,833	0.232	0.172	0.038	0.185	1
<i>TC</i>	11,833	0.165	0.110	0.013	0.140	0.540
<i>Trust</i>	11,800	74.040	61.480	4.600	77.700	218.900
<i>EPU</i>	11,833	0.408	0.492	0	0	1
<i>Cycle</i>	11,833	0.387	0.487	0	0	1
<i>KZ</i>	11,359	0.894	1.726	−7.434	1.242	4.395
<i>Innovation</i>	7,201	0.021	0.015	0	0.019	0.085
<i>Transaction</i>	11,833	0.095	0.069	0.011	0.081	0.456
<i>Asset</i>	11,833	21.750	1.174	19.480	21.58	25.22
<i>Leverage</i>	11,833	0.441	0.207	0.051	0.444	0.964
<i>Fixed</i>	11,833	0.262	0.149	0.019	0.236	0.655
<i>Growth</i>	11,833	0.222	0.414	−0.300	0.109	2.370
<i>MB</i>	11,833	0.003	0.003	0.001	0.003	0.019
<i>Payroll</i>	11,833	7.298	5.120	1.360	6.190	34.53
<i>First</i>	11,833	0.363	0.148	0.090	0.345	0.744
<i>Executive</i>	11,833	6.439	2.215	3	6	14
<i>Short-loans</i>	11,833	0.133	0.120	0	0.112	0.491
<i>Subsidy</i>	11,833	0.010	0.016	0	0.004	0.098
<i>SOE</i>	11,833	0.452	0.498	0	0	1

Note: This table presents the descriptive statistics of our key variables. All variables are defined in Online Appendix A1.

Table 2. Trade credit and firm efficiency.

	(1)	(2)
<i>TC</i>	0.228*** (8.702)	0.282*** (8.242)
<i>Size</i>		−0.019*** (−4.736)
<i>Leverage</i>		−0.076*** (−3.382)
<i>Fixed</i>		−0.015 (−0.911)
<i>Growth</i>		0.017*** (5.275)
<i>MB</i>		3.829*** (4.612)
<i>Payroll</i>		0.005*** (8.175)
<i>First</i>		0.086*** (3.518)
<i>Executive</i>		−0.001 (−0.654)
<i>Short-loans</i>		−0.036 (−1.471)
<i>Subsidy</i>		−0.090 (−0.773)
<i>SOE</i>		−0.032*** (−3.499)
Constant	0.196*** (43.879)	0.569*** (6.683)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	11,833	11,833
Adjusted R ²	0.579	0.609

Note: This table reports the regression results for Equation (1). All variables are defined in Online Appendix A1. Robust t-statistics based on standard errors clustered by the firm level are reported in the parentheses. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 3. Economic channels.

Dep Variable	Financial Constraint Channel		Agency Conflict Channel		Transaction Cost Channel	
	(1) <i>KZ</i>	(2) <i>Efficiency</i>	(3) <i>AC</i>	(4) <i>Efficiency</i>	(5) <i>Transaction</i>	(6) <i>Efficiency</i>
<i>TC</i>	−0.638*** (−2.584)	0.293*** (9.205)	−0.018* (−1.839)	0.249*** (8.336)	−0.173*** (−13.953)	0.190*** (5.684)
<i>KZ</i>		−0.017*** (−11.427)				
<i>AC</i>				−0.063** (−2.226)		
<i>Transaction</i>						−0.626*** (−15.226)
Controls	Included	Included	Included	Included	Included	Included
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,359	11,359	11,833	11,833	11,833	11,833
Adjusted R ²	0.586	0.620	0.451	0.651	0.653	0.630

Note: This table reports the results of mediating effects. All variables are defined in Online Appendix A1. Robust t-statistics based on standard errors clustered by the firm level are reported in the parentheses. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 4. Cross-sectional analyses.

	(1)	(2)	(3)
<i>TC</i>	0.197*** (4.453)	0.220*** (5.978)	0.266*** (7.225)
<i>TC*Trust</i>	0.001** (2.473)		
<i>TC*EPU</i>		0.078*** (2.785)	
<i>EPU</i>		0.014*** (2.613)	
<i>TC*Cycle</i>			−0.060*** (−2.592)
<i>Cycle</i>			0.001 (0.245)
Controls	Included	Included	Included
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	11,833	11,833	11,833
Adjusted R ²	0.610	0.502	0.498

Note: This table shows the moderating effects of environmental variables on the positive association between trade credit and firm efficiency. All variables are defined in Online Appendix A1. The social trust scores in our sample are generally time-invariant and are excluded from firm fixed effect. Robust t statistics based on standard errors clustered by the firm level are reported in the parentheses. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Supplemental materials to

Trade Credit and Firm Efficiency: Evidence from Chinese Manufacturing Firms

Supplemental Materials

- A1. Variable Definition
- A2. Correlation Analyses
- A3. Direct, Indirect and Total Effect
- A4. SOEs versus non-SOEs
- A5. Endogeneity Threats
- A6. Robustness Checks

A1. Variable Description

The table below lists all variable definition in our paper.

	Variables	Description
Dependent Variable	<i>Efficiency</i>	Firm efficiency, calculated based on the <i>Data Envelopment Analysis (DEA)</i> model using MAXDEA 9.0 software. Inputs include total assets, number of employees and intermediate goods. Outputs include sales and profit.
	<i>Efficiency_SBM</i>	Firm efficiency, calculated based on the non-orientated slacks-based measure (SBM)-DEA model. Inputs include total assets, number of employees and intermediate goods. Outputs include sales and profit.
	<i>Efficiency_R1</i>	Firm efficiency, calculated based on the DEA model. Inputs include tangible plus intangible assets, expenditure for raw materials and number of employees. Outputs include total sales.
	<i>Efficiency_R2</i>	Firm efficiency, calculated based on the DEA model. Inputs include expenditure for raw materials, the capital stock and number of employees. Outputs include total sales.
	<i>Efficiency_SFA</i>	Firm efficiency, calculated based on the stochastic frontier analysis (SFA) model. Inputs include total assets, number of employees and intermediate goods. Outputs include sales and profit.
Independent Variables	<i>TC</i>	Trade credit, measured by total payables/total assets. The total payables include accounts payable, notes payable and accounts received in advance.
	<i>TC_Net</i>	Trade credit, measured by net payables /total assets.
	<i>TC_OC</i>	Trade credit, measured by accounts payable /operating cost.
	<i>TC_OI</i>	Trade credit, measured by accounts payable / operating income.
Context Variables	<i>Trust</i>	Social trust, following the method from Wu et al. (2014).
	<i>Trust_Blood</i>	Social trust measure, based on blood donations.
	<i>EPU</i>	A dummy variable that equals 1 if economic policy uncertainty index is larger than the median value, and 0 otherwise. Economic policy uncertainty index is obtained from Baker et al. (2016).
	<i>EPU_new</i>	A dummy variable that equals 1 if economic policy uncertainty index is larger than the median value, and 0 otherwise. Economic policy uncertainty index is obtained from Huang and Luk (2020).
	<i>Cycle</i>	A dummy variable, which equals 1 if in economic upturn, and 0 otherwise.
	<i>Cycle_dum</i>	A dummy variable based on business climate index issued by National Bureau of Statistics of China. This dummy variable equals 1 if it is larger than median value, and 0 otherwise.
Control Variables	<i>Size</i>	The natural logarithm of total assets
	<i>Leverage</i>	Liabilities/assets
	<i>Fixed</i>	Fixed assets/total assets
	<i>Growth</i>	Annual growth rate of sales
	<i>MB</i>	Market value/book value
	<i>Payroll</i>	Personnel expenses, measured by payrolls/number of employees
	<i>First</i>	Holding ratio of the largest shareholder
	<i>Executive</i>	Number of executives
	<i>Short-loans</i>	Short-term bank loans, measured as short loans/total assets
	<i>Subsidy</i>	Government subsidy/total sales
	<i>SOE</i>	State ownership, which equals to 1 if the firm is state-owned, 0 otherwise

A2. Correlation Analyses

Table A2 Correlation Analyses

This table presents the Pearson and Spearman correlation tests of our main variables. The Pearson (Spearman) correlations are reported below (above) the diagonal. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. All variable definitions are shown in Appendix A1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) <i>Efficiency</i>		0.157***	0.183***	0.035***	-0.038***	0.122***	0.101***	0.154***	0.122***	-0.014	-0.063***	-0.248***	0.049***
(2) <i>TC</i>	0.145***		0.258***	0.514***	-0.069***	0.018*	-0.059***	0.090***	0.071***	0.064***	0.083***	-0.160***	0.195***
(3) <i>Size</i>	0.166***	0.265***		0.412***	0.081***	0.099***	-0.291***	0.332***	0.116***	0.252***	0.145***	0.007	0.214***
(4) <i>Leverage</i>	0.029***	0.512***	0.390***		0.248***	-0.081***	-0.106***	-0.025***	0.019**	0.109***	0.651***	-0.207***	0.313***
(5) <i>Fixed</i>	-0.062***	-0.122***	0.098***	0.254***		-0.244***	-0.201***	-0.196***	0.041***	0.028***	0.337***	-0.153***	0.193***
(6) <i>Growth</i>	0.028***	-0.087***	-0.034***	-0.212***	-0.268***		0.179***	-0.020**	0.022**	0.059***	-0.085***	0.081***	-0.167***
(7) <i>MB</i>	0.089***	-0.024***	-0.263***	0.054***	-0.128***	0.083***		0.069***	-0.069***	-0.063***	-0.102***	0.229***	-0.171***
(8) <i>Payroll</i>	0.230***	0.093***	0.288***	0.024**	-0.146***	-0.071***	0.020**		-0.005	0.076***	-0.199***	0.271***	0.026***
(9) <i>First</i>	0.116***	0.073***	0.147***	0.018*	0.047***	0.013	-0.065***	0.019**		0.001	-0.030***	-0.153***	0.184***
(10) <i>Executive</i>	-0.010	0.069***	0.290***	0.108***	0.034***	-0.003	-0.065***	0.044***	0.001		0.045***	0.059***	0.169***
(11) <i>Short-loans</i>	-0.071***	-0.005	0.081***	0.634***	0.294***	-0.165***	0.005	-0.137***	-0.023**	0.021**		-0.171***	0.124***
(12) <i>Subsidy</i>	-0.164***	-0.161***	-0.078***	-0.147***	-0.095***	0.087***	0.125***	0.085***	-0.118***	0.022**	-0.117***		-0.224***
(13) <i>SOE</i>	0.059***	0.203***	0.231***	0.313***	0.207***	-0.187***	-0.091***	0.066***	0.186***	0.151***	0.108***	-0.115***	

A3. Direct, Indirect and Total Effect

The table below reports the results of the Bootstrap method to investigate the direct and indirect effects (shown in three channels) of trade credit on firm efficiency. This approach follows Hasan and Habib (2019). All variable definitions in Appendix in our manuscript. We estimate standard errors by using the bootstrapping method with 1000 replications. For the financial constraints channel (*KZ*), the total effect on firm efficiency is 0.243, of which the indirect effect captures 0.012 (significant at the 1% level). For the agency cost channel (*Agency*), the total effect on firm efficiency is 0.181, of which the indirect effect accounts for 0.036 (significant at the 1% level). For the transaction costs channel (*Transaction*), the total effect of trade credit on firm efficiency is 0.239, of which the indirect effect accounts for 0.089 (significant at the 1% level). These results imply that trade credit affects firm efficiency both independently and collectively, through the three channels identified.

Table A3 Direct, Indirect and Total Effect

	Coefficient	Bootstrap std. error	Bootstrap -based 95% confidence interval	
Indirect (<i>KZ</i>)	0.012	0.0036	0.0039	0.0177
Direct (<i>TC</i>)	0.231	0.0196	0.1920	0.2675
Total (direct + indirect)	0.243			
Indirect (<i>Agency</i>)	0.036	0.0059	0.0241	0.0473
Direct (<i>TC</i>)	0.145	0.0291	0.0883	0.2025
Total (direct + indirect)	0.181			
Indirect (<i>Transaction</i>)	0.089	0.0087	0.1346	0.1687
Direct (<i>TC</i>)	0.150	0.0227	0.0527	0.1430
Total (direct + indirect)	0.239			

A4. SOEs versus non-SOEs

This table shows the results in terms of the impact of state ownership on the association between trade credit and firm efficiency. An observation is classified as “SOE” if the firm is a state-owned enterprise, and “non-SOE” otherwise. The dependent variable is firm efficiency, *Efficiency*. All variables are defined in Appendix A1. A seemingly unrelated regression estimation is used to test the difference between two groups and the chi-square statistics are shown in the table. Robust t-statistics based on standard errors clustered by the firm level are reported in the parentheses. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table A4 Results of SOEs versus non-SOEs

	(1) SOE	(2) non-SOE
<i>TC</i>	0.315*** (7.102)	0.214*** (3.963)
<i>Size</i>	-0.038*** (-6.674)	-0.007 (-1.190)
<i>Leverage</i>	-0.064* (-1.948)	-0.059* (-1.799)
<i>Fixed</i>	-0.003 (-0.146)	-0.029 (-1.140)
<i>Growth</i>	0.033*** (4.065)	0.009** (2.548)
<i>MB</i>	3.663*** (3.421)	2.657** (2.131)
<i>Payroll</i>	0.005*** (6.383)	0.005*** (4.687)
<i>First</i>	-0.004 (-0.098)	0.173*** (4.838)
<i>Executive</i>	-0.001 (-0.990)	0.000 (0.063)
<i>Short-loans</i>	-0.073** (-2.362)	0.009 (0.237)
<i>Subsidy</i>	-0.252* (-1.822)	-0.044 (-0.241)
Constant	1.019*** (7.983)	0.270** (2.159)
Difference		0.101
Chi-square		1.06
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	5,288	6,545
Adjusted R ²	0.649	0.592

A5. Endogeneity Threats

(1) Generalized Propensity Score Approach

One way to alleviate the threat from the nonlinear impact of our variables or omitted covariates is to use a matching method. Given that our treatment (TC) takes on continuous values and a general matching approach does not fit, a newly developed method known as the generalized propensity score (GPS) is employed. Further, GPS is generally used together with the dose-response function (DRF), as it is a GPS-based DRF approach. This method has been used in recent studies (e.g., Zhang et al., 2020) when the treatment is neither binary nor categorical.¹ The results from GPS-based DRF approach are reported in Panel A of Table A5. The coefficient on TC is still positive and statistically significant, showing a robust outcome.

(2) The Impact Threshold for a Confounding Variable

To further address concerns about omitted variables, we investigate the potential impact of unobserved confounding variables. Frank (2000) proposes including an impact threshold for a confounding variable (ITCV) to calculate the minimum correlations that cause the observed statistical relation between independent variable and dependent variable to be insignificant. We follow his method and calculate the ITCV for TC to be 0.0586. The detailed results are reported in Panel B of Table A5. Given that we employ a good set of control variables, as established by prior studies, this evidence suggests that our main results are robust enough to be able to withstand problems related to omitted variables.

¹ Following Zhang et al. (2020), the GPS-based DRF approach is estimated using the command *gpscore* in Stata.

(3) Instrumental Variable Approach

We next employ an instrumental variable (IV) for trade credit to tackle the issue of endogeneity. We use the China Commercial Credit Environment Index in each location as our IV. The IV is measured as the natural logarithm of this index in firm's headquartered.² We expect that firms located in a city with a better commercial credit environment are more likely to use trade credit financing, but it would be exogenous with respect to individual efficiency. The results are reported in Columns (1)-(2) in Panel C of Table A5. The Kleibergen-Paap Wald rk F statistic is 37.347, which is larger than the critical value (16.38 at the 10% level), indicating that our IV is not weak. These results are consistent with our main results.

(4) Heteroscedasticity-based Instrument Approach

To further address potential endogeneity issues, we follow the method from Lewbel (2012) and construct heteroscedasticity-based instruments. This method has been widely used in recent studies, especially where instrumental variables are not available or may have weak validity. Following Lewbel (2012), we use the mean-centred variables of all control variables as the internal instrument in the first stage and calculate the predicted *TC* for the second stage regression. The results are reported in the last column of Panel C of Table A5. Our results remain robust.

Table A5 Results of Endogeneity Threats

This table shows the results for the analyses addressing endogeneity threats. Panel A reports the results from GPS-based DRF approach. Panel B reports the instrument variable and heteroscedasticity-based

² This index measures the commercial credit environment in each city from 7 aspects, including 23 sub-indexes. The higher value of this index represents a better commercial credit environment. If there is a missing value of this index in some years, we use the average value of the annual index to replace. More details about this index are shown on: <http://www.chinacei.org/about.asp?Title=%D6%B8%B1%EA%CC%E5%CF%B5>.

instrument analyses employed to address endogeneity concerns. *CEI* is our instrument variable, measured as the natural logarithm of the China Commercial Credit Environment Index in each firm's headquartered. The dependent variable in Column (1) is *TC*, the dependent variable in Columns (2) and (3) is *Efficiency*. Panel C reports the results of for the impact threshold for a confounding variable (ITCV). This approach is proposed by Frank (2000). All variable definitions are shown in Appendix A1. Robust t-statistics based on standard errors clustered by the firm level are reported in the parentheses. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Panel A: GPS-based DRF approach

	(1)
<i>TC</i>	1.259*** (9.627)
Controls	Included
Observations	11,833
Wald Chi ²	75.65

Panel B: ITCV

	Partial Correlation	Raw Correlation
<i>Subsidy</i>	0.0249	0.0265
<i>Short-loans</i>	0.018	0.0003
<i>Fixed</i>	0.0064	0.0076
<i>First</i>	0.0049	0.0085
<i>SOE</i>	0.0001	0.0119
<i>Executive</i>	-0.0003	-0.0007
<i>Growth</i>	-0.0012	-0.0024
<i>Payroll</i>	-0.0018	0.0213
<i>Size</i>	-0.0093	0.0239
<i>Leverage</i>	-0.0132	0.0151
<i>MB</i>	-0.0187	-0.0021
ITCV for <i>TC</i>	0.0586	

Panel C: Instrumental variable and heteroscedasticity-based instrument

	(1)	(2)	(3)
	IV Approach		Heteroscedasticity-based instrument
	First Stage	Second Stage	
<i>CEI</i>	0.213*** (13.589)		
<i>TC (or predicted TC)</i>		0.282*** (8.242)	0.179*** (2.843)
Controls	Included	Included	Included
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	11,833	11,833	11,833
Adj.R ²	0.327	0.163	0.152

A6. Robustness Checks

In this section, we execute several robustness checks. First, given that the firm efficiency, calculated based on DEA, is within the range of 0 to 1, the results of any OLS regression may be biased. We therefore use Truncated regression and Tobit regression to re-estimate our basic model. The results are reported in Panel A of Table A6. Second, we use alternative measures of trade credit to do a robust check. The alternative measures are calculated as the ratio of net payables to total assets (*TC_Net*), the ratio of accounts payable to operating cost (*TC_OC*) and the ratio of accounts payable to operating income (*TC_OI*). The results are reported in Panel B of Table A6. Third, we use alternative methods to calculate the measure of firm efficiency. We check whether our findings hold when we change inputs and outputs in DEA model. We use tangible plus intangible assets, expenditure for raw materials and number of employees as inputs, and total sales as our outputs to calculate (*Efficiency_R1*) (Agostino & Trivieri, 2019). We also follow Bogetoft and Kromann (2018) and use expenditure for materials, the capital stock and number of employees as inputs, while total sales are our outputs (*Efficiency_R2*). Then, we re-estimate firm efficiency using a non-orientated slacks-based measure (SBM)-DEA model (*Efficiency_SBM*) (Tone, 2001) and the stochastic frontier analysis (SFA) (*Efficiency_SFA*) (Greene, 2005). The results are presented in Panel C of Table A6. In all these additional tests, there are no qualitative changes in the results obtained.

We further consider different proxies for moderator variables. As far as social trust is concerned, we adopt an alternative measure (*Trust_Blood*), which is calculated as the millilitres of blood donated on a purely voluntary basis in a province, divided by the

population within that province for the year 2000. In addition, we use EPU index from Huang and Luk (2020) as our alternative measure for EPU. Our new measure, *EPU_new*, is a dummy variable that equals 1 if its value is larger than the median value, and 0 otherwise. As for the business cycle, a dummy variable (*Cycle_dum*) is generated, based on the annual business climate index issued by the National Bureau of Statistics of China. This variable equals 1 if it is higher than the median, and 0 otherwise. The results are presented in Panel D of Table A6, again showing a robust outcome.

Table A6 Results of Robustness Checks

This table reports the results for robustness checks. Panel A reports the results from alternative regression method. Panel B reports the results from alternative measures of independent variable. Panel C reports the results from alternative measures of dependent variable. Panel D reports the results from measures of environmental variable. All variable definitions are shown in Appendix A1. Robust t-statistics based on standard errors clustered by the firm level are reported in the parentheses. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Panel A: Alternative regression method

	(1)	(2)
Regression Method	Truncated	Tobit
<i>TC</i>	0.337*** (7.480)	0.238*** (5.838)
Controls	Included	Included
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	11,833	11,833
Wald Chi-square / F	124.100	78.281

Panel B: Alternative measure of independent variable

	(1)	(2)	(3)
<i>TC_Net</i>	0.088*** (3.726)		
<i>TC_OC</i>		1.188*** (3.480)	
<i>TC_OI</i>			2.415*** (8.249)
Control	Included	Included	Included
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	11,833	11,833	11,833
Adjusted R ²	0.604	0.657	0.676

Panel C: Alternative measure of dependent variable

Dependent Variable	(1) <i>Efficiency_R1</i>	(2) <i>Efficiency_R2</i>	(3) <i>Efficiency_SBM</i>	(4) <i>Efficiency_SFA</i>
<i>TC</i>	0.079** (2.244)	0.180*** (4.983)	0.179*** (3.35)	0.427*** (9.087)
Control	Included	Included	Included	Included
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	11,833	11,833	11,833	11,833
Adjusted R ²	0.643	0.618	0.190	0.614

Panel D: Alternative measure of environmental variable

	(1)	(2)	(3)
<i>TC</i>	0.229*** (5.410)	0.218*** (5.848)	0.255*** (6.831)
<i>TC*Trust_Blood</i>	0.115** (2.205)		
<i>EPU_dum</i>		0.001 (0.072)	
<i>TC*EPU_dum</i>		0.061** (2.443)	
<i>Cycle_dum</i>			0.046*** (9.160)
<i>TC*Cycle_dum</i>			-0.048* (-1.893)
Control	Included	Included	Included
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	11,800	11,833	11,833
Adjusted R ²	0.609	0.498	0.511

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