Institutions and Export Dynamics

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Abstract

We study how contract enforcement and export experience shape firm export dynamics in an environment with incomplete information. We show that exporters start with higher volumes and sell for longer periods in countries with better contracting institutions and when they have prior foreign experience. However, conditional on survival, firm export growth *decreases* with the quality of the country's institutions. Controlling for time-varying firm unobservables and other factors, we confirm these and other predictions using a panel of Belgian exporting firms from 1995 to 2008. The results highlight the manifold implications of export experience and contracting institutions for firm dynamics in foreign markets.

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1 Introduction

Imperfect enforcement of contracts can inhibit mutually beneficial transactions. This problem is particularly severe for transactions across different jurisdictions, as in international trade. Empirical research has found that strong contract enforcement indeed boosts aggregate trade levels.[1] Likewise, recent research shows that export experience helps firms to succeed in new foreign markets.[2] In this paper we study how those factors influence the dynamics of trade at the firm level. Relying on the premise that informational frictions create fundamental obstacles to international trade, we argue that strong institutions (at the country level) and export experience (at the firm level) may assuage those constraints, but the effects can be subtle. For example, we show that strong institutions increase the survival rates of exporting firms while at the same time *decreasing* growth of the ones that manage to cope. Similarly, firms survive longer in a market if they have prior experience in similar foreign markets, but this effect is not long-lasting.

We develop these and other results in a simple dynamic model where firms engaged in international exchange build reputations as a response to incomplete information in their foreign relationships. To access a foreign market, potential exporters search for distributors there without observing their types. This makes exporters cautious, as some distributors are opportunistic and default on their contracts whenever possible. Yet others are forward-looking and have an incentive to abide by their contractual obligations. By doing so they build private reputations within their relationships, and through this mechanism they ameliorate the problems created by asymmetric information. This yields a simple dynamic framework that is consistent with previous findings in the literature.[3] More importantly, it allows us to study how exporters' dynamics depend on the strength of the contracting institutions in their destinations and on their own previous export experience.

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[1]Anderson and Marcouiller (2002) and Ranjan and Lee (2007), for example, find sizeable effects of institutional variables on bilateral trade flows using gravity specifications. Turrini and van Ypersele (2010) show that differences in legal systems can depress trade even within a country (in their analysis, France).

[2]For example, Carrere and Strauss-Kahn (2012) show that export experience increases survival in a new foreign market, even when experience is in a non-OECD country and the new market is an OECD country.

[3]Producers in successful partnerships increase their exports over time, as typically observed in micro datasets. Alternative explanations for this stylized fact are provided by Rauch and Watson (2003)—buyers make investments to train foreign suppliers under asymmetric information—by Arkolakis (2010)—increasing marginal penetration costs—and by Albornoz et al. (2012), Eaton et al. (2011) and Fernandes and Tang (2015)—uncertain export profitability. Similarly, the conditional probability of a partnership failure decreases with its duration, just as Cadot et al. (2013) observe for African exporters, and also related to Besedes and Prusa's (2006) finding that the hazard of trade relationships at the product level falls with their duration. More generally, Allen (2014) provides compelling evidence for the prominence of informational frictions among the costs that hamper trade.

Specifically, the model generates several testable implications relying on the idea that good institutions limit the scope for costless contractual default, whereas previous experience yields better matches by allowing firms to spot some opportunistic types. First, producers selling to countries with good contracting institutions, or similar to other markets they have served, start with higher volumes. Second, they are more likely to keep selling to those markets in the future, but this effect eventually vanishes. These results stem from different forces. Because having stronger institutions make contractual defaults more difficult, it both increases the expected longevity of partnerships and makes producers more confident about the workings of their partnerships; this induces them to start with higher volumes. In contrast, more export experience in similar markets allows producers to select their foreign partners better and to cater more effectively to foreign consumers' tastes. This too leads to higher initial export volumes and greater average export spells.

Contracting institutions also matter for firms' export growth. We show that, conditional upon survival, the growth of a firm's exports to a country *decreases* with the quality of the country's institutions. The reason is that, in a good institutional environment, the private reputation of a distributor evolves slowly over time, as successful interactions are less informative of the distributor's type when institutions impose tighter constraints on her behavior. Thus, although tight enforcement of contracts raises the expected return of foreign exporters, boosting initial trade volumes, it also has the perverse effect of slowing down the learning of exporters.

We test these predictions using a rich panel of Belgian firms that contains both goods export values and their destinations from 1995 to 2008. Our data allow us to control for a wide range of factors at the firm, destination and time dimensions. In our main empirical specification we use *firm-year* fixed effects to control for time-varying firm-specific characteristics that influence firm decisions about where to export, for how long and how much. Therefore, we identify the effects of institutions and of previous experience on firms' export dynamics only from within-firm-year variation across export destinations—so for example unobservable time-varying shocks to firm productivity are fully accounted for. We define export experience at entry as the number of similar destinations the firm already serves, where *similarity* between two destinations is based on the "extended gravity" variables proposed by Morales et al. (2014), which incorporate cultural, geographical and economic characteristics. Hence, our benchmark measure of export experience is not subsumed in the firm-year fixed effects, varying at the firm, year and *destination* levels.

We find strong support for our theoretical predictions. Overall, our findings reveal that

weak contracting institutions and lack of export experience cannot be thought simply as an extra sunk or fixed export cost, as is often believed; they also affect firms' export volumes and dynamic patterns in non-trivial ways. Essentially, as long as institutions or previous experience are unable to fully neutralize the problems created by informational frictions, firms overcome those problems over time by building private reputations within their relationships. Such a mechanism operates more strongly, the weaker the country's contracting institutions.

Our analysis is inspired by the existing literature on institutions and trade. However, by focusing on how institutions shape firms' export dynamics, we depart considerably from the standard approach. As Nunn and Trefler (2013) underscore, that line of research concentrates on developing and testing the implications from static frameworks. Significant attention has been given to the fundamental question of how different types of institutions shape the pattern of comparative advantage across countries.[4] Much work has been done also to understand how contractual frictions affect the structure of trade through their effects on the boundaries of the firm.[5] This literature, however, largely bypasses dynamic issues.

The paper contributes to a recent but growing literature on firm export dynamics. It is closely related to the contributions of Albornoz, Fanelli and Hallak (2014), Chaney (2014) and Morales et al. (2014).[6] Albornoz et al. analyze the different ways in which fixed and sunk costs affect firm survival rates in foreign markets. Chaney develops a model of international network formation where firms gather information about potential partners from their current ones. Morales et al. argue that export experience facilitates entry in related markets by reducing sunk entry costs. Unlike those papers, which focus on the expansion of firms across markets, we concentrate on the dynamics within a market. Like us, Antràs and Foley (2014) and Besedes, Kim and Lugovskyy (2014) study the intensive margin, but their goals are different. Antràs and Foley study the choice of financial terms in international transactions. In the same spirit of our analysis, they show how this effect changes over time, as agents develop their relationships. Besedes et al. examine how credit constraints in the origin country affect import growth at the product level in the European Union and the United States. Exploring a mechanism that

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[4]See e.g. Acemoglu et al. (2007), Antràs (2005), Costinot (2009), Cuñat and Melitz (2012), Levchenko (2007) and Nunn (2007). Nunn and Trefler (2013) provide an insightful survey. A related line of research explores instead how trade affects institutions; e.g. Puga and Trefler (2014) provide a fascinating account of changing institutions in Venice following exogenous shocks to the value of international trade during Medieval times.

[5]For example, Bernard et al. (2010) and Corcos et al. (2013) estimate the effect of product contractibility and countries' institutions on the level of and the choice to engage or not in intra-firm trade.

[6]See also Aeberhardt et al. (2014), who study related but different empirical implications obtained from a variant of our model.

is intuitively similar to ours, they find that imports of more financially-dependent goods from less developed countries are initially constrained but grow relatively fast.

The paper is also related to two other lines of research. One is well established and explains how informal cooperative coalitions form and develop in the absence of formal enforcement institutions.[7] The other is recent and studies the circumstances when international trade is likely to be carried out indirectly and the matching pattern between buyers and sellers in international transactions.[8] It is worth noting that indirect trade can take place for many reasons. In our model it is a requirement that creates informational frictions, but in other contexts intermediaries may arise to *solve* informational problems—Chinese exports through Hong Kong provide a classic example (Feenstra and Hanson 2004).

The paper proceeds as follows. In section 2 we develop the model and characterize the equilibrium and its dynamic properties. In section 3 we derive testable implications for how institutional quality and export experience shape firm level exports. We discuss the empirical strategy in section 4 and describe the data in section 5. In section 6 we show and analyze the empirical findings. Section 7 concludes.

2   Model

We develop a model where agents learn about the reliability of their trade partners through repeated interactions. The learning process is affected by both the country's institutions and the producer's export experience. Weak institutions offer greater scope for opportunistic behavior. Lack of experience makes it more difficult to identify risky partners and to offer a product in line with consumers' tastes. These ideas can be modeled in different ways. We make some strong assumptions to keep the analysis simple. However, most of those assumptions can be relaxed. We describe below the benchmark environment. In the end of this section we sketch formal extensions of the benchmark structure and discuss alternatives to some of the simplifying assumptions.

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[7]See Greif (1993) for an insightful early contribution. Related to this approach, McLaren (1999) studies the circumstances under which firms choose to base their relationships on trust instead of on (enforceable) contracts.

[8]For example, Ahn, Khandelwal and Wei (2011), Antràs and Costinot (2011), Bernard, Grazzi and Tomasi (2013), Felbermayr and Jung (2011) and Tang and Zhang (2014) provide theoretical and empirical analyses of direct vs. indirect trade. Bernard, Moxnes and Ulltveit-Moe (2013) and Carballo, Ottaviano and Volpe-Martincus (2013) characterize the matching of exporters with their foreign buyers.

2.1 The Benchmark Environment

Consider an economy with many countries and segmented markets. We focus on the unidirectional trade flows between two of them, Home and Foreign. In Home there is a continuum of agents with the ability to produce differentiated goods, and in Foreign there is a continuum of agents with the ability to internally distribute goods produced in Home. Each producer is a monopolist and has a constant marginal cost of production, c.[9] Thus, the sales of a Home producer in the domestic or other foreign markets has no direct impact on the cost of his sales to Foreign. All producers have the same discount factor, $\delta_e \in (0,1)$. In contrast, a measure $\widehat{\theta}$ of distributors is myopic and has a zero discount factor, while a measure $1 - \widehat{\theta}$ is patient and has a discount factor $\delta_d \in (0,1)$. The type of a distributor is her private information. Thus, absent any additional information, a producer holds a prior $\widehat{\theta}$ that a randomly chosen distributor is myopic.[10] But producers differ with respect to their ability to screen out myopic distributors: those with more experience in exporting to markets similar to Foreign are more able to spot and avoid myopic distributors in Foreign. We capture this idea by assuming that a producer with experience indexed by $e \in [0,1]$ faces an initial pool of distributors equivalent to one where the proportion of myopic distributors is $\widehat{\theta}(1 - e)$. Thus, the effective pool of distributors faced by a new exporter to Foreign is better, the more export experience he has.

The assumption that distributors differ in terms of their privately observed discount factors reflects the idea that distributors condition their behavior on characteristics that producers find difficult to observe. Clearly, there are numerous interpretations as to what those unobservable characteristics may be. At the end of this section we discuss an alternative where distributors differ in terms of their ability to distribute goods in Foreign.

Previous experience is also likely to improve the exporter's profitability, as the exporter becomes more apt at adjusting its product to the tastes of local consumers. Accordingly, we assume that demand, and thus the revenue from sales, is increasing in the experience of the producer.[11] Hence, if a producer exports quantity q, he obtains a revenue $R(q, e)$, where $R_q > 0$, $R_{qq} < 0$, $R_e > 0$, $R_{ee} < 0$ and $R_{qe} \geq 0$.

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[9]It is straightforward to extend the model to allow for differences in marginal costs across firms. This would, however, generate no insight beyond those already known from Melitz (2003) and the literature that paper spurred.

[10] In a previous working paper version of the paper (Araujo et al. 2012), we endogenize the producer's prior by modeling the process of entry and exit from Foreign and focusing on the steady state where entry and exit rates are equalized. The main additional insight from that extra layer of structure is that in steady state the producer's prior is better (i.e. $\widehat{\theta}$ is lower), the stronger is Foreign's contract enforcement. Since this does not alter the sign of our testable implications, for brevity we keep the model simpler here.

[11]We thank an anonymous referee for this suggestion.

Producers from Home and distributors from Foreign meet randomly. Upon meeting, they decide whether to keep their match. The same decision is made at the end of every period in which the partnership is active. We assume that each producer and distributor participates in only one partnership, but extend the analysis to the case of multiple partnerships in section 2.3.[12]

At the beginning of every period in any ongoing partnership, the producer proposes a one-period contract to the distributor. We impose restrictions to prevent the separation between myopic and patient distributors during the contracting stage. If such screening were possible, we would be unable to study the dynamic interplay between the process of reputation formation and the volume of trade. We prevent screening at the contractual stage by restricting the class of contracts as follows. The contract specifies the quantity of goods to be exported and distributed in Foreign, and that the distributor has to return the ensuing revenue to the producer. The contract also specifies an exogenous payment $\kappa > 0$ to the distributor.[13]

In reality, learning about the quality of one's match involves learning not about a single dimension like an agent's discount factor, but about many dimensions (the agent's honesty, work ethic, knowledge, reliability etc.). In such a multi-dimensional setting, learning usually happens both through experience and through contract screening. We focus on a single dimension and restrict contracts so that we can shut down the latter channel and highlight the workings of the former.

In every period after the partnership is formed and the volume of trade is chosen by the producer, the distributor decides between performing according to the contract (returning the revenue to the producer) and defaulting (keeping the revenue for herself). We use the allegory that distributors can "steal the revenue" from exporters to capture in a simple way the idea that distributors can act opportunistically in their relationships with exporters. At the end of this section we discuss alternative ways in which opportunistic behavior may arise.

We want to emphasize that the possibility of default is closely linked to the institutional quality of Foreign. We do so by assuming that in each period while the partnership is active, the distributor privately finds an opportunity to default on the contract without incurring costs

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[12]Interestingly, Carballo et al. (2013) show that, for Costa Rica, Ecuador and Uruguay, for which they have nearly the universe of transactions for 2005-2008, the median exporter has indeed a single buyer in each foreign destination it serves. However, the largest exporters deal with multiple buyers per destination.

[13]Restrictions like these are common in the reputation literature. For instance, in Tirole's (1996) classic model of collective reputation, there are agents who are 'honest' and others who are 'dishonest.' Both are behavioral types. Only agents of the third type ('opportunistic') act strategically. The contract offered by the principal in Tirole's model precludes screening and is very simple: the principal can only offer one of two tasks.

with probability $1 - \lambda$. With probability λ, the distributor does not find such an opportunity. This probability is constant across distributors and over time. Thus, parameter λ provides a measure of the strength of Foreign's contract enforcement institutions.[14]

Finally, at the end of each period there is a probability $1 - \sigma \in (0, 1)$ that an ongoing partnership will break down for exogenous reasons (e.g., the product becomes "obsolete"). When a partnership ends, for either endogenous or exogenous reasons, the producer and the distributor exit the economy and are replaced by new agents. We assume that this replacement is such that, in any given period, the measure of myopic distributors is given by $\widehat{\theta}$.[15] Figure 1 describes the sequence of events within a period.

In what follows, we let $\beta_e \equiv \sigma \delta_e$ and $\beta_d \equiv \sigma \delta_d$ denote the relevant discount factors of producers and patient distributors, respectively.

Figure 1: Partnership

2.2   Equilibrium

Consider the following strategy profile. Each producer forms a partnership whenever he meets a distributor. In a partnership, the producer chooses the quantity to export in each period by

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[14]We study the consequences of contract enforcement institutions in Foreign, but not in Home, because our data has multiple import countries (hence there is variation in that dimension) but only one exporting country, where contracting institutions are relatively strong, Belgium.

[15]For instance, this is the case if distributors from partnerships that end are replaced by new distributors, whose types come as random draws from a distribution in which the measure of myopic distributors is given by $\widehat{\theta}$. In the online Appendix, available at http://personal.lse.ac.uk/ornelas/AMO_OnlineAppendix.pdf, we consider the case in which, after the end of a partnership, a producer reenters a new partnership with probability $\rho \in [0, 1]$. Although the model becomes more nuanced with this modification, the main qualitative results remain unchanged.

maximizing current expected profits. The producer terminates an existing partnership if and only if the distributor defaults on the contract. Each myopic distributor defaults whenever he finds an opportunity to do so, while patient distributors never default. A distributor never terminates a partnership. In this subsection we show that this strategy profile is part of a sequential equilibrium.

2.2.1 Producer's Behavior

Assume that distributors behave as above. The problem of a producer is as follows. At the beginning of every period, if he is not in a partnership and finds a match, he decides whether to take the opportunity and form a partnership. If the producer is in a partnership, in every period he writes a one-period contract with the distributor where he chooses the volume of output to sell in Foreign; at the end of the period he decides whether to maintain it.

Reputation All decisions of a producer depend on his belief about the type of the distributor he is paired with. In turn, beliefs depend on past decisions made by the distributor. It is immediate to see that, since patient distributors never default, the producer concludes that the distributor is myopic as soon as he observes a default. The situation is different if the producer has never observed a default. Let θ_k denote the posterior belief of a producer with experience e that the distributor is myopic in an ongoing partnership that started at date t and is currently in period $t + k$. Repeated application of Bayes rule yields

$$\theta_k = \frac{\lambda^k \widehat{\theta}(1-e)}{\lambda^k \widehat{\theta}(1-e) + 1 - \widehat{\theta}(1-e)} = \frac{\lambda^k \widehat{\theta}(1-e)}{1 - \widehat{\theta}(1-e)(1-\lambda^k)}. \tag{1}$$

Note that θ_k decreases with k and converges to zero as k goes to infinity, regardless of $\widehat{\theta}$ and of e. That is, as long as the distributor does not default and the partnership is not terminated exogenously, the producer becomes increasingly convinced that the distributor is patient. We interpret $1 - \theta_k$ as the reputation of the distributor. A reputation of being patient means that the producer's belief θ_k that his distributor is myopic is relatively small.

Contract The producer pays the cost of production. He receives the revenue if the distributor does not default, an event with probability $\theta_k \lambda + 1 - \theta_k$. Otherwise, he receives nothing. Thus, the producer's current expected profit when the contract specifies production level q is

$$\pi(q, e, \theta_k; \lambda, c, \kappa) = -cq + (\theta_k \lambda + 1 - \theta_k) R(q, e) - \kappa. \tag{2}$$

The assumptions on the structure of contracts imply they cannot be used to extract information about the distributor's type. Thus, when proposing a contract the producer chooses q to maximize $\pi(q, \theta_k, e; \lambda, c, \kappa)$. Denoting the producer's optimal quantity by Q_k, the first-order necessary condition if the producer chooses to sell a strictly positive quantity is

$$-c + (\theta_k \lambda + 1 - \theta_k) R_q(Q_k, e) = 0. \tag{3}$$

The optimal quantity $Q_k = Q(\theta_k, e; \lambda, c)$ depends on the belief θ_k of the producer, his experience e, the institutional parameter λ, and the marginal cost of production c.

We impose restrictions on the structure of demand and the range of parameters $\{\lambda, c, \kappa\}$ such that the following conditions are satisfied:

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\begin{aligned}
A1 \quad &: \quad Q(1, 0; \lambda, c) > 0, \\
A2 \quad &: \quad \pi(Q, 1, 1; \lambda, c, \kappa) < 0, \\
A3 \quad &: \quad \pi(Q, 0, 0; \lambda, c, \kappa) > 0.
\end{aligned}
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$A1$ ensures that the quantity that maximizes current variable expected profits is strictly positive even when the producer is certain that the distributor is myopic ($\theta = 1$) and has no experience ($e = 0$). In that case, $A2$ implies that the producer's current expected profit is strictly negative, irrespective of the experience of the producer. $A3$ entails that the producer's current expected profit is strictly positive when he is certain that the distributor is patient ($\theta = 0$), even if the producer has no experience.

Partnership Consider an ongoing partnership where $\pi(Q_k, \theta_k, e; \lambda, c, \kappa) \equiv \pi(\theta_k, e) > 0$. The flow payoff of the producer is given by

$$\pi(\theta_k, e) = -cQ_k + (\theta_k \lambda + 1 - \theta_k) R(Q_k, e) - \kappa, \tag{4}$$

while his continuation payoff depends on the posterior beliefs. If the producer observes a default, he infers that the distributor is myopic. Assumption $A2$ then implies that he terminates the partnership. If the producer does not observe a default, his belief that the distributor is patient increases. Since $\pi(\theta_k, e)$ is decreasing in θ_k, it follows that the producer maintains the partnership.

It remains to consider whether the producer would ever want to start a partnership. Note that an unmatched producer faces a stationary problem. Thus, he either forms a partnership upon meeting with a distributor for the first time or he never forms a partnership. The following

lemma fully characterizes the behavior of producers. This and all other proofs are in the Appendix. To simplify notation, let $Q(\theta_k, e) \equiv Q(\theta_k, e; \lambda, c)$ henceforth.

Lemma 1 *For every $e \in [0,1]$, there is a unique value $\overline{\theta}(e) \equiv \overline{\theta}(e, \lambda, c, \kappa, \sigma, \delta_e) \in (0,1)$ such that, if $\widehat{\theta}(1-e) < \overline{\theta}(e)$, a producer with experience $e \in [0,1]$ forms a partnership whenever he finds a match. Moreover, he chooses to maintain the partnership if and only if the distributor does not default, and exports $Q(\theta_k, e)$ in every period in which the partnership is active.*

2.2.2 Distributor's Behavior

We now solve the problem of the distributor, taking as given the behavior of the producers. First note that since producers pay the cost of production, the gain of a distributor in a partnership is always positive.

Consider a myopic distributor. By definition, she does not care about the future and therefore does not bother to build a reputation. Hence, a myopic distributor has an incentive to default and keep the revenue whenever she finds an opportunity to do so. A patient distributor, on the other hand, anticipates that after a default the partnership will be terminated, given the strategy of the producers. Conversely, if there is no default her reputation with the producer improves and the relationship is maintained with probability σ. Hence, as long as she is not too impatient and the probability of an exogenous breakdown of the partnership is not too large, she never defaults. Lemma 2 formalizes this claim.

Lemma 2 *For every $e \in [0,1]$, there is a unique value $\underline{\beta_d}(e) \in \left(\frac{R[Q(1,e;\lambda,c)]}{R[Q(1,e;\lambda,c)]+\kappa}, \frac{R[Q(0,e;\lambda,c)]}{R[Q(0,e;\lambda,c)]+\kappa} \right)$ such that a patient distributor never defaults if and only if $\beta_d \geq \underline{\beta_d}(e)$.*

We focus on the polar case where distributors with low discount factor always default and distributors with high discount factor never default, but this could be relaxed. More generally, one could think of an environment where distributors come in many types. For instance, discount factors could be independent random realizations of a uniform distribution in the unit interval. We conjecture that this modified environment would also exhibit a positive relationship between the discount factor of the distributor and the period she starts defaulting on the contract (in particular, distributors with sufficiently high discount factors would never default, just as in the benchmark model). This implies that a producer would end a partnership as soon as a default is observed, and that a producer who does not observe a default would increase his posterior that the distributor is relatively patient. It also implies that, as we

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will show to be the case here, the quantity produced would increase with the duration of the partnership. The upshot of such a generalization is that the benefit of "cheating" increases over time, so that distributors with relatively high discount factors default later in the relationship.

Proposition 1 follows directly from Lemma 1 and Lemma 2. Henceforth, we assume that $\widehat{\theta} < \overline{\theta}(e)$, for all $e \in [0, 1]$.

Proposition 1 *A producer with experience e starts a partnership whenever he finds a match, maintains the partnership as long as he does not observe a default, and exports $Q(\theta_k, e)$ in each period k in which the partnership is active, where θ_k is his period-k belief that the distributor is myopic. A myopic distributor defaults whenever she finds an opportunity to do so. A patient distributor never defaults. Irrespective of type, a distributor never terminates a partnership. This strategy profile, together with the Bayesian updating described in equation (1), is a sequential equilibrium.*

Notice that, although producers with the same export experience are ex ante identical in the benchmark model, they are ex post heterogeneous: at any point in time, some producers do not export to Foreign while others do, and among the latter export quantities vary depending on the age of the partnerships. That is, in our model firms differ initially only because of their export experience, but additional market-specific firm heterogeneity arises endogenously, as a result of distinct individual experiences in the market. This contrasts with the standard modeling strategy in the literature, after Melitz (2003), of assuming that firms only differ in terms of their ex-ante productivity. We abstract from that important, but well known, source of heterogeneity to study a different force that also causes firms to behave differently in foreign markets, namely individual histories in an environment marked with incomplete information and imperfect enforcement of contracts. Naturally, in our empirical implementation we control for differences in firm productivity.

2.3   Extensions and Discussion

Our model is simple but contains the central ingredients for the forces we want to highlight. It is also amenable to numerous extensions. For instance, we can let producers and distributors participate in more than one partnership at a time. Similarly, we can allow the process through which a distributor loses her reputation to be slow, so that the endogenous termination of a partnership requires a sufficiently long history of unfavorable outcomes.[16] In what follows we

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[16]We provide other formal extensions in an early background version of the model (Araujo and Ornelas 2007).

also suggest alternative interpretations of two key assumptions of the model—that distributors' types are defined by their discount factors and that distributors pay producers after receiving the goods.

2.3.1 Multiple Partnerships

Consider an extension of our benchmark environment in which producers and distributors participate in multiple simultaneous partnerships, with producers observing the actions of their distributors in the other partnerships in which they participate, and distributors finding an opportunity to default independently across the partnerships in which they participate. Specifically, let distributors have j possible types, where $j \in \{1, ..., n\}$ denotes the number of producers a distributor is able to match with at the same time, whereas there is no limit on the number of distributors that a producer can be matched with at the same time. In this case, the posterior belief of a Home producer in a partnership with a type-j distributor, after k periods of observing no default, becomes

$$\theta_{k,j} = \frac{\lambda^{kj}\widehat{\theta}(1-e)}{\lambda^{kj}\widehat{\theta}(1-e) + 1 - \widehat{\theta}(1-e)}. \tag{5}$$

Thus, the reputation of a distributor after a history of no defaults increases with its size, as given by the number of partnerships in which she participates at the same time.

It is straightforward to show that Lemmas 1 and 2, as well as Proposition 1, remain valid under this extension. To see that, simply note that neither $\overline{\theta}(e, \lambda, c, \kappa, \sigma, \delta_e)$ in Lemma 1 nor the interval $\left(\frac{R[Q(1,e;\lambda,c)]}{R[Q(1,e;\lambda,c)]+\kappa}, \frac{R[Q(0,e;\lambda,c)]}{R[Q(0,e;\lambda,c)]+\kappa}\right)$ in Lemma 2 depend on the dynamics of $\theta_{k,j}$ within a partnership.[17]

2.3.2 Acquisition and Loss of Reputation

In our model reputations are acquired slowly over time, but are lost permanently in a single period. This asymmetry reflects our distinct modeling of "good" and "bad" outcomes: "bad outcomes" from the perspective of producers are always caused by opportunistic behavior of distributors, whereas "good outcomes" can be due either to the distributor's intention or to institutional constraints. As a result, the construction of a good reputation takes time, whereas

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[17]Naturally, one could also develop richer structures of information transmission. For example, to characterize firm dynamics at both intensive and extensive margins, one could embed our process of reputation acquisition within a partnership in Chaney's (2014) model of network formation. Implications from the resulting mechanism could potentially be tested with recent datasets like the one from Carballo et al. (2013).

a bad reputation is acquired in a single period. This feature of the model simplifies the analysis significantly, but is not essential.

Suppose that "bad outcomes" from the perspective of exporters could also be generated by factors other than the opportunistic behavior of distributors, e.g. imperfectly observed demand shocks. In that case, a producer may choose to maintain his partnership even after observing a bad outcome, although his belief that the distributor is forward-looking would decline after such an event. The properties of Lemma 1 and, in turn, those of the equilibrium characterized in Proposition 1 would nevertheless remain essentially unchanged under this alternative specification. In particular, the optimal behavior of a producer would still involve the existence of a threshold (say θ') such that a partnership is terminated if and only if the posterior θ of the producer is higher than θ'. We prove this in the online Appendix.

2.3.3 Distributors' Types

We define the type of a distributor by her discount factor, but this is not essential. As long as distributors have unobservable characteristics that separate them into a group that defaults whenever possible and a group that never defaults, Proposition 1 holds.

Consider an environment as in our benchmark except that all distributors have the same discount factor $\delta > 0$ but vary in terms of their abilities to distribute goods, an attribute that is unobservable to producers. Specifically, let a fraction $1 - \widehat{\theta}$ of distributors be able to distribute goods at zero cost, whereas a fraction $\widehat{\theta}$ of distributors needs to incur a cost $f > 0$ to distribute goods. In every partnership, events unfold as follows. First, a distributor observes if she has an opportunity to default on the contract. She then chooses whether to distribute the goods. If she does, she also decides whether to return the revenue to the producer. If she does not distribute the goods, she keeps them and obtains a payoff of $R(Q_k, e)$.

It is immediate to see that, as long as the discount factor is sufficiently large, an "able" distributor will choose to always distribute the goods and return the revenue to the producer. The reasoning is the same as in the original model. Consider now the problem of an "unable" distributor. If there is no opportunity to default on the contract, she must distribute the goods, incurring cost f and returning $R(Q_k, e)$ to the producer. If there is an opportunity to default, a large enough cost f will make it optimal for the distributor to simply consume the goods, even if this causes the end of the partnership. If the cost f is not so large as to prevent unable distributors from participating in partnerships, Proposition 1 holds essentially unchanged. The difference between these minimum and maximum levels of effort is necessarily positive as long

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as λ is not too high, so that an unable distributor would have a large enough probability to default on the contract and keep the goods without incurring distribution costs.

2.3.4 Payments

We assume that distributors pay exporters only after receiving the goods. This is a straightforward way to allow for opportunistic behavior in the importing country (where there is variation in terms of institutional quality in our dataset), but is not essential for our results.[18] Provided that distributors cannot pay in advance more than a myopic distributor expects to receive in a period—as this would permit the producer to easily screen types—the analysis would remain identical. What is crucial is that distributors have the option to behave opportunistically in their relationships with exporters, and that this option is more available in countries with weaker institutions. To make this point clear, we consider below two alternative scenarios in which the incentives of distributors to behave opportunistically vary with the institutional setting but are independent of the trade finance mode.

First consider a scenario where distributors have to sell the goods from Home but also to provide a service related to the goods (e.g. tailoring the goods to the clients' needs, or providing technical assistance). Such services can be offered at either high quality or low quality, the former being more costly for the distributor. When low-quality service is provided, future demand for the good drops, and the producer observes this fall in demand at the beginning of the subsequent period. Suppose that the extra cost of providing high-quality instead of low-quality service is small enough that it is optimal for the exporter to contractually specify high-quality service from the distributor. If the distributor is myopic, however, she will choose to provide a low-quality service whenever she believes she can do so without incurring in legal costs, an event that is more likely, the lower the country's institutional quality. It is easy to see that Proposition 1 would remain essentially unaltered under this setting.

Consider now an alternative scenario that relies on the idea that contracts with many contingencies are more difficult to enforce in countries with lower institutional quality. Specifically, assume that a complete contract has n dimensions (contingencies) but only the enforceable

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[18]It is nevertheless worth noting that, although such "open account" transactions are obviously not the only form of trade financing, they seem to be quite common in practice. We do not know for sure because, as Foley et al. (2010, p. 4) point out, "there is a dearth of data on the relative use of different arrangements" to finance international trade. But as they note, the more comprehensive industry surveys indicate that around 80% of the transactions are settled on an open account basis. Schmidt-Eisenlohr (2013) develops and tests a model of the firms' choices of trade finance mode in international transactions. Antràs and Foley (2014) emphasize how this choice evolves over time.

contingencies are written in a contract. Assume further that the number n_c of enforceable contingencies is increasing in λ. Now, let ε be a random variable that is uniformly distributed in $[0, n]$. We can then describe the probability that a myopic distributor defaults with the probability that $\varepsilon \in [n_c(\lambda), n]$, which is given by $\frac{n - n_c(\lambda)}{n}$. Clearly, this probability is decreasing in Foreign's institutional quality. Again, it is easy to see that Proposition 1 would remain unaltered under this setting.

3 Institutional Quality, Experience and Dynamics

Institutions place constraints on the action of distributors, whereas export experience—a characteristic of the producer rather than the importing country—affects the expected reliability of matched distributors. Operating through distinct channels, these factors shape both the level and the dynamics of trade relationships. In our analysis, we concentrate on the effects that are novel and can be evaluated empirically.[19]

3.0.1 Unconditional Survival of Partnerships

Survival captures the probability that a partnership will remain active after its formation. One way to measure survival is by looking at the probability that a partnership formed at date t will still be active at date $t + k$. This probability is given by

$$S_k = (\sigma\lambda)^k \, \widehat{\theta}(1 - e) + \sigma^k \left[1 - \widehat{\theta}(1 - e) \right]. \tag{6}$$

It follows that

$$\frac{\partial S_k}{\partial \lambda} = \frac{k}{\lambda} \, (\sigma\lambda)^k \, \widehat{\theta}(1 - e) > 0. \tag{7}$$

Since better institutional quality makes a default less likely, it increases the probability that a partnership will survive longer. Similarly,

$$\frac{\partial S_k}{\partial e} = \sigma^k \left(1 - \lambda^k \right) \widehat{\theta} > 0. \tag{8}$$

As experienced exporters screen partners better, on average their partnerships last longer.

Note also that both $\partial S_k / \partial \lambda$ and $\partial S_k / \partial e$ converge to zero as k increases. The intuition is simple: if a relationship has lasted for a very long period, the distributor is very likely to be forward-looking; in that case, neither institutions nor export experience plays any role.

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[19]In our model, and in the predictions discussed below, we ignore selection issues, largely because selection effects on exporters are well known. Naturally, in the empirical analysis we seek to control for selection as well as possible.

Thus, we have the following clear-cut predictions.

Prediction 1 *The probability that a relationship will last $k \geq 1$ periods is larger, the stronger the institutional quality of the destination country. This effect vanishes for large enough k.*

Prediction 2 *The probability that a relationship will last $k \geq 1$ periods is larger, the greater the producer's experience in serving similar foreign markets. This effect vanishes for large enough k.*

3.0.2 Conditional Survival of Partnerships

Another way of looking at survival is by computing the probability that a partnership that has lasted for k periods will remain active for at least another period. This conditional probability is given by

$$CS_k = \sigma \lambda \theta_k + \sigma(1 - \theta_k). \tag{9}$$

Consider first the impact of institutional quality on conditional survival:

$$\frac{\partial CS_k}{\partial \lambda} = \sigma \left[\theta_k - (1 - \lambda)\frac{\partial \theta_k}{\partial \lambda} \right] = \sigma \theta_k \frac{1 - \lambda}{\lambda} \left[\frac{\lambda}{1 - \lambda} - \frac{1 - \widehat{\theta}(1 - e)}{1 - \widehat{\theta}(1 - e)(1 - \lambda^k)} k \right] \gtreqless 0. \tag{10}$$

The direct effect of λ on CS_k, given by $\sigma \theta_k$, is unambiguously positive: for given θ_k, a higher λ improves survival. On the other hand, the indirect effect of λ on CS_k, given by $-\sigma(1 - \lambda)\frac{\partial \theta_k}{\partial \lambda}$, is unambiguously negative: a relationship with a myopic distributor is more likely to have lasted for k period, the higher λ is. The net effect balances these two forces, and is generally ambiguous. Note, however, that $\partial CS_k / \partial \lambda$ eventually goes to zero as k grows large, i.e. the effect of institutional quality on conditional survival vanishes in old partnerships.[20] Intuitively, as in old enough partnerships the distributor is very likely to be forward-looking, institutions do not matter for them.

The effect of experience on conditional survival on the other hand, is unambiguous:

$$\frac{\partial CS_k}{\partial e} = -\sigma (1 - \lambda) \frac{\partial \theta_k}{\partial e} = \sigma (1 - \lambda) \frac{\lambda^k \widehat{\theta}}{\left[1 - \widehat{\theta}(1 - e)(1 - \lambda^k) \right]^2} > 0. \tag{11}$$

More experience allows a producer to weed out some unreliable distributors before his match. This improves the pool of potential distributors he draws from, raising survival probabilities at every period in which the partnership is active. Yet the effect of experience on conditional

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[20]To see that, note that $\lim_{k \to \infty} k\theta_k = 0$.

survival eventually vanishes (i.e. $\lim_{k\to\infty} \partial CS_k/\partial e = 0$), just as it happens with the effect of institutions.

We can now state our second set of predictions.

Prediction 3 *For large enough k, the probability that a relationship that has lasted k periods will remain active for another period is unaffected by the institutional quality of the destination country.*

Prediction 4 *The probability that a relationship that has lasted $k \geq 1$ periods will remain active for another period is larger, the greater the experience of the producer in serving similar foreign markets. This effect vanishes for large enough k.*

3.0.3 Initial Volume of Exports

The quality of Foreign's institutions and the experience of Home's producer affect the volume exported in the first period of a partnership. From (3) we have that

$$\frac{\partial Q_0}{\partial \lambda} = -\frac{\widehat{\theta}(1-e)R_q(Q_0, e)}{\left[1 - \widehat{\theta}(1-e)(1-\lambda)\right] R_{qq}(Q_0, e)} > 0 \tag{12}$$

and

$$\frac{\partial Q_0}{\partial e} = -\frac{(1-\lambda)\widehat{\theta}R_q(Q_0, e) + \left[1 - \widehat{\theta}(1-e)(1-\lambda)\right] R_{qe}(Q_0, e)}{\left[1 - \widehat{\theta}(1-e)(1-\lambda)\right] R_{qq}(Q_0, e)} > 0. \tag{13}$$

Intuitively, stronger institutions increase the probability that the producer will receive his revenue. As he anticipates this higher probability, he chooses to export more. In turn, a more experienced producer is more likely to match with a reliable distributor and is more able to adapt its product to the preferences of consumers in Foreign; both forces induce a higher initial volume of exports. Thus we have our third set of predictions.

Prediction 5 *The initial volume exported to a country is higher, the stronger the institutional quality of that country.*

Prediction 6 *The initial volume exported to a country is higher, the greater the experience of the producer in serving similar foreign markets.*

3.0.4 Export Growth

Our model also predicts how institutions shape the process of reputation building and, in turn, affect the export growth of surviving exporters.

Let us start by describing how the volume of trade within a partnership evolves under the equilibrium characterized in Proposition 1. Note first that, although the type of a distributor is key to determine the probability that a partnership lasts, the actual volume of trade depends only on the distributor's reputation with her producer. Hence we can concentrate on the evolution of the export volume irrespective of the type of distributor the producer is paired with.

There is a one-to-one correspondence between the distributor's reputation and the time span of a partnership. Therefore, we can obtain a clear relationship between the export volume and the age of a partnership. Consider a partnership formed at some date t that is still active after k periods. We know from the first-order condition for Q_k that

$$\frac{\partial Q_k}{\partial \theta_k} = \frac{(1-\lambda)R_q(Q_k, e)}{[1 - \theta_k(1-\lambda)] R_{qq}(Q_k, e)} < 0. \tag{14}$$

That is, the optimal export quantity increases as the belief that the distributor is myopic decreases. But we also know from equation (1) that

$$\frac{\partial \theta_k}{\partial k} = \frac{\lambda^k \widehat{\theta}(1-e) \left[1 - \widehat{\theta}(1-e)\right] \ln(\lambda)}{\left[\lambda^k \widehat{\theta}(1-e) + 1 - \widehat{\theta}(1-e)\right]^2} < 0, \tag{15}$$

so we have that

$$\frac{dQ_k}{dk} = \frac{\partial Q_k}{\partial \theta_k} \frac{\partial \theta_k}{\partial k} > 0. \tag{16}$$

Hence, in an ongoing partnership the volume of trade increases over time.

This result captures in a simple way the idea that trust is built over time, through repeated interactions. While a producer learns about the type of his partner, he exports less than he would if he were sure that the distributor were patient. Thus, in the first stages of a partnership relatively low quantities are exported; if the distributor proves to be reliable, the producer progressively improves his foreign sales.[21] In the limiting case where this process

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[21]Our model delivers this point too strongly, making no concession for sales to come down except when the producer exits Foreign's market. It also yields the counterfactual prediction that producers exit the market at their pinnacle (we thank Costas Arkolakis for pointing this out). This is a direct implication of our simplifying assumption that "bad outcomes" from the perspective of the producers are always caused by distributors' intentions, unlike "good outcomes." Yet as discussed in the end of subsection 2.3.2, we develop in the online Appendix an extension that relaxes this asymmetry without altering the essential properties of our equilibrium.

continues until the producer becomes fully convinced that his distributor is patient, any lack of proper contract enforcement becomes effectively inconsequential. Hence, sufficiently long-lasting partnerships overcome the problems created by informational frictions.

Now, while useful for our understanding of firms' export dynamics, other models have yielded similar results, which have also been confirmed empirically.[22] What is novel in our model is that it informs us about the factors that affect the *speed* of the process generating export growth.

To see that, define $\gamma \equiv \theta\lambda + 1 - \theta$. This is the likelihood with which the producer expects to receive the revenue. Since θ changes over time according to θ_k in equation (1), so does γ, starting at $\gamma_0 = \widehat{\theta}(1-e)\lambda + 1 - \widehat{\theta}(1-e)$ and reaching $\gamma_k = \theta_k\lambda + 1 - \theta_k$ after k periods in an active partnership. Institutional quality affects $\gamma_k - \gamma_0$ as follows:

$$\frac{\partial(\gamma_k - \gamma_0)}{\partial\lambda} = \underbrace{\left[\theta_k - \widehat{\theta}(1-e)\right]}_{\text{lower value of reputation}} + \underbrace{(1-\lambda)\frac{\partial\left[\widehat{\theta}(1-e) - \theta_k\right]}{\partial\lambda}}_{\text{reputation building slowdown}} < 0. \tag{17}$$

This first term of the expression above is negative because $\theta_k < \widehat{\theta}(1-e)$, and the second because

$$\frac{\partial\left[\widehat{\theta}(1-e) - \theta_k\right]}{\partial\lambda} = -\frac{\partial\theta_k}{\partial\lambda} = -\frac{\widehat{\theta}(1-e)\left[1 - \widehat{\theta}(1-e)\right]k\lambda^{k-1}}{\left[\lambda^k\widehat{\theta}(1-e) + 1 - \widehat{\theta}(1-e)\right]^2} < 0. \tag{18}$$

The intuition can be conveyed as follows. As the reputation of the distributor improves, the producer becomes more confident that contracts will be honored. This improved reputation is reflected in the expression $-\left[\theta_k - \widehat{\theta}(1-e)\right]$. However, this matters only when institutions fail, an event with probability $(1-\lambda)$. Thus, a small increase in λ directly reduces the value of an improved reputation by $\left[\theta_k - \widehat{\theta}(1-e)\right]$. Furthermore, a better institutional environment slows down the process of reputation building itself, because it makes it more difficult for a producer to discern, after a successful outcome, whether the distributor has complied with the contract because she wanted to or because of the threat of a legal challenge. Put differently, a better institutional setting in Foreign reduces the informational content of past histories, thus lowering the future reputation of an active distributor, relative to what it would have been under a lower λ. This result has important implications for the export growth of active exporters.

Let the demand function satisfy the following condition:

In that extension, after a "bad outcome" the producer's belief about the type of the distributor worsens but does not jump to $\theta = 1$, implying that the export volume falls but can remain strictly positive in the subsequent period. Thus, export volumes within an active partnership do not increase monotonically over time and a partnership is endogenously terminated only after quantities have decreased for some time.

[22]See e.g. Albornoz et al. (2012), Eaton et al. (2011) and Freund and Pierola (2010) for alternative views of why surviving exporters on average increase exports over time, especially after their first year as exporters.

Condition 1 *The elasticity of the marginal revenue with respect to the quantity,* $\varepsilon_{MR}(Q) \equiv -\frac{QR_{qq}(Q,e)}{R_q(Q,e)}$, *is non-decreasing in* Q.

Condition 1 requires the marginal revenue (expressed as a function of Q) to not become too much 'flatter' at higher levels of Q (that is, the rate at which marginal revenue falls with Q should not decrease too fast with Q). The condition is quite general; in particular, it is satisfied when demand is linear, CES or translog.[23] If Condition 1 holds (and it is only a sufficient condition), then we have (see proof in the Appendix) that the export growth of an exporter to an economy *decreases* with the quality of that economy's institutions.

Prediction 7 *A producer's export growth from period* 0 *to period* k *is higher, the weaker the institutional quality of the destination country.*

A corollary of Prediction 7 is that, after the initial period, a clear-cut ranking of firm export volumes across destinations with different institutional environments (as in Prediction 5) no longer exists. Because of the slower updating process, a producer's exports to a low-λ destination after a successful outcome may be higher (or not) than the exports of the same producer to a high-λ (but otherwise identical) country after a similarly successful outcome.

Export experience also affects export growth, but the effect is generally ambiguous. To see that, consider in particular the simpler case where $R_{qe} = 0$. Paralleling calculations used in the proof of Prediction 7, one can show that a producer's export growth from period 0 to period k increases with experience if and only if

$$\frac{\varepsilon_{MR}(Q_k)}{\varepsilon_{MR}(Q_0)} < \frac{\varepsilon_{\gamma_k,e}}{\varepsilon_{\gamma_0,e}}, \tag{19}$$

where $\varepsilon_{\gamma_k,e} \equiv \frac{\partial \gamma_k}{\partial e} \frac{e}{\gamma_k}$ and $\varepsilon_{\gamma_0,e}$ is the analogous expression for γ_0. The left-hand side of equation (19) shows how the elasticity of the marginal revenue changes overtime, as Q_k grows. The right-hand side of (19) shows how the elasticity of γ_k with respect to experience changes overtime, as the partnership matures. Thus, the left-hand side reflects the demand structure of the partnership, whereas the right-hand side reflects the learning process inside the partnership. Which of the two prevail is an empirical question.[24]

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[23]Mrazova and Neary (2013a) express ε_{MR} as $\varepsilon_{MR} = \frac{2-\rho}{\epsilon-1}$, where ϵ denotes the elasticity and ρ the convexity of the demand function. Thus Condition 1 can be rewritten as $\frac{d\rho}{dQ}(\epsilon - 1) + \frac{d\epsilon}{dQ}(\rho - 1) \leq 0$. The terms in parenthesis are positive whenever the first- and second-order necessary conditions are satisfied. As Mrazova and Neary (2013b) indicate, $\frac{d\epsilon}{dQ} < 0$ is considered by many to be the most intuitive case. $\frac{d\rho}{dQ} < 0$ iff the pass-through from cost to price increases with Q.

[24]Observe that Condition 1 implies that the left-hand side of equation (19) is greater than or equal to 1.

4   Empirical Strategy

The empirical analysis is divided in two parts. First we study a firm's probability of survival in a new export market both conditional on entry and conditional on the firm being active in that market $s > 0$ periods after entry. Then we study a firm's choice of the initial value to export to a market, which depends on its prior decision to enter the market, and the firm's export growth, which depends on its decision to keep exporting to that country. In each part we face, therefore, a potential selection bias. Furthermore, the usual issue of omitted variables arising in non-experimental settings may apply to our analysis. We deal with those issues by introducing firm-year fixed effects into linear regression models, as well as a large battery of controls at the country and time levels.

In what follows we use subscript i for firms, d for countries and t for years. Superscript k denotes the number of years after the start of a partnership at which we measure an outcome (survival or growth). Superscript s refers to the point in time at which we condition firm survival. For example, when considering export growth two years after the start of a partnership, we have $k = 2$ and $s = 0$; when estimating the probability of a partnership survival after five years conditional on the partnership being active two years after its start, we have $k = 5$ and $s = 2$.

To better see how our regression design, and in particular the firm-year fixed effects, helps us deal with selection and endogeneity, let us first consider the case of entry in a new destination market and the initial value of exports. We consider firm entry into a new export destination in 1996, 1997 and 1998, pooled together. To estimate the entry probability, we define a binary dependent variable $Entry_{idt}$ taking value one when firm i enters a new export market d at time t. To construct $Entry_{idt}$, we first identify all firm-country (i, d) pairs appearing in the trade data in period $t - 1$. We then fill in the country d dimension with zeros for all destinations to which firm i has zero exports in $t - 1$. $Entry_{idt} = 1$ if in period t firm i serves a destination d that is in that group. Thus in each period a firm decides whether to enter into one or more new export destinations, with the set of countries to choose from given by the countries where the firm did not export to in the previous year.[25]

If firm i enters destination d at time t, it also chooses how much to sell in d. The initial

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However, in contrast to the case of institutional quality, the right-hand side of (19) can be either greater or smaller than 1. Intuitively, experience improves the producer's beliefs both at the start of the relationship and in the future, and in principle either effect can dominate.

[25]In section 6.4 we show results for a much stricter definition for entry, where $Entry_{idt} = 1$ if firm i serves destination d in period t but not in any period between $t - 5$ and $t - 1$.

(log) export value Exp^0_{idt} is thus observed only when $Entry_{idt} = 1$, raising a potential selection issue that we model in the following way:

$$Entry_{idt} = \mathbf{1}_{[Entry^*_{idt} > 0]},$$
$$Entry^*_{idt} = constant + \beta 1_{IQ} IQ_{dt} + \beta 1_E Experience_{idt} + \mathbf{Z1}'_{idt} \gamma \mathbf{1} + \zeta 1_{idt}; \qquad (20)$$

$$Exp^0_{idt} = constant + \beta 2_{IQ} IQ_{dt} + \beta 2_E Experience_{idt} + \mathbf{Z2}'_{idt} \gamma \mathbf{2} + \zeta 2_{idt}, \qquad (21)$$

where $Entry^*_{idt}$ is a latent variable measuring firm i profitability when serving country d as a new exporter in year t, institutional quality IQ_{dt} and $Experience_{idt}$ are our main variables of interest, $\mathbf{Z1}_{idt}$ and $\mathbf{Z2}_{idt}$ are vectors of firm-country-time controls, and $\zeta 1_{idt}$ and $\zeta 2_{idt}$ are residual terms. Even if standard omitted variables were not an issue, as when $\zeta 1_{idt}$ and $\zeta 2_{idt}$ are uncorrelated with IQ_{dt}, $Experience_{idt}$, $\mathbf{Z1}_{idt}$ and $\mathbf{Z2}_{idt}$, selection bias arises as long as $\zeta 1_{idt}$ and $\zeta 2_{idt}$ are correlated to each other.

First, we consider that $\zeta 1_{idt} = f1_{it} + \upsilon 1_{idt}$ and $\zeta 2_{idt} = f2_{it} + \upsilon 2_{idt}$. Second, we assume $\upsilon 1_{idt}$ and $\upsilon 2_{idt}$ to be uncorrelated with each other as well as with $f1_{it}$, $f2_{it}$ and covariates. Letting the correlation between $f1_{it}$, $f2_{it}$ and covariates unconstrained, our set of assumptions is sufficient (along with standard regularity conditions on the distribution of $\upsilon 1_{idt}$ and $\upsilon 2_{idt}$) for parameters in (20) and (21) to be separately and consistently estimated. In particular, the marginal effects of (20) around the mean of covariates can be consistently estimated using a linear probability model and applying the within transformation to get rid of the firm-time fixed effects $f1_{it}$.[26] A simple linear panel regression with firm-time fixed effects does the same for (21).[27] Finally, we report two-way clustered (country and firm) standard errors. Although demanding in terms of estimates precision, this has the advantage of allowing residuals to be correlated both across observations referring to the same firm and across observations pertaining to the same country.[28]

The identifying variation in our regression design is provided by firms starting to export in two or more new destinations in the same year. Therefore, the variation due to new exporting firms being different across destinations is washed out. However, such new destinations do differ in terms of their rule of law and in terms of the experience acquired by a particular firm in similar markets. By using firm-time fixed effects we exploit the within-firm-year variation across destinations only. This is demanding on the data, as it relies on firms entering in the

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[26]In section 6.4 we also show results from a conditional fixed effects Logit model.

[27]In section 6.4 we also show results from a generalization of the Heckman two-stage procedure that allows for firm-time varying unobservables potentially correlated with covariates (Wooldridge 1995).

[28]We implement this by using the STATA command xtivreg2. See Cameron et al. (2011) for a general discussion of multi-way clustering.

same year in more than one destination and keeping serving multiple destinations. After 10 years, for example, rather than the 12K surviving triples indicated in Table 2, we identify our parameters from around 8K surviving triples corresponding to firms that entered multiple destinations within a year and kept at least two of them after ten years. The advantage is that firm-time fixed effects allow us to control for both potentially observable (firm productivity, capital intensity etc.) and typically unobservable (e.g., the quality of a firm management and products) firm characteristics. Importantly, they also control for arbitrarily correlated time-varying shocks to those characteristics, which simultaneously affect the firm's decision to enter/stay in a market and the firm's choice of how much to sell in that market.

For the analysis of export dynamics, we consider survival, both conditional on entry and conditional on the firm being active at a later period s, and export growth in a new export destination. We consider firms that have entered market d as a new exporter (in 1996, 1997 and 1998) and are still selling to d after k years. We carry out survival and growth analyses at different lengths $k = 1, 2, 5, 10$, thus requiring the full time coverage (1995-2008) of our trade data.[29] We apply the same econometric model, assumptions and tools described above to deal with endogeneity and selection. Consider, for example, $Survival_{idt}^{k|0}$. Survival is an outcome that is conditional on entry and can then replace Exp_{idt}^0 in (21). Again, under our assumptions, we can estimate the impact of IQ_{dt} and $Experience_{idt}$ by using a linear probability model and applying the within transformation to get rid of firm-time fixed effects. A similar reasoning extends to survival after k periods conditional on the firm still exporting in $s \in (0, k)$, $Survival_{idt}^{k|s}$, and to export growth between 0 and k, $Growth_{idt}^k$, computed as the difference between Exp_{idt}^k and Exp_{idt}^0. It is important to observe that, in line with the model, we study the effects on *cumulative* export growth from 0 to k, not on year-to-year export growth.

5   Data

To test the predictions of our model, we use data on Belgian goods exports provided by the National Bank of Belgium (NBB). The data allow us to analyze exports at the firm level disaggregated by destination country over 1995-2008, a period of relative stability in world trade flows.[30] We focus on firms that start exporting to a given destination between 1996-1998,

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[29]In section 6.4 we also show results from a Cox Proportional Hazard model for the survival analysis, using all the available information at the same time.

[30]The impact of the financial crisis on world trade was felt mainly in 2009, so our results are largely unaffected by that rather unique disruption of trade flows.

so that we can follow new exporters for a long enough period (10 years).

We note that, when observing a firm's export flow to country d, k years after its entry in that market, we are assuming that the firm is in the same partnership since entry. This is what a strict interpretation of our model suggests. In reality, of course, some firms may switch distributors and remain serving the market. Ideally, we would like to investigate this pattern empirically, but our dataset does not have information about foreign distributors. Nevertheless, in the online Appendix we extend the benchmark model to allow for the possibility of reentry upon dissolution of a partnership and discuss its empirical implications.[31]

5.1 Micro Trade Data and Variables

The trade data are very rich. Exports of each firm are recorded in current euros at the 8-digit CN product level by country of destination. The data are collected by the NBB from Intrastat (intra-EU trade) and Extrastat (extra-EU trade) declarations. The reliability of the trade declaration data builds upon firms' mandatory VAT returns. Sales and purchases involving a non-resident must be separately indicated in VAT returns due to the different treatment of those operations with respect to the VAT tax. This information is used by the NBB to identify firms involved in trade activities.

The data encompass the universe of declared trade transactions. Extra-EU trade is virtually exhaustive, with the legal requirement for declaration being either a value above €1,000 or a weight above 1,000 kg. For intra-EU trade, the declaration threshold has changed over time. Firms had a legal obligation to declare exports if their total foreign sales were above €104,105 for the period 1993-1997, above €250,000 for the period 1998-2005, and above €1 million since 2006. Firms trading less than 1 million euros represent less than 1% of aggregate exports. Firms nonetheless often provide information about their European foreign sales even when they are below the threshold. Since it is unclear whether these threshold changes generate biases in our estimations, in our benchmark analysis we use all data available. In section 6.4 we also show results from adopting a common threshold for EU and non-EU trade across all years.

As Belgium is a key port of entry to and exit from the EU, Belgian data have the drawback

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[31]The predictions on different types of survival probabilities remain qualitatively unchanged when we allow producers whose partnerships break down to reenter the same market, except in the extreme case when producers *always* reenter (and thus counterfactually never exit an export destination). The additional impact of institutional quality on the growth rate of the export volume of a producer, when we allow the observed and the actual age of the partnership to differ, could in principle weaken the effect highlighted in Prediction 7. Since, as we will see, the empirical results strongly support Prediction 7, such additional element cannot be dominant.

of including a large amount of re-exports. Many official 'Belgian' firms thus trade exclusively with non-resident partners. We deal with this problem by building on detailed information gathered by the NBB since 1995 and exclude all trade by firms identified as non-resident.[32]

Belgian firms export a wide range of products. For example, there are 10,330 CN8 exported products in our data for the year 2008. In terms of value, its main export products are motor vehicles, diamonds and medicaments. Relative to the other EU-15 countries, Belgium's sector strengths are in carpets, precious or semi-precious stones, articles of zinc and tin, and fertilizers.[33]

We use the micro trade data to construct the following variables: (i) a dummy $Entry_{idt}$ taking value 1 if firm i enters a new export destination d in year $t \in [1996, 1998]$; (ii) the log value of exports of firm i to country d at the time of entry, Exp_{idt}^0; (iii) a dummy $Survival_{idt}^{k|s}$ taking value 1 if firm i, which has entered market d in year t and was observed exporting in year $t + s$, still exports to d after $k > s \geq 0$ years; (iv) the growth of firm i exports to country d between years t and $t + k$, $Growth_{idt}^k$; (v) the number of destinations "similar" to d served by firm i one year prior to t, $Experience_{idt}$, where similarity is defined as sharing the same language, sharing a border, being in the same continent, or belonging to the same quartile of the world GDP distribution as country d.

More specifically, we construct four variables that capture the "proximity" between the set of countries a firm was already exporting to in year $t - 1$ and the new potential markets where the firm could start exporting to in t. Following Morales et al. (2014), we measure proximity in terms of geographical (contiguity and presence in the same continent), cultural (sharing of the same official language) and income similarities (quartiles of the distribution of GDP per capita in US dollars across countries in 2008).[34] Naturally, there are alternative ways of defining export experience. In section 6.4 we show results from several alternative ways of defining that variable, such as its log value, as a dummy, and as the share of similar markets among all the

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[32]Non-resident firms are the main re-exporters in Belgium. They are identified by the NBB from VAT declarations. Firms with a Belgian VAT identifier that have a foreign legal address and firms offering fiscal representation services to foreign firms are considered non-resident. These firms must report how much they trade with foreign parties (re-exports) in VAT declarations. Trade between non-resident firms and Belgian residents is recovered from VAT-suppliers data. Non-resident firms are classified as 'pure' if they are not involved in any trade transaction with Belgian residents, and as 'mixed' otherwise. They account for about 26% of Belgian exports in 2008.

[33]We obtain this ranking by using a Balassa (Revealed Comparative Advantage) index defined as $\left(X_{Belgium}^i / X_{Belgium} \right) / \left(X_{EU-15}^i / X_{EU-15} \right)$, where X_j^i denotes exports of a 2-digit HS product i by j and X_j denotes total exports by j, $j = Belgium, EU$-15.

[34]See Morales et al. (2014) for details on the construction of those four variables.

markets served by the firm.

We consider that a new partnership is created whenever a firm enters a new export market in a given year. Since our analysis is for the 1996-1998 cohorts, we do not consider firms that start exporting to a destination after 1998. Similarly, if a firm-destination pair is observed in year $k-1$ but not in year k, it is no longer considered in the analysis of period $k+j$, for any $j > 0$. We define firm i as an entrant in destination d in year t if the firm has positive exports to d in year t but no exports to d in $t-1$.[35],[36] Naturally, a firm may be an entrant in country d in year t while being already an exporter to other destinations in $t-1$. Table 1 reports the number of new firm-country-year triples during the period 1996-1998. Over the three years, there are $157,537$ such triples.[37] Table 1 also shows the number of firms and countries involved in this entry activity. Note that the total number of firms involved in entry during 1996-1998 is less than the sum of the entering firms in each year, as a firm can be a new exporter (in a different market) in more than one year. The same is true for the total number of countries experiencing entry of new Belgian firms.

Table 1: Firm Entry Into a New Export Market

Year	New Firm-Country-Year Triples	Number of Firms	Number of Countries
1996	55,903	23,500	204
1997	54,641	22,833	204
1998	46,993	19,955	205
Overall	157,537	41,060	211

The growth rate of exports after k years is defined as the difference between log export value after k years and log export value at entry: $Growth_{idt}^{k} \equiv Exp_{idt}^{k} - Exp_{idt}^{0}$. In constructing $Growth_{idt}^{k}$ we consider only exporters surviving k periods after entry, i.e. $Growth_{idt}^{k}$ is computed conditional on $Survival_{idt}^{k|0} = 1$. Table 2 reports the number of surviving triples and some

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[35]In section 6.4 we also consider results for a broader definition of entry, where we redefine firm i as an entrant in destination d in year t if the firm has positive exports to d in year t but no exports to d from $t-5$ and $t-1$. In that case we also broaden our definition of $Experience_{idt}$ accordingly, considering markets served between $t-5$ and $t-1$.

[36]We exclude from the analysis the triples we can identify as corresponding to "reentry," i.e., firms that exit a market in a year and return in the next. In our case, this refers to 1998 triples of firms that export to a destination in 1996 and 1998 but not in 1997. They correspond to around 2% of the new triples. Including them in the sample has virtually no effect on the results.

[37]The 16% drop in the number of new triples from 1997 to 1998 is largely explained by the change in the intra-EU declaration threshold in 1998. We thank Andrew Bernard for pointing this out. As mentioned above, it is unclear the nature of the bias this may generate in the testing of our predictions. In section 6.4 we nevertheless confirm that our qualitative results are unaffected by the changes in declaration requirements.

descriptive statistics of the growth of exports k years after entry in a new destination for $k = 1, 2, 5, 10$. It shows that only about 40% of the new triples created during 1996-1998 are still ongoing after one year. After 10 years, fewer than 8% of the initial pool are still ongoing. Table 2 further indicates that, conditional upon survival, the growth of exports is on average positive. The mean 1-year growth rate is 30% ($=\exp^{0.2659} -1$) and the mean 10-year growth reaches 268%; the median growth rates are slightly lower.

Table 2: Firm Survival and Export Growth

Export Growth After	1 Year	2 Years	5 Years	10 Years
Mean	0.2659	0.4855	0.7606	1.3041
Median	0.2240	0.4116	0.6585	1.2368
Stand. dev.	1.6306	1.7928	2.0532	2.2952
5th percentile	-2.3717	-2.3670	-2.5085	-2.3651
95th percentile	2.9080	3.4781	4.2075	5.1145
Surviving Triples	63,970	40,010	24,059	12,073
Surviving Firms	19,452	12,757	8,220	4,159
Surviving Countries	198	194	181	168

A key variable in our analysis is $Experience_{idt}$. Out of the 157,537 observations corresponding to entry in a new destination, 88,507 (56.2%) correspond to cases where the firm did not export to a similar destination in the previous year. For the remaining triples, $Experience_{idt}$ is distributed as in Figure 2, with a maximum of 129 markets reached by one observation.

5.2 Country-Level Data and Variables

The other key variable in our analysis is the institutional parameter IQ_{dt}, corresponding to the variable λ in the model, which we proxy with the "Rule of Law" index from Kaufmann et al. (2009). Ranging from -2.5 to 2.5, it corresponds to a weighted average of several variables that measure individuals' perceptions of the effectiveness and predictability of the judiciary and the enforcement of contracts in destination d in year t. This is a fairly accurate description of our theoretical institutional variable. It is widely used and also has the important advantage of classifying a large number of countries (170). As institutions change slowly over time, almost all the variation in IQ_{dt} is cross-sectional.[38] For simplicity of the interpretation we therefore consider the value of IQ_{dt} for the destinations of the new triples in 1996-1998, but not the trifling changes in IQ_d from period t to period $t + k$. In the online Appendix we show the

[38]For example, the correlation between $\lambda_{d,1996}$ and $\lambda_{d,2008}$ is 0.95.

Figure 2: Density of positive values of experience

list of all countries and their corresponding rule of law score in 1997. We provide results for alternative measures of IQ_{dt} in section 6.4.

Other control variables at the country-level include the usual set of gravity equation covariates: the log of distance ($Distw_d$), an ex-colony dummy ($Colony_d$), a common language dummy ($Lang_d$), a common border dummy ($Border_d$)—all relative to Belgium—and the log of GDP in euros (GDP_{dt}). Except for GDP_{dt}, which we borrow from the World Outlook Database provided by the International Monetary Fund (IMF), these data are time-invariant and come from the Centre d'Etude Prospectives et d'Informations Internationales; full details can be found in Head and Mayer (2002).

To account for differences in trade patterns and their evolution over time that are related to membership to the World Trade Organization, the integrated EU economic market, and to more general regional trade agreements, we use time-varying WTO_{dt}, EU_{dt} and RTA_{dt} membership dummies. To control for the level of development of export destination countries, we include an OECD membership dummy ($OECD_{dt}$). In the analysis of export growth and survival, we also include changes in the time-varying country variables as well as real exchange rate changes over the time interval $[t, t + k]$. Nominal Exchange rate data are obtained from the

28

IMF's International Financial Statistics database while PPP conversion rate data come from the World Outlook Database.

6 Empirical Results

6.1 Firms' Survival in a New Market

Table 3 reports the results of the within estimator applied to the linear probability model (20) in which we consider as outcome firm survival in a new market k years ($k = 1, 2, 5, 10$) upon entry ($Survival_{idt}^{k|0}$), as well as survival conditional on the firm being still exporting s years ($0 \leq s < k$) after entry ($Survival_{idt}^{k|s}$). For the latter we focus on the following combinations of s and k: s=1 and k=2, s=2 and k=5, s=5 and k=10. The left panel of Table 3 refers to estimations of the survival probability, while the right panel reports conditional survival.[39] We provide standard errors adjusted for two-way clustering at the firm and country levels.

The vector of controls for the survival and conditional survival analyses includes all the country and country-time variables discussed in section 5.[40] We also add firms' initial value of exports in the regression. As emphasized by Arkolakis (2010) and Eaton et al. (2011), among others, the initial value is crucial to understand firms' dynamics in a market.[41]

Predictions 1 and 2 state that the likelihood that an exporter to a new market will still serve that market after k years increases with the effectiveness of the contracting institutions of the country and with the experience of the firm in similar foreign markets. The positive and significant estimates of IQ_{dt} and $Experience_{idt}$ in the left panel of Table 3 strongly confirm both assertions. Their magnitudes are also sizeable.

For example, using the unconditional probability of survival as reference, if China ($IQ = -0.25$) had institutions like those in Singapore ($IQ = 1.74$), the probability of survival of an exporter to China after one year would increase by 6.6% ($1.99 \times 0.0136/0.4089$). After 5 years, the increase would be of 13.6% ($1.99 \times 0.0106/0.1544$). Similarly, moving from no experience to the mean experience in similar markets among those that have experience (6.9 markets), the probability of survival after one year would increase by 6.2% ($6.9 \times 0.0037/0.4089$), and after 5

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[39]In the left (right) panel of Table 3, the number of observations does not correspond to the number of triples in Table 1 (Table 2) because about 2% of observations is lost due to the lack of country-time covariates.

[40]As indicated at the end of that section, we also include the *changes* in some country controls between periods t and $t + k$ for the survival, and between periods $t + s$ and $t + k$ for the conditional survival analyses (in addition to the levels of those variables). We report their estimates in the online Appendix.

[41]In section 6.4 we show results after excluding the initial value of exports from the covariates.

Table 3: Survival in a New Export Market

	Probability of Survival k Years Upon Entry Conditional on Surviving Until $0 \le s < k$						
	Survival Prob.: $s = 0$				Condit. Survival Prob.: $s > 0$		
k	**k = 1**	**k = 2**	**k = 5**	**k = 10**	**k = 2**	**k = 5**	**k = 10**
s	**s = 0**	**s = 0**	**s = 0**	**s = 0**	**s = 1**	**s = 2**	**s = 5**
Unconditional Probability	0.4089	0.2562	0.1544	0.0776	0.4840	0.4896	0.5018
	The Role of Institutions						
IQ_{dt}	0.0136^a	0.0147^a	0.0106^b	0.0050^c	0.0122^c	0.0205^a	0.0037
	(0.0050)	(0.0052)	(0.0043)	(0.0030)	(0.0063)	(0.0070)	(0.0078)
	The Role of Experience						
$Experience_{idt}$	0.0037^a	0.0024^a	0.0011^b	-0.0006	0.0013^b	0.0010	-0.0007
	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0006)	(0.0008)
	idt, d, and dt Controls						
Exp^0_{idt}	0.0722^a	0.0690^a	0.0519^a	0.0313^a	0.0376^a	0.0252^a	0.0193^a
	(0.0023)	(0.0019)	(0.0024)	(0.0022)	(0.0018)	(0.0021)	(0.0031)
$Distw_d$	-0.0344^a	-0.0332^a	-0.0273^a	-0.0194^a	-0.0279^a	-0.0291^a	-0.0421^a
	(0.0073)	(0.0067)	(0.0057)	(0.0037)	(0.0051)	(0.0059)	(0.0080)
$Lang_d$	0.0058	-0.0093	-0.0152	-0.0108	-0.0106	-0.0081	-0.0187
	(0.0151)	(0.0163)	(0.0145)	(0.0101)	(0.0114)	(0.0114)	(0.0132)
$Colony_d$	0.0677^b	0.0619^a	0.0502^a	0.0412^a	0.0320	0.0547	0.1337^a
	(0.0289)	(0.0214)	(0.0157)	(0.0100)	(0.0280)	(0.0417)	(0.0455)
$Border_d$	0.0539^c	0.0584^c	0.0783^a	0.0439^b	0.0317^c	0.0519^a	0.0208
	(0.0298)	(0.0339)	(0.0304)	(0.0210)	(0.0186)	(0.0145)	(0.0206)
GDP_{dt}	0.0083^b	0.0023	-0.0003	0.0014	0.0051^c	0.0071^b	0.0251^a
	(0.0039)	(0.0042)	(0.0040)	(0.0025)	(0.0029)	(0.0034)	(0.0045)
EU_{dt}	0.0503^a	0.0467^b	0.0416^b	0.0261^b	0.0225	0.0242	-0.0088
	(0.0185)	(0.0198)	(0.0169)	(0.0126)	(0.0183)	(0.0184)	(0.0211)
$OECD_{dt}$	0.0308^b	0.0431^a	0.0426^a	0.0270^a	0.0348^b	0.0274^c	0.0242
	(0.0131)	(0.0144)	(0.0109)	(0.0070)	(0.0148)	(0.0156)	(0.0176)
WTO_{dt}	0.0277^a	0.0348^a	0.0361^a	0.0251^a	0.0299^a	0.0379^b	0.0233
	(0.0101)	(0.0096)	(0.0086)	(0.0057)	(0.0113)	(0.0165)	(0.0184)
RTA_{dt}	-0.0105	-0.0129	-0.0122	-0.0110	0.0072	0.0082	-0.0275
	(0.0160)	(0.0164)	(0.0138)	(0.0081)	(0.0145)	(0.0146)	(0.0175)
	Changes of dt controls are also included in estimations, along with real exchange rate changes						
Firm-Year fixed effects	YES	YES	YES	YES	YES	YES	YES
Observations	154,882	154,882	154,882	154,882	63,330	39,679	23,918
# of Firms	18,366	18,366	18,366	18,366	8,490	5,412	3,323
# of Countries	173	173	173	173	170	167	162
R^2	0.0947	0.1093	0.1072	0.0745	0.0498	0.0551	0.0527

Two-way clustered (country-firm) standard errors in parentheses. ^{abc} indicate the significance of the coefficient, ^{a} p<0.01, ^{b} p<0.05, ^{c} p<0.1. The number of firms and countries reported in the Table correspond to the actual observations used in estimations, i.e., after the xtivreg2 Stata command has dropped singleton groups.

years by 4.9% ($6.9 \times 0.0011/0.1544$).

Predictions 1 and 2 also indicate that these effects should disappear in the long run, when the role of private reputations tends to prevail. Indeed, both effects essentially vanish after 10 years. Predictions 3 and 4 indicate that the effect of institutions and firm experience on conditional survival—that is, the probability that a relationship that has lasted s periods will remain active for k years, $k > s$—should similarly disappear for s sufficiently large. The results in the right panel of Table 3 confirm that. Prediction 4 also asserts that previous experience should have a positive effect on conditional survival for relatively small s. The estimated coefficient for $Experience_{idt}$ for $s=1$ is indeed positive and significant, although not for larger values of s.

Overall, the results for the effect of institutions and firm experience on survival and conditional survival corroborate empirically the predictions from our model.

6.2 Export Growth and Initial Exports in a New Market

Table 4 reports the results of the within estimator applied to the linear model (21) in which we consider as outcome either the (log) initial value of exports in a new market (Exp^0_{idt}) or (log) export growth from entry to year k, $k = 1, 2, 5, 10$ ($Growth^k_{idt}$). Those outcomes are observed upon the realization of an event (entry for Exp^0_{idt} and survival until k for $Growth^k_{idt}$) and raise an issue of selection that we deal with by controlling for a range of observable and (with firm-time fixed effects) unobservable characteristics, as discussed in section 4. The left panel of Table 4 shows the estimation of the initial value of exports, whereas the right panel reports the estimates of export growth. The vector of controls in the case of export growth comprises the same covariates considered for survival and conditional survival.[42] Again, we provide standard errors adjusted for two-way clustering at the firm and country levels.

The estimates of the IQ_{dt} and the $Experience_{idt}$ coefficients in the initial exports regression support Predictions 5 and 6: all else equal, a firm enters into a new export market with higher sales, the greater is the effectiveness of the contracting institutions in the country and the firm's experience in similar foreign markets. Those results suggest that strong institutions and export know-how can be partially understood as a proxy for lower variable costs in the first year of activities in a new market. The effects are neither huge nor trivial. For example, considering the point estimates, if Brazil ($IQ = -0.21$) had institutions like Chile ($IQ = 1.22$), exporters would start their sales to Brazil with a 4.3% higher initial export value. Analogously, a firm

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[42]We report baseline covariates in Table 4; additional covariates estimates are reported in the online Appendix.

Table 4: Export Growth and the Initial Value of Exports in a New Destination

	Initial Value	Growth k Years Upon Entry			
		k = 1	**k = 2**	**k = 5**	**k = 10**
Unconditional log growth	–	0.2669	0.4865	0.7632	1.3057
	The Role of Institutions				
IQ_{dt}	0.0294^a	-0.0248^c	-0.0576^b	-0.1193^a	-0.1221^b
	(0.0081)	(0.0155)	(0.0233)	(0.0366)	(0.0520)
	The Role of Experience				
$Experience_{idt}$	0.0054^b	0.0030^c	0.0025	0.0044	0.0043
	(0.0025)	(0.0017)	(0.0024)	(0.0034)	(0.0049)
	idt, d, and dt Controls				
Exp^0_{idt}	–	-0.4396^a	-0.5043^a	-0.6039^a	-0.7310^a
	–	(0.0219)	(0.0247)	(0.0295)	(0.0301)
$Distw_d$	-0.1283^a	-0.1110^a	-0.1314^a	-0.1795^a	-0.1954^a
	(0.0288)	(0.0255)	(0.0308)	(0.0458)	(0.0599)
$Lang_d$	-0.2041^a	-0.0817^a	-0.0221	-0.1144^b	0.0826
	(0.0786)	(0.0294)	(0.0395)	(0.0560)	(0.0636)
$Colony_d$	0.0722	0.0226	-0.0178	0.1751	0.5155^c
	(0.0554)	(0.0795)	(0.1162)	(0.2251)	(0.2645)
$Border_d$	1.0158^a	0.3448^a	0.3431^a	0.4435^a	0.5115^a
	(0.1471)	(0.0642)	(0.0916)	(0.1222)	(0.1488)
GDP_{dt}	0.0611^a	0.0908^a	0.1398^a	0.2123^a	0.3104^a
	(0.0184)	(0.0116)	(0.0140)	(0.0209)	(0.0255)
EU_{dt}	-0.0698	0.0672	0.1655^c	0.1960^c	0.3186^b
	(0.0444)	(0.0566)	(0.0869)	(0.1095)	(0.1422)
$OECD_{dt}$	-0.0208	-0.0470	-0.0464	-0.0060	-0.1856
	(0.0617)	(0.0434)	(0.0601)	(0.0927)	(0.1320)
WTO_{dt}	-0.0718^b	0.0156	-0.0014	0.0263	0.0186
	(0.0336)	(0.0302)	(0.0429)	(0.0907)	(0.1698)
RTA_{dt}	-0.1141^c	0.0100	0.0396	0.1228	0.1119
	(0.0676)	(0.0454)	(0.0666)	(0.0928)	(0.1373)
	Changes of dt controls are also included in growth estimations, along with real exchange rate changes				
Firm-Year fixed effects	YES	YES	YES	YES	YES
Observations	154,882	63,330	39,679	23,918	12,019
# of Firms	18,366	8,490	5,412	3,323	1,661
# of Countries	173	170	167	162	151
R^2	0.0603	0.1764	0.2166	0.2609	0.3417

Two-way clustered (country-firm) standard errors in parentheses. ^{abc} indicate the significance of the coefficient, ^{a} p<0.01, ^{b} p<0.05, ^{c} p<0.1. The number of firms and countries reported in the Table correspond to the actual observations used in estimations, i.e., after the xtivreg2 Stata command has dropped singleton groups.

that has average experience in similar markets among the new exporters with $Experience_{idt} > 0$ (6.9 markets) would start with sales 3.8% higher than a firm without such experience.

The results from the growth analysis, being (ex-ante) less intuitive, are possibly the most surprising. Prediction 7 states that a firm's export growth to a market in its first k years should be higher, the *lower* the effectiveness of the country's contracting institutions. The first row (columns 2-5) of Table 4 confirms the prediction empirically. The magnitude of the effect is remarkably sizeable: if China had institutions like those in Singapore, export growth of individual firms to China would be around 5% lower after one year, and over 20% lower after 10 years. This result underscores the dynamic effects of institutions on firm exports: initially it unambiguously depresses foreign sales, but as the relationship evolves, privately developed reputations counteract that effect. In fact, our estimates suggest that, if all else were kept constant, the initially negative effect would be quickly *reversed*, so that after two years the average level of exports would already be higher to countries with lower IQ_{dt}, with the difference increasing at longer horizons.[43] Of course, this effect is for surviving exporters, and needs to be weighted against the finding that survival rates increase with IQ_{dt}. It nevertheless highlights the nuanced role that contracting institutions play in international trade.

Finally, recall that the model yields an ambiguous prediction about the net effect of experience on export growth, because better identification of reliable foreign partners boosts export sales both initially and in the future. The empirical results show that the net effect of experience on export growth to a destination is positive and significant after one year, suggesting that at first the effect of previous experience on future export levels dominates its impact on the initial level. Nevertheless, the effect becomes statistically indistinguishable from zero at longer horizons, reflecting the two opposing forces.

6.3 Comparison with Other Variables

To get a better sense of the economic magnitude of our results, we use our point estimates to compare the effects of rule of law and of experience with the effects of distance. Distance is appealing for the comparison for three reasons. First, it is (with GDP) one of the main determinants of aggregate bilateral trade flows. Second, it is likely to be related to sunk and fixed costs of exporting, and therefore should matter for export dynamics.[44] Third, it is indeed

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[43]To see this using our point estimates from Table 4, simply note the negative effect of λ_{dt} on growth k years after entry is greater (in absolute value) than the positive effect of λ_{dt} on the initial level of exports for $k \geq 2$.

[44]See Albornoz et al. (2014) for a discussion of how distance relates to both types of costs and the resulting implications for firm export survival.

highly significant in all of our regressions (unlike GDP).

We consider the effect of a one standard deviation increase in each variable on our outcome variables (for brevity, we show the calculations of one time horizon for each outcome). Table 5 displays the results.

Table 5: % change associated to a one standard deviation increase in *IQ*, *Experience* and *Distance*

	IQ	3.4%
On $Survival_{idt}^{1|0}$	$Experience$	3.3%
	$Distance$	-7.3%
On $Survival_{idt}^{2|1}$	$Experience$	1.0%
	$Distance$	-5.0%
	IQ	3.0%
On Exp_{idt}^{0}	$Experience$	2.0%
	$Distance$	-10.6%
On $Growth_{idt}^{10}$	IQ	-11.6%
	$Distance$	-15.6%

For survival after one year, the effect of distance (in absolute value) is roughly equivalent to the combined effects of institutions and experience in similar markets. Conditionally on surviving one year, the probability of staying another year is much more affected by distance than by experience.[45] For initial exports, the effect of a one standard deviation change in distance is about twice as much the combined effect of a similar change in our variables of interest. On the other hand, for export growth after ten years, the impact of institutions is similar to the effect of distance.

Overall, the message we obtain is that export experience and institutional quality are no panacea. However, they have sizeable influence on firm export dynamics. Although they are not nearly as studied as a determinant of international trade as distance is, their influences on export dynamics, albeit smaller, are of a comparable order of magnitude.

6.4 Robustness

We provide now a battery of supplementary empirical results obtained from restricted samples, a different empirical definition for our institutional variable, different definitions of our experience variable, a stricter definition for entry, and alternative estimations techniques.

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[45]Recall that the theoretical effect of institutions on conditional survival is ambiguous.

First, we consider alternative ways of dealing with unobservables and selection. For survival and conditional survival, we use a conditional fixed effects Logit model instead of the linear probability model with firm-time fixed effects reported in Table 3. Fixed effects are still defined at the firm-time level while standard errors are obtained under the hypothesis of homoscedasticity. Although the coefficients translate less directly into meaningful marginal effects, the conditional fixed effects Logit model has the advantage of dealing more directly with those issues related to the incidental parameters problem in discrete response models.

For the initial value of exports and export growth we use, as an alternative to the fixed effects linear model reported in Table 4, the procedure described in Wooldridge (1995). At the cost of relying on exclusion restrictions, such procedure allows us to deal simultaneously with firm-time correlated unobservables and selection along the firm, time and market dimensions (as opposed to selection along the firm and time dimensions only) within a Heckman-type model. We use as exclusion restrictions in the first stage the extended gravity variables described in Morales et al. (2014). This procedure, which is computationally very demanding, requires the inclusion as additional control variables in the first and second stages the values that each covariate (rule of law, experience, GDP, distance, etc.) takes—for a firm in a given year—in each of the destination markets other than the one referring to a particular observation.

Second, we consider a measure for the institutional variable IQ_{dt} that is more directly related to the enforceability of contracts. Although a broader measure, as we use in the main text, is best to capture a more general interpretation of our model, it is useful to know whether our empirical results hinge on that. Specifically, we now define IQ_{dt} as 6 minus the log of the cost of enforcing a contract as a percent of the debt value.[46] The data come from the World Bank's 2011 Doing Business database.

Third, we investigate whether the different declaration thresholds between EU and non-EU trade data, as well as the varying thresholds across time for EU trade, engender biases in the estimates. In the main text we take a "liberal" stance, using all data available. In contrast, we now deal with this issue as conservatively as possible, by imposing the highest threshold (€1 million) across country groups and time on the original sample and redoing the analysis using the resulting restricted sample.

Fourth, we check whether our results are sensitive to the presence of the initial value of exports in a new market as a covariate, replicating our estimations while excluding such variable.

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[46]This normalization matches the log of the highest cost of enforcing a contract in the data, so that there is a positive value of λ_{dt} for all observations.

Table 6: Survival in a New Export Market: Robustness

	Probability of Survival k Years Upon Entry Conditional on Surviving Until $0 \leq s < k$						
	Survival Prob.: $s=0$				Condit. Survival Prob.: $s>0$		
k	**k = 1**	**k = 2**	**k = 5**	**k = 10**	**k = 2**	**k = 5**	**k = 10**
s	**s = 0**	**s = 0**	**s = 0**	**s = 0**	**s = 1**	**s = 2**	**s = 5**
Conditional Fixed Effects Logit							
IQ_{dt}	0.0621^a	0.0997^a	0.1217^a	0.1293^a	0.0553^b	0.1239^a	-0.0122
	(0.0138)	(0.0158)	(0.0200)	(0.0277)	(0.0246)	(0.0355)	(0.0525)
$Experience_{idt}$	0.0196^a	0.0188^a	0.0209^a	0.0177^a	0.0077^a	0.0085^b	0.0007
	(0.0018)	(0.0019)	(0.0022)	(0.0028)	(0.0028)	(0.0039)	(0.0051)
Alternative Measure for IQ_{dt}							
IQ_{dt}	0.0280^a	0.0220^b	0.0154^b	0.0101^b	0.0161^c	0.0043	0.0092
	(0.0095)	(0.0092)	(0.0076)	(0.0049)	(0.0086)	(0.0101)	(0.0119)
$Experience_{idt}$	0.0038^a	0.0024^a	0.0012^b	-0.0004	0.0013^b	0.0008	-0.0006
	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0006)	(0.0007)
Same Threshold (€1 mil.) for EU & non-EU Exports							
IQ_{dt}	0.0313^a	0.0289^a	0.0239^a	0.0123^a	0.0210^a	0.0221^b	0.0013
	(0.0061)	(0.0062)	(0.0051)	(0.0039)	(0.0063)	(0.0089)	(0.0092)
$Experience_{idt}$	0.0026^a	0.0026^a	0.0017^a	0.0005	0.0013^b	0.0007	-0.0001
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0007)	(0.0009)
Excluding Exp^0_{idt}							
IQ_{dt}	0.0117^b	0.0130^b	0.0094^c	0.0044	0.0110	0.0195^a	0.0030
	(0.0057)	(0.0059)	(0.0048)	(0.0032)	(0.0067)	(0.0071)	(0.0078)
$Experience_{idt}$	0.0041^a	0.0027^a	0.0014^b	-0.0004	0.0016^a	0.0012^c	-0.0005
	(0.0005)	(0.0006)	(0.0006)	(0.0007)	(0.0006)	(0.0006)	(0.0008)
Different Definitions of Entry and Experience							
IQ_{dt}	0.0175^a	0.0115^a	0.0126^a	–	0.0168^a	0.0225^b	–
	(0.0050)	(0.0038)	(0.0033)	–	(0.0059)	(0.0102)	–
$Experience_{idt}$	0.0039^a	0.0026^a	0.0013^a	–	0.0008	0.0010	–
	(0.0007)	(0.0006)	(0.0005)	–	(0.0009)	(0.0012)	–

Two-way clustered (country-firm) standard errors in parentheses. Standard errors are obtained under the hypothesis of homoscedasticity in the case of conditional fixed effects Logit estimations. ^{abc} indicate the significance of the coefficient, ^{a} p<0.01, ^{b} p<0.05, ^{c} p<0.1.

Table 7: Export Growth and the Initial Value of Exports in a New Destination: Robustness

	Initial Value	Growth k Years Upon Entry			
		k = 1	k = 2	k = 5	k = 10
	Wooldridge (1995) Procedure				
IQ_{dt}	0.0208^b	-0.0239^c	-0.0496^b	-0.1494^a	-0.1901^a
	(0.0097)	(0.0129)	(0.0206)	(0.0305)	(0.0511)
$Experience_{idt}$	0.0031^b	0.0047^a	0.0038^c	0.0074^b	0.0123^a
	(0.0013)	(0.0017)	(0.0022)	(0.0034)	(0.0046)
	Alternative Measure for IQ_{dt}				
IQ_{dt}	0.0467^a	-0.0230	-0.0973^a	-0.0746^b	-0.0857^a
	(0.0121)	(0.0272)	(0.0372)	(0.0296)	(0.0298)
$Experience_{idt}$	0.0053^b	0.0031^c	0.0019	0.0066^b	0.0055
	(0.0024)	(0.0017)	(0.0024)	(0.0033)	(0.0051)
	Same Threshold (€1 mil.) for EU & non-EU Exports				
IQ_{dt}	0.0342^a	-0.0081	-0.0681^b	-0.1091^b	-0.1091^c
	(0.0124)	(0.0225)	(0.0284)	(0.0425)	(0.0646)
$Experience_{idt}$	0.0093^a	0.0040^c	0.0046^c	0.0030	-0.0004
	(0.0020)	(0.0021)	(0.0027)	(0.0037)	(0.0048)
	Excluding Exp_{idt}^0				
IQ_{dt}	$-$	-0.0092	-0.0382^b	-0.1068^a	-0.1140^b
	$-$	(0.0169)	(0.0161)	(0.0402)	(0.0532)
$Experience_{idt}$	$-$	0.0006	-0.0012	-0.0010	-0.0053
	$-$	(0.0017)	(0.0027)	(0.0040)	(0.0056)
	Different Definitions of Entry and Experience				
IQ_{dt}	0.0345^c	-0.0561^a	-0.0878^a	-0.0578^c	$-$
	(0.0198)	(0.0207)	(0.0310)	(0.0288)	$-$
$Experience_{idt}$	0.0145^a	0.0040	0.0080^b	0.0038	$-$
	(0.0028)	(0.0026)	(0.0034)	(0.0068)	$-$

Two-way clustered (country-firm) standard errors in parentheses. ^{abc} indicate the significance of the coefficient, ^{a} p<0.01, ^{b} p<0.05, ^{c} p<0.1.

Fifth, we adopt different definitions for $Entry_{idt}$ and $Experience_{idt}$. In the benchmark estimations, $Entry_{idt} = 1$ if firm i exports to destination d in year t but not in year $t-1$, where $t = 1996, 1997, 1998$. This definition of entry is standard in the literature and also has the advantage of allowing for the longest possible time span over which we can study firm export dynamics. However, it overrepresents entry, since there are firms that export to a destination in $t-2$ and t, but not in $t-1$, in which case the firm is not really "new" in the market in year t. Although avoiding this problem entirely is impossible, we now tighten the definition as follows: $Entry_{idt} = 1$ if firm i exports to destination d in year t but not in any year between $t-1$ and $t-5$. In this case we focus on the 2000, 2001 and 2002 entrants cohorts, so we can identify firm presence in a market five years before the analysis starts. Thus, the only "reentrants" we still capture in this definition are those that have been out of the market for more than five years. The number of such firms is likely to be small and, in any case, it is probably appropriate to treat a firm as "new" in a destination if it has not served it for more than 5 years. For analogous reasons, we also broaden the variable $Experience_{idt}$ to consider not only the similar countries to which firm i exported to in year $t-1$, but also those served between years $t-5$ and $t-1$.

In Tables 6 (for survival and conditional survival) and 7 (for the initial value of exports and export growth), we show the estimates of the coefficients on our variables of interest for the variations of our main specification discussed above. In each of those variations, the predictions from our model are similarly upheld. In some of them the statistical significance of the coefficient estimates of our variables of interest is somewhat higher than in the benchmark regressions (e.g. in the survival analysis under conditional logit), while in others it is lower than in the benchmark (e.g. in the conditional survival analysis under the stricter definition of entry). Similarly, the value of the estimated coefficients fluctuates slightly up or down depending on the specification. The general message from the estimates is nevertheless unchanged, providing evidence for the robustness of our findings.

Now, in our measure of export experience, we seek to capture the notion of previous knowledge of similar markets, motivated by recent contributions such as Albornoz et al. (2012) and Morales et al. (2014). A potential concern is that other, similarly sensible definitions of export experience may yield different results. To check whether our results are robust to the exact form of that variable, we rerun our benchmark regressions with alternative ways of representing export experience. First, we add the square of the original definition to capture possible nonlinearities. Second, we use instead the log of our original definition (added by 1). Third, we add the variable $ShareExperience_{idt}$ to measure the share of destinations similar to

Table 8: Survival in a New Export Market: Robustness with respect to experience

	Probability of Survival k Years Upon Entry Conditional on Surviving Until $0 \leq s < k$						
	Survival Prob.: $s=0$				Condit. Survival Prob.: $s>0$		
k	k = 1	k = 2	k = 5	k = 10	k = 2	k = 5	k = 10
s	s = 0	s = 0	s = 0	s = 0	s = 1	s = 2	s = 5
	Experience and Experience Square						
IQ_{dt}	0.0144^a	0.0153^a	0.0111^a	0.0051^c	0.0131^b	0.0217^a	0.0039
	(0.0051)	(0.0052)	(0.0043)	(0.0029)	(0.0063)	(0.0070)	(0.0078)
$Experience_{idt}$	0.0058^a	0.0041^a	0.0026^a	-0.0003	0.0030^a	0.0032^a	-0.0003
	(0.0009)	(0.0009)	(0.0009)	(0.0010)	(0.0010)	(0.0012)	(0.0012)
$Experience^2_{idt}$	-0.0000^a	-0.0000^a	-0.0000^b	-0.0000	-0.0000^b	-0.0000^b	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	Log of Experience						
IQ_{dt}	0.0149^a	0.0152^a	0.0110^a	0.0051^c	0.0127^b	0.0219^a	0.0042
	(0.0051)	(0.0051)	(0.0042)	(0.0029)	(0.0063)	(0.0070)	(0.0077)
$Log\,(1+Experience_{idt})$	0.0349^a	0.0196^a	0.0106^b	-0.0025	0.0131^b	0.0169^b	-0.0027
	(0.0048)	(0.0046)	(0.0046)	(0.0059)	(0.0053)	(0.0066)	(0.0078)
	Experience and Share of Experience						
IQ_{dt}	0.0146^a	0.0154^a	0.0112^a	0.0055^c	0.0129^b	0.0211^a	0.0040
	(0.0051)	(0.0052)	(0.0043)	(0.0030)	(0.0062)	(0.0069)	(0.0078)
$Experience_{idt}$	0.0017^a	0.0008	-0.0003	-0.0015^b	0.0004	0.0003	-0.0012
	(0.0005)	(0.0005)	(0.0006)	(0.0007)	(0.0006)	(0.0007)	(0.0009)
$Share\;Experience_{idt}$	0.2408^a	0.1952^a	0.1700^a	0.1165^a	0.1541^a	0.1330^b	0.1058
	(0.0289)	(0.0250)	(0.0220)	(0.0210)	(0.0516)	(0.0636)	(0.0957)
	Experience and Dummy for Experience						
IQ_{dt}	0.0141^a	0.0148^a	0.0106^b	0.0050^c	0.0122^c	0.0207^a	0.0034
	(0.0050)	(0.0051)	(0.0042)	(0.0029)	(0.0063)	(0.0070)	(0.0078)
$Experience_{idt}$	0.0034^a	0.0023^a	0.0011^b	-0.0005	0.0013^b	0.0009	-0.0006
	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0006)	(0.0008)
$Dummy\;Experience_{idt}$	0.0197^a	0.0039	0.0012	-0.0024	0.0019	0.0062	-0.0108
	(0.0065)	(0.0068)	(0.0061)	(0.0055)	(0.0086)	(0.0100)	(0.0134)

Two-way clustered (country-firm) standard errors in parentheses. ^{abc} indicate the significance of the coefficient, ^{a} p<0.01, ^{b} p<0.05, ^{c} p<0.1.

Table 9: Export Growth and the Initial Value of Exports in a New Destination: Robustness with respect to experience

	Initial Value	Growth k Years Upon Entry			
		k = 1	k = 2	k = 5	k = 10
Experience and Experience Square					
IQ_{dt}	0.0270^a	-0.0214	-0.0537^b	-0.1122^a	-0.1129^b
	(0.0080)	(0.0161)	(0.0233)	(0.0362)	(0.0518)
$Experience_{idt}$	0.0121^a	0.0101^a	0.0095^b	0.0165^a	0.0173^b
	(0.0037)	(0.0032)	(0.0047)	(0.0063)	(0.0085)
$Experience_{idt}^2$	-0.0001^a	-0.0001^b	-0.0001	-0.0002^b	-0.0002^b
	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Log of Experience					
IQ_{dt}	0.0259^a	-0.0179	-0.0478^b	-0.1026^a	-0.1050^b
	(0.0081)	(0.0161)	(0.0233)	(0.0367)	(0.0517)
$Log\ (1+Experience_{idt})$	0.0710^a	0.0788^a	0.0877^a	0.1394^a	0.1332^b
	(0.0221)	(0.0182)	(0.0224)	(0.0331)	(0.0545)
Experience and Share of Experience					
IQ_{dt}	0.0273^a	-0.0216	-0.0543^b	-0.1168^a	-0.1190^b
	(0.0079)	(0.0161)	(0.0231)	(0.0363)	(0.0518)
$Experience_{idt}$	0.0016	-0.0015	-0.0024	0.0001	0.0009
	(0.0028)	(0.0018)	(0.0027)	(0.0042)	(0.0056)
$Share\ Experience_{idt}$	0.4622^a	0.7236^a	0.8973^a	0.8443^b	0.7129
	(0.1219)	(0.1440)	(0.2284)	(0.3408)	(0.5514)
Experience and Dummy for Experience					
IQ_{dt}	0.0280^a	-0.0213	-0.0519^b	-0.1130^a	-0.1158^b
	(0.0080)	(0.0161)	(0.0229)	(0.0364)	(0.0515)
$Experience_{idt}$	0.0045^c	0.0017	0.0008	0.0026	0.0023
	(0.0025)	(0.0017)	(0.0024)	(0.0035)	(0.0047)
$Dummy\ Experience_{idt}$	0.0558	0.1114^a	0.1595^a	0.1707^b	0.1916^c
	(0.0389)	(0.0343)	(0.0497)	(0.0784)	(0.0984)

Two-way clustered (country-firm) standard errors in parentheses. ^{abc} indicate the significance of the coefficient, ^{a} p<0.01, ^{b} p<0.05, ^{c} p<0.1.

Table 10: Cox Proportional Hazard regression. Dependent variable: duration of exports of a firm in a particular country. Observations start in 1995 and censoring of data applies in 2008

IQ_{dt}	0.3287^a
	(0.0028)
IQ_{dt} X Duration	-0.1115^a
	(0.0010)
$Experience_{idt}$	0.0226^a
	(0.0007)
$Experience_{idt}$ X Duration	-0.0129^a
	(0.0005)
Exp^0_{idt}	0.0015
	(0.0014)
$Distw_d$	-0.0194^a
	(0.0018)
$Lang_d$	0.0132^a
	(0.0029)
$Colony_d$	-0.3989^a
	(0.0225)
$Border_d$	-0.0812^a
	(0.0040)
GDP_{dt}	-0.0787^a
	(0.0011)
EU_{dt}	-0.2561^a
	(0.0044)
$OECD_{dt}$	0.1149^a
	(0.0043)
WTO_{dt}	-0.0342^a
	(0.0057)
RTA_{dt}	-0.0832^a
	(0.0036)
Firm controls	YES
Observations	1,140,751
No. of exits	874,583
Time at risk	3,320,105
No. of Clusters	140,354

Coefficients are reported here instead of hazard ratios. Firm controls, not reported here in order to save space, include firm log labour productivity, log capital intensity, log skill intensity, log employment and a dummy indicating whether a firm is foreign owned and/or a multinational. Firm-level clustered standard errors in parentheses.[abc] indicate the significance of the coefficient, [a] $p<0.01$, [b] $p<0.05$, [c] $p<0.1$.

d, among all those previously served by firm i upon entry in d. Fourth, we add the variable $DummyExperience_{idt}$ to capture whether firm i had any experience in similar markets when entering in d, to see whether the effects are restricted to the extensive margin of experience.

The results are in Tables 8 and 9. They show that, indeed, nonlinearities are at work and the model performs actually better in terms of significance by either adding the square of experience or by using the log of experience instead of experience. Furthermore, simple variables like the share of similar markets previously served and the dummy for experience already capture a lot of relevant information. Yet, the number of countries in which the firm has experience still retains some explanatory power. Given the signs, magnitudes and significance of the different coefficients we conclude that the importance of export experience for the dynamics in a new market is unequivocal and largely unaffected by the exact way in which it is measured.

Using a linear probability model for the survival analysis, as we do, has the advantage of allowing for a simple way to address unobserved heterogeneity. Leaving the issue of unobserved heterogeneity aside, a more natural approach would be to estimate a hazard model where the key variables are the institutional and experience variables, alone and interacted with the duration of the relationship. We provide such estimates in Table 10, where we employ a Cox Proportional Hazard model using the whole available time span, 1995-2008. We confirm that the effect of both institutional quality and export experience on survival is positive, and that it decreases with duration. The direct effects and the interactions with duration are all estimated very precisely.

Finally, in the online Appendix (Tables A-3 and A-4) we show the results after controlling for two additional variables: (1) the capital abundance of the destination country[47]; and (2) a measure of the degree of differentiation of the products exported by a firm in a new market in the year of entry, based on Nunn (2007).[48] Again, results are broadly consistent with our benchmark estimations.

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[47]Capital abundance of country d is measured by the log of the capital/labor ratio as provided by Hall and Jones (1999).

[48]Nunn (2007) and subsequent papers show that there is a close relationship between the quality of the institutions of a country and the degree of complexity of the production process of its traded products. Such a relationship could potentially bias our results. Following his approach, we assign each CN8 product code as being either homogeneous (sold on an organized exchange) or not, according to Rauch's (1999) liberal definition. We then compute the share of non-homogeneous products a firm exports to a given market using the export sales of all of its products in the year of entry as weights. Observe that, due to the firm-year fixed effects, we already control for different firms selling different products to different markets. The potential bias still left in the data is thus only related to the *same* firm selling different products to different markets, which we deal with by means of the product control just described.

7 Concluding Remarks

Recent research has highlighted the significant changes exporting firms go through in their foreign destinations—high entry and exit rates, large swings in destination-specific sales—but which had for a long time been eclipsed by the relative stability of aggregate trade flows. We still know very little, however, about the factors that shape this dynamic pattern. A separate line of research has shown that countries' contracting institutions matter for the level and structure of aggregate trade flows. There have not been, however, attempts at understanding how, or whether, institutions shape the dynamics of exporting firms. In this paper we do precisely that, bringing together and extending the insights from those distinct literatures. We show that, comparing two otherwise identical countries, a firm exporting to them will tend to start with higher volumes and serve for a longer period the country that is similar to others where the firm has previous experience and/or has stronger institutions. However, if the firm keeps serving both destinations, its export growth will be higher to the country with *weaker* institutions. Thus, (weak) contracting institutions represent not simply an extra trade cost such as a higher tariff, as is often suggested. They also affect the dynamics of exporting firms in fundamental ways—as if firms' marginal cost of exporting changed overtime depending on their export experience and on the type of market that they serve.

We generate these and other predictions in the context of a simple model designed to highlight the essential features of the mechanism we want to study. The model builds on the idea that exporting firms typically need to rely on foreign partners who may act opportunistically. We argue that strong institutions limit the scope for opportunistic behavior and that experienced firms are able to choose their partners better. Still, as long as the problems created by incomplete information are not fully eliminated, forward-looking agents will seek to mitigate them by building private reputations within their relationships. We develop this logic to study the evolution of the relationships between exporters and local importers in order to reach final consumers. A similar logic would extend to interactions in the context of production sharing and other deeper relationships. A key insight from the analysis is that strong institutions help to insulate exporters from the "bad type" problem, but also limit the extent of learning through repeated interactions.

We test our predictions using a rich firm-destination-level panel of Belgian exporters serving virtually all countries in the world over 14 years. We identify our parameters using firm-year fixed effects, which allow us to control for all firm-level characteristics, including those that change over time and/or are typically unobservable. We find strong support for our theoretical

43

predictions.

Understanding the dynamic behavior of exporting firms is central to fully comprehend the welfare implications of international trade flows. As Eaton et al. (2008) show for Colombian firms, new exporters generally contribute little to aggregate exports and display high failure rates, but over several years the successful new exporters account for almost half of total export growth. As our analysis makes clear, this dynamic pattern is very different across markets, with potentially important consequences for aggregate trade flows, as well as for trade policies.

Our model and its predictions concern a general problem that arises when firms seek to serve a new foreign market. Naturally, they should apply differently to different sectors and firms. Furthermore, when the problem is serious enough, it should also prompt the affected firms to take other actions to mitigate it. We observe the "net effect" after any such action is implemented, and in that sense our main estimates provide only a lower bound for its severity. A much closer scrutiny is necessary to give us a fuller view of how weak institutions and lack of experience affect the dynamics of firms in foreign markets and the actions they take (or not) to mitigate that difficulty. The flexible structure of our model is amenable to several extensions in this vein, in ways that would be testable with existing firm-level datasets. We look forward to future research in this direction.

Appendix

Proof of Lemma 1. Since $Q(\theta, e)$ maximizes $\pi(q, \theta, e; \lambda, c, \kappa)$, it must be the quantity established in any contract. Now let "0" denote the event "no default" and $v(\theta, e)$ the value function of a producer with experience e in a partnership with a distributor with reputation $1 - \theta$. At any date, if a producer who is not in a partnership finds a match and decides to take this opportunity, he obtains

$$v(\theta_0, e) = \pi(\theta_0, e) + \beta_e \Pr(0 \mid \theta_0) v(\theta_1, e). \tag{22}$$

We can rewrite $v(\theta_0, e)$ as

$$v(\theta_0, e) = \pi(\theta_0, e) + \sum_{i=1}^{\infty} (\beta_e)^i \prod_{j=0}^{i-1} \Pr(0 \mid \theta_j) \pi(\theta_i, e). \tag{23}$$

Since

$$\prod_{j=0}^{i-1} \Pr(0 \mid \theta_j) = \prod_{j=0}^{i-1} (1 - \theta_j + \theta_j \lambda) = \prod_{j=0}^{i-1} \left(\frac{1 - \theta_0 + \lambda^{j+1}\theta_0}{1 - \theta_0 + \lambda^j \theta_0} \right) = 1 - \left(1 - \lambda^i\right) \theta_0,$$

44

we can rewrite (23) as

$$v(\theta_0, e) = \pi(\theta_0, e) + \sum_{i=1}^{\infty} (\beta_e)^i \left[1 - \left(1 - \lambda^i\right)\theta_0\right] \pi \left(\frac{\lambda^i \theta_0}{\lambda^i \theta_0 + 1 - \theta_0}, e\right).$$

Note that

$$v(0, e) = \frac{\pi(0, e)}{1 - \beta_e} > 0$$

and

$$v(1, e) = \frac{\pi(1, e)}{1 - \beta_e \lambda} < 0.$$

We now show that $\frac{\partial v(\theta_0, e)}{\partial \theta_0} < 0$. First note that, for all periods $i \in \{0, 1, 2, ...\}$, (1) and (4) imply

$$\frac{\partial \pi \left(\frac{\lambda^i \theta_0}{\lambda^i \theta_0 + 1 - \theta_0}, e\right)}{\partial \theta_0} = \frac{\partial \pi}{\partial \frac{\lambda^i \theta_0}{\lambda^i \theta_0 + 1 - \theta_0}} \frac{\partial \frac{\lambda^i \theta_0}{\lambda^i \theta_0 + 1 - \theta_0}}{\partial \theta_0} = \frac{-(1 - \lambda) R[Q(\frac{\lambda^i \theta_0}{\lambda^i \theta_0 + 1 - \theta_0}, e)] \lambda^i}{(1 - \theta_0 + \lambda^i \theta_0)^2} < 0.$$

Since, for all $i \in \{0, 1, 2, ...\}$, $[1 - (1 - \lambda^i)\theta_0]$ is decreasing in θ_0, it must be that $\frac{\partial v(\theta_0, e)}{\partial \theta_0} < 0$. As a result, there exists a unique $\bar{\theta}(e) \in (0, 1)$ such that $v(\bar{\theta}, e) = 0$. Thus, if $\theta_0 < \bar{\theta}(e)$ we have that $v(\theta_0, e) > 0$ and it is optimal to enter a partnership. Otherwise, it is not. Finally, if a producer observes a default, his posterior belief becomes 1; since $v(1, e) < 0$, he terminates the partnership. If the producer does not observe a default, he increases the belief that the distributor is patient; since $v(\theta, e)$ is strictly decreasing in θ, he keeps the partnership. ∎

Proof of Lemma 2. Since the producer pays the cost of production, it is always optimal for the distributor to participate in a partnership. Moreover, since an unmatched distributor faces a stationary problem, she wants to form a partnership with the first producer she meets. Consider then an ongoing partnership that has lasted for k periods. The distributor follows the prescribed strategy and does not default even if he has the opportunity to do so if and only if

$$\frac{\kappa}{1 - \beta_d} \geq \kappa + R\left[Q\left(\theta_k, e\right)\right],$$

which can be rewritten as

$$\frac{\beta_d}{1 - \beta_d}\kappa \geq R\left[Q\left(\theta_k, e\right)\right]. \tag{24}$$

A sufficient condition for (24) is

$$\frac{\beta_d}{1 - \beta_d}\kappa \geq R\left[Q\left(0, e\right)\right].$$

Conversely, a sufficient condition ensuring that a distributor always has an incentive to default is

$$\frac{\beta_d}{1 - \beta_d}\kappa \leq R\left[Q\left(1, e\right)\right].$$

Thus, there is a unique value $\underline{\beta_d}(e) \in \left(\frac{R[Q(1,e;\lambda,c)]}{R[Q(1,e;\lambda,c)]+\kappa}, \frac{R[Q(0,e;\lambda,c)]}{R[Q(0,e;\lambda,c)]+\kappa} \right)$ such that a patient distributor never defaults if and only if $\beta_d \geq \underline{\beta_d}(e)$. ∎

Proof of Prediction 7. We can express export growth from period t to period $t+k$ as $(\ln Q_k - \ln Q_0)$. It is affected by λ as follows:

$$\frac{\partial (\ln Q_k - \ln Q_0)}{\partial \lambda} = -\frac{R_q(Q_k, e)\frac{\partial \gamma_k}{\partial \lambda}}{R_{qq}(Q_k, e)Q_k \gamma_k} + \frac{R_q(Q_0, e)\frac{\partial \gamma_0}{\partial \lambda}}{R_{qq}(Q_0, e)Q_0 \gamma_0}.$$

This expression is negative if and only if

$$\frac{\frac{\partial \gamma_k}{\partial \lambda}\frac{1}{\gamma_k}}{\frac{\partial \gamma_0}{\partial \lambda}\frac{1}{\gamma_0}} < \frac{R_q(Q_0, e)R_{qq}(Q_k, e)Q_k}{R_q(Q_k, e)R_{qq}(Q_0, e)Q_0}. \tag{25}$$

If Condition 1 holds, the right-hand side of (25) is greater than or equal to 1 and inequality (25) is always satisfied if

$$\frac{\partial \gamma_k}{\partial \lambda}\frac{1}{\gamma_k} < \frac{\partial \gamma_0}{\partial \lambda}\frac{1}{\gamma_0}.$$

Since $\gamma_k > \gamma_0$, it suffices to show that

$$\frac{\partial \gamma_k}{\partial \lambda} - \frac{\partial \gamma_0}{\partial \lambda} < 0,$$

which is true from (17). ∎

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