Financial Dependence and Intensive Margin of Trade*

Melise JAUD† Madina KUKENOVA‡ Martin STRIEBORNY§

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Abstract

This paper examines the transmission process from finance to the product-level export survival. We find that conditional on the specific financial needs of exported products, banks and stock markets play distinctive roles in helping exporters survive in foreign markets. Stock markets rather than banks help exporters who lack easily collateralizable tangible assets. Active rather than large stock markets facilitate exports of products requiring high levels of working capital. And the trade credit can act as a substitute for external financing from banks but not from stock markets and only in the presence of well-established export links.

JEL classification: F14, G10, G21.

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†World Bank; E-Mail: mjaud@worldbank.org

‡Swiss School of Higher Education; E-Mail: madina.kukenova@sshe.ch

§University of Glasgow, Adam Smith Business School, Room 469, Main Building, University Avenue, Glasgow, G12 8QQ, United Kingdom. E-Mail: martin.strieborny@glasgow.ac.uk

1 Introduction

The role of finance in international trade has received a lot of attention among scholars in both trade and finance (e.g., Beck 2002; Greenaway, Guariglia, and Kneller 2007; Manova 2008; Amiti and Weinstein 2011; Minetti and Zhu 2011; Becker, Chen, and Greenberg 2013; Manova 2013; Muûls 2015; Paravisini *et al.* 2015). This finance-trade literature often focuses on the extensive margin of international trade and measures the export success in terms of export entry. However, most exports cease shortly after they started without leaving a significant mark on the long-term export performance of a country (see, e.g., Besedeš and Prusa 2006a, 2006b; Békés and Muraközy 2012; Albornoz, Fanelli, and Hallak 2016). Export survival is also an important component of the intensive margin of international trade that often sets apart the successful developing countries from the unsuccessful ones (Besedeš and Prusa 2011). Surviving in foreign markets is thus a crucial element of the export success and deserves proper attention when it comes to analyzing the role of financial factors in international trade.

This paper looks at how exactly domestic financial markets and institutions help exporters survive in foreign product markets. We recompute five measures representing different transmission channels from finance to the real economy for narrowly defined industrial sectors and match them with the disaggregated product-level data on international trade. Given that the explored transmission channels might operate differently in the short term and long term, we examine export survival at time horizons ranging from one to ten years. We also allow for the possibility that the size and the activity of domestic stock markets play different roles in shaping export survival at the product level.

Our main analysis focuses on transmission channels associated with three distinct sources of financial vulnerability that can be alleviated by well-developed financial markets and institutions. First, the manufacturing process of certain products requires high levels of investment in physical capital. Strong banks and deep stock markets can provide external funding to cover these investment needs (Rajan and Zingales 1998). Second, a well-developed financial system can supply the necessary liquidity for production

processes requiring high levels of working capital (Raddatz 2006). Third, borrowers in financially underdeveloped countries usually need to provide high levels of collateral in order to obtain the necessary external financing. Well-developed financial markets and institutions are therefore particularly important for products whose manufacturing process relies on intangible assets that are less suitable to serve as collateral (Braun 2003; Claessens and Laeven 2003).

We further test the robustness of our main results to the inclusion of two additional transmission channels little studied in the finance-trade literature. One channel is linked to the firm-to-firm trade credit that can serve as a substitute for funding from financial sector (Fisman and Love 2003). The other additional channel looks at the role of the financial sector in allocating resources to firms and industries with high growth potential (Fisman and Love 2007).

Our three main empirical findings are as follows. First, well-developed stock markets rather than strong banks are key in promoting export survival across all time horizons for products from industries with a high share of intangible assets. This result supports the notion that stock markets have an advantage over banks when it comes to promoting innovative sectors of the economy that face increasing returns to scale and a pronounced technological change (see, e.g., Allen 1993; Aghion et al. 2004; Brown, Martinsson, and Petersen 2013; Hsu, Tian, and Xu 2014). Second, *active* stock markets play the most important role for the export survival of products with high liquidity needs, possibly reflecting the role active stock markets have in monitoring the efficiency of working capital management (see, e.g., Gill and Biger 2013; Ben-Nasr 2016; Zeidan and Shapir 2017). By contrast, *large* stock markets are often dominated by banks in promoting these products, especially when it comes to the long-term export survival. These results highlight the importance of distinguishing between size and activity of financial markets. Third, trade credit operates as a substitute for external finance from banks but not from stock markets. In addition, this substitution works only for the *long-term* export survival, suggesting that the channel can successfully operate only alongside well-established export links where exporters and their foreign customers already enjoy the mutual trust necessary for an

extensive use of trade credit.

Overall, our results suggest that banks and stock markets play different roles in shaping product-level export survival, depending on the examined transmission channel, on the specific dimension of bank and stock market development, and on the time horizon under consideration. This relates our work to three distinct strands of the existing literature.

First, the paper connects to the existing finance-trade literature. The notion that cross-country differences in financial development can drive the international trade flows goes back at least to Kletzer and Bardhan (1987). Due to data limitations, the empirical testing of this theoretical insight had to wait until Beck (2002), leading to a booming literature at the intersection of finance and international trade that has explored both the positive impact of a well-functioning financial system on export performance (e.g., Beck 2002; Greenaway, Guariglia, and Kneller 2007; Berman and Héricourt 2010; Ju and Wei 2011) and the negative impact of financial disturbances and crises on trade (e.g., Amiti and Weinstein 2011; Levchenko, Lewis, and Tesar 2011; Bricongne *et al.* 2012; Chor and Manova 2012; Paravisini *et al.* 2015). Similarly to us, several papers in this literature examine various transmission channels from finance to real economy in the context of international trade (e.g., Beck 2003; Svaleryd and Vlachos 2005; Hur, Raj, and Riyanto 2006; Manova 2013; Fan, Lai, and Li 2015; Crino and Ogliari 2017). These papers look mostly at how a well-developed financial system shapes export entry, export exit or export volume alongside the transmission channels related to high investment needs, high liquidity needs, and high share of intangible assets in the production process. We focus on the relative importance of banks versus stock markets within these transmission channels and explore both short-term and long-term dynamics by examining export survival at different time horizons.[1] Furthermore, we allow different dimensions of well-functioning financial institutions and markets to play distinct roles in promoting export survival, for

[1] Rather than investigating these transmission channels, several other papers look at the role of banks and stock markets in international trade from different angles. Cho et al. (2019) develop a model linking bank and bond financing with firm size distribution, gains from trade, and the real exchange rate. Amissah et al. (2021) explore theoretically and empirically the bi-directional relationship between financial infrastructure and comparative advantage of countries.

example by distinguishing between the size and the activity of stock markets. Besides the three main transmission channels, we also examine trade credit as a possible substitute for external finance from banks and stock markets and the role of bank and stock markets in channelling funds towards projects with high growth potential. These two additional transmission channels from finance to real economy have so far attracted little attention in the finance-trade literature.

Second, the paper is related to the strand of literature examining the impact of banks and stock markets on the real economy. This line of research looks at the importance of banks and stock markets for economic growth (e.g., Demirgüç–Kunt and Maksimovic 1998; Levine and Zervos 1998; Beck and Levine 2004; Shen and Lee 2006), the relevance of having a bank-based or a market-based financial system for the real economic outcomes (e.g., Beck and Levine 2002; Demirgüç–Kunt and Maksimovic 2002; Levine 2002; Langfield and Pagano 2016), as well as the evolving roles of banks and stock markets during the process of economic development (e.g., Song and Thakor 2010; Demirgüç–Kunt, Feyen, and Levine 2013). Exploring the transmission process from banks and stock markets to export survival can complement findings in this literature, which has focused mostly on output growth at the country, industry or firm level. For one thing, financial constraints are even more important in international trade than in domestic production due to many additional costs associated with exporting like cross-border transport, custom clearance, conforming with foreign product market regulations, etc. The bilateral character of the data in international trade also allows for a cleaner identification of the impact of financial markets and institutions on the real economic outcomes. In particular, we can exploit the varying strength of domestic banks and stock markets across exporting countries while at the same time holding the product market structure as well as the legal, regulatory and institutional environment constant by focusing on a single destination market (USA). Last but not least, our empirical analysis can rely on highly disaggregated product-level data that are both available and comparable for many different countries across all stages of financial and economic development.

Third, the paper relates to the trade survival literature. Besedeš and Prusa (2006a,

2006b) were the first to apply the analytical tools of survival analysis in the context of international trade and uncovered the surprisingly short lifespan of most export spells. This finding triggered an extensive follow-up research on trade survival (see, e.g., Nitsch 2009; Brenton, Saborowski, and von Uexkull 2010; Besedeš and Prusa 2011; Békés and Muraközy 2012; Hess and Persson 2012; Besedeš 2013; Cadot *et al.* 2013; Albornoz, Fanelli, and Hallak 2016; Araujo, Mion, and Ornelas 2016). Trade survival literature has so far not systematically looked at the different transmission channels from banks and stock markets to export survival at different time horizons, although a few papers did explore particular aspects of the relationship between domestic financial system and export survival. These include Jaud, Kukenova, and Strieborny (2015, 2019) who investigate the importance of financial frictions in the context of agricultural exports, and Jaud, Kukenova, and Strieborny (2018) who document the disciplining impact of banks on exporting managers. Also related is the work by Besedeš, Kim, and Lugovskyy (2014) who use the survival analysis to compute a measure of project risk, which they then use as an explanatory variable in their main regression that examines the impact of credit constraints on export growth.[2]

The rest of the paper is organized as follows. Section 2 outlines our empirical approach. Section 3 describes the construction of our dataset. Section 4 discusses the main results for various transmission channels from finance to export survival, using the most common proxies for the levels of banking and stock market development. Section 5 explores if and how these results change when we look at alternative dimensions of banking and stock market development instead. Section 6 concludes and suggests directions for further research.

2 Empirical Approach

We combine an export survival framework based on Araujo, Mion, and Ornelas (2016) with the difference-in-differences identification strategy developed by Rajan and Zingales

[2] Jaud, Kukenova, and Strieborny (2021) also examine export survival but focus on the role of foreign investors rather than domestic financial system. Bridges and Guariglia (2008) and Görg and Spaliara (2014) look at how the export status affects the link between financial factors and firm survival but do not examine the link between finance and trade.

(1998). This allows us to examine the importance of well-developed banks and stock markets for export success at different time horizons through the lenses of five well-established transmission channels from finance to the real economy.

Subsection 2.1 describes in more detail the transmission channels, while Subsection 2.2 discusses our estimation strategy. Additional arguments supporting the relevance of the examined transmission channels and the suitability of the chosen identification strategy in the context of international trade can be also found in those finance-trade papers that have used the Rajan and Zingales (1998) methodology outside of the survival framework (e.g., Beck 2003; Svaleryd and Vlachos 2005; Hur, Raj, and Riyanto 2006; Manova 2013; Fan, Lai, and Li 2015; Crino and Ogliari 2017).[3]

2.1 Transmission Channels

The transmission channels examined in this paper have been originally developed in papers exploring the impact of finance on economic growth (Rajan and Zingales 1998; Braun 2003; Claessens and Laeven 2003; Fisman and Love 2003, 2007; Raddatz 2006).[4] As outlined below, these channels might be even more important in the context of finance and international trade.

Investment needs. Firms in certain industries do not generate sufficient cash flows to maintain the necessary level of physical capital from internal financial sources alone. Typical technological reasons for high investment needs include large scale of a typical investment project or a long gestation period (time span between the start of an investment project and the start of actual production making use of this project) in a given industry. Consequently, the firms in these industries need to rely on providers of external finance like banks and stock markets to fund a significant part of their investment needs (Rajan and Zingales 1998). This would be even more true in the case of exporting that requires substantial additional investments due to adjusting of products to different consumer preferences, satisfying regulatory requirements in foreign countries, establishing

[3] Trade papers that have used this type of difference-in-differences methodology when looking at non-financial determinants of international trade include Romalis (2004), Levchenko (2007) or Nunn (2007).

[4] Other finance papers using the difference-in-differences identification strategy of Rajan and Zingales (1998) in various contexts include Cetorelli and Gambera (2001), Braun and Larrain (2005), Cetorelli and Strahan (2006), Kroszner, Laeven and Klingebiel (2007), Gupta and Yuan (2009), Strieborny and Kukenova (2016) and many others.

and maintaining distribution networks abroad, etc.

Liquidity needs. Firms in certain industries require high levels of liquid funds (working capital) to maintain their operations. Typical technological reasons for high liquidity needs are a long production process or the necessity to hold a significant amount of inventories in a given industry. A smooth operating performance in these industries would therefore generally require external funding provided by banks or stock markets (Raddatz 2006). Again, exporting activities magnify the liquidity needs, because the time-intensive cross-border shipping, custom clearance, and product distribution in a foreign country further increase the time lag between paying for the purchased inputs and receiving payments for the sold products.

Asset intangibility. Firms in certain industries utilize a high share of intangible assets in their production process. The examples of intangible (soft) assets include intellectual property (patents, copyrights and trademarks), client lists, licenses, blueprints and building designs, brand recognition, human and organizational capital, etc. By contrast, typical tangible (hard) assets include plants, machinery, equipment or land. Intangible assets are less suitable to serve as collateral because they are less durable and can be easier stolen by competitors or employees. Compared to the hard assets, intangible assets also have a limited liquidation value, both because they are often industry-specific or even firm-specific, and because the management can more easily hide them from the providers of external finance in case of firm's default. The lower collateral and liquidation value of intangible assets present an important obstacle for obtaining the necessary external finance (Shleifer and Vishny 1992; Rampini and Viswanathan 2010; Falato et al. 2020). Importantly, it presents a bigger problem in financially underdeveloped countries characterized by less efficient monitoring and screening of borrowers and worse protection of the rights of investors and debtholders vis-a-vis corporate insiders. Firms operating in financially underdeveloped countries therefore usually need to possess easily collateralizable tangible assets like plants and machinery in order to obtain the necessary external financing. Consequently, industries relying for technological reasons on a high share of intangible assets would benefit disproportionately more from being located in a financially

developed country (Braun 2003; Claessens and Laeven 2003). Given the higher need of external finance in cross-border trade, this would arguably be even more the case when it comes to the exporting activities of such industries.

Trade credit. Borrowing from business partners in the form of trade credit can serve as a substitute for external financing by banks and stock markets. Therefore, firms in industries that rely on trade credit financing should benefit disproportionately *less* from the development of formal financial institutions and markets (Fisman and Love 2003). However, this alternative financing channel often relies on well-established trust between buyers and suppliers of given products. When it comes to production growth of industries dependent on trade credit, the effect should be therefore more visible in the growth of already established firms rather than in entry of new firms. This conjecture is indeed confirmed by Fisman and Love (2003). Well-established trust between providers and recipients of trade credit is arguably even more important in international trade where higher risk and longer time spans between production and final delivery put an additional burden on the business partner who provides the trade credit. In the context of export survival, one would therefore expect the trade credit to matter especially for the long-term survival of products already established in the foreign markets and to matter rather less for the immediate survival of new products that have just entered these markets.

Global growth opportunities. Fisman and Love (2007) argue that a well-developed financial system increases economy's resource allocation towards firms and sectors that have better growth opportunities. They suggest this allocative transmission channel as an alternative to the channel of investment needs by Rajan and Zingales (1998) and demonstrate in a direct horse race that their measure of global growth opportunities performs better than the investment needs measure when it comes to dissecting the impact of the overall financial development on industrial growth. We examine how these results translate into the context of international trade while considering different time horizons of export survival and separate measures for the strength of banks and stock markets.

2.2 Estimation Strategy and Empirical Specifications

The difference-in-difference identification strategy introduced by Rajan and Zingales (1998) employs proxies of financial vulnerability that are measured at the level of industrial sectors, making these proxies exogenous from the point of view of decision makers at the firm level. Furthermore, these sector-level financial measures are based on data from large firms in a country with a highly developed financial system (USA). They are thus unaffected by financial frictions faced by smaller firms or by firms in countries with underdeveloped financial systems. Consequently, these measures can be seen as capturing the exogenous financing needs driven by technological characteristics of different industrial sectors including scale of typical investment project, length of the production process, or typical amount of inventories (see, e.g., Rajan and Zingales 1998, Braun and Larrain 2005; Raddatz 2006). This represents the main advantage of these sectoral measures over firm-level financial variables. The data observed at the firm level are by their very nature a result of both the external financial constraints facing the firm and the endogenous financial decisions of the firm itself, making causal inferences difficult.

An empirical model inspired by Araujo, Mion, and Ornelas (2016) provides us with a unified framework to explore export survival at different time horizons, allowing for the possibility that the examined transmission channels operate differently in short term and long term. In contrast to the non-linear estimators like logit or probit, this linear probability model also facilitates the inclusion of full sets of diverse fixed effects that are an indispensable part of the difference-in-difference identification strategy based on Rajan and Zingales (1998).

Combining the trade survival framework of Araujo, Mion, and Ornelas (2016) with the difference-in-differences identification strategy inspired by Rajan and Zingales (1998) yields the following general empirical model:

$$\begin{aligned} S_{kic}^{l/t_0} &= \beta_1 FinancialVulnerability_i * Banks_{c,t_0} \\ &+\beta_2 FinancialVulnerability_i * StockMarkets_{c,t_0} \\ &+\mathbf{controls}_{kic,t_0}\phi + \delta_k + \delta_{c*t_0} + \varepsilon_{kic,t_0}, \end{aligned} \tag{1}$$

where the dependent variable is the probability of export survival of product k from

industrial sector (industry) i exported by country c to the USA. The export survival probability is measured l years ($l = 1, 5, 10$) after the beginning of export spell (t_0).[5]

Our main variables of interest are the interaction terms of financial vulnerability with banking and stock market development ($FinancialVulnerability_i * Banks_{c,t_0}$, $Financial\ Vulnerability_i{*}StockMarkets_{c,t_0}$). The direct effects of the individual components of these interaction terms ($FinancialVulnerability_i$, $Banks_{c,t_0}$, $StockMarkets_{c,t_0}$) are absorbed by the product and country-time fixed effects (δ_k, δ_{c*t_0}).

We use different measures of financial vulnerability to explore different transmission channels from finance to export survival: investment needs, liquidity needs, and asset intangibility. Equation 1 thus comprises nine different specifications that look at the relative importance of banks and stock markets for export survival at three different time horizons alongside three different transmission channels. A positive coefficient β_1 and/or β_2 would suggest that well-developed banks and/or stock markets particularly promote export survival of products from industries that suffer from a given source of financial vulnerability.

As an example, let us pick from the nine variants of Equation 1 the one looking at export survival after 10 years ($S_{kic}^{l=10/t_0}$) and focusing on the high share of intangible and thus not easily collateralizable assets in the production process as the source of financial vulnerability.[6] In this specification, an insignificant coefficient β_1 for the interaction term $AssetIntangibility_i * Banks_{c,t_0}$ and a positive and significant coefficient β_2 for the interaction term $AssetIntangibility_i * StockMarkets_{c,t_0}$ would have the following economic interpretation: It is only well-developed stock markets but not well-developed banks that promote the long-term export survival of financially vulnerable products from industries that for technological reasons rely on a high share of intangible assets.

In some estimations, we also control for two additional transmission channels from finance to the real economy (Fisman and Love 2003, 2007). Firstly, industries that are able to rely on trade credit from their business partners might benefit disproportionately *less*

[5] In this survival framework, we thus estimate a linear probability model for various lengths of export spells. See Araujo, Mion, and Ornelas (2016) for a more detailed and more technical discussion.

[6] This variant of Equation 1 thus writes: $S_{kic}^{l=10/t_0} = \beta_1 AssetIntangibility_i * Banks_{c,t_0} + \beta_2 AssetIntangibility_i * StockMarkets_{c,t_0} + \mathbf{controls}_{kic,t_0}\phi + \delta_k + \delta_{c*t_0} + \varepsilon_{kic,t_0}$

from a well-developed formal financial system compared to industries whose only source of external finance are banks and stock markets. Secondly, well-developed banks and/or stock markets in the exporting country might particularly promote export performance of products from industries that require significant external funding to fulfil their high growth potential.

All regressions are estimated by OLS with robust standard errors clustered at the country-time level ($c * t_0$), where country c refers to the exporting country and time t_0 refers to the beginning of a given export spell.

All estimations contain a full set of product-level fixed effects (δ_k) and fixed effects at the country-time level (δ_{c*t_0}). The product-level fixed effects control for all product characteristics that could affect the probability of export survival (e.g., weight or volume of a product increasing the shipping costs). The product fixed effects also absorb the direct effects of all industry characteristics entering the interaction terms included in the regressions (investment needs, liquidity needs, asset intangibility, physical and human capital intensity). The country-time fixed effects (i.e., the interacted fixed effects of the exporting country c and the year t_0 when a given export spell started) control for all time-varying characteristics of the exporting countries that could affect the chances for the subsequent export survival. Consequently, they absorb the direct effects of those time-varying country characteristics that enter our interaction terms (various dimensions of bank and stock market development, GDP per capita, real exchange rate, endowments of the exporting country with physical and human capital). The country-time effects also control for all time-invariant country characteristics potentially affecting export performance (country size, access to the sea, etc.) and time-varying conditions in the world market (global business cycle, technological progress reducing shipping costs, etc.).[7]

Our focus on a single destination market allows for a cleaner identification strategy that relies on a more parsimonious set of fixed effects when controlling for potential sources of the omitted variable bias. In our setting, the included (exporting)country-time fixed effects also control for time-varying origin-destination characteristics like political conflicts

[7] See also the discussion of the fixed effects in the context of the applied difference-in-differences methodology in Raddatz (2006, p. 682-683) or Cetorelli and Strahan (2006, p. 442-443).

or deepening economic interdependence between the exporting and the importing country. This alleviates the need for including complex origin-destination-time fixed effects into our regressions. Similarly, the included product effects also control for various observable and unobservable destination-product characteristics.

Any remaining omitted variable bias affecting the estimates for β_1 and β_2 would need to work simultaneously via time-varying country characteristic correlated with our measures of bank and stock market development and via industry characteristic correlated with our measures of financial vulnerability. To take care of this possibility, we include in all regressions several additional interaction terms - interactions of financial vulnerability measures with both GDP per capita and real exchange rate of the exporting country, as well as interactions of physical (human) capital intensity in a given industry with physical (human) capital endowment in a given country. The row vector of control variables ($\mathbf{controls}_{kic,t_0}$) also includes product-level control variables that vary across countries and time: initial export, total export, number of suppliers, and a multiple spell dummy.

3 Data

Our unit of analysis is an export spell defined as the length (in years) that a country c exports a particular good k to the USA without interruption. There can be multiple spells for a given country-product pair if a country ceases and then re-starts exporting the same product to the US destination market. All time-varying explanatory variables are measured at the beginning of a given export spell.

Table 12 in the Appendix shows summary statistics for the main variables used in our analysis. When controlling for all variables of interest, our final database consists of 252,147 export spells of 3,300 HS 6-digit products exported from 71 countries to the USA over the period 1995-2011. Online Appendix A provides the list of exporting countries in our sample.

3.1 Financial Vulnerability

The standard empirical proxies capturing the different financial vulnerabilities explored in this paper have been developed in a series of papers examining the impact of finance

on economic growth. These papers follow different industrial classifications, computing their measures for different number of sectors at different levels of aggregation. Rajan and Zingales (1998) compute investment needs for 36 different sectors at the level of 3-digit and 4-digit ISIC classification, Claessens and Laeven (2003) compute asset intangibility for 20 sectors following the SIC 2-digit classification, and Raddatz (2006) computes liquidity needs for 70 sectors at the ISIC 4-digit level. Fisman and Love (2003, 2007) follow the definition of 36 ISIC sectors used by Rajan and Zingales (1998) when computing their measures of trade credit dependence and global growth opportunities.

We recompute these five measures at a significantly more disaggregated level of 192 industrial sectors (120 4-digit and 72 3-digit sectors according to the SIC classification). After merging these measures with our trade data and other control variables, the final sample comprises 174 industrial sectors (108 4-digit and 66 3-digit SIC sectors). Defining financial vulnerability across narrowly defined sectors not only allows for a more precise measurement, but it also represents a better fit with the highly disaggregated data on international trade described in Subsection 3.3.[8] To ensure the comparability of different measures capturing different aspects of financial vulnerability, we compute the measures in a unified way and normalize them to be between zero and one.[9]

Following Rajan and Zingales (1998), we compute *Investment needs* as the difference between capital expenditures (Compustat item 128) and cash flow (Compustat item 110),

[8] The use of more broadly defined sectors in the original papers fits with the prevailing aggregate focus of the finance-growth literature at that time. Existing trade literature has mostly followed these broader industries when using the difference-in-difference identification strategy adopted in this paper. More recently, both finance and trade papers using disaggregated data have started to recompute some of these measures for narrowly defined industrial sectors. Crinò and Ogliari (2017) recompute investment needs and asset tangibility for 273 SIC industries in their study on financial frictions and product quality in international trade. Tong and Wei (2011) recompute investment needs and liquidity needs for around 250 SIC industries when investigating the impact of financial crisis on the firm-level stock market returns.

[9] In the first step, we compute median value of a given measure for each US firm in Compustat over the period 1989-2006. In the second step, we look at the computed measures for all firms in a given industry and take the value of the median firm to represent the industry, following the approach of Raddatz (2006). Other approaches used in the original papers include taking mean rather than median in the first step or eliminating the two-steps procedure altogether and take an average value across all firm-year observations in a given industry in just one step. More fundamentally, none of the measures in the original papers is normalized in order to allow for better comparability with other measures. This is only natural given that each of these papers focuses primarily on one particular transmission channel and the measure of financial vulnerability associated with it.

divided by capital expenditures.[10] This proxy captures the share of the necessary investment into physical capital that cannot be financed from internally generated funds and therefore requires external financing. The reliance on large US firms covered in Compustat in the computation assures that the resulting share reflects the investment that a representative firm in the industry truly requires but cannot finance itself. For smaller US firms and most other firms around the world, the observed use of external financing represents an equilibrium outcome between the firm's demand and the available supply from local banks and stock markets. As Rajan and Zingales (1998) argue, large publicly traded firms in the US face only minimal frictions in accessing external finance so that the observed amount of their external funding represents a good measure of their actual financing needs.

Following Raddatz (2006), we compute *Liquidity needs* as the median ratio of total inventories to sales (i.e. dividing Compustat item 3 by Compustat item 12). A higher value for this ratio means a lower share of investment into inventories that can be financed by ongoing revenue, suggesting a higher level of liquidity needs that have to be financed externally. The reason for focusing on inventories rather than the overall investment into working capital is to capture the technologically driven exogenous part of liquidity needs. The completion of final goods take longer in certain industries, requiring higher inventory values during the production process. This technological link is arguably weaker for other parts of liquid assets like cash (Raddatz 2006, p. 685).

Following Claessens and Laeven (2003), we measure *Asset intangibility* as the ratio of the net value of intangible assets (Compustat item 33) to the net fixed assets (Compustat item 8).[11] In Compustat, the intangibles include the value of blueprints or building designs, patents, copyrights, trademarks, franchises, organization costs, client lists, computer software patent costs, licenses, and goodwill. The ratio thus measures for a representative firm in a given industry the relative importance of assets that are less

[10] Compustat reports data for different firms and years in different formats. For formats 1/2/3, we compute the cash flow as the sum of following variables: funds from operations (operating income + depreciation), decreases in inventories, decreases in receivables, and increases in payables. For format 7, we use the variable cash flow directly provided in Compustat.

[11] The net fixed assets equal gross property, plan and equipment (Compustat item 7) minus accumulated depreciation, depletion and amortization (Compustat item 196).

suitable to serve as collateral due to their lack of physical manifestation as opposed to the easily collateralizable fixed assets.

The proxies for our two additional transmission channels also rely on Compustat data on large US firms. Following Fisman and Love (2003), we compute *Trade credit dependency* as the ratio of accounts payable (Compustat item 70) to total assets (Compustat item 6). The ratio represents the share of total assets that is financed by trade credit, capturing the ability of a representative firm in a given industry to rely on informal credit from its business partners rather than on formal financing from financial markets and intermediaries. We measure *Global growth opportunities* by the actual growth in real sales for the representative firm in a given industry in the US. This proxy is based on the argument outlined in Fisman and Love (2007) that large publicly traded US firms respond optimally to worldwide industry-specific shocks to growth opportunities, making the actual growth rate of these firms a good proxy for these growth opportunities.

Table 11 in the Appendix shows that all five measures are only weakly and often negatively correlated with each other. The measures thus seem to represent genuinely distinct transmission channels from finance to the real economy. A closer look at the exposure of individual industries to the three main sources of financial vulnerability further reinforces this point. For example, the production process in the cigarettes industry (SIC code 2111) is highly dependent on intangible assets. At the same time, the cigarettes industry generates high levels of cash flow, which makes it less dependent on external funding for its investment needs. Another example involves the two industries representing publishing and printing of newspapers (SIC code 2711) and periodicals (SIC code 2721) that face low liquidity needs but use high levels of intangible assets in their production process. Online Appendix B provides more details by listing 15 industries with both the lowest and the highest levels of investment needs, liquidity needs and asset intangibility.[12]

Given that all five variables are measured at the industry level, their direct effects are captured in our regressions by the included product fixed effects (δ_k). Consequently, the variables described in this subsection enter the regressions explicitly only as part of

[12] As we normalize all measures to be between zero and one, the value for the least (most) exposed industry for every measure is zero (one).

interaction terms with the measures capturing the strength of financial institutions and markets that are described in the next subsection.

3.2 Financial Institutions and Markets

Our main measure capturing the strength of financial institutions in the exporting country is called *Banks*. This standard measure of a well-developed banking sector represents the ratio between credit provided by deposit-taking banks to the private sector and GDP of a given country. In some empirical specifications, we also use two alternative measures looking at the broader role played by financial institutions in the real economy. *Bank assets* represent the value of the claims hold by deposit-taking banks vis-a-vis the domestic real non-financial sector, again normalized by the GDP level in a given country. *Total credit* represents the ratio of all credit to the private sector over GDP. The variable thus includes credit provided both by deposit-taking banks and by other financial institutions.

Our main measure of the depth of financial markets in the exporting country is called *Stock markets*. It represents the ratio between stock market capitalization (the market value of all listed stocks) and GDP of a given country, and it is a standard measure of well-developed stock markets. Stock market value traded and stock market turnover are two alternative measures that we use to capture different dimensions of the role played by stock markets in the real economy. *Stock market value traded* is the value of stock market transactions divided by GDP, putting more emphasis on the activity and liquidity rather than the size of stock markets. Even cleaner proxy for an active and liquid (rather than large) stock market is *Stock market turnover*, measured as the ratio between the value of stock market transactions and the stock market capitalization.

The data are from the Global Financial Development Database that builds on the earlier work by Beck et al. (2000) and has been substantially extended by Čihák et al. (2012). The database contains various indicators of financial development across countries and over time and is regularly updated.

All measures representing financial institutions and markets vary over time. We measure them at the beginning of a given export spell in order to capture the impact of the predetermined financial environment on the subsequent export performance. The

direct effects of these time-varying country-level financial variables are thus captured in our regressions by the included country-time fixed effects (δ_{c*t_0}), with time referring to the beginning of a given export spell (t_0). Consequently, the variables described in this subsection enter the regressions explicitly only as part of interaction terms with the industry-level measures of financial vulnerability.

3.3 Product-related Trade Variables

The export survival rate in the US market and all trade-related control variables at the product level (initial export, total export, number of suppliers, a multiple spell dummy) are computed using the BACI dataset developed by the CEPII and described in Gaulier and Zignago (2010). The dataset provides harmonized bilateral trade flows for more than 5,000 HS 6-digit products and 143 countries. Export flows are reported annually in values (thousands of US dollars) and quantities.[13] Trade data at the HS 6-digit level allows us to account for export failures at a detailed product level which would otherwise be undetected when using more aggregated industry data. In our estimations, we focus on the manufacturing exports to the USA during the 1995-2011 period.[14]

The three time-varying variables (initial export, total export, number of suppliers) are measured at the beginning of the export spell. The terms 'given year' or 'time' thus refer to the initial year of a given export spell. *Initial export* is measured at the product-country-time level and represents the export value of a given product exported by a given country to the US market in the initial year of exporting. The variable captures the levels of mutual trust and expectations about the potential future exports that exist among the trade partners at the beginning of a new trade relationship. *Total export* represents the overall value of the country's exports of a given product to the world market in a given year. It is thus measured at the product-country-time level and serves as a proxy for the size and overall export performance of a given exporting country in that given product.

[13] We do not need export values for measuring the export survival rate but we do use them for constructing some of the trade-related control variables.

[14] We start our sample period in 1995 due to the high number of missing values before 1994. In particular, we are using BACI in HS classification from 1992 that covers the period 1994-2011. As the survival analysis relies on the length of export spells, we cannot use the data from the initial year. This leaves us with the data for 1995-2011. We finish our sample period in 2011 to match the time period for which we have data for all our industry-level variables.

Number of suppliers counts the number of countries that export a given product in a given year to the United States. The variable is thus measured at the product-time level and can represent both the level of competition and the potential market size for a given product in the US destination market.

A dummy variable called *Multiple spell* is measured at the product-country level. It equals one if a given country exports a given product to the United States during two or more separate export spells, identifying instances when the country at some point stops exporting a product but later re-enters the US market with the same product again. The inclusion of this variable accounts for the possibility that repeated exits and re-entries into exporting of the same product to the same destination might affect this product's chances for export survival at various time horizons.

3.4 Other Control Variables

We include in our regressions also several country-level and industry-level variables from the real economy. The real *GDP per capita* is reported in constant 2005 US dollars. *Real exchange rate* is computed as the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. The source for both variables is the World Development Indicators of the World Bank. We also control for countries' endowments with physical and human capital, relying on data from the Penn World Table (version 8.1). The stock of *physical capital* per worker in a given country is constructed according to the perpetual inventory method. *Human capital* per worker is calculated from the average years of schooling in a given country using attainment data. These time-varying economic characteristics of exporting countries are measured at the beginning of a given export spell. We also include two time-invariant industry-level characteristics - *physical capital intensity* and *human capital intensity*. Both variables are from Braun (2003) and are measured at the ISIC 3-digit level.

The direct effects of these real-economy variables are absorbed by the country-time and product fixed effects included in our empirical specifications. However, these control variables do explicitly enter the regressions as parts of various interaction terms.

4 Main Results

This section relies on standard measures of well-developed banks and stock markets when examining their relative importance for export survival at different time horizons. Subsection 4.1 provides preliminary graphical evidence, both by capturing the overall impact of banks and stock markets on export survival, and by further exploring our main transmission channels related to high investment needs, high liquidity needs, and asset intangibility. Subsection 4.2 reports full results from additional regressions focusing on these three channels from finance to export survival (Equation 1). Subsection 4.3 extends the baseline empirical model to include the alternative transmission channels of trade credit and global growth opportunities. Besides examining the robustness of our previous results, the exploration of these two additional channels in the context of export survival is worthwhile in its own right.

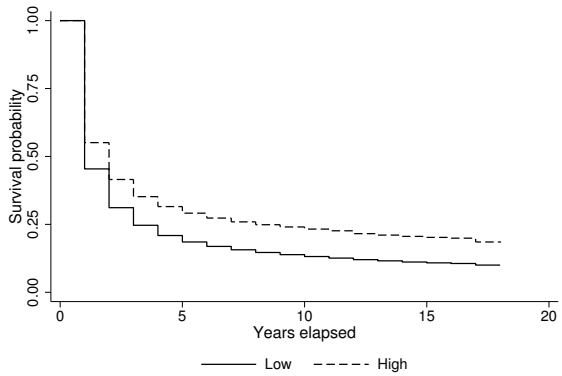
4.1 Graphical Evidence

Figure 1a and Figure 1b report the Kaplan-Meier survival functions that capture the probability of export spells (continuous exporting of a given product from a given country to the US market) to survive after year 1,2, etc. The survival probability in the first year is one by default given the annual frequency of the data. Figure 1a compares the average survival in the US market for products exported from countries with a well-developed versus underdeveloped domestic banking sector. The solid line captures the export survival for products from countries at the 25th percentile of banking development while the dashed line captures the export survival for products from countries at the 75th percentile of banking development. Analogously, Figure 1b compares average export survival for products from countries at the 25th percentile versus the 75th percentile of the stock market development. In both figures, the dashed line is located above the solid line, suggesting that products have better survival chances in the US market if they are exported from countries with a strong domestic banking sector or a well-developed stock market.

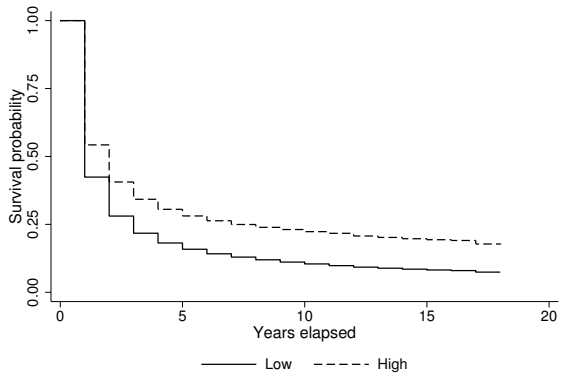
Next we explore the specific transmission channels that could explain the reduced-form relationship between finance and export survival from Figure 1a and Figure 1b. Figure 2

Figure 1: Export survival and financial development

(a) Banking development



(b) Stock market development

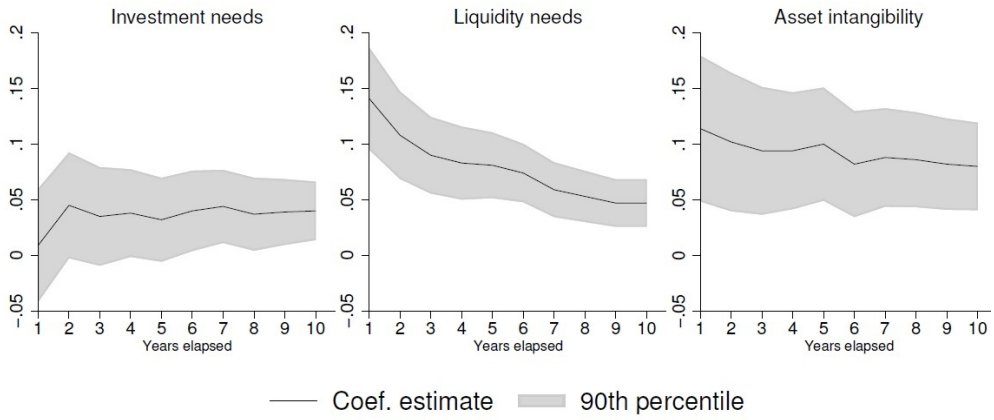


Note: The solid line (denoted 'Low') captures the export survival for products from countries at the 25th percentile of banking (stock market) development. The dashed line (denoted 'High') captures the export survival for products from countries at the 75th percentile of banking (stock market) development.

examines these transmission channels in the context of strong banks, and Figure 3 examines them in the context of well-developed stock markets. In particular, we regress the export survival at the product level after year 1,2,...,10 on the interaction terms between three measures of financial vulnerability (investment needs, liquidity needs, asset intangibility) and stock market/banking development. We then plot the coefficient estimates of these interaction terms together with the bounds of their 90 per cent confidence interval. Figure 2 and Figure 3 thus visually summarize a series of regression results about the impact of banks and stock markets on export survival. Unlike the unconditional export survival analyzed in Figure 1a and Figure 1b, the regressions summarized in Figure 2 and Figure 3 also control for fixed effects at the (exporting country)*time and product level as well as for several trade-related control variables (initial export, total export, number of suppliers, multiple spell dummy).

The results in Figure 2 and Figure 3 suggest that all three transmission channels play an important role in driving the reduced-form relationship from Figure 1a and Figure 1b. The effects are generally significant, ranging from the very short-term export survival of one year up to the long-term survival of ten years after the beginning of an export spell. The exceptions are the insignificant effects of both banks and stock markets for exports from industries with high investment needs in the shorter term as well as the insignificant

Figure 2: Export survival and banks: The transmission channels



Note: Each of the three graphs summarizes ten regressions representing one transmission channel from banking development to export survival at ten different time horizons. We regress the export survival at the product level after year 1,2,...,10 on the interaction term between a given measure of financial vulnerability (investment needs, liquidity needs, asset intangibility) and the banking development in the exporting country. The horizontal axis in the graphs represents the ten different time horizons of export survival, the solid line connects the ten coefficient estimates for the corresponding interaction term, and the shaded area represents the 90 per cent confidence interval for these point estimates. While the graphs focus on the visual summary of the coefficient estimates for the main interaction terms, the underlying regressions control also for (exporting country)*time and product fixed effects, as well as for several trade-related control variables (initial export, total export, number of suppliers, multiple spell dummy). Robust standard errors are clustered at the (exporting country)*time level.

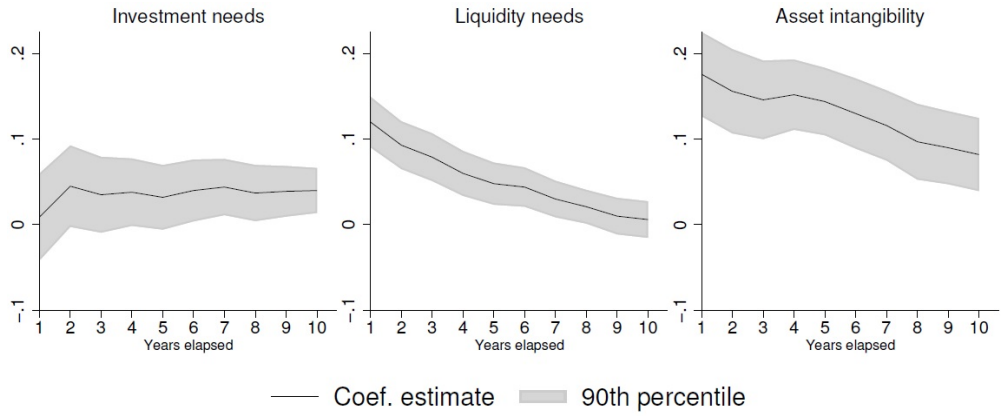
effects of stock markets on exports from industries with high liquidity needs in the longer term.[15]

4.2 Main Channels

This subsection provides a further analysis of the three transmission channels from a well-functioning financial system to the export survival at the product level. Additionally to the fixed effects and trade-related control variables included in regressions summarized by Figure 2 and Figure 3, the regressions reported both in this subsection and in the

[15] One should read the graphs in the following way. If for a given year 1,2,...,10, the whole confidence interval is above zero, then the estimated coefficient for the corresponding main interaction term is positive and statistically significant for that year. For example, in the first graph of Figure 2, the whole confidence interval is above zero in year 10, meaning that the coefficient of the interaction term between investment needs and banking development is positive and significant in a regression examining the ten-year export survival at the product level. This suggest that banking development over-proportionately promotes export survival of products with high investment needs at the horizon of ten years. In year 1 on the same graph, the coefficient line is above zero but the confidence interval spreads both above and below zero. The estimated coefficient is thus positive but not statistically different from zero, suggesting that banking development does not play a particular role in promoting one-year export survival of products with high investment needs. The transmission mechanism tested in the first graph of Figure 2 thus seems to play an important role for the export survival in the long term but not in the short term.

Figure 3: Export survival and stock markets: The transmission channels



Note: Each of the three graphs summarizes ten regressions representing one transmission channel from stock market development to export survival at ten different time horizons. We regress the export survival at the product level after year 1,2,...,10 on the interaction term between a given measure of financial vulnerability (investment needs, liquidity needs, asset intangibility) and the stock market development in the exporting country. The horizontal axis in the graphs represents the ten different time horizons of export survival, the solid line connects the ten coefficient estimates for the corresponding interaction term, and the shaded area represents the 90 per cent confidence interval for these point estimates. While the graphs focus on the visual summary of the coefficient estimates for the main interaction terms, the underlying regressions control also for (exporting country)*time and product fixed effects, as well as for several trade-related control variables (initial export, total export, number of suppliers, multiple spell dummy). Robust standard errors are clustered at the (exporting country)*time level.

remainder of the text control also for non-financial channels related to the Heckscher-Ohlin forces of comparative advantage in international trade, the economic development, the business cycle fluctuations, and changes in the real exchange rate. As we now report extensive regression tables rather than summarizing graphs, we do not provide all results for the export survival after 1,2,...,10 years but focus on the export survival at the one, five, and ten year time horizon.

Table 1 examines the hypothesis that a well-functioning domestic financial system facilitates export performance of products from industries requiring external finance to cover their investment needs. In columns (1) to (3) of Table 1, we look whether a well-developed banking system particularly promotes products with high investment needs, taking as a dependent variable the product-level export survival after one, five, and ten years. In columns (4) to (6) of Table 1, we focus on the importance of stock markets for the export performance of these products, again looking at export survival after one, five, and ten years. A positive and significant coefficient for the main interaction term (investment

needs interacted with banks in the first three columns, investment needs interacted with stock markets in the last three columns) would confirm that providing external finance for investment into physical capital is an important transmission channel from finance to export survival. We also allow for the possibility that certain *non-financial* transmission channels promote exports of products from industries with high investment needs. In particular, we control for the possible role of both economic development and value of domestic currency, by interacting our measure of investment needs with both GDP per capita and real exchange rate. We also include additional control variables that could affect the probability of export survival at the product level - initial export, total export, number of suppliers, multiple spell dummy, and interactions of physical (human) capital intensity at the industry level with physical (human) capital endowment at the country level. The last two interaction terms are based on the standard Heckscher-Ohlin theory of international trade and control for the importance of countries' factor endowments in shaping the international trade flows.

The results reported in Table 1 suggest that stock markets play a more robust role than banks when it comes to facilitating exports of products from industries with high investment needs. While banks have a significant role for the export survival only at the longest horizon of ten years (third column), stock markets promote export survival of products with high investment needs at horizons of both five and ten years (fifth and sixth column). And at the survival horizon of ten years, the significance level for the interaction term including stock markets in the sixth column is higher than the significance level for the interaction term including banks in the third column. As for the non-financial channels, economic development seems to play no particular role in promoting exports of products with high investment needs as documented by the insignificant results for the interaction term of investment needs and GDP per capita. The interaction term of investment needs and real exchange rate is also insignificant in four out of six specifications.[16]

Table 2 explores the transmission channel related to differing liquidity needs. Products

[16] These insignificant results do not imply that economic development and real exchange rate do not have any impact on export performance in general. The results for the two interaction terms in our difference-in-difference framework merely suggest that this impact does not vary between products with high versus low investment needs.

Table 1: Banks, stock markets, and investment needs

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
investment needs × banks	-0.011	0.034	0.056^{b}			
	(0.047)	(0.033)	(0.027)			
investment needs × stock markets				0.034	0.062^{b}	0.057^{a}
				(0.040)	(0.026)	(0.020)
investment needs × GDPpc	-0.004	-0.005	-0.010	0.006	-0.002	0.002
	(0.018)	(0.012)	(0.010)	(0.017)	(0.011)	(0.009)
investment needs × real exchange rate	-0.642	-0.396	-0.407^{c}	-1.933^{b}	-0.703	-0.420
	(0.464)	(0.258)	(0.215)	(0.874)	(0.638)	(0.528)
initial export	0.020^{a}	0.016^{a}	0.012^{a}	0.020^{a}	0.016^{a}	0.012^{a}
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
total export	0.041^{a}	0.032^{a}	0.024^{a}	0.041^{a}	0.032^{a}	0.024^{a}
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
number of suppliers	0.003^{a}	-0.001^{a}	-0.004^{a}	0.003^{a}	-0.001^{b}	-0.004^{a}
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
multiple spell	-0.042^{a}	-0.268^{a}	-0.351^{a}	-0.044^{a}	-0.274^{a}	-0.360^{a}
	(0.008)	(0.015)	(0.021)	(0.008)	(0.016)	(0.022)
phys. cap. intensity × physical capital	-0.139^{b}	-0.166^{a}	-0.100^{b}	-0.047	-0.080	-0.023
	(0.067)	(0.047)	(0.040)	(0.079)	(0.053)	(0.043)
hum. cap. intensity × human capital	0.274^{a}	0.265^{a}	0.221^{a}	0.279^{a}	0.289^{a}	0.244^{a}
	(0.027)	(0.021)	(0.019)	(0.031)	(0.024)	(0.021)
Observations	252,147	252,147	252,147	243,509	243,509	243,509
R-squared	0.263	0.546	0.692	0.254	0.547	0.695
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Investment needs is defined at the industry level i and represents the difference between capital expenditures and cash flow, divided by capital expenditures. Banks represents the ratio between credit from deposit-taking banks to the private sector and GDP in a given exporting country c. Stock markets is the ratio between stock market capitalization and GDP of a given exporting country c. Other variables entering regressions directly or as a part of interaction terms include GDPpc (GDP per capita in country c reported in constant 2005 US dollars), real exchange rate (nominal effective exchange rate divided by price deflator or index of costs of country c), initial export (export value of a product k exported by country c to the US in the initial year of exporting), total export (value of all exports from country c to the world market), number of suppliers (number of countries exporting product k to the US), multiple spell (dummy variable that equals one if country c exports product k to the US during more than one export spell), and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

from industries that require large amount of working capital should benefit disproportionately more from liquidity provided by well-developed financial institutions and markets. Again, we explore separately the role of banks (first three columns) and stock markets (last three columns), looking at export survival over the horizons of one, five, and ten years as our dependent variable. The results suggest that strong banks play a somewhat more important role than deep stock markets in promoting export survival of products

with high liquidity needs, especially in the longer term. In the case of the immediate survival over a one-year horizon, both banks and stock markets promote exports of products with high liquidity needs as attested by positive and significant main interaction terms both in column (1) and in column (4) of Table 2. The same applies for the time horizon of five years, but the significance level for the main interaction term is higher for banks in column (2) than for stock markets in column (5) of Table 2. And when it comes to the very long-term survival of ten years reported in columns (3) and (6) of Table 2, only banks seem to play a significant role. As for the non-financial channels, the interaction term including real exchange rate is insignificant in four out of six specifications, similarly to the previous table. However, the interaction term of liquidity needs and GDP per capita is positive and significant in all six columns of Table 2, suggesting that a higher level of economic development over-proportionately benefits the exports of products that require external finance to fund their working capital.

Table 3 examines the transmission channel linked to the differing tangibility of assets. Industries with a high share of intangible assets benefit disproportionately more from well-functioning and sophisticated financial systems where financing decisions rely comparatively less on the availability of collateralizable tangible assets (see, e.g., Braun 2003). When it comes to promoting exports of products from such industries, it is only deep stock markets and not strong banks that matter. This applies independently on the time horizon of export survival. In particular, the interaction term between asset intangibility and banks is insignificant in the first three columns, while the interaction term of asset intangibility with stock markets is positive and highly significant in the last three columns of Table 3. As for the non-financial channels, economic development does not seem to play a particular role in promoting exports from industries characterized by a high share of intangible assets, as the corresponding interaction term is marginally significant only in two out of six specifications. By contrast, the interaction term of asset intangibility and real exchange rate is negative and highly significant in all six columns of Table 3. This suggest that a strong domestic currency disproportionately hurts export of those products whose manufacturing process heavily relies on intangible assets.

Table 2: Banks, stock markets, and liquidity needs

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
liquidity needs × banks	0.103^a	0.082^a	0.050^b			
	(0.039)	(0.029)	(0.022)			
liquidity needs × stock markets				0.127^a	0.052^b	-0.009
				(0.026)	(0.024)	(0.020)
liquidity needs × GDPpc	0.059^a	0.035^a	0.028^a	0.061^a	0.043^a	0.038^a
	(0.013)	(0.012)	(0.010)	(0.013)	(0.011)	(0.009)
liquidity needs × real exchange rate	-1.246^b	-0.362	-0.638	-1.392^c	-0.317	-0.415
	(0.596)	(0.504)	(0.394)	(0.722)	(0.586)	(0.470)
initial export	0.020^a	0.016^a	0.012^a	0.020^a	0.016^a	0.012^a
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
total export	0.041^a	0.032^a	0.024^a	0.041^a	0.032^a	0.024^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
number of suppliers	0.003^a	-0.001^a	-0.004^a	0.003^a	-0.001^b	-0.004^a
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
multiple spell	-0.042^a	-0.268^a	-0.352^a	-0.044^a	-0.274^a	-0.360^a
	(0.008)	(0.015)	(0.021)	(0.008)	(0.016)	(0.022)
phys. cap. intensity × physical capital	-0.056	-0.110^b	-0.060	0.027	-0.028	0.016
	(0.069)	(0.050)	(0.042)	(0.081)	(0.059)	(0.046)
hum. cap. intensity × human capital	0.265^a	0.259^a	0.218^a	0.273^a	0.285^a	0.241^a
	(0.027)	(0.021)	(0.019)	(0.031)	(0.024)	(0.022)
Observations	252,147	252,147	252,147	243,509	243,509	243,509
R-squared	0.264	0.546	0.692	0.254	0.547	0.695
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Liquidity needs represents the median ratio of total inventories to sales in industry i. Other variables are described in Table 1. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

A comparison of the results from Table 3 with Figure 2 and Figure 3 demonstrates the importance of controlling for alternative determinants of export survival like economic development, exchange rate or factor endowments. According to Figure 2 and Figure 3, both strong banks and deep stock markets promote exports of products from industries with a high share of intangible assets. Stock markets maintain this beneficial impact also after controlling for the differential impact of GDP per capita, real exchange rate, and countries' endowments with physical and human capital in columns (4) to (6) of Table 3. By contrast, the positive impact of banks on export survival of products from industries with a high share of intangible assets completely disappears when we control for the same

additional variables in columns (1) to (3) of Table 3.

Table 4 runs a direct horse race between banks and stock markets for each of the three main transmission channels, allowing for a further scrutiny of the results reported in the previous tables. Columns (1) to (3) of Table 4 correspond to Table 1, looking at products requiring external finance for investment into physical capital. Columns (4) to (6) of Table 4 correspond to Table 2, focusing on products requiring external finance for working capital. Columns (7) to (9) of Table 4 correspond to Table 3, looking at products whose manufacturing process relies on intangible assets. Like in the previous three tables, the dependent variable is probability of export survival after one, five, and ten years, but the main interaction terms including banks and stock markets enter the regression simultaneously rather than separately. We also control for the same non-financial transmission channels and additional variables as in Table 1, Table 2, and Table 3.

The results in Table 4 are in accordance with results from the previous three tables. Stock markets seem to play a more important role in promoting exports with high investment needs (first to third column of Table 4) while banks seem to be more important for export survival of products with high liquidity needs (fourth to sixth column of Table 4). These two sets of results apply especially when it comes to export survival at longer horizons, again confirming the previous findings from Table 1 and Table 2, respectively.

The most clear-cut result regarding the relative importance of strong banks versus deep stock markets emerges again in the case of products from industries with a high share of intangible assets. The results in the seventh to ninth column of Table 4 show that only deep stock markets and not strong banks promote export survival of such products, confirming the results from Table 3. The results for non-financial channels are also in accordance with previous tables. Economic development disproportionately promotes export survival for products with high liquidity needs (fourth to sixth column of Table 4), and a strong domestic currency disproportionately hurts export performance of products from industries with a high share of intangible assets (seventh to ninth column of Table 4).

For space reasons, we do not report in the remaining sections the coefficients for

Table 3: Banks, stock markets, and asset intangibility

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
asset intangibility × banks	0.067	0.065	0.036			
	(0.056)	(0.043)	(0.032)			
asset intangibility × stock markets				0.213^{a}	0.181^{a}	0.087^{a}
				(0.039)	(0.030)	(0.028)
asset intangibility × GDPpc	0.017	0.025^{c}	0.015	0.014	0.022^{c}	0.011
	(0.018)	(0.015)	(0.013)	(0.017)	(0.013)	(0.011)
asset intangibility × real exchange rate	-2.114^{a}	-2.055^{a}	-1.534^{a}	-2.829^{a}	-3.340^{a}	-2.298^{a}
	(0.759)	(0.728)	(0.558)	(1.049)	(0.775)	(0.614)
initial export	0.020^{a}	0.016^{a}	0.012^{a}	0.020^{a}	0.016^{a}	0.012^{a}
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
total export	0.041^{a}	0.032^{a}	0.024^{a}	0.041^{a}	0.032^{a}	0.024^{a}
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
number of suppliers	0.003^{a}	-0.001^{a}	-0.004^{a}	0.003^{a}	-0.001^{b}	-0.004^{a}
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
multiple spell	-0.042^{a}	-0.268^{a}	-0.351^{a}	-0.044^{a}	-0.274^{a}	-0.360^{a}
	(0.008)	(0.015)	(0.021)	(0.008)	(0.016)	(0.022)
phys. cap. intensity × physical capital	-0.123^{c}	-0.146^{a}	-0.089^{b}	-0.033	-0.063	-0.016
	(0.067)	(0.046)	(0.039)	(0.079)	(0.054)	(0.043)
hum. cap. intensity × human capital	0.268^{a}	0.258^{a}	0.217^{a}	0.274^{a}	0.282^{a}	0.241^{a}
	(0.027)	(0.021)	(0.019)	(0.031)	(0.024)	(0.021)
Observations	252,147	252,147	252,147	243,509	243,509	243,509
R-squared	0.263	0.546	0.692	0.254	0.547	0.695
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Asset intangibility is the ratio of the net value of intangible assets to the net fixed assets in industry i. Other variables are described in Table 1. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

following control variables: initial export, total export, number of suppliers, multiple spell dummy, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level.

4.3 Additional Channels

Table 5 takes as a point of departure Table 4 in Subsection 4.2, adding the interaction terms of trade credit dependency with both banks and stock markets. These interaction terms allow us to examine if trade credit can act as a substitute for external finance provided by formal financial intermediaries and markets. According to this hypothesis, firms that have access to trade credit from their business partners suffer relatively less in countries with underdeveloped financial systems. Such firms would therefore also

Table 4: The three main channels: Banks versus stock markets

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y	(7) 1y	(8) 5y	(9) 10y
investment needs × banks	-0.003	0.006	0.046^{c}						
	(0.052)	(0.035)	(0.028)						
investment needs × stock markets	0.032	0.064^{b}	0.044^{b}						
	(0.044)	(0.027)	(0.020)						
investment needs × GDPpc	0.006	-0.003	-0.008						
	(0.019)	(0.012)	(0.010)						
investment needs × real exchange rate	-1.944^{b}	-0.744	-0.646						
	(0.920)	(0.657)	(0.551)						
liquidity needs × banks				0.029	0.068^{b}	0.063^{a}			
				(0.041)	(0.032)	(0.023)			
liquidity needs × stock markets				0.112^{a}	0.029	-0.026			
				(0.028)	(0.026)	(0.020)			
liquidity needs × GDPpc				0.058^{a}	0.036^{a}	0.030^{a}			
				(0.014)	(0.013)	(0.010)			
liquidity needs × real exchange rate				-1.456^{c}	-0.630	-0.668			
				(0.758)	(0.637)	(0.485)			
asset intangibility × banks							-0.031	-0.026	-0.009
							(0.062)	(0.045)	(0.035)
asset intangibility × stock markets							0.224^{a}	0.187^{a}	0.091^{a}
							(0.043)	(0.032)	(0.031)
asset intangibility × GDPpc							0.015	0.025	0.012
							(0.019)	(0.016)	(0.014)
asset intangibility × real exchange rate							-2.631^{b}	-3.129^{a}	-2.184^{a}
							(1.115)	(0.829)	(0.662)
initial export	0.019^{a}	0.016^{a}	0.012^{a}	0.019^{a}	0.016^{a}	0.012^{a}	0.019^{a}	0.016^{a}	0.012^{a}
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
total export	0.041^{a}	0.032^{a}	0.024^{a}	0.041^{a}	0.033^{a}	0.024^{a}	0.041^{a}	0.032^{a}	0.024^{a}
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
number of suppliers	0.003^{a}	-0.001^{b}	-0.004^{a}	0.003^{a}	-0.001^{b}	-0.004^{a}	0.003^{a}	-0.001^{b}	-0.004^{a}
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
multiple spell	-0.045^{a}	-0.276^{a}	-0.363^{a}	-0.046^{a}	-0.276^{a}	-0.363^{a}	-0.045^{a}	-0.276^{a}	-0.363^{a}
	(0.008)	(0.016)	(0.022)	(0.008)	(0.016)	(0.022)	(0.008)	(0.016)	(0.022)
phys. cap. intensity × physical capital	-0.056	-0.099^{c}	-0.039	0.020	-0.044	0.003	-0.044	-0.082	-0.031
	(0.080)	(0.055)	(0.044)	(0.082)	(0.060)	(0.048)	(0.079)	(0.055)	(0.044)
hum. cap. intensity × human capital	0.284^{a}	0.292^{a}	0.248^{a}	0.278^{a}	0.287^{a}	0.244^{a}	0.279^{a}	0.285^{a}	0.244^{a}
	(0.032)	(0.025)	(0.022)	(0.032)	(0.025)	(0.022)	(0.032)	(0.024)	(0.022)
Observations	235,294	235,294	235,294	235,294	235,294	235,294	235,294	235,294	235,294
R-squared	0.259	0.548	0.698	0.259	0.548	0.699	0.259	0.548	0.699
Country-Time FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1), (4) and (7), $l = 5$ in columns (2), (5) and (8), and $l = 10$ in columns (3), (6) and (9). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. All variables are described in Table 1, Table 2, and Table 3. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

benefit somewhat less than other firms from the process of financial development. Consequently, we would expect *negative* coefficients for these additional interaction terms as well-developed banks and stock markets would be comparatively *less* useful in promoting export survival of products from industries that can rely on trade credit. Note that in our difference-in-differences framework, the negative coefficients do not imply that well-developed financial markets and institutions actually hurt the export survival of these

products. The products from industries that can rely on trade credit just do not benefit from well-developed financial system quite as much as products from industries that lack access to trade credit as an alternative form of financing.

The results in Table 5 show that the distinction between banks and stock markets as well as the time horizon of export survival both matter for this additional transmission channel. The interaction term of trade credit dependency with banks has the expected negative sign and is highly significant for the long-term export survival at the horizons of both five years (second, fifth, and eighth column of Table 5) and ten years (third, sixth, and ninth column of Table 5). By contrast, the interaction term of trade credit dependency with stock markets is never significant in these specifications. When it comes to the short-term survival at the one-year horizon (first, fourth, and seventh column of Table 5), the interaction terms of trade credit with both banks and stock markets are insignificant.

The trade credit thus can act as a substitute only for external financing by banks and not by stock markets. Furthermore, the trade credit channel promotes only the long-term export survival and not the short-term one. These results for export survival broadly confirm the theoretical reasoning and findings by Fisman and Love (2003) who focus on industrial growth. In their paper, trade credit also primarily serves as a substitute for external finance provided by banks rather than by stock markets. Moreover, their transmission channel from finance to industrial growth works only at the intensive margin via growth in average firm size rather than at the extensive margin via growth in number of firms within an industry. According to Fisman and Love (2003), this is consistent with the need for firms to establish reputation first before being able to rely on trade credit from their business partners as a substitute for a formal bank credit. In the context of product-level export survival, this reputation argument implies that the transmission channel related to trade credit should primarily affect products that are already well-established in the US destination market, further promoting their long-term export survival. By the same token, the channel should not substantially affect products whose exports started only recently, limiting the relevance of trade credit for the short-term export survival.

Table 5: Additional channel from finance to export survival: Trade credit

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y	(7) 1y	(8) 5y	(9) 10y
investment needs × banks	-0.004	0.002	0.042						
	(0.052)	(0.035)	(0.028)						
investment needs × stock markets	0.032	0.065^{b}	0.045^{b}						
	(0.044)	(0.027)	(0.020)						
investment needs × GDPpc	0.007	-0.003	-0.007						
	(0.019)	(0.012)	(0.010)						
investment needs × real exchange rate	-1.949^{b}	-0.755	-0.657						
	(0.920)	(0.658)	(0.552)						
liquidity needs × banks				0.029	0.064^{b}	0.059^{b}			
				(0.041)	(0.032)	(0.023)			
liquidity needs × stock markets				0.112^{a}	0.030	-0.025			
				(0.028)	(0.026)	(0.019)			
liquidity needs × GDPpc				0.058^{a}	0.035^{a}	0.030^{a}			
				(0.014)	(0.013)	(0.010)			
liquidity needs × real exchange rate				-1.458^{c}	-0.635	-0.673			
				(0.758)	(0.637)	(0.486)			
asset intangibility × banks							-0.029	-0.019	-0.002
							(0.063)	(0.045)	(0.036)
asset intangibility × stock markets							0.226^{a}	0.185^{a}	0.089^{a}
							(0.042)	(0.032)	(0.031)
asset intangibility × GDPpc							0.015	0.025	0.012
							(0.019)	(0.016)	(0.014)
asset intangibility × real exchange rate							-2.647^{b}	-3.148^{a}	-2.201^{a}
							(1.115)	(0.828)	(0.662)
trade credit dependency × banks	-0.014	-0.050^{a}	-0.051^{a}	-0.007	-0.044^{a}	-0.046^{a}	-0.011	-0.048^{a}	-0.050^{a}
	(0.023)	(0.016)	(0.012)	(0.023)	(0.016)	(0.012)	(0.023)	(0.016)	(0.013)
trade credit dependency × stock markets	-0.007	0.015	0.015	-0.003	0.015	0.014	-0.015	0.008	0.012
	(0.020)	(0.015)	(0.011)	(0.020)	(0.015)	(0.011)	(0.019)	(0.015)	(0.011)
Observations	235,294	235,294	235,294	235,294	235,294	235,294	235,294	235,294	235,294
R-squared	0.259	0.548	0.699	0.259	0.548	0.699	0.259	0.548	0.699
Country-Time FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1), (4) and (7), $l = 5$ in columns (2), (5) and (8), and $l = 10$ in columns (3), (6) and (9). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Trade credit dependency is the ratio of accounts payable to total assets in industry i. Other variables are described in Table 1, Table 2, and Table 3. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

Regarding our three main transmission channels from finance to export survival, Table 5 confirms the previous findings. The channel of providing external finance for investment needs operates via deep stock markets promoting long-term export survival at the time horizons of five and ten years (first to third column of Table 5). Products with high liquidity needs particularly benefit from deep stock markets when it comes to the one-year export survival, while banks play the dominant role for the long-term export survival of five and ten years (fourth to sixth column of Table 5). And it is only stock markets and not banks that promote export survival of products from industries with a

high share of intangible assets, independently of the time horizon at which the survival in foreign product markets is measured (seventh to ninth column of Table 5).

Table 6 adds to the nine specifications from Table 4 the interaction terms of growth opportunities with banks and with stock markets. Fisman and Love (2007) find that in the context of promoting industrial growth, the interaction term of financial development with growth opportunities dominates the interaction term of financial development with investment needs. In the context of export performance, it turns out to be the export survival at longer time horizons where the inclusion of the channel related to growth opportunities affects the results for the channel related to investment needs. When looking at the short-term survival of one year in column (1) of Table 6, neither banks nor stock markets seem to particularly promote products with high investment needs, in accordance with the findings from the previous subsection. However, when it comes to the long-term export survival at the horizon of five and ten years, the situation changes substantially after adding in columns (2) and (3) of Table 6 the interaction terms that contain growth opportunities. In particular, it is now banks rather stock markets that seem to promote export performance of products with high investment needs. This is exactly the opposite result compared to the findings in Subsection 4.2 on how the channel of investment needs operates. Part of the explanation might lie in a possible collinearity problem between various interaction terms. The fact that the interaction terms of growth opportunities with banks and stock markets are both highly significant but their regression coefficients have opposite signs throughout Table 6 would also support this interpretation.[17]

Unlike the results for the channel related to the investment needs of exported products, the two other main transmission channels from finance to export survival are not substantially affected by the inclusion of the channel related to global growth opportunities. Strong banks play a more important role in promoting export survival of products with high liquidity needs over longer time horizons, while deep stock markets are decisive for the one-year survival of these products (columns (4) to (6) of Table 6). And stock

[17] Fisman and Love (2007) do not encounter this problem as they interact growth opportunities only with a general measure of financial development, which is the sum of the two proxies capturing the strength of the banks and the depth of stock markets in a given country.

Table 6: Additional channel from finance to export survival: Growth opportunities

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y	(7) 1y	(8) 5y	(9) 10y
investment needs × banks	0.045	0.064^{c}	0.090^{a}						
	(0.053)	(0.034)	(0.028)						
investment needs × stock markets	-0.003	0.036	0.024						
	(0.047)	(0.027)	(0.021)						
investment needs × GDPpc	0.005	-0.005	-0.009						
	(0.019)	(0.012)	(0.011)						
investment needs × real exchange rate	-1.945^{b}	-0.743	-0.645						
	(0.920)	(0.656)	(0.550)						
liquidity needs × banks				0.022	0.059^{c}	0.056^{b}			
				(0.042)	(0.032)	(0.023)			
liquidity needs × stock markets				0.120^{a}	0.035	-0.022			
				(0.029)	(0.027)	(0.019)			
liquidity needs × GDPpc				0.058^{a}	0.035^{a}	0.030^{a}			
				(0.014)	(0.013)	(0.010)			
liquidity needs × real exchange rate				-1.452^{c}	-0.629	-0.667			
				(0.759)	(0.637)	(0.484)			
asset intangibility × banks							-0.020	-0.013	0.000
							(0.062)	(0.045)	(0.035)
asset intangibility × stock markets							0.217^{a}	0.181^{a}	0.086^{a}
							(0.042)	(0.032)	(0.031)
asset intangibility × GDPpc							0.013	0.023	0.011
							(0.019)	(0.016)	(0.014)
asset intangibility × real exchange rate							-2.625^{b}	-3.149^{a}	-2.199^{a}
							(1.114)	(0.828)	(0.661)
growth opportunities × banks	-0.065^{a}	-0.079^{a}	-0.060^{a}	-0.060^{a}	-0.072^{a}	-0.051^{a}	-0.062^{a}	-0.075^{a}	-0.054^{a}
	(0.021)	(0.016)	(0.012)	(0.021)	(0.016)	(0.012)	(0.020)	(0.015)	(0.012)
growth opportunities × stock markets	0.049^{a}	0.038^{a}	0.027^{a}	0.052^{a}	0.041^{a}	0.027^{a}	0.044^{a}	0.036^{a}	0.026^{a}
	(0.017)	(0.012)	(0.010)	(0.016)	(0.012)	(0.009)	(0.015)	(0.012)	(0.010)
Observations	235,294	235,294	235,294	235,294	235,294	235,294	235,294	235,294	235,294
R-squared	0.259	0.548	0.699	0.259	0.548	0.699	0.259	0.548	0.699
Country-Time FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1), (4) and (7), $l = 5$ in columns (2), (5) and (8), and $l = 10$ in columns (3), (6) and (9). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Growth opportunities is the growth in real sales for the representative firm in industry i in the US. Other variables are described in Table 1, Table 2, and Table 3. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

markets clearly dominate banks across all time horizons when it comes to improving the export performance of products from industries with a high share of intangible assets (columns (7) to (9) of Table 6).

5 Alternative Dimensions of Bank and Stock Market Development

The results reported in the previous section revealed several patterns regarding the importance of banks and stock markets for export survival at the product level. This section explores if and how these patterns change when we look at alternative dimensions of

banking and stock market development.

5.1 Size vs Activity of Stock Markets

In Table 7, Table 8, and Table 9, we replace the traditional measure of deep stock markets - the normalized stock market capitalization (the market value of all listed shares divided by GDP) - with two alternative proxies. In the first three columns of each table, we use the normalized stock market value traded (the value of stock market transactions divided by GDP), and in the last three columns we focus on the stock market turnover (the value of stock market transactions relative to the market value of all listed shares). While the stock market capitalization measures the size of the stock market relative to the size of the economy, the stock market turnover captures liquidity or activity of a stock market in a given country. The stock market value traded lies somewhere in-between these two measures.[18]

Table 7 explores the results regarding the export survival of products with high investment needs. The point of departure are the first three columns of Table 4. Results in columns (1) to (3) of Table 7 suggest that stock market value traded does play a role in promoting exports of products with high investment needs. However, it seems to matter more for the export survival at shorter time horizons compared to stock market capitalization. In particular, the interaction term of investment needs with stock market value traded is significant for the export survival at the horizons of one and five years in columns (1) and (2) of Table 7, while the interaction term of investment needs with stock market capitalization in the previous tables has been significant at the horizons of five and ten years instead. The results for the bank interaction term in columns (1) to (3) of Table 7 are qualitatively the same as in Table 4, with banks having no role in promoting shorter-term export survival of products with high investment needs while having a marginally significant role in promoting export survival of these products at the longest time horizon of ten years. Columns (4) to (6) of Table 7 look at the role of stock market turnover, a proxy specifically focused on the activity rather than the size of stock markets

[18] Note that multiplying the stock market turnover with the stock market capitalization yields the stock market value traded. For a further discussion of various dimensions and measures of banking and stock market development see, e.g., Levine and Zervos (1998), Beck, Demirgüç–Kunt, and Levine (2000, 2010), Manova (2008), Strieborny and Kukenova (2016).

Table 7: Investment needs and alternative dimensions of stock market development

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
investment needs × banks	-0.026	0.007	0.058^{c}	0.006	0.036	0.065^{b}
	(0.050)	(0.036)	(0.030)	(0.050)	(0.035)	(0.028)
investment needs × stock market value traded	0.100^{b}	0.068^{b}	0.023			
	(0.050)	(0.033)	(0.022)			
investment needs × stock market turnover				0.043	0.015	0.025
				(0.037)	(0.028)	(0.021)
investment needs × GDPpc	0.004	-0.006	-0.008	0.009	-0.004	-0.008
	(0.019)	(0.012)	(0.011)	(0.019)	(0.013)	(0.011)
investment needs × real exchange rate	-1.741^{c}	-0.558	-0.590	-2.004^{b}	-0.684	-0.592
	(0.928)	(0.662)	(0.564)	(0.925)	(0.669)	(0.562)
Observations	233,886	233,886	233,886	232,766	232,766	232,766
R-squared	0.260	0.550	0.701	0.259	0.549	0.700
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Stock market value traded is the value of stock market transactions divided by GDP in exporting country c. Stock market turnover is measured as the ratio between the value of stock market transactions and the stock market capitalization. Other variables are described in Table 1. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

in a given country. While this dimension of stock market development is important in other contexts (e.g., Levine and Zervos 1998, Manova 2008), our results suggest that it does not play a particular role in promoting the export survival of products with high investment needs. The interaction term including stock market turnover is insignificant in all three columns where it is included.

Table 8 focuses on the role played by alternative dimensions of stock market development in promoting the export survival of products with high liquidity needs. The results for stock market value traded in the first three columns of Table 8 are mostly in accordance with the previous findings using stock market capitalization. Stock markets play a more important in promoting the short-term export survival of products with high liquidity needs. When it comes to the longer-term export survival, it is banks rather than stock markets that benefit these products. This is particularly true at the horizon of ten years, where a high value of stock market value traded seems to be actually detrimental

Table 8: Liquidity needs and alternative dimensions of stock market development

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
liquidity needs × banks	0.064	0.069^{b}	0.052^{b}	0.065	0.061^{b}	0.031
	(0.041)	(0.031)	(0.022)	(0.040)	(0.029)	(0.023)
liquidity needs × stock market value traded	0.064^{c}	0.002	-0.034^{b}			
	(0.034)	(0.025)	(0.017)			
liquidity needs × stock market turnover				0.090^{a}	0.066^{a}	0.043^{a}
				(0.026)	(0.021)	(0.015)
liquidity needs × GDPpc	0.055^{a}	0.037^{a}	0.031^{a}	0.056^{a}	0.035^{a}	0.030^{a}
	(0.014)	(0.013)	(0.010)	(0.014)	(0.013)	(0.010)
liquidity needs × real exchange rate	-1.148	-0.256	-0.412	-1.161	-0.384	-0.498
	(0.766)	(0.636)	(0.471)	(0.763)	(0.620)	(0.479)
Observations	233,886	233,886	233,886	232,766	232,766	232,766
R-squared	0.261	0.550	0.701	0.260	0.549	0.701
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. All variables are described in Table 1, Table 2, and Table 7. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

to the export performance of products with high liquidity needs. While the interaction term between liquidity needs and stock markets did have a negative sign at this time horizon also in the case of stock market capitalization (sixth column in Table 2, Table 4, Table 5 and Table 6), it was never significant unlike the interaction term including stock market value traded in the third column of Table 8.

The results for products with high liquidity needs are very different when we look at the stock market turnover, a proxy capturing the activity of stock market. The interaction term of liquidity needs and stock market turnover is positive and highly statistically significant across all time horizons (last three columns of Table 8), while strong banks seem to have a significant effect only at the time horizon of five years (fifth column of Table 8). In previous specifications looking at the long-term export survival of five and ten years for products with high liquidity needs, banks dominated both stock market capitalization (fifth and sixth column of Table 4, Table 5 and Table 6) and stock market

value traded (second and third column of Table 8). It is thus active (rather than large) stock markets that play the crucial role in promoting export survival of products that have high liquidity needs.

Finally, Table 9 examines the importance of alternative dimensions of stock market development for the export survival of products whose manufacturing process requires a high share of intangible assets, with the last three columns of Table 4 as the point of departure. Table 9 confirms that it is well-developed stock markets rather than banks that improve the export performance of these products. This result holds independently on whether we look at the short-term one-year export survival or the long-term survival at the time horizons of five and ten years.

Table 9: Asset intangibility and alternative dimensions of stock market development

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.: Survival	1y	5y	10y	1y	5y	10y
asset intangibility × banks	0.012	0.019	0.019	0.076	0.060	0.030
	(0.062)	(0.044)	(0.033)	(0.061)	(0.043)	(0.031)
asset intangibility × stock market value traded	0.205^{a}	0.173^{a}	0.071^{b}			
	(0.054)	(0.038)	(0.028)			
asset intangibility × stock market turnover				0.099^{a}	0.079^{a}	0.045^{b}
				(0.036)	(0.028)	(0.018)
asset intangibility × GDPpc	0.003	0.015	0.007	0.008	0.021	0.010
	(0.018)	(0.015)	(0.013)	(0.019)	(0.016)	(0.013)
asset intangibility × real exchange rate	-1.911^{c}	-2.771^{a}	-1.983^{a}	-2.126^{c}	-2.716^{a}	-1.967^{a}
	(1.104)	(0.833)	(0.661)	(1.160)	(0.859)	(0.660)
Observations	233,886	233,886	233,886	232,766	232,766	232,766
R-squared	0.260	0.550	0.701	0.259	0.549	0.701
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. All variables are described in Table 1, Table 3, and Table 7. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

5.2 Broader Measures of Bank Development

We have also replaced the traditional measure of a well-developed banking sector - credit provided by deposit-taking banks to the private sector divided by GDP - by two broader

proxies for importance of financial institutions in the real economy. One proxy looks at a broader measure of claims banks have vis-a-vis the rest of the economy: the ratio of bank assets to GDP. The other proxy looks beyond traditional banks at a broader group of financial institutions: the total credit by both banks and other financial institutions divided by GDP.

The results for both broader banking measures confirm the previous results. Stock markets rather than banks promote export survival of the products with high investment needs at the longer time horizons, while neither banks nor stock markets matter for the short-term survival of these products. When it comes to promoting export survival of products with high liquidity needs, stock markets play a more important role in the short term, while banks dominate in the long term. And across all time horizons, it is well-developed stock markets rather than banks that improve the export performance of products requiring a high share of intangible assets.

For space reasons, we report the detailed results for the two alternative bank measures in the Online Appendix C.

5.3 An Alternative Horse Race

The results in this section suggest that the outcome of a horse race between banks and stock markets often depends on the distinction between large and active stock markets. In this subsection, we further explore this issue by running an alternative horse race. Instead of looking at the relative importance of banks and large/active stock markets within individual transmission channels, we examine the relative importance of the three main transmission channels for different dimensions of financial development. Besides the main interaction terms, each specification in Table 10 also controls for interaction terms of the three measures of financial vulnerability with GDP per capita and with real exchange rate (coefficients for these six additional interaction terms not reported due to space reasons).

In columns (1) to (3) of Table 10, we interact each of the main proxies of financial vulnerability with our measure of banking development and allow all three interaction terms to enter the regressions simultaneously. The results suggest that strong banks shape

the export survival especially through the transmission channel of liquidity needs. When it comes to the long-term export survival at the time horizon of ten years (third column), well-developed banks also help products with high investment needs. Independently on the time horizon of export survival, banks do not seem to play any role in promoting products whose manufacturing process requires a high share of intangible assets.

Table 10: An alternative horse race across transmission channels

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. var.: Survival	1y	5y	10y	1y	5y	10y	1y	5y	10y
investment needs × banks	0.002	0.044	0.064^{b}						
	(0.047)	(0.033)	(0.027)						
liquidity needs × banks	0.103^{a}	0.083^{a}	0.052^{b}						
	(0.039)	(0.029)	(0.022)						
asset intangibility × banks	0.063	0.065	0.038						
	(0.056)	(0.043)	(0.032)						
investment needs × stock markets				0.054	0.076^{a}	0.062^{a}			
				(0.040)	(0.026)	(0.019)			
liquidity needs × stock markets				0.128^{a}	0.053^{b}	-0.007			
				(0.026)	(0.024)	(0.020)			
asset intangibility × stock markets				0.215^{a}	0.184^{a}	0.090^{a}			
				(0.039)	(0.030)	(0.028)			
investment needs × stock market turnover							0.055	0.021	0.035^{c}
							(0.036)	(0.027)	(0.019)
liquidity needs × stock market turnover							0.097^{a}	0.070^{a}	0.046^{a}
							(0.025)	(0.021)	(0.015)
asset intangibility × stock market turnover							0.111^{a}	0.083^{a}	0.047^{a}
							(0.034)	(0.027)	(0.017)
Observations	252,147	252,147	252,147	243,509	243,509	243,509	240,981	240,981	240,981
R-squared	0.264	0.546	0.692	0.255	0.547	0.695	0.255	0.549	0.697
Country-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full set of controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1), (4) and (7), $l = 5$ in columns (2), (5) and (8), and $l = 10$ in columns (3), (6) and (9). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Each specification controls for interaction terms of the three measures of financial vulnerability with GDP per capita and with real exchange rate. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

In columns (4) to (6) of Table 10, we interact the three financial vulnerability proxies with the size dimension of stock market development. At all time horizons, the positive impact of large stock markets on export survival manifests itself especially through alleviating the financial vulnerability arising from the presence of intangible assets. Large stock markets also promote products with high investment needs, especially when it comes to export survival at longer time horizons. When it comes to products with high liquidity

needs, the size of stock markets matters in particular for the short-term export survival.

In columns (7) to (10) of Table 10, we interact our proxies of financial vulnerability with the activity of a given stock market. Similarly to large stock markets explored in the previous three columns, the active stock markets also play an important role in promoting the export survival of products whose manufacturing process requires a high share of intangible assets. However, the other two transmission channels operate differently in the case of active stock markets. Across all time horizons, alleviating the financial vulnerability of products with high liquidity needs represents an important transmission channel from active stock markets to export survival. At the same time, the stock market activity does not play a substantial role in promoting exports of products with high investment needs.

Overall, the results of the horse race across transmission channels in Table 10 are consistent with the previous findings from horse races between banks and large stock markets in Table 4 and between banks and active stock markets in columns (4) to (6) of Table 7, Table 8, and Table 9.

6 Conclusions

We examine the transmission process from well-developed financial institutions and markets in exporting countries to the short-term and long-term export survival at the product level. Our analysis focuses on three distinct sources of products' financial vulnerability arising due to high investment needs, high liquidity needs, and the lack of easily collateralizable tangible assets in the production process. We also explore two additional transmission channels related to the use of trade credit among firms and to the role of financial institutions and markets in allocating resources towards sectors of the real economy with the best growth potential.

Our results are most clear-cut for products from industries with a high share of intangible assets. It is only well-developed stock markets but not strong banks that promote the short-term and long-term export survival of these products. This finding is in accordance with the notion that stock market rather than banking development is particularly important in promoting R&D investment (Aghion et al. 2004; Brown, Martinssson, and

Petersen 2013), encouraging innovation (Hsu, Tian, and Xu 2014), as well as helping industries that face increasing returns to scale and a rapid technological change (Allen 1993). Industries with a high share of intangible assets are often associated with innovative activities and a pronounced technological change. Our product-level evidence on export survival also complements the recent research on banks and intangible capital. Dell'Ariccia et al. (2020) show that banks decrease their commercial lending if local firms increasingly use intangible capital. Beck et al. (2021) find that liquidity created by banks promotes only tangible investment and consequently does not benefit those countries that specialize in industries using intangible assets.

When it comes to promoting export survival of products whose production process requires external finance to maintain sufficient levels of working capital (products with high liquidity needs), it is specifically the active but not the large stock markets that matter. This result might be related to the role played by the corporate governance and by shareholders' monitoring in improving the efficiency of working capital management (see, e.g., Gill and Biger 2013, Ben-Nasr 2016, Zeidan and Shapir 2017). Arguably, it is the activity rather than size of the stock market that strengthens the ability of shareholders to monitor the firms' management. In particular, active and liquid stock markets make it easier for shareholders to put the management under pressure by selling or threatening to sell the shares of the firm (see, e.g., Edmans and Manso 2011 or Edmans and Holderness 2017). In accordance with the traditional role of banking system in covering the working capital needs of firms, well-developed banks also promote export survival of products with high liquidity needs, especially at longer time horizons.[19]

Our empirical analysis also reveals the necessity of long-term export links if the trade credit among business partners is to serve as a viable source of export financing. Based on our results, informal credit between upstream and downstream firms cannot substitute for well-developed financial markets and institutions in promoting immediate survival of

[19] Besides the traditional route of bank loans, banks can support firms' working capital management also by specialized instruments like letters of credit. These instruments are particularly important in international trade and at the same time do not directly enter our proxies for banking development. The results in this paper might therefore represent only a lower bound for the importance of a well-developed banking system for the export survival of products with high liquidity needs.

newly exported products. The ability to rely on trade credit matters only for the long-term export survival, helping products that are already well-established in the destination market. Moreover, trade credit seems to serve as a substitute for external financing from banks rather than from stock markets. This is also in accordance with the existing findings from outside the trade literature (e.g., Fisman and Love 2003).

No clear pattern emerges in the export survival of products that require external finance to fund investment into physical capital, i.e. products with high investment needs. This is especially the case when we control for the alternative channel of high growth potential. These results complement some existing findings from outside the trade literature. Fisman and Love (2007) provide evidence that growth potential dominates investment needs in the transmission process from financial development to industrial growth. Tong and Wei (2011) find less robust results for this channel in the context of the transmission from the 2007-2009 financial crisis to stock market returns at the firm level, especially when compared to the channel of liquidity needs.

Our results on product-level export survival suggest three possible directions for further research on the distinct roles played by financial markets and institutions in international trade. First, it seems that the specific source of products' financial needs affects the relative importance of banks versus stock markets in promoting export success. It matters whether given products need to fund their investment needs related to physical capital, to fund their liquidity needs related to working capital, or to overcome the focus of more rudimentary financial systems on collateralizable tangible assets. Second, the relative importance of banks versus stock markets can vary even for the same group of products, depending on the specific time horizon used for measuring the export success. Third, the distinction between the size and the activity of stock markets matters substantially. Further research on these three topics could not only contribute to the existing finance-trade literature but also improve our understanding of the transmission process from finance to the real economy more generally.

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APPENDIX

Table 11: Correlations among the measures of financial vulnerability

	Investment needs	Liquidity needs	Asset intangibility	Growth opp.	Trade credit
Investment needs	1				
Liquidity needs	-0.0497	1			
Asset intangibility	-0.1822	-0.1346	1		
Growth opportunities	0.2399	0.0512	-0.1042	1	
Trade credit	-0.0391	-0.0693	-0.1704	0.0256	1

The table reports correlations among five measures of financial vulnerability described in Subsection 3.1. All measures are computed at the level of the 4-digit and 3-digit sectors according to the SIC classification.

Table 12: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Q1	Median	Q3
investment needs	252147	0.39	0.05	0.37	0.38	0.40
liquidity needs	252147	0.25	0.08	0.21	0.26	0.30
asset intangibility	252147	0.05	0.05	0.02	0.04	0.07
trade credit dependency	252147	0.40	0.11	0.34	0.39	0.46
global growth opportunities	252147	0.41	0.16	0.29	0.40	0.52
investment needs x banks	252147	0.28	0.19	0.12	0.25	0.38
investment needs x stock markets	235294	0.22	0.21	0.07	0.15	0.30
investment needs x GDPpc	252147	3.60	0.69	3.18	3.65	3.99
investment needs x real exchange rate	252147	-0.87	0.12	-0.90	-0.86	-0.82
investment needs x bank assets	252082	0.31	0.20	0.15	0.27	0.42
investment needs x total credit	251588	0.28	0.20	0.12	0.26	0.39
investment needs x stock market value traded	233886	0.13	0.18	0.02	0.06	0.16
investment needs x stock market turnover	232766	0.20	0.20	0.07	0.16	0.28
liquidity needs x banks	252147	0.18	0.14	0.07	0.15	0.25
liquidity needs x stock markets	235294	0.14	0.14	0.04	0.09	0.19
liquidity needs x GDPpc	252147	2.31	0.79	1.82	2.28	2.75
liquidity needs x real exchange rate	252147	-0.56	0.17	-0.67	-0.57	-0.46
liquidity needs x bank assets	252082	0.20	0.15	0.09	0.16	0.27
liquidity needs x total credit	251588	0.18	0.14	0.07	0.15	0.25
liquidity needs x stock market value traded	233886	0.08	0.12	0.01	0.04	0.10
liquidity needs x stock market turnover	232766	0.13	0.14	0.04	0.10	0.17
asset intangibility x banks	252147	0.03	0.05	0.01	0.02	0.05
asset intangibility x stock markets	235294	0.03	0.05	0.00	0.01	0.03
asset intangibility x GDPpc	252147	0.47	0.49	0.14	0.32	0.63
asset intangibility x real exchange rate	252147	-0.11	0.12	-0.16	-0.08	-0.04
asset intangibility x bank assets	252082	0.04	0.05	0.01	0.02	0.05
asset intangibility x total credit	251588	0.04	0.05	0.01	0.02	0.05
asset intangibility x stock market value traded	233886	0.02	0.03	0.00	0.00	0.02
asset intangibility x stock market turnover	232766	0.03	0.05	0.00	0.01	0.03
trade credit dependency x banks	252147	0.28	0.21	0.12	0.24	0.39
trade credit dependency x stock markets	235294	0.22	0.22	0.07	0.15	0.30
global growth opportunities x banks	252147	0.29	0.23	0.11	0.23	0.40
global growth opportunities x stock markets	235294	0.23	0.24	0.06	0.14	0.31
banks	252147	0.71	0.47	0.31	0.65	0.98
stock markets	235294	0.56	0.52	0.17	0.37	0.76
GDPpc (log)	252147	9.24	1.28	8.38	9.52	10.34
real exchange rate	252147	-2.23	0.02	-2.24	-2.23	-2.22
bank assets	252082	0.78	0.51	0.39	0.69	1.08
total credit	251588	0.73	0.50	0.30	0.68	1.00
stock market value traded	233886	0.33	0.45	0.04	0.15	0.40
stock market turnover	232766	0.52	0.51	0.17	0.41	0.73
initial export	252147	2.95	2.42	1.18	2.48	4.23
total export	252147	6.27	2.69	4.40	6.31	8.13
number of suppliers	252147	37.99	19.36	24.00	35.00	48.00
multiple spell	252147	0.73	0.44	0.00	1.00	1.00
physical capital intensity	252147	0.06	0.02	0.05	0.06	0.07
human capital intensity	252147	0.98	0.23	0.81	1.06	1.13
physical capital intensity x physical capital	252147	0.74	0.27	0.62	0.71	0.86
human capital intensity x human capital	252147	2.17	0.57	1.73	2.24	2.62
physical capital	252147	11.46	0.91	10.94	11.68	12.17
human capital	252147	2.20	0.25	2.08	2.27	2.38

We measure all time-varying explanatory variables at the beginning of a given export spell. The time dimension in our dataset is therefore reduced to the initial year of a given export spell - t_0. The variables $GDPpc_{c,t_0}$, $initial\_export_{ck,t_0}$, $total\_export_{ck,t_0}$ are taken in log terms.

Financial Dependence and Intensive Margin of Trade

Online Appendix

Melise Jaud* Madina Kukenova† Martin Strieborny‡

This version: October 25, 2021

*World Bank; E-Mail: mjaud@worldbank.org

†Swiss School of Higher Education; E-Mail: madina.kukenova@sshe.ch

‡University of Glasgow, Adam Smith Business School, Room 469, Main Building, University Avenue, Glasgow, G12 8QQ, United Kingdom. E-Mail: martin.strieborny@glasgow.ac.uk

Appendix A - Full Sample of Countries Exporting to the USA

Armenia; Australia; Austria; Bahrain; Belgium-Luxembourg; Belize; Bolivia; Bulgaria; Burundi; Cameroon; Canada; Central African Republic; Chile; China; Colombia; Congo, Dem. Rep.; Costa Rica; Cote d'Ivoire; Croatia; Cyprus; Czech Republic; Denmark; Dominican Republic; Ecuador; Fiji; Finland; France; Gabon; Gambia; Germany; Ghana; Greece; Hungary; Iceland; Iran; Ireland; Israel; Italy; Japan; Malawi; Malaysia; Malta; Mexico; Morocco; Netherlands; New Zealand; Norway; Pakistan; Paraguay; Philippines; Poland; Portugal; Romania; Russian Federation; Saudi Arabia; Sierra Leone; Singapore; Slovakia; Southern African Customs Union (comprises South Africa, Botswana, Lesotho, Namibia, Swaziland); Spain; Sweden; Switzerland, Liechtenstein; Togo; Trinidad and Tobago; Tunisia; Uganda; Ukraine; United Kingdom; Uruguay; Venezuela; Zambia.

Appendix B - Industries with the lowest and the highest levels of the three main measures of financial vulnerability

Table I: Bottom and top 15 industries: Investment needs

SIC code	SIC industry name	Investment needs
2111	Cigarettes	0.000
234	Women's and children's undergarments	0.206
278	Blank books and bookbinding	0.305
2851	Paints, varnishes, lacquers, enamels and allied prods	0.308
2761	Manifold business forms	0.312
2711	Newspapers: publishing or publishing and printing	0.325
3561	Pumps and pumping equipment	0.328
3613	Switchgear and switchboard apparatus	0.329
305	Hose and belting and gaskets and packing	0.337
2451	Mobile homes	0.339
2891	Adhesives and sealants	0.342
3721	Aircraft	0.342
251	Household furniture	0.343
3942	Dolls and stuffed toys	0.347
3812	Search, detection, navigation, guidance, aeronautical syst.	0.350
3861	Photographic equipment and supplies	0.442
3911	Jewelry, precious metal	0.444
3577	Computer peripheral equipment, nec	0.445
3651	Household audio and video equipment	0.460
351	Engines and turbines	0.464
3612	Power, distribution and specialty transformers	0.481
3751	Motorcycles, bicycles and parts	0.513
396	Costume jewelry and notions	0.536
3845	Electro-medical and electrotherapeutic apparatus	0.562
3652	Phonograph records and prerecorded audio tapes and disks	0.589
299	Miscellaneous petroleum and coal products	0.620
3841	Surgical and medical instruments and apparatus	0.640
2835	In vitro and in vivo diagnostic substances	0.657
2834	Pharmaceutical preparations	0.754
2836	Biological products, (no diagnostic substances)	1.000

Table II: Bottom and top 15 industries: Liquidity needs

SIC code	SIC industry name	Liquidity needs
2836	Biological products, (no diagnostic substances)	0.000
2711	Newspapers: publishing or publishing and printing	0.025
2721	Periodicals: publishing or publishing and printing	0.053
279	Printing trade services	0.067
2741	Miscellaneous publishing	0.068
205	Bakery products	0.077
3695	Magnetic and optical recording media	0.082
2451	Mobile homes	0.083
339	Miscellaneous primary metal products	0.084
2911	Petroleum refining	0.084
2086	Bottled and canned soft drinks and carbonated waters	0.096
275	Commercial printing	0.100
2011	Meat packing plants	0.102
2761	Manifold business forms	0.102
2834	Pharmaceutical preparations	0.109
232	Men's and boys' furnishings	0.323
3845	Electromedical and electrotherapeutic apparatus	0.324
396	Costume jewelry and notions	0.326
3634	Electric housewares and fans	0.327
239	Miscellaneous fabricated textile products	0.329
3861	Photographic equipment and supplies	0.341
3728	Aircraft parts and auxiliary equipment, nec	0.341
3873	Watches, clocks, clockwork operated devices/parts	0.342
2833	Medicinal chemicals and botanical products	0.353
3844	X-ray apparatus and tubes and related irradiation apparatus	0.381
3541	Machine tools, metal cutting types	0.399
3532	Mining machinery and equip (no oil and gas field mach and equip)	0.411
3562	Ball and roller bearings	0.420
391	Jewelry, silverware, and plated ware	0.425
2084	Wines, brandy, and brandy spirits	1.000

Table III: Bottom and top 15 industries: Asset intangibility

SIC code	SIC industry name	Asset intangibility
3433	Heating equipment, except electric and warm air furnaces	0.000
2911	Petroleum refining	0.001
3661	Telephone and telegraph apparatus	0.001
2621	Paper mills	0.001
2451	Mobile homes	0.001
367	Electronic components and accessories	0.001
3721	Aircraft	0.001
2211	Broad woven fabric mills, cotton	0.001
333	Primary nonferrous metals	0.003
3312	Steel works, blast furnaces and rolling mills (coke ovens)	0.003
331	Blast furnace and basic steel products	0.003
207	Fats and oils	0.003
327	Concrete, gypsum, and plaster products	0.004
287	Agricultural chemicals	0.004
3663	Radio and tv broadcasting and communications equipment	0.005
3533	Oil and gas field machinery and equipment	0.147
305	Hose and belting and gaskets and packing	0.148
2842	Specialty cleaning, polishing and sanitation preparations	0.149
3579	Office machines, nec	0.150
3585	Air-cond and warm air heating equip, refrig equip	0.165
3728	Aircraft parts and auxiliary equipment, nec	0.177
3944	Games, toys and children's vehicles (no dolls and bicycles)	0.193
284	Soap, cleaners, and toilet goods	0.196
3634	Electric housewares and fans	0.240
2844	Perfumes, cosmetics and other toilet preparations	0.242
396	Costume jewelry and notions	0.244
2741	Miscellaneous publishing	0.311
2111	Cigarettes	0.381
2711	Newspapers: publishing or publishing and printing	0.477
2721	Periodicals: publishing or publishing and printing	1.000

Appendix C - Broader measures of bank development

Table IV: Investment needs and alternative dimensions of bank development

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
investment needs × bank assets	0.012	-0.017	0.014			
	(0.046)	(0.030)	(0.025)			
investment needs × total credit				-0.027	0.001	0.043
				(0.046)	(0.031)	(0.026)
investment needs × stock markets	0.029	0.068^{a}	0.056^{a}	0.039	0.061^{b}	0.044^{b}
	(0.041)	(0.026)	(0.020)	(0.043)	(0.027)	(0.021)
investment needs × GDPpc	0.004	0.001	-0.004	0.011	-0.001	-0.005
	(0.020)	(0.012)	(0.010)	(0.019)	(0.012)	(0.010)
investment needs × real exchange rate	-2.034^{b}	-0.620	-0.502	-1.767^{c}	-0.653	-0.610
	(0.938)	(0.657)	(0.550)	(0.906)	(0.650)	(0.549)
Observations	235,229	235,229	235,229	239,824	239,824	239,824
R-squared	0.258	0.548	0.699	0.256	0.548	0.697
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. Bank assets represents the ratio between the claims held by deposit-taking banks vis-a-vis the domestic real non-financial sector and the GDP level in exporting country c. Total credit is ratio between the overall credit by both deposit-taking banks and other financial institutions and the GDP level in exporting country c. Other variables are described in **??**. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table V: Liquidity needs and alternative dimensions of bank development

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
liquidity needs × bank assets	0.018	0.072^{b}	0.054^{a}			
	(0.040)	(0.031)	(0.020)			
liquidity needs × total credit				0.028	0.057^{b}	0.052^{b}
				(0.039)	(0.029)	(0.021)
liquidity needs × stock markets	0.118^{a}	0.039	-0.016	0.115^{a}	0.035	-0.025
	(0.026)	(0.025)	(0.020)	(0.029)	(0.026)	(0.020)
liquidity needs × GDPpc	0.059^{a}	0.031^{b}	0.029^{a}	0.061^{a}	0.036^{a}	0.030^{a}
	(0.015)	(0.014)	(0.011)	(0.014)	(0.013)	(0.010)
liquidity needs × real exchange rate	-1.412^{c}	-0.712	-0.672	-1.491^{b}	-0.603	-0.650
	(0.757)	(0.646)	(0.485)	(0.749)	(0.633)	(0.486)
Observations	235,229	235,229	235,229	239,824	239,824	239,824
R-squared	0.259	0.548	0.699	0.256	0.548	0.697
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. All variables are described in **??**, **??**, and Table IV. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.

Table VI: Asset intangibility and alternative dimensions of bank development

Dep. var.: Survival	(1) 1y	(2) 5y	(3) 10y	(4) 1y	(5) 5y	(6) 10y
asset intangibility × bank assets	-0.014	-0.029	-0.009			
	(0.052)	(0.038)	(0.031)			
asset intangibility × total credit				-0.025	-0.018	-0.014
				(0.056)	(0.039)	(0.030)
asset intangibility × stock markets	0.217^{a}	0.183^{a}	0.089^{a}	0.222^{a}	0.187^{a}	0.094^{a}
	(0.040)	(0.031)	(0.029)	(0.042)	(0.032)	(0.031)
asset intangibility × GDPpc	0.013	0.027	0.013	0.018	0.024	0.013
	(0.020)	(0.017)	(0.014)	(0.018)	(0.016)	(0.014)
asset intangibility × real exchange rate	-2.708^{b}	-3.092^{a}	-2.183^{a}	-2.634^{b}	-3.207^{a}	-2.194^{a}
	(1.113)	(0.820)	(0.670)	(1.105)	(0.805)	(0.652)
Observations	235,229	235,229	235,229	239,824	239,824	239,824
R-squared	0.259	0.548	0.699	0.256	0.548	0.697
Country-Time FE	yes	yes	yes	yes	yes	yes
Product FE	yes	yes	yes	yes	yes	yes
Full set of controls included	yes	yes	yes	yes	yes	yes

Dependent variable is the probability of export survival of product k from industrial sector (industry) i exported by country c to the USA. Export survival probability is measured l years after the beginning of export spell, with $l = 1$ in columns (1) and (4), $l = 5$ in columns (2) and (5), and $l = 10$ in columns (3) and (6). The regressions are estimated by OLS and contain a full set of fixed effects at the product level and the (exporting country)*time level, with time referring to the beginning of a given export spell. All variables are described in **??**, **??**, and Table IV. The full set of controls also includes initial export, total export, number of suppliers, multiple spell, and interaction terms between physical and human capital endowments of country c and the corresponding capital intensities at the industry level. All time-varying explanatory variables are measured at the beginning of the export spell. Robust standard errors are clustered at the (exporting country)*time level, with time referring to the beginning of a given export spell. ^{a}, ^{b}, ^{c} denote statistical significance at the 1%, 5%, and 10% level, respectively.