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Abstract

When trading, firms choose between different payment contracts. As shown theoretically in Schmidt-Eisenlohr (forthcoming), this allows firms in international trade to optimally trade-off differences in financing costs and enforcement across countries. This paper provides evidence from a large number of countries that shows that country characteristics are indeed central determinants of the payment contract choice. As predicted, the use of open account decreases in financing costs and contract enforcement in the source country. We extend the theory and test two additional predictions. First, we show that the more complex the industry of a firm, the more important is the quality of contract enforcement and the less important are the financing costs for the contract choice. Second, we compare direct and indirect exporters and find evidence that suggests that intermediaries play a relevant role in contract enforcement across borders.

JEL-Code: F120, F300, G210, G320.

Keywords: trade finance, payment contracts, industry complexity, developing countries, trade intermediation.

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1 Introduction

When trading goods within and across borders, firms choose between different payment contracts. The key decision is whether the payment should be made before the delivery (cash in advance) or after the delivery (open account). This is an important aspect of any trade transaction as it determines both which trading partner has to pre-finance the transaction and who bears its risk. As shown theoretically in Schmidt-Eisenlohr (forthcoming), payment contracts in international trade should therefore be chosen by firms to optimally trade-off differences in financing costs and enforcement between countries.

This paper provides evidence on this trade-off from a large number of countries, showing that country characteristics are indeed central determinants of payment contract choice. As predicted, the use of open account decreases in the source country's financing costs and the source country's contract enforcement. We extend the original theory and use the firm level data to test two additional predictions. First, we find that the industry a firm is operating in affects her payment contract choice. In more complex industries contract enforcement is key to the choice of the payment contract, whereas for less complex industries financing costs are more relevant. Second, we show that there is a difference in the behavior between direct and indirect exporters. The former pay more attention to country level contract enforcement when choosing their contract. For the latter enforcement is less relevant, suggesting that the intermediary is able to solve the enforcement problem to a large extent. Finally, we show theoretically that there is a notable difference between payment contract choice for domestic and international transactions. In the former, both parties find themselves in the same legal and financial environment while in the latter this is not the case. The payment contract choice should hence be much more important for international than for domestic transactions.

The basic trade finance model is quite intuitive. Due to the time gap between production and sales, any transaction in international trade requires working capital financing and implies a commitment problem. If pre-delivery payment (cash in advance) is chosen, the importer finances the transaction and a commitment problem arises on the side of the exporter. Post-delivery payment (open account) implies the reverse. The exporter has to pre-finance the required working capital and the importer commitment problem needs to be resolved.

This setup delivers clear predictions on how country level variables affect the contract choice. Post-delivery payment (open account) should be used more if finance in the source country is cheap and if enforcement in the source country is weak. The former directly affects profits under open account while the latter reduces the profitability of the alternative cash in advance and thereby makes open account more attractive.

To test these predictions, this paper uses data from the World Bank Enterprise Survey from a large number of firms in developing countries. The original model is extended in several ways. It now captures variation of the payment contract choice at the firm level within a country and differences in the payment contract choice between domestic and international sales. Furthermore, it introduces industry complexity and shows how this affects the contract choice of firms.

In the model, one seller is matched with one buyer. Both firms are risk neutral and play a one shot game. The seller can make a take it or leave it offer to the buyer, specifying the price and the quantity of the goods sold and the timing of the payment. If payment is demanded before delivery (cash in advance), the importer has to borrow money in her local financial market. As she pays in advance, there is an incentive for the seller not to deliver the goods. This is prevented by courts with an exogenously given probability that depends on legal institutions in the source country. If the seller chooses payment after delivery (open account), she has to borrow on her financial market. Now, the buyer, who receives the goods before payment, has an incentive to deviate from the contract. With an exogenous probability that depends on destination country, however, courts enforce the contract.

The optimal payment contract choice thus depends on the relative financing costs and the probabilities of contract enforcement of the buyer and the seller, respectively. If the buyer and seller are in the same country, the choice only depends on firm specific factors. If the two trading partners are located in different countries, the choice is also affected by country level variables. For international sales, country level characteristics thus influence the payment contract choice while they do not affect domestic choices.

This difference is exploited in the baseline specification where firms with different export intensities are compared. Firms with a higher export intensity are predicted to react more to country level variations in financing costs and contract enforcement than firms with a larger share of domestic sales.

The empirical section tests for the effects of financing costs and contract enforcement in the source country on the payment contract choice. The main measure of contract enforcement is the inverse of days it takes to enforce a contract in court, while financial costs are captured by the net interest rate margin. The results are exactly as predicted by the theory. That is, for international sales, better enforcement in the source country increases the use of pre-delivery payment and reduces the use of post-delivery payment. Higher financing costs in the source country imply that more contracts are on pre-delivery payment and less contracts are on post-delivery payment terms.

Contract enforcement depends on the verifiability of contracts in court. It can be argued that this is more difficult for complex products which are often relationship specific. This is analyzed in an extended version of the model and tested in the second empirical specification. For this, the complexity measure from Nunn (2007) is used to classify industries. Triple interactions between financing costs and enforcement, export intensity and the complexity of an industry are then added to the estimation equation. In line with the extended model, we find that the strength of contract enforcement is relatively more important for the contract choice in complex industries, while financing costs are more relevant for the choice in less complex industries.

A large fraction of international trade is done indirectly through intermediaries. This could in part be due to the fact that an intermediary is able to reduce the risk of non-payment for example through a reputation mechanism. Therefore, enforcement concerns should be less relevant for indirect exporters. We test this idea in the context of our payment contract model and find results that are consistent with this view of intermediaries. While for indirect exporters, country level enforcement does not affect the contract choice, it is a central decision variable for direct exporters. The reverse is true for financing costs. These affect the choice of indirect exporters but not that of direct exporters. We thus provide evidence for an additional rationale for trade intermediation besides the typically assumed fixed costs of distribution.

We check the robustness of our results and show that they are very similar when alternative measures of legal and financial conditions are used. Running regressions with data aggregated to the industry level and alternatively using a fractional response model delivers similar findings to the OLS regressions.

Literature To our knowledge, only two papers have tested the payment contract choice model empirically.[1] Schmidt-Eisenlohr (forthcoming) derives implications of contract choice for bilateral trade flows and uses them for an indirect test of the model with aggregate trade data. Antràs and Foley (2011) are closest to this paper as they directly test the choice between payment contracts. They extend the model in Schmidt-Eisenlohr (forthcoming) and test its predictions in regard of destination country variation in enforcement with data from one large US food seller. Their paper furthermore exploits the rich time dimension of the data to study dynamic aspects of payment contract choice in international trade. This paper adds to this line of research by providing evidence on the contract choice across many independent firms in many source countries and by testing for differences across industries and between direct and indirect exporters.[2]

This study focuses on the effects of international differences in legal and financial conditions on the payment contract choice for international and domestic trade. It therefore complements the large literature on trade credit that explains the use of supplier credit within a country.[3] The analysis also relates to the wider literature on financial conditions and trade. First, there are several papers that have studied whether conditions in the source country can affect bilateral trade patterns and sectoral specialization.[4] A second group of papers have tested whether financial constraints can be a detriment to international trade, in particular at the extensive margin.[5] Third, several papers tested for the effects of financial shocks on trade in times of crisis.[6]

By deriving and testing new results on the interaction between the product complexity

[1] Glady and Potin (2011) focus on Letters of Credit and analyze how its use is affected by country level contract enforcement and financing costs, but do not test for choices between different payment contracts.

[2] For theoretical contributions to trade finance see Schmidt-Eisenlohr (forthcoming), Ahn (2010), Antràs and Foley (2011), Engemann et al. (2011), Eck et al. (2011) and Olsen (2013). See Schmidt-Eisenlohr (forthcoming) for a review. Several policy papers also discuss trade finance. See for example Menichini (2011) and Ellingsen and Vlachos (2009).

[3] For recent empirical contributions see Giannetti et al. (2011) and Klapper et al. (2012). For theoretical aspects of trade credit see among others Biais and Gollier (1997), Petersen and Rajan (1997), Wilner (2000), Burkart and Ellingsen (2004), and Cunat (2007). Mateut (2012) extends the analysis of trade credit to prepayments which she denotes as reverse trade credit. Demirguc-Kunt and Maksimovic (2001), Choi and Kim (2005) and Love et al. (2007) study the effect of country level variables on trade credit use. Their analysis does, however, not distinguish between domestic and international sales. Klapper et al. (2012) contains an excellent review of the trade credit literature.

[4] See, in particular, Beck (2002), Beck (2003), and Manova (2013).

[5] See among others Greenaway et al. (2007), Muûls (2008), Berman and Héricourt (2010), Bricongne et al. (2012) and Manova (2013).

[6] See Paravisini et al. (2011), Amiti and Weinstein (2011) and Ahn (2013).

and enforcement, the paper also adds to the work in this area by Nunn (2007) and Levchenko (2007). Finally, Eck et al. (2011) use similar data on the shares of pre- and post-delivery payments in total sales to test for effects of trade credit on the extensive and intensive margins of trade.

The rest of the paper is organized as follows. Section 2 develops the theoretical model and derives the predictions for the empirical analysis. In section 3, we present the empirical results of the paper and report our robustness exercises. Section 4 concludes.

2 Theory

This section starts with a simplified version of Schmidt-Eisenlohr (forthcoming), focusing on the choice between cash in advance and open account. It then extends the model to allow for differences in contract choice between domestic and international sales and for a role of industry complexity.

Setup There is one seller S who is matched with one buyer B. Firms are risk neutral. The seller and the buyer play a one-shot game. The seller makes a take it or leave it offer to the buyer. The buyer can accept or reject the offer. Then, the seller can produce and send goods to the buyer. The goods arrive at the buyer in the next period and sales revenues are realized. Firms can be of a good and bad type. Let η and η^* denote the shares of good firms in the source and destination country, respectively. A good firm always fulfills a contract whereas a bad firm breaks it whenever this is profitable. Production costs are given by K and revenues are given by R.

There is a time gap between the dispatch of the goods by the seller and their arrival at the buyer. This gives rise to a working capital need that has to be financed by one of the two parties.[7] Cash in advance denotes the case where the buyer pays for the goods in advance and therefore does the financing. Under open account, the seller only gets paid after delivery and thus has to finance the transaction.

[7]Intermediate contracts in which part of the amount is paid before delivery and part of the amount is paid after delivery are not considered, as they cannot be identified in the data used. See Schmidt-Eisenlohr (forthcoming) for an analysis of these contracts. Antràs and Foley (2011) report that in their data from the large US food exporter, intermediate contracts are hardly used at all. More research is necessary, however, to establish to which extent this is also true for other firms and other industries.

Assume that financial markets are segmented across countries and that financial intermediaries in the source and the destination country differ in their efficiency. This implies that financing costs can differ between countries. Let source and destination country interest rates be denoted by $1 + r$ and $1 + r^*$.

In addition to the financing requirement, the time gap also leads to a commitment problem of bad firms. If the buyer pays in advance, the seller has an incentive not to deliver the goods after receipt of the payment. When the buyer only pays after the goods arrive (open account), she has an incentive not to transfer the money. A bad firm that tries to deviate from the contract can be brought to court by its trading partner. Enforcement is successful with exogenously given country specific enforcement probabilities denoted by λ and λ^*.

The seller is by definition always located in the source country and therefore faces enforcement probability λ and interest rate r. The buyer can be in the same country facing the same country conditions or she can be in another country. Then she faces enforcement probability λ^* and interest rate r^*. For the general case we start by denoting the buyer variables with subscript B.

Cash in Advance Cash in advance corresponds to a full pre-payment by the buyer. That is, before delivery, the buyer pays an amount C^{CIA} to the seller. A bad seller defaults on the contract, but with probability λ she is forced to deliver the goods anyways. A pooling or separating case can arise. In the pooling case, a bad firm imitates the behavior of good firms. Alternatively, bad firms can choose to deviate. Throughout the paper, it is assumed that parameters are such that only the pooling case arises, which requires that $\frac{R}{K} \geq \frac{1+r^*}{\eta}$.[8] Under pooling, the optimal contract depends only on the choice of a good seller.[9] She maximizes her expected profits subject to the buyer participation constraint:[10]

$$\max_{C} \mathrm{E}\left[\Pi_S^{CIA}\right] = C^{CIA} - K, \tag{1}$$

$$\text{s.t. } \mathrm{E}\left[\Pi_B^{CIA}\right] = \frac{\eta + (1-\eta)\lambda}{1 + r_B} R - C^{CIA} \geq 0. \qquad \text{(buyer participation constraint)} \tag{2}$$

[8] In this, we follow the assumption in Schmidt-Eisenlohr (forthcoming). See Appendix B for details.

[9] In the following all expressions on expected profits are in regard of good sellers under pooling. Subscript g for good seller and superscript p for the pooling case are dropped in the following for expositional purposes.

[10] Assume that the seller and buyer discount profits with their own country specific interest rates. To compare profits between CIA and OA, they have to be discounted to the same time period.

Under Cash in Advance, the participation constraint of the buyer always binds. This implies the following optimal payment and expected profits:

$$C^{CIA} = \frac{\eta + (1-\eta)\lambda}{1+r_B} R, \qquad \mathrm{E}\left[\Pi_S^{CIA}\right] = \frac{\eta + (1-\eta)\lambda}{1+r_B} R - K. \tag{3}$$

As Cash in advance requires complete pre-financing by the buyer, only her financing costs $1 + r_B$ affect expected profits. The commitment problem is in regard of the seller. Thus, only contract enforcement λ and the share of good firms η in the source country are relevant for expected profits.

Open Account Open account represents full payment after delivery. First, the seller produces the goods and delivers them to the buyer. When the goods arrive, the buyer sells them. While a good buyer pays the amount due, a bad buyer tries to default on the contract, but is forced to pay with probability λ_B. The exporter now chooses between a pooling case where both types of buyers accept the offered contract and a separating case where the demanded payment is so high that only bad buyers agree to it. Again, we assume that parameters are such that the pooling case arises which is the case if $\frac{R}{K} > \frac{\eta^*(1+r)}{\eta^* - (1-\eta^*)(1-\lambda^*)}$.[11] The seller then maximizes the following problem:

$$\max_C \mathrm{E}\left[\Pi_S^{OA}\right] = \frac{\eta_B + (1-\eta_B)\lambda_B}{1+r} C^{OA} - K, \tag{4}$$

$$\text{s.t. } \mathrm{E}\left[\Pi_B^{OA}\right] = R - C^{OA} \geq 0. \qquad \text{(participation constraint good buyer)} \tag{5}$$

Under Open Account, the the participation constraint of a good buyer binds. The optimal payment amount and expected profits are:

$$C^{OA} = R, \qquad \mathrm{E}\left[\Pi_S^{OA}\right] = \frac{\eta_B + (1-\eta_B)\lambda_B}{1+r} R - K. \tag{6}$$

Open account represents exactly the reverse case from cash in advance. Now, pre-financing is done completely by the seller and thus only her financing cost $1 + r$ affects expected profits. The commitment problem arises on the side of the buyer and therefore solely the enforcement probability λ_B and the share of good firms η_B influence expected profits.

[11] See Appendix B for details.

Summary Let the payment probability be denoted by $\tilde{\lambda} = \eta + (1-\eta)\lambda$. The expected seller profits from the two payment forms then are:

$$\mathrm{E}\left[\Pi_S^{CIA}\right] = \frac{\tilde{\lambda}}{1+r_B}R - K \qquad \mathrm{E}\left[\Pi_S^{OA}\right] = \frac{\tilde{\lambda}_B}{1+r}R - K.$$

Optimal Contract Choice Assume that there is a firm-specific additive shock to the profitability of open account denoted by Z_i that is proportional to R, that is $Z_i = z_i R$.[12] In the following, the optimal payment contract choice in international trade and domestic trade are studied separately. The differences between the two are key to the identification strategy.

Suppose that the buyer and the seller are in two different countries, so that $r_B = r^*$ and $\lambda_B = \lambda^*$. Then, the seller chooses open account over cash in advance iff:

$$\mathrm{E}\left[\Pi_S^{OA}\right] > \mathrm{E}\left[\Pi_S^{CIA}\right] \Leftrightarrow \frac{\tilde{\lambda}^*}{1+r} - \frac{\tilde{\lambda}}{1+r^*} + z_i > 0 \tag{7}$$

For domestic trade both firms face the same country level interest rate and enforcement probability, that is $r_B = r$ and $\lambda_B = \lambda$. The condition thus simplifies to:

$$\mathrm{E}\left[\Pi_S^{OA}\right] > \mathrm{E}\left[\Pi_S^{CIA}\right] \Leftrightarrow z_i > 0. \tag{8}$$

These results are summarized in the following Proposition:

Proposition 1. *The optimal choice of payment contract is uniquely determined by the following conditions:*

i) International trade:

$$E\left[\Pi_S^{OA}\right] > E\left[\Pi_S^{CIA}\right] \Leftrightarrow \frac{\tilde{\lambda}^*}{1+r} - \frac{\tilde{\lambda}}{1+r^*} + z_i > 0$$

[12] While not the focus of our analysis, these shocks are necessary to generate heterogeneity across firms that is observed in the data.

ii) Domestic trade:

$$E\left[\Pi_S^{OA}\right] > E\left[\Pi_S^{CIA}\right] \Leftrightarrow z_i > 0$$

Proof. Follows directly from Equations (7) and (8). □

The payment contract choice in international trade depends on the financial conditions and the legal environments both in the origin and the destination. For domestic trade, however, the choice only depends on the firm-level shock. The country level financing costs and payment probabilities do not affect the contract choice for domestic transactions because with domestic sales they do not differ between the buyer and the seller.

Now, assume that the profitability shocks are such that there is always a seller i that is indifferent between choosing cash in advance and open account.[13] Let $\bar{z}^I$ denote the value at which a firm is indifferent between using open account and cash in advance for an international transaction. This cutoff can be derived easily from equation (7) as:

$$\bar{z}^I = \frac{\tilde{\lambda}}{1+r^*} - \frac{\tilde{\lambda}^*}{1+r} \tag{9}$$

All sellers for which $z_i > \bar{z}^I$, choose open account terms for their international sales. The share of open account in international transactions thus increases if and only if $\bar{z}^I$ decreases.

Let $S^{OA,I}$ and $S^{OA,D}$ denote the share of open account in international and domestic transactions, respectively. The following Proposition derives the effects of source and destination country characteristics on the payment contract choice for international sales:

Proposition 2. *Suppose $S^{OA,I} \in (0,1)$. Then, more export contracts are on open account terms if*

i) contract enforcement in the source country is worse: $\frac{\partial S^{OA,I}}{\partial \lambda} < 0$

ii) financing costs in the source country are lower: $\frac{\partial S^{OA,I}}{\partial (1+r)} < 0$

Proof. Note that $\frac{\partial S^{OA,I}}{\partial \bar{z}^I} < 0 \quad \forall S^{OA,I} \in (0,1)$. Then, i) and ii) follow directly from taking the derivative of $\bar{z}^I$ with respect to the two variables of interest. □

[13] For example, one can assume that $F(z_i)$ has a support of $z_i \in (-\infty, \infty)$ and that the density function $f(z_i)$ is positive on the entire support.

More firm pairs use an open account contract for international sales if financing costs at the source are low. Furthermore, open account is used more if enforcement in the source country is weak as this reduces the profitability of the alternative cash in advance.

Interaction Terms In the data, we observe the share of open account in total sales. There is, however, no information on the split of this variable between domestic and international sales. In the following, we show that it is possible to test the predictions on contract choice for international sales by employing interaction terms between export intensity and the country level variables. This works because country level characteristics affect the payment contract choice for international sales but not for domestic sales as derived in Proposition 1. Note that the share of open account can be expressed as:

$$S^{OA} = S^{OA,I} XS + S^{OA,D}(1 - XS), \tag{10}$$

where S^{OA}, $S^{OA,I}$ and $S^{OA,D}$ are the shares of Open Account in total, international and domestic sales, respectively. XS is the share of exports in total sales.

The following Proposition summarizes the effect on changes in country level characteristics on firms with different export intensities:

Proposition 3. *Suppose $S^{OA} \in (0, 1)$. Then, an exporter uses more open account than another exporter who generates a smaller share of her revenues abroad if*

i) contract enforcement in the source country is worse: $\frac{\partial^2 S^{OA}}{\partial XS \partial \lambda} < 0$

ii) financing costs in the source country are lower: $\frac{\partial^2 S^{OA}}{\partial XS \partial (1+r)} < 0$

Proof. $\frac{\partial S^{OA}}{\partial XS} = S^{OA,I} - S^{OA,D}$. Noting that $S^{OA,D}$ is independent of λ and r, the rest follows directly from Proposition 2. □

Source country characteristics affect the payment contract for international sales but not for domestic sales. Any change in the share of open account in total sales that is related to changes in country level variables can therefore be attributed to adjustment of international sales contracts. The cross-derivatives of the share of open account in total sales with respect to the export intensity and the two country variables therefore give us the marginal effects

of interest. Hence, interaction terms between export intensities and financing costs and enforcement, respectively, can be employed to estimate the relationships.

Complexity of products Nunn (2007) and Levchenko (2007) have shown that product complexity affects the patterns of trade. Does product complexity also affect the payment contract choice? Sales of complex products often involve customization and other relationship-specific investments on the side of the seller. These expenditures as well as the quality of the delivered product can be difficult to verify in court. Contract enforcement should therefore be harder for complex products. The involved parties might thus be particularly keen to choose the payment contract that shifts the commitment problem to the country with better legal institutions when products are more complex.

In the following this idea is introduced and its effects on the contract choice are analyzed. Assume that there is a complementarity between product complexity and contract enforcement. That is, better courts improve contract enforcement more for complex products than for non-complex products. Let $\gamma \in [0,1]$ denote the complexity of a product and assume that the probability of enforcement now equals λ^γ. For $\gamma = 0$, the product is the least complex and the country level enforcement factor equals one. The higher γ, the more complex is the product and the harder is enforcement in court. For international trade, this implies that:

$$\mathrm{E}\left[\Pi_S^{OA}\right] > \mathrm{E}\left[\Pi_S^{CIA}\right] \Leftrightarrow \frac{\eta^* + (1-\eta^*)\left(\lambda^*\right)^\gamma}{1+r} - \frac{\eta + (1-\eta)\lambda^\gamma}{1+r^*} + z_i > 0 \tag{11}$$

From this, the following proposition can be derived:

Proposition 4. *Suppose $\lambda > 1/e$. Then, the effect of λ on the payment contract choice, as stated in Proposition 3 is the larger, the higher the product complexity γ. The effect of $1+r$ on the payment contract choice is the smaller, the higher the product complexity γ. That is: i) $\frac{\partial^3 S^{OA}}{\partial XS\partial\lambda\partial\gamma} < 0$; ii) $\frac{\partial^3 S^{OA}}{\partial XS\partial(1+r)\partial\gamma} > 0$.*

Proof. See Appendix A. □

The Proposition predicts that exporters in complex industries should put relatively more weight on cross-country differences in contract enforcement and relatively less weight on differences in financing costs.[14]

[14]The condition $\lambda > 1/e$ is quite weak as $1/e \approx .37$.

3 Empirical Results

3.1 Data

The main data source for the analysis of the payment contract choice is the World Bank Enterprise Survey. It is a comprehensive firm-level survey, conducted in a wide range of developing countries. The analysis is based on a cross-section of firms from data collected between 2006-2009. Each firm was interviewed once.

In the survey, a firm was asked which percentage of its annual sales in the last fiscal year was paid before-, after- or on-delivery. We classify payment before-delivery as cash in advance. Payments on- and after-delivery are assigned to open account. Both in the case of on- and after-delivery payments, the exporter bears the risk of non-payment and has to finance the transaction.[15] From the survey we also use the export intensity, defined as the share of exports in total sales, as well as a set of firm level controls.[16]

The firm level data is augmented by three additional sources to proxy for enforcement and financing costs in the different countries. First, we use the number of days it takes to enforce a commercial dispute in a country, which is extracted for the World Bank Doing Business database. We interpret a delay in payment contract as weaker enforcement. For ease of interpretation, the measure is inverted. Second, we us the rule of law index from the World Bank World Governance Indicators as an alternative enforcement measure. The index measures the confidence in the rule of law in a country, in particular in the quality of contract enforcement, property rights and courts. Both enforcement measures are used frequently in the literature on trade and institutions.

Third, we capture the financial conditions at the country level by using financial variables from Beck et al. (2009). In the baseline regression financing costs are proxied by the net interest rate margin. It is an ex-post efficiency measure for the overall banking sector and is

[15] There is a notable difference between the two as post-delivery payment requires a longer financing period and can imply a larger risk for the buyer than on-delivery payment. Letters of credit might also be used for some transactions of firms in the data. These would most likely be reported as on-delivery payments. They thus represent an additional reason why distinguishing between post-delivery and on-delivery payments might be useful. In a robustness exercise, we therefore ignore the information about on-delivery payments and redefine the share of open account as the share of post-delivery payments in all transactions that are either on pre-delivery or post-delivery terms. Results remain unchanged when employing this alternative measure of open account.

[16] The additional firm level controls are sales per worker, age, manager's experience, state-owned and import status.

calculated as the ratio of the net interest revenues over total assets of all banks in a country. In addition we use the private credit over GDP and overhead costs as alternative proxies for financing conditions. Private credit over GDP is a proxy for general financial development. The higher this measure, the lower should be the financing costs for firms. Our third variable is given by the sum of all overhead costs of a banking sector over total bank assets. This is another measure for the efficiency of a banking system. Lower overhead costs should imply lower costs of financial services. All three proxies for financing costs are commonly used in the literature on financial conditions and trade.

We also make some adjustments to the data set to reduce measurement error and to bring it in line with the model. First, only data on manufacturing firms is used for the analysis, as for this sector standard trade theory seems most appropriate. Data for all other sectors are dropped from the sample. Furthermore, as the theory mainly applies to trade at arm's length, firms that are affiliates of multinational companies or are owned fully or partially by foreigners are excluded.[17] In the survey, interviewers can indicate at the end of the interview whether they believe that answers of firms where truthful and reliable. To limit measurement error, observations for which interviewers do not believe this to be the case are dropped.[18] Finally, additional observations are lost when merging in the additional data sets containing our measures of contract enforcement and financing costs.

Summary statistics of the final data set are reported in Table 1. While the original survey data set contains 9616 observations of exporters in the manufacturing sector from 92 developing countries, the data set used for the baseline regression has 3762 observations of exporters from 53 countries.

Data Discussion In figure 1 we plot the share of open account in total sales against the export intensity of each firm. Both variables take values anywhere in the range between zero and one. No strong clustering can be observed. While there is a mass point of open account at one, there is still a large variation in the use of open account.[19] When a regression line is

[17] One way to resolve the commitment problem discussed in the theory is to become a multinational firm. When we run regressions on affiliates only, the effects of enforcement indeed lose their significance as expected.

[18] This is the case if the interviewer chooses answer 3 for questions a16 or a17 in the survey.

[19] In the sample, 28 percent of firms have a post-delivery payment share of one. If we calculate the share of firms with a combined on-delivery and post-delivery share of one, this number rises to 58 percent.

fitted, a weak negative relationship emerges, which is statistically significant. Note that the theory does not give any prediction on this relationship.

The data set is also well balanced in regard of country observations. Table 2 shows the numbers of observations by country. While there is some heterogeneity, no single country's observations dominate the data set. Also, from table 1 we see that with a mean below 50% and a high standard deviation, the export intensity of firms seems well balanced. According to the sample note, the survey is biased towards larger firms. The summary statistics suggest that there is still a sizable variation in both the log sales per worker and the log employment. In our estimation we also control for reputation effects on the payment contract choice by including the age of the firm and the manager's experience. The average firm is about 15 years old, whereas the average manager has an experience of 20 years. Both variables have a high variance. In the dataset only a small fraction of firms is state owned (0.8%). The mean on the importer dummy shows that a large fraction of the firms are importers (76%). All proxies for enforcement and financing conditions have high standard deviations, indicating a substantial cross-country heterogeneity in contract enforcement and financing conditions in our sample.

3.2 Methodology and Specification

Methodology The baseline regressions employ standard OLS estimation at the firm level. In the robustness section we follow two alternative approaches. First, to mitigate the problem of endogeneity at the firm level, we estimate the relationships for industry averages. Second, because the share of open account is between 0 and 1, we use a fractional response model to directly take this restriction into account. All estimation techniques deliver similar results.

Identification Identification is based on the theoretical results summarized in Proposition 3. The proposition states that for an exporter that generates more of her revenues abroad than another exporter, country level financial conditions and contract enforcement have a larger effect on the payment contract choice. We exploit this result for our identification by including interaction terms between the export intensity and our measures of enforcement and financing costs, respectively.

Main Specification The dependent variable is the share of open account payments in total sales. Note that only one equation needs to be estimated as all remaining transactions are classified as cash in advance. The equation takes the following form:

$$OA_{it} = \psi_0 + \psi_1 XS_{it} + \psi_2 XS_{it} \times ENF_{ct} + \psi_3 XS_{it} \times INT_{ct} + \Psi X_{it} + \nu_j + \nu_c + \nu_t + \epsilon_{it}. \quad (12)$$

An observation is the share of open account OA_{it} in the total sales of firm i in year t. The regressions include the firm level controls as well as industry (j), country (c) and year fixed effects.[20] XS is the export intensity. ENF represents contract enforcement and INT denotes the net interest rate margin.

The main prediction of the model is on the coefficients of the two interaction terms between export intensity and enforcement, ψ_2, and export intensity and financing costs, ψ_3, respectively. In international transactions, the share of open account should decrease in source country enforcement, as this makes cash in advance more attractive. It should also decrease in source country financing costs, because this reduces profits from open account. For domestic transactions, open account use is independent of these variables. Taken together, this implies that the coefficients on both interactions ψ_2 and ψ_3 should be negative.

Industry Complexity Proposition 4 predicts that the extent to which contract enforcement affects the payment contract choice should be related to the complexity of the industry the exporter is operating in. More precisely, the contract choice of a firm in a more complex industry should be more affected by differences in contract enforcement and less influenced by interest rate differentials.

In the theory section we argue that a product is complex if it involves customization and other relationship specific investments. To quantify complexity, we adopt the classification developed in Nunn (2007) based on intermediate inputs. Industries that use a large share of intermediate inputs that are either not traded on an exchange or where no reference price exists tend to be more contractually intensive and are classified as more complex.[21] For example, in our data, the manufacture of refined petroleum products (ISIC code: 2320) is

[20] The firm level controls are listed in table 1. We discuss the controls in more details in the results section.

[21] To use the industry classification in Nunn (2007), it is mapped to the industry classification of the data set. A correspondence from SITC to ISIC developed for this purpose is available on request.

classified as an industry of low complexity whereas motor vehicles production (ISIC code: 3410) is classified as a complex industry. It is quite intuitive that the quality of petroleum products should be easier to verify than the quality of motor vehicles, which consist of a large number of complex parts. The classification in Nunn (2007) is developed using US input-output table. A drawback of this approach is that one needs to assume that the complexity measure constructed with US data can be applied to all countries in the data set. To test the predictions of Proposition 4, the following specification is estimated:

$$\begin{aligned} OA_{it} &= \psi_0 + \psi_1 XS_{it} + \psi_2 XS_{it} \times ENF_{ct} + \psi_3 XS_{it} \times INT_{ct} \\ &+ \psi_4 XS_{it} \times ENF_{ct} \times COM_j + \psi_5 XS_{it} \times INT_{ct} \times COM_j \\ &+ \psi_6 XS_{it} \times COM_j + \psi_7 ENF \times COM_j + \psi_8 INT \times COM_j \\ &+ \Psi X_{it} + \nu_j + \nu_c + \nu_t + \epsilon_{it}. \end{aligned} \tag{13}$$

The two coefficients of interest are ψ_4 and ψ_5 on the triple interactions between the export intensity, industry complexity and source country enforcement and financing costs, respectively. The model predicts $\psi_4 < 0$ and $\psi_5 > 0$. That is, the more complex the industry of a firm, the stronger the effect of contract enforcement and the weaker the effect of financing costs on the international payment contract choice.

3.3 Results

Baseline In table 3 column (1) we report the results for the baseline specification. All results are highly statistically significant and all coefficients have the signs predicted by the theory. The coefficient on the interaction between contract enforcement and the export intensity is negative as expected. Firms use less open account for international sales if contract enforcement in the source country is better. The estimated coefficient on the net interest rate margin interaction is negative. The share of open account in international transactions thus decreases in the financing costs.

To check the robustness of our results the net interest margin is replaced by alternative financial measures. Substituting in either private credit over GDP or overhead costs over total assets in column (2) and (3) in table 3 respectively, delivers very similar results. Note

that the coefficient on private credit is positive because it is an inverse measure of financing costs, that is a higher private credit over GDP ratio should indicate lower financing costs. Next, the regressions are run with the alternative measure for enforcement, the rule of law index. Results are shown in column (4) in the same table. Again, the findings are robust to this change.

We also report results for the firm level controls. They show that the log sales per worker, which is a proxy for the productivity of a firm, is positively correlated with the share of open account. More productive firms might be more willing to extend credit to their buyers as they might have a higher cash flow and more liquidity. There is some weak evidence that firm size is negatively correlated with open account use, the coefficients on log employment are however not statistically significant at conventional levels. Finally, the share of open account is predicted to be lower if a seller is also an importer. All other firm controls, that is age, the manager's experience and state ownership status, turn out to be insignificant.

Industry Complexity The results for the estimation of equation (13) are summarised in table 4. The coefficients for the two triple interactions in column (1) have the predicted signs. The estimated coefficient on the enforcement triple interaction is highly significant, large and negative. It implies that the more complex an industry, the larger the effect of contract enforcement on the payment contract choice. The net interest rate margin triple interaction has the predicted positive sign. It is, however, only significant at a 20 percent level. Note that the coefficient has roughly the same magnitude as the one estimated for the interaction between the net interest margin and the export intensity. This suggests that for firms in the most complex industries, financing costs do not affect the payment contract choice. Indeed, we cannot reject the null hypothesis that both coefficients add to zero. Firms in non-complex industries, however, use substantially less open account if financing costs are high. As predicted by Proposition 4, the contract choice in industries that produce more complex products is hence more affected by the legal environment whereas financing costs are more relevant in less complex industries.

Again, we estimate the same relationship for the different proxies of financing costs and enforcement in the remaining columns of table 4. The results are robust to the use of alternative variables. If we use private credit as the proxy for the financing conditions, the

coefficient on the triple interaction is highly significant and has the predicted negative sign. The coefficient for the enforcement triple interaction has the right sign but is insignificant. When we use the overhead costs as our financial proxy we get similar results to using the net interest margin. Both signs of the triple interaction coefficients are as predicted. They are significant for enforcement but insignificant for overhead costs. While not always significant, all estimated coefficients are in line with the predictions of the model.

Quantitative Size of Effects What is the economic size of the estimated effects? As discussed in the theory section, the estimates on the interaction terms of financing costs and contract enforcement with the export intensity exactly identify the effects of interest, that is $\frac{\partial S^{OA,I}}{\partial(1+r)}$ and $\frac{\partial S^{OA,I}}{\partial \lambda}$. To evaluate the size of these effects, consider a country at the 25 percentile in enforcement and financing costs. Suppose this country improved both its legal and financial conditions such that it moves to the 75 percentile in both measures.[22] By how much would the share of open account in international sales increase? Table 5 shows the results of this experiment. According to the estimates, the increase in enforcement would decrease the share of open account by 6.3 percentage points, while the increase in financing costs would decrease the share by 5.0 percentage points.

Columns (2) and (3) show the results for industries of high and low complexity, respectively, and column (4) reports their difference. Again, we consider the experiment described above. In an industry of low complexity, the share of open account is predicted to decrease by 7.1 percentage points in response to the higher interest rates. The change in enforcement does not imply a significant change in open account. In a highly complex industry, a change in enforcement should decrease the open account share by 1.5 percentage points. The coefficient is, however, insignificant. The difference in the changes in open account between the two industries following the increase in enforcement is predicted to be -3.3 percentage points. That is highly complex industries increase their cash in advance share relative to less complex industries.

[22]The percentiles correspond to the following countries and values: Enforcement: El Salvador (p25) 0.0012723 (786 days); Nigeria (p75) 0.0021882 (457 days); Interest Margin: Bulgaria (p25): 0.041 ; Mexico (p75): 0.073.

Direct versus Indirect Exporting The recent literature on exporting has highlighted the role of intermediaries for international trade. In the following, we compare firms that export directly with firms that export indirectly through an intermediary and estimate our baseline specification separately for these two sub-samples.

Intermediaries can have a comparative advantage in enforcement, for example because they could impose reputation losses on a trading partner if she defaults. If a firm behaves opportunistically it might be banned from business through the intermediary. Furthermore, the market might interpret this as a bad signal for the trustworthiness of the firm. Based on this idea, we would expect enforcement to matter more for firms that export directly, whereas financing costs should be more relevant for the choice of firms that export indirectly.[23]

In table 6 we report estimates for these regressions. The first three columns show results for pure indirect exporters, whereas the subsequent three columns display the estimates from regressions run with pure direct exporters only. For indirect exporters, the coefficient on the interaction term between export intensity and contract enforcement is never significant. For direct exporters it is however highly significant and in line with our previous results. This suggests that country level contract enforcement is central for direct exporters but less relevant for indirect exporters as the latter can rely on the intermediary to obtain payment. For financing costs we find the reverse results. These only show up significantly for indirect exporters. As indirect exporters need to worry less about enforcement, they can trade-off differences in financing costs. The same is not true for direct exporters. They need to pay attention to differences in enforcement which limits there ability to take interest rates into account.

Our results thus provide evidence for the idea that intermediaries help in resolving problems of contract enforcement across borders. This is a different rationale for the use of intermediaries than the fixed costs of distribution that are typically assumed in the literature on trade intermediation.[24]

[23]The theory developed in this paper does not model this trade-off explicitly. It would however arise if intermediaries interacted more repeatedly with their counter-parties than individual firms. For a models of repeated transactions in the context of contract choice see Schmidt-Eisenlohr (2011), Antràs and Foley (2011) and Olsen (2013).

[24]See for example Akerman (2010) and Ahn et al. (2011).

3.4 Robustness

Industry Level Variation A potential concern is the endogeneity of the export intensity at the firm level. Results would be biased if there were some unobserved factors affecting both the export intensity as well as the payment contract choice. To address this issue, we aggregate the data to the industry level and reestimate our main specifications. An alternative would be to use an instrumental variable approach and instrument for export intensity at the firm level. Unfortunately, no suitable instrument is available in the firm survey.[25]

The results from the industry level regressions are reported in Table 7. Column $(1)-(3)$ report the results for the baseline specification. The coefficients on the interactions between enforcement and the export intensity are highly significant and negative, confirming the firm level estimation results. Coefficients on the interaction between the variables measuring financing costs and the export intensity of firms have the predicted signs. They are, however, insignificant.

Regressions including the triple interactions with complexity are reported in columns $(4)-(6)$. The triple interaction coefficients for enforcement have the predicted negative signs and are highly significant. For the financing cost proxies, the coefficients on the net interest margin and the overhead costs have the predicted positive signs and are highly significant. It turns out that at the industry level, these two coefficients are estimated more precisely than at the firm level, suggesting that firm variation adds more noise than information along this dimension. The coefficient on the private credit has the predicted sign but is insignificant. Overall, the results at the industry level are fully consistent with our firm level regressions. In particular, we find strong support for the predictions on industry complexity and payment contract choice.

Fractional Response Models The share of open account is by definition constrained to lie between 0 and 1. Additionally, as should be expected, there are mass points for open account both at values 0 and 1. To directly account for those aspects of the dependent

[25]The best predictor for export intensity in the firm survey is (log) employment. It is, however, quite easy to imagine ways in which the size of a firm directly affects the payment contract choice, for example by affecting bargaining power. The variable would thus not fulfill the exclusion restriction.

variable we use a fractional response model.[26] The results are presented in Table 8. Because the fractional response model is non linear we report the average marginal effect for each variable in the table. In the main specification all coefficients of interest have the right sign and are highly significant with the exception of the private credit interaction in column (2). In two of the three specifications where it is included, the triple interaction coefficient for enforcement is highly significant and has the predicted sign. The triple interaction for our proxies of financing costs is only significant in the case of private credit. Note that the size of the coefficients is similar to the size in the baseline specifications, suggesting that the mass point at an open account share of one does not have a large effect on our OLS estimates.

To summarize, the payment contract choice model is strongly supported by the data. Running regressions for the industry average delivers almost identical results to the firm level regressions. Employing a fractional response model instead of OLS does not change our findings. Replacing the baseline proxies for enforcement and financing costs by other measures hardly changes the estimated relationships.

4 Conclusions

Complementing research on aggregate data by Schmidt-Eisenlohr (forthcoming) and on a single US firm by Antràs and Foley (2011), this paper uses firm level survey data to test for the determinants of the payment contract choice of firms. The empirical findings support the predictions of Schmidt-Eisenlohr (forthcoming) as well as our new theoretical results on the role of product complexity. Legal and financial conditions in the source country affect the contract choice as expected and the data is in line with the idea that enforcement and product complexity are complements. We furthermore provide evidence that intermediaries might play a central role in mitigating enforcement problems across countries. Different to Antràs and Foley (2011), the paper is able to study the effects of source country variation, analyze differences across industries and compare direct with indirect exporters. We find all three aspects to be highly relevant for the contract choice of firms.

For future research better data is essential. Ideally, new payment contract data would contain information at the country-pair level to fully test the choice model developed in

[26] For details on the methodology see Papke and Wooldridge (1996). See Ramalho et al. (2011) for a survey.

Schmidt-Eisenlohr (forthcoming) and extended here. A further analysis of the role of firm and industry characteristics following this paper as well as more work on dynamic aspects of payment contract choice along the lines of Antràs and Foley (2011) should lead to interesting new results and help shed more light on exporter-importer relationships.

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A Proofs

Proof of Proposition 3 From before:

$$\Delta S^{OA} = XS(S^{OA,I} - S^{OA,D})$$

Now, $\frac{\partial S^{OA}}{\partial XS} = S^{OA,I} - S^{OA,D}$. Further, remember that $S^{OA,I}$ is increasing in $\bar{z}^I_{od}$ and recall that $S^{OA,D}$ is increasing in $\bar{z}^D_o$. Then, taking the derivatives of $\bar{z}^I_{od}$ and $\bar{z}^D_o$ with respect to the variables of interest, the claims in Proposition 3 are easily verified.

Proof of Proposition 4 Note that $\frac{\partial^2\left(\mathrm{E}\left[\Pi_E^{OA}\right]-\mathrm{E}\left[\Pi_E^{CIA}\right]\right)}{\partial\lambda\partial\gamma} = -\frac{(1-\eta)\lambda^{\gamma-1}}{1+r^*}\left[1+\gamma\ln\lambda\right]$. This is smaller than zero if $1+\gamma\ln\lambda > 0$. This is less likely the case for higher γ. Inserting the maximum value of $\gamma = 1$ delivers the sufficient condition $\lambda > 1/e$. The rest of the proof follows the previous proof for Proposition 3. Taking the triple derivatives with respect to XS, γ and λ and $1+r$, respectively, the claims are easy to verify.

B Pooling Conditions

B.1 Pooling Condition Cash in Advance

Pooling In the following we consider the pooling and the separating case for a bad type exporter and then derive the condition given in the main text. In the pooling case, a bad exporter maximizes her expected profits subject to the importer participation constraint:

$$\begin{aligned}
\text{Bad type: } \max_C \mathrm{E}\left[\Pi_{E,b}^{CIA,p}\right] &= C^{CIA,p} - \lambda K, && (14)\\
\text{s.t.}& \\
\mathrm{E}\left[\Pi_I^{CIA,p}\right] &= \frac{\eta+(1-\eta)\lambda}{1+r^*}R - C^{CIA,p} \geq 0, && (15)\\
&\text{(participation constraint importer)} \\
\mathrm{E}\left[\Pi_{E,g}^{CIA,p}\right] &= C^{CIA,p} - K \geq 0. && (16)\\
&\text{(participation constraint good exporter)}
\end{aligned}$$

The optimal payment $C^{CIA,p}$ and optimal expected profits of a good and bad exporter are:

$$C^{CIA,p} = \frac{\eta+(1-\eta)\lambda}{1+r^*}R, \quad (17)$$

$$\text{Bad type: } \mathrm{E}\left[\Pi_{E,b}^{CIA,p}\right] = \frac{\eta+(1-\eta)\lambda}{1+r^*}R - \lambda K. \quad (18)$$

Separating It is easy to see that if a good exporter chooses cash in advance, a bad exporter chooses it as well and imitates the good type. This is optimal as pooling implies as a higher pre-payment at no additional cost. Yet, if good firms do not choose cash in advance, a bad firm could deviate and choose this contract. This is considered next.

Suppose a good exporter does not choose cash in advance. A bad firm might still consider to offer a cash in advance contract, even though this implies revelation of her type. Then, the importer understands that she deals with a bad firm and adjusts her expected revenue downwards. Her participation constraint becomes:

$$\mathrm{E}\left[\Pi_I^{CIA,s}\right] = \frac{\lambda}{1+r^*}R - C^{CIA,s} \geq 0. \tag{19}$$

A binding importer participation constraint gives:

$$C^{CIA,s} = \frac{\lambda}{1+r^*}R. \tag{20}$$

The expected profit of a bad exporter in the CIA separating case is thus:

$$\mathrm{E}\left[\Pi_{E,b}^{CIA,s}\right] = \frac{\lambda}{1+r^*}R - \lambda K. \tag{21}$$

Now, note that it is a sufficient condition for the bad exporter not to choose cash in advance that the expected profits in the separating case are less or equal to the expected profits of a good firm in the pooling case. That is if:

$$\mathrm{E}\left[\Pi_{E,g}^{CIA,p}\right] \geq \mathrm{E}\left[\Pi_{E,b}^{CIA,s}\right]. \tag{22}$$

From this, the condition in the main text can be derived:

$$\frac{R}{K} \geq \frac{1+r^*}{\eta}. \tag{23}$$

B.2 Pooling Condition Open Account

Open Account - Overview Under open account, the exporter can choose between a pooling and a separating strategy. Pooling is the case where good and bad importers accept the contract. The separating case implies that only bad importers agree to buy the goods at the offered price. In the following, we study both cases and derive the pooling condition.

Pooling From the main analysis we have the following optimal payment and profits:

$$C^{OA,p} = R, \tag{24}$$

$$\mathrm{E}\left[\Pi_E^{OA,p}\right] = \frac{\eta^* + (1-\eta^*)\lambda^*}{1+r} R - K. \tag{25}$$

Separating The following participation constraint for a bad importer has to be respected:

$$\mathrm{E}\left[\Pi_{I,b}^{OA,s}\right] = \frac{R - \lambda^* C^{OA}}{1+r^*} \geq 0. \tag{26}$$

A binding participation constraint implies:

$$C^{OA,s} = \frac{R}{\lambda^*}. \tag{27}$$

The prepayment C^{OA} is set such that it exactly offsets the the risk of non-payment by the importer. On average, the importer thus pays R to the exporter. Expected profits of the exporter are however reduced in the separating case as good importers reject the contract and only bad importers (share $1-\eta^*$) accept it. Expected profits hence are:

$$\mathrm{E}\left[\Pi_E^{OA,s}\right] = (1-\eta^*)\left(\frac{1}{1+r} R - K\right). \tag{28}$$

Comparing profits, an exporter strictly prefers a pooling contract if:

$$\frac{R}{K} > \frac{\eta^*(1+r)}{\eta^* - (1-\eta^*)(1-\lambda^*)}. \tag{29}$$

C Tables

Table 1: Summary Statistics

	Mean	Standard Deviation	Observations
Open Account	.8646	.2377	3762
Exportshare	.4408	.3672	3762
Log Sales per Worker	13.1797	2.8576	3762
Log Employment	4.3154	1.3354	3762
Ln Age	2.7466	.7937	3762
Manager's Experience	20.2770	11.62479	3762
State Owned	.0080	.0744	3762
Importer	.7666	.4230	3762
Enforcement	.0020	.0010	3762
Private Credit	.4299	.2758	3762
Interest Margin	.0536	.0262	3762
Overhead Costs	.0450	.0257	3741
Rule of Law	-.3260	.5772	3762
Industry Complexity	.5494	.1960	3762

Figure 1: Open Account and Exportshare

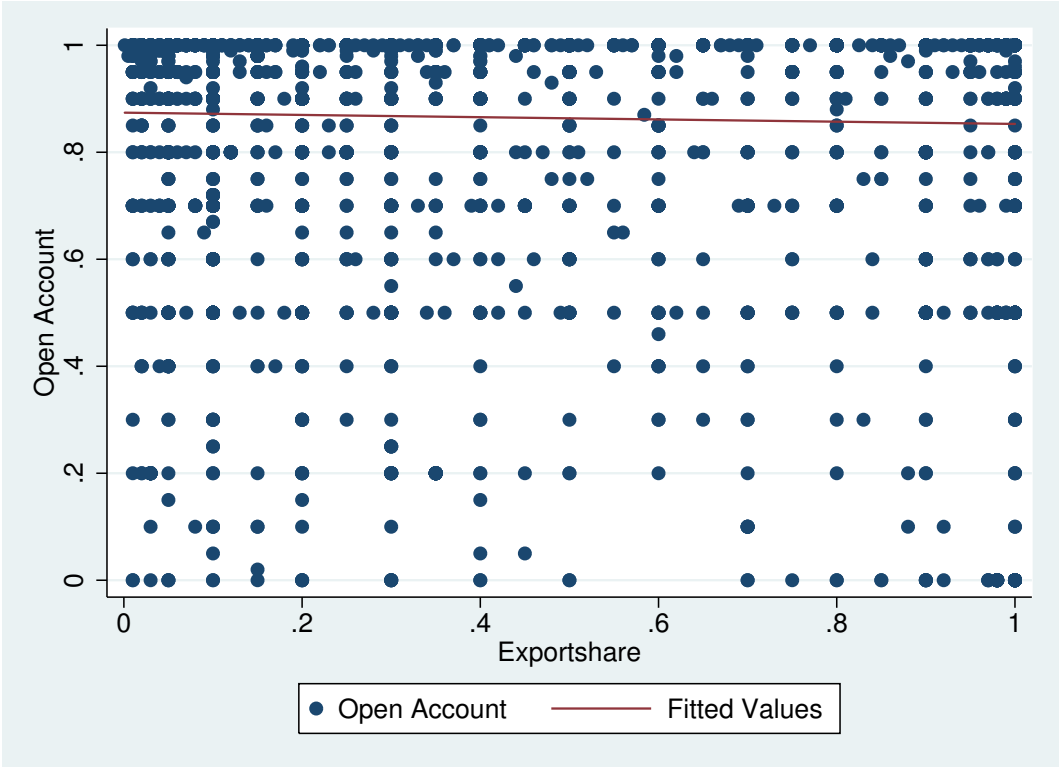

Table 2: Number of Observation by Country

Country	No of Observations	Country	No of Observations
Albania	12	Madagascar	21
Angola	2	Malawi	5
Argentina	166	Mali	45
Armenia	36	Mauritius	30
Bangladesh	235	Mexico	73
Benin	13	Moldova	99
Bolivia	65	Mozambique	9
Botswana	7	Nepal	31
Brazil	99	Niger	2
Bulgaria	243	Nigeria	22
BurkinaFaso	11	Panama	26
Cameroon	32	Paraguay	49
Chile	116	Peru	144
Colombia	178	Philippines	116
Ecuador	55	Poland	102
ElSalvador	141	Romania	22
Fyr Macedonia	70	Russia	101
Gambia	4	Senegal	40
Georgia	15	SouthAfrica	113
Guatemala	119	Swaziland	6
Honduras	52	Tanzania	24
Indonesia	16	Turkey	304
Kazakhstan	6	Uganda	22
Kenya	108	Uruguay	91
Kyrgyz Republic	7	Vietnam	258
Latvia	65	Zambia	26
Lithuania	108		

Table 3: Payment Contract Choice

This table presents the results of the baseline specification and robustness checks for the enforcement and financial proxy. Standard errors are reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively. The dependent variable is the sum of post-sale and on-sale payment (OA). Enforcement is proxied by the inverse days to enforce a contract. The financial proxies are the net interest rate margin, private credit and overhead costs. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text.

	(1)	(2)	(3)	(4)
Exportershare	0.132***	0.034	0.120***	-0.023
	(0.049)	(0.029)	(0.043)	(0.030)
Enforcement x Exportshare	-56.921***	-63.683***	-54.955***	
	(13.605)	(15.809)	(13.370)	
Interest Margin x Exportshare	-1.248**			-0.952*
	(0.555)			(0.549)
Private Credit x Exportshare		0.104**		
		(0.052)		
Overhead x Exportshare			-1.361***	
			(0.517)	
Rule of Law x Exportshare				-0.068***
				(0.020)
Log Sale per Worker	0.007**	0.007**	0.007**	0.007**
	(0.003)	(0.003)	(0.003)	(0.003)
Log Employment	-0.004	-0.004	-0.005	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)
Log Age	0.001	0.001	0.002	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)
Manager's Experience	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
State Owned	-0.030	-0.028	-0.025	-0.016
	(0.057)	(0.057)	(0.057)	(0.057)
Importer	-0.019**	-0.019**	-0.018*	-0.016*
	(0.009)	(0.009)	(0.009)	(0.009)
R-squared	0.321	0.321	0.323	0.320
N	3762.000	3762.000	3741.000	3762.000

Table 4: Payment Contract Choice: Complexity

Notes: This table includes the effects of industry complexity. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is the sum of payments at post- and on-sale delivery (OA). The indsutry complexity is measured as the share of the intermediates used, which are not traded on an exchange or no reference price exists. We use country, industry and year fixed effects.

	(1)	(2)	(3)	(4)
Exportershare	0.037	-0.189**	-0.026	0.179**
	(0.133)	(0.082)	(0.122)	(0.079)
Enforcement x Exportshare	48.178	-32.493	50.365	
	(37.851)	(44.419)	(37.535)	
Enforcement x Exportshare x Complexity	-191.846***	-51.735	-193.618***	
	(64.741)	(76.836)	(63.386)	
Interest Margin x Exportshare	-2.886**			-3.119**
	(1.390)			(1.344)
Interest Margin x Exportshare x Complexity	2.887			3.728*
	(2.257)			(2.137)
Private Credit x Exportshare		0.550***		
		(0.145)		
Private Credit x Exportshare x Complexity		-0.848***		
		(0.247)		
Overhead x Exportshare			-1.900	
			(1.315)	
Overhead x Exportshare x Complexity			1.016	
			(2.234)	
Rule of Law x Exportshare				0.105*
				(0.053)
Rule of Law x Exportshare x Complexity				-0.328***
				(0.102)
Exportshare x Complexity	0.176	0.409***	0.268	-0.362***
	(0.223)	(0.135)	(0.201)	(0.125)
Enforcement x Complexity	109.760***	39.784	107.719***	
	(36.268)	(40.885)	(36.124)	
Interest Margin x Complexity	-0.003			-0.601
	(0.896)			(0.847)
Private Credit x Complexity		0.387***		
		(0.125)		
Overhead x Complexity			0.455	
			(1.050)	
Rule of Law x Complexity				0.121**
				(0.048)
R-squared	0.326	0.328	0.327	0.325
N	3762.000	3762.000	3741.000	3762.000

Table 5: Average Effects

This table computes the magnitude of our previous estimates. Standard errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels respectively. The dependent variable is the sum of post-sale and on-sale payment (OA). The table shows by how many percentage points Open Account would change in financing costs and enforcement in the source country, respectively, increased from the 25th percentile to the 75th percentile.

	Baseline	Low Complexity (25th pctl)	High Complexity (75th pctl)	Difference (75th-25th pctl)
	(1)	(2)	(3)	(4)
Enforcement	-0.063***	0.018	-0.015	-0.033*
	(0.015)	(0.029)	(0.026)	(0.018)
Interest Margin	-0.050**	-0.071**	-0.029	0.042
	(0.022)	(0.035)	(0.028)	(0.026)
N	3762.000	3762.000	3762.000	3762.000

Table 6: Indirect versus Direct Exporters

This table presents the results of the baseline specification for indirect and direct exporters. Standard errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels respectively. The dependent variable is the sum of post-sale and on-sale payment (OA). Enforcement is proxied by the inverse days to enforce a contract. The financial proxies are the net interest rate margin, private credit and overhead costs. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text.

	Indirect Exporting				Direct Exporting			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exportershare	0.179	-0.002	0.181*	0.130**	0.105*	0.046	0.093*	-0.061
	(0.122)	(0.070)	(0.104)	(0.065)	(0.059)	(0.037)	(0.055)	(0.040)
Enforcement x Exportshare	-14.729	3.845	-16.081		-65.872***	-64.599***	-64.070***	
	(35.447)	(41.603)	(34.114)		(18.064)	(20.907)	(18.097)	
Interest Margin x Exportshare	-2.418*			-2.513*	-0.801			-0.605
	(1.383)			(1.300)	(0.640)			(0.674)
Private Credit x Exportshare		0.035				0.033		
		(0.108)				(0.071)		
Overhead x Exportshare			-3.049**				-0.755	
			(1.311)				(0.665)	
Rule of Law x Exportshare				-0.066				-0.072***
				(0.047)				(0.027)
R-squared	0.351	0.344	0.351	0.352	0.414	0.414	0.416	0.412
N	834.000	834.000	828.000	834.000	2424.000	2424.000	2410.000	2424.000

Table 7: Industry Averages

Notes: This table reports the results for the estimates of the baseline specifciation and the specification with industry complexity using inudstry averages. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is the sum of payments at post- and on-sale delivery (OA). The industry complexity is measured as the share of the intermediates used, which are not traded on an exchange or no reference price exists. We use country, industry and year fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)
Exportershare	0.102**	0.091***	0.124***	0.143*	0.055	0.152**
	(0.050)	(0.035)	(0.046)	(0.077)	(0.053)	(0.074)
Enforcement x Exportshare	-64.313***	-73.013***	-66.644***	32.612	-18.707	25.120
	(15.878)	(17.894)	(15.730)	(26.956)	(37.537)	(27.050)
Enforcement x Exportshare x Complexity				-180.145***	-103.559	-169.601***
				(48.075)	(72.005)	(47.318)
Interest Margin x Exportshare	-0.067			-3.410***		
	(0.539)			(1.080)		
Interest Margin x Exportshare x Complexity				6.331***		
				(1.800)		
Private Credit x Exportshare		0.057			0.137	
		(0.053)			(0.125)	
Private Credit x Exportshare x Complexity					-0.152	
					(0.246)	
Overhead x Exportshare			-0.511			-3.503***
			(0.540)			(1.135)
Overhead x Exportshare x Complexity						5.645***
						(1.951)
Exportshare x Complexity				-0.069	0.083	-0.046
				(0.110)	(0.079)	(0.102)
Enforcement x Complexity				74.620***	28.024	70.707***
				(18.218)	(30.938)	(17.743)
Interest Margin x Complexity				-2.467***		
				(0.551)		
Private Credit x Complexity					0.004	
					(0.114)	
Overhead x Complexity						-2.420***
						(0.605)
R-squared	0.305	0.306	0.307	0.313	0.310	0.314
N	3762	3762	3741	3762	3762	3741

Table 8: Fractional Response Model

This table presents the average marginal effects of the baseline specification and and industry complexity using a fractional response model. Standard errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels respectively. The dependent variable is the sum of post-sale and on-sale payment (OA). Enforcement is proxied by the inverse days to enforce a contract. The financial proxies are the net interest rate margin, private credit and overhead costs. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text.

	(1)	(2)	(3)	(4)	(5)	(6)
Exportershare	0.1314**	0.0223	0.1046**	0.0673	-0.1374*	-0.0011
	(0.0520)	(0.0308)	(0.0450)	(0.1361)	(0.0836)	(0.1205)
Enforcement x Exportshare	-48.5448***	-48.2441***	-43.2441***	10.0294	-48.9828	16.7118
	(12.9056)	(15.3369)	(12.2890)	(33.2912)	(38.0152)	(32.4004)
Enforcement x Exportshare x Complexity				-103.1226**	7.8080	-107.2671**
				(51.8595)	(601.663)	(50.1935)
Interest Margin x Exportshare	-1.4387***			-2.5299*		
	(0.5405)			(1.3326)		
Interest Margin x Exportshare x Complexity				1.9944		
				(2.1702)		
Private Credit x Exportshare		0.0791			0.4645***	
		(0.0504)			(0.1228)	
Private Credit x Exportshare x Complexity					-0.7341***	
					(2.014)	
Overhead x Exportshare			-1.4160***			-1.6247
			(0.5106)			(12.786)
Overhead x Exportshare x Complexity						0.4144
						(21.335)
N	3762	3762	3741	3762	3762	3741