Payment Choice in International Trade: Theory and Evidence from Cross-country Firm Level Data*

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Abstract

When trading across borders, firms choose between different payment contracts. As shown in Schmidt-Eisenlohr (2011), this choice is relevant as it allows firms to trade off differences in legal and financial conditions across countries and can thereby have large effects on aggregate trade flows. This paper extends the model to allow for variation of contract choice at the firm level, between domestic and international trade and across industries with different product complexity. It uses data from the World Bank Enterprise Survey to test several key predictions of the model. In line with the model, a larger share of international sales is paid after delivery (Open Account) if enforcement is weak and financing costs are low in the source country. Contract choice in complex industries is strongly related to measures of enforcement, whereas contract choice in non-complex industries is mostly explained by differences in financing costs.

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1 Introduction

When trading across borders, firms choose between different payment contracts. In particular, an exporter and an importer have to agree on whether the payment should be made before or after delivery. Schmidt-Eisenlohr (2011) shows theoretically how firms trade off differences in financing costs and enforcement across countries when deciding on a contract.[1] This paper extends the trade finance model and provides evidence for its validity based on firm-level data from the World Bank Enterprise Survey. It introduces a role for product complexity to the payment contract choice and shows that, as predicted by the theory, contract choice in complex industries is more affected by enforcement, whereas contract choice in non-complex industries is more affected by financing costs.

Due to the time gap between production and sales, any transaction in international trade requires working capital financing and implies a moral hazard problem. If pre-delivery payment (Cash in Advance) is chosen, the importer finances the transaction and a moral hazard 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 importer moral hazard needs to be resolved.

The trade-off described matters for several reasons. In contrast to standard trade models, it implies that legal and financial conditions both in the source and the destination country matter for trade. Furthermore, the model predicts that financial conditions in only one country and only legal conditions in the other country matter for a specific trade relationship. Thus, payment contracts can be a way for firms to overcome institutional impediments to trade. However, they also imply that conditions in both countries are relevant. That is, even a country like the US that has strong contract enforcement and a well developed financial market is dependent on institutions of the trading partner. These implications of the payment contract theory differ substantially from standard trade models that usually focus on exporters.

The model has clear predictions on how country level variables affect the contract choice. Pre-delivery payment (Cash in Advance) should be used more frequently if there is relatively

[1]The original paper also studies Letters of Credit. As the data does not allow to identify this payment contract, the analysis focuses on the choice between Cash in Advance and Open Account.

cheap access to finance in the destination country and relatively strong contract enforcement in the source country. The reverse is predicted for post-delivery payment (Open Account). That is, Open Account should be more prevalent if access to finance in the source country is cheap and if enforcement in the destination country is strong.

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 differentiates between complex and non-complex industries and shows that this distinction is relevant for 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 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 and on seller characteristics. 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 and buyer characteristics, 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, these differences only reflect firm level variations in access to finance and contract enforceability. 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 therefore have larger influence on the payment contract choice than for domestic sales.

This difference is exploited in the baseline specification where firms with different export intensities are compared. Firms with a larger share of exports in total sales 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, the share of exports in total sales 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 non-complex industries.

Results are robust to the use of alternative measures of legal and financial conditions. Instrumenting the share of exports in total sales by log employment and alternatively using a fractional response model delivers results that are qualitatively in line with the OLS estimates, but have substantially larger coefficient estimates.

Literature To our knowledge, only two papers have tested the payment contract choice model empirically.[2] Schmidt-Eisenlohr (2011) 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 (2011) and test

[2]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.

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.[3]

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.[4] 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.[5] A second group of papers have tested whether financial constraints can be a detriment to international trade, in particular at the extensive margin.[6]

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

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

[4]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.

[5]See, in particular, Beck (2002), Beck (2003), and Manova (forthcoming).

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

2 Theory

This section starts with a simplified version of Schmidt-Eisenlohr (2009) focusing on the choice between Cash in Advance (pre-sale payment) and Open Account (post-sale payment). It then extends the model to allow for heterogeneity of legal and financial conditions at the firm level, for differences in contract choice between domestic and international sales and for a role of industry complexity.

First, the payment contract choice is studied in a static game between one buyer and one seller. Then, the micro-model is embedded in a standard homogeneous firms trade model based on Krugman (1980) and predictions for the payment contract choice both for domestic and international trade are derived.

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. Denote production costs by K and revenues 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 pre-financing. Under Open Account, the seller only gets paid after delivery and thus has to pre-finance the transaction. Financing costs are captured by the interest rate $1 + r$.

In addition to the financing requirement, the time gap also leads to a moral hazard problem. 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 firm that tries to deviate from

[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 (2011) 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 whether this is also true for other firms and other industries.

the contract can be brought to court by its trading partner. The enforcement of the contract through the court is successful with an exogenously given country-firm specific enforcement probability denoted by λ.

The seller and the buyer can both be in the same country or in two different countries. In the former case, both firms face the same legal and financial environment. If they are located in different countries, the enforcement probability and the interest rate at the country level can differ.

Assume that financial markets are segmented across countries and that financial intermediaries in the source and the destination country differ in their efficiency. Furthermore assume that within a country firms differ in their ability to access cheap finance. Differential interest rates at the firm level can be driven by firm age, industry, product, length of the relationship with the bank and other characteristics. The costs of financing a transaction can therefore differ between the seller and the buyer both due to country and firm level variation.

Similarly, the probability of successfully enforcing contracts in court can differ across countries and between firms within the same country. Firm level variation in enforcement can, among others, result from differences in product or industry characteristics.

Let $\lambda_S \in (0, 1]$ and $r_S \geq 0$ denote the enforcement probability and the interest rate for the seller, respectively. Variables for the buyer are denoted by B. As discussed above, enforcement probabilities and interest rates can be decomposed into a firm and a country effect. That is the probabilities of forcing the seller and the buyer to fulfill the contract are given by $\lambda_S = \lambda_o \lambda_i$ and $\lambda_B = \lambda_d \lambda_j$, respectively; where o and d refer to the origin and the destination and i and j denote the two firms. An analog decomposition holds for the interest rates. Assume that the individual enforcement probabilities and financing costs are common knowledge.

Finally, assume that there is a limited value of contract constraint in place, i.e. the payment amount cannot exceed the sales value of the goods R.[8] The seller maximizes

[8]This is a technical assumption. In a model with two types of firms it can be replaced by a more realistic pooling condition. Suppose there are good and bad firms. Good firms always fulfill the contract, whereas bad firms try do default if it is profitable. In the presence of sufficiently high enforcement costs, the seller prefers to offer a pooling contract that is also acceptable to good firms. The payment amount in a pooling contract, however, cannot exceed the value of the goods sold. See Schmidt-Eisenlohr (2011) for details. For

her expected profits taking into account the participation constraint of the buyer and the constraint on the contract value.

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. The seller defaults on the contract, but with probability λ_S she is forced to deliver the goods anyways.

The seller maximizes her expected profits subject to the buyer participation constraint and the limited value of contract constraint. Note that profits Π, revenues R, production costs K and payment amount C are endogenous and seller-buyer specific. For presentational simplicity, the subscripts SB for these four variables are suppressed in this subsection. Their endogeneity is taken into account, once the trade model is introduced. The maximization problem of the seller is:[9]

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

$$\text{s.t. } C^{CIA} \leq R, \qquad \text{(limited value of contract)} \tag{2}$$

$$\text{and } \mathrm{E}\left[\Pi_B^{CIA}\right] = \lambda_S R - (1 + r_B) C^{CIA} \geq 0. \qquad \text{(buyer participation constraint)} \tag{3}$$

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

$$C^{CIA} = \frac{\lambda_S}{1 + r_B} R, \qquad \mathrm{E}\left[\Pi_S^{CIA}\right] = \frac{\lambda_S}{1 + r_B} R - \lambda_S K. \tag{4}$$

As Cash in Advance requires complete pre-financing by the buyer, only her financing costs $1 + r_B$ affect expected profits. As the moral hazard problem is in regard of the seller, solely her probability of contract enforcement λ_S is relevant.

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. Then, the buyer tries to default on the contract, but is forced to pay with probability

tractability the original limited value of contract constraint as in Schmidt-Eisenlohr (2009) is used.

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

λ_B. The seller maximizes the following problem:

$$\max_C \mathrm{E}\left[\Pi_S^{OA}\right] = \frac{1}{1+r_S}(\lambda_B C^{OA} - K(1+r_S)), \tag{5}$$

$$\text{s.t. } C^{OA} \leq R, \qquad \text{(limited value of contract)} \tag{6}$$

$$\text{and } \mathrm{E}\left[\Pi_B^{OA}\right] = \frac{1}{1+r_B}(R - \lambda_B C^{OA}) \geq 0. \qquad \text{(buyer participation constraint)} \tag{7}$$

Under Open Account, the limited value of contract constraint always binds. The optimal payment amount and expected profits are:

$$C^{OA} = R, \qquad \mathrm{E}\left[\Pi_S^{OA}\right] = \frac{\lambda_B}{1+r_S}R - K. \tag{8}$$

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 $1+r_S$ affects expected profits. The moral hazard problem arises on the side of the buyer and therefore solely her enforcement probability λ_B influences expected profits.

Choosing between Cash in Advance and Open Account thus allows the seller to maximize expected profits by trading-off differences in enforcement probabilities and financing costs. Note that if the buyer and the seller are located in different countries, always one parameter from each country affects expected profits. That is even a firm in a country like the US with a well-functioning financial system and strong legal enforcement is dependent on conditions in the country of the trading partner. None of the two contracts allows to have enforcement and financing in the same country.

Trade Model In a next step the payment contract choice model is put into a standard homogenous firms trade model following Krugman (1980). This allows to derive endogenous values for quantities and prices.[10]

Assume the following utility function of a representative household which determines the

[10] All Propositions on the effects of country level enforcement and financing costs on the payment contract choice also hold under the alternative assumption that revenues R and costs K are given exogenously.

demand structure:

$$U = \left(\int_{\Omega} q(\omega)^{\frac{\sigma-1}{\sigma}} d\omega \right)^{\frac{\sigma}{\sigma-1}}. \tag{9}$$

Q is a CES (constant elasticity of substitution) basket of differentiated goods. The demand for a variety ω of the differentiated good can be derived as:

$$q(\omega) = p(\omega)^{-\sigma} P^{\sigma} Q. \tag{10}$$

$P = \left(\int_{\Omega} p(\omega)^{1-\sigma} \right)^{\frac{1}{1-\sigma}}$ is the price index of the optimal CES basket, and $\sigma > 1$ is the elasticity of substitution between varieties. From before, the expected profits under the two payment contracts are:

$$\begin{aligned} \mathrm{E}\left[\Pi_S^{CIA}\right] &= \lambda_S (1+r_B)^{-1} R - \lambda_S K, \\ \mathrm{E}\left[\Pi_S^{OA}\right] &= \lambda_B (1+r_S)^{-1} R - K. \end{aligned}$$

Note that these can be represented by the general expression:

$$\mathrm{E}\left[\Pi_S\right] = \alpha_{SB} R - \beta_{SB} K. \tag{11}$$

Optimization implies the following prices, quantities and profits:[11]

$$p = \frac{\beta_{SB}}{\alpha_{SB}} \tilde{p}, \qquad \mathrm{E}\left[q\right] = A_{SB} \tilde{q}, \qquad \mathrm{E}\left[\Pi\right] = A_{SB} \tilde{\Pi}, \tag{12}$$

with A=$(\alpha_{SB})^{\sigma} (\beta_{SB})^{1-\sigma}$.[12] $\tilde{p}$, $\tilde{q}$ and $\tilde{\Pi}$ represent the price, quantity and profits a firm would choose in the absence of any trade finance frictions. Note that for the optimal contract choice in our partial equilibrium analysis, the exact values of these terms are irrelevant as they cancel out.

[11] Expected profits can be normalized to $\mathrm{E}\left[\tilde{\Pi}_S\right] = \mathrm{E}\left[\frac{\Pi_S}{\alpha}\right] = R - \frac{\beta_{SB}}{\alpha_{SB}} K$. Maximizing the original objective function $\mathrm{E}\left[\Pi_E\right]$ implies the same optimal decisions as maximizing the new function $\mathrm{E}\left[\tilde{\Pi}_S\right]$. Therefore, the price setting problem is equivalent to the standard case with new per unit production costs of $\frac{\beta_{SB}}{\alpha_{SB}} a$.

[12] $\mathrm{E}\left[q_x\right]$ is the expected quantity, taking into account that under CIA only a fraction λ of export contracts is enforced.

This implies the following expected profits under Cash in Advance and Open Account, respectively.

$$\mathrm{E}\left[\Pi_S^{CIA}\right] = \lambda_S(1+r_B)^{-\sigma}\tilde{\Pi}, \tag{13}$$

$$\mathrm{E}\left[\Pi_S^{OA}\right] = (\lambda_B)^{\sigma}(1+r_S)^{-\sigma}\tilde{\Pi}. \tag{14}$$

Optimal Contract Choice 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. A seller chooses Open Account over Cash in Advance iff:

$$\mathrm{E}\left[\Pi_S^{OA}\right] > \mathrm{E}\left[\Pi_S^{CIA}\right] \Leftrightarrow (\lambda_B)^{\sigma}(1+r_S)^{-\sigma} - \lambda_S(1+r_B)^{-\sigma} > 0. \tag{15}$$

Suppose that the buyer and the seller are in two different countries. Then, the enforcement for seller S can be decomposed into an origin effect o and a firm effect i: $\lambda_S = \lambda_o\lambda_i$. The enforcement for the buyer B can be decomposed into a destination effect d and a firm effect j: $\lambda_B = \lambda_d\lambda_j$. The same decomposition holds for the respective interest rates. Substituting the decomposition into (15) yields:

$$\mathrm{E}\left[\Pi_S^{OA}\right] > \mathrm{E}\left[\Pi_S^{CIA}\right] \Leftrightarrow (\lambda_d\lambda_j)^{\sigma}\left[(1+r_o)(1+r_i)\right]^{-\sigma} - \lambda_o\lambda_i\left[(1+r_d)(1+r_j)\right]^{-\sigma} > 0. \tag{16}$$

Let $z_{ij} = \lambda_i(1+r_j)^{-\sigma}(\lambda_j)^{-\sigma}(1+r_i)^{\sigma}$ collect all firm-pair ij specific factors that affect the relative profitability of Open Account as compared to Cash in Advance. Then, equation (16) can be rearranged to:

$$\mathrm{E}\left[\Pi_S^{OA}\right] > \mathrm{E}\left[\Pi_S^{CIA}\right] \Leftrightarrow (\lambda_d)^{\sigma}(1+r_s)^{-\sigma} - \lambda_o(1+r_d)^{-\sigma}z_{ij} > 0. \tag{17}$$

For domestic trade both firms face the same country level interest rate and enforcement probability, i.e. $r_d = r_o$ and $\lambda_d = \lambda_o$. The condition thus simplifies to:

$$\mathrm{E}\left[\Pi_S^{OA}\right] > \mathrm{E}\left[\Pi_S^{CIA}\right] \Leftrightarrow (\lambda_o)^{\sigma} - \lambda_o z_{ij} > 0. \tag{18}$$

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:

$$E\left[\Pi_S^{OA}\right] > E\left[\Pi_S^{CIA}\right] \Leftrightarrow (\lambda_d)^{\sigma}(1+r_o)^{-\sigma} - \lambda_o(1+r_d)^{-\sigma} z_{ij} > 0$$

ii) Domestic trade:

$$E\left[\Pi_S^{OA}\right] > E\left[\Pi_S^{CIA}\right] \Leftrightarrow (\lambda_o)^{\sigma} - \lambda_o z_{ij} > 0$$

Proof. Follows directly from Equations (17) and (18). □

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 firm-level variation and the legal environment in the country where trade takes place.

Assume that there exists a distribution of $F(z_{ij})$, where $z_{ij} \in (0, \infty)$ and the density function $f(z_{ij})$ is positive on the entire support. This implies that there is always a firm pair ij with pair-specific factor z_{ij} where the seller is indifferent between choosing Cash in Advance and Open Account. Let $\bar{z}_{od}^I$ denote this cutoff value for an exporter selling from origin o to destination d and let $\bar{z}_o^D$ denote the cutoff for a domestic seller located in o. These values can be derived easily from equations (17) and (18) as:

$$\bar{z}_{od}^I = (\lambda_d)^{\sigma}(1+r_o)^{-\sigma}(\lambda_o)^{-1}(1+r_d)^{\sigma} \tag{19}$$

$$\bar{z}_o^D = \lambda_o^{\sigma-1} \tag{20}$$

All firm pairs for which $z_{ij} < \bar{z}_{od}^I$ ($z_{ij} < \bar{z}_o^D$), choose Open Account terms for their international sales (domestic sales). The share of Open Account in international (domestic) transactions thus increases if and only if $\bar{z}_{od}^I$ ($\bar{z}_o^D$) increases. 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, export contracts are more likely on Open Account (post-delivery) terms if*

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

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

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

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 The main identification strategy in the empirical section relies on interaction terms between measures of enforcement and financing conditions and the share of exports in total sales of a firm. The following Proposition summarizes the expected signs on these terms:

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

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

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

Proof. See Appendix A. □

As discussed earlier, the higher the export intensity of a firm, the more of its transactions are affected by the cross-country trade-offs in enforcement and financing costs.

Derivation of Marginal Effects How can marginal effects of country conditions on the payment contract choice be computed? Consider first the easier case of financing costs. The international cutoff $\bar{z}_{od}^{I}$ is a function of country level financing costs, while the domestic cutoff $\bar{z}_{o}^{D}$ is not. Thus, any estimate on the differential effect of financing costs on the payment contract choice between international and domestic sales directly delivers an estimate of the international sales trade-off. That is:

$$\frac{\partial S^{OA}}{\partial XS} = S^{OA,I} - S^{OA,D} \tag{21}$$

Thus:

$$\frac{\partial^2 S^{OA}}{\partial XS \partial(1+r_o)} = \frac{\partial S^{OA,I}}{\partial(1+r_o)} - \frac{\partial S^{OA,D}}{\partial(1+r_o)} = \frac{\partial S^{OA,I}}{\partial(1+r_o)} \tag{22}$$

For enforcement this complicates, as source country enforcement also affects contract choice for domestic sales. That is:

$$\frac{\partial^2 S^{OA}}{\partial XS \partial \lambda_o} = \frac{\partial S^{OA,I}}{\partial \lambda_o} - \frac{\partial S^{OA,D}}{\partial \lambda_o} \tag{23}$$

As $\frac{\partial S^{OA,D}}{\partial \lambda_o} > 0$ and $\frac{\partial S^{OA,I}}{\partial \lambda_o} < 0$, it follows that our estimate of $\frac{\partial^2 S^{OA}}{\partial XS \partial \lambda_o}$ constitutes an upper bound (in absolute terms) for the effect we are interested in $\frac{\partial S^{OA,I}}{\partial \lambda_o}$.

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.

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 at the country level. That is, better courts improve contract enforcement more

for complex products than for non-complex products.[13] 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:

$$\mathrm{E}\left[\Pi_{E,xm}^{OA}\right] > \mathrm{E}\left[\Pi_{E,xm}^{CIA}\right] \Leftrightarrow (\lambda_d)^{\gamma\sigma}(1+r_o)^{-\sigma}\eta_{ij}^{OA} - (\lambda_o)^{\gamma}(1+r_d)^{-\sigma}\eta_{ij}^{CIA} > 0 \tag{24}$$

From this, the following proposition can be derived:

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

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]

3 Empirical Results

3.1 Data

The main data set 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. During this period, each firm was interviewed once.

[13] The firm-specific component of contract enforcement could also interact with product complexity. As in the empirical analysis only tests for the role of country level variation in enforcement and financing costs, any interaction with firm level variables is abstracted from. While formulas would become more complicated, none of the results would change in this more general case.

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

In the survey, firms are asked which percentage of their annual sales in the last fiscal year was paid before, after or on delivery. It is straightforward to classify payment before delivery as Cash in Advance and payment after delivery as Open Account. Payment on delivery is harder to assign. Following the logic of the model, on-delivery payment is a closer substitute to post-delivery than to pre-delivery payment. As in the case of post-delivery payment, with on-delivery payment, pre-financing during the production and delivery period has to be done by the seller. Furthermore, in both cases, the seller bears the risk of non-payment. Post-delivery, however, requires a longer financing period and also implies a larger risk for the buyer than on-delivery. Thus, in spite of the similarities, there remains some ambiguity how to best treat on-delivery payments. This issue is dealt with in two alternative ways. In the baseline specification, both payments which are made after delivery and on delivery are classified as Open Account. For the alternative, all on-delivery transactions are disregarded and the share of sales paid after delivery is normalized by the sum of payments before and after delivery. This second measure thus captures relative changes between post-delivery payment and pre-delivery payment. Both strategies deliver very similar results.

The survey also contains information on the share of exports in total sales as well as a set of firm level controls. These are sales per worker, age, manager's experience, foreign-owned, state-owned and import status.

The firm level data is augmented by three additional sources. First, the number of days it takes to enforce a commercial dispute is extracted for the World Bank Doing Business database. Its inverse serves as the main proxy for contract enforcement in the analysis. Second, an alternative enforcement measure for robustness checks, the rule of law index, is taken from the World Bank World Governance Indicators. The index measures the confidence in the rule of law in a country, in particular in the quality of contract enforcement, property right and courts. Finally, variables that capture financial conditions at the country level are obtained 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 calculated as the ratio of the net interest revenues over total assets of all banks in country. In robustness checks, it is replaced by private credit over GDP and overhead costs. Private credit over GDP is a variable that captures general financial development and is

commonly used in the literature on financial conditions and trade. Overhead costs measures the total sum of overhead costs in the banking sector as a fraction of the bank's total assets.

The analysis focuses on manufacturing firms for which standard trade theory seems most appropriate. All other sectors are dropped from the sample. Furthermore, as the theory applies to trade at arm's length, firms that are affiliates of multinational companies or are owned fully or partially by foreigners are excluded. 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.[15] Finally, additional observations are lost when controlling for enforcement, private credit over GDP and the net interest margin, respectively.

Summary statistics of the final data set are reported in Table 1. While the original survey data set contains 9549 observations of exporters in the manufacturing sector from 91 developing countries, the data set used for the baseline regression has 3762 observations of exporters from 54 countries.

3.2 Methodology and Specification

Methodology The baseline regressions use standard OLS estimation. As the share of each payment contract is between 0 and 1, a fractional response model that directly takes account of this restriction could be used. However, in fractional response models, the estimation and interpretation of coefficients on interaction terms is difficult. As in this paper, the coefficients of interest are those on the interaction terms, the main analysis relies on OLS. In the robustness section, however, a fractional response model is estimated. Furthermore, results from an IV estimation approach that addresses the potential endogeneity of the share of exports in total sales are provided. All three estimation techniques, OLS, the fractional response model and the IV estimation, deliver qualitatively similar results.

Identification Identification is based on the theoretical results summarized in Proposition 3. It 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

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

the payment contract choice.

Main Specification The dependent variable is the share of Open Account 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:

$$OA_{it} = \psi_0 + \psi_1 XS_{it} + \psi_2 XS_{it} \times ENF_{ct} + \psi_3 XS_{it} \times INT_{ct} + \Psi X_{it} + \nu_j + \nu_c + \nu_t + \epsilon_{it}. \quad (25)$$

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, country and year fixed effects. XS is the share of exports in total sales. ENF represents contract enforcement and INT denotes the net interest rate margin.

The main prediction of the model is on the interaction term coefficients ψ_1 and ψ_2. Open Account use for international trade is predicted to decrease in enforcement and in the financing costs in the source country. If enforcement in the country of the seller improves, pre-payment (Cash in Advance) becomes more acceptable to the buyer and is chosen more often. This makes the alternative payment contract Open Account less attractive. With higher financing costs in the source country, the ability and willingness of the exporter to extend credit to the importer (Open Account) is reduced. The model thus predicts negative coefficients for both the contract enforcement interaction ψ_2 and for the net interest margin interaction ψ_3.

Product 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 a firm is operating in. More precisely, the contract choice of a firm that trades in a more complex product should be more affected by the strength of contract enforcement and less influenced by the level of financing costs.

To quantify complexity, the classification developed in Nunn (2007) based on intermediate inputs is adopted. Industries that use a large share of intermediates 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.[16] To test the predictions of Proposition 4, the following specification is estimated:

$$\begin{aligned} OA_{it} &= \psi_0 + \psi_1 XS_{it} + \psi_2 XS_{it} \times ENF_{ct} + \psi_3 XS_{it} \times INT_{ct} \\ &+ \psi_4 XS_{it} \times ENF_{ct} \times COM_j + \psi_5 XS_{it} \times INT_{ct} \times COM_j \\ &+ \psi_6 XS_{it} \times COM_j + \psi_7 ENF \times COM_j + \psi_8 INT \times COM_j \\ &+ \Psi X_{it} + \nu_j + \nu_c + \nu_t + \epsilon_{it}. \end{aligned} \tag{26}$$

The two coefficients of interest are ψ_4 and ψ_5 on the triple interactions between the share of exports in total sales, 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 on the international payment contract choice and the weaker the effect of financing costs on the international payment contract choice.

3.3 Results

Table 2 columns $(1)-(2)$ reports the results for the baseline specification. In the first column, Open Account is measured by the sum of post-delivery and on-delivery payments. In the second column, it is calculated as the ratio of post-delivery payments over post-delivery plus pre-delivery payments.

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.

Columns $(3)-(4)$ show the results for the estimation of equation (26) that tests for

[16] 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.

the role of industry complexity. The coefficients for the two triple interactions 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 is marginally significant and positive. Note that it has roughly the same magnitude as the coefficient estimate for the interaction between the net interest margin and the exportshare. Thus, the estimates suggest that for firms in the most complex industries, financing costs do not affect the payment contract choice. Firms in non-complex industries, however, use substantially less Open Account if financing costs are high. Thus, as predicted by Proposition 4, the contract choice in industries that produce complex products is more affected by legal conditions whereas less complex industries are more affected by financing costs.

Quantitative Size of Effects What is the economic size of the estimated effects? As discussed in the theory section, the estimate on the interaction of financing costs with the share of exports in total sales exactly delivers the effect of interest $\frac{\partial S^{OA,I}}{\partial(1+r_o)}$. The coefficient on the enforcement interaction, however, represents an upper bound for the magnitude of $\frac{\partial S^{OA,I}}{\partial \lambda_o}$.

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.[17] By how much would the share of Open Account in international sales increase? Table 3 shows the results of this experiment. According to the estimates, the increase in enforcement would decrease the share of Open Account by 5.9-6.4 percentage points, while the increase in financing costs would decrease the share by 5-6.4 percentage points. As discussed above, the effect of enforcement represents an upper bound, as the difference can also increase if more Open Account is used for domestic sales.

[17]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.

3.4 Robustness

Instrumental Variables One concern is potential endogeneity of the share of exports in total sales. There is a large literature discussing the self-selection of firms into exporting. While less work has been done on the choice of the export intensity, it seems plausible that similar factors determine both export participation and the extent to which a firm sells on international markets. Our results would be biased if the same factors that determine export intensity also drive the payment contract choice.

To address this issue, export intensity is instrumented by the the log number of employees of a firm. The previous literature, starting with Bernard et al. (1995), has shown that firm size is highly correlated with export participation.

The estimation is done with standard two stage least square (2SLS). In the first stage the export share of a firm is predicted by the log of employment. Furthermore, additional instruments for the interactions terms are included. They are generated by interacting the source country enforcement and financing costs with the log of the number of employees. In the second stage, the predicted export shares and interaction terms from the first stage are plugged in and the two specifications are estimated.

Results are reported in Table 7. Columns (1) and (2) report results on the baseline specification, whereas columns (3) and (4) show estimates including the industry complexity interactions.

The coefficients on the interaction between enforcement and the share of exports in total sales are highly significant, negative and very large. This confirms the signs estimated in the OLS model. However, the estimated coefficients in the IV specification are larger by a factor 5, which suggests a large downward bias in the baseline OLS regressions. Estimated coefficients on the interaction between the net interest margin and the export intensity of firms are, however, insignificant in the IV specification. The IV estimation confirms the role of industry complexity found in the OLS estimates in regard of enforcement. The more complex the products of an industry, the more relevant is enforcement for the payment contract choice.

Fractional Response Models As discussed above, the dependent variable is a fraction and thus lies between 0 and 1. Furthermore, there is a mass point both at values 0 and 1. To directly account for this aspect of the dependent variables, in the following, a fractional response model is employed.[18] As the fractional response model requires non-linear estimation, the sizes of the interaction term coefficients are not straightforward to interpret. The discussion of results therefore focuses on the signs and the significance levels of the estimates.[19]

Results are presented in Table 8. In the main specification the coefficients of interest are all highly significant and have the right sign. The triple interaction coefficient for enforcement is significant and has the predicted sign. The triple interaction for the net interest rate margin, however, is insignificant.

Thus, the fractional response model regressions support the basic contract choice model. Furthermore, they are in line with the prediction on product complexity and legal conditions. That is, the choice in more complex industries is more affected by the strength of contract enforcement.

Alternative Measures for Financial and Legal Conditions In further robustness checks, the net interest margin is replaced by alternative financial efficiency. Substituting in either private credit over GDP or overhead costs over total assets delivers very similar results. These findings are reported in Tables 4 and 5.

Next, the regressions are run with an alternative measure for enforcement, the rule of law index. Results are shown in Table 6. Again, the findings are robust to this change.

To summarize, the payment contract choice model is strongly supported by the data. While alternatively using OLS, instrumental variable or fractional response model estimation delivers coefficients of substantial different magnitudes, the qualitative results are robust to employing these alternative methods. Replacing the proxies for enforcement and financing costs by other measures hardly changes the estimated relationships.

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

[19] For a discussion about the interpretation of interaction coefficients in non-linear models see Ai and Norton (2003).

4 Conclusions

Complementing research on aggregate data by Schmidt-Eisenlohr (2011) 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 (2009) as well as 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. Different to Antràs and Foley (2011), the paper is able to study the effects of source country variation as well as differences across industries, which we find both to be highly relevant for the contract choice.

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 Schmidt-Eisenlohr (2011) 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 $\frac{\partial^2[(\lambda_o)^\gamma]}{\partial\gamma\partial\lambda_o} = -(\lambda_o)^{\gamma-1}\left[1+\gamma\ln\lambda_o\right]$. Now, $1+\gamma\ln\lambda_o$ is positive as long as $\lambda_o > e^{-\frac{1}{\gamma}}$. This condition is less likely to hold for higher γ. Inserting the maximum value of $\gamma = 1$ delivers the condition $\lambda_o > 1/e$. The rest of the proof follows the previous proof for Proposition 3. Taking the triple derivatives with respect to XS, γ and λ_o and $1 + r_o$, respectively, the claims are easy to verify.

B Tables

1

Table 1: Exportshare Summary Statistics

	Mean	Standard Deviation	Observations
Post-delivery	.6261124	.3686646	3762
Pre-delivery	.1353004	.2377463	3762
Exportshare	.4408045	.3672502	3762
Log Sales per Worker	13.17973	2.857682	3762
Log Employment	4.315473	1.335444	3762
Ln Age	2.746627	.7937053	3762
Manager's Experience	20.27698	11.62479	3762
State Owned	.0079452	.0744263	3762
Importer	.7666135	.4230423	3762
Enforcement	.0019462	.0009509	3762
Destination Enforcement	.0023263	.0006292	3581
Private Credit	.4298971	.2757892	3762
Destination Private Credit	.9445519	.4086102	3581
Interest Margin	.0535854	.0261838	3762
Industry Complexity	.5493759	.1959645	3762

Table 2: Payment Contract Choice

This table presents the results of the baseline specification. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is either the sum of post- and on-delivery payments (OA) or the ratio of post-delivery payments to the sum of post- and pre-delivery payments (OA ratio). Enforcement is proxied by the inverse of days it takes to enforce a contract. Interest margin is the net interest rate margin. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text.

	All Industries		Industry Complexity	
	(1)	(2)	(3)	(4)
	OA	OA ratio	OA	OA ratio
Exportshare	0.131***	0.139**	0.033	0.091
	(0.042)	(0.059)	(0.111)	(0.162)
Enforcement x Exportshare	-57.379***	-53.141***	49.788	52.910
	(12.262)	(17.055)	(31.651)	(44.970)
Interest Margin x Exportshare	-1.254***	-1.593**	-2.883**	-4.633***
	(0.448)	(0.619)	(1.253)	(1.759)
Enforcement x Exportshare x Complexity			-195.365***	-193.232**
			(54.161)	(76.205)
Interest Margin x Exportshare x Complexity			2.872	5.388*
			(2.132)	(2.970)
Exportshare x Complexity			0.182	0.090
			(0.192)	(0.276)
Enforcement x Complexity			111.001***	148.918***
			(33.465)	(44.965)
Interest Margin x Complexity			0.014	0.084
			(1.055)	(1.404)
R-squared	0.321	0.302	0.326	0.307
N	3762	3447	3762	3447

Table 3: Size of Effects

This table computes an example to evaluate the economic relevance of our estimates. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is either the sum of post- and on-delivery payments (OA) or the ratio of post-delivery payments to the sum of post- and pre-delivery payments (OA ratio) The table shows by how many percentage points Open Account would change if financing costs and enforcement in the source country, respectively, increased from the 25th percentile to the 75th percentile.

	Percentiles	
	(1)	(2)
	OA	OA ratio
Enforcement x Exportshare	-0.064***	-0.059***
	(0.014)	(0.019)
Interest Margin x Exportshare	-0.050***	-0.064**
	(0.018)	(0.025)
N	3762	3447

Table 4: Payment Contract Choice and Private Credit

This table presents the results of the robustness check, replacing the net interest rate margin by private credit over GDP. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is either the sum of post- and on-delivery payments (OA) or the ratio of post-delivery payments to the sum of post- and pre-delivery payments (OA ratio). Enforcement is proxied by the inverse of days it takes to enforce a contract. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text.

	All Industries		Complex Industries	
	(1)	(2)	(3)	(4)
	OA	OA ratio	OA	OA ratio
Exportshare	0.033	0.009	-0.191***	-0.276***
	(0.027)	(0.037)	(0.074)	(0.104)
Enforcement x Exportshare	-64.582***	-65.093***	-31.398	-49.562
	(14.028)	(19.197)	(38.072)	(52.708)
Private Credit x Exportshare	0.107**	0.160***	0.551***	0.775***
	(0.045)	(0.060)	(0.124)	(0.166)
Enforcement x Exportshare x Complexity			-54.848	-19.747
			(64.670)	(89.102)
Private Credit x Exportshare x Complexity			-0.847***	-1.179***
			(0.216)	(0.290)
R-squared	0.321	0.302	0.328	0.309
N	3762	3447	3762	3447

Table 5: Payment Contract Choice and Overhead Costs

This table presents the results of the robustness check, replacing the net interest rate margin overhead costs. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is either the sum of post- and on-delivery payments (OA) or the ratio of post-delivery payments to the sum of post- and pre-delivery payments (OA ratio). Enforcement is proxied by the inverse of days it takes to enforce a contract. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text.

	All Industries		Complex Industries	
	(1)	(2)	(3)	(4)
	OA	OA ratio	OA	OA ratio
Exportshare	0.119***	0.128**	-0.030	-0.001
	(0.037)	(0.052)	(0.102)	(0.146)
Enforcement x Exportshare	-55.399***	-50.448***	52.165*	58.582
	(12.070)	(16.595)	(31.455)	(44.375)
Overhead x Exportshare	-1.363***	-1.905***	-1.911	-3.523**
	(0.440)	(0.601)	(1.239)	(1.701)
Enforcement x Exportshare x Complexity			-197.473***	-200.781***
			(53.322)	(74.404)
Overhead x Exportshare x Complexity			1.034	3.019
			(2.124)	(2.910)
R-squared	0.322	0.304	0.327	0.308
N	3741.000	3428.000	3741.000	3428.000

Table 6: Payment Contract Choice and Rule of Law

This table presents the results of the robustness check, where enforcement is proxied by the rule of law index. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is either the sum of post- and on-delivery payments (OA) or the ratio of post-delivery payments to the sum of post- and pre-delivery payments (OA ratio). Interest margin is the net interest rate margin. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text.

	All Industries		Industry Complexity	
	(1)	(2)	(3)	(4)
	OA	OA ratio	OA	OA ratio
Exportshare	-0.022	-0.008	0.175***	0.224**
	(0.025)	(0.033)	(0.065)	(0.088)
Rule of Law x Exportshare	-0.066***	-0.051*	0.102*	0.130*
	(0.020)	(0.027)	(0.052)	(0.073)
Interest Margin x Exportshare	-1.006**	-1.288**	-2.952**	-4.438***
	(0.440)	(0.597)	(1.212)	(1.663)
Rule of Law x Exportshare x Complexity			-0.322***	-0.341***
			(0.094)	(0.129)
Interest Margin x Exportshare x Complexity			3.352	5.460*
			(2.056)	(2.802)
R-squared	0.320	0.303	0.325	0.307
N	3741.000	3428.000	3741.000	3428.000

Table 7: IV Regression

This table presents the results of the IV regression. Exportshare is instrumented by the log number of workers. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is either the sum of post- and on-delivery payments (OA) or the ratio of post-delivery payments to the sum of post- and pre-delivery payments (OA ratio). Enforcement is proxied by the inverse of days it takes to enforce a contract. Interest margin is the net interest rate margin. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text. The share of exports in total sales is instrumented by log employment.

	All Industries		Industry Complexity	
	(1)	(2)	(3)	(4)
	OA	OA ratio	OA	OA ratio
Exportshare	0.507	0.601	-0.033	-0.395
	(0.597)	(0.673)	(0.580)	(0.722)
Enforcement x Exportshare	-295.083***	-348.986***	1124.226**	974.514*
	(95.961)	(108.360)	(475.901)	(513.662)
Interest Margin x Exportshare	-0.995	3.525	-4.498	-1.092
	(7.592)	(9.003)	(19.066)	(18.752)
Enforcement x Exportshare x Complexity			-1433.087**	-1485.617**
			(572.674)	(646.498)
Interest Margin x Exportshare x Complexity			8.250	5.979
			(41.258)	(33.677)
N	3741.000	3428.000	3741.000	3428.000

Table 8: Fractional Response Model: Exportshare

This table presents the results of the fractional response model estimation. Standard Errors are reported in brackets. ***, **, and * denoting significance at the 1%, 5%, and 10% levels, respectively. The dependent variable is either the sum of post- and on-delivery payments (OA) or the ratio of post-delivery payments to the sum of post- and pre-delivery payments (OA ratio). Enforcement is proxied by the inverse of days it takes to enforce a contract. Interest margin is the net interest rate margin. All regressions include country, industry and year fixed effects and the firm level controls discussed in the text. The share of exports in total sales is instrumented by log employment.

	All Industries		Industry Complexity	
	(1)	(2)	(3)	(4)
	OA	OA ratio	OA	OA ratio
Exportshare	1.339**	1.004*	0.693	0.510
	(0.532)	(0.523)	(1.400)	(1.466)
Enforcement x Exportshare	-490.515***	-337.319**	91.284	335.383
	(132.865)	(133.159)	(342.655)	(363.484)
Interest Margin x Exportshare	-15.301***	-14.354***	-24.276*	-33.412**
	(5.489)	(5.482)	(13.765)	(15.285)
Enforcement x Exportshare x Complexity			-1026.419*	-1193.387**
			(531.629)	(591.550)
Interest Margin x Exportshare x Complexity			16.507	34.514
			(22.393)	(25.180)
N	3741.000	3428.000	3741.000	3428.000