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Financial development and the choice of trade partners

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ABSTRACT

What determines the choice of countries' trade partners? We show theoretically and empirically that financial market imperfections affect the number and identity of exporters' destinations. Bigger economies with lower trade costs are more attractive markets because they offer higher export profits. This generates a pecking order of destinations such that firms serve all countries above a cut-off level of market potential. Credit constraints, however, raise this cut-off above the first best. Financially more advanced nations thus have more trade partners and go further down the pecking order, especially in sectors that rely heavily on the financial system. Our results provide new, systematic evidence that countries follow a hierarchy of export destinations, that market size and trade costs determine this hierarchy, and that financial frictions interact importantly with it. This has policy implications for the effects of cross-border linkages that depend on the number and identity of countries' trade partners.

1. Introduction

For many developing countries, international trade contributes significantly to aggregate output and economic growth. Exporting provides access to a bigger consumer market, enabling firms to expand production, increase domestic employment and reap higher profits. This can in turn boost firms' productivity by allowing them to benefit from scale economies under existing manufacturing practices, as well as to invest in innovation and technology upgrading. The very exposure to international know-how and the frequent use of imported inputs in production for foreign countries can mediate productivity spillovers across borders. Aside from raising income levels and growth rates, exporting can also reduce volatility over time. By diversifying across multiple consumer markets, exporters may be able to hedge fluctuations in country-specific demand and insure against downturns at home.

These arguments suggest that being able not only to export more, but also to sell to more destinations matters for aggregate welfare. In practice, successful economies indeed boast high exports to many destinations. For example, countries with more trade partners in 1985 exported substantially more over the next 10 years (Fig. 1). They attained faster average annual growth in both exports and GDP per capita (Fig. 2a and b). They also experienced less volatility, as reflected in lower standard deviations of these growth rates over time (Fig. 3a and b). As the regressions in Appendix Table A.1 show, these correlations are not driven by cross-country differences in initial export volumes in 1985. While faster growth in the number of export destinations is not associated with faster income or export growth in the raw data (Fig. 4a and b), it is when catch-up effects are taken into account in regressions controlling for initial trade activity (Appendix Table A.1).

These patterns indicate that it is important to understand what determines countries' ability to establish more trade links. Among other things, financial development appears strongly positively correlated with exporters' destination count (Fig. 5).

This paper examines the effect of financial market imperfections on the number and characteristics of exporters' trade partners. Because market size and trade costs vary across countries, bigger economies with lower trade costs are relatively more profitable export targets. This generates a pecking order of destinations based on their market potential. In the absence of credit constraints, firms export to all

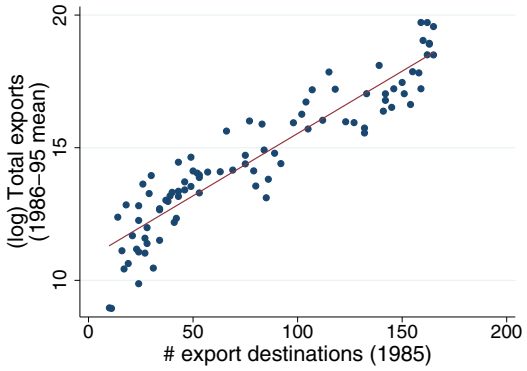

Fig. 1. Export partners and total exports. Slope (t-stat) of the fitted line: 0.047 (23.1). $N = 90$.

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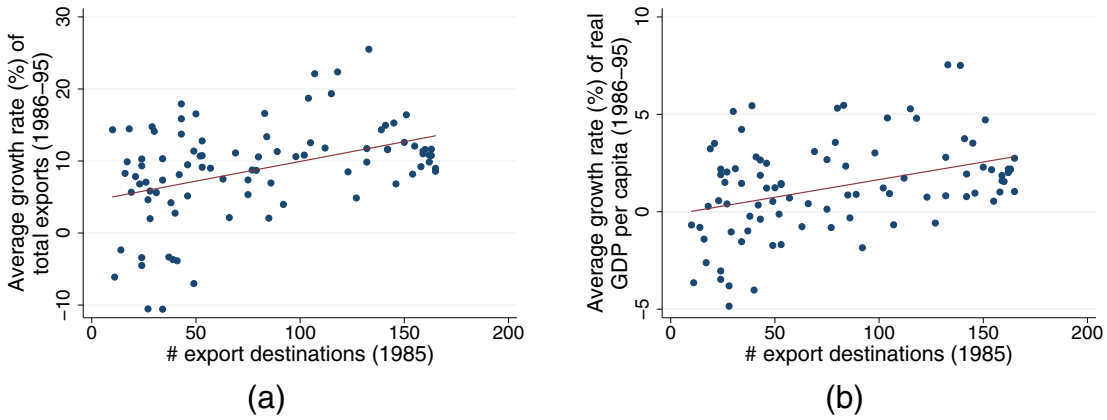

Fig. 2. (a) Export partners and growth rate of total exports; (b) export partners and growth rate of GDP per capita. Slope (t-stat) of the fitted line: (a) 0.054 (4.2); (b) 0.018 (3.8). $N = 90$.

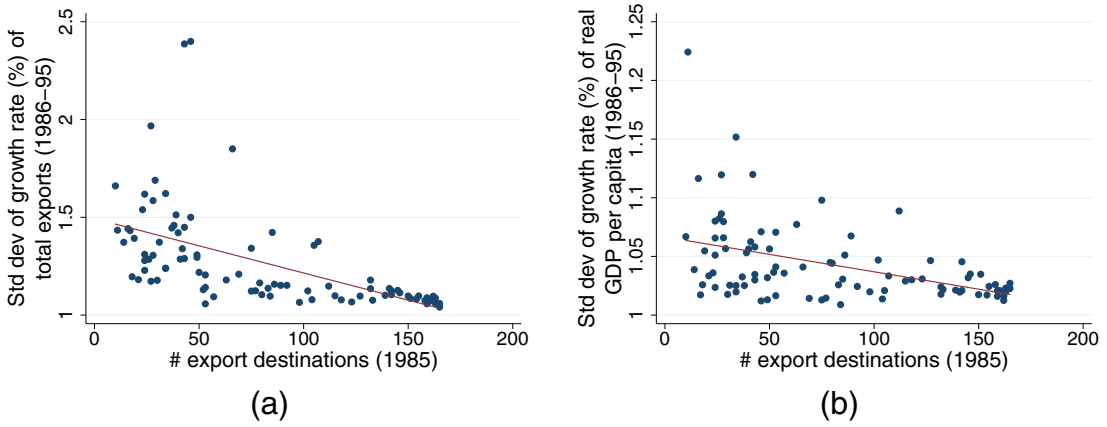

Fig. 3. (a) Export partners and std. dev. of growth rate of total exports; (b) export partners and std. dev. of growth rate of GDP per capita. Slope (t-stat) of the fitted line: (a) −0.003 (−6.2); (b) −0.0003 (−4.6). $N = 90$.

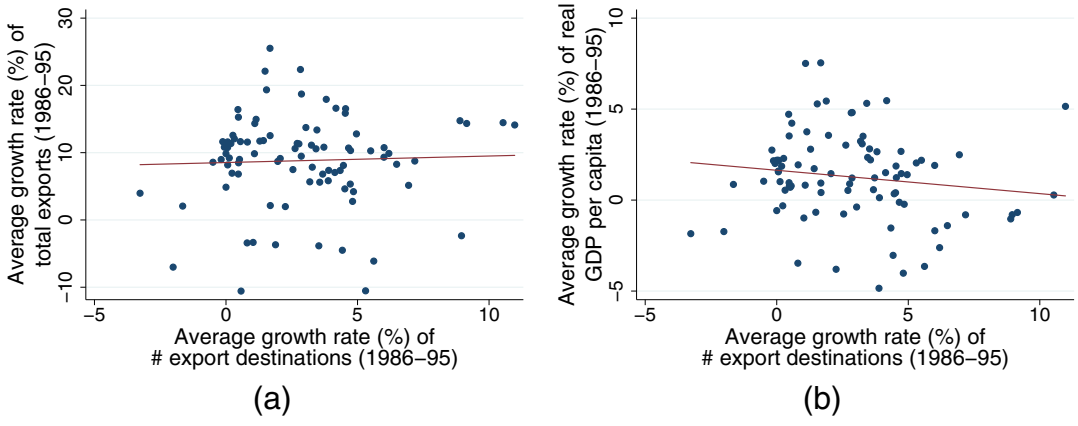

Fig. 4. (a) Growth rate of number of export partners and growth rate of total exports; (b) growth rate of number of export partners and growth rate of real GDP per capita. Slope (t-stat) of the fitted line: (a) 0.097 (0.37); (b) −0.128 (−1.37). $N = 90$.

destinations above a cut-off level of market potential. Financial frictions, however, raise this cut-off and prevent firms from serving some markets that they would otherwise have entered in the first best. Financially developed nations thus have more trade partners and go further down the pecking order of destinations, especially in sectors that rely more heavily on the financial system.

We study these questions formally by extending the theory developed in Manova (2013). In the model, heterogeneous firms incur trade costs in each market they enter. They face liquidity problems and require outside funding for a fraction of these costs, which they can raise by pledging collateral. Financial contracts are imperfectly enforced and creditors face default risks. Producers are thus unable to pursue all profitable export opportunities because they have limited access to capital. Instead, companies optimally add destinations in decreasing order of profitability until they exhaust their financial resources. Aggregating across firms, this implies that credit constraints restrict countries' number of trade partners to suboptimal levels and change the composition of these trade partners.

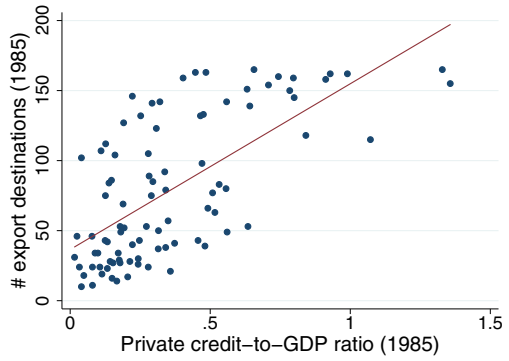

Fig. 5. Private credit and export partners. Slope (t-stat) of the fitted line: 118.4 (8.5). $N = 90$.

The theory illustrates how these distortions vary systematically across exporting countries and sectors. The strength of financial contractibility depends on how developed the exporter's financial institutions are. Firms' need for external finance and availability of collateralizable assets differ across industries for technological reasons, exogenous from the perspective of individual producers. Hence while all countries can export to the most attractive destinations in the world, financially advanced countries also sell to economies with less market potential. Importantly, these effects are more pronounced in sectors that require more external capital and in sectors that are endowed with fewer tangible assets.

We provide strong empirical support for these predictions using panel data on bilateral trade for 78 export countries and 27 industries in 1985–1995. We first derive model-consistent estimating equations that relate characteristics of an exporter's destination countries to its number of destinations and credit conditions at home. We then develop a model-consistent ranking of destinations by market potential, and record the highest and lowest destination market potential among an exporter's trade partners. In line with the theory, we document no systematic variation in the maximum value across export countries and industries. By contrast, the minimum value falls with the exporter's level of financial development disproportionately faster in financially more vulnerable sectors. In other words, financially more advanced exporters go further down the pecking order in such sectors and are able to service lower-ranked destinations. Indeed, once we control for the number of destinations, we find that it fully explains the minimum destination market potential, and there is no residual direct effect of financial conditions. As further evidence that financial frictions do not reposition economies in the pecking order and that export countries follow this pecking order without gaps, we present consistent results for destinations at every 5th percentile in the distribution of countries' export markets.

These results have two key implications. First, they indicate that there exists a hierarchy of destinations that exporters observe which is stable across exporting countries, and that this hierarchy is governed by market size and trade costs in specific ways. Second, they show how credit constraints interact with this pecking order, intensify its relevance to export decisions, and ultimately affect the choice (both number and identity) of countries' trade partners. While the latter is the main focus of our study, the former is a side product of the analysis.

Our empirical strategy relies on exploiting the variation in financial development across export economies and in financial vulnerability across sectors. Following common practice, we measure the former with countries' private credit, and the latter with sectors' external finance dependence and sectors' asset tangibility.[1] Since financial development is correlated with other country characteristics that could influence export activity, interpreting its direct effect as causal is problematic. It can also become theoretically ambiguous in general equilibrium. On the other hand, the differential effect of financial development across industries survives in general equilibrium and cannot easily be attributed to alternative explanations. For this reason, this difference-in-difference approach has been widely used in the literature as a means of establishing a causal effect of credit constraints on various economic outcomes. It permits the inclusion of a rigorous set of control variables such as Heckscher–Ohlin sources of comparative advantage, country and sector fixed effects. We further ensure that our results do not capture the role of overall development or other institutions by controlling for the interactions of GDP per capita, rule of law and corruption with the sector measures of financial vulnerability.

We propose two methodologies to gauge destinations' relative position in the pecking order. We first examine different proxies for market size and trade costs as the sole determinants of destinations' desirability. We then pursue an alternative approach, which remains agnostic about the exact drivers of market potential and is based on the principle of revealed preferences: If a market is particularly attractive and profitable, more exporters will enter it. The number of nations selling to a given country thus implicitly signals its market potential. By the same logic, we also adopt a semi-structural two-stage estimation technique. In the first stage, we run a probit regression of an indicator for positive bilateral exports on exporter, importer and sector fixed effects. We use the coefficients on the importer dummies from this regression as an index of market desirability in the second stage. We find robust results consistent with the model's predictions both with the direct and with the agnostic measures of market potential.

Our findings extend three lines of research in the prior literature. We advance a large literature that seeks to understand why the incidence and magnitude of cross-border transactions vary substantially across countries, sectors and firms. At the aggregate level, about half of all country pairs conduct no bilateral trade, and another 15% initiate only one-way flows (Helpman et al., 2008). At the micro level, export sales are highly concentrated in a few large and productive firms that ship to many countries (Bernard et al., 2007). These patterns can be explained if economies differ in their market potential and exporters observe a pecking order of destinations. While recent work-horse models of international trade incorporate this feature, however, they can have opposing implications as to which country characteristics determine market potential and how. For example, bigger destinations rank higher in the pecking order in Melitz (2003), but lower in Melitz and Ottaviano (2008) and Eaton and Kortum (2002). Separately, Armenter and Koren (2014) present a random-assignment model of "balls" (i.e. export transactions) to "bins" (i.e. export markets), in which a pecking order arises atheoretically, rather than because firms purposefully add destinations in decreasing order of profitability.

Despite this theoretical interest, the pecking order hypothesis has received little attention in the empirical literature to date, with mixed results. Eaton et al. (2011a) show that French companies with more export destinations tend to enter less popular markets, i.e. countries served by fewer manufacturers. However, there are significant deviations from a uniform pecking order across firms, which Eaton et al. (2011a) rationalize with idiosyncratic firm-destination specific export cost and demand draws. In cross-country data, Helpman et al. (2008) find that bigger market sizes and lower trade costs increase the probability of bilateral trade on average, but do not examine whether exporting countries observe a hierarchy of destinations without gaps. It has thus remained an open empirical question whether there is a stable pecking order of exporting at the aggregate level and what factors govern it. Our analysis is one of the first to provide systematic evidence that countries do follow a (common) hierarchy of destinations, that bigger market size and lower trade costs raise destinations in this

[1] "Private credit" is the amount of credit extended to the private sector as a share of GDP. "External finance dependence" is the share of capital expenditures not financed from internal cash flows from operations. "Asset tangibility" is the share of plant, property and equipment in total assets. See Section 4 for more details.

hierarchy, and that financial frictions interact nontrivially with it.[2] In the process, we develop a methodology for obtaining agnostic, comprehensive measures of market potential from observable data that can be applied to other contexts, such as testing models with and without a pecking order of products within multi-product firms (e.g. Bernard et al., 2011; Dhingra, 2013; Mayer et al., 2014).

Most directly, this paper adds to the growing body of work at the intersection of international trade and corporate finance (c.f. Foley and Manova, forthcoming). A number of theoretical models have examined the mechanisms through which credit constraints disrupt trade activity (e.g. Feenstra et al., forthcoming; Manova, 2013). These frameworks have illustrated that financially developed countries have a comparative advantage in financially vulnerable sectors. They have also emphasized the heterogeneous impact of imperfect capital markets across firms. On the empirical side, evidence indicates that credit constraints impede firms' export operations and distort aggregate trade flows, both in normal times and during crisis episodes (e.g. Amiti and Weinstein, 2011; Berman and Héricourt, 2010; Bricongne et al., 2012; Chor and Manova, 2012; Feenstra et al., forthcoming; Manova, 2013; Minetti and Zhu, 2011).

Our contribution to this literature is in identifying a novel dimension of global commerce that is affected by credit market imperfections: the choice of countries' trade partners. Of note, Manova (2013) establishes theoretically and empirically that (i) financially developed countries export to more destinations in financially more vulnerable sectors. We complement this result by showing theoretically and empirically that (ii) financial development operates by allowing exporting nations to go further down the pecking order of destinations. Importantly, while our theoretical predictions follow directly from the Manova (2013) framework which we extend, our empirical findings are not automatically implied by hers because pattern (i) can obtain in alternative trade models with financial frictions that do not generate pattern (ii). What guarantees (ii) is that credit constraints do not change the ranking of destinations in the pecking order and do not cause gaps in the order in which destinations are added. These features are, however, sensitive to modeling assumptions about the economic environment and the nature of financial frictions (see Section 2.4). Hence our analysis implicitly provides validation for the theoretical mechanisms we propose in favor of alternative models. This may shed light on the potential welfare losses from imperfect capital markets if greater deviations from the first-best choice of trade partners are associated with lower gains from trade.

More broadly, our work is motivated by and informs studies that relate international trade linkages to economic growth, cross-country technology spillovers, and contagion. Trade openness is typically associated with faster income growth, although results are somewhat mixed (Rodrik, 2005). Countries' number of trade partners too appears positively correlated with growth after controlling for other covariates (Kali et al., 2007, Fig. 2). Evidence also suggests that access to imported inputs allows firms in developing countries to improve product quality and to manufacture more products (Goldberg et al., 2010; Manova and Zhang, 2012; Verhoogen, 2008). In addition, firms in developing economies appear to learn from exporting and experience productivity gains when selling to developed nations (de Loecker, 2007). Separately, business cycles are more synchronized between countries that trade with each other (Baxter and Kouparitsas, 2005; Clark and van Wincoop, 2001; Frankel and Rose, 1998). Moreover, cost or demand shocks originating in one economy tend to propagate to its trade partners (Burstein et al., 2008; Eaton et al., 2011b).

The effects of these cross-country interdependencies clearly hinge on the identity of the economies in question in terms of their size, average income, overall development, TFP, and role in global financial and goods markets. Understanding these interdependencies can thus be enhanced by better understanding how countries' trade partners are determined. Our results highlight the importance of financial development and credit constraints as one such determinant.

The remainder of the paper is organized as follows. The next section outlines the theoretical framework, while Section 3 derives model-consistent estimating equations. We introduce the data in Section 4 and present the empirical results in Section 5. The last section concludes.

2. Theoretical framework

We extend the Manova (2013) theoretical model to study how financial market imperfections affect the choice of countries' trade partners. We provide a variant of that model here, focusing specifically on the predictions for the pecking order of export destinations. The underlying production and market structure follows Melitz (2003) in a static, partial-equilibrium setup. Correspondingly, the exposition moves quickly and refers the reader to Manova (2013) for further details.

2.1. Setup

The world consists of I countries and S sectors. Within each country and sector, a continuum of heterogeneous firms produce differentiated goods. The representative consumer in country i has utility $U_i = \prod_s C_{is}^{\theta_s}$, where $C_{is} = \left[\int_{\omega\in\Omega_{is}} q_{is}(\omega)^{\alpha} d\omega\right]^{\frac{1}{\alpha}}$, Ω_{is} spans the set of available varieties, and θ_s gives the share of expenditure on industry s. The constant elasticity of substitution across products is given by $\varepsilon = 1/(1-\alpha) > 1$ with $0 < \alpha < 1$. Demand for variety ω in sector s is thus $q_{is}(\omega) = \frac{p_{is}(\omega)^{-\varepsilon}\theta_s Y_i}{P_{is}^{1-\varepsilon}}$, where $p_{is}(\omega)$ is the price of that variety, Y_i equals total spending in country i, and $P_{is} = \left[\int_{\omega\in\Omega_{is}} p_{is}(\omega)^{1-\varepsilon} d\omega\right]^{\frac{1}{1-\varepsilon}}$ reflects an ideal price index.

2.2. Firms' export behavior

Firms in country j pay a sunk cost $c_{js}e_j$ in order to enter industry s. At that point, they draw their productivity level $1/\alpha$ from a cumulative distribution function $G(\alpha)$ with support $[a_L, a_H]$, $a_H > a_L > 0$. This productivity draw uniquely determines manufacturers' production and trade behavior. The marginal cost of making one unit of output is $c_{js}a$, where c_{js} is the country-sector specific cost of a cost-minimizing bundle of inputs. Exporting to market i entails fixed ($c_{js}f_{ij} > 0$) and variable trade costs of the iceberg variety ($\tau_{ij} > 1$) in each period of trading.[3] These costs could, for example, relate to researching consumer demand, building and maintaining foreign distribution networks, product customization, and transportation. Setting $\tau_{jj} = 1$ would correspond to operations in the domestic market. Given our interest, we concentrate on companies' export decisions. In other words, we study the selection of domestic producers into exporting, and leave the selection of entrants into domestic production in the background.

[2] In work subsequent to ours, Muûls (2008) has confirmed that our results for the maximum and minimum GDP across an exporter's destinations hold not only in aggregate, but also at the firm level: Financially healthier firms in Belgium are able to export to smaller destinations than credit constrained firms.

[3] We allow the fixed costs of firm entry and exporting to depend on factor costs in the exporting country to add richness and flexibility to the model. Intuitively, the fixed investment required to establish a new firm is bigger when local factor inputs are more expensive, for example because that raises the cost of building a plant, hiring managers, buying equipment, conducting research and product development etc. Likewise, fixed trade costs may be higher when the workers employed in marketing research, product customization or advertising are more expensive. This formulation is not consequential for the model's predictions since fixed costs enter all relevant expressions linearly and are additively separable.

Firms face liquidity needs because a portion $d_s \in (0, 1)$ of the fixed trade cost is incurred up-front and cannot be financed with retained earnings or internal cash flows from operations.[4] In order to raise these funds in the external capital market, companies must pledge collateral. Their available collateralizable assets constitute a fraction $t_s \in (0, 1)$ of the initial entry cost, which can be interpreted as tangible investments in plant, property, and equipment. Financially more vulnerable sectors have relatively higher d_s and lower t_s.

Entrepreneurs obtain outside financing by making a take-it-or-leave-it offer to potential (risk-neutral) investors. However, agents operate in an environment with imperfect contractibility. With an exogenous probability $\lambda_j \in (0, 1)$, financial agreements are enforced and lenders are repaid a pre-specified amount $F_{js}(a)$. Otherwise, with probability $(1 - \lambda_j)$, the firm defaults, and the creditor claims the collateral $t_s c_{js} e_j$. Manufacturers then have to replace this collateral to continue operations in the future. The parameter λ_j can thus be thought of as an indicator of the strength of financial institutions or the level of financial development in exporting country j.

Profit-maximizing exporters choose which destination markets i to enter, the optimal price p_{ijs} and quantity q_{ijs} in each destination, and the terms of the financial contract they propose to investors (total loan size, repayment $F_{js}(a)$, and collateral posted $t_s c_{js} e_j$).[5] If $TP(a)$ is the set of trade partners that a firm with productivity $1/\alpha$ sells to, the firm's total liquidity needs will amount to $\sum_{i \in TP(a)} d_s c_{js} f_{ij}$. The company's maximization problem can therefore be expressed as follows:

$$\max_{TP,p,q,F} \pi_{js}(a) = \sum_{i \in TP(a)} \left\{ p_{ijs}(a) q_{ijs}(a) - q_{ijs}(a) \tau_{ij} c_{js} a - (1 - d_s) c_{js} f_{ij} \right\} - \lambda_j F_{js}(a) - (1 - \lambda_j) t_s c_{js} e_j \quad (2.1)$$

s.t.

(1) $q_{ijs}(a) = \frac{p_{ijs}(a)^{-\varepsilon} \theta_s Y_i}{P_{is}^{1-\varepsilon}}$,

(2) $A_{js}(a) \equiv \sum_{i \in TP(a)} \left\{ p_{ijs}(a) q_{ijs}(a) - q_{ijs}(a) \tau_{ij} c_{js} a - (1 - d_s) c_{js} f_{ij} \right\} \geq F_{js}(a)$, and

(3) $B_{js}(a) \equiv - \sum_{i \in TP(a)} d_s c_{js} f_{ij} + \lambda_j F_{js}(a) + (1 - \lambda_j) t_s c_{js} e_j \geq 0$.

The expression for profits reflects the fact that the firm finances all of its variable costs $q_{ijs}(a) \tau_{ij} c_{js} a$ and a fraction $(1 - d_s)$ of its fixed costs internally, pays the investor $F_{js}(a)$ when the contract is enforced (with probability λ_j), and replaces the collateral in case of default (with probability $(1 - \lambda_j)$). In the absence of financial frictions, exporters maximize profits subject to demand (1). With liquidity needs, two additional conditions bind manufacturers' decisions. In case of repayment, entrepreneurs can offer at most their net revenues to the creditor, i.e. $A_{js}(a) \geq F_{js}(a)$. Also, investors only fund the company if their net return $B_{js}(a)$ exceeds their outside option, here normalized to 0.

With competitive credit markets, lenders always break even in expectation. This implies that producers adjust their payment $F_{js}(a)$ so as to bring the financier to his participation constraint in (3), i.e. $B_{js}(a) = 0$. The optimization problem therefore reduces to a familiar Melitz-type formulation with the additional credit constraint (2):

$$\max_{TP,p,q} \pi_{js}(a) = \sum_{i \in TP(a)} \left\{ p_{ijs}(a) q_{ijs}(a) - q_{ijs}(a) \tau_{ij} c_{js} a - c_{js} f_{ij} \right\} = \sum_{i \in TP(a)} \pi_{ijs}(a) \quad (2.2)$$

s.t.

(1) $q_{ijs}(a) = \frac{p_{ijs}(a)^{-\varepsilon} \theta_s Y_i}{P_{is}^{1-\varepsilon}}$, and

(2) $A_{js}(a) \geq \frac{1}{\lambda_j} \left\{ \sum_{i \in TP(a)} d_s c_{js} f_{ij} - (1 - \lambda_j) t_s c_{js} e_j \right\}$.

The profits $\pi_{ijs}(a)$ from any market are unaffected by financial considerations (conditional on exporting there). This occurs because firms require external capital only for their fixed costs. They thus optimally set the same price and quantity in every destination they choose to serve as in the absence of financial frictions. Incorporating the demand condition (1), the maximization problem finally becomes:

$$\max_{TP} \pi_{js}(a) = \sum_{i \in TP(a)} \left\{ (1 - \alpha) \left(\frac{\tau_{ij} c_{js} a}{\alpha P_{is}} \right)^{1-\varepsilon} \theta_s Y_i - c_{js} f_{ij} \right\} = \sum_{i \in TP(a)} \pi_{ijs}(a)$$

$$s.t. \quad \sum_{i \in TP(a)} \left\{ (1 - \alpha) \left(\frac{\tau_{ij} c_{js} a}{\alpha P_{is}} \right)^{1-\varepsilon} \theta_s Y_i - c_{js} f_{ij} \right\} \geq \frac{1 - \lambda_j}{\lambda_j} \left\{ \sum_{i \in TP(a)} d_s c_{js} f_{ij} - t_s c_{js} e_j \right\}. \quad (2.3)$$

We build intuition for the solution to this problem in steps. Note first that profitability will vary across export markets. From the perspective of firms in country j and sector s, destinations i can be uniquely ranked in terms of their relative profitability: While profits $\pi_{ijs}(a)$ increase with productivity $1/\alpha$, one can verify that $\pi_{xjs}(a') > \pi_{yjs}(a')$ whenever $\pi_{xjs}(a) > \pi_{yjs}(a)$. In other words, if destination x is more profitable than destination y for firm α, it is also more desirable for firm a', if both firms are based in the same country j and sector s.

Observe also that importing countries with a larger market size Y_i and lower trade costs, τ_{ij} and f_{ij}, are more attractive because they guarantee higher profits. We jointly refer to these characteristics as *market potential* (MP), and to the ranking of destinations in decreasing order of market potential as *the pecking order*. A summary statistic for the market potential of destination i relevant for firms exporting from country j is $MP_{ijs} = Y_i/(\tau_{ij} f_{ij})$. What matters for our purposes is not the exact functional form for MP_{ijs}, but rather that it is increasing in Y_i and decreasing in τ_{ij} and f_{ij}.

In this setup, all firms in a given country j will observe the same pecking order regardless of their sector affiliation, since the pertinent sector characteristics (c_{js}, θ_s, d_s and t_s) enter separably. We capture these characteristics with sector fixed effects in our empirical analysis. To the extent that the hierarchy of destinations in fact varies across industries within j, the theoretical predictions below would be weakened and we would be less likely to find support for them in the data.

On the other hand, our framework does not guarantee that manufacturers in different export countries will follow the same pecking order. While all firms exporting to i face the same destination market size Y_i regardless of their country of origin j, they incur different bilateral trade costs τ_{ij} and f_{ij} that depend on the country pair. If these trade costs are separable into exporter- and importer-specific components, then the pecking order will be stable across exporting nations. For example, if $\tau_{ij} = \tau_i \tau_j$ and $f_{ij} = f_i f_j$, then the summary statistic for market potential can be expressed as $MP_{ijs} = MP_i = Y_i/(\tau_i f_i)$ for all j. We return to this point later on.

With perfect financial contractibility ($\lambda_j = 1$), each firm would export to all countries that promise non-negative profits. For a firm

[4] While requiring firms to use external finance for part of their variable costs would not qualitatively affect our predictions, securing funding for fixed trade costs is plausibly more difficult than raising funds for their working capital needs associated with variable trade costs. For example, banks often provide letters of credit to cover the latter since these are tied to specific trade transactions and the goods shipped can serve as collateral themselves.

[5] To maximize their chance of obtaining the loan, it is in firms' interest to pledge all of their collateralizable assets.

with productivity $1/\alpha$, there will be a minimum level of market potential such that the firm serves all destinations more attractive than it. This threshold is pinned down by $\pi_{ijs}(a) = 0$. We denote this first-best group of trade partners $TP^{FB}(a)$, and the number of countries in it $\#\, TP^{FB}(a)$.

With financial frictions ($\lambda_j < 1$), entrepreneurs might have to forgo exporting to some countries in their ideal set $TP^{FB}(a)$. This arises because each destination not only brings extra profits, but also imposes additional liquidity needs. The limited collateral a firm possesses, however, constrains the total loan it can access. This implies that the marginal country the producer ships to will have to generate strictly positive profits to warrant the extra burden it places on the overall financial contract. We restrict our attention to the interesting case when the total loan size needed to access all destinations in $TP^{FB}(a)$ exceeds the value of the available collateral, i.e., $\sum_{i\in TP^{FB}(a)} d_s c_{js} f_{ij} > t_s c_{js} e_j$.

Formally, the exporter's constrained optimal choice of trade partners $TP^*(a)$ satisfies:

$$\sum_{i\in TP^*(a)} \pi_{ijs}(a) \geq \frac{1-\lambda_j}{\lambda_j}\left\{\sum_{i\in TP^*(a)} d_s c_{js} f_{ij} - t_s c_{js} e_j\right\} \text{ and}$$
$$\sum_{i\in TP^*(a)+1} \pi_{ijs}(a) < \frac{1-\lambda_j}{\lambda_j}\left\{\sum_{i\in TP^*(a)+1} d_s c_{js} f_{ij} - t_s c_{js} e_j\right\}, \tag{2.4}$$

where the set $TP^*(a) + 1$ includes all countries in $TP^*(a)$ plus the destination ranked next in the pecking order according to its market potential.

By construction, $\#\, TP^*(a) \leq \#\, TP^{FB}(a)$ necessarily holds. $\#\, TP^*(a)$ will be strictly below the first-best $\#\, TP^{FB}(a)$ whenever $\sum_{i\in TP^{FB}(a)} \pi_{ijs}(a) < \frac{1-\lambda_j}{\lambda_j}\left\{\sum_{i\in TP^{FB}(a)} d_s c_{js} f_{ij} - t_s c_{js} e_j\right\}$, i.e. when the profits from exporting to all destinations in the first-best set $\sum_{i\in TP^{FB}(a)} \pi_{ijs}(a)$ are insufficient to incentivize investors to provide the necessary funding $\sum_{i\in TP^{FB}(a)} d_s c_{js} f_{ij}$ given the available collateral $t_s c_{js} e_j$ and probability of repayment λ_j. Note that the left-hand side of this inequality (i.e. global firm profits) rises monotonically with productivity, while the right-hand side is invariant across firms. This implies that more productive firms will be able to go further down the pecking order and export to more destinations. Moreover, only companies below a certain productivity level will be affected by financial concerns and forced to reduce their number of trade partners below the first best.

2.3. Countries' trade partners

We next consider the implications of imperfect financial markets for countries' aggregate export behavior. All producers target destinations in decreasing order of market potential and follow the same pecking order (for given exporter–sector characteristics). In the aggregate, country j will therefore export to country i in sector s as long as at least one firm in j can afford to do so. This will in turn depend on importer i's position in j's hierarchy of destinations. For example, if i is the fifth most attractive market, at least one firm in j should sell to five or more nations in order to ship to i; if i is ranked tenth, at least one firm should serve ten or more markets; etc. This implies a one-to-one mapping between the number of country j's trade partners $\#\, TP_{js}$ and the identity of these trade partners.

For any given set (number) of export destinations TP_{js} ($\#\, TP_{js}$), there is a minimum productivity level $1/a_{TP_{js}}$ above which firms can sustain this many trade links. This cut-off is determined by the liquidity constraint in Eq. (2.3):

$$\sum_{i\in TP_{js}}\left\{(1-\alpha)\left(\frac{\tau_{ij} c_{js} a_{TP_{js}}}{\alpha P_{is}}\right)^{1-\varepsilon}\theta_s Y_i - c_{js} f_{ij}\right\} = \frac{1-\lambda_j}{\lambda_j}\left\{\sum_{i\in TP_{js}} d_s c_{js} f_{ij} - t_s c_{js} e_j\right\}. \tag{2.5}$$

The left-hand side of this equality is increasing in the productivity cut-off. Taking derivatives, simple comparative statics describe the effect of financial market imperfections on the right-hand side RHS:

$$\frac{\partial RHS}{\partial \lambda_j} = -\frac{1}{\lambda_j^2}\left\{\sum_{i\in TP_{js}} d_s c_{js} f_{ij} - t_s c_{js} e_j\right\} < 0,$$
$$\frac{\partial RHS}{\partial d_s} = \frac{1-\lambda_j}{\lambda_j}\sum_{i\in TP_{js}} c_{js} f_{ij} > 0, \frac{\partial RHS}{\partial t_s} = -\frac{1-\lambda_j}{\lambda_j} c_{js} e_j < 0, \tag{2.6}$$
$$\frac{\partial^2 RHS}{\partial \lambda_j \partial d_s} = -\frac{1}{\lambda_j^2}\sum_{i\in TP_{js}} c_{js} f_{ij} < 0, \frac{\partial^2 RHS}{\partial \lambda_j \partial t_s} = \frac{1}{\lambda_j^2} c_{js} e_j > 0.$$

This immediately implies that the productivity cut-off for exporting from j to $\#\, TP_{js}$ destinations is higher in sectors that require more external finance or have fewer tangible assets, $\frac{\partial\left(1/a_{TP_{js}}\right)}{\partial d_s} > 0$ and $\frac{\partial\left(1/a_{TP_{js}}\right)}{\partial t_s} < 0$. The threshold also falls with the strength of financial contractibility, $\frac{\partial\left(1/a_{TP_{js}}\right)}{\partial \lambda_j} < 0$. Importantly, financial development reduces the export cut-off relatively more in financially vulnerable industries, $\frac{\partial^2\left(1/a_{TP_{js}}\right)}{\partial \lambda_j \partial d_s} < 0$ and $\frac{\partial^2\left(1/a_{TP_{js}}\right)}{\partial \lambda_j \partial t_s} > 0$.[6] If no firm in country j has productivity above this cut-off (i.e., if $1/a_{TP_{js}} > 1/a_L$), then j will sell to fewer than $\#\, TP_{js}$ markets and will certainly not export to the destination country in position $\#\, TP_{js}$ of j's pecking order.

Recall that the ranking of destinations by market potential will generally vary across exporting nations because it depends on bilateral trade costs. Ceteris paribus, these comparative statics therefore describe the impact of financial development on trade patterns within an exporting country over time and across sectors. To the extent that the pecking order is universal, they would also apply to the cross-sectional variation across exporting nations and sectors. Our empirical exercise takes this into account by including export country, sector and time fixed effects. We also consider different proxies for market potential, some of which are specific to each importer (market size, import costs), while others are bilateral in nature (distance). This allows us to shed light on the stability of the pecking order in practice.

The following propositions summarize the key implications of the model that we take to the data. For brevity, we state them without reference to the above caveat about the uniformity of the pecking order across countries.

Proposition 1. *(Trade partners) The number of export destinations increases with the exporter's level of financial development. This effect is stronger in financially more vulnerable sectors,* i.e.

$$\frac{\partial(\#TP_{js})}{\partial \lambda_j} > 0, \frac{\partial^2(\#TP_{js})}{\partial \lambda_j \partial d_s} > 0, \frac{\partial^2(\#TP_{js})}{\partial \lambda_j \partial t_s} < 0.$$

Proposition 2. *(Pecking order) Exporters follow a pecking order of destinations, determined by market potential. All exporters sell to the destination with the greatest market potential. Financially developed countries go further down the pecking order and also export to destinations with*

[6] While the level effect of financial development can become ambiguous in general equilibrium, its differential impact across sectors would persist. See Manova (2013) for more details.

lower market potential. This latter effect is stronger in financially more vulnerable sectors, i.e.

$$\frac{\partial \max_{i\in TP_{js}} MP_{ijs}}{\partial \lambda_j} = \frac{\partial^2 \max_{i\in TP_{js}} MP_{ijs}}{\partial \lambda_j \partial d_s} = \frac{\partial^2 \max_{i\in TP_{js}} MP_{ijs}}{\partial \lambda_j \partial t_s} = 0, \quad \text{and}$$

$$\frac{\partial \min_{i\in TP_{js}} MP_{ijs}}{\partial \lambda_j} < 0, \frac{\partial^2 \min_{i\in TP_{js}} MP_{ijs}}{\partial \lambda_j \partial d_s} < 0, \frac{\partial^2 \min_{i\in TP_{js}} MP_{ijs}}{\partial \lambda_j \partial t_s} > 0.$$

The first proposition restates theoretical and empirical results from Manova (2013), which we have re-derived in the present version of the model. The second proposition is novel, and it is the one we focus on in our empirical analysis.

2.4. Discussion

In our model, credit constraints disrupt trade activity but do not change the ranking of destinations in the pecking order and do not cause gaps in the order in which destinations are added. This feature is important in allowing us to derive Proposition 2. While it would also be present in other models of international trade with imperfect capital markets, it is not insensitive to certain assumptions about the economic environment and the nature of financial frictions. In particular, financing considerations may reshuffle the hierarchy of destinations to one that is not based solely on market profitability as in the first best, or they may lead different exporters to follow different pecking orders. Credit market imperfections may also lead to gaps in the pecking order such that more profitable markets are not served first. To illustrate this, we now briefly describe some alternative frameworks that would deliver Proposition 1 but not necessarily Proposition 2. In light of this discussion, our empirical analysis below implicitly provides validation for the theoretical mechanisms we propose in favor of alternative models.

Departures from the Melitz (2003) market demand structure may negate the prediction for a pecking order of exporting even in the absence of financial frictions. Adding financial frictions would then trivially imply no pecking order either. For example, firm-destination specific cost or demand draws would generate a hierarchy of destinations that varies across firms from the same exporting country (Eaton et al., 2011a). Whether a stable pecking order obtains across exporting countries at the aggregate level would then become theoretically ambiguous and dependent on the joint distribution of firm productivity and firm-destination specific draws.

When a pecking order does hold in the absence of financial frictions, it matters *how* different market characteristics govern it and *whether* it interacts with credit constraints. While bigger markets are more attractive export destinations with CES demand for instance (Melitz, 2003), with linear demand they are more competitive, require a higher productivity cut-off for exporting and place lower in the hierarchy of destinations (Melitz and Ottaviano, 2008). If a pecking order arises atheoretically due to the random falling of "balls" into "bins" (Armenter and Koren, 2014), financial frictions could restrict all trade flows proportionately, rather than systematically shift trade activity towards more profitable markets.

Finally, alternative forms of credit market imperfections may affect *how* financial frictions interact with the pecking order. First, if exporters face the risk of non-payment by the importer, and if this risk varies across destinations but is not correlated with market size and trade costs, investors may be more willing to fund exports to less risky countries. This would result in deviations from the first-best pecking order based on market size and trade costs. Second, firms might require external finance for both their fixed and variable costs. Under certain demand or production functions, it may be optimal for firms to serve more, smaller markets with first-best export quantities rather than fewer, bigger destinations with reduced, second-best export quantities. Third, violations of the pecking order could occur if financial frictions lead to strategic interactions whereby financially more developed exporters choose to fully saturate demand in destinations with less market potential, while financially less developed exporters use their limited resources to sell in the top markets.

Fourth, our model features credit underprovision but no credit misallocation since there is no informational asymmetry between borrowers and lenders: More productive firms receive more financing than less productive firms, even if not enough to implement their first-best export strategy. Credit misallocation may however arise if lenders do not observe firms' productivity or firm-destination specific profitability. Financiers might then extend the "wrong" amount of funding to the "wrong" firms for the "wrong" export markets. The pecking order of destinations would be violated at the firm level, with ambiguous implications for its observance at the country level.

3. Empirical specification

Our model delivers clear predictions for exporters' choice of destination countries in the presence of imperfect capital markets. We test Proposition 2 with the following reduced-form equations:

$$\max_{i\in TP_{jst}} MP_{ijst} = \alpha + \alpha_0 FinDev_{jt} + \alpha_1 FinDev_{jt} \times ExtFin_s + \alpha_2 FinDev_{jt} \times Tang_s + \Lambda_X X_{jst} + \varphi_j + \varphi_s + \varphi_t + \epsilon_{jst}, \quad (3.1)$$

$$\min_{i\in TP_{jst}} MP_{ijst} = \beta + \beta_0 FinDev_{jt} + \beta_1 FinDev_{jt} \times ExtFin_s + \beta_2 FinDev_{jt} \times Tang_s + B_X X_{jst} + \phi_j + \phi_s + \phi_t + \nu_{jst}, \quad (3.2)$$

$$\min_{i\in TP_{jst}} MP_{ijst} = \gamma + \gamma_0 FinDev_{jt} + \gamma_1 FinDev_{jt} \times ExtFin_s + \gamma_2 FinDev_{jt} \times Tang_s + \gamma_3 \#TP_{jst} + \Gamma_X X_{jst} + \psi_j + \psi_s + \psi_t + \eta_{jst}. \quad (3.3)$$

Here TP_{jst} represents the set of trade partners that country j exports to in sector s and year t. If the relative attractiveness of importer i is measured by its market potential MP_{ijst}, and if exporters observe a pecking order governed by MP_{ijst}, then much can be learned from examining the maximum and minimum values of MP_{ijst} among j's chosen destinations. The unit of observation in these regressions is thus the exporter–sector–year, and the outcomes precisely these extreme values. The main explanatory variables of interest are exporter j's level of financial development $FinDev_{jt}$, sector s's external finance dependence $ExtFin_s$, and sector s's asset tangibility $Tang_s$. These are the empirical counterparts to the parameters λ_j, d_s and t_s in the model.

Consider the case of a stable pecking order across exporting countries. According to Proposition 2, all exporters should be able to enter the most profitable market in the world. Thus, $max_{i\in TP_{jst}} MP_{ijst}$ should not vary systematically across countries and sectors, and we would hypothesize that $\alpha_1 = \alpha_2 = 0$.[7] On the other hand, financially developed economies should be able to go further down the hierarchy of export destinations and penetrate less attractive markets as well, especially in financially vulnerable industries. This implication would be validated if $\beta_1 < 0$ and $\beta_2 > 0$. Finally, the model generates a direct mapping between the number of trade partners $\# TP_{jst}$ and the market potential of the least appealing one among them. In other words, $\# TP_{jst}$ should exactly pin down $min_{i\in TP_{jst}} MP_{ijst}$. Once we control for $\# TP_{jst}$, we would expect that $\gamma_1 = \gamma_2 = 0$ and $\gamma_3 < 0$ in the third regression.

We adopt two strategies to address the possibility that the pecking order of destinations might vary across exporters. First, we use panel data on bilateral trade by sector which allows us to include various fixed effects. Exporter fixed effects (φ_j, ϕ_j and ψ_j) control for intransient

[7] While Proposition 2 also makes predictions regarding the coefficients on $FinDev_{jt}$, i.e. α_0, β_0, and γ_0, we focus on the interaction terms since only they hold unambiguously in general equilibrium.

country characteristics that affect export outcomes in all sectors, such as local infrastructure or regulatory obstacles to production and trade. Similarly, sector fixed effects (φ_s, ϕ_s and ψ_s) capture industry features that shape trade activity in all countries, such as the composition of consumer demand, need for product customization, marketing costs, and the main effects of $ExtFin_s$ and $Tang_s$. Finally, year fixed effects (φ_t, ϕ_t and ψ_t) reflect cost or demand shocks common to all suppliers, such as changes in energy prices, shipping and logistics technologies, or global crises. We cluster errors by country, to allow for correlated trade patterns across sectors and over time within an exporter. Our results are very similar if we instead cluster by exporter–sector pair. For a meaningful spread in market potential across export destinations, we focus on observations with more than 5 trade partners, but our findings are not sensitive to this restriction.

Our second strategy is to consider different dimensions of market potential as dictated by the model. Ceteris paribus, the comparative statics derived for overall market potential hold for its individual components as well. We thus examine some proxies for MP_{ijst} that are invariant across exporting countries (e.g. destinations' market size and bureaucratic import costs). All exporters should order destinations uniformly along these dimensions. We also study proxies that are bilateral in nature (e.g. distance). While these would tend to generate varying pecking orders across exporting countries, they would still imply a stable pecking order across sectors within a country. Since these different MP_{ijst} measures are imperfectly correlated, no one factor alone will determine j's overall hierarchy of destinations. Our results could thus deviate from our strict predictions when we focus on only one aspect of market potential. For this reason, we also analyze more encompassing measures, which we expect to perform better.

Implicitly, these specifications test the base premise that a pecking order of exporting exists, as well as the hypothesis that it interacts systematically with financial conditions. To the extent that countries follow different pecking orders that we fail to capture, this would work against us finding support for Proposition 2.

Separately, we want to rule out alternative explanations of the pecking order unrelated to credit constraints. To this end, we include a series of controls X_{jst} to account for other determinants of trade activity. Their corresponding coefficients form the vectors Λ_X, B_X and Γ_X. We condition on the exporter's size with its annual log GDP. This accommodates the possibility that bigger economies have more or different trade links, for example because they support a larger mass of firms. We also take into account Heckscher–Ohlin sources of comparative advantage. We allow exporters' log endowments of physical capital K/L_{jt}, human capital H/L_{jt} and natural resources per capita N/L_{jt} to enter the regression, as well as their interactions with sectors' respective factor intensities k_s, h_s and n_s. The main effects of these sector characteristics are subsumed by the sector dummies. Finally, we ensure that our estimates capture the role of financial development as opposed to overall economic development. We do so by controlling for exporters' log GDP per capita and its interactions with both $ExtFin_s$ and $Tang_s$. All country-level variables in X_{jst} are time-variant.

4. Data

Our empirical analysis requires five pieces of information. First, we obtain bilateral trade flows for 164 exporting and 175 importing countries over the 1985–1995 period from Feenstra's *World Trade Flows*. These data are available at the 4-digit SITC Rev. 2 industry level, which we aggregate up to the 3-digit ISIC level to merge with various industry characteristics of interest.[8]

Second, we capture exporters' level of financial development with a standard measure in the literature: the amount of credit extended by deposit-money banks and other financial institutions to the private sector, as a share of GDP. This outcome-based variable reflects the actual availability of financial resources in an economy, and is commonly believed to gauge the depth and breadth of the financial system. It is available for over 150 nations from Beck et al. (2000) and varies substantially both in the cross-section and over time. In our sample, it has an average of 0.414 and standard deviation of 0.364. In robustness checks, we also consider indicators of the underlying institutional environment and its ability to sustain financial contracts. We discuss these alternative measures in Section 5.4.

Third, we employ two widely used measures of sectors' financial vulnerability that correspond to the concepts of d_s and t_s in the model. External finance dependence is the share of capital expenditures not financed with internal cash flows from operations. It signals producers' need for outside funding so that they can meet up-front expenditures that have to be incurred before revenues are realized. Asset tangibility is computed as net property, plant and equipment, as a share of total book-value assets. It identifies producers' ability to raise external finance by pledging hard, collateralizable assets.

These two variables are meant to capture inherent characteristics of the manufacturing process that are largely exogenous from the perspective of individual firms. Consistent with this, they vary significantly more across industries than across companies within an industry. Following best practice in the literature, we adopt measures based on data for all publicly listed US companies in Compustat from Braun (2003). These are available for 27 3-digit ISIC manufacturing industries.[9] The mean (standard deviation) of external finance dependence and asset tangibility are 0.242 (0.330) and 0.298 (0.139), respectively. Both of their effects can be analyzed as they are only weakly correlated at 0.010. This low correlation corroborates the notion that the variables capture two distinct aspects of financial vulnerability. Manova (2013) and Manova et al. (forthcoming) provide further justification for the use of these proxies.

Fourth, we examine a series of importer characteristics that determine countries' attractiveness to potential exporters. We measure market size using data on PPP-adjusted GDP from the *Penn World Tables 6.1* (PWT). Alternatively, we gauge aggregate consumer demand with the sum of net imports and domestic output by sector from UNIDO (in international dollars in 1996 constant prices).

Since trade costs are not readily observed directly, we examine a variety of proxies proposed in the prior literature.[10] We use bilateral distance from CEPII as a correlate of transportation costs. We also employ estimates of the regulation costs of exporting and importing from the World Bank *Doing Business Report* (DB). These include the number of days, number of documents, and nominal cost (per shipping container) required for a cross-border transaction. Separately, the World Bank collects survey data on trade facilitation and calculates a Logistics Performance Index (LPI), based on 6 different indicators.[11,12] Finally, the ESCAP-World Bank Trade Cost Database provides an index of comprehensive trade costs and decomposes it into its tariff and

[8] We use SITC–ISIC concordance tables provided by Haveman at http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/tradeconcordances.html.

[9] The measures are calculated as the median values across all firms in a given industry, after first averaging these firm values over the 1986–1995 period. The measures are available for manufacturing, i.e. industries with first digit equal to 3 in the ISIC Rev. 2 classification system. The industries excluded from our analysis are agriculture, mining, utilities (electricity/gas/water) and services (e.g. construction, retail, financial, transportation).

[10] See Novy (2013) for a short summary.

[11] Specifically, these 6 components are: (1) the efficiency of customs and border management clearance; (2) the quality of trade and transport infrastructure; (3) the ease of arranging competitively priced shipments; (4) the competence and quality of logistics services; (5) the ability to track and trace consignments; and (6) the frequency with which shipments reach consignees within scheduled or expected delivery times.

[12] The year closest to our panel for which DB and LPI data are available is 2007. While these costs may change over time, they arguably reflect the underlying institutional environment which is slow-moving. The cross-sectional variation and ranking across nations is thus relatively stable. For example, the correlation between the values in 2007 and 2012 is in the range of 0.77 to 0.90 for the various DB and LPI measures.

Table 1
Top and bottom importers.

Country	Total imports (in billions)	Average number of partners	GDP (in billions)	GDP per capita (in thousands)	DB trade cost index
1. USA	459	94.6	6530	26.1	9.2
2. Germany	268	81.9	1540	19.4	7.4
3. France	177	80.9	1110	19.1	11.5
4. Great Britain	171	89.3	1030	17.9	8.9
5. Japan	136	65.0	2620	21.2	9.9
…					
103. Sierra Leone	0.156	15.7	4.57	1.14	23.3
104. Burundi	0.137	11.9	4.34	0.80	60.9
105. Central African Republic	0.122	10.8	3.91	1.34	74.1
106. Chad	0.114	7.8	5.73	0.99	79.7
107. Equatorial Guinea	0.063	6.6	0.50	1.43	28.3

Notes: Total imports, GDP, and GDP per capita are measured in 1996 international dollars. Average number of partners refers to the mean number of partners across sectors where imports are positive. Mean values over the period 1985–1995 given for the first four columns, values in 2007 for the last.

Table 2
Top and bottom exporters.

Country	Total exports (in billions)	Average number of partners	Private credit	Maximum destination GDP (in billions)	10th percentile destination GDP (in billions)
1. USA	351	130.0	0.91	2690	4.93
2. Germany	349	141.3	0.93	6534	4.68
3. Japan	302	121.0	1.63	6534	7.50
4. France	178	139.5	0.86	6534	4.22
5. Great Britain	160	146.1	0.95	6534	4.23
…					
103. Guinea-Bissau	0.025	4.3	0.03	2544	657
104. Central Africa Republic	0.020	3.4	0.07	2044	477
105. Equatorial Guinea	0.015	2.4	0.18	1362	682
106. Rwanda	0.008	3.3	0.09	3027	719
107. Burundi	0.007	3.0	0.09	1641	524

Notes: Total exports and GDP are measured in 1996 international dollars. Average number of partners refers to the mean number of partners across sectors where exports are positive. Private credit is the ratio of the amount of private credit by deposit money banks and other financial institutions to GDP. Mean values over the period 1985–1995 given.

non-tariff components.[13] All of these trade cost measures are country characteristics that do not vary over time.

Lastly, we require a number of control variables. GDP per capita is accessible from PWT. Economies' endowments of physical and human capital per capita come from Caselli (2005). The World Bank's *Expanding the Measure of Wealth* gives estimates of natural resource endowments, which we translate into per-capita terms by dividing by population size from PWT. Sectors' physical capital, human capital, and natural resource intensities are from Braun (2003).

The core sample for our empirical analysis comprises 78 export countries with available data on financial development and the above control variables. The set of importing countries we use to construct the dependent variables of interest in each regression ($\max_{i \in TP_{jst}} MP_{ijst}$ and $\min_{i \in TP_{jst}} MP_{ijst}$) varies across specifications because different indicators of market potential MP_{ijst} are available for different subsamples of countries. For example, GDP (a measure of market size) is observed for more destinations than regulatory and logistical barriers to trade (a measure of trade costs). We are, however, able to develop a comprehensive measure of market potential for all 175 destinations in the raw trade data by estimating country fixed effects in an auxiliary probit regression that circumvents such data limitations.

4.1. A first glance at the data

As a prelude to the econometric analysis, we first present some suggestive descriptive patterns broadly in line with the theory's predictions. In particular, we tabulate summary statistics for the top and bottom exporters and importers in the sample. For each nation, we record its total exports and imports. We also count the number of destinations it exports to and the number of origin countries it imports from (averaged across sectors). Tables 1 and 2 show averages for the 1985–1995 period, but qualitatively similar patterns hold in any one year. Given our focus on the role of financial development, we concentrate on a common set of 107 economies with data both on GDP and private credit.[14]

The five biggest importers in the sample are the US, Germany, France, the United Kingdom, and Japan, in that order. The five destinations with the lowest import flows are Equatorial Guinea, Chad, the Central African Republic, Burundi, and Sierra Leone. The contrasts between these two sets of countries are striking: The largest importers receive shipments worth 3–4 orders of magnitude more than the smallest ones. While the top importers purchase goods from 65–95 countries, the bottom five source products from 6–16 suppliers only. Moreover, these outcomes appear strongly correlated with key determinants of the pecking order of destinations in our model (Appendix Table A.2). Leading importers are significantly larger and richer economies, as evidenced by their GDP and per capita income. They also tend to have markedly lower trade costs. For the purposes of this table, we proxy the latter with an overall index of the DB regulation cost variables. We construct it by first normalizing each of the three components to a number between 0 and 100, and then taking the unweighted average.

We next turn to the most and least active exporters in the data (Table 2). The top five importers are also the top five exporters in the world during this period, with a slightly reordered ranking. Their cross-border sales dramatically exceed those of the bottom five exporters (Burundi, Rwanda, Equatorial Guinea, the Central African

[13] See Arvis et al. (2013) for more details on these data.

[14] We first count the number of trade partners in the full sample of 164 exporting and 175 importing countries in the raw trade data. We then report the top and bottom trading countries among the 107 nations in our sample.

Republic, and Guinea-Bissau) by 4 orders of magnitude. While the largest exporters service 121–146 economies, the smallest enter only 2–4 foreign markets. Consistent with our theory, exporters' level of financial development is highly correlated with their choice of trade partners (Appendix Table A.2). Private credit is about 10 times more accessible in the leading exporters, indicating deeper and more effective capital markets. Looking across exporters' destination countries, the biggest markets served are quite comparable and vary between 1.4 and 6.5 trillion USD in size. By contrast, the smallest markets penetrated differ tremendously: Their GDP is on average some 100 times lower for the top exporters (roughly 4 vs 700 billion USD).

Note also that the biggest export destination of Germany, France, the UK and Japan is the same country (the US), as implied by a strictly size-driven pecking order in our model. Although the bottom exporters do not exhibit this consistency, they generally still tap into some of the biggest economies in the world. In fact, they sell only to relatively large destinations, while top exporters are also able to access smaller markets. This can be gauged from the gap between the values in the last two columns.

When we look across an exporter's destination countries, we focus on the importer at the 10th percentile of the distribution instead of at the absolute minimum to guard against idiosyncrasies in the data. Our model examines firms as monopolistic competitors in a static environment. In reality, there could be temporary fluctuations in conditions that may influence suppliers' choice of locations to sell in. For instance, price and demand shocks could alter the relative attractiveness of different markets. In addition, firms might face uncertainty about their products' consumer appeal, and first experiment in some markets with limited sales before deciding whether to scale up or pull out from a market. These factors are more likely to affect export entry into marginal destinations around the cut-off minimum market potential; they are by contrast less likely to influence export entry into large and established markets with known high potential. To address these concerns, we use the 10th percentile and the maximum values of market potential across an exporter's trade partners. Our results are however not sensitive to this choice.

Overall, these descriptive statistics provide preliminary evidence consistent with market size and trade costs shaping the relative attractiveness of different destinations. In addition, countries' level of financial development appears closely related to their total exports, number of export markets, and ability to go further down the pecking order of destinations.

5. Results

We next evaluate econometrically the impact of financial development on countries' choice of trade partners. We organize the analysis into three steps that correspond to different ways of ranking the desirability of export destinations. We first consider a pecking order of importers based exclusively on market size, and ignore cross-country differences in trade costs. We then study the opposite and complementary case, in which only trade costs matter, while market size plays no role. Finally, we take an integrated approach and develop summary statistics of market potential that incorporate information on both size and costs.[15]

Implicit in our study is that credit conditions affect the level of countries' exports and their number of trade partners. For completeness, in Appendix Table A.3 we reproduce results from Manova (2013) confirming that this is indeed the case.[16] Financially advanced economies export relatively more in sectors more reliant on external capital and in sectors more intensive in intangible assets than in less financially vulnerable sectors. Countries with stronger financial systems also ship to more destinations in such industries. These patterns hold in a baseline regression controlling for the exporter's GDP, country, sector and year fixed effects, as well as when we condition on the full set of control variables from the specifications below.

Appendix Fig. A.1 provides some canonical examples of the impact of financial development on trade activity. We consider 6 nations that experienced some of the biggest improvements in financial conditions in our panel: Bolivia, China, Indonesia, Mexico, Poland, and Thailand. The left-hand side graphs illustrate how private credit and the aggregate number of export destinations generally moved closely together within countries over the 1985–1995 period. The right-hand side graphs plot the rise in the destination count by sector between 1985 and 1995 against sectors' external finance dependence. Financial development indeed tended to differentially affect market entry across sectors.[17]

5.1. A pecking order of market sizes

We first evaluate how market size influences the pecking order of export destinations and if financial development affects how far down this pecking order exporting countries reach. We use GDP as our main measure of market size, since it is the conceptual counterpart to aggregate spending Y_i in the model. For each exporter j, we rank its trade partners in sector s (TP_{jst}) by size, and record the log GDP of its largest importer, $\max_{i \in TP_{jst}} GDP_{it}$. We do this separately for each year in the panel to allow for changes in economic conditions that affect destinations' attractiveness. Similarly, we note the log GDP of the destination at the 10th percentile of the distribution, our proxy for $\min_{i \in TP_{jst}} GDP_{it}$ for reasons outlined above. Using these two variables, we estimate specifications (3.1), (3.2), and (3.3).

The results in Panel A of Table 3 lend strong support to our model's predictions. We find no systematic variation in the market size of exporters' largest trade partners across exporters at different levels of financial development and across sectors at different levels of financial vulnerability (Column 1). By contrast, credit conditions are an important driver of the size of the smallest market that exporters choose to service (Column 2). Financially advanced economies are able to penetrate smaller destinations than financially less developed exporters, and this difference is bigger in financially more vulnerable industries. The coefficients on the two interaction terms of interest ($FinDev_{jt} \times ExtFin_s$ and $FinDev_{jt} \times Tang_s$) are highly statistically significant, both individually and jointly. The last row in the panel reports the p-value from an F-test of $\beta_1 = \beta_2 = 0$, and decisively rejects this null hypothesis at the 0.1% level of confidence.[18]

These effects are also of sizable economic magnitude. Consider a country such as Mexico that undergoes financial reforms. Let these reforms increase the amount of private credit available in the economy (as a share of GDP) by 0.364, which corresponds to one standard deviation in our data. As a result, Mexico would be able to begin exporting to more destinations by going further down the pecking order and entering progressively smaller markets. The extent of this expansion into additional export markets would vary across industries and depend on their reliance on the financial system. Since sectors differ along two dimensions that are not perfectly correlated with each other (external finance dependence and asset tangibility), we characterize their

[15] In our partial-equilibrium model, the aggregate price index in a destination country also affects its position along the pecking order. In general equilibrium, however, it too would be a function of market size and trade costs.

[16] Table 5, Panel B, Column 1 in Manova (2013) is identical to Appendix Table A.3, Panel A, Column 2 here. The other regression results we report are not exactly the same as those in Manova (2013) because of slight differences in the sample and the control variables included.

[17] These figures are of course only suggestive since many other developments take place in these countries over the 1985–1995 period aside from financial development. Our regression analysis will take this into account with a combination of country, sector and year fixed effects, as well as various controls.

[18] In unreported results available on request, we have considered a decomposition of GDP into population and GDP per capita, and found consistent results for both components. While the maximum values of log population and log income do not vary systematically across exporters and sectors, the minimum values do much like aggregate GDP.

Table 3
Market size.

Dependent variable:	Panel A (log) GDP			Panel B Ranking of GDP		
	Maximum	10th percentile		Minimum	90th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.250*	−0.150	−0.206	−1.534*	0.235	1.474
	(1.81)	(−0.70)	(−1.16)	(−1.88)	(0.06)	(0.47)
$FinDev_{jt} \times ExtFin_s$	0.044	−0.498***	−0.047	−0.287	10.740***	0.802
	(0.56)	(−3.71)	(−0.37)	(−0.70)	(4.27)	(0.41)
$FinDev_{jt} \times Tang_s$	−0.210	0.809**	0.536*	1.602	−15.985**	−9.973*
	(−0.93)	(2.01)	(1.77)	(1.18)	(−2.13)	(−1.93)
# $Partners_{jst}$			−0.015***			0.333***
			(−11.93)			(15.68)
R^2	0.28	0.52	0.56	0.12	0.54	0.61
F-test on interaction terms (*p*)	0.64	<0.01	0.21	0.50	<0.01	0.15
Dependent variable:	Panel C (log) Aggregate consumption across all sectors			Panel D (log) Consumption by sector		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.256*	−0.149	−0.214	0.349**	−0.056	−0.108
	(1.70)	(−0.47)	(−0.66)	(2.00)	(−0.22)	(−0.42)
$FinDev_{jt} \times ExtFin_s$	0.053	−0.465***	0.054	0.025	−0.338***	0.023
	(0.65)	(−3.35)	(0.44)	(0.34)	(−3.27)	(0.24)
$FinDev_{jt} \times Tang_s$	−0.238	0.930*	0.616	−0.426	0.481	0.263
	(−0.95)	(1.97)	(1.58)	(−1.52)	(1.22)	(0.77)
# $Partners_{jst}$			−0.017***			−0.012***
			(−11.73)			(−8.15)
R^2	0.23	0.45	0.49	0.79	0.59	0.61
F-test on interaction terms (*p*)	0.64	<0.01	0.24	0.24	<0.01	0.74

Notes: This table shows the effect of an export country's financial development on the maximum and minimum destination market size among its export destinations. Estimates from Eqs. (3.1), (3.2) and (3.3) are reported in Columns 1, 2, and 3 of each panel respectively. Financial development is measured by private credit as a share of GDP. Market size is measured by log GDP, a rank order based on GDP, log aggregate consumption, or log consumption by sector. The sample is restricted to exporter–sector–year observations with more than 5 trade partners. The number of observations (number of exporters) is 16,332 (78) in Panels A to C and 15,688 (78) in Panel D. All regressions include a constant and controls as listed in the text. Standard errors are clustered at the exporter level. T-statistics in parentheses.
*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

differential response with three comparative statics. Take first two sectors that have the same level of asset tangibility but one requires as much external capital as the Electrical Machinery industry (ISIC 383, $ExtFin_s = 0.768$), the sector at the 90th percentile of the distribution, while the other uses as little outside finance as the Leather industry (ISIC 323, $ExtFin_s = -0.140$), the sector at the 10th percentile. Following financial reforms, the size of Mexico's smallest export destination would fall by 16.6 percentage points more in Electrical Machinery than in Leather. Conversely, two sectors might exhibit the same reliance on external finance but have endowments of tangible assets corresponding to the 10th and 90th percentiles of the distribution, Footwear (ISIC 324, $Tang_s = 0.117$) and Iron and Steel (ISIC 371, $Tang_s = 0.458$). The size of Mexico's smallest trade partner would fall by 10.1 percentage points more in Footwear than in Iron and Steel. Finally, we account for the actual variation across sectors in the data along both dimensions of financial vulnerability, and calculate the total implied impact of financial reforms for each sector. The industry that experiences the biggest expansion into new export markets would see the size of its smallest destination fall by 32.0 percentage points more than the industry that benefits the least.

Appendix Table A.4 reports these comparative statics, as well as similar calculations for other measures of market potential discussed below such as aggregate consumption or bilateral distance. For each of these measures, Column 1 reports the differential effect of a one-standard-deviation improvement in financial conditions on the market potential of the marginal export destination in a sector at the 90th vs at the 10th percentile of $ExtFin_s$ (holding $Tang_s$ fixed) or of $Tang_s$ (holding $ExtFin_s$ fixed). Column 3 compares instead the implied impact on the most vs. least affected industry, based on the actual variation in both $ExtFin_s$ and $Tang_s$ across industries. Column 2 replicates Column 1 but compares sectors that are one standard deviation apart in financial vulnerability rather than spanning the 90th–10th percentile range.

Column 3 in Table 3 confirms that there is an intimate link between the number of countries' export destinations # TP_{jst} and the size of their smallest trade partner. When we include # TP_{jst} in the regression for $\min_{i \in TP_{jst}} GDP_{it}$, the point estimates are substantially reduced in size and significance. We can no longer reject the null hypothesis that the interaction term coefficients are jointly zero. (However, $FinDev_{jt} \times Tang_s$ still enters weakly significantly at 10%, albeit with a much smaller coefficient.) As expected, # TP_{jst} receives a negative and very significant coefficient.

There are two ways to view these results through the lens of the theory. Strictly interpreted, our model implies that each exporter observes the same pecking order in every sector with respect to destinations' aggregate expenditure. Our findings are broadly consistent with this implication. To the extent that sector-level consumer preferences vary across importing countries (for example because of non-homothetic preferences or home bias), the ranking of destinations might not be exactly the same across sectors. This could contribute to the residual effect of $FinDev_{jt} \times Tang_s$ even after controlling for trade partner intensity in Column 3. Separately, the pecking order is a function of both market size and trade costs in the model. Since we consider only the former here, potential differences in trade costs across country pairs and sectors remain unaccounted for.

To shed more light on the stability of the size-based pecking order across exporters and sectors, we next pursue a slightly different exercise. We now rank all countries in the world based on their GDP, year by year. Since there are 119 importing nations in our sample, the biggest one receives rank 1, and the smallest — rank 119. For each exporter, we note the GDP rank of its trade partners, by sector. If all countries follow the same pecking order, they will all be able to export to the single largest market in the world. The minimum destination rank observed for each exporter–sector pair, $min_{i \in TP_{jst}} GDPrank_{it}$, will thus be 1. Moreover, an exporter selling to # TP_{jst} countries in sector s will record a maximum destination rank exactly equal to $\max_{i \in TP_{jst}} GDPrank_{it} = \#TP_{jst}$, and will export to all countries with rank lower than # TP_{jst}. Conversely, when the pecking order is not stable across exporting countries and industries, there will be gaps in this rank sequence and $\max_{i \in TP_{jst}} GDPrank_{it} > \#TP_{jst}$ will mechanically hold.

In line with these predictions, in Panel B we find that $\min_{i \in TP_{jst}} GDPrank_{it}$ is independent of exporters' financial conditions and sectors' financial vulnerability. By contrast, $max_{i \in TP_{jst}} GDPrank_{it}$ varies systematically in the data such that financially advanced economies go further down the global hierarchy of destinations in financially dependent industries.[19] (The signs of the coefficients are opposite to those in Panel A since large economies receive a lower rank.) Once again, controlling for the number of trade partners substantially reduces the point estimates on the interaction terms: They are no longer jointly significant and the coefficient on $FinDev_{jt} \times ExtFin_s$ cannot be distinguished from 0, but that on $FinDev_{jt} \times Tangs_s$ remains marginally significant at 10%. As anticipated, the number of partners now enters positively, with a p-value below 0.1%. These results suggest that the size-based pecking order of export markets is relatively stable if imperfect across exporters and sectors.

Recall that in the model, market size affects firms' cross-border sales via aggregate consumer demand Y_i. With balanced trade, a nation's GDP exactly equals total expenditure as an accounting identity. In practice, however, the two often differ since countries run trade deficits or surpluses. In the rest of Table 3 we confirm that our results hold, and in fact become sharper, when we proxy market size with a direct measure of consumption instead of GDP. The associated economic effects are of comparable magnitudes too (Appendix Table A.4). We impute total consumption as the sum of domestic production (available from UNIDO) and net imports (from the trade data).

In Panel C, we repeat the analysis from Panel A using the log highest and lowest levels of aggregate consumption observed across a countries' trade partners as outcome variables. As earlier, we find that the maximum value does not vary systematically across exporters and sectors. By contrast, the smallest consumer market that financially advanced exporters serve is significantly smaller in industries that require more external capital or feature fewer tangible assets. Moreover, this pattern is now completely driven by the number of destinations and both interaction terms lose significance when we control for the latter. Similar results obtain in Panel D when we instead consider consumption by destination and sector, constructed from sector-level production and trade data. This suggests that a consumption-based hierarchy of importers is broadly stable across exporters, and more so than a GDP ranking.

5.2. A pecking order of trade costs

The results in the previous subsection lend strong support to our prediction that financial development importantly affects countries' choice of trade partners in terms of market size. We next study the extent to which this is also true of export costs, the second determinant of the pecking order of destinations in our model.

[19] Consistently with our use of the 10th percentile of market size instead of the minimum, we use the 90th percentile of the size rank instead of the maximum.

Since trade costs are not directly observable, we employ a few standard proxies in the literature. We first consider bilateral distance $Dist_{ji}$, which is arguably associated with the expense of shipping goods across borders. In this sense it provides an empirical counterpart to the iceberg costs in the model, τ_{ij}. To the extent that transportation entails both fixed and variable costs, distance may also partly capture the fixed cost of exporting, f_{ij}. The same would apply if countries that are geographically closer are more likely to be similar along various economic dimensions that reduce the cost of setting up a trade partnership. For example, proximate nations might share similar business practices, legal frameworks, and consumer preferences. Such factors could facilitate the establishment of new commercial links, ease the maintenance of distribution networks, make researching market potential cheaper, and reduce the need for customizing products and advertising to local tastes. We therefore do not take a stand as to whether distance picks up the role of τ_{ij} or f_{ij} in the model. While the measures of market size above vary by importer and year, distance is a time-invariant characteristic of each exporter–importer pair. Hence, it is not associated with a uniform pecking order across exporters (e.g. Mexico is closer to US exporters than Germany, but the converse is true for French exporters).

In Panel A of Table 4, we assess whether financial development allows countries to go further down the pecking order of export destinations in terms of bilateral distance. According to our model, exporters will access all markets closer than a maximum distance, but this cutoff will vary across exporters and sectors. To test this prediction, we record the shortest log distance at which countries export in each year and industry, $\min_{i \in TP_{jst}} Dist_{ji}$. As expected, we find that this value does not vary systematically with credit conditions. Instead, the longest distance at which countries ship their goods, $\max_{i \in TP_{jst}} Dist_{ji}$, rises with $FinDev_{jt} \times ExtFin_s$. This implies that stronger financial markets enable firms to fund higher trade costs, particularly in sectors that demand more external capital. As anticipated, this effect becomes insignificant when we control for # TP_{jst}, and so it can be attributed to an expansion into more markets: The expected positive sign on # TP_{jst} indicates that having more export partners is associated with reaching farther destinations. The insignificant coefficient on $FinDev_{jt} \times Tangs_s$ in Column 2, however, suggests that financial development does not affect the choice of trade partners differentially across sectors at different levels of asset tangibility.

We next examine a series of destination-specific proxies for trade costs that reflect the regulatory and logistical barriers for exporting to country i, $Cost_i$. In Panel A of Table 5, we consider the log nominal cost (per shipping container) required for cross-border sales. The lowest shipping cost observed across country j's destinations does not appear to vary systematically with j's credit conditions (Column 1). By contrast, the highest shipping cost rises with j's private credit in sectors with high reliance on external capital and few collateralizable assets (Column 2). In other words, financially developed exporters are able to penetrate foreign markets that are more expensive to access. As expected, this pattern can be explained with the fact that j has more trade partners in such sectors (Column 3).

We find similar results when we instead consider the log number of days it takes for customs transactions to clear (Panel B). On the other hand, the log number of import documents needed does not appear to generate a pecking order of destinations (Panel C). This suggests that shipping and customs delays increase exporters' working capital needs because they force suppliers to stretch their cash flow cycle and maintain bigger inventories. By contrast, filling out forms does not have such implications for companies' balance sheets. Moreover, the cross-sectional dispersion in the time and monetary cost of exporting significantly exceeds that in paperwork (coefficients of variation of 0.67 and 0.61 vs. 0.35). For completeness, in Panel B of Table 4 we also report results for the aggregate index that we construct as the average of the three regulatory barriers. This behaves in much the same way as the cost and duration of shipping.

Table 4
Trade costs.

Dependent variable:	Panel A			Panel B		
	(log) Bilateral distance			DB trade cost index		
	Minimum	90th percentile		Minimum	90th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	−0.055	−0.089*	−0.079	0.379	1.371	1.882
	(−0.60)	(−1.84)	(−1.59)	(1.29)	(0.71)	(1.11)
$FinDev_{jt} \times ExtFin_s$	−0.011	0.082*	−0.003	0.149	3.514**	−0.583
	(−0.33)	(1.85)	(−0.07)	(0.47)	(2.54)	(−0.46)
$FinDev_{jt} \times Tang_s$	−0.119	0.059	0.111	−0.294	−1.115	1.363
	(−1.50)	(0.63)	(1.18)	(−0.50)	(−0.48)	(0.75)
# $Partners_{jst}$			0.003***			0.137***
			(5.92)			(13.04)
R^2	0.79	0.48	0.50	0.46	0.52	0.56
F-test on interaction terms (*p*)	0.32	0.15	0.50	0.76	0.04	0.74
Dependent variable:	Panel C			Panel D		
	Logistics Performance Index			ESCAP-WB trade costs		
	Maximum	10th percentile		Minimum	90th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	−0.009	−0.044	−0.056	−1.784	−8.325	−3.640
	(−0.43)	(−0.85)	(−1.20)	(−0.55)	(−0.87)	(−0.43)
$FinDev_{jt} \times ExtFin_s$	0.001	−0.047	0.052	0.645	30.099**	−10.902
	(0.04)	(−1.23)	(1.44)	(1.08)	(2.44)	(−1.33)
$FinDev_{jt} \times Tang_s$	0.023	0.138*	0.079	−2.562	−24.775	0.410
	(0.55)	(1.71)	(1.12)	(−1.30)	(−1.22)	(0.03)
# $Partners_{jst}$			−0.003***			1.382***
			(−8.34)			(18.13)
R^2	0.27	0.46	0.48	0.80	0.49	0.59
F-test on interaction terms (*p*)	0.86	0.15	0.15	0.26	0.03	0.40

Notes: This table shows the effect of an export country's financial development on the minimum and maximum trade costs among its export destinations. Estimates from Eqs. (3.1), (3.2) and (3.3) are reported in Columns 1, 2, and 3 of each panel respectively. Financial development is measured by private credit as a share of GDP. Trade costs are measured by log bilateral distance, a trade cost index from the World Bank *Doing Business Report*, the Logistics Performance Index, or a comprehensive ESCAP-World Bank index of trade costs. The sample is restricted to exporter–sector–year observations with more than 5 trade partners. The number of observations (number of exporters) is 16,334 (78) in Panels A to C and 16,070 (75) in Panel D. All regressions include a constant and controls as listed in the text. Standard errors are clustered at the exporter level. T-statistics in parentheses.
*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

We next exploit another measure of trade facilitation: destination countries' Logistics Performance Index (LPI). Higher values for this index imply more reliable, efficient and expedient customs, shipment and overall logistics. This variable captures other dimensions of trade costs not present in the previous indicators. For example, its correlation with the trade cost index from Panel B is −0.64. Consistent with our hypothesis, in Panel C of Table 4 we find that all exporters service attractive locations with high LPI. However, exporters with stronger financial systems also enter markets with more challenging logistics: The lowest LPI they tolerate falls with financial development faster in financially more vulnerable industries. This time, however, only $FinDevt_{jt} \times Tang_s$ but not $FinDevt_{jt} \times ExtFin_s$ is precisely estimated. Once we control for the number of destinations, both interactions become predictably insignificant.

The various regulatory costs of trade we have employed characterize the environment in the importing country only. In robustness checks available on request, we have alternatively taken the average of regulatory barriers in both trade partners. Encouragingly, these specifications deliver very similar conclusions and lend further support to our interpretation.

Lastly, we make use of the ESCAP-World Bank data on comprehensive trade costs. It provides annual ad-valorem equivalent values for the cost of cross-border sales relative to the cost of domestic transactions.[20] The main advantage of these cost measures is that they are bilateral and broken down into tariff and non-tariff components. On the other hand, they may not be ideally suited to our analysis to the extent that domestic trade costs differ across countries. This caveat notwithstanding, results in Panel D of Table 4 once again indicate that exporting in sectors more reliant on external funds benefits more from deeper capital markets.

Our estimates suggest that financial conditions matter less for the set of countries' export destinations with respect to trade costs than with respect to market size (Appendix Table A.4). For example, a one-standard-deviation increase in private credit would raise the longest distance at which countries export by 1–3 percentage points more in a sector at the 90th percentile by financial vulnerability, compared to a sector at the 10th percentile. Taking both external finance dependence and asset tangibility into account, the difference between the most and least affected industry would be 5 percentage points. These economic magnitudes are approximately a sixth of those for GDP.

In summary, it appears that no single measure of trade barriers uniquely characterizes the pecking order of exporting. Taken collectively, however, the evidence points to financial frictions and trade costs jointly affecting the location of foreign sales as predicted by theory.

5.3. A pecking order of market potential

Through the lens of our model, the above results suggest that multiple factors govern firms' choice of export markets. We next propose that these determinants can be jointly captured with summary measures of market potential, which indicate the relative desirability of different destinations. In this section, we develop three such summary measures,

[20] The data are available separately for manufacturing and agriculture, and so we use the former. Since data are missing for various years and countries, we compute an average for each country based on an interpolated series of trade costs. We obtain qualitatively similar results if we simply take country-specific averages without interpolation.

Table 5
World Bank *Doing Business Report* costs to import.

Dependent variable:	Panel A (log) Nominal cost (USD per container)			Panel B (log) Number of days		
	Minimum	90th percentile		Minimum	90th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.047*	0.057	0.072*	−0.018	0.082	0.101*
	(1.90)	(1.19)	(1.95)	(−0.59)	(1.19)	(1.69)
$FinDev_{jt} \times ExtFin_s$	0.019	0.111***	−0.010	0.006	0.117**	−0.034
	(0.74)	(2.96)	(−0.32)	(0.25)	(2.07)	(−0.69)
$FinDev_{jt} \times Tang_s$	−0.046	−0.112	−0.038	-7.9×10^{-5}	−0.127	−0.036
	(−1.23)	(−1.49)	(−0.76)	(−0.002)	(−1.48)	(−0.49)
# $Partners_{jst}$			0.004***			0.005***
			(13.63)			(11.19)
R^2	0.60	0.51	0.57	0.43	0.48	0.52
F-test on interaction terms (*p*)	0.28	0.01	0.72	0.97	0.09	0.65

Dependent variable:	Panel C (log) Number of documents		
	Minimum	90th percentile	
	(1)	(2)	(3)
$FinDev_{jt}$	0.017	0.012	0.017
	(0.81)	(0.45)	(0.66)
$FinDev_{jt} \times ExtFin_s$	0.007	−0.001	−0.041**
	(0.36)	(−0.06)	(−2.42)
$FinDev_{jt} \times Tang_s$	0.006	−0.048	−0.024
	(0.14)	(−1.22)	(−0.61)
# $Partners_{jst}$			0.001***
			(9.25)
R^2	0.44	0.37	0.39
F-test on interaction terms (*p*)	0.91	0.47	0.04

Notes: This table shows the effect of an export country's financial development on the minimum and maximum trade costs among its export destinations. Estimates from Eqs. (3.1), (3.2) and (3.3) are reported in Columns 1, 2, and 3 of each panel respectively. Financial development is measured by private credit as a share of GDP. Trade costs are measured by the log nominal cost per shipping container, the log number of days per export transaction, or the log number of documents per export transaction. The sample is restricted to exporter–sector–year observations with more than 5 trade partners. The number of observations (number of exporters) is 16,334 (78) exporters in all panels. All regressions include a constant and controls as listed in the text. Standard errors are clustered at the exporter level. T-statistics in parentheses.
*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

and show that financial development affects exporters' set of trade partners in line with the pecking order implied by these measures.

We first consider a proxy for market potential that combines information about both consumer demand and trade costs: the log ratio of GDP to distance. This measure is meant to concisely reflect the basic idea that bigger and more proximate destinations are more attractive. Although it imposes a specific functional form, we have confirmed that similar results obtain when we adopt alternative formulations.[21] Note that market size is common across all sellers to a given economy, while distance is country-pair specific. The GDP-to-distance ratio thus allows the relative appeal of an importer to depend on the identity of the exporter. For example, Canada may be a profitable and proximate market for the US, but not for other exporters such as Korea, for whom Japan might be preferable.

Using this measure of market potential, we once again record its maximum and minimum (10th percentile) value across all destinations that exporter *j* services in sector *s*. In Panel A of Table 6, we re-estimate our baseline specifications with these values as outcome variables. We find strong support for the predictions of the model. As expected, all countries are able to access the markets with the greatest export potential, but financially more advanced economies go further down their hierarchy of destinations in financially more vulnerable industries. Moreover, both interaction terms are now highly statistically significant in Column 2, but become insignificant when we control for the number of trade partners in Column 3. Given the patterns in Panel A of Tables 3 and 4, this suggests that taking both market size and trade costs into account indeed provides a tighter fit between theory and data. This is not surprising, since the correlation between GDP and bilateral distance is only 0.06 for the average exporter, and it is the combination of both country characteristics that determines the pecking order of exporting.

For completeness, in Panel B we perform the same analysis using the log ratio of GDP to the *Doing Business* trade cost index as a summary statistic for market potential. In Panel C, we expand this to the log ratio of GDP to the product of bilateral distance and the trade cost index. We obtain similar results for these alternative measures as well.

Of note, the implied economic significance of financial development for countries' choice of trade partners is considerably larger when we use these summary measures of market potential, than when we separately consider market size or trade costs (Appendix Table A.4). If a country improves its financial system by 1 standard deviation, the lowest market potential (=GDP/DB trade costs) among its export destinations would fall by 22 percentage points more in a financially dependent sector (90th percentile) relative to a financially less dependent sector (10th percentile). Taking both sectors' external finance dependence and asset tangibility into account, the spread between the most and least affected sector would be 45 percentage points.

We next take an agnostic approach to what exact factors affect the relative attractiveness of different foreign markets. To do so, we rely on the principle of revealed preferences: The more popular a given

[21] For example, the residuals from regressing (log) importers' GDP on (log) bilateral distance as the only regressor can be obtained and used to proxy market potential.

Table 6
Market potential.

	Panel A			Panel B		
Dependent variable:	(log) GDP / bilateral distance			(log) GDP / DB trade cost index		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.282*	−0.072	−0.150	0.269*	−0.305	−0.386*
	(1.71)	(−0.36)	(−1.10)	(1.81)	(−1.09)	(−1.68)
$FinDev_{jt} \times ExtFin_s$	0.013	−0.540***	0.091	0.055	−0.677***	−0.032
	(0.33)	(−3.01)	(0.66)	(0.62)	(−3.72)	(−0.20)
$FinDev_{jt} \times Tang_s$	−0.060	0.815*	0.433	−0.220	1.157**	0.767**
	(−0.49)	(1.89)	(1.47)	(−0.87)	(2.34)	(2.13)
# $Partners_{jst}$			−0.021***			−0.022***
			(−16.14)			(−12.31)
R^2	0.83	0.60	0.68	0.26	0.53	0.81
F-test on interaction terms(*p*)	0.89	<0.01	0.18	0.69	<0.01	0.11
	Panel C			Panel D		
Dependent variable:	(log) GDP / (bilateral distance × DB trade cost index)			(log) Number of exporters by sector		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.310*	−0.212	−0.315*	0.032	0.008	−0.012
	(1.80)	(−0.82)	(−1.75)	(1.49)	(0.09)	(−0.15)
$FinDev_{jt} \times ExtFin_s$	0.013	−0.700***	0.126	0.008	−0.150**	0.003
	(0.27)	(−3.11)	(0.76)	(0.54)	(−2.46)	(0.06)
$FinDev_{jt} \times Tang_s$	−0.077	1.211**	0.712**	−0.051	0.128	0.035
	(−0.48)	(2.27)	(2.07)	(−1.61)	(0.93)	(0.29)
# $Partners_{jst}$			−0.028***			−0.005***
			(−16.88)			(−10.49)
R^2	0.81	0.62	0.69	0.87	0.71	0.73
F-test on interaction terms(*p*)	0.89	<0.01	0.07	0.28	0.05	0.96
	Panel E			Panel F		
Dependent variable:	(log) Average number of exporters across sectors			Fixed effect coefficient from auxiliary probit regression		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.035	−0.026	−0.044	0.059	−0.038	−0.059
	(1.46)	(−0.39)	(−0.72)	(1.48)	(−0.49)	(−0.85)
$FinDev_{jt} \times ExtFin_s$	0.007	−0.191***	−0.045	0.011	−0.201***	−0.033
	(0.52)	(−4.07)	(−1.07)	(0.48)	(−3.84)	(−0.69)
$FinDev_{jt} \times Tang_s$	−0.028	0.218**	0.130	−0.050	0.241**	0.140
	(−0.77)	(2.41)	(1.94)	(−0.79)	(2.34)	(1.85)
# $Partners_{jst}$			−0.005***			−0.006***
			(−12.33)			(−12.69)
R^2	0.17	0.54	0.59	0.88	0.82	0.84
F-test on interaction terms (*p*)	0.74	<0.01	0.12	0.73	<0.01	0.17

Notes: This table shows the effect of an export country's financial development on the maximum and minimum market potential among its export destinations. Estimates from Eqs. (3.1), (3.2) and (3.3) are reported in Columns 1, 2, and 3 of each panel respectively. Financial development is measured by private credit as a share of GDP. Market potential is measured by the log of GDP / bilateral distance, the log of GDP / World Bank *Doing Business Report* trade cost index, the log GDP / (bilateral distance × World Bank *Doing Business Report* trade cost index), the log number of countries selling to a given destination-sector, the log average number of countries selling to a given destination across sectors, or a destination fixed effect from Eq. (5.1). The sample is restricted to exporter–sector–year observations with more than 5 trade partners. The number of observations (number of exporters) is 16,332 (78) in Panels A to C and 16,334 (78) in Panels D to F. All regressions include a constant and controls as listed in the text. Standard errors are clustered at the exporter level. T-statistics in parentheses.
*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

destination is, the more profitable it must be. We thus count the number of countries exporting to importer *i*, # TP_{ist}. We obtain this count separately for each sector *s* since trade conditions (such as demand and cost structure) could vary not only across destinations, but also across sectors. On the other hand, by construction # TP_{ist} imposes a hierarchy of markets that is shared by all exporters.

This indicator of market potential delivers more evidence in support of our model. In Panel D, we replace the outcome variable with the log maximum and minimum (10th percentile) values of # TP_{ist} across the countries to which *j* exports to in sector *s*. In Panel E, we instead use the log number of importer *i*'s trade partners averaged across sectors *s*. In both cases, we find patterns consistent with financial development allowing exporters to go further down the pecking order of destinations in financially vulnerable industries.

Recall from the model that whether bilateral trade occurs depends on both characteristics of the seller (productivity distribution, wages, trade costs, financial development) and of the buyer (aggregate demand, trade costs, price index). The number of countries *j* that sells to *i* thus reflects how the combination of exporter and importer factors affect the probability of a trade link between each *j* and *i*. To isolate the contribution of importer-specific determinants without specifying their precise nature, we finally estimate an auxiliary probit regression with importer fixed effects and examine the relative magnitude of their coefficients.

Formally, let T_{ijst} be a binary variable equal to 1 if j exports to i in sector s in year t, and zero otherwise. Assuming a normally distributed error term, the conditional probability of this trade link is:

$$Pr(T_{ijst} = 1) = \Phi(\delta_{jt} + \delta_{it} + \delta_{st}) \quad (5.1)$$

where Φ is the c.d.f. of the standard normal distribution, and δ_{jt}, δ_{it} and δ_{st} indicate exporter–year, importer–year and sector–year fixed effects.[22] The coefficients δ_{it} give a summary measure of the ease and attractiveness of entering market i in year t. Larger positive coefficients on δ_{it} are associated with more popular destinations. We perform the estimation separately for each year since economic conditions may vary over time.

Using our estimates of δ_{it} in Panel F of Table 6, we record highly statistically and economically significant results in line with the model's predictions. We estimate that a one-standard-deviation improvement in financial conditions would allow exporters to add 5 more countries down the pecking order of destinations in an industry highly reliant on external finance (90th percentile) relative to a less dependent industry (10th percentile). Accounting for the variation in both sector measures of financial vulnerability implies a differential impact of 9 countries between the most and least affected sectors (Appendix Table A.4).[23] Since these fixed effects δ_{it} constitute our most agnostic ranking of export destinations by relative market potential, they are our preferred summary statistic in the remainder of the empirical analysis.

5.4. Robustness

We conclude by showing that our empirical findings survive a series of specification checks that reinforce our conclusions. We report these robustness tests using the fixed effects from the auxiliary probit regression, but qualitatively similar patterns hold for the other measures we have employed as well.

Our analysis has relied on the amount of private credit in an economy as a signal of financial market development. In Table 7, we first confirm that other indicators of financial sector activity (also from Beck et al., 2000) deliver comparable findings. In Panel A, we consider the stock market turnover ratio, constructed as the value of total shares traded divided by stock market capitalization. While private credit reflects firms' use of debt financing, value traded captures the availability and liquidity of equity capital. In Column 2, we find that active stock markets help exporters in reaching less attractive destinations, and this is especially true in financially vulnerable sectors. (Although there is a statistically significant effect present for the largest market as well in Column 1, it is much weaker in comparison.) Similar patterns emerge in Panel B, where we study stock market value traded as a share of GDP. This suggests that loan access and stock issuance are both relevant to trade activity, presumably because they provide alternative sources of funding.[24]

Private credit and stock market activity are outcome-based measures that reflect the actual availability and use of financial capital in a country. The health of the financial system in turn depends on the underlying institutions that support financial contracts. For this reason, the prior literature has exploited different institutional measures to gauge the variation in financial development across nations. As Panels C, D, and E demonstrate, our results are qualitatively the same when we follow this strategy: Using the risk of contract repudiation, the risk of expropriation, or accounting standards instead of private credit delivers similar patterns for exporters' choice of trade partners.[25]

We further verify that our measure of financial development does not simply pick up the strength of the broader institutional environment. To do so, we expand the set of control variables to include the interactions of rule of law and corruption with each of the two sector indicators of financial vulnerability.[26] Panel F shows that this does not affect the coefficients of interest.

We next ensure that our findings are not driven by specific functional form assumptions. In Panels A and B of Table 8, we include only one interaction term at a time. The magnitude and statistical significance of the point estimates are barely affected, consistent with the low correlation between the two sector measures. This supports the idea that $ExtFin_s$ and $Tang_s$ reflect separate dimensions of financial vulnerability that are both important in practice.

In the rest of Table 8, we consider a series of other perturbations to the baseline functional form that leave our results unchanged or stronger. In Panel C, we set the outcome variables equal to the 90th percentile and the minimum value of market potential across a country's export destinations, instead of the maximum and the 10th percentile as we have done so far. In Panel D, we study importers' rank based on their fixed effects from the auxiliary probit regression, instead of the value of those fixed effects. In Panels E and F, we estimate the first-stage Eq. (5.1) either with logit or with a linear probability model, instead of with probit. In Panel G, we run the first-stage probit in the pooled panel for 1985–1995 with year dummies, instead of year-by-year. This imposes time-invariant importer fixed effects, such that the hierarchy of destinations is stable over this period. Conversely, in Panel H we allow the pecking order to vary flexibly both across time and across sectors, by estimating the first stage separately for each sector-year pair.

We next conduct a more stringent test of our model's predictions. If countries follow a strict pecking order of exporting, we should observe nestedness: no country should enter the Nth most popular market unless it also serves the (N-1)th most popular market. We have so far provided indirect evidence for nestedness by finding significant coefficients in Eq. (3.2) but not in Eqs. (3.1) and (3.3). In particular, these results imply a one-to-one mapping between an exporter's number of destinations and the minimum market potential among them, such that all destinations with higher market potential must also be served with no gaps in the pecking order. As a more direct test of nestedness, we now estimate specification (3.1) for 21 values from the distribution of market potential across an exporter's trade partners: 100th percentile (= maximum), 95th percentile, 90th percentile, …, 10th percentile, 5th percentile, and 0th percentile (= minimum). For each of these 21 regressions, we record the coefficients on the two interactions of interest, and plot them against the percentile corresponding to the outcome variable.[27]

[22] We estimate this regression on the full sample of 164 exporting and 175 importing nations in the trade dataset, since no control variables are required. This arguably provides the most complete picture of global trade patterns and their underlying determinants. Very similar results hold if we instead restrict our attention to the 78 export countries with sufficient data to enter our baseline regressions above.

[23] Since it is difficult to directly interpret the point estimates in regressions with δ_{it} as the measure of market potential, we calculate these comparative statics using the δ_{it}-based ranking of countries in Panel D of Table 8 below. This ranking of destinations lends itself to a more natural interpretation.

[24] In unreported results available on request, we have found that the size of the stock market itself (measured by stock market capitalization divided by GDP) does not affect exporters' trade partners systematically. This is consistent with prior evidence in the literature that stock market activity can sometimes be a more informative measure of financial sector development than stock market size (c.f. Manova, 2008). We have also studied total liquid liabilities (the sum of currency in circulation, demand- and interest-bearing liabilities of all banks and non-bank financial intermediaries), divided by GDP. This ratio provides an alternative index of financial depth and of the overall size of the financial intermediary sector. The results are in line with our other findings, though the coefficients are less precisely estimated.

[25] The indices for the risk of contract repudiation or expropriation range from 0 to 10, while the rating of accounting standards varies in the unit interval. All three measures come from La Porta et al. (1998), and are available for a smaller sample of 34–42 export countries. Since they are time-invariant, the main effect of financial development in these regressions is subsumed by the exporter country fixed effects.

[26] These two measures also come from La Porta et al. (1998), do not vary over time, and are available for 42 of the export countries in the sample.

[27] Bustos et al. (2012) employ other econometric tests of nestedness that are not readily applicable to difference-in-differences estimation. We leave the application of their methodology to the study of export-market nestedness with financial frictions to future work.

Table 7
Alternative measures of financial development.

	Panel A			Panel B		
$FinDev_{jt}$ measure:	Stock market turnover ratio			Stock market value traded-to-GDP		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	−0.004	−0.041*	−0.018	−0.0003	−0.030	0.011
	(−0.32)	(−1.78)	(−0.76)	(−0.02)	(−0.59)	(0.28)
$FinDev_{jt} \times ExtFin_s$	−0.021**	−0.125***	−0.027	−0.010	−0.094*	0.017
	(−2.31)	(−5.36)	(−1.23)	(−0.92)	(−1.88)	(0.40)
$FinDev_{jt} \times Tang_s$	0.034	0.182**	0.054	−0.010	0.206*	0.010
	(0.81)	(2.65)	(0.78)	(−0.25)	(1.70)	(0.10)
# $Partners_{jst}$			−0.005***			−0.005***
			(−13.08)			(−13.31)
R^2	0.92	0.85	0.87	0.92	0.85	0.87
F-test on interaction terms (*p*)	0.08	<0.01	0.34	0.50	0.12	0.86
	Panel C			Panel D		
$FinDev_j$ measure:	Risk of contract repudiation			Risk of expropriation		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_j \times ExtFin_s$	−0.002	−0.065***	−0.010	−0.005	−0.052***	0.011
	(−0.19)	(−3.91)	(−0.73)	(−0.58)	(−2.82)	(0.71)
$FinDev_j \times Tang_s$	−0.033	0.078*	0.016	−0.001	0.111**	0.055
	(−0.95)	(1.74)	(0.47)	(−0.03)	(2.03)	(1.23)
# $Partners_{jst}$			−0.006***			−0.006***
			(−12.74)			(−12.78)
R^2	0.92	0.84	0.87	0.92	0.84	0.87
F-test on interaction terms (*p*)	0.37	<0.01	0.70	0.70	0.02	0.30
	Panel E			Panel F		
$FinDev_{jt}$ measure:	Accounting standards			Private credit (extended controls)		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$				0.029	−0.069	−0.073
				(1.37)	(−0.84)	(−1.05)
$FinDev_{jt} \times ExtFin_s$	−0.106*	−0.393**	−0.039	0.019	−0.170**	−0.032
	(−1.73)	(−2.13)	(−0.25)	(0.66)	(−2.62)	(−0.61)
$FinDev_{jt} \times Tang_s$	0.026	0.517	0.150	−0.072	0.322**	0.180**
	(0.11)	(1.52)	(0.40)	(−1.11)	(2.52)	(2.16)
# $Partners_{jst}$			−0.006***			−0.006***
			(−11.66)			(−12.71)
R^2	0.97	0.88	0.91	0.92	0.85	0.87
F-test on interaction terms (*p*)	0.22	0.09	0.90	0.50	0.01	0.10

Notes: This table shows that the effect of export countries' financial development on their choice of export destinations is robust to alternative measures of financial development. Estimates from Eqs. (3.1), (3.2) and (3.3) are reported in Columns 1, 2, and 3 of each panel respectively. Financial development is measured by the stock market turnover ratio, stock market value traded as a share of GDP, the risk of contract repudiation, the risk of expropriation, accounting standards, or private credit as a share of GDP. Market potential is measured by a destination fixed effect from Eq. (5.1). The sample is restricted to exporter–sector–year observations with more than 5 trade partners. The number of observations (number of exporters) from Panels A to F are: 12,687 (55), 13,224 (56), 12,091 (42), 12,091 (42), 9962 (34), and 11,821 (42). All regressions include a constant and controls as listed in the text. Standard errors are clustered at the exporter level. T-statistics in parentheses.
*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

Fig. 6 displays patterns strongly indicative of nestedness. With perfect nestedness, financial development should not affect the maximum market potential among a country's destinations differentially across sectors with different levels of financial vulnerability. As we have already seen, the estimated coefficients are indeed 0 for both sector measures when the outcome is the 100th percentile of market potential. As we move right along the horizontal axis from the 100th to the 0th percentile, the line generally slopes down for external finance dependence and generally slopes up for asset tangibility. In other words, financial development allows countries to smoothly go further down their pecking order of destinations in financially more vulnerable sectors, relative to financially less vulnerable sectors. Moreover, any non-monotonicities in the precise point estimates disappear when we take into account the 95-percent confidence interval around these estimates.

Fig. 6 indicates that the effects of financial development become statistically significant around and below the 70th percentile of the distribution of export destinations by market potential. How important are these destinations to countries' aggregate exports? Our difference-in-differences identification strategy prevents us from calculating implied magnitudes for effects at the country level. Summary statistics nevertheless suggest that although the distribution of trade flows across destinations is much skewed,

Table 8
Specification checks.

Dependent variable:	Panel A			Panel B		
	Fixed effect coefficient from auxiliary probit regression			Fixed effect coefficient from auxiliary probit regression		
$FinVul_s$ measure:	External finance dependence			Asset tangibility		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.044	0.037	−0.016	0.062	−0.094	−0.068
	(1.26)	(0.52)	(−0.26)	(1.51)	(−1.24)	(−1.00)
$FinDev_{jt} \times FinVul_s$	0.011	−0.204***	−0.034	−0.051	0.258**	0.142*
	(0.50)	(−3.86)	(−0.72)	(−0.79)	(2.46)	(1.87)
# $Partners_{jst}$			−0.006***			−0.006***
			(−12.68)			(−13.08)
R^2	0.88	0.82	0.84	0.88	0.82	0.84
Dependent variable:	Panel C			Panel D		
	Fixed effect coefficient from auxiliary probit regression			Ranking of fixed effect coefficient from auxiliary probit regression		
	90th percentile	Minimum		Minimum	90th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.117**	0.143	0.102	−1.126	2.620	4.216
	(2.04)	(1.19)	(1.07)	(−1.58)	(0.48)	(0.85)
$FinDev_{jt} \times ExtFin_s$	−0.085*	−0.354***	−0.025	−0.283	14.958***	2.182
	(−1.67)	(−5.27)	(−0.36)	(−0.75)	(3.87)	(0.62)
$FinDev_{jt} \times Tang_s$	0.010	0.356**	0.157	0.770	−19.607**	−11.878*
	(0.09)	(2.41)	(1.45)	(0.63)	(−2.36)	(−1.95)
# $Partners_{jst}$			−0.011***			0.428***
			(−15.93)			(12.44)
R^2	0.84	0.76	0.80	0.09	0.54	0.59
F-test on interaction terms (*p*)	0.19	<0.01	0.35	0.71	<0.01	0.15
Dependent variable:	Panel E			Panel F		
	Fixed effect coefficient from auxiliary logit regression			Fixed effect coefficient from auxiliary LPM regression		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.085	−0.054	−0.092	0.014	−0.012	−0.016
	(1.21)	(−0.40)	(−0.74)	(1.48)	(−0.71)	(−1.03)
$FinDev_{jt} \times ExtFin_s$	0.020	−0.369***	−0.066	0.002	−0.045***	−0.012
	(0.50)	(−3.81)	(−0.75)	(0.45)	(−4.25)	(−1.22)
$FinDev_{jt} \times Tang_s$	−0.081	0.466**	0.282**	−0.012	0.048**	0.028*
	(−0.69)	(2.43)	(2.02)	(−0.81)	(2.19)	(1.72)
# $Partners_{jst}$			−0.010***			−0.001***
			(−2.41)			(−12.59)
R^2	0.84	0.79	0.81	0.92	0.88	0.89
F-test on interaction terms (*p*)	0.78	<0.01	0.12	0.72	<0.01	0.15
Dependent variable:	Panel G			Panel H		
	Fixed effect coefficient from auxiliary probit regression (pooled)			Fixed effect coefficient from auxiliary probit regression (by sector-year)		
	Maximum	10th percentile		Maximum	10th percentile	
	(1)	(2)	(3)	(1)	(2)	(3)
$FinDev_{jt}$	0.068*	−0.066	−0.086	0.039	−0.016	−0.042
	(1.79)	(−0.95)	(−1.32)	(0.95)	(−0.17)	(−0.49)
$FinDev_{jt} \times ExtFin_s$	0.009	−0.185***	−0.031	0.046	−0.280***	−0.075
	(0.40)	(−3.86)	(−0.70)	(1.41)	(−4.51)	(−1.45)
$FinDev_{jt} \times Tang_s$	−0.047	0.224**	0.131*	−0.086	0.265**	0.140
	(−0.74)	(2.32)	(1.80)	(−1.49)	(2.11)	(1.34)
# $Partners_{jst}$			−0.005***			−0.007***
			(−11.79)			(−13.78)
R^2	0.15	0.52	0.57	0.90	0.76	0.79
F-test on interaction terms (*p*)	0.76	<0.01	0.18	0.25	<0.01	0.14

Notes: This table shows that the effect of export countries' financial development on their choice of export destinations is robust to alternative estimation methods. Estimates from Eqs. (3.1), (3.2) and (3.3) are reported in Columns 1, 2, and 3 of each panel respectively. Financial development is measured by private credit as a share of GDP. Market potential is measured by a destination fixed effect from Eq. (5.1). The sample is restricted to exporter–sector–year observations with more than 5 trade partners. The number of observations (number of exporters) is 16,334 (78) in all panels. All regressions include a constant and controls as listed in the text. Standard errors are clustered at the exporter level. T-statistics in parentheses.

*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

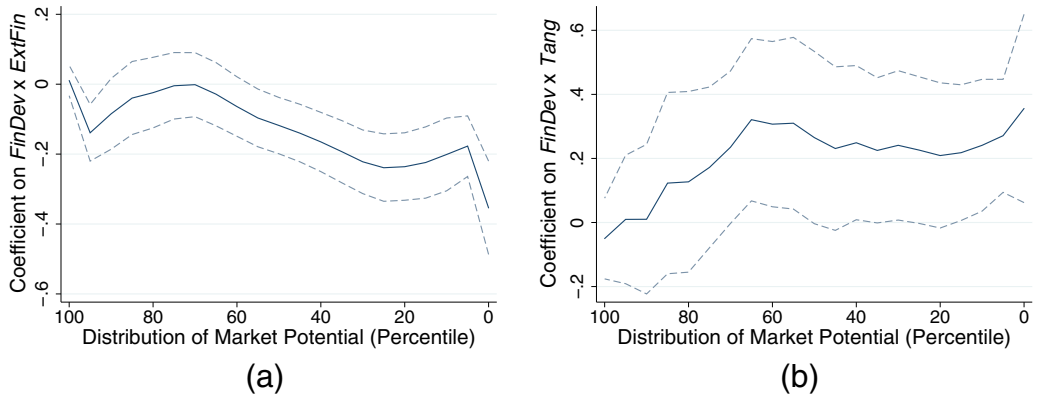

Fig. 6. This figure shows the effect of an export country's financial development on market potential at the 100th, 95th, 90th, …, 10th, 5th, and 0th percentile of the distribution of market potential among its export destinations. Plots (a) and (b) present coefficient estimates for $FinDev_{jt} \times ExtFin_s$ and $FinDev_{jt} \times Tang_s$, respectively, from estimating Eq. (3.1) for each of these 21 percentiles as the outcome variable. The dashed lines correspond to the 95% confidence interval around these coefficient estimates. Financial development is measured by private credit as a share of GDP. Market potential is measured by a destination fixed effect from Eq. (5.1). Coefficients at the 100th percentile (maximum) correspond to coefficients in Table 6 Panel F Column 1, and at the 10th percentile to Column 2.

the contribution of destinations outside the top deciles is not trivial. Appendix Fig. A.2 plots the share of exports (summed across sectors) going to each of ten deciles of destinations grouped by market potential, averaged across exporting countries in 1995. The top, second and third deciles capture respectively about 65%, 18% and 7% of the average country's exports. Very similar patterns obtain whether we rank all potential destinations based on our preferred measure of market potential or order actual destinations served separately for each exporter. Expansion into new markets abroad can also add substantially to export growth within countries over time. We identify the new destinations that each exporter in our data entered between 1985 and 1995. For the average country, sales to new markets contribute 10.9% to total exports in 1995 (standard deviation 16.7%) and 14.5% to total export growth between 1985 and 1995 (standard deviation 80.3%).

Finally, we have performed sensitivity checks to address potential concerns with reporting errors in trade values (available on request). While classical measurement error would introduce noise and bias our results downwards, a particular form of non-classical measurement error might bias our results upwards: If very low trade flows are systematically under-reported, the pecking order of countries would not be affected, but the coefficients in regressions for the minimum market potential might be overestimated. This might arise for two reasons. First, the raw data report only positive bilateral trade flows, in thousands of dollars. Hence the lowest observed value is $1000, and any unobserved exporter–importer–sector triplet is assumed to conduct zero trade. Our results, however, remain robust when we set to 0 all observed positive trade flows below the 1st percentile ($5000) or below $100,000.

Second, less developed nations may be more likely to misreport trade flows. Note that all of our specifications already control for the exporter's level of overall development (GDP per capita), and Panel F of Table 7 shows that our findings also hold conditioning on the exporter's corruption level. We have additionally checked that our results survive when, in the first-stage auxiliary probit regression, we drop origin and destination countries with GDP per capita below the 5th percentile, or exporter–importer–sector triplets with annual export growth above 100% that might signal misreporting. We have also estimated a weighted first-stage probit regression, where we weighted observations by the exporter's GDP per capita or anti-corruption index.

The stability of the results across these robustness checks bolsters our conclusion that countries' level of financial development is an important determinant of their export behavior, and the range of markets they choose to service in particular.

6. Conclusion

This paper establishes that exporters follow a pecking order of destinations, but financial frictions disrupt their decision to enter foreign markets. We develop a theoretical model to illustrate how firms add destinations in decreasing order of profitability, determined by market size and trade costs. Credit constraints limit firms' access to financial resources and prevent them from entering all markets they could serve in the first best. This distortion is alleviated in exporting countries with better-functioning capital markets. As a result, financially advanced economies export to more destinations by going further down the pecking order. This effect is especially pronounced in financially vulnerable sectors characterized by high external finance dependence and low asset tangibility.

We confirm these theoretical predictions empirically by estimating model-consistent relationships between characteristics of exporters' destination countries and credit conditions at home. Using aggregate bilateral trade data, we analyze how the maximum and minimum values of market potential among an exporter's trade partners vary with exporters' financial development and sectors' financial vulnerability. In the process, we develop a model-consistent hierarchy of destinations based on observed market size and trade costs, as well as on unobserved market potential inferred from actual trade links. Our findings are robust to a series of specification checks and variable measurement.

Our results imply that financial institutions importantly affect the number and identity of countries' trade partners. This adds to prior evidence in the literature that international trade linkages have a wide range of economic repercussions that crucially depend on countries' characteristics, such as overall level of development and role in global goods and capital markets. A promising direction for future work lies at the intersection of these two lines of research. By improving domestic financial conditions, countries can expand their set of export destinations and foster entry into new locations. A key question for policy makers in developing economies is how this would shape economic growth, volatility, cross-border productivity spillovers, and the transmission of shocks across nations.

Appendix A

Table A.1
Export destinations, growth, and volatility.

Dependent variable:	Δ(Exports) (1)	σ(Δ(Exports)) (2)	Δ(Exports) (3)	Δ(GDPpc) (4)	σ(Δ(GDPpc)) (5)	Δ(GDPpc) (6)
(log) # of export destinations $_{1985}$	5.985**	−0.149**	11.851***	1.231*	−0.019*	2.113**
	(2.60)	(−2.34)	(6.21)	(1.74)	(−1.72)	(2.45)
(log) total exports $_{1985}$	−0.747	−0.010	−1.208***	0.027	−0.001	−0.042
	(−1.15)	(−0.53)	(−2.67)	(0.13)	(−0.33)	(−0.22)
Δ(# of export destinations)			1.772***			0.266*
			(6.34)			(1.81)
R^2	0.19	0.29	0.44	0.17	0.24	0.21

Notes: $\Delta(x)$ and $\sigma(\Delta(x))$ refer to the mean and standard deviation of the growth rate of x between 1986 and 1995. $N = 90$ exporters in all regressions. All regressions include a constant term. Heteroskedastic robust standard errors used. T-statistics in parentheses.
*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

Table A.2
Correlations for variables in Tables 1 and 2.

Variable	1	2	3	4	5
Panel A—importers					
Total imports	–				
Average number of partners	0.79	–			
GDP	0.86	0.60	–		
GDP per capita	0.63	0.80	0.40	–	
Trade cost index	−0.34	−0.61	−0.22	−0.63	–
Panel B—exporters					
Total exports	–				
Average # of partners	0.77	–			
Private credit	0.63	0.78	–		
Max. of export partners' GDP	0.24	0.61	0.49	–	
10th percentile of distribution of export partners' GDP	−0.29	−0.56	−0.47	−0.63	–

Notes: 104 countries in Panel A, 107 in Panel B.

Table A.3
Financial development and trade activity.

	Panel A		Panel B	
	At least 1 partner		More than 5 partners	
Dependent variable:	(log) Exports	# *TP*	(log) Exports	# *TP*
	(1)	(2)	(1)	(2)
$FinDev_{jt}$	0.150	−2.227	0.229	−3.732
	(0.57)	(−0.46)	(0.70)	(−0.58)
$FinDev_{jt} \times ExtFin_s$	1.564***	41.942***	1.356***	29.872***
	(8.31)	(13.44)	(4.38)	(5.08)
$FinDev_{jt} \times Tang_s$	−1.171*	−17.045**	−1.680**	−18.074
	(−1.89)	(−2.12)	(−2.06)	(−1.53)
Controls	$\log(GDP_{jt})$ and j, s, t fixed effects		$\log(GDP_{jt})$, K/L, H/L, N/L, $\log(GDPPC_{jt})$, interactions, and j, s, t fixed effects	
R^2	0.82	0.90	0.80	0.88

Notes: # *TP* refers to the number of trade partners of the exporter in each sector. The measure of financial development is private credit. The unit of observation is at the exporter–sector–year level. The sample is restricted to observations with at least 1 trade partner in Panel A and more than 5 trade partners in B. The number of observations (number of exporters) is 26,900 (107) in Panel A and 16,334 (78) in Panel B. Panel B controls are the same as those listed in the text. Standard errors are clustered at the exporter level. T-statistics in parentheses.
*** Statistically significant at the 1% level.
** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

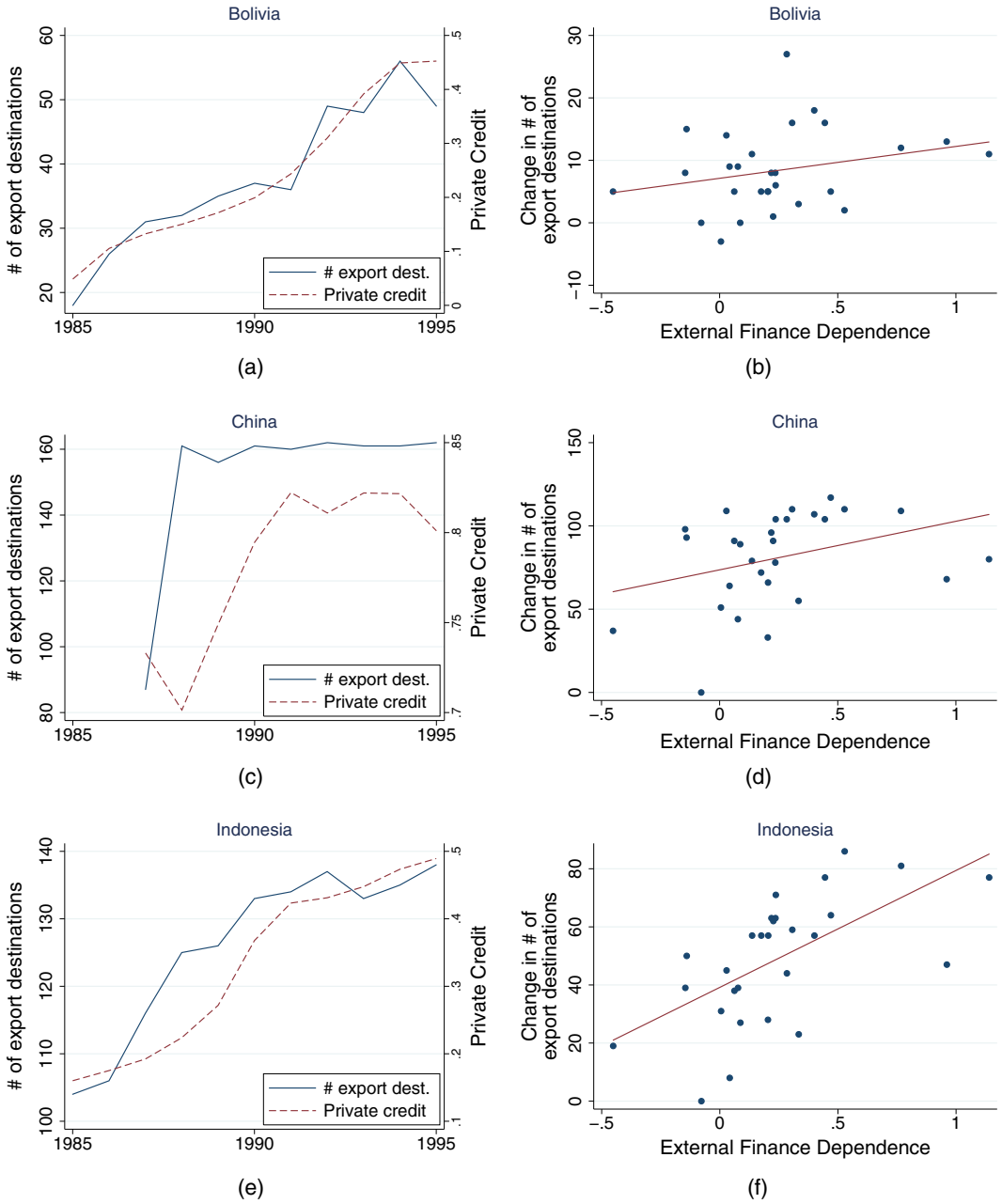

Fig. A.1. For each country (Bolivia, China, Indonesia, Mexico, Poland, and Thailand), we plot the number of export destinations and financial development (private credit) from 1985 to 1995 (left side), and the change in the number of export destinations from 1985 to 1995 by industry against industries' external finance dependence (right side).

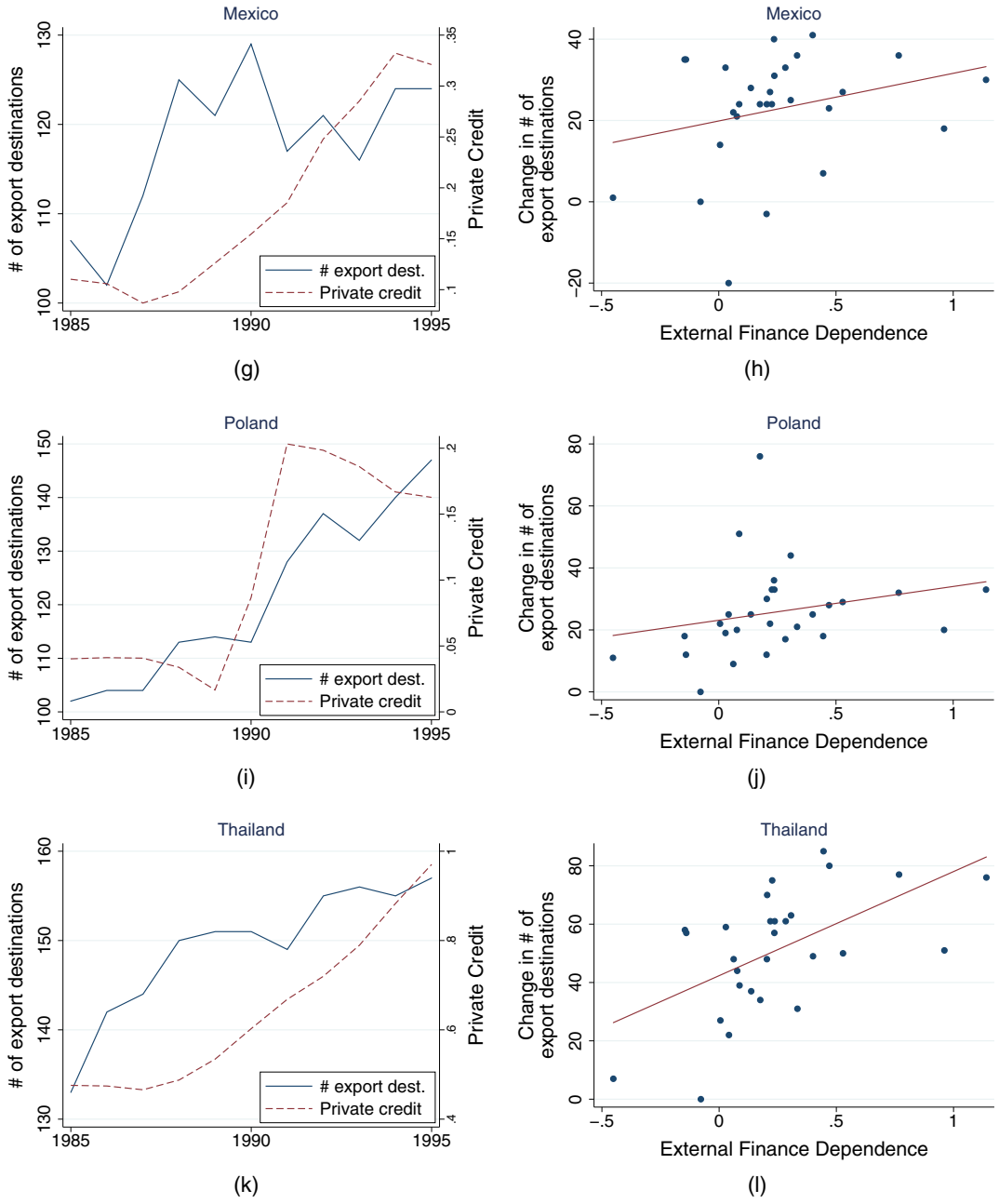

Fig. A.1 (*continued*).

Table A.4
Economic magnitudes.

Dependent variable	$FinVul_s$	(1) 10th and 90th pctl.	(2) 1 std. dev.	(3) Maximum
(log) GDP	ExtFin	−0.165	−0.060	−0.320
	Tang	−0.101	−0.041	
(log) Aggregate consumption	ExtFin	−0.154	−0.056	−0.331
	Tang	−0.116	−0.047	
(log) Bilateral distance	ExtFin	0.027	0.010	0.050
	Tang	−0.007	−0.003	
DB trade cost index	ExtFin	1.161	0.422	1.985
	Tang	0.139	0.056	
(log) GDP / bilateral distance	ExtFin	−0.178	−0.065	−0.335
	Tang	−0.101	−0.041	
(log) GDP / DB trade cost index	ExtFin	−0.224	−0.081	−0.445
	Tang	−0.144	−0.059	
Fixed effect coefficient	ExtFin	−0.013	−0.005	−0.021
	Tang	−0.006	−0.002	
Rank of fixed effect coefficient	ExtFin	4.941	1.796	8.713
	Tang	2.437	0.993	

Notes: This table reports comparative statics based on Tables 3, 4, 6, and 8 to illustrate the implied economic effect of financial development on countries' ability to add destinations down the pecking order. For each measure of export market potential, Column 1 reports the differential effect of a one-standard-deviation increase in private credit (0.364) on the market potential of the marginal export destination in a sector at the 90th versus at the 10th percentile of external finance dependence (holding asset tangibility fixed) or of asset tangibility (holding external finance dependence fixed). Column 3 compares instead the implied impact on the most versus least affected industry, based on the variation in both external finance dependence and asset tangibility across industries. Column 2 replicates Column 1 but compares sectors that are one standard deviation apart in financial vulnerability rather than spanning the 90th–10th percentile range.

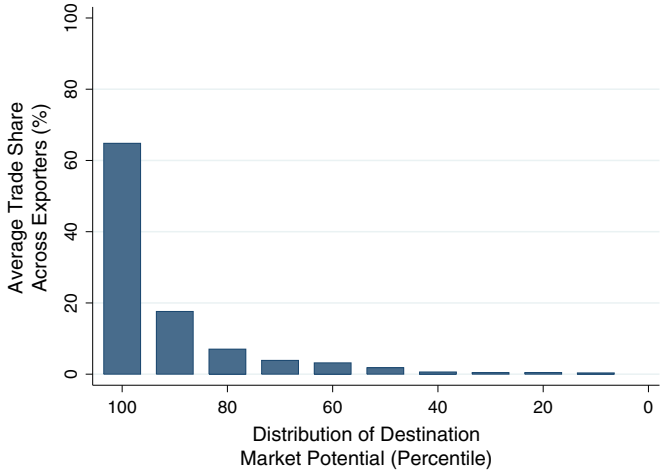

Fig. A.2. This figure plots the share of exports to each decile of destinations grouped by their market potential (measured by the destination fixed effect from Eq. (5.1)), averaged across exporting countries in 1995.

Appendix B

The data and Stata code used in the analysis can be found at http://dx.doi.org/10.1016/j.jdeveco.2015.04.002.

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