PREDATORY TRADE FINANCE: THE IMPACT OF BARGAINING POWER AND FINANCING CONSTRAINTS ON THE DEMAND AND SUPPLY OF TRADE CREDIT

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Abstract

Purpose: Anecdotal evidence suggests that in trade credit relations, as in any other form of negotiation, the economic outcome of a trade deal is contingent on the bargaining power of transacting parties. We empirically demonstrate that the 'predator-prey' metaphor may be well-suited to describe the trade finance mechanisms in an emerging economy. Having analyzed the dynamics of trade credit in the Polish corporate sector over the period between 1997 and 2014, we found that the suppliers of trade credit were smaller, younger, less liquid, less indebted and more financially constrained than the beneficiaries of the extended trade credit. 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. In turn, the companies, which reported higher trade payables, appear to enjoy higher cash flows and a better access to external financing, yet with no significant improvements to the operating KPIs. In contrast to the conventional wisdom, which praises trade credit for its beneficial role in accelerating firm growth, we hypothesize that trade credit bargaining may be a negative-sum game with the consequences possibly being particularly detrimental to the smaller and more constrained companies.

Key words: trade credit; working capital; emerging economy

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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 et al., 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 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 et al., 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), 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. Hence, 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, the 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 the 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.

The paper tests the empirical predictions of the ultimatum bargaining theory (Konrad & Morath, 2016) 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 the 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. In particular, we incorporate the theory of ultimatum trade bargaining into the analytical framework of the conventional redistributive theory of trade credit. As a result, 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. Although at odds with the redistributive theory of trade credit, the latter finding has been previously reported in the empirical literature. The present study advances the argument a step further and attempts to investigate whether unequal distribution of trade credit ultimately represents a negative-sum game for the transacting parties. To start with, we change the approach to the measurement of bargaining power. While the empirical literature frequently suggests that the bargaining position of transacting parties mostly derives from their mutual trading

exposure (Fabbri & Klapper, 2016), we postulate that it is significantly shaped by the counterparties' financing constraints status. In essence, trade credit bargaining represents a competition for a limited pool of accessible external financing. The financially constrained firms are frequently reliant exclusively on internally generated resources to fund their organic development. Lack of external financing forces constrained firms to seek for a faster growth fueled by sales on credit at the risk of falling prey to liquidity shortages. The financially unconstrained firms are more conservative in this respect and are more likely to be granted trade credit due to lower counterparty risk. Overall, we posit that the firms' exposure to financing constraints represents a crucial factor shaping the outcome of trade credit redistribution with the unconstrained firms being likely to emerge as net beneficiaries as opposed to constrained firms, which may be the net suppliers thereof. Our findings support this stance and demonstrate that constrained companies are experiencing a time-invariant shortage of trade financing.

We further investigate whether the 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 suppliers, we find no concomitant improvements in the performance of trade credit beneficiaries. The empirical findings presented in the paper suggest that the 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 the 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. To start with, the Polish capital market is still undergoing major regulatory and institutional changes aimed at increasing its allocational and informational efficiency (Czekaj, 2014). Despite having experienced a dynamic growth in recent decades, the market still manifests significant liquidity shortages and insufficient depth. The latter complicates the process of external capital raising by public companies and prompts firms to look for additional financial resources outside of public capital markets. The banking system, in turn is largely dominated by foreign-owned institutions (Hasan et al., 2017), which bears important implications for the accessibility of bank financing and for the distribution of credit resources. Capital market imperfections cause the financially constrained companies to suffer from a severe shortage of external financing and increase the importance of trade credit in fueling their growth. A persistent shortage of trade financing may hinder their growth and damage their value creating potential. The results of our empirical study relying on the data from the Polish stock market demonstrate that the problem of inequitable trade finance redistribution is especially acute in the emerging economies, where capital allocation mechanisms frequently ration dynamically growing constrained firms.

The paper is structured as follows: first, we present a brief overview of the existing empirical literature and a theoretical framework of ultimatum trade credit bargaining, 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.

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). 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 (Petersen & Rajan, 1997; Love et al., 2007; Carbo-Valverde et al., 2009; McGuinness et al., 2017; Ferrando & Mulier, 2013). 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, 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 et al., 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 by procuring cheaper trade finance to their counterparties, financially unconstrained companies are willing to contribute to a long-term business relationship with the constrained clients and secure future sales (Summers & Wilson, 2002). Alternatively, trade credit may constitute a strategy of supplier surplus maximization through price discrimination: by selling the goods for cash to the unconstrained firms and by providing trade credit to the constrained clients, the firm may maximize its sales and return on investment without putting its short-term liquidity at peril (Brennan, 1988).

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 et al. (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. 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.

Anecdotal evidence suggests that an endowment with disproportionate market power may induce a firm to force its counterparty to extend trade credit. 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.

We contribute to the empirical literature analyzing the impact of bargaining power on the outcome of trade credit transactions in the following two aspects: 1) we shift the focus towards financing constraints as a determinant of the counterparties' bargaining power and, as a corollary, a driver of trade finance redistribution; 2) by approaching trade credit bargaining as a bilateral cooperative game, we concentrate on the overall outcome of trade credit redistribution with the goal of establishing whether inequitable trade finance allocation may reduce the overall efficiency.

Theoretical Framework: Ultimatum Trade Credit Bargaining

In order to study the impact of bargaining power disparities on the outcomes of trade credit bargaining, we incorporate the analytical framework of ultimatum bargaining (Konrad & Morath, 2016) into the conventional redistributive theory of trade credit. We apply to original model developed by Konrad and Morath to formulate the testable predictions underlying the present empirical research. To start with, we part with the assumption that

trade credit bargaining represents a cooperative game. Instead, we postulate that it constitutes a competitive process whereby the transacting parties are partaking in the limited pool of trade financing with the utility of the counterparties positively associated with the value of trade credit obtained at the end of the bargaining process. Thereby we recognize that the primary objective guiding the behavior of the transacting parties is the maximization of the amount of relatively cheaper external financing obtained from their trade counterparties. Within this analytical framework, the bargaining power of the transacting parties becomes the key factor impacting the distribution of trade credit. The model of ultimatum bargaining developed by Konrad and Morath (2016) appears to be perfectly suited for incorporating the factor of bargaining power into the trade credit allocation process.

The model posits that asymmetry of information and disproportionate bargaining power may prevent the transacting parties from reaching an efficient negotiation outcome (Konrad & Morath, 2016; Myerson & Satterthwaite, 1983). The process is further complicated if the parties involved in the bargaining process recur to evolutionary stable strategies ESS, which are aimed at maximizing the relative payoff of the transacting parties rather than their absolute payoff (Konrad & Morath, 2016). The ultimate goal of ESS is assuring the comparative advantage of the transacting parties within a competitive setting. The application of ESS implies that one of the counterparties may reject an attractive offer if the gain of the other party is substantially larger than its own even if the final outcome is beneficial for both parties in absolute terms.

The original model developed by Konrad and Morath (2016) may be adapted to the trade finance settings. Assume that the economy consists of $n = 2m$ firms, which engage in trade credit bargaining. At the end of the bargaining process, some of the firms will end up being the suppliers of trade credit, while the remainder will be the beneficiaries of trade credit. The supplier (encoded by subscript s) offers trade credit terms to its counterparty by

allowing for extension of trade credit for k days, which is tantamount to a monetary reward of b. The deal is expected to increase the supplier's wealth by v_s). The net result for the supplier, if the beneficiary accepts the deal, is (v_s-b). In return, the beneficiary (encoded with a subscript b) agrees to purchase the goods from the supplier. If the beneficiary renounces to the deal, it will have to transact with the supplier's competitor with the transaction yielding the net benefit of v_b compared to the terms offered by the supplier. The function $\beta(v_b)$: $[0; 1] \rightarrow [0; \infty)$ approximates the value that the beneficiary places on its right to choose the supplier.

Konrad and Morath (2016) demonstrate that

$b = \frac{4m^2-2m-1}{2(4m^2-2m-m)}$, if $m > 1$; $b \in [0; 0.5]$ if $m = 1$; $\beta(v_b) = v_b + \frac{1-v_b}{2m}$ (1).

As a corollary of (1), the beneficiary agrees to transact with the given supplier only if:

$$V_b(\beta) = \begin{cases} 0 \; if \; \beta < \frac{1}{2m} \\ \frac{2\beta m-1}{2m-1} \; if \; \frac{1}{2m} \leq \beta \leq 1 \\ 1 \; if \; \beta > 1 \end{cases}, (2),$$

where $V_b(\beta)$ is an inverse function of $\beta(v_b)$ (Konrad & Morath, 2016). The key implications of the model by Konrad and Morath (2016) may be summarized as follows: 1) some of the mutually beneficial deals are rejected by the beneficiary if the value of the monetary payoff offered to the beneficiary is lower than the value of the gain obtained by the supplier; i.e., the beneficiary may agree to an inefficient bargain in order to maximize its relative payoff (the implicit loss of the beneficiary if lower than that of the supplier); 2) as a corollary of the preceding implication, in order to encourage the beneficiary to take the trade credit deal, the supplier may be forced to offer a higher monetary reward (more extended trade credit) than under non-evolutionary stable strategies.

The outcome is further modified in the presence of significant disparities in bargaining power between the suppliers and beneficiaries of trade credit. Other things equal, the higher

bargaining power of the beneficiary causes the number of unsuccessful bargaining attempts to increase. Secondly, the higher the bargaining power of the beneficiary, the more attractive terms have to be offered by the suppliers in order to encourage the beneficiary to take the deal. A combination of the two enumerated factors may yield a negotiation outcome which may be regarded as suboptimal for both the supplier and beneficiary of trade credit, with the former being in a clear disadvantage in terms of monetary losses. Hence, the application of ESS may induce the beneficiaries to inflict losses on the suppliers with the ultimate goal of improving the relative positioning of the former with respect to the latter (Konrad & Morath, 2016).

Overall, the beneficiaries of trade credit with a higher bargaining power than that of the supplier are in a privileged position and may therefore dictate the terms of trade credit. In turn, if the supplier of trade credit has a higher bargaining power than the beneficiary, the terms of trade credit are expected to be much less favorable to the beneficiary (i.e., the period of trade credit is likely to be shorter).

The second theoretical implication resulting from the model may be formulated as follows: the bargaining power of a party to a trade credit negotiation is negatively associated with its exposure to financing constraints. Hence, whenever a financially unconstrained company is a beneficiary of a trade credit agreement, it is expected to demand an extension of trade credit recurring to a credible threat to renounce to the deal. In turn, if a financially unconstrained company is a supplier of trade credit, it is expected to curtail trade financing to a maximum extent agreed to by the beneficiary.

The financially constrained and unconstrained companies are distinct in a key aspect of exhibiting different elasticities of demand and supply of trade credit. The financially constrained companies are likely to have an inelastic demand for trade credit since the alternative sources of external capital are more expensive and less available thereby limiting their financial flexibility. In contrast, financially unconstrained companies face a more

elastic demand for trade credit, since they have an opportunity to tap capital markets and obtain external financing at a cost not significantly exceeding that offered by the trade credit supplier.

Financially constrained firms are likely to exhibit an inelastic supply of trade credit: even if there is an opportunity to maximize the company's wealth by issuing more trade credit, the firm may not be able to do so due to insufficiency of internal financial resources and lack of alternative sources of funds. Under inelastic demand for trade credit and low bargaining power, a financially constrained company is likely to have most of its consumer surplus overtaken by the less constrained counterparty through imposition of unfavorable trade credit terms.

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 et al., 2012). The constrained companies may have less flexibility in offering discounts to their clients due to potentially negative impact on the profit margins. On the other hand, large counterparties representing a considerable portion of a firm's sales may exercise pressure and frequently even recur to abusive practices in order to force the supplier to extend trade credit (Gianetti et al., 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 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 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.

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, and positive price-to-book value ratios. 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.

The choice of the jurisdiction is dictated by the fact that the determinants of demand and supply have been mostly studied on the data from mature markets (Klapper et al., 2012). The study of the phenomenon in question within the context of an emerging economy may shed light on the intricacies of the phenomena in question. The cross-country data of the World Bank (Van Horen, 2007) demonstrate that the distortionary impact of bargaining power on the supply of trade credit is decreasing with the development of financial markets. As the financial intermediation and public debt markets consequentially mitigate the problems related to adverse selection and information asymmetry, the problem of market power abuse, including in the context of provision of trade credit, may subside. The Polish market has been undergoing major systemic changes over the last two decades, however, the capital market may be still characterized as incomplete due to the prevalence of banking finance and underdevelopment of the public debt market (Hasan et al., 2017).

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 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 et al., 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:

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

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 et al. (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. Analysis of regression coefficients should allow for identification of distinguishing features of the financial decisions by the trade credit suppliers and providers thereby constituting a robustness check for prior findings.

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:

$$OP_{it} = \beta_0 + \beta_1 Trade\ Credit_{it} + \beta_2 Sales\ Growth_{it} + \varepsilon_{it}, (5),$$

where OP_{it} – operating performance indicator; $Trade\ Credit_{it}$ – the value of trade payables/receivables (under two separate model specifications) scaled by the value of firm's total assets; $Sales\ Growth_{it}$ – 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. We already explained that trade credit may impact both the margins (through the mechanisms of early settlement discounts) as well as the asset turnover through balance sheet values of current assets and current liabilities. 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.

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 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, less liquid and less tangible than a representative company in the population. It also generates lower operating cash flows, which may be due to relatively lower sales growth. The price-to-book value ratio is also significantly lower that of the remainder of the sample. In contrast, the firms which received trade credit during the studied period, are evidenced to exhibit relatively higher asset tangibility, liquidity (approximated by the relative share of cash holdings in the firm's total assets) and price-to-book value ratio. No significant inter-sample differences have been recorded in terms of capital expenditures and dividend payout ratio. 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 et al. (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.

<<Table 1 here>>

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 and inventories in total assets. In contrast, the companies, which received trade credit, are evidenced to hold relatively less trade receivables and less inventories. 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 2 here>>

<<Table 3 here>>

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 and younger, whereas the opposite is true for the firms demanding credit extension. Both age and size have been shown to perform well in approximating the 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, 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.

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 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 4 here>>

Table 5 presents a comparative analysis of contemporaneous cash flow allocation priorities in the subsamples of trade credit suppliers/beneficiaries. 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. In similar circumstances, the suppliers of trade credit have the capacity to incur only 0.336 monetary units of external financing. 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), 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, while the credit suppliers increase dividends by only 0.020 units. 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.

<<Table 5 here>>

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. In turn, the firms, which increased trade payables, save only 0.275 units of cash 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. The latter may be explained by the fact that the less constrained firms are able to mitigate cash flow volatility by tapping alternative sources of financing, e.g., equity and debt issuances. The more aggressive working capital management combined with complicated access to external finance may be responsible for the phenomenon of precautionary cash savings exhibited by the constrained companies

(Almeida et al., 2004). As evidenced by quantitative analysis, the trade credit suppliers exhibit a higher cash flow sensitivity of cash holdings than the remainder of the sample.

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 a lower cash flow sensitivity of investment than the subsample of trade credit beneficiaries (the difference is significant at 1% level). 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 et al., 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 investment-cash flow sensitivity coefficients resulting from the widely utilized methodology of Fazzari et al. (1988) proves to be much less informative.

<<Table 6 here>>

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 estimates demonstrate that, overall, the share of trade receivables in total assets (TREC/A) is positively associated with the net profit margin. 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 and statistically significant at 1% level. Hence, 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.

<<Table 7 here>>

The relationship between the value of trade payables and net profit margin exhibits nonlinearity: 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 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. Perhaps, a firm with an excessive amount of payables is struggling with meeting its short-term liabilities. No unambiguous causal link may be established between the value of trade payables and net profit margin.

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 positive impact appears to be more pronounced in the subsample of trade credit suppliers. 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. 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 regression coefficient at the variable interacting the dummy variable TPINCR and the nominal variable TP/A measuring the ratio of trade payables to total assets is negative and significant at 1% level). Higher 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 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.

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 the companies, which increasingly obtain trade credit from their counterparties. The provision of trade credit appears to undermine the 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. After all, these firms exhibit the highest investment demand, which however, is capped by the availability of internally generated finance. An access to trade credit appears to be extremely important for the growth of constrained firms. The financial intermediaries may not be effective enough in screening their investment projects and providing external financing. In turn, a substitutive public debt market requires an extensive infrastructure, which could assure transparency and proper risk pricing. One may reasonable ask whether protective mechanisms may be put in place, which could potentially limit the scale of market power abuse and trade credit extraction from the constrained suppliers. Protective regulations have already been put in place and have proven effective in the industries, where the abusive practices may endanger the survival of suppliers.

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Table 1. Descriptive statistics

Variable	Mean	Median	St. Deviation
Total Assets	231198.470	40013.350	769482.600
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

Source: own elaboration

Table 2. The results of binary logit regressions estimating the likelihood of the firm increasing trade payables or increasing trade receivables

	Receivables Increase		Payables Increase	
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	***

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.

Table 3. The differences in working capital management by the firms supplying/demanding trade credit

	Receivables Increase		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	***

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.

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

	Receivables Increase		Payables 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	***

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.

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

Payables Increase								
Explained Variables	Capex/Assets		External Finance/Assets		Dividend/Assets		Cash Holdings Increase/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/Assets		External Finance/Assets		Dividend/Assets		Cash Holdings Increase/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)	

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.

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

Subsample	Receivables Increase		Payables Increase	
no. of observations	2621		4587	
Wald (joint)	103.2	***	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)	

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.

Table 7. The impact of trade finance on operational performance

Panel A.										
Model No	1		2		3		4		5	
no. of observations	8241		8139		8241		8116		8116	
Wald (joint)	23.2	***	39.51	***	57.1	***	18.47	***	18.49	***
R^2	0.020995		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		-0.014		-0.007		-0.007	
	(0.011)		(0.011)		(0.011)		(0.011)		(0.011)	
TREC/A	0.163383	***	0.237549	***						
	(0.035)		(0.042)							
(TREC/A)*RECINCR			-0.124	***						
			(0.042)							
TP/A					-0.20908	***	0.047708		0.045706	
					(0.028)		(0.079)		(0.081)	
(TP/A)^2							-0.21618	**	-0.21679	**
							(0.101)		(0.101)	
(TP/A)*TPINCR									0.003	
									(0.031)	
Panel B.										
Model No	6		7		8		9		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	*
	(0.021)		(0.021)		(0.022)		(0.021)		(0.021)	
TREC/A	1.67655	***	2.20333	***						
	(0.073)		(0.084)							
(TREC/A)*RECINCR			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	***
							(0.209)		(0.209)	
(TP/A)*TPINCR									-0.331	***
									(0.063)	
Panel C.										
Model No	11		12		13		14			
no. of observations	8241		8139		8116		8116			
Wald (joint)	118.3	***	89.13	***	16.29	***	17.77	***		
R^2	0.046002		0.043173		0.038846		0.039031			
Constant	0.067729	***	0.073767	***	0.130018	***	0.129521	***		
	(0.020)		(0.020)		(0.020)		(0.020)			
Sales Growth	0.003		0.003		0.006		0.006			
	(0.006)		(0.006)		(0.005)		(0.005)			
TREC/A	0.203021	***	0.177839	***						
	(0.019)		(0.022)							
(TREC/A)*RECINCR			-0.118	***						
			(0.021)							
TP/A					0.042116		0.053121			
					(0.041)		(0.042)			
(TP/A)^2					-0.12371	**	-0.12036	**		
					(0.052)		(0.052)			
(TP/A)*TPINCR							-0.019			
							(0.016)			

Source: own elaboration. Notes: All models include the time and industry dummies (not reported). This table presents the 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. In Panel A, the explained variable is Net Profit Margin; in Panel B, the explained variable is Asset Turnover Ratio; in Panel C, the explained variable is Return on Assets (ROA).