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Predatory trade finance: The impact of bargaining power and financing constraints on the demand and supply of trade credit

Journal of Applied Economics

Provided in Cooperation with: University of CEMA, Buenos Aires

Suggested Citation: Osiichuk, Dmytro; Mielcarz, Paweł (2021) : Predatory trade finance: The impact of bargaining power and financing constraints on the demand and supply of trade credit, Journal of Applied Economics, ISSN 1667-6726, Taylor & Francis, Abingdon, Vol. 24, Iss. 1, pp. 441-459, https://doi.org/10.1080/15140326.2021.1963394

This Version is available at: https://hdl.handle.net/10419/314139

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Journal of Applied Economics

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/recs20

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To cite this article: Dmytro Osiichuk & Paweł Mielcarz (2021) Predatory trade finance: the impact of bargaining power and financing constraints on the demand and supply of trade credit, Journal of Applied Economics, 24:1, 441-459, DOI: <u>10.1080/15140326.2021.1963394</u>

To link to this article: <u>https://doi.org/10.1080/15140326.2021.1963394</u>

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Published online: 28 Aug 2021.

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Predatory trade finance: the impact of bargaining power and financing constraints on the demand and supply of trade credit

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ABSTRACT

We demonstrate that the "predator-prey" metaphor may be wellsuited to describe trade finance mechanisms in emerging economies. Having analyzed the dynamics of trade credit in the Polish corporate sector over the period between 1997 and 2014, we found that suppliers of trade credit were smaller, younger, less liquid, less indebted, and more financially constrained than the beneficiaries thereof. The firms, which increased trade receivables during the analyzed period, improved their asset turnover ratio at the expense of operating profitability. In a quest for growth and cash flows, these firms appear to be forced to supply trade credit to their counterparties with a stronger bargaining position. Companies, which reported higher trade payables, enjoy higher cash flows and a better access to external financing, yet with no improvements to the operating KPIs. In contrast to the conventional wisdom, we hypothesize that trade credit bargaining may be a negative-sum game.

ARTICLE HISTORY

Received 23 June 2020 Accepted 29 July 2021

KEYWORDS

Trade credit; working capital; emerging economy

1. Introduction

How does the firm's bargaining power impact the terms of trade credit? Can trade credit bargaining be a negative-sum game for the transacting parties under disparity of bargaining power? Do the companies with a more elastic demand for external capital simultaneously face a more elastic demand and supply of trade credit? These questions bear significant importance in the context of trade finance theory, which conventionally propones that working capital management plays a crucial role in channeling and accelerating firms' growth.

An important strand of empirical literature (Casey & O'Toole, 2014; Ferrando & Mulier, 2013; McGuinness, Hogan, & Powell, 2018) posits that trade credit is an important tool of alleviating financing constraints and fueling the growth of firms, which face an impeded access to financial markets. In imperfect capital markets, where the scale of information asymmetry and adverse selection is decreasing in the firm's net worth (Bernanke & Gertler, 1989), age and size (Hadlock & Pierce, 2010), trade credit should supposedly substitute for bank credit thereby partially softening the binding financing

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constraints and providing the financial resources necessary for fostering firms' growth. Hence, it is frequently assumed that trade credit plays a redistributive role (McGuinness et al., 2018): the financially unconstrained companies obtain external financing and reallocate it to their constrained trade counterparties. In a sense, unconstrained firms act as financial intermediaries, who are supposedly more familiar with their counterparties' business profile and are therefore better positioned to assess their creditworthiness (Smith, 1987). Overall, trade credit is commonly praised for its altruistically beneficial impact on the growth and value generation of the constrained companies (Yazdanfar & Ohman, 2015).

The narrative prevailing in the empirical literature is suggestive of the idea that the less financially constrained companies act as net suppliers of trade credit, while their constrained counterparties emerge as net beneficiaries thereof. The ambiguity persists with regards to the factors contributing to this status quo. Some studies conclude that trade credit may be used to strengthen business relationships with the constrained counterparties (Cuñat, 2007). Others (Brennan, Maksimowic, & Zechner, 1988) regard the recurrence to trade credit as a prerequisite for price discrimination, whereby the unconstrained clients are demanded to make cash settlement for the goods instantly, while the more constrained firms obtain trade credit. In both cases, the theoretical framework underlying the narrative excludes the factor of bargaining power of the counterparties from the list of determinants of trade credit terms.

Once one has accounted for the impact of bargaining power on the outcome of trade credit negotiations, the constrained firms with low bargaining power may emerge as net suppliers of trade credit to their unconstrained counterparties. We attempt to merge the theory of trade credit with the conceptual framework of ultimatum bargaining. Each trade credit deal is preceded with negotiations between the transacting parties. The outcome of the negotiations is preconditioned by their bargaining power. Other things equal, we assume that any company should be reluctant to grant trade credit unless forced to do so by the counterparty. At the same time, the beneficiary of trade credit should be interested in the maximum extension of trade credit. While it is clear and consistent with prior empirical findings, that financially unconstrained companies are better positioned to grant trade credit (Biais & Gollier, 1997; Shi, Wang, & Tan, 2020), the following conjectures require empirical verification: 1) the unconstrained firms are interested in the minimization of the amount of trade credit granted to their counterparties; and in 2) the maximization of trade credit obtained from their counterparties. Therefore, if we assume that the financially unconstrained companies are endowed with a higher bargaining power in trade credit negotiation, they should be the ultimate net beneficiaries in trade credit transactions. Simultaneously, financially constrained companies, who have a limited bargaining power, are expected to be the net suppliers of trade credit.

Overall, one obtains a picture of "predatory" trade credit relations, whereby financially constrained companies fall prey to the inequitable trade finance arrangements with their unconstrained counterparties. The ultimate question arising from this inference is whether these arrangements bear any consequences for the operating performance of the respective parties and whether trade finance may impede the growth and value creation of the constrained companies instead of fueling them as broadly suggested by the existing body of empirical literature.

Relying on the data on trade credit dynamics in an emerging economy, we verify, whether the suppliers and beneficiaries of trade credit diverge in their bargaining power and exposure to financing constraints. We also assess whether the participation in trade credit transactions contributes to the amelioration or deterioration of the operating performance of the respective parties.

The empirical findings documented in the paper contribute to the ongoing discussion regarding the role of trade credit in shaping firms' growth and diversifying their sources of external financing. We formulate a set of empirical predictions suggesting that under disparities in bargaining power between the transacting parties, the distribution of trade credit may be heavily skewed towards the stronger bargainer.

We further investigate whether inequitable redistribution of trade credit impedes the overall efficiency of bargaining outcomes. The more financially constrained companies, which are likely to face a larger wedge between the cost of internal and external financing (Kaplan & Zingales, 1997), are more vulnerable to the shortages of trade credit financing due to lack of available substitutes for trade credit. Therefore, we posit that the potential detrimental impact of inequitable trade finance distribution on the growth of financially constrained firms may outweigh the beneficial influence of an influx of cheap trade credit on the financial standing of trade credit beneficiaries, which are more well-off and enjoy a better access to alternative sources of external financing. Our empirical findings corroborate this line of reasoning. While showing a deterioration in contemporaneous operating performance of trade credit beneficiaries. The empirical findings presented in the paper suggest that trade credit bargaining may be a negative-sum game, whereby the outcomes are inefficient from the standpoint of both suppliers and beneficiaries of trade credit.

Finally, the paper showcases the inefficiencies of trade credit allocation on the Polish market, where trade credit bargaining may be affected by several distinct features inherent in emerging economies. Since the dynamics of trade credit is to a large extent contingent upon the characteristics of the local financial markets (Antràs & Foley, 2015; Schmidt-Eisenlohr, 2013), an in-depth inquiry into the specificity of trade credit bargaining under incomplete capital markets seems timely and warranted.

The paper is structured as follows: first, we present a brief overview of the existing empirical literature and a theoretical framework, which is subsequently used to derive testable predictions; thereafter, we formulate the research hypotheses and present the research methodology applied in the study; finally, we discuss the outcomes of empirical research and highlight their importance for the contemporary theory of trade finance.

2. Literature review

Trade credit is commonly viewed as a substitute for external finance, which is of particular importance for the financially constrained companies (Berger & Udell, 2006; Cosci, Guida, & Meliciani, 2019). It is frequently argued that whenever the intermediated and direct lending from the capital markets shrinks, corporate sector may engage in financial intermediation by providing the necessary financial resources to the companies, which experience a severe shortage of financing and operating cash flows. The redistributive effect of trade credit was reported to improve the liquidity position, growth

prospects, and long-term business survival of financially constrained firms, who receive financial support from financially unconstrained firms (Carbo-Valverde, Rodriquez-Fernandez, & Udell, 2009; Ferrando & Mulier, 2013; Love, Preve, & Sarria-Allende, 2007; ; Petersen & Rajan, 1997). In most cases, the issue of bargaining power disparities is left out from the argumentation. When bargaining power appears among the explanatory variables, ambiguities persist with regards to its operationalization.

Overall, the assumptions and empirical evidence speaking in favor of the redistributive function of trade credit allow to conclude the following: the financially unconstrained companies emerge as net suppliers of trade finance (Shang, 2020; Tsuruta, 2013), while the constrained firms are net beneficiaries thereof. While this view has a sound theoretical foundation, it may not perfectly accord with the anecdotal evidence, which suggests that the unconstrained firms may frequently force their constrained counterparties to become suppliers of trade credit. The key factor deciding upon the firms' ability to benefit from trade credit extension is their bargaining power. The remainder of this section explains, why the redistributive mechanism of trade credit may work the other way around with the financially unconstrained debtors benefiting at the expense of their constrained creditors.

The theoretical framework underpinning the redistributive explanation of trade finance does not explicitly address two issues. First, the firm, which agrees to sell on credit inevitably faces an increased credit risk (Jones, 2010) and possibly negative repercussions for its operating performance (Deloof, 2003; Enqvist, Graham, & Nikkinen, 2014). What constitutes the reward of a financially unconstrained firm for providing trade credit to a financially constrained counterparty and thus, for accepting an elevated risk? It may be the case, that financially unconstrained clients and secure future sales (Wilson & Summers, 2002). Alternatively, trade credit may constitute a strategy of supplier surplus maximization through price discrimination (Brennan et al., 1988). Finally, firms may regard trade credit provision as a part of a broader corporate social responsibility (CSR) strategy: empirical studies suggest that firms with higher CSR scores offer more generous trade credit terms (Xu, Wu, & Dao, 2020).

Secondly, the short-term assets have to be financed with either bank debt or accounts payable. While the former exposes the firm to monitoring by the financial intermediary, the latter implies the need to negotiate trade credit extension with the firm's trade counterparties (Ferrando & Mulier, 2013). The question is whether the creditors perform a screening of the potential trade credit beneficiaries with the goal of eliminating the credit risk. It is clear that the trade credit market suffers from the imperfections stemming from information asymmetry (Akerlof, 1970; Smith, 1987). Empirical evidence strongly suggests that only credible debtors, who convey an appropriate signal to the market with regards to their creditworthiness, may obtain trade credit. Kling, Paul, and Gonis (2014) report that adequate cash holdings may frequently serve as a criterion for granting trade credit. It appears that similarly to bank financing, trade credit mandates an appropriate collateral on the part of the debtor (Costello, 2019). With regards to the redistributive theory of trade credit, the latter inference may suggest that the better performing companies, which are more likely to survive and repay the suppliers, obtain more trade credit. Therefore, the negative link between the amount of trade credit received and the probability of financial distress may have an embedded reverse causality bias. This conclusion contrasts with a common view of trade credit as a tool precluding the liquidation or improving the financial health of constrained companies (McGuinness et al., 2018).

Anecdotal evidence suggests that an endowment with disproportionate market power may induce a firm to force its counterparty to extend trade credit (Mateut & Chevapatrakul, 2018). Empirical evidence indicates that the amount and duration of trade credit are positively associated with the buyer's share in firm's sales (Wilner, 2000) and with the degree of competition in the firm's environment (Fisman & Raturi, 2004). Fabbri and Klapper (2016) demonstrate that firms with lower bargaining power offer more trade credit and for relatively longer periods; their counterparties with a stronger bargaining position, in turn, are likely to delay payments. Similar findings are reported by Biais and Gollier (1997), who argue that financially stronger firms tend to satisfy their demand for short-term financing with cheaper bank debt rather than with the more expensive trade credit. These findings are in dissonance with empirical evidence reported by the advocates of redistributive function of trade credit. It is clear, that under asymmetric bargaining power, the mechanisms of trade credit may work to the detriment of a weaker party.

3. Hypotheses development

Relying on the premise that the supply and demand of trade credit are intermediated by the bargaining power of the transacting parties, we formulate the following key research hypothesis:

H1: There is a disparity of bargaining power between the firms supplying trade credit and their counterparties, who demand trade credit, with the latter having a stronger position resulting from a lower exposure to financing constraints.

Despite having a larger capacity to provide trade credit, financially unconstrained firms may be reluctant to do so in order to avoid counterparty risks and minimize capital involvement. In order to reduce receivables, financially unconstrained companies may offer discounts for early payments to their constrained counterparties (Klapper, Laeven, & Rajan, 2012). The constrained companies may have less flexibility in offering discounts to their clients due to potentially negative impact on the profit margins (Hoang, Xiao, & Akbar, 2019). On the other hand, large counterparties representing a considerable portion of firm's sales may exercise pressure and frequently even recur to abusive practices in order to force the supplier to extend trade credit (Giannetti, Burkart, & Ellingsen, 2011).

The financially unconstrained firms have alternative sources of external financing which may be substituted for trade credit in case of unsuccessful bargaining outcome. At the same time, they are less likely to agree to a sale on credit without fully controlling for the underlying counterparty risks. On the other hand, the constrained firms are forced to rely exclusively on their internally generated cash flows to finance their operations and are therefore more inclined to sell on credit in order to accelerate organic growth. This line of reasoning suggests that ultimately, unconstrained companies with a stronger bargaining position should emerge as net beneficiaries of trade credit, while the financially constrained firms are more likely to become net suppliers thereof.

If the asymmetry of bargaining power results in the burden of trade credit disproportionately falling on the constrained firms, one may reasonably inquire into the repercussions of trade credit distribution for the operating performance of the transacting parties. Since the unconstrained companies are in position to dictate the conditions of trade credit contracts to their constrained suppliers, their bargaining power should allow them to ameliorate their contemporaneous operating performance by either improving the profit margins or increasing their asset turnover. In turn, the constrained trade credit suppliers may end up on the losing side. Hence, we formulate the following research hypothesis:

H2: Inequitable trade credit distribution benefiting the financially unconstrained buyers results in an improvement of their contemporaneous operating performance with the suppliers bearing the costs of redistribution.

Large customers may claim significant price discounts as well as extended trade credit. Both may translate into improving margins and increasing efficiency of capital investments. Hence, for the beneficiaries of trade credit, operating performance should be an increasing function of trade payables. The opposite may be true for the suppliers of trade credit: due to limited bargaining power resulting from financing constraints, they may experience a deterioration of operating performance. However, while the negative effect of trade receivables on the profit margins may be self-explanatory, their impact on the asset turnover may be ambiguous. On one hand, sales on credit allow to boost firms' revenues, on the other hand, the expansion of the balance sheet may counterbalance the receivables' beneficial impact on sales.

The outcomes of trade credit bargaining may also be subject to a distortionary impact of evolutionary stable strategies (ESS) applied by the transacting parties (Konrad & Morath, 2016). Under ESS settings, the party with a stronger bargaining position may reject mutually attractive deals in order to inflict disproportionately higher losses on the counterparty with lower negotiating power. If the deal is struck under asymmetry of bargaining positions, the results are likely to be skewed in favor of the party with a stronger bargaining power. The question, however, is whether the trade credit bargaining is ultimately a zero-sum game for its participants. If the potential implicit costs inflicted on the financially constrained firms are higher than the gains obtained by the unconstrained trade credit beneficiaries, the outcome of the negotiation may be deemed inefficient from the standpoint of overall welfare maximization. In order to test the predictions of the theory of ultimatum bargaining, we formulate the following research hypothesis:

H3: Under asymmetry of bargaining positions, trade credit bargaining represents a negative-sum game as the gains of the buyers outweigh the costs borne by the suppliers.

The extant empirical literature offers some hints suggesting that trade credit redistribution skewed by imbalance of bargaining power may ultimately be a negative-sum game. In particular, Lawrenz and Oberndorfer (2018) show that in the event of credit contraction, financially constrained companies with no substitute sources of external financing face larger cuts to trade credit provision than unconstrained companies. Since the former are more reliant on trade credit, reallocation of financial resources imperils their survival to the detriment of the economy as a whole. These findings are corroborated by theoretical models (e.g., Wu, Zhang, & Baron, 2018). For many years, policymakers and regulatory bodies have been receiving signals that imbalances of bargaining power in some industries have resulted in the use of trade credit for the purpose of rent extraction (Cowton & San-Jose, 2017). In an attempt to alleviate the negative consequences of inequitable trade credit redistribution, regulators started adopting procedures and standards aimed at protecting counterparties vulnerable to abuses of market power (Costello, 2019). However, the empirical studies investigating the role of bargaining power in shaping the outcomes of trade credit redistribution remain scarce.

4. Description of the dataset and research design

For the purposes of quantitative analysis, we assembled an unbalanced firm-level dataset covering all public companies listed on the Warsaw Stock Exchange during the observation span between 1997 and 2014. The dataset features only non-financial companies with non-zero total asset and sales values. All nominal variables were adjusted for inflation. The outliers were trimmed at 1% and 99% levels. The resulting panel dataset covers 970 public companies and 8244 firm-year observations. Descriptive statistics for the research sample are presented in Table 1.

We start by identifying the companies, which received or/and supplied trade credit during the observation window. We look at the dynamics of demand and supply of trade credit during the analyzed period. An initial screening shows, that 830 out of 970 sampled firms increased trade receivables at least once during the analyzed period; overall, increases of trade receivables are recorded in 2807 firm-years. 921 out of 970 firms increased trade payables at least once during the observation window; in total, we record 4645 instances of payables growth. The very fact that public companies, which are perceived as less financially constrained, increased trade payables more frequently than trade receivables (without accounting for the magnitudes of respective increases), is suggestive of an important role that trade credit plays in the financing strategies of the

Variable	Mean	Median	St. Deviation
Total Assets	231,198.470	40,013.350	769,482.600
Receivables/Assets	0.2320	0.1965	0.1839
Payables/Assets	0.2505	0.1898	0.2277
Inventory/Assets	0.1452	0.0987	0.1635
Age	8.4615	7.0000	7.3865
Sales Growth	0.1521	0.0325	0.4424
Asset Turnover Ratio	1.3905	1.1380	1.1452
Net Profit Margin	-0.0081	0.0304	0.4551
ROA	0.0465	0.0375	0.2409
P/BV	0.8100	0.3565	1.1295
CF/Assets	0.0745	0.0515	0.2009
Capex/Assets	0.0112	0.0120	0.1894
Asset Tangibility	0.2955	0.2636	0.2388
Debt to Equity	0.6118	0.2424	0.8617
Cash/Assets	0.0880	0.0407	0.1352
Dividend Payout Ratio	0.0564	0.0000	0.1783

 Table 1. Descriptive statistics.

Source: own elaboration

sampled firms. An overlap of payables and receivables growth occurs in 1095 firm-years, hence, it appears that the practice of matching current assets with current liabilities (Bastos & Pindado, 2013) is not commonplace among Polish public companies.

We create dummy variables TPINCR and RECINCR to encode the instances of trade payables and trade receivables increases respectively. We start by identifying the fundamentals differences between the firms, which provided trade credit during the observation window (i.e., increased trade receivables) and received trade credit (i.e., increased trade payables). In order to do so, we run binary logit models, in which the dummy variables TPINCR and RECINCR are used as regressands. The fundamentals of each of the subsamples separated using the dummy variables are benchmarked against the remainder of the sample in order to see, how the studied subgroups compare to the population of public companies. Using the same methodology, we check whether the subsamples of trade credit suppliers and beneficiaries differ in terms of their working capital stock as well as the parameters, which are identified as close proxies for the degree of financing constraints. In conjunction, the results obtained at this stage should allow to confirm or refute H1.

The following variables are used as discriminatory factors in the logit regression analysis: capital expenditures (Capex/Assets); operating cash flows (CF/Assets); price-to-book value ratio (P/BV); asset tangibility (defined as a ratio of the firm's fixed assets to the value of total assets); cash holdings (Cash/Assets); dividend payout ratio; debt-to-equity ratio (Debt to Equity). All variables are scaled by the contemporaneous value of total assets.

At the following stage, we use common measures of financing constraints in order to establish, whether the firms receiving and granting trade credit are similar in their degree of exposure to capital market frictions. In particular, we compare the contemporaneous investment-cash flow sensitivity coefficients (Fazzari, Hubbard, Petersen, Blinder, & Poterba, 1988; Kaplan & Zingales, 1997) of the RECINCR and TPICR subsamples. The model specification used for the estimation of cash flow sensitivity of investments is as follows:

$$\frac{I}{K_{it}} = \beta_0 + \beta_1 \frac{CF}{K_{it}} + \beta_2 \frac{CF}{BV_{it}} + \varepsilon_{it}$$
(3)

where $\frac{I}{K_{it}}$ - capital expenditures of i-th firm in year t scaled by the value of fixed assets; $\frac{CF}{K_{it}}$ operating cash flows; $\frac{P}{BV_{it}}$ - price-to-book value ratio. We run random-effect static panel
regressions with year and industry dummies; standard errors are heteroscedasticity
robust.

In order to ascertain, whether the subsamples of firms supplying/obtaining trade credit differ in their financing/investment/dividend policies, we perform a constrained study of cash flow uses within the particular subsamples. We utilize the methodology developed by Gatchev, Pulvino, and Tarhan (2010). We estimate a system of regression equations with the following specification:

$$CFU_{it} = \beta_0 + \beta_1 \frac{CF}{A_{it}} + \beta_2 \frac{P}{BV_{it}} + \beta_3 Size_{it} + \varepsilon_{it}$$
(4)

where CFU_{it} – cash flow use scaled by the value of total assets; $Size_{it}$ – a control variable approximating firm size and measured by the natural logarithm of total assets; other

variables are defined as above. The models account for year – and firm-level fixed effects by introducing appropriate dummy variables. Equation (4) is tested under four different specifications with four different regressands, which represent the four alternative uses of cash flows: capital expenditures, external finance (calculated as a sum of net debt issuances and net equity issuances), dividend payouts, and cash holdings accumulation.

Finally, in order to verify, whether trade credit bargaining may alter the operating performance of the sampled companies, we run static panel regressions of the following specification:

$$OP_{it} = \beta_0 + \beta_1 TradeCredit_{it} + \beta_2 SalesGrowth_{it} + \varepsilon_{it}$$
(5)

where OP_{it} – operating performance indicator; *TradeCredit_{it}* – the value of trade payables/receivables (under two separate model specifications) scaled by the value of firm's total assets; *SalesGrowth_{it}* – YoY relative sales growth. The model is tested with three different regressands, i.e., return on assets (ROA) and its constituents – net profit margin and asset turnover ratio. Pyramidal analysis of the key components of ROA allow for a better understanding of the transmission mechanisms of trade credit on the operating performance of the sampled companies. It is worth noting that the relationship between operating performance and working capital proxies may exhibit nonlinearity, therefore, we include several additional polynomial specifications, which may allow for a more accurate approximation of the studied relationships.

5. Empirical findings

In this section, we present and discuss the results of quantitative analysis. Table 2 summarizes the results of binary logit regressions estimating the likelihood of a firm being a supplier/beneficiary of trade credit. The summary metrics for all econometric models suggest that they may be used for further statistical inference. The comparison of fundamental characteristics of firms which increased trade receivables during the observation period with the remainder of the sample demonstrates that, on average, a typical supplier of trade credit is less indebted (the respective regression coefficient of -0.095 is statistically significant at 1% level), less liquid (coefficient: -1.138; sig.: 1%) and less tangible (coefficient: -0.943; sig.: 1%) than a representative company in the population. It also generates lower operating cash flows (coefficient: -0.221; sig.: 10%), which may be due to relatively lower sales growth (coefficient: -0.203; sig.: 1%). In contrast, the firms which received trade credit (model 2 in Table 2) during the studied period, are evidenced to exhibit relatively higher asset tangibility (coefficient: 0.330; sig.: 1%), liquidity (approximated by the relative share of cash holdings in the firm's total assets; coefficient: 0.697; sig.: 1%) and price-to-book value ratio (coefficient: 0.068; sig.: 1%). No significant inter-sample differences have been recorded in terms of capital expenditures and dividend payout ratio; the respective regression coefficients are persistently insignificant. The comparison of these results with evidence from prior studies on the determinants of financing constraints suggests that the suppliers of trade credit are more likely to be financially constrained than those obtaining trade credit. Lamont, Polk, and Saa-Requejo (2001) note that the degree of financing constraints is inversely associated with the value of cash flows, cash holdings, and market-to-book value ratio.

	Receivab	les Increase	Payables Increase	2
Model No	1		2	
	Coefficient		Coefficient	
Capex/Assets	-0.186315		-0.12303	
	(0.1276)		(0.1173)	
CF/Assets	-0.220783	*	-0.08216	
	(0.1177)		(0.1119)	
P/BV	-0.0691291	***	0.06759	***
	(0.02044)		(0.01952)	
Asset Tangibility	-0.943202	***	0.33026	***
	(0.08087)		(0.07616)	
Sales Growth	-0.20326	***	0.05372	
	(0.05211)		(0.04968)	
Debt to Equity	-0.0952491	***	-0.02421	
	(0.02719)		(0.02556)	
Cash/Assets	-1.13824	***	0.69728	***
	(0.1734)		(0.1602)	
Dividend Payout Ratio	9.95E-05		0.00076	
	(0.001342)		(0.001291)	
Log-likelihood	-5358.9207		-5651.71	
No of observations	8244		8244	
Chi^2	710.77	***	125.19	***

 Table 2. The results of binary logit regressions estimating the likelihood of payables or receivables increases.

Source: own elaboration. Note: the table presents the maximum likelihood estimates of a binary logit model. Asymptotic standard errors are reported in parentheses under the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

The analysis of inter-sample differences in working capital ratios (Table 3) demonstrates that the suppliers of trade credit implement (or are induced to implement) a relatively more aggressive working capital management strategy. The firms' propensity to increase trade receivables is positively associated with the shares of trade receivables (coefficient: 3.130; sig.: 1%) and inventories (coefficient: 1.100; sig.: 1%) in total assets. In contrast, the companies, which received trade credit (model 2 in Table 3), are evidenced to hold relatively lower trade receivables (coefficient: -1.053; sig.: 1%) and lower inventories (coefficient: -0.986; sig.: 1%). Trade payables appear to have no significant associative relation with the firms' propensity to increase trade payables/receivables. In conjunction, higher working capital investments and lower cash flows may significantly constrain the growth of the suppliers of trade credit.

Table 4 shows, how the propensity to provide/use trade credit is related to the firms' size, age, and mode of financing. The suppliers of trade credit are significantly more likely to be smaller (coefficient: -0.059; sig.: 1%) and younger (coefficient: -0.042; sig.: 1%), whereas the opposite is true for firms demanding credit extension (the respective regression coefficients are 0.023 and 0.014 significant at 1% level). Both age and size have been shown to perform well in approximating firms' exposure to financing constraints and information asymmetry (Hadlock & Pierce, 2010). Hence, the subsample of companies, which increased trade receivables during the studied period appears to be more financially constrained than the remainder of the population of public companies. In contrast, the users of trade credit are evidenced to be of larger size and older age, which may mitigate their exposure to capital market frictions.

Overall, our empirical evidence speaks in favor of H1: due to being more financially constrained, some firms may be forced to provide trade credit to their counterparties,

	Receivables Increas	e Payables Increase
Model No	1	2
	Coefficient	Coefficient
Receivables/Assets	3.12995 ***	-1.05285 ***
	(0.1391)	(0.09990)
Payables/Assets	0.137569	0.0329
	(0.1090)	(0.09055)
Inventory/Assets	1.10E+00 ***	-0.98648 ***
	(0.1221)	(0.1050)
Log-likelihood	-6465.28577	-8619.34
No of observations	8244	8244
Chi^2	2389.4 ****	629.26 ***

Table 3. The differences in w	vorking capita	l management by	r firms supplying	i/demanding	trade credit.
				,	

Source: own elaboration. Note: the table presents the maximum likelihood estimates of a binary logit model. Asymptotic standard errors are reported in parentheses under the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

who are less confronted with capital rationing. The providers of trade credit are smaller, younger, less tangible, less liquid and maintain relatively higher investments into working capital, which may impose a heavy burden on their constrained cash flows. Table 4 clearly demonstrates that the suppliers of trade credit are significantly more likely to rely on equity issuances to finance their operations, while in the subsample of firms, which increased payables, the reliance on equity is the lowest in the sample. Model 1 in Table 4 shows that increases in trade receivables exhibit significant positive associative link with the magnitude of net equity issuances (the respective regression coefficient is 3.190 significant at 1% level). The opposite negative relationship is observed in case of beneficiaries of trade credit (coefficient: -1.077; sig.: 1%).

The beneficiaries of trade credit are likely to be less financially constrained due to higher net worth, availability of collateral and lower degree of information asymmetry. Yet, despite potentially enjoying a better access to capital markets, these firms are shown to implement a conservative working capital management strategy and rely on trade

	Receivabl	les Increase	e Payabl	es Increase	
Model No	1		2		
	Coefficient		Coefficient		
Age	-0.041832	***	0.01386		***
	(0.002101)		(0.001977)		
Log-likelihood	-5502.06508		-5689.52		
No of observations	8244		8244		
Chi^2	424.48	***	49.574		***
Ln Assets	-0.0598069	***	0.02327		***
	(0.002180)		(0.002075)		
Log-likelihood	-5309.7264		-5645.25		
No of observations	8236		8236		
Chi^2	798.07	***	127.02		***
Net Equity Issuances/Assets	3.19029	***	-1.07741		***
	(0.2044)		(0.1436)		
Log-likelihood	-5533.44162		-5684.19		
No of observations	8244		8244		
Chi^2	361.73	***	60.238		***

Table 4. The impact of firms' age, size, and mode of financing on the likelihood of increasing trade receivables or trade payables.

Source: own elaboration. Note: the table presents the maximum likelihood estimates of a binary logit model. Asymptotic standard errors are reported in parentheses under the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

credit more heavily than their constrained counterparties. The bargaining power seems to play a crucial role in determining the firms' roles as suppliers/beneficiaries of trade finance with the former potentially bearing disproportionately higher costs of trade credit redistribution.

Table 5 presents a comparative analysis of contemporaneous cash flow allocation priorities in the subsamples of trade credit suppliers/beneficiaries. The reported results are based on fixed-effects panel regression models with time and industry dummies. Several important distinguishing features are noticeable. First and foremost, the firms, which increased trade payables during the analyzed period, exhibit a significantly higher elasticity of demand for external financing. Whenever operating cash flows shrink by one monetary unit, these companies are able to compensate the cash flow shock with external financing (either net debt issuances or net equity issuances) worth 0.528 monetary units (the respective regression coefficient is significant at 1% level). In similar circumstances, the suppliers of trade credit have the capacity to incur only 0.336 monetary units of external financing (sig.: 1%). Overall, the suppliers of trade credit have been demonstrated to be more reliant on equity financing, while simultaneously having inelastic demand for external financing, the two features suggestive of their financially constrained status.

We observe no significant inter-sample differences in terms of firm-level propensity to reinvest operating cash flows. With the subsample of credit suppliers investing a marginally higher proportion of cash flows (0.192 against 0.176 for beneficiaries;

Payables Increase								
Explained Variables	Capex/As	sets	External Finar	nce/Assets	Dividend/A	ssets	Cash Holdings Ir	ncrease/Assets
no. of observations	4639		4639		4639		4639	
Wald (joint)	60.05	***	104.9	***	38.44	***	38.75	***
R^2	0.443413		0.512348		0.502527		0.412155	
Constant	0.251832	***	-0.544	***	0.009276	***	0.272818	***
	(0.014)		(0.039)		(0.003)		(0.032)	
OCF/Assets	0.176	***	0.528	***	0.029	***	0.275	***
	(0.024)		(0.054)		(0.005)		(0.044)	
P/BV	0.003623	*	-0.00461		-0.00056		0.002453	
	(0.002)		(0.005)		(0.001)		(0.004)	
Ln Assets	0.000622		-0.0001		0.000426		-0.00033	
	(0.001)		(0.004)		(000)		(0.003)	
Receivables Increase								
Explained Variables	Capex/As	sets	External Finar	nce/Assets	Dividend/A	ssets	Cash Holdings Ir	ncrease/Assets
no. of observations	2803		2803		2803		2803	
Wald (joint)	55.26	***	21.9	***	17.47	***	20.55	***
R^2	0.53266		0.538313		0.599034		0.534247	
Constant	0.033178	**	-0.15415	***	-0.00149		0.100674	**
	(0.015)		(0.051)		(0.004)		(0.040)	
OCF/Assets	0.192	***	0.336	***	0.020	***	0.357	***
	(0.026)		(0.093)		(0.006)		(0.079)	
P/BV	0.006142	*	-0.01436	**	0.001702	*	0.003465	
	(0.003)		(0.007)		(0.001)		(0.006)	
Ln Assets	0.00128		0.000941		0.000228		-0.00156	
	(0.001)		(0.005)		(000)		(0.004)	

Table 5. The study of contemporaneous cash flow allocation by the firms increasing trade receivables/ trade payables.

Source: own elaboration. Notes: All models include the time and industry dummies (not reported). This table presents fixed-effect static panel model estimates. The heteroscedasticity robust standard errors are provided in parentheses. ****, ***, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

both coefficients are significant at 1% level), we may conclude that trade credit provision bears no significant repercussions for investment policies.

The firms, which increased trade payables, appear to pay significantly higher dividends than their constrained counterparties. An additional unit of cash flows increases the contemporaneous dividend payout of a trade credit beneficiary by 0.029 units (sig.: 1%), while the credit suppliers increase dividends by only 0.020 units (sig.: 1%). Since the dividend payout policy has been initially thought of as one of the key indicators of the firms' exposure to financing constraints (Fazzari et al., 1988), we obtain one more argument speaking in favor of suppliers' constrained status.

Finally, a closer analysis of the inter-sample differences in the propensities to accumulate cash holdings shows that trade credit suppliers stash more cash out of contemporaneous cash flows. Each additional unit of cash flows translates into 0.357 additional units of cash holding (sig.: 1%). In turn, the firms, which increased trade payables, save only 0.275 units of cash (sig.: 1%) out of each additional unit of cash flows. Looking from the other perspective, in case of negative cash flow shocks, the supposedly more constrained suppliers deplete cash reserves more intensively than their less constrained counterparts.

Table 6 presents the empirical estimates of model (3). We use the methodology of investment-cash flow sensitivity measurement, which was initially suggested by Fazzari et al. (1988) for identifying financially constrained companies. The subsample of trade credit suppliers is demonstrated to exhibit lower cash flow sensitivity (coefficient: 0.090, sig: 1%) of investment than the subsample of trade credit beneficiaries (coefficient: 0.194; sig.: 1%). The seemingly contradictory fact may be explained by two key factors, which may distort the measurement results. First, the subsample of credit suppliers has been shown to exhibit lower asset tangibility: since both capital expenditures and cash flows are scaled by the value of fixed assets, the difference in fundamentals may pose a challenge to the rightful comparison of investment-cash flow sensitivity coefficients. If one scales the cash flows and capital expenditures by the value of total assets, the difference in cash flow sensitivity coefficients disappears (Table 5). Secondly, the cash flows may approximate the firm's immediate growth opportunities instead of approximating internally available financial resources (Cummins, Hassett, & Oliner, 2006). Our analysis demonstrates that age, size as well as cash flow sensitivity coefficients unambiguously point to the financially constrained status of the suppliers of trade credit. The

Subsample	Receivables Increase		Payables In	crease
no. of observations Wald (joint)	2621 103.2	***	4587 534.9	***
R^2	0.082635		0.125542	
Constant	0.250402	***	0.251876	***
	(0.039)		(0.045)	
CF/K	0.090	***	0.194	***
	(0.009)		(0.008)	
P/BV	-0.00253		0.016458	**
	(0.006)		(0.006)	

Table 6. The difference in cash flow sensitivity of investments between the firms increasing trade receivables and those increasing trade payables.

Source: own elaboration. Notes: All models include the time and industry dummies (not reported). This table presents random-effect static panel model estimates. The heteroscedasticity robust standard errors are provided in parentheses. ***, ***, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

investment-cash flow sensitivity coefficients resulting from the widely utilized methodology of Fazzari et al. (1988) proves to be much less informative.

Finally, we test for the impact of trade credit provision on the operating performance of the transacting parties. Table 7 summarizes our empirical results. In panel A, the explained variable is net profit margin. Static panel regression (model 1) estimates demonstrate that, overall, the share of trade receivables in total assets (TREC/A) is positively associated with the net profit margin (coefficient: 0.163; sig.: 1%). It may be explained by the beneficial impact of trade on the sales growth and supplier surplus: sales on credit may allow to price-discriminate between buyers. Simultaneously, a proper screening of counterparties' creditworthiness may allow for minimization of bad debts and collection delays. While on the sample level, provision of trade credit appears to have a beneficial impact on margins, the opposite is true for the subsample of firms, which increased trade receivables during the studied period. The variable interacting the dummy RECINCR and the nominal variable TREC/A is negative (coefficient: -0.124) and statistically significant at 1% level. The financially constrained suppliers of trade credit appear to increase their sales on credit at the expense of profit margins. The latter may be due to the fact, that the buyers with a stronger bargaining position may claim discounts or demand an extension of trade credit, which may be unacceptably costly for constrained firms. As a consequence, cash flow shortages may be amplified with alternative costs of holding unwanted/excessive current assets.

The relationship between the value of trade payables and net profit margin exhibits nonlinearity (models 4–5 in Table 7): the squared term TP/A, which relates the value of the companies' outstanding trade payables to the value of total assets, is significant and negative (coefficient: -0.216) suggesting a parabolic relationship between profit margins and the use of trade credit. It appears that after a certain threshold, a further increase in the value of trade payables is associated with lower operating performance.

In line with expectations, the positive link between the provision of trade credit and asset turnover ratio (Panel B, Table 7) is confirmed by our empirical findings. The respective regression coefficient at the variable TREC/A equals 1.677 and is significant at 1% level. The positive impact appears to be more pronounced in the subsample of trade credit suppliers: the coefficient at the variable interacting TREC/A and RECINCR equaling 0.436 is significant at 1% level. The stimulative impact of trade credit on sales outweighs the costs of maintaining higher current assets. As initially conjectured, the credit-constrained suppliers of trade credit target sales growth as a solution to the problem of cash flow shortage. In a pursuit of faster volume expansion fueled by trade credit, they are induced to sacrifice profit margins. The growth-profitability trade-off posits a considerable challenge to the internal financing of these companies as alternative sources of funds remain scarce.

The relationship between payables-to-assets ratio and asset turnover ratio is found to exhibit non-linearity. The coefficient at the squared TP/A equal to -1.032 (sig.: 1%) suggests a parabolic relationship between trade credit provision and asset productivity. One may postulate the existence of an optimal value of payables-to-assets ratio allowing to maximize the efficiency of asset utilization. In case of firms, which increased trade payables during the observation period, the share of trade payables in liability structure is found to be negatively associated with asset turnover ratio. The coefficient at the interaction term TP/A * TPINCR is negative (-0.331) and significant at 1%. Higher

Table 7. The impact of trade	e finance on operational p	erformance.			
Panel A.					
Model No	1	2	3	4	5
no. of observations	8241 23 2***	8139 30.61***	8241 57 1***	8116 10 47***	8116 19 40***
Wald JUIIL) RA2	23.20095	0.024047	0.024939	0.019871	0.019868
Constant	0.014392	0.007304	0.133799***	0.08212**	0.082208**
- - -	(0.037)	(0.037)	(0.036)	(0.036)	(0.037)
sales Growth	-0.015	-0.014 (0.011)	-0.014	-0.00/	-0.00/
TREC/A	0.163383***	0.237549***			
	(0.035)	(0.042)			
(TREC/A)*RECINCR		-0.124*** (0.042)			
TP/A		(71-0-0)	-0.20908***	0.047708	0.045706
			(0.028)	(0.079)	(0.081)
(IP/A)^2				-0.21618** (0.101)	-0.21679** (0.101)
(TP/A)*TPINCR					0.003
Panel B.					
Model No	6	7	ø	6	10
no. of observations	8241	8139	8241	8116	8116
Wald (joint)	529.1***	746.7***	281.6***	439.5***	467.9***
R^2	0.190563	0.214022	0.164266	0.18538	0.187945
Constant	1.57761***	1.43503***	1.75277***	1.60883***	1.6002***
	(0.091)	(0.089)	(0.095)	(0.093)	(0.093)
Sales Growth	0.042**	0.046**	0.044**	0.039*	0.039
TREC/A	(0.021) 1.67655***	(0.021) 2.20333***	(7770)	(17070)	(170.0)
	(0.073)	(0.084)			
(IREC/A)*RECINCK		0.436*** (0.078)			
TP/A			0.9476***	2.02231***	2.21006***
			(0.057)	(0.164)	(0.168)
(TP/A)^2				-1.03208***	-0.96933***
(TP/A)*TPINCR				(60700)	-0 331***
					(0.063)
Source: own elaboration. Notes: <i>I</i> robust standard errors are provi Panel R. the evolutioned variable.	VII models include the time and ided in parentheses. ***, **, and is Asset Turnover Ration in Dane	industry dummies (not reported) 1 * indicate significance at the 1% 1 f the evolution variable is Bari	. This table presents the random-e , 5%, and 10% levels, respectively.	ffect static panel model estimates. In Panel A, the explained variable	The heteroscedasticity is Net Profit Margin; in
rahet d, the explained variable	IS ASSEL LUTIOVEL NAUU, III FAILE	וו כי נוופ באטומווופט אמוומטופ וא היוו	III UII ASSELS (NUA).		

JOURNAL OF APPLIED ECONOMICS

availability of trade credit seems to have no repercussions for the dynamics of sales recorded by these firms. Larger volume of third-party financing and lower financing constraints seem to bring but a limited contribution to the improvement of operating KPIs of these companies.

The overall impact of trade finance on the bottom line of the sampled companies may be evaluated relying on the empirical results reported in panel C of Table 7. We use return on assets as a summary proxy for operating performance of the sampled firms. As noted previously, the provision of trade credit by the suppliers allows them to boost asset turnover ratio at the expense of decreasing net profit margin. In sum, the negative effect of trade receivables on profit margin outweighs the beneficial impact on asset turnover. Thus the profitability of trade credit suppliers measured by return on assets appears to be impaired (the regression coefficient at the variable interacting the dummy variable RECINCR and the nominal variable TREC/A is negative (-0.118) and significant at 1% level).

In case of firms, which increased trade payables during the research period, a higher value of trade payables appears to have no significant impact on these firms' ROA.

To sum up, our evidence suggests that trade credit provision bears negative consequences for the operating performance of trade credit suppliers. In search for dynamic growth and cash flow expansion, which should ultimately alleviate financing constraints, these firms lose a part of their profit margin, which translates into a deteriorating performance record. Despite significantly improving asset turnover, trade credit seems to produce a cumulative negative impact on the suppliers' scorecard. In contrast, no significant improvements of operating performance are recorded by the beneficiaries of trade credit. H2 thus seems to find no empirical confirmation. Rather we postulate that the trade credit bargaining constitutes a negative sum game (H3), whereby the suppliers' deteriorating performance is not channeled to the users of trade credit. The theory of ultimatum trade credit bargaining under ESS seems to provide a plausible clarification to these insights.

6. Concluding remarks

The paper focuses on the importance of bargaining power and financing constraints in shaping the outcomes of trade credit negotiations. Empirical evidence confirms that the suppliers of trade credit tend to be more financially constrained than companies, which increasingly obtain trade credit from their counterparties. The provision of trade credit appears to undermine profit margins of the constrained companies without sufficiently compensating the performance damage with adequate sales growth. In contrast, the firms, which increased their reliance on trade payables, are found to experience no improvements to their operating KPIs stemming thereof: while substantially decreasing their asset turnover ratio, trade credit seems to have no repercussions for operational profitability. Our results suggest that trade credit bargaining may represent a negative-sum game for its participants.

It is important to note that inequitable distribution of trade credit may significantly exacerbate the binding constraints confronted by trade credit suppliers. In addition to experiencing hardships accessing debt and equity markets, these companies may be forced to channel their limited financial resources to their counterparties with the financial consequences possibly imperiling their liquidity position, operating efficiency, and growth prospects.

Appropriate regulation may be designed in order to preclude the application of trade credit for the purposes of rent seeking in presence of bargaining power asymmetry. The relevant regulation should be focused on limiting the scale of unjustified payment delays, increasing the role of collateral in hedging the risks of trade credit suppliers, improving legal framework behind financial instruments backed with receivables, stimulating the development of mechanisms of securitization, and facilitating legal recourse in the event of counterparties' default. Additionally, dedicated financing vehicles may be designed, possibly under government sponsorship, to facilitate the access to capital for firms experiencing hardships with raising bank or direct financing.

Disclosure statement

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

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References

- Akerlof, G. (1970). The market for "lemons": quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84(3), 488–500.
- Antràs, P., & Foley, F. (2015). Poultry in motion: A study of international trade finance practices. *Journal of Political Economy*, 123(4), 809–852.
- Bastos, R., & Pindado, J. (2013). Trade credit during a financial crisis: A panel data analysis. *Journal of Business Research*, 66(5), 614–620.
- Berger, A., & Udell, G. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance*, 30(11), 2945–2966.
- Bernanke, B., & Gertler, M. (1989). Agency costs, net worth, and business fluctuations. *American Economic Review*, 79: 14–31.
- Biais, B., & Gollier, C. (1997). Trade credit and credit rationing. *Review of Financial Studies*, 10(4), 903–937.
- Brennan, M., Maksimowic, V., & Zechner, J. (1988). Vendor financing. *Journal of Finance*, 43(5), 1127–1141.
- Carbo-Valverde, S., Rodriquez-Fernandez, F., & Udell, G. (2009). Trade credit, the financial crisis and firms access to finance. *Review of Finance*, 13, 309–340.

- Casey, E., & O'Toole, C. (2014). Bank-lending constraints, trade credit and alternative financing during the financial crisis: Evidence from European SMEs. *Journal of Corporate Finance*, 27, 173–193.
- Cosci, S., Guida, R., & Meliciani, V. (2019). Does trade credit really help relieving financial constraints? *European Financial Management*, 26(1), 198–215.
- Costello, A. (2019). The value of collateral in trade finance. *Journal of Financial Economics*, 134(1), 70–90.
- Cowton, C., & San-Jose, L. (2017). On the ethics of trade credit: Understanding good payment practice in the supply chain. *Journal of Business Ethics*, 140(4), 673–685.
- Cummins, J., Hassett, K., & Oliner, S. (2006). Investment behavior, observable expectations, and internal funds. *The American Economic Review*, *96*(3), 796–810.
- Cuñat, V. (2007). Trade credit: Suppliers as debt collectors and insurance providers. *Review of Financial Studies*, 20(2), 491–527.
- Deloof, M. (2003). Does working capital management affect profitability of belgian firms? *Journal* of Business Finance & Accounting, 30(4), 573–587.
- Enqvist, M., Graham, J., & Nikkinen, J. (2014). The impact of working capital management on firm profitability in different business cycles: Evidence from Finland. *Research in International Business and Finance*, *32*, 36–49.
- Fabbri, D., & Klapper, L. (2016). Bargaining power and trade credit. *Journal of Corporate Finance*, *41*, 66–80.
- Fazzari, S., Hubbard, G., Petersen, B., Blinder, A., & Poterba, J. (1988). Financing Constraints and Corporate Investment. *Brookings Papers on Economic Activity*, *1*(1988), 141–206.
- Ferrando, A., & Mulier, K. (2013). Do firms use the trade credit channel to manage growth? *Journal of Banking & Finance*, 37(8), 3035–3046.
- Fisman, R., & Raturi, M. (2004). Does competition encourage credit provision? Evidence from African trade credit relationships. *The Review of Economics and Statistics*, 86(1), 345–352.
- Gatchev, V., Pulvino, T., & Tarhan, V. (2010). The interdependent and intertemporal nature of financial decisions: An application to cash flow sensitivities. *The Journal of Finance*, 65(2), 725–763.
- Giannetti, M., Burkart, M., & Ellingsen, T. (2011). What you sell is what you lend? Explaining trade credit contracts. *The Review of Financial Studies*, *24*(4), 1261–1298.
- Hadlock, C., & Pierce, J. (2010). New evidence on measuring financial constraints: Moving beyond the KZ Index. *Review of Financial Studies*, 23(5), 1909–1940.
- Hoang, H., Xiao, Q., & Akbar, S. (2019). Trade credit, firm profitability, and financial constraints: Evidence from listed SMEs in East Asia and the Pacific. *International Journal of Managerial Finance*, 15(5), 744–770.
- Jones, P. (2010). Trade Credit Insurance. In *Primer Series on Insurance* (pp. 15). World Bank, Washington, DC.
- Kaplan, S., & Zingales, L. (1997). Do Investment-cash flow sensitivities provide useful measures of financing constraints? *The Quarterly Journal of Economics*, 112(1), 169–215.
- Klapper, L., Laeven, L., & Rajan, R. (2012). Trade credit contracts. *Review of Financial Studies*, 25 (3), 838–867.
- Kling, G., Paul, S., & Gonis, E. (2014). Cash holding, trade credit and access to short-term bank finance. *International Review of Financial Analysis*, 32, 123–131.
- Konrad, K., & Morath, F. (2016). Bargaining with incomplete information: Evolutionary stability in finite populations. *Journal of Mathematical Economics*, *65*, 118–131.
- Lamont, O., Polk, C., & Saa-Requejo, J. (2001). Financial constraints and stock returns. *Review of Financial Studies*, 14(2), 529–554.
- Lawrenz, J., & Oberndorfer, J. (2018). Firm size effects in trade credit supply and demand. *Journal* of Banking & Finance, 93, 1–20.
- Love, I., Preve, L., & Sarria-Allende, V. (2007). Trade credit and bank credit: Evidence from recent financial crises. *Journal of Financial Economics*, *83*(2), 453–469.
- Mateut, S., & Chevapatrakul, T. (2018). Customer financing, bargaining power and trade credit uptake. *International Review of Financial Analysis*, 59, 147–162.

- McGuinness, G., Hogan, T., & Powell, R. (2018). European trade credit use and SME survival. *Journal of Corporate Finance*, 49, 81–103.
- Petersen, M., & Rajan, R. (1997). Trade credit: Theories and evidence. *The Review of Financial Studies*, 10(3), 661–691.
- Schmidt-Eisenlohr, T. (2013). Towards a theory of trade finance. Journal of International Economics, 91(1), 96-112.
- Shang, C. (2020). Trade credit and stock liquidity. Journal of Corporate Finance, 62, 101586.
- Shi, X., Wang, A., & Tan, S. (2020). Trade-credit financing under financial constraints: A relational perspective and evidence from listed companies in china. *Emerging Markets Finance and Trade*, 56(4), 860–893.
- Smith, J. (1987). Trade credit and informational asymmetry. *The Journal of Finance*, 42(4), 863–872.
- Tsuruta, D. (2013). Customer relationships and the provision of trade credit during a recession. *Applied Financial Economics*, 23(12), 1017–1031.
- Wilner, B. (2000). The exploitation of relationships in financial distress: The case of trade credit. *The Journal of Finance*, 55(1), 153–178.
- Wilson, N., & Summers, N. (2002). Trade credit terms offered by small firms: Survey evidence and empirical analysis. *Journal of Business Finance & Accounting*, 29(3-4), 317-335.
- Wu, D., Zhang, B., & Baron, O. (2018). A trade credit model with asymmetric competing retailers. Production and Operations Management, 28(1), 206–231.
- Xu, H., Wu, J., & Dao, M. (2020). Corporate social responsibility and trade credit. *Review of Quantitative Finance and Accounting*, 54(4), 1389–1416.
- Yazdanfar, D., & Ohman, P. (2015). The impact of credit supply on sales growth: Swedish evidence. International Journal of Managerial Finance, 11(3), 329-340.