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Title: Multidimensional financial development, exporter behavior and export diversification

Year: 2020

Version: Accepted version (Final draft)

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Please cite the original version:

Nieminen, M. (2020). Multidimensional financial development, exporter behavior and export diversification. *Economic Modelling*, 93, 1-12. <https://doi.org/10.1016/j.econmod.2020.07.021>

Multidimensional Financial Development, Exporter Behavior and Export Diversification

Mika Nieminen¹

Abstract

Financial development shapes export sector performance because exporters need external finance and face credit constraints. Previous empirical research has relied largely on single-country studies. The Exporter Dynamics Database (EDD), which features firm-level exports from over 60 countries, reveals differences in the microstructure of the export sector across countries. In this paper, we first provide new evidence that these differences are related to cross-country variation in financial development and structure. Second, we combine the EDD and multidimensional data on financial development with a global database on export diversification. This study is the first to examine how macrolevel export diversification is determined by the microcharacteristics of the export sector. This approach is novel in the empirical literature on export diversification. According to our cross-country analysis, access to domestic financial services positively contributes to export diversification by increasing the number of small exporters, as financial services ease the credit constraints these exporters face.

JEL classification: O11; F14; G20

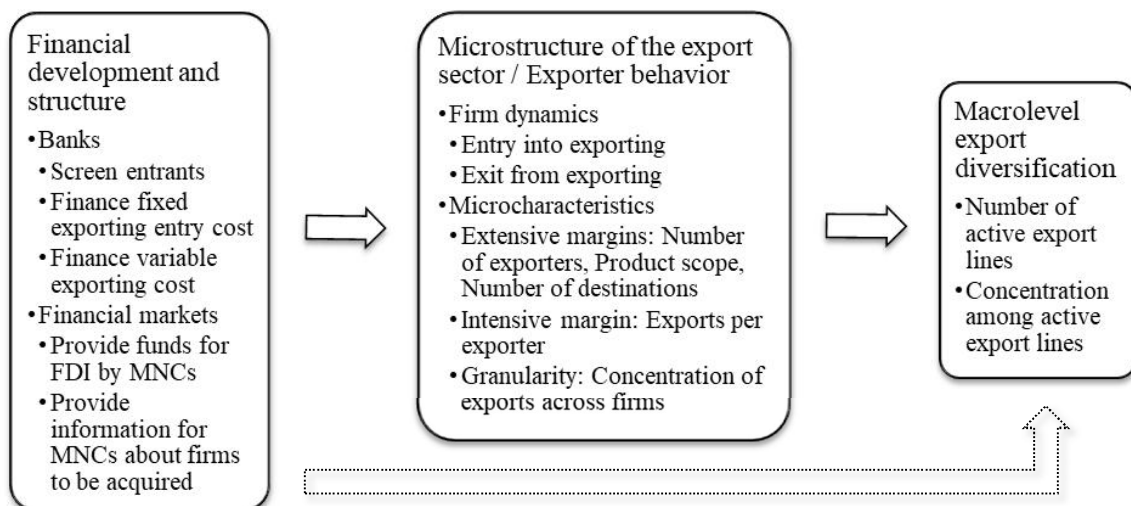
Keywords: Export diversification; Export dynamics; Financial development

¹ The author thanks the editor, Sushanta Mallick, and two anonymous referees for valuable comments and suggestions. The author thanks Axelle Kere, Hannu Koskinen, Julia Niemeläinen, Jolana Stejskalová and participants at the 23rd Annual International Conference on Macroeconomic Analysis and International Finance, the 2019 Nordic Conference on Development Economics, and the 41st Annual Meeting of the Finnish Economic Association for useful comments and suggestions. The author acknowledges financial support from the OP Group Research Foundation. Correspondence Address: Mika Nieminen, Jyväskylä University School of Business and Economics, Mattilanniemi 2, Agora Building, Jyväskylä, Finland. P.O. Box 35, FI-40014, University of Jyväskylä, Finland. Email: mika.p.nieminen@jyu.fi Tel.: +358504016350.

1. Introduction

Based on economic theory, financial development shapes export sector performance because exporters need external finance and face credit constraints (see, e.g., Manova, 2013, or Chaney, 2016 for a model of international trade with heterogeneous firms and credit constraints). Empirical studies on the relationship between financial constraints and exporter behavior rely on customs data from individual countries (see, e.g., Paravisini et al., 2014; Secchi et al., 2014; Muûls, 2015) or survey-based data from the World Bank Enterprise Survey (see, e.g., Regis, 2018). In this paper, we utilize the recent World Bank's Exporter Dynamics Database, which enables us to expand the analysis to a larger number of countries. The Exporter Dynamics Database reveals large differences in the microstructure of the export sector across countries.¹ In this paper, we examine whether these differences can be explained by country characteristics such as financial development or financial structures.² Furthermore, as illustrated by Graph 1, we extend the inference from exporter behavior to export diversification and provide empirical evidence that macrolevel export diversification is largely determined by export-sector microcharacteristics, such as the number of exporters.³ Due to the lack of cross-country data on exporter behavior, the relationship between the microstructure of the exporting sector and macrolevel export diversification has not been tested before our paper. Enhancing export diversification is of great importance for many developing countries (see, e.g., UNCTAD, 2018; International Monetary Fund, 2014) because it decreases their vulnerability to external shocks. Overall, our main finding is that the development of the domestic banking sector positively contributes to export diversification by increasing the number of small exporters. This is a new finding in the empirical literature on export diversification (see Agosin et al., 2012; Parteka and Tamberi, 2013; or a survey by Cadot et al., 2011b, Section 7.4).

Graph 1. Illustration of economic reasoning⁴



¹ The microstructure of the export sector refers to measures such as the number of exporters or the firm-size distribution. Firm-level data on exports are a necessary input for calculating such measures.

² Different multidimensional aspects of financial development and structure are measured by the subindices of the Financial Development Index Database (IMF) introduced recently by Svirydenka (2016) (see Graph A1 in the Appendix).

³ In the paper, we use terms “exporter behavior” and “microstructure of the export sector” interchangeably. These measures can be divided into measures of export-sector firm dynamics and export-sector microcharacteristics.

⁴ MNC refers to multinational companies. Export lines refer to product-destination pairs. Active export lines have nonzero exports.

The Exporter Dynamics Database introduced by Fernandes et al. (2016) is unique in the sense that it is the first to contain measures of exporter behavior for a large number of countries. These measures are constructed using firm-level customs data as inputs, and the data are provided at different levels of aggregation. In addition to introducing the data, Fernandes et al. (2016) analyze how different measures of exporter behavior vary with basic country characteristics such as GDP and GDP per capita. Based on economic theory, financial development should be taken into account in the analysis. Financial market imperfections restrict international trade flows because exporters need external finance. Due to the higher fixed costs (Bernard and Jensen, 2004) and longer time needed for export shipments (Djankov et al., 2010), credit constraints are tighter for exporters than for domestic producers. Models of international trade with heterogeneous firms and credit constraints propose that financial development affects both the extensive and intensive margins of exports (see, e.g., Manova, 2013; Chaney, 2016).⁵ According to Fernandes et al. (2016, Table 4), countries with a higher GDP per capita have more exporters, larger exporters and a greater share of exports controlled by the top 5% of exporters. We find that after controlling for the quality of domestic institutions, GDP per capita is not positively associated with the extensive or intensive margin of exports, whereas banking sector development increases the number of exporters. To our knowledge, we are the first to establish this finding in a multicountry study using customs data. Along with the study by Minetti et al. (2018) conducted at the same time, but independently of ours, our paper is the first to utilize the Exporter Dynamics Database to analyze the relationship between financial development and exporter behavior.

Our empirical findings also shed light on the determinants of export-sector firm dynamics and the granularity of exports. Countries with highly developed banking sectors tend to have a low entry rate into exporting but a high survival rate of entrants. This finding highlights banks' role in screening the entrants. The concentration of exports across firms is a measure of the export-sector microcharacteristics that we analyze. Hence, our paper is also related to the recent literature on granularity. According to the granular hypothesis, firm-specific shocks drive aggregate fluctuations (see, e.g., Gabaix, 2011; di Giovanni et al., 2014). A related finding is that exports are highly concentrated in the sense that only a few top firms account for a large share of total exports (see, e.g., Freund and Pierola, 2015). In these prior studies, the magnitude of the granularity of exports is evaluated. However, less is known about the mechanisms that give rise to this granular behavior. We make a contribution to this literature by producing empirical results on the determinants of share exports controlled by the top 1% of exporters. We find that countries with deeper financial markets have a higher share of exports controlled by the top 1% of exporters. A possible intuition behind this finding is that more developed financial markets in the host country encourage multinational firms to invest in the country and acquire ownership of the supplier.

As already illustrated by Graph 1, the main goal of this paper is to analyze how cross-country variation in multidimensional financial development and export-sector microcharacteristics translate into cross-country differences in macrolevel export diversification. At the firm level, export diversification depends on the product scope and the number of foreign markets served. However, they do not explicitly define export diversification at the country level. At the macro level, export diversification depends both on the number of export lines (i.e., the number of product-destination pairs) and the distribution of the trade values across export lines. To our knowledge, we are the first to examine the relationship between macrolevel export diversification and export-sector microcharacteristics (see, e.g., Cadot et al., 2011b, Section 7.4 for a survey of the drivers of diversification). We find that the number of exporters and access to domestic financial services are

⁵ The extensive margin of exports refers to the number of firms exporting, the number of products per exporting firm or to the number of destinations per exporting firm, whereas the intensive margin of exports is the exports per exporting firm. Firm-level data on exports is a necessary input for decomposing total exports into extensive and intensive margins. When using bilateral trade data, the extensive and intensive margins need to be quantified by a two-stage structural estimation procedure (see, Helpman et al., 2008, or Manova, 2013).

positively associated with macrolevel export diversification. Based on our descriptive theoretical framework, this association occurs because financial services ease the credit constraint in financing the fixed exporting entry cost, from which domestic startups and small domestic producers suffer the most. Consequently, countries with more developed banking sectors have a larger number of small exporters. As small domestic exporters specialize in different varieties, the sectoral pattern of exports becomes more even, and export diversification increases. Our cross-country evidence suggests that if policy makers want to enhance export diversification and if there is a choice between (A1) facilitating domestic firms to enter the foreign market and (A2) helping incumbents to broaden their product scope or between (B1) enhancing domestic banking sector development and (B2) increasing the development of domestic financial markets, they should prefer the first choice over the second choice in both cases.

The rest of the paper is organized as follows. Section 2.1 derives testable hypotheses on the relationship between financial development and exporter behavior. Section 2.2 formulates testable hypotheses on the relationships between financial development, export-sector microcharacteristics and macrolevel export diversification. Section 3 introduces our data, which are collected by combining several recently introduced databases and our econometric specifications. Section 4 presents our rich and detailed empirical results and reflects them in light of previous empirical findings and economic theory. Section 5 summarizes our findings and discusses some policy recommendations based on the empirical findings.

2. Derivation of testable hypotheses

In this section, we derive testable hypotheses on the relationships between financial development, exporter behavior and macrolevel export diversification.

2.1 Institutional quality and exporter behavior

2.1.1 Extensive and intensive margins of exports

Exports can be decomposed into extensive and intensive margins:

$$Exports = f \cdot \bar{x} = f \cdot \frac{1}{f} \sum_{i=1}^n x_i, \quad (1)$$

where f is the number of exporters, \bar{x} is the mean exports per exporter, and x_i is exports of exporter i . We will use this decomposition in our econometric analysis.

The extensive margin changes by the net entry rate:

$$\frac{\Delta f}{f} = \frac{entrants}{f} - \frac{exits}{f}, \quad (2)$$

where Δf is the change in the number of exporters, $entrants$ is the number of entrants, and $exits$ is the number of exiting exporters.

There is cross-country variation in the number of exporters, but in the steady state, the entry rate should equal the exit rate.⁶ In other words, in the long run, neither the entry rate nor the exit rate drives the number of exporters. Nevertheless, there is creative destruction, which means, for example, that the turnover (the sum of the entry rate and exit rate) is positive. The export entry rate is the ratio

⁶ In our terminology, the entry rate means the entry rate into exporting, and the exit rate means the exit rate from exporting.

of entrants to exporters, whereas the exit rate is the ratio of the sum of exiting entrants and exiting incumbents to the number of exporters.

2.1.2 Selection into exporting

Exporters consist of entrants and incumbents. For a moment, let us assume that all exporters are domestic firms. Analogous to Melitz (2003, Section 3), we assume that there is a fixed entry cost of exporting, which the entrant has to pay up front. This fixed entry cost creates economies of scale in exporting. An entrant's productivity is drawn from a probability distribution, but there is idiosyncratic uncertainty about the entrant's true productivity level, which is revealed only in the actual exporting activity.⁷ Entrants are optimistic about their productivity (De Meza and Southey, 1996). An entrant's profitability is correlated over time within a foreign market and across destinations (Albornoz et al., 2012).

Following Manova (2013, Section 3.3), the entrant needs external funding to pay the sunk entry cost. Due to contract incompleteness, the entrant establishes financial relationships with a domestic bank.⁸ However, contracts between entrepreneurs and domestic banks have enforcement problems. In other words, a domestic bank can expect to be repaid with some probability smaller than one, which is determined by the domestic institutional quality. The enforcement problem induces a credit constraint on the entrant. Due to the credit constraint, the lowest productivity of exporting (i.e., foreign market entry) is above the zero-profit threshold (Manova, 2013, Section 3.4). A more developed banking sector decreases this wedge between the productivity thresholds for foreign market entry with and without credit constraints (Manova, 2013, Proposition 1). A higher level of bank development can be characterized, for example, by a larger proportion of pledgeable future profits.

As the entrant's true productivity level is known only after it enters the foreign market, domestic banks have an important role in screening optimistic entrants. Following De Meza and Southey (1996), entrepreneurs' assessment of the probability of success (e.g., high productivity) is larger than the true probability, whereas banks have better information on the expected profits. A more developed banking sector does a better job at screening entrants and evaluating their true productivity.⁹ In other words, idiosyncratic uncertainty is decreasing in banking sector development.

The entrant survives in a foreign market and becomes an incumbent if its productivity is above the zero-profit threshold. If the entrant's productivity turns out to be below the zero-profit cut-off, it exits. In addition, an incumbent faces the risk of a bad shock.¹⁰

As an entrant's profitability is correlated over time within a foreign market and across destinations, paying the fixed entry cost is worthwhile despite high failure rates (Albornoz et al., 2012). However, the relationship between domestic banking development and entry rate depends on the relative importance of the fixed entry cost and idiosyncratic uncertainty. Financial development decreases the wedge and enables more entries, but at the same time, by decreasing the uncertainty on entrant productivity via enhanced screening of the optimistic entrants, it precludes entries.

The relationship between domestic banking development and the exit rate is negative because entrants' survival rate is increasing in bank development. Due to banks' role in screening the entrants, we expect that

Hypothesis 1 Banking sector development is negatively associated with the exit rate of entrants.

⁷ Thus, all firms share the same fixed entry cost, but the variable cost and profitability depend on productivity, which is firm-specific.

⁸ Trade credit potentially alleviates the credit constraint, but it is typically offered only to incumbents. See, e.g., Bose et al. (2020) for an analysis of the impact of financial liberalization on firm export performance.

⁹ In addition, banks' screening ability might be related to their market power (Memanova and Mylonidis, 2020).

¹⁰ In reality, exporting may boost a firm's productivity (see, e.g., Yang and Mallick, 2014 for a meta-analysis).

Based on their empirical analysis, Minetti et al. (2018) claim that the main driver of the positive impact of bank-oriented financial systems on total exports is a significant reduction in the exit rate of exporters. However, this claim contradicts economic theory, as in the steady state, aggregate variables are constant over time. In the long run, entry and exit rates are equal, or more precisely, the number of successful entrants equals the number of exiting incumbents. Hence, in the long run, the number of exporters is constrained by the wedge between the productivity thresholds for foreign market entry with and without credit constraints (zero-profit condition). If the probability distribution (i.e., technology) and the number of draws (i.e., population) are held constant, we expect that

Hypothesis 2a Banking sector development is positively associated with the number of exporters.

According to Hypothesis 2a, total exports increase with the development of the domestic banking sector through the extensive margin. Hypothesis 2a is such a reformulation of Proposition 1 in Manova (2013) and Proposition 2 in Manova (2008) that is testable with aggregated country-level data.

2.1.3 Product scope and the number of destinations

Thus far, we have implicitly assumed that exporters sell one product to one foreign market. In practice, however, exporters are multiproduct firms that serve a large number of destinations. If the fixed exporting entry cost is destination- and product-specific¹¹, the situation is analogous to the banking sector's development and the ranking of exporters (Hypothesis 2a): there is a pecking order of product-destination pairs. In the absence of credit constraints, all product-destination pairs above the zero-profit threshold will be produced and served.¹² However, again, there is a wedge between the thresholds for exporting with and without credit constraints that is decreasing with domestic banking development. Hence, analogous to Hypothesis 2a, we expect that

Hypothesis 2b Banking sector development is positively associated with both the product scope of exporters and the number of destinations per exporter (i.e., firm-level export diversification).

Hypothesis 2b is related to Proposition 1 in Chan and Manova (2015) and Propositions 3 and 7 in Manova (2008), but to be exact, the latter concerns macrolevel export diversification and bilateral trade flows, whereas Hypothesis 2b concerns firm-level export diversification and the microstructure of the exporting sector.¹³ Firm-level data aggregated at the country level are necessary for testing Hypothesis 2b.

2.1.4 Level of firm exports

Thus far, we have assumed that entrants need external funding to pay for the sunk entry cost. In practice, exporters may face a credit constraint in financing variable exporting costs that impede the growth of incumbents. However, entrants need not be startups; they can be large domestic producers that begin to export. Domestic producers can use their own financial resources to pay the sunk exporting entry cost. Typically, the larger the domestic producer is, the larger its exporting capacity and the less external funding it needs to pay this cost.

¹¹ See, e.g., Manova (2013, Sections 3.2-3.3) for a destination-specific fixed exporting entry cost.

¹² The landlocked status affects the zero-profit threshold, and fewer product-destination pairs are profitable. In other words, the landlocked status is negatively associated with both the product scope of exporters and the number of destinations per exporter (i.e., firm-level export diversification).

¹³ Firm-level export diversification and macrolevel export diversification are not necessarily positively correlated. In other words, a certain level of macrolevel diversification can result from large number of firms each exporting one differentiated product to a unique destination (minimal firm-level diversification) or from one exporter selling a large number of products to several markets (large firm-level diversification).

At the firm level, it should hold that improvements in credit conditions positively affect the level of exports (see, e.g., Paravisini et al., 2014). However, because we use firm-level data that are aggregated at the country level, we need to consider that financial development negatively affects exporting capacity via a decreased entry wedge. Financial development decreases the entry wedge and allows a large number of startups and small domestic producers to begin successful exporting; at the same time, it helps incumbents to expand their exporting activities. Thus, it is not clear how domestic banking development affects the intensive margin of exports.

2.1.5 Concentration of exports across firms

Little is known about the mechanisms that give rise to the granularity of exports. However, neither the extensive nor the intensive margin of exports explicitly defines the concentration of exports across firms. As previously mentioned, the fixed exporting entry cost creates economies of scale in exporting. If the fixed exporting entry cost increases with transportation costs, it is higher for landlocked countries than for nonlandlocked countries (see, e.g., Cadot et al., 2011b, p. 267). As increasing returns to scale lead to the concentration of exports across firms (see, e.g., Freund and Pierola, 2015, p. 1023), it is reasonable to expect that landlocked status is positively associated with the share of exports controlled by the top exporters.¹⁴

Thus far, we have considered only domestic firms and have implicitly assumed that the financial sector consists only of banks. In practice, however, large multinational firms dominate exports¹⁵ (see, e.g., Freund and Pierola, 2015), and the financial sector consists of banks and financial markets (i.e., the stock market and bond market). Similar to large domestic producers, multinational firms can rely on internal finance (see Foley and Manova, 2015, Section 4, or Yeaple, 2013, Section 3.5 for a review). Moreover, unlike small domestic exporters, they can raise funds from capital markets.

Let us consider a multinational firm that serves foreign markets. When establishing its global production network, the firm has to decide in which countries production facilities are located and whether these facilities are owned by the firm (integration by foreign direct investment (FDI)) or not (outsourcing via arm's-length contracting). The first decision is called the location decision, and the latter is called the internalization decision.

Exports are largely dominated by multinational firms, and thus, it is logical to expect that the determinants of FDI are also important for the concentration of exports across firms. There is a vast body of literature on the determinants of FDI. However, as our main interest is to determine how credit constraints induced by enforcement problems affect firms' choices regarding exporting, we focus on institutional factors (see, e.g., Bailey, 2018 for a review on institutions and FDI). With regard to institutions, we distinguish the protection of property rights¹⁶ (material and immaterial) from financial development.

Based on economic theory and empirics, a high level of property protection attracts FDI (see, e.g., Bénassy-Quéré et al., 2007; Bailey, 2018). However, intrafirm trade is relatively more attractive as the level of property protection decreases (see Antràs et al., 2009). Thus, the relationship between property protection and the concentration of exports across firms is ambiguous.¹⁷ FDI can come in the form of greenfield investment (i.e., new facility) or cross-border acquisition (i.e., buying an

¹⁴ See also Neary (2010, Figure 2) for an illustration of the negative relationship between fixed costs and the number of exporters in a free-entry equilibrium.

¹⁵ Due to economies of scale in exporting, this situation is not surprising. Multinational firms can be privately owned or state-owned companies.

¹⁶ For our purposes, there is no need to make a strict distinction between property rights institutions and contracting institutions.

¹⁷ Despite their emphasis on comparative advantage, Carluccio and Fally (2012) show that it holds true for the development of the banking sector in host countries that a multinational firm's profits increase with the level of banking sector development (attracting investments), while multinational firms are more likely to integrate suppliers located in countries with less developed banking sectors than those in countries with more developed banking sectors.

existing foreign firm). The development of financial markets¹⁸ is beneficial for both of these types of FDI because it facilitates the raising of funds, irrespective of the type of FDI and the finding of suitable foreign firms to be acquired. Hence, we expect the following:

Hypothesis 3 Financial market development is positively associated with the share of exports controlled by top exporters.

Hypothesis 3 need not be driven by the FDI of multinational firms. An identical hypothesis emerges if we assume that small exporters have access only to domestic banks, whereas large domestic producers have access to domestic financial markets.

2.2 Financial development, microcharacteristics of the export sector and export diversification

2.2.1 Decomposition of macrolevel export concentration

Neither the product scope of exporters nor the number of destinations per exporter explicitly defines export concentration at the macro level.¹⁹ The export concentration can be measured by Theil's entropy index. The higher the value is, the higher the export concentration. Naturally, the index values depend on the level of disaggregation. Cadot et al. (2011a) show that the Theil index of export concentration can be decomposed additively into between and within components. Changes in the between component of export concentration reflect proportional changes in the number of active trade lines (i.e., variation in the number of new products exported or in the number of new markets for existing exports). Changes in the within component of export concentration reflect changes in the concentration among active trade lines (i.e., the distribution of trade values across existing export lines becomes more or less even).

The within component of export concentration measures the concentration among active trade lines, taking into account product categories and destinations, but not the exporter. The concentration of exports across firms (i.e., the share of exports controlled by the top exporters) does not take into account product categories or destinations.

If we assume firm heterogeneity in trade à la Melitz (2003), an increase in the extensive margin of exports (number of exporters) would contribute an increase in export diversification through a reduction in the between component of the Theil index of export concentration because, in a monopolistic competition model, each firm produces a different variety of exported goods. In practice, however, several firms produce the same variety, one firm can produce several varieties, and firms are nonatomistic.

2.2.2 Macrolevel export concentration

Compared to that of a single country, the world population produces a larger number of draws (exporter productivity), and fixed entry costs create economies of scale. Hence, we assume that exports are dominated by a multinational firm that 1) has a large product scope, 2) is specialized in exporting one particular product, and 3) serves all destinations. A similar but less drastic pattern of export superstars emerges from the findings of Bernard et al. (2007) and Freund and Pierola (2015).

If the Theil index is not calculated from highly disaggregated data, the between component of export concentration is not affected by an increase in the number of exporters because the

¹⁸ By the development of financial markets, we refer to the state and degree of the institutional development of the domestic financial markets, not to price fluctuations. In our data, financial markets include stock and bond markets. However, for simplicity, we will use the phrase "financial market development" instead of "development of financial markets".

¹⁹ In our terminology, concentration means dediversification, that is, when concentration increases, diversification decreases.

multinational firm whose presence we take as given operates along the majority of trade lines. However, the within component of export concentration decreases with the number of exporters as the sectoral pattern of exports becomes more even. If domestic exporters specialize in different varieties, we expect that

Hypothesis 4 The number of exporters is negatively associated with (the within component of) the Theil index of export concentration.

If domestic banking sector development is positively associated with the number of exporters (Hypothesis 2a) and with firm-level export diversification (Hypothesis 2b), or alternatively, if Hypothesis 2a holds true and domestic exporters specialize in different varieties, we expect that

Corollary 1 Banking sector development is negatively associated with the Theil index of export concentration.

One should notice that while Hypothesis 2b concerns firm-level export diversification, Corollary 1 concerns macrolevel export concentration and diversification.

3. Data and econometric specifications

3.1 Data

Our sample consists of 68 countries in the 1998-2014 period.²⁰ The listing of countries is presented in Table A2 in the Appendix. Following the IMF's country classification, 58 of the countries are emerging markets and developing economies, and 10 are advanced economies. The descriptive statistics are provided in Table 1, a detailed description of all the variables and data sources is provided in Table A1 in the Appendix, and the correlation matrix is provided in Table A3 in the Appendix.

Large cross-country differences are shown in Table 1. Typically, the within component of variance is small. For the number of exporters and the indicators of financial market development, it holds that the median is far below the mean (see Table 1) because the majority of the countries in our sample are small developing countries, while we also have a few large advanced countries (see Table A2 in the Appendix). The top 1% of exporters on average account for more than half of a country's total (nonoil) exports, highlighting the granularity of exporters.

²⁰ The sample period begins in 1998 because in the Exporter Dynamics Database, the measures of export-sector firm dynamics are available from 1998 onwards.

Table 1. Descriptive statistics – annual observations for 65 countries over the 2006-2012 period

Variable	Min	Max	Median	Mean	St. dev.	Share of within σ^2	# Obs.
<i>Dependent variables:</i>							
<i>Export-sector firm dynamics</i>							
Export entry rate	0.138	0.701	0.354	0.370	0.100	0.112	330
Entrant exit rate	0.299	0.854	0.583	0.585	0.095	0.181	276
Incumbent exit rate	-0.142	0.938	0.200	0.218	0.096	0.529	276
<i>Export-sector microcharacteristics</i>							
Number of exporters	136	119,399	3,147	10,105	18,669	0.006	364
Product scope	1.560	16.045	5.429	5.965	2.696	0.039	357
Mean destinations per exporter	1.334	9.089	2.665	2.971	1.290	0.024	364
Mean exports per exporter	2.53*10 ⁵	1.89*10 ⁷	2.10*10 ⁶	2.93*10 ⁶	2.79*10 ⁶	0.059	364
Share of top 1% exporters	0.145	0.962	0.564	0.559	0.155	0.066	364
<i>Macrolevel export diversification</i>							
Theil index of export concentration	1.598	5.891	2.958	3.158	1.133	0.025	310
<i>Explanatory variables:</i>							
<i>Domestic institutional quality</i>							
<i>Multidimensional financial development</i>							
<i>Financial institutions (banks)</i>							
FI depth	0.006	1.000	0.147	0.244	0.230	0.009	455
FI access	0.007	1.000	0.254	0.311	0.274	0.028	455
FI efficiency	0.246	0.908	0.665	0.647	0.152	0.092	455
<i>Financial markets</i>							
FM depth	0.000	0.995	0.093	0.212	0.251	0.037	455
FM access	0.000	1.000	0.027	0.182	0.252	0.019	455
FM efficiency	0.000	1.000	0.053	0.207	0.311	0.124	455
<i>Protection of property rights</i>							
Rule of law	-1.548	2.014	-0.390	-0.149	0.911	0.008	455
<i>Control variables</i>							
GDPpc	331	91,617	3,928	10,384	16,627	0.002	455
GDP	3.98*10 ⁹	3.56*10 ¹¹	3.56*10 ¹¹	2.23*10 ¹¹	5.33*10 ¹¹	0.003	455
Landlocked	0.000	1.000	0.000	0.200	0.400	0.000	455
Fuel exports	0.000	0.969	0.053	0.150	0.230	0.046	417

Notes: See Table A2 in the Appendix for a list of countries.

3.1.1 Dependent variables

Our dependent variables include measures of export-sector firm dynamics and microcharacteristics, as well as measures of macrolevel export diversification. Data on exporter behavior (export-sector firm dynamics and microcharacteristics) and firm-level export diversification are taken from the Exporter Dynamics Database (World Bank), which was recently introduced by Fernandes et al. (2016). The data are available at different disaggregation levels. The country-sector-year level would be needed to analyze questions related to comparative advantage. Because we do not concentrate on comparative advantage and neither our explanatory variables nor macrolevel export concentration have sectoral variation, we use the country-year level. An important notion is that oil exports are excluded from the Exporter Dynamics Database.²¹ In other words, the measures of exporter behavior are calculated from the nonoil-exporting sector.

Data on macrolevel export concentration are taken from the Export Diversification Database (IMF), which contains the Theil overall index of export concentration and the between and within

²¹ To be more precise, HS Chapter 27 (hydrocarbons such as oil, petroleum, natural gas, coal, etc.) is eliminated from the cross-country raw dataset (Cebeci et al. 2012, p. 11-12).

components of the index. The index is based on bilateral trade flow data at the 4-digit SITC (Rev. 1) level with 851 product categories (International Monetary Fund, 2014).

3.1.2 Explanatory variables

Our set of explanatory variables includes institutional variables and control variables. We distinguish financial development from the protection of property rights and banking sector development from financial market development.

The subindices of the Financial Development Index Database (IMF) introduced recently by Svirydzienka (2016) are utilized to measure multidimensional financial development: the depth of financial institutions, access to financial institutions, the efficiency of financial institutions, the depth of financial markets, access to financial markets and the efficiency of financial markets. Financial institutions (FI) include banks, insurance companies, mutual funds and pension funds, whereas financial markets (FM) include stock and bond markets. Depth gauges the size and liquidity of FI or FM, access captures the ability of individuals and companies to access financial services, and efficiency measures the ability of institutions to provide financial services at a low cost and with sustainable revenues or the level of activity of capital markets (Svirydzienka, 2016, p. 5). The banking sector and financial markets have different functions, and it is important to distinguish between the two.

The protection of property rights is measured by the World Governance Indicators' index value for the rule of law – the most widely used proxy for the quality of contract enforcement and the protection of property rights (see, e.g., a review by Nunn and Trefler, 2014; Araujo et al., 2016).

The set of control variables includes GDP per capita (“GDPpc”), GDP, the share of fuel exports in merchandise exports (“Fuel exports”) and an indicator of whether a country is landlocked.

3.2 Econometric specifications

Our main goal is to examine whether large differences in the microstructure of the export sector across countries are related to cross-country variation in multidimensional financial development and how these differences affect export diversification at the macro level. Hence, with regard to the empirical methodology, we follow Fernandes et al. (2016)²², who introduce the Exporter Dynamics Database, and estimate the following cross-sectional regression model with the OLS estimator:

$$\overline{\text{ExportMeasure}}_i = \alpha + \beta_1 \overline{\text{FI}}_i + \beta_2 \overline{\text{FM}}_i + \beta_3 \overline{\text{Rule of law}}_i + \bar{\mathbf{x}}_i' \mathbf{f} + \varepsilon_i, \quad (3)$$

where $\overline{\text{ExportMeasure}}$ is a measure of export-sector firm dynamics, microcharacteristics, or macrolevel export concentration; α is a constant; FI measures the depth of, access to or efficiency of financial institutions (i.e., banks); FM measures the depth of, access to or efficiency of financial markets²³; Rule of law is a proxy for the protection of protection rights; \mathbf{x} is a vector of control variables; and ε is a residual.

The bar indicates that in equation (3), for every country i , all variables are measured as averages over the 2006-2012 period.²⁴ The functional forms (natural logarithms) are derived from Fernandes et al. (2016).²⁵ The set of control variables includes GDP per capita, GDP and a landlocked dummy.

²² The only difference is that we use country-year level data on exporter behavior because we do not concentrate on comparative advantage and neither our explanatory variables nor macrolevel export concentration has sectoral variation.

²³ All combinations of (FI, FM) pairs are tested, and the results are presented for the particular (FI, FM) pair that produces the highest R-squared. In other words, we apply an information criterion-based criterion. If the scatter plot suggests a nonlinear relation, we test for the quadratic term and include it if it is statistically significant.

²⁴ For macrolevel export concentration, the data end in 2010, and consequently, the sample period is 2006-2010.

²⁵ We draw a scatter plot for all meaningful relationships to ensure that the functional forms are correct (see Figures A1-10 in the Appendix). In addition, we test the quadratic term of Ln GDPpc and include it if it is statistically

The first two are included because these are the two variables that Fernandes et al. (2016) include in their analysis. The latter is included because our discussion in Section 2 suggests that it could be an important determinant of some of our dependent variables.²⁶ When the dependent variable is the Theil index of export concentration, we control for fuel exports.²⁷

Along with the cross-sectional regressions (equation (3)), we estimate a similar panel data regression model using annual observations for the 1998-2014 period.²⁸ When the dependent variable is the Theil index of export concentration, variables are measured over the 2006-2010 period in cross-sectional regressions, and in panel data regressions, annual observations for the 1998-2010 period are used.²⁹

In addition to pairwise correlations, multicollinearity is tested by the variance inflation factor (VIF) (see Tables A4-A7 in the Appendix). When the dependent variables are regressed against explanatory variables and the latter with higher-order terms are mean-centered, VIFs are always below 10, which is a commonly used threshold value. In other words, there is no indication of severe multicollinearity.

4. Empirical results

4.1 Financial development and exporter behavior

In Section 2.1, we propose hypotheses on the relationship between institutional quality and exporter behavior. In this section, we empirically test these hypotheses by estimating equation (3) for the measures of export-sector firm dynamics and microcharacteristics.

4.1.1 Determinants of export-sector firm dynamics

In Table 2, we present the results for the relationships between domestic multidimensional financial development and export-sector firm dynamics. There is a strong negative linear relationship between the export entry rate and the depth of the domestic banking sector (FI depth) (columns 1 and 4 in Table 2 and Figure A1 in the Appendix). Based on our discussion in Section 2.1.2, as banks both screen and finance the entrants, idiosyncratic uncertainty on entrants' productivity outweighs the credit constraint in financing the fixed entry cost. Higher banking sector development decreases the wedge between the productivity thresholds for foreign market entry with and without credit constraints but also decreases the uncertainty in optimistic entrants' productivity. Our empirical finding suggests that the latter clearly dominates.³⁰

There is a negative but statistically insignificant relationship between the entrant exit rate and the efficiency of domestic banks (FI efficiency) (columns 2 and 5 in Table 2 and Figure A2 in the Appendix). Consequently, we fail to find strong empirical support for Hypothesis 1: "Banking sector development is negatively associated with the exit rate of entrants".

significant at the 5% level because there is a U-shaped relationship between export concentration and GDP per capita (see, e.g., Cadot et al., 2013).

²⁶ For example, Parteka and Tamberi (2013), Agosin et al. (2012) and Cadot et al. (2011b) find that location or remoteness statistically significantly correlates with export diversification.

²⁷ Fuel exports are included because the measures of export-sector microcharacteristics from the Exporter Dynamics Database are calculated from the nonoil-exporting sector, whereas oil exports are included in the data from which the Theil index of export concentration is calculated. For example, Bahar and Santos (2018) find that countries with larger shares of natural resources in exports have more concentrated nonresource export baskets.

²⁸ To understand cross-country variation in dependent variables, including country fixed effects would undermine much of the economically meaningful aspects of the econometric analysis. Hence, when estimating the panel data regression model, we use the pooled OLS estimator. Based on Table 1, the within component of variance is small for the dependent variables.

²⁹ The sample period ends in 2010 because IMF's Diversification Toolkit does not include observations thereafter.

³⁰ Another implication of the result is that modeling the credit constraint with incomplete information (i.e., the bank cannot observe the productivity of the firm) seems erroneous.

Table 2
Export-sector firm dynamics and multidimensional financial development

Dependent variable	Export entry rate	Entrant exit rate	Incumbent exit rate	Export entry rate	Entrant exit rate	Incumbent exit rate
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Banks</i>						
FI depth	-0.320*** (0.102)			-0.200*** (0.071)		
FI efficiency		-0.156 (0.136)	-0.132 (0.104)		-0.055 (0.065)	-0.055 (0.075)
<i>Financial markets</i>						
FM depth	0.196** (0.098)			0.136* (0.072)		
FM access		0.044 (0.062)	0.062 (0.040)		0.013 (0.051)	0.022 (0.026)
Rule of law	0.028 (0.023)	0.019 (0.028)	-0.009 (0.025)	0.013 (0.018)	0.021 (0.021)	-0.022 (0.016)
Ln GDPpc	-0.007 (0.016)	0.002 (0.019)	-0.009 (0.011)	-0.010 (0.015)	0.004 (0.016)	0.002 (0.009)
Ln GDP	-0.024** (0.012)	-0.023* (0.013)	-0.010 (0.007)	-0.017** (0.008)	-0.017* (0.009)	-0.011** (0.005)
Landlocked	0.003 (0.039)	-0.036 (0.041)	0.006 (0.025)	0.044 (0.033)	-0.001 (0.030)	0.007 (0.024)
Constant	1.063*** (0.280)	1.246*** (0.289)	0.606*** (0.215)	0.918*** (0.174)	1.006*** (0.207)	0.539*** (0.151)
Time effects				Yes	Yes	Yes
R ²	0.311	0.124	0.273	0.315	0.095	0.149
# Obs.	63	60	60	503	426	426
Type of regression	Cross-sectional	Cross-sectional	Cross-sectional	Pooled	Pooled	Pooled

The regressions in columns (1)-(3) are based on country-level averages during the 2006-2012 period. Heteroscedasticity-robust standard errors are in parentheses. The regressions in columns (4)-(6) are based on measures at the country-year level for 1998-2014. Panel robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Multicollinearity is tested using the variance inflation factor (VIF), and in all regressions, VIFs are below 10 (see Tables A4-A5 in the Appendix).

4.1.2 Determinants of the extensive margin of exports

In Table 3, we present the results for the relationships between multidimensional financial development and the extensive margin of exports. The number of exporters increases with the size of the economy (columns 1 and 4), which is trivial. However, both the development of domestic banks and that of domestic financial markets are positively associated with the number of exporters. On the one hand, this finding provides support for Hypothesis 2a – “Banking sector development is positively associated with the number of exporters”; on the other hand, it indicates that the positive relation does not depend on the financial structure. The number of exporters increases with companies’ access to financial services and with the level of activity of capital markets. The former relationship is positive quadratic and decreasing in FI access (see Figure A3 in the Appendix). This finding is in line with Manova (2013), who, using different data, establishes that banking sector development increases the probability of bilateral exports. Because we use the Exporter Dynamics Database in our empirical analysis, unlike Manova (2013), we can go from trade flows to the microstructure of the export sector.

In the long run, the number of successful entrants equals the number of exiting incumbents. In other words, the number of exporters is constrained by the wedge between the productivity thresholds

for foreign market entry with and without the credit constraint. Although the negative relationship between the export entry rate and banking sector development (columns 1 and 4 in Table 2) suggests that idiosyncratic uncertainty on entrants' productivity is more important than the fixed entry cost, the positive relationship between the number of exporters and banking sector development suggests that the fixed entry cost and credit constraint nevertheless shape the microcharacteristics of the export sector.

At the firm level, export diversification depends on product scope and the number of foreign markets served. We find evidence that there is a strong positive relationship between the product scope of exporters and the depth of domestic financial institutions (i.e., banks) across countries (columns 2 and 5 in Table 3 and Figure A4 in the Appendix). This finding is consistent with Manova (2013, Table 4), who finds that financially advanced economies export a wider range of products in industries intensive in outside finance and intangible assets. Based on Section 2.1.3, this finding is because 1) the fixed exporting entry cost is product-specific, 2) the credit constraint in financing fixed product-specific exporting entry cost is binding and restricts the product scope, and 3) the deeper the domestic banking sector is, the more credit constraints are eased.

Country size measured by GDP is positively associated – and landlocked status is negatively associated – with the number of markets exporters serve (columns 3 and 6 in Table 3). Compared to firm-level export diversification in terms of product scope, the positive relationship between the number of export destinations and the depth of domestic financial institutions is slightly weaker. In addition, the coefficient of FI depth is smaller by half.³¹ This finding suggests that either the destination-specific components of the fixed exporting entry cost are modest or that the credit constraint in financing fixed destination-specific exporting entry cost is only weakly binding and does not greatly restrict entry into new markets.

Overall, we find empirical support for Hypothesis 2b: “Banking sector development is positively associated with both the product scope of exporters and the number of destinations per exporter (i.e., firm-level export diversification)”, but the former association is stronger.

³¹ Banking sector development and financial market development have opposing effects on the number of export destinations.

Table 3
Extensive margin of exports and multidimensional financial development

Dependent variable	Ln number of exporters	Ln mean of the number of HS6 products per exporter	Ln mean of the number of destinations per exporter	Ln number of exporters	Ln mean of the number of HS6 products per exporter	Ln mean of the number of destinations per exporter
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Banks</i>						
FI depth		1.421*** (0.398)	0.518* (0.297)		1.072** (0.443)	0.442* (0.262)
FI access	5.208*** (1.130)			3.943*** (1.334)		
FI access ^2	-3.091*** (0.838)			-2.541** (1.024)		
FI efficiency						
<i>Financial markets</i>						
FM depth		0.629 (0.743)			0.376 (0.847)	
FM depth ^2		-1.715** (0.698)			-1.122 (0.713)	
FM access			-0.306* (0.180)			-0.302* (0.162)
FM efficiency	0.992*** (0.267)			0.776*** (0.196)		
Rule of law	0.175 (0.118)	0.054 (0.101)	0.081 (0.072)	0.179 (0.120)	0.066 (0.095)	0.099 (0.064)
Ln GDPpc	-0.365** (0.157)	-0.058 (0.072)	-0.065 (0.054)	-0.232 (0.156)	-0.058 (0.070)	-0.057 (0.053)
Ln GDP	0.520*** (0.083)	0.062 (0.048)	0.130*** (0.036)	0.547*** (0.083)	0.052 (0.049)	0.111*** (0.031)
Landlocked	-0.343* (0.191)	-0.248* (0.125)	-0.192* (0.102)	-0.366** (0.176)	-0.325** (0.123)	-0.253** (0.108)
Constant	-2.832 (1.854)	0.381 (1.103)	-1.668* (0.839)	-4.302*** (1.599)	0.700 (1.123)	-1.234 (0.768)
Time effects				Yes	Yes	Yes
R ²	0.900	0.496	0.535	0.890	0.428	0.521
# Obs.	65	64	65	564	557	564
Type of regression	Cross-sectional	Cross-sectional	Cross-sectional	Pooled	Pooled	Pooled

The regressions in columns (1)-(3) are based on country-level averages during the 2006-2012 period. Heteroscedasticity-robust standard errors are in parentheses. The regressions in columns (4)-(6) are based on measures at the country-year level for 1998-2014. Panel robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Multicollinearity is tested using the variance inflation factor (VIF), and in all regressions (with mean-centered variables), VIFs are below 10 (see Tables A4-A5 in the Appendix).

4.1.3 Determinants of the intensive margin of exports and the concentration of exports across firms

In Table 4, we present the results for the relationships between multidimensional financial development, the intensive margin of exports and the concentration of exports across firms. It is largely trivial that larger countries have larger exporters (columns 1 and 3 in Table 4). More importantly, we find weak empirical evidence that the mean exports per exporter are negatively

associated with banking sector development. This finding may seem surprising, but at the macro level, it is theoretically plausible. In addition to helping incumbents expand their export activities, financial development also decreases the entry wedge and allows a larger number of startups and small domestic producers to begin successful exporting. The negative coefficient implies that the latter dominates.

Based on Tables 3 and 4, the extensive margin of exports is positively associated with financial development, but with regard to the intensive margin of exports, the results are sensitive to whether the cross-sectional or the panel regression model is estimated.³² These findings coincide nicely with Regis (2018), who, by using firm-level data from the World Bank Enterprise Survey (104 developing countries), finds that access to credit increases the likelihood of entry into international markets but does not increase the export volume.

As expected, landlocked status is positively associated with the share of exports controlled by the top 1% of exporters (columns 2 and 4 in Table 4). Furthermore, it turns out that there is a robust positive relationship between the share of the top 1% of exporters and the depth of financial markets. Consequently, we find empirical support for Hypothesis 3 – “Financial market development is positively associated with the share of exports controlled by the top exporters”. Based on Section 2.1.5, this result occurs because financial market development encourages multinational firms to invest in the country and acquire ownership of the supplier. In addition, we find weak evidence that the share of exports controlled by the top 1% of exporters increases with the protection of protection rights, which is proxied by the rule of law.

According to Fernandes et al. (2016, Table 4), countries with a higher GDP per capita have more exporters, larger exporters and a greater share of exports controlled by the top 5% of exporters. We find that after controlling for the quality of domestic institutions, GDP per capita is not positively associated with the extensive or intensive margin of exports (Tables 3 and 4). Domestic financial development, along with country size (GDP), determines the extensive margin of exports and, to some extent, the intensive margin of exports. Financial market development, along with landlocked status and GDP per capita, is an important determinant of the concentration of exports across firms.

³² These two effectively rule each other out so that the total exports are positively associated with banking sector development, but the result is not statistically significant at the 10% level.

Table 4

Intensive margin of exports, concentration and multidimensional financial development

Dependent variable	Ln mean exports per exporter	Share of top 1% exporters	Ln mean exports per exporter	Share of top 1% exporters
	(1)	(2)	(3)	(4)
<i>Banks</i>				
FI efficiency	-1.698** (0.702)	-0.226 (0.144)	-0.744 (0.472)	-0.150 (0.113)
<i>Financial markets</i>				
FM depth		0.318** (0.121)		0.206** (0.095)
FM efficiency	-0.527 (0.375)		-0.726*** (0.236)	
Rule of law	0.159 (0.154)	0.042 (0.039)	0.109 (0.128)	0.063* (0.034)
Ln GDPpc	0.039 (0.107)	0.402*** (0.150)	0.082 (0.094)	0.421*** (0.156)
Ln GDPpc ^2		-0.023** (0.009)		-0.024** (0.009)
Ln GDP	0.331*** (0.072)	-0.003 (0.017)	0.338*** (0.059)	0.015 (0.013)
Landlocked	0.156 (0.253)	0.154*** (0.057)	0.305 (0.236)	0.198*** (0.060)
Constant	7.300*** (1.942)	-1.025 (0.720)	5.664*** (1.495)	-1.570 (0.696)
Time effects			Yes	Yes
R ²	0.368	0.400	0.467	0.441
# Obs.	65	65	564	564
Type of regression	Cross-sectional	Cross-sectional	Pooled	Pooled

The regressions in columns (1)-(2) are based on country-level averages during the 2006-2012 period. Heteroscedasticity-robust standard errors are in parentheses. The regressions in columns (3)-(4) are based on measures at the country-year level for 1998-2014. Panel robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Multicollinearity is tested using the variance inflation factor (VIF), and in all regressions (with mean-centered variables), VIFs are below 10 (see Tables A6-A7 in the Appendix).

4.2 Financial development, microcharacteristics of the export sector and macrolevel export diversification

In Section 2.2, we propose two hypotheses (Hypotheses 4 and Corollary 1) on the relationships between financial development, the number of exporters and macrolevel export concentration. In this section, we empirically test these hypotheses by estimating equation (3) for the measure of macrolevel export concentration.

In Table 5, the dependent variable is the Theil index of export concentration, which measures export concentration at the macro level. In columns 1-2 and 4-5, the measures of export-sector microcharacteristics are included one by one as explanatory variables, whereas in columns 3 and 6, the relationship between financial development and export concentration is tested directly.³³

³³ Number of exporters is included instead of product scope or number of export destinations because, based on Table A8 in the Appendix, the first has the strongest relationship with export concentration. Mean exports per exporter are not included because, based on Table A9 in the Appendix, there is no statistically significant relationship between export concentration and mean exports per exporter.

It is largely trivial that export concentration increases with the share of fuel exports in merchandise exports.³⁴ More importantly, it is evident from Table 5 that export-sector microcharacteristics are important determinants of macrolevel export concentration. For example, the relationship between the Theil index and the share of the top 1% of exporters is U-shaped (columns 2 and 5),³⁵ which suggests that although the presence of large multinational firms is typically considered desirable in terms of economic activity, at its maximum, the concentration of exports across firms decreases export diversification. Both a high level of concentration of exports across firms and a low degree of export diversification increase an economy's vulnerability to external shocks (i.e., economic fragility).

However, among the export-sector microcharacteristics, the number of exporters is superior in explaining the cross-country variation in the Theil index of export concentration. Decomposition of the Theil overall index of concentration into between and within components reveals that the relationship between macrolevel export concentration and the number of exporters is negative because the distribution of trade values across existing export lines becomes more evenly distributed as the number of exporters increases (see column 4 in Table A8 in the Appendix). In the cross-sectional regression, the variance inflation factor (VIF) of the Ln number of exporters is slightly above the threshold value (see Table A6 in the Appendix). This multicollinearity results from a high pairwise correlation between the number of exporters and GDP. Based on the following reasoning, we conclude that there is empirical support for Hypothesis 4: "The number of exporters is negatively associated with (the within component of) the Theil index of export concentration": 1) The coefficient of Ln number of exports remains unchanged across different specifications (compare Table 5 to Tables A10-A11 in the Appendix); 2) in a simple linear regression, the number of exporters explains a much larger portion of the cross-country variation in the Theil index of export concentration than, for example, GDP; and 3) the VIF of Ln number of exporters is below the threshold value in the panel data regression.

In Table 5, columns 3 and 6, we present the results for the direct relationship between domestic multidimensional financial development and macrolevel export concentration.³⁶ We find empirical evidence for Corollary 1 – "Banking sector development is negatively associated with the Theil index of export concentration." This finding is consistent with the International Monetary Fund (2014, p. 33) but contradicts Agosin et al. (2012, Tables 3-5), who fail to find any statistically significant association between domestic credit and export diversification. However, if the number of exporters is controlled for, the statistical significance of FI access, the most important aspect of financial development for macrolevel export diversification, depends on whether multiyear averages or annual observations are used (columns 1 and 4 in Table 5).

Overall, we find that banking sector development positively contributes to export diversification by increasing the number of (small) exporters, but other than that, it has only a marginal effect. Based on Section 2, the explanation for this empirical finding is the following: Development of the domestic banking sector eases the credit constraint in financing the fixed exporting entry cost, from which domestic startups and small domestic producers suffer the most. Hence, in the long run, when the entry and exit rates are equal, countries with a more developed banking sector have a larger number of small exporters. As small domestic exporters specialize in

³⁴ Less trivial is that Bahar and Santos (2018) find that countries with larger shares of natural resources in exports have more concentrated nonresource export baskets. Our results do not contradict their finding.

³⁵ The within component of the Theil index of export concentration measures the concentration among active trade lines by taking into account product categories and destinations, but not the exporter. Concentration of exports across firms does not take into account product categories or destinations.

³⁶ Consistent with previous studies (see, e.g., Cadot et al., 2013), we find that there is a U-shaped relationship between export concentration and GDP per capita. However, when regressed together with other explanatory variables, the quadratic term of Ln GDPpc is not statistically significant at the 5% level. Hence, the quadratic term is not included.

different varieties, the sectoral pattern of exports becomes more even, and export diversification increases.

Table 5
Macrolevel export concentration, export-sector microcharacteristics and multidimensional financial development

Dependent variable	Theil index of export concentration			Theil index of export concentration		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Export-sector microcharacteristic</i>						
Ln number of exporters	-0.491*** (0.156)			-0.358** (0.136)		
Share of top 1% exporters		-9.894*** (3.039)			-9.577*** (2.513)	
Share of top 1% exporters ^2		9.587*** (2.664)			8.933*** (2.255)	
<i>Banks</i>						
FI access	-0.656 (0.394)	-0.704 (0.469)	-1.286*** (0.439)	-0.870*** (0.323)	-0.732** (0.342)	-0.918** (0.348)
<i>Financial markets</i>						
FM efficiency	-0.247 (0.436)	-0.391 (0.461)	-0.510 (0.367)	-0.171 (0.283)	-0.334 (0.267)	-0.345 (0.288)
Rule of law	0.196 (0.166)	0.194 (0.167)	0.256 (0.162)	0.167 (0.170)	0.148 (0.149)	0.264* (0.149)
Ln GDPpc	-0.242 (0.176)	-0.314** (0.150)	-0.239 (0.156)	-0.175 (0.181)	-0.210 (0.140)	-0.302** (0.149)
Ln GDP	0.267** (0.101)	-0.079 (0.110)	-0.073 (0.076)	0.143 (0.086)	-0.087 (0.074)	-0.091 (0.071)
Landlocked	0.139 (0.319)	0.190 (0.342)	0.142 (0.285)	0.224 (0.349)	0.364 (0.323)	0.201 (0.280)
Fuel exports	2.134*** (0.538)	2.941*** (0.484)	2.701*** (0.463)	1.839*** (0.424)	2.452*** (0.351)	2.612*** (0.398)
Constant	2.500 (1.967)	9.882*** (2.412)	7.010*** (1.582)	3.759** (1.464)	9.200*** (1.518)	7.762*** (1.312)
Time effects				Yes	Yes	Yes
R ²	0.709	0.724	0.658	0.674	0.704	0.651
# Obs.	59	59	65	406	406	653
Type of regression	Cross-sectional	Cross-sectional	Cross-sectional	Pooled	Pooled	Pooled

The dependent variable is the Theil index of export concentration (higher values mean higher concentrations). The regressions in columns (1)-(3) are based on country-level averages during the 2006-2010 period. Heteroscedasticity-robust standard errors are in parentheses. The regressions in columns (4)-(6) are based on measures at the country-year level for 1998-2010. Panel robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Multicollinearity is tested using the variance inflation factor (VIF), and with one exception in all regressions (with mean-centered variables), VIFs are below 10 (see Tables A6-A7 in the Appendix). The exception is the Ln number of exporters in column 1. In the corresponding panel data regression (column 4), the VIF of the Ln number of exporters is below 10.

5. Concluding remarks

The model of international trade with heterogeneous firms and credit constraints proposes that financial development affects both the extensive and the intensive margins of exports. However, along with the study by Minetti et al. (2018), which was conducted at the same time as – but independent of – our study, our paper is the first to utilize the Exporter Dynamics Database to analyze the relationship between financial development and exporter behavior. Previous studies have relied on customs data from individual countries or survey-based data. The Exporter Dynamics Database enables analysis of cross-country variation in the extensive and intensive margins of exports. Compared to Minetti et al. (2018), the merit of our paper is that the empirical analysis is linked more tightly to economic theory than previous empirical analyses. We provide strong empirical evidence that both the development of the domestic banking sector and financial markets are positively associated with the number of exporters. This finding is in line with Manova (2013) and Regis (2018), who, using different data, establish that banking sector development or access to credit increases the probability of bilateral exports. Based on our descriptive theoretical framework, the intuition behind this finding is the following: the credit constraint in financing the fixed exporting entry cost is binding, and the development of both the domestic banking sector and domestic financial markets ease the credit constraint.

In addition, our empirical findings shed light on the determinants of export-sector firm dynamics and the granularity of exports. Countries with a highly developed banking sector tend to have a low entry rate into exporting but a high survival rate of entrants. This finding highlights banks' role in screening the entrants and suggests that modeling the credit constraint with incomplete information (i.e., the bank cannot observe the productivity of the firm) would be erroneous. The empirical result is more in line with the idea of entrepreneurs' optimism and the reversion of the borrower-lender information structure. Countries that are landlocked or that have deeper financial markets have a greater share of exports controlled by the top 1% of exporters. The former suggests that landlocked countries have a higher fixed entry cost, which creates economies of scale for domestic exporters. The latter suggests that the depth of financial markets in the host country encourages multinational firms to invest in the country and acquire ownership of the supplier.

Furthermore, to our knowledge, this study is the first to examine the relationship between macrolevel export diversification and export-sector microcharacteristics. We find that the number of exporters is positively associated with macrolevel export diversification. The development of the domestic banking sector eases the credit constraint in financing the fixed exporting entry cost, from which domestic startups and small domestic producers suffer the most. Hence, countries with a more developed banking sector have a larger number of small exporters. As small domestic exporters specialize in different varieties, the sectoral pattern of exports becomes more even, and export diversification increases.

It is plausible that both a high level of concentration of exports across firms and a low degree of export diversification increase the vulnerability of an economy to external shocks, creating economic fragility. In addition, due to the high granularity of exports, small domestic policy changes may have large effects if they alter the entry or exit of multinational export superstars (i.e., policy fragility). Our results suggest that enhancing individuals' and companies' ability to access domestic financial services reduces such economic fragility, whereas the development of domestic financial markets strengthens the presence of export superstars. One interpretation could be that an increase in bank lending would be beneficial. However, our results emphasize banks' role in screening entrants. Thus, banks' expertise in evaluating the expected profits of entrants needs to improve, while bank lending increases.

Overall, our paper joins the vast number of studies that highlight the importance of financial development for the economic success of developing countries. However, our results suggest that the matter is much more complex. With regard to financial development, complexity occurs as the effects

of banking sector development and financial market development on exporter behavior and export diversification differ in detail. With regard to economic success, complexity means that the presence of export superstars is desirable in terms of economic activity, but on the other hand, “having all eggs in one basket” is risky.

Our empirical findings call for further research. With regard to theory, improvements in the understanding of the determinants of export diversification are needed. Empirical research would benefit if data on the microstructure of the export sector provided separate measures of exporter behavior for multinational firms and domestic firms as well as for privately owned companies and state-owned companies. In addition, carrying out the analysis at the country-year-destination level would allow for the level of financial development in both the exporting country and the importing country to be controlled and, thus, the effect of trade credit on the relationship between exporter behavior and financial development to be assessed.

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Online Appendix: Additional tables and figures

Table A1. Data sources and variable descriptions

Variable	Description	Source ^a
Export entry rate	Firm entry rate (i.e. entry rate into exporting)	EDD
Entrant exit rate	1 – Entrant 1st year survival rate	EDD
Incumbent exit rate	$(\text{Firm exit rate} - (\text{Number of entrants}/\text{Number of exporters}) \times (1 - \text{Entrant 1st year survival rate})) / (\text{Number of incumbents}/\text{Number of exporters})$	EDD
Number of exporters	Number of exporters	EDD
Product scope	Number of HS6 products per exporter: Mean	EDD
Number of export destinations	Number of destinations per exporter: Mean	EDD
Mean exports per exporter	Export value per exporter: Mean	EDD
Share of top 1% exporters	Share of top 1% exporters in TEV (total export value)	EDD
Theil index of export concentration	Export Diversification Index	IMF_a
FI depth	Financial Institutions Depth Four indicators: Private-sector credit to GDP; Pension fund assets to GDP; Mutual fund assets to GDP; Insurance premiums, life and non-life to GDP	IMF_b
FI access	Financial Institutions Access Two indicators: Bank branches per 100,000 adults; ATMs per 100,000 adults	IMF_b
FI efficiency	Financial Institutions Efficiency Six indicators: Net interest margin; Lending-deposits spread; Non-interest income to total income; Overhead costs to total assets; Returns on assets; Returns on equity	IMF_b

^a EDD: Exporter Dynamics Database – Indicators at Country-Year Level; IMF_a: Export Diversification Database; IMF_b: Financial Development Index Database introduced by Svirydenka (2016); WDI: World Development Indicators; WGI: World Governance Indicators; Wikipedia:
<https://en.wikipedia.org/wiki/Landlocked_country#List_of_landlocked_countries_and_territories>

Table A1. Data sources and variable descriptions (continues)

Variable	Description	Source ^a
FM depth	Financial Markets Depth Five indicators: Stock market capitalization to GDP; Stocks traded to GDP; International debt securities of government to GDP; Total debt securities of financial corporations to GDP; Total debt securities of nonfinancial corporations to GDP	IMF_b
FM access	Financial Markets Access Two indicators: Percent of market capitalization outside of top 10 largest companies; Total number of issuers of debt (domestic and external, nonfinancial and financial corporations)	IMF_b
FM efficiency	Financial Markets Efficiency One indicator: Stock market turnover ratio (stocks traded to capitalization)	IMF_b
Rule of law	Rule of law: Estimate	WGI
GDPpc	GDP per capita (constant 2010 US\$)	WDI
GDP	GDP (constant 2010 US\$)	WDI
Landlocked	Equals one if a country is a landlocked country, zero otherwise.	Wikipedia
Fuel exports	Fuel exports (% of merchandise exports) multiplied by 0.01	WDI

^a EDD: Exporter Dynamics Database – Indicators at Country-Year Level; IMF_a: Export Diversification Database; IMF_b: Financial Development Index Database introduced by Svirydzenka (2016); WDI: World Development Indicators; WGI: World Governance Indicators; Wikipedia: https://en.wikipedia.org/wiki/Landlocked_country#List_of_landlocked_countries_and_territories

Table A2. List of countries in different samples

Country	Abbr.	EDD 63 countries	EDD 60 countries	EDD 65 countries	EDD 64 countries	IMF_a 65 countries
Albania	ALB	x	x	x	x	x
Bangladesh	BGD	x	x	x	x	x
Belgium	BEL	x	x	x	x	
Bolivia	BOL	x	x	x	x	x
Botswana	BWA	x	x	x	x	
Brazil	BRA	x	x	x	x	x
Bulgaria	BGR	x		x	x	x
Burkina Faso	BFA	x	x	x	x	x
Cambodia	KHM	x	x	x	x	x
Cameroon	CMR	x	x	x	x	x
Chile	CHL	x	x	x	x	x
Colombia	COL	x	x	x	x	x
Costa Rica	CRI	x	x	x	x	x
Cote d'Ivoire	CIV	x	x	x	x	x
Croatia	HRV	x	x	x	x	x
Denmark	DNK	x	x	x	x	x
Dominican Rep.	DOM	x	x	x	x	x
Ecuador	ECU	x	x	x	x	x
Egypt, Arab Rep.	EGY	x	x	x		x
El Salvador	SLV	x	x	x	x	x
Estonia	EST	x	x	x	x	x
Ethiopia	ETH					x
Gabon	GAB	x	x	x	x	x
Georgia	GEO	x	x	x	x	x
Germany	DEU	x	x	x	x	x
Guatemala	GTM	x	x	x	x	x
Guinea	GIN	x	x	x	x	x
Iran, Islamic Rep.	IRN	x	x	x	x	x
Jordan	JOR	x	x	x	x	x
Kenya	KEN	x	x	x	x	x
Kuwait	KWT	x		x	x	x
Kyrgyz Republic	KGZ	x	x	x	x	x
Lao PDR	LAO	x	x	x	x	x
Lebanon	LBN	x	x	x	x	x
Macedonia, FYR	MKD	x	x	x	x	x
Madagascar	MDG	x	x	x	x	x
Malawi	MWI	x	x	x	x	x
Mali	MLI	x	x	x	x	x
Mauritius	MUS	x	x	x	x	x
Mexico	MEX	x	x	x	x	x
Morocco	MAR	x	x	x	x	x
Myanmar	MMR	x	x	x	x	x
Nepal	NPL	x	x	x	x	x
New Zealand	NZL	x	x	x	x	x
Nicaragua	NIC	x	x	x	x	x
Niger	NER	x	x	x	x	x
Norway	NOR	x	x	x	x	x
Pakistan	PAK	x	x	x	x	x
Paraguay	PRY	x	x	x	x	x
Peru	PER	x	x	x	x	x
Portugal	PRT	x	x	x	x	x
Romania	ROU	x	x	x	x	x
Rwanda	RWA	x	x	x	x	x
Sao Tome P.	STP					x
Senegal	SEN	x	x	x	x	x
Slovenia	SVN	x	x	x	x	x
South Africa	ZAF	x	x	x	x	x
Spain	ESP	x	x	x	x	x
Sri Lanka	LKA					x
Swaziland	SWZ			x	x	
Sweden	SWE	x		x	x	x
Tanzania	TZA	x	x	x	x	x
Thailand	THA			x	x	x
Turkey	TUR	x	x	x	x	x
Uganda	UGA	x	x	x	x	x
Uruguay	URY	x	x	x	x	x
Yemen, Rep.	YEM	x	x	x	x	x
Zambia	ZMB	x	x	x	x	x

Table A3. Correlation matrix (55 countries, country-level averages during the 2006-2010 period)

	y ₁	y ₂	y ₃	y ₄	y ₅	y ₆	y ₇	y ₈	y ₉	y _{9a}	y _{9b}	x _{1a}	x _{1b}	x _{1c}	x _{1d}	x _{1e}	x _{1f}	x ₂	x ₃	x ₄	x ₅	x ₆	
Export entry rate	y ₁	1.00																					
Entrant exit rate	y ₂	0.71	1.00																				
Incumbent exit rate	y ₃	0.60	0.34	1.00																			
Ln number of f	y ₄	-0.52	-0.30	-0.35	1.00																		
Ln HS6 p. per f	y ₅	-0.56	-0.32	-0.35	0.66	1.00																	
Ln destinations per f	y ₆	-0.65	-0.51	-0.55	0.54	0.47	1.00																
Ln exports per f	y ₇	-0.38	-0.27	-0.42	0.27	0.22	0.62	1.00															
Share of top 1% f	y ₈	-0.01	0.06	0.04	0.34	0.20	-0.04	0.24	1.00														
T. concentration i.	y ₉	0.38	0.13	0.39	-0.67	-0.53	-0.30	-0.07	-0.25	1.00													
T. between c.	y _{9a}	0.11	0.04	0.19	-0.25	-0.33	0.07	0.11	-0.06	0.42	1.00												
T. within c.	y _{9b}	0.37	0.12	0.35	-0.63	-0.45	-0.36	-0.13	-0.25	0.92	0.04	1.00											
FID	x _{1a}	-0.46	-0.18	-0.44	0.70	0.56	0.58	0.39	0.41	-0.56	-0.20	-0.53	1.00										
FIA	x _{1b}	-0.42	-0.09	-0.35	0.74	0.51	0.43	0.21	0.26	-0.70	-0.22	-0.67	0.73	1.00									
FIE	x _{1c}	-0.44	-0.17	-0.42	0.57	0.47	0.39	0.07	0.08	-0.41	-0.12	-0.40	0.64	0.61	1.00								
FMD	x _{1d}	-0.36	-0.16	-0.36	0.72	0.44	0.59	0.38	0.43	-0.51	-0.18	-0.49	0.89	0.66	0.64	1.00							
FMA	x _{1e}	-0.35	-0.10	-0.27	0.67	0.38	0.41	0.38	0.47	-0.38	-0.09	-0.38	0.69	0.60	0.54	0.75	1.00						
FME	x _{1f}	-0.28	-0.25	-0.22	0.71	0.34	0.49	0.24	0.28	-0.47	-0.14	-0.45	0.57	0.51	0.40	0.76	0.57	1.00					
Rule of law	x ₂	-0.30	-0.06	-0.34	0.55	0.40	0.46	0.26	0.34	-0.51	-0.16	-0.49	0.79	0.71	0.57	0.69	0.69	0.47	1.00				
Ln GDP per capita	x ₃	-0.51	-0.17	-0.44	0.73	0.45	0.56	0.38	0.34	-0.58	-0.08	-0.61	0.76	0.85	0.60	0.70	0.71	0.53	0.76	1.00			
Ln GDP	x ₄	-0.52	-0.31	-0.38	0.91	0.54	0.66	0.51	0.31	-0.46	-0.07	-0.48	0.66	0.62	0.49	0.71	0.68	0.68	0.47	0.70	1.00		
Landlocked	x ₅	0.41	0.13	0.34	-0.52	-0.46	-0.50	-0.19	0.17	0.34	-0.02	0.38	-0.35	-0.40	-0.45	-0.33	-0.35	-0.20	-0.24	-0.49	-0.50	1.00	
Fuel Exports	x ₆	-0.07	0.05	0.08	-0.09	-0.24	0.09	0.03	-0.15	0.44	0.40	0.31	-0.11	-0.11	0.10	-0.06	0.05	-0.01	-0.18	0.15	0.12	-0.12	1.00

Notes: f stands for exporter, T. stands for Theil, i. stands for index, c. stands for component

Table A4. Testing for multicollinearity

	Cross-sectional regressions in Table 2		Cross-sectional regressions in Table 3				
	(1)	(2)-(3)	(1)	(1) ^{CEN}	(2)	(2) ^{CEN}	(3)
<i>Banks</i>							
FI depth	5.80				6.21	6.21	3.76
FI access			23.16	6.47			
FI access ^2			14.65	2.53			
FI efficiency		1.56					
<i>Financial markets</i>							
FM depth	5.46				17.35	8.69	
FM depth ^2					10.93	3.16	
FM access		2.67					2.60
FM efficiency			2.60	2.60			
Rule of law	4.40	3.43	3.17	3.17	4.40	4.40	4.64
Ln GDPpc	4.41	4.26	7.62	7.62	4.42	4.42	4.29
Ln GDP	2.99	2.60	3.36	3.36	2.98	2.98	2.90
Landlocked	1.54	1.56	1.57	1.57	1.52	1.52	1.52

Multicollinearity is tested using the variance inflation factor (VIF). ^{CEN} denotes regression model in which variables with quadratic terms have been mean-centered.

Table A5. Testing for multicollinearity

	Panel data regressions in Table 2		Panel data regressions in Table 3				
	(1)	(2)-(3)	(1)	(1) ^{CEN}	(2)	(2) ^{CEN}	(3)
<i>Banks</i>							
FI depth	5.06				5.52	5.52	3.59
FI access			23.62	6.27			
FI access ^2			15.40	2.59			
FI efficiency		1.77					
<i>Financial markets</i>							
FM depth	4.72				20.52	9.45	
FM depth ^2					11.56	3.19	
FM access		2.23					2.37
FM efficiency			2.07	2.07			
Rule of law	4.93	4.59	3.55	3.55	4.82	4.82	5.03
Ln GDPpc	5.24	5.22	8.02	8.02	5.14	5.14	5.04
Ln GDP	2.96	2.26	2.94	2.94	3.14	3.14	2.84
Landlocked	1.43	1.46	1.48	1.48	1.45	1.45	1.45

Multicollinearity is tested using the variance inflation factor (VIF). ^{CEN} denotes regression model in which variables with quadratic terms have been mean-centered.

Table A6. Testing for multicollinearity

	Cross-sectional regressions in Table 4			Cross-sectional regressions in Table 5			
	(1)	(2)	(2) ^{CEN}	(1)	(2)	(2) ^{CEN}	(3)
<i>Export-sector microcharacteristic</i>							
Ln number of exporters				11.09			
Share of top 1% exporters					31.78	1.70	
Share of top 1% exporters ^2					32.30	1.22	
<i>Banks</i>							
FI access				4.48	4.34	4.34	3.84
FI efficiency	1.64	1.79	1.79				
<i>Financial markets</i>							
FM depth		4.21	4.21				
FM efficiency	2.55			2.43	2.25	2.25	2.06
Rule of law	3.21	4.72	4.72	3.52	3.51	3.51	3.54
Ln GDPpc	4.29	193.21	4.74	8.27	9.20	9.20	8.64
Ln GDPpc ^2		221.49	1.87				
Ln GDP	3.33	2.93	2.93	7.73	3.37	3.37	2.53
Landlocked	1.62	1.60	1.60	1.65	2.00	2.00	1.51
Fuel exports				2.04	1.82	1.82	1.69

Multicollinearity is tested using the variance inflation factor (VIF). ^{CEN} denotes regression model in which variables with quadratic terms have been mean-centered.

Table A7. Testing for multicollinearity

	Panel data regressions in Table 4			Panel data regressions in Table 5			
	(1)	(2)	(2) ^{CEN}	(1)	(2)	(2) ^{CEN}	(3)
<i>Export-sector microcharacteristic</i>							
Ln number of exporters				9.86			
Share of top 1% exporters					33.39	1.75	
Share of top 1% exporters ^2					33.85	1.23	
<i>Banks</i>							
FI access				3.72	4.03	4.03	3.56
FI efficiency	1.72	1.92	1.92				
<i>Financial markets</i>							
FM depth		3.82	3.82				
FM efficiency	2.05			2.13	1.89	1.89	1.76
Rule of law	3.85	5.27	5.27	3.80	3.83	3.83	3.41
Ln GDPpc	5.02	173.12	5.75	8.65	9.17	9.17	7.57
Ln GDPpc ^2		196.93	1.62				
Ln GDP	2.93	2.98	2.98	6.24	2.93	2.93	2.45
Landlocked	1.54	1.59	1.59	1.71	1.81	1.81	1.52
Fuel exports				1.98	1.66	1.66	1.56

Multicollinearity is tested using the variance inflation factor (VIF). ^{CEN} denotes regression model in which variables with quadratic terms have been mean-centered.

Table A8. Export concentration and extensive margins of exports

Dependent variable	Between component of export concentration			Within component of export concentration		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Extensive margin of exports</i>						
Ln number of exporters	-0.072 (0.045)			-0.429*** (0.059)		
Ln mean of the number of HS6 products		-0.338* (0.190)			-1.046*** (0.207)	
Ln mean of the number of destinations			-0.038 (0.156)			-1.105*** (0.301)
Constant	0.884 (0.404)	0.868** (0.357)	0.340** (0.163)	6.349*** (0.510)	4.597*** (0.374)	3.977*** (0.322)
R ²	0.058	0.111	0.001	0.433	0.220	0.165
# Obs.	60	59	60	60	59	60
Type of regression	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional

In columns (1)-(3) the dependent variable is the between component of the Theil index of export concentration (higher values mean higher concentrations). In columns (4)-(6) the dependent variable is the within component of the Theil index of export concentration (higher values mean higher concentrations). Regressions are based on country-level averages during the 2006-2010 period. Heteroscedasticity-robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Table A9. Export concentration and export-sector microcharacteristics

Dependent variable	Between component of export concentration		Within component of export concentration	
	(1)	(2)	(3)	(4)
<i>Export-sector microcharacteristics</i>				
Ln exports per exporter	-0.002 (0.325)		-0.236 (0.159)	
Share of top 1% exporters		0.623 (1.740)		-14.697*** (3.325)
Share of top 1% exporters ^2		-0.688 (1.435)		12.147*** (3.196)
Constant	0.325 (1.058)	0.180 (0.529)	6.273*** (2.313)	7.005*** (0.884)
R ²	0.000	0.003	0.033	0.200
# Obs.	60	60	60	60
Type of regression	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional

In columns (1)-(2) the dependent variable is the between component of the Theil index of export concentration (higher values mean higher concentrations). In columns (3)-(4) the dependent variable is the within component of the Theil index of export concentration (higher values mean higher concentrations). Regressions are based on country-level averages during the 2006-2010 period. Heteroscedasticity-robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Table A10
 Macrolevel export concentration, the number of exporters and GDP

Dependent variable	Theil index of export concentration		Theil index of export concentration	
	(1)	(2)	(3)	(4)
Ln number of exporters	-0.492*** (0.056)		-0.475*** (0.022)	
Ln GDP		-0.294** (0.066)		-0.295*** (0.023)
Constant	7.175*** (0.459)	10.422*** (1.630)	6.946** (0.186)	10.310*** (0.568)
Time effects			Yes	Yes
R ²	0.434	0.191	0.454	0.226
# Obs.	59	59	453	453
Type of regression	Cross-sectional	Cross-sectional	Pooled	Pooled

The dependent variable is the Theil index of export concentration. The regressions in columns (1)-(2) are based on country-level averages during the 2006-2010 period. Heteroscedasticity-robust standard errors are in parentheses. The regressions in columns (3)-(4) are based on measures at the country-year level for 1998-2010. Panel robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

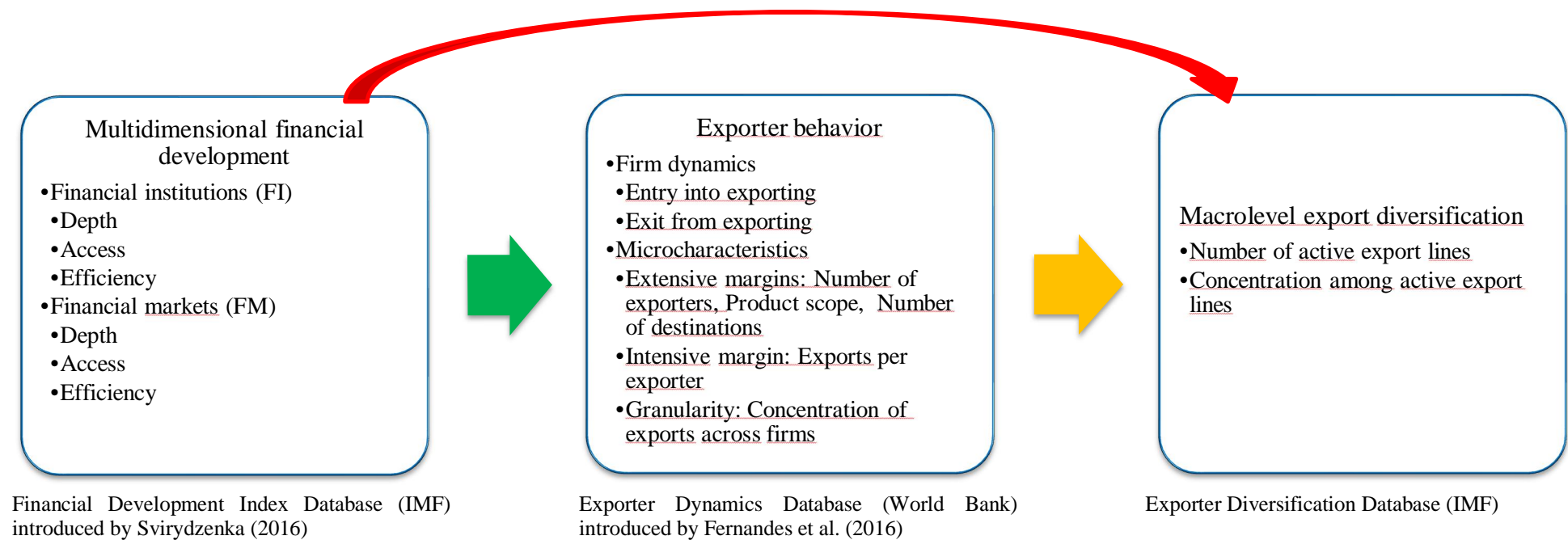
Table A11

Macrolevel export concentration, extensive margins of exports and multidimensional financial development

Dependent variable	Theil index of export concentration			
	(1)	(2)	(3)	(4)
<i>Extensive margin of exports</i>				
Ln mean of the number of HS6 products	-1.346*** (0.219)		-0.218 (0.267)	
Ln mean of the number of destinations		-1.082*** (0.394)		0.097 (0.449)
<i>Banks</i>				
FI access			-1.332*** (0.411)	-1.293*** (0.448)
<i>Financial markets</i>				
FM efficiency			-0.449 (0.410)	-0.593 (0.433)
Rule of law			0.315* (0.168)	0.248 (0.177)
Ln GDPpc			-0.333* (0.166)	-0.263 (0.173)
Ln GDP			0.017 (0.110)	-0.030 (0.109)
Landlocked			0.166 (0.331)	0.317 (0.320)
Fuel exports			2.750*** (0.483)	2.706*** (0.461)
Constant	5.415*** (0.405)	4.263*** (0.408)	5.976 (2.150)	6.051 (2.237)
R ²	0.277	0.110	0.705	0.671
# Obs.	58	59	58	59
Type of regression	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional

The dependent variable is the Theil index of export concentration. Regressions are based on country-level averages during the 2006-2010 period. Heteroscedasticity-robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Graph A1
Illustration of testable hypotheses



H1: FI $\xrightarrow{(-)}$ Exit rate of entrants

H2: FI $\xrightarrow{(+)}$ Extensive margins of exports

H3: FM $\xrightarrow{(+)}$ Concentration of exports across firms

H4: Number of exporters $\xrightarrow{(+)}$ Macrolevel export diversification

C1: FI $\xrightarrow{(+)}$ Macrolevel export diversification

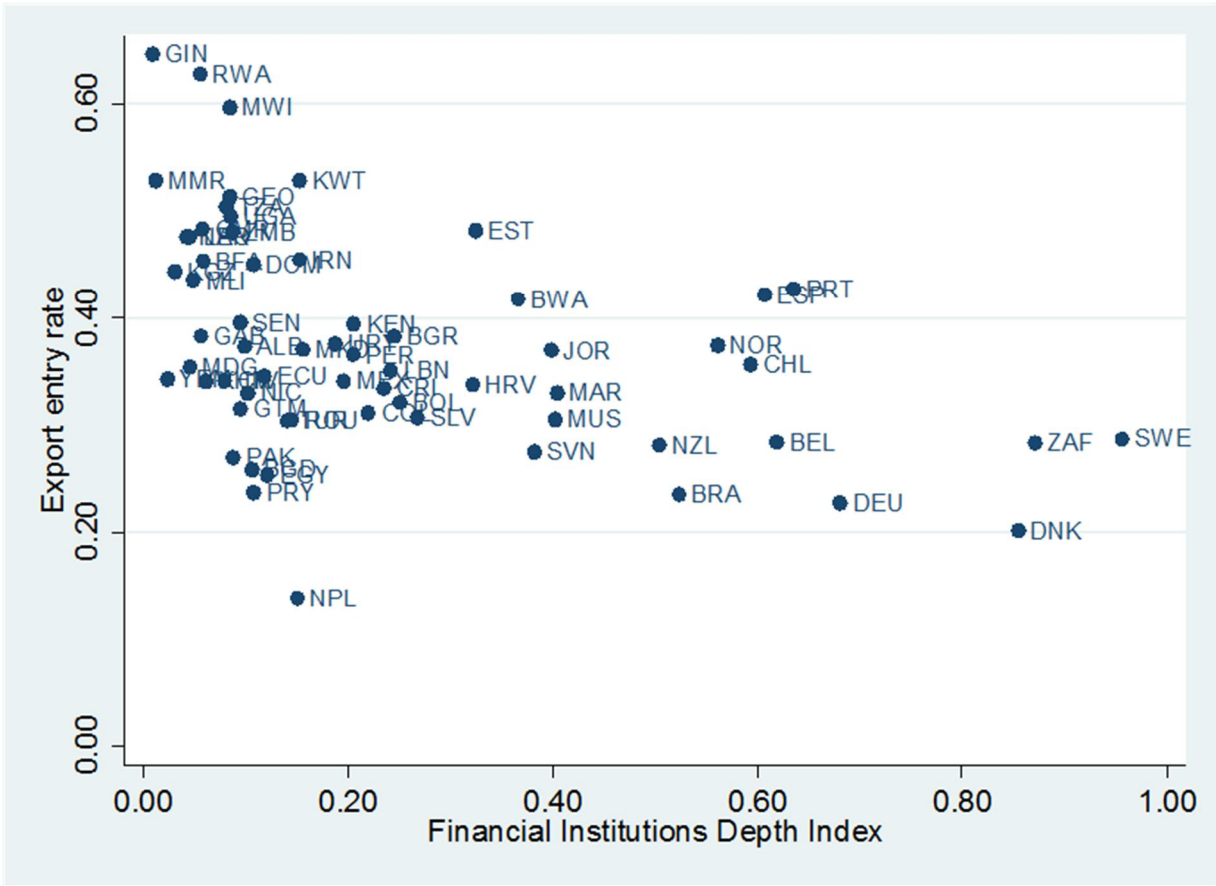


Figure A1. Export entry rate and the depth of banking sector, 63 countries

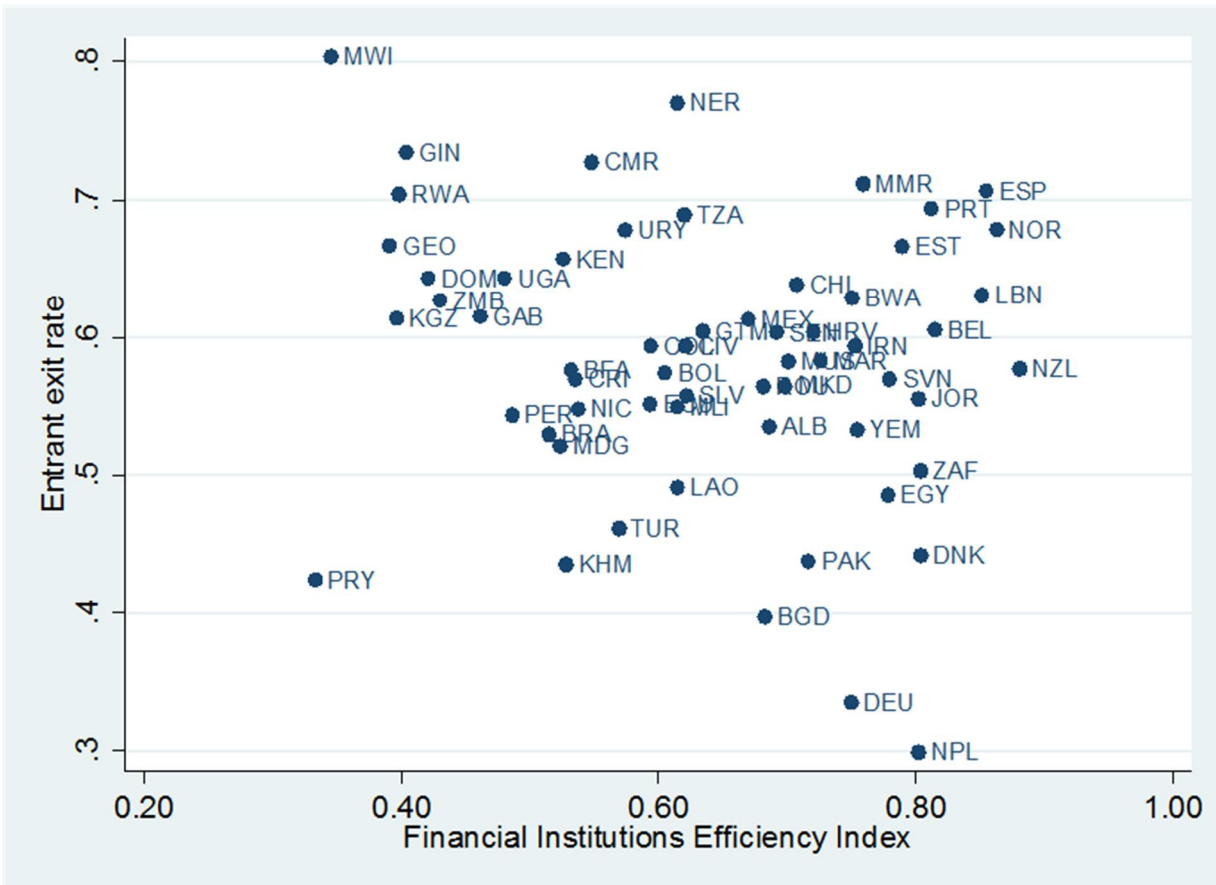


Figure A2. Entrant exit rate and efficiency of banks, 60 countries

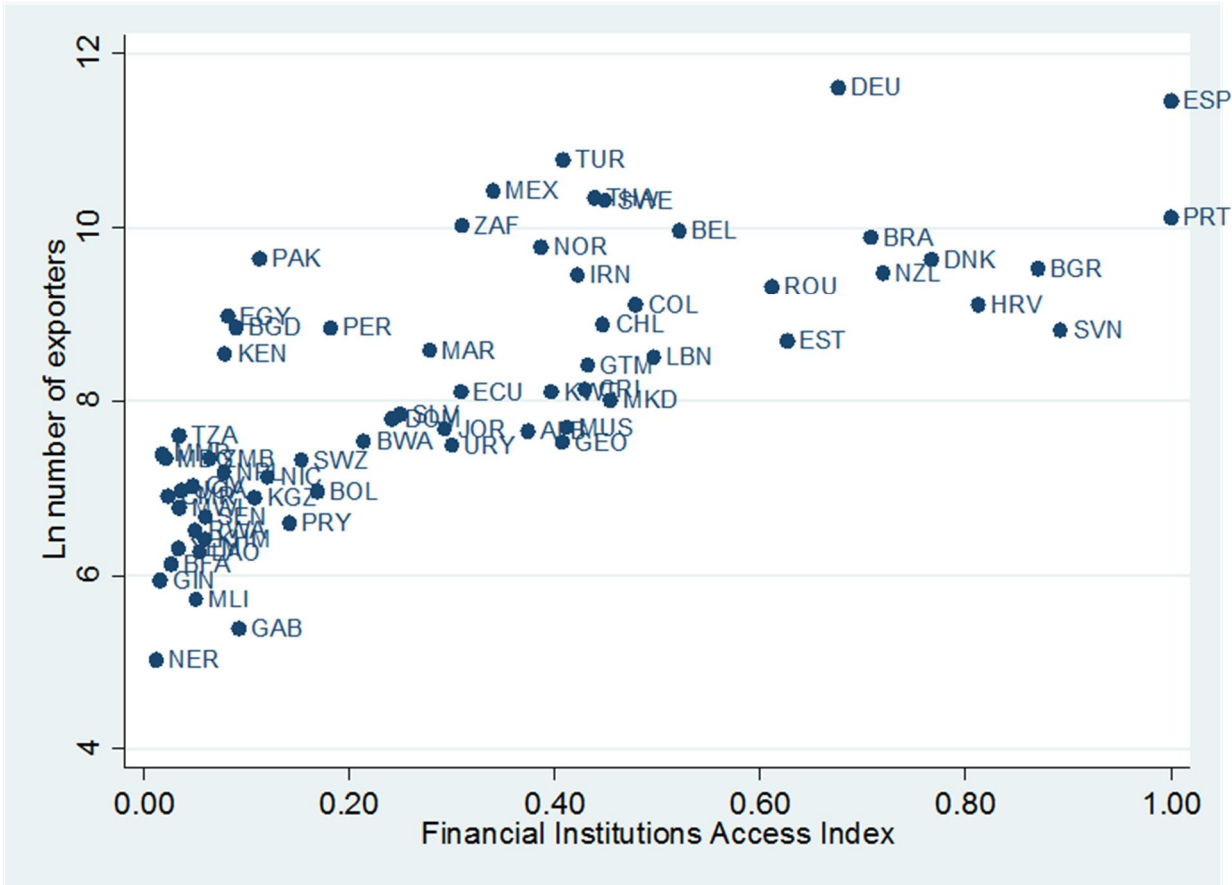


Figure A3. The number of exporters and access to banking services, 65 countries

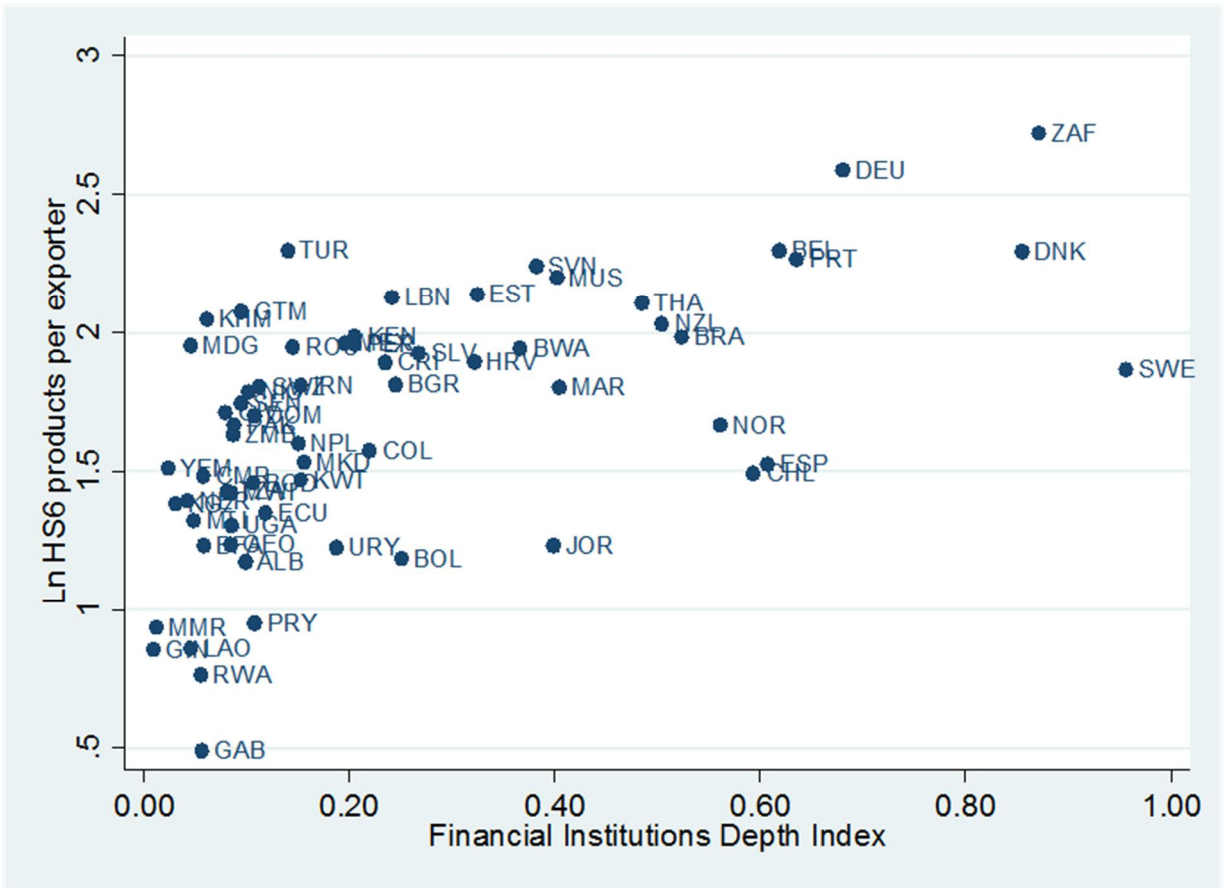


Figure A4. Product scope and the depth of banking sector, 64 countries

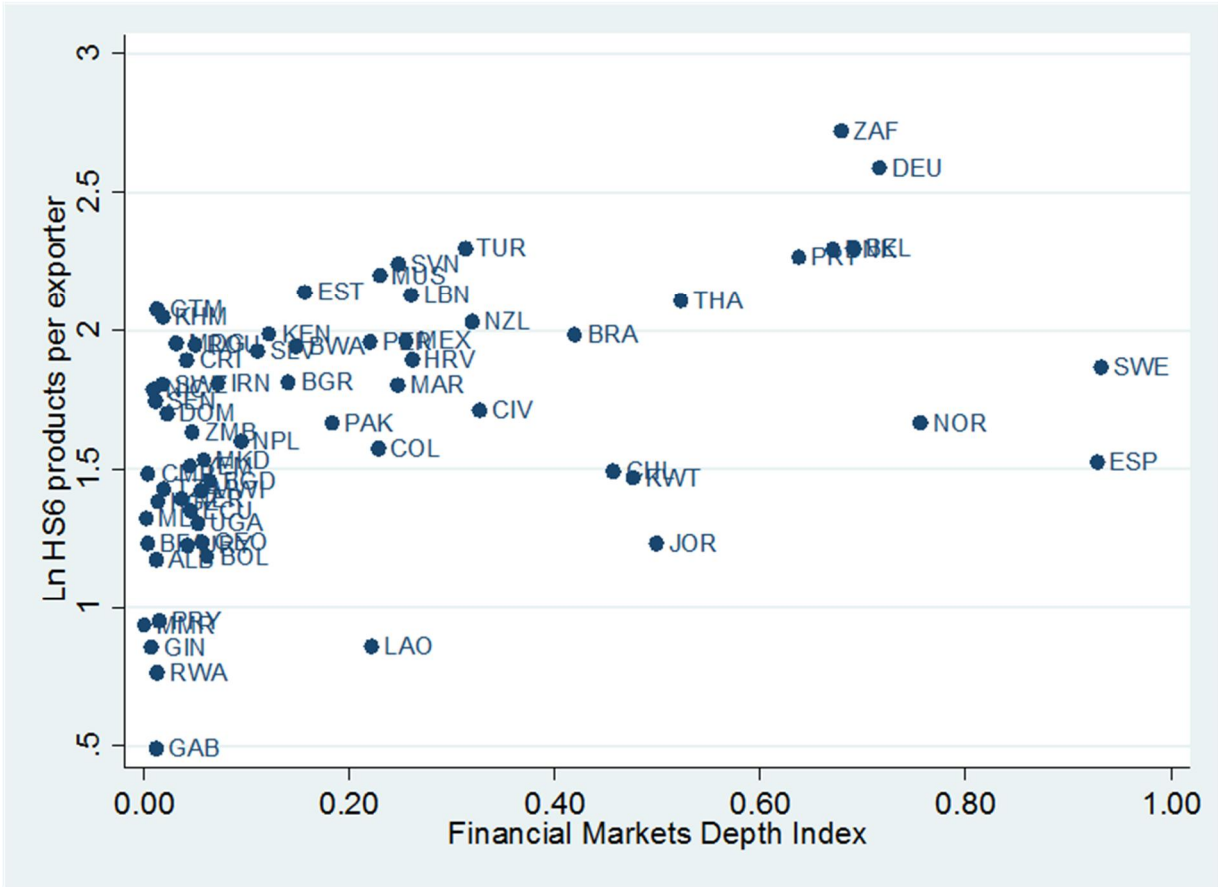


Figure A5. Product scope and the depth of financial markets, 64 countries

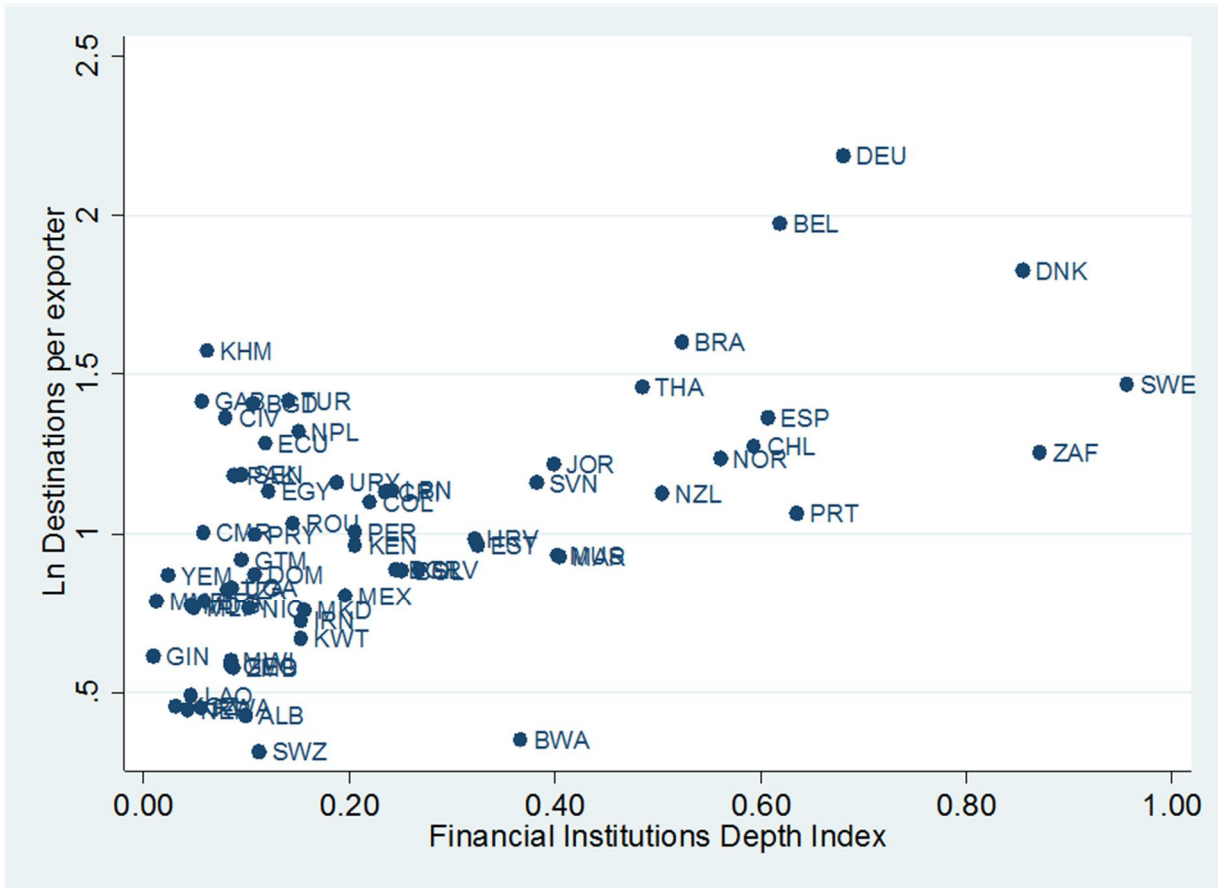


Figure A6. Number of export destinations and the depth of banking sector, 65 countries

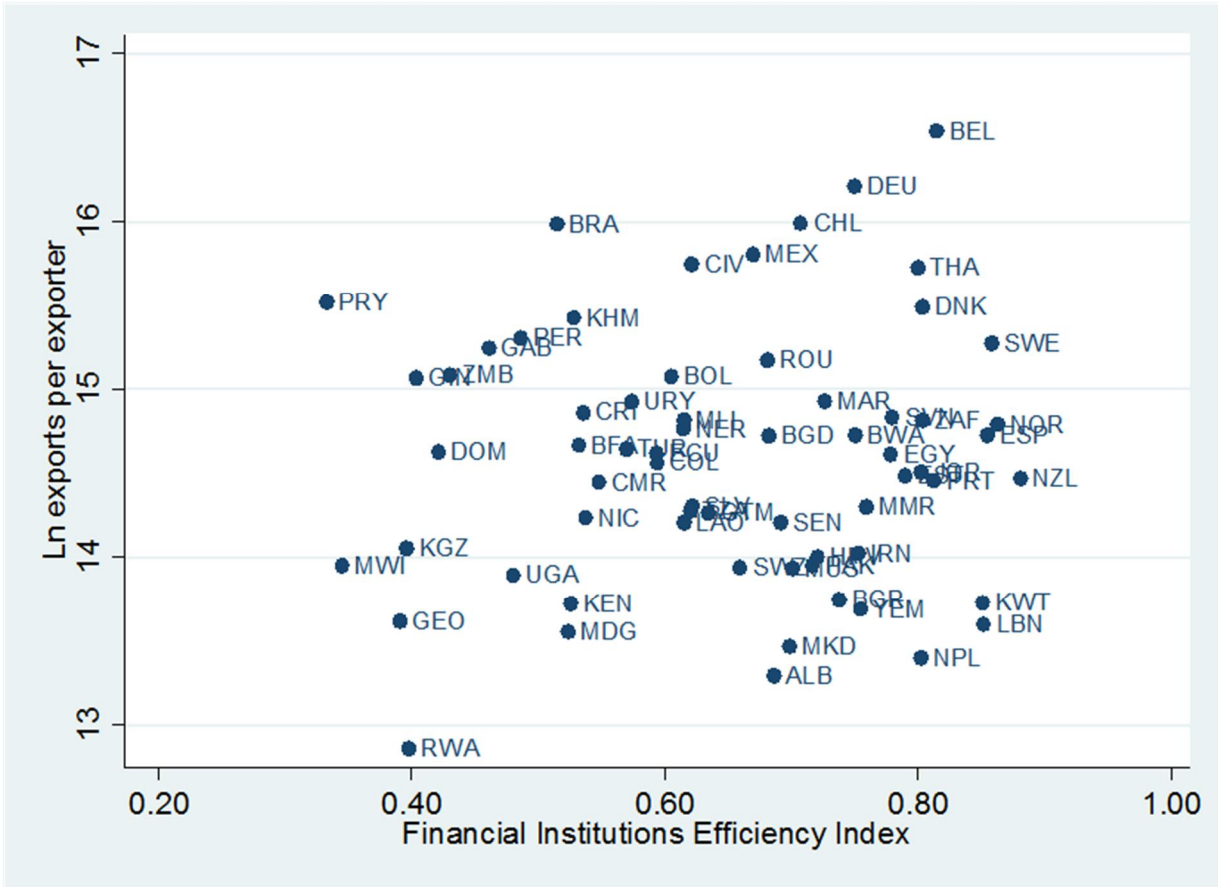


Figure A7. Mean exports per exporter and efficiency of banks, 65 countries

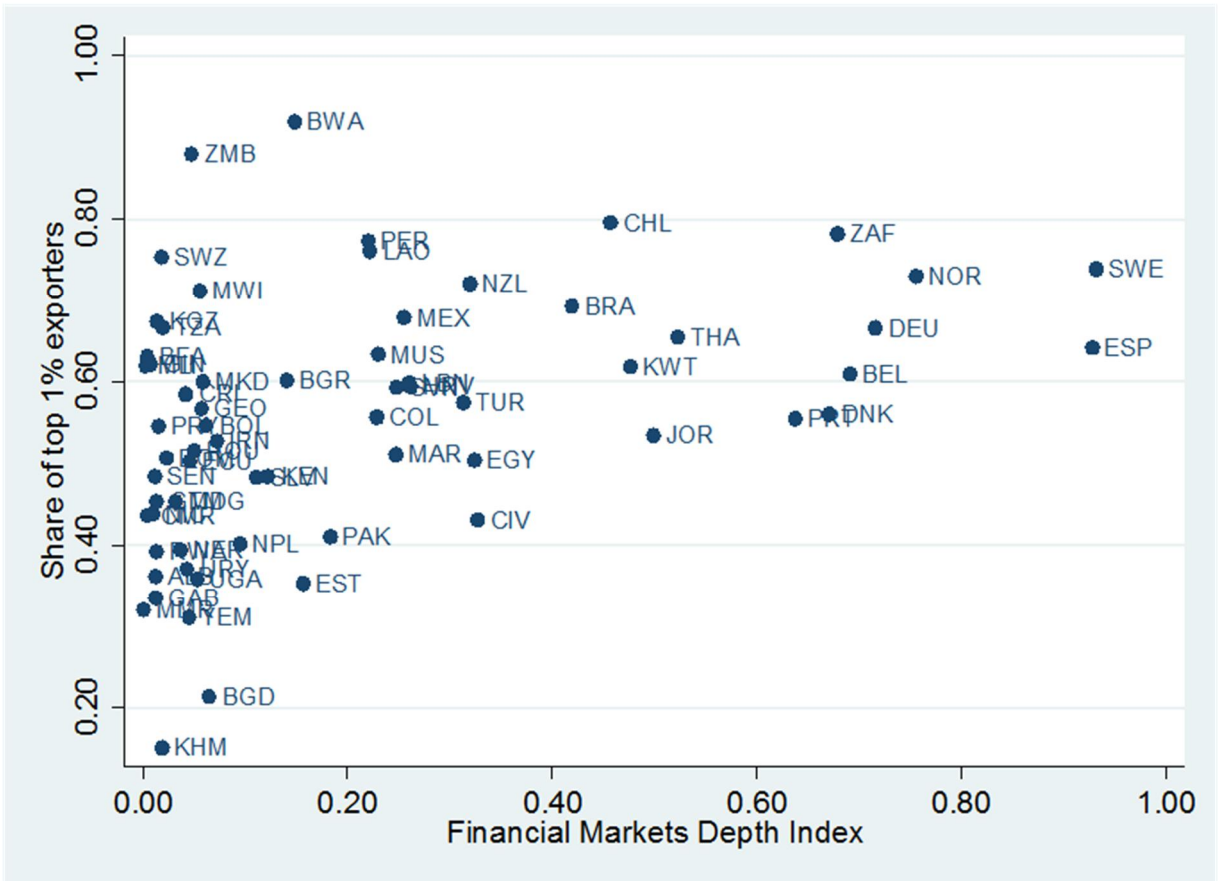


Figure A8. The share of the top 1% of exporters and the depth of financial markets, 65 countries

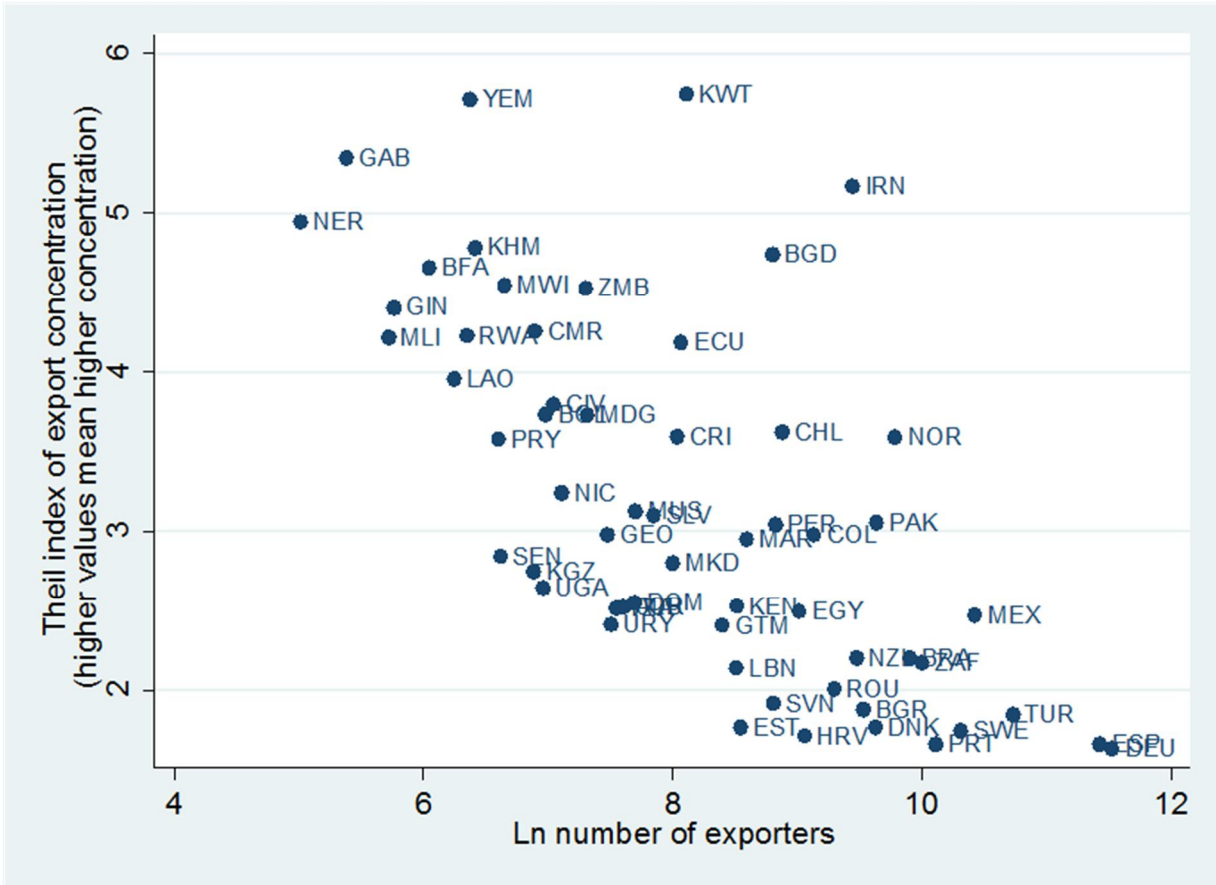


Figure A9. Macrolevel export concentration and the number of exporters, 59 countries

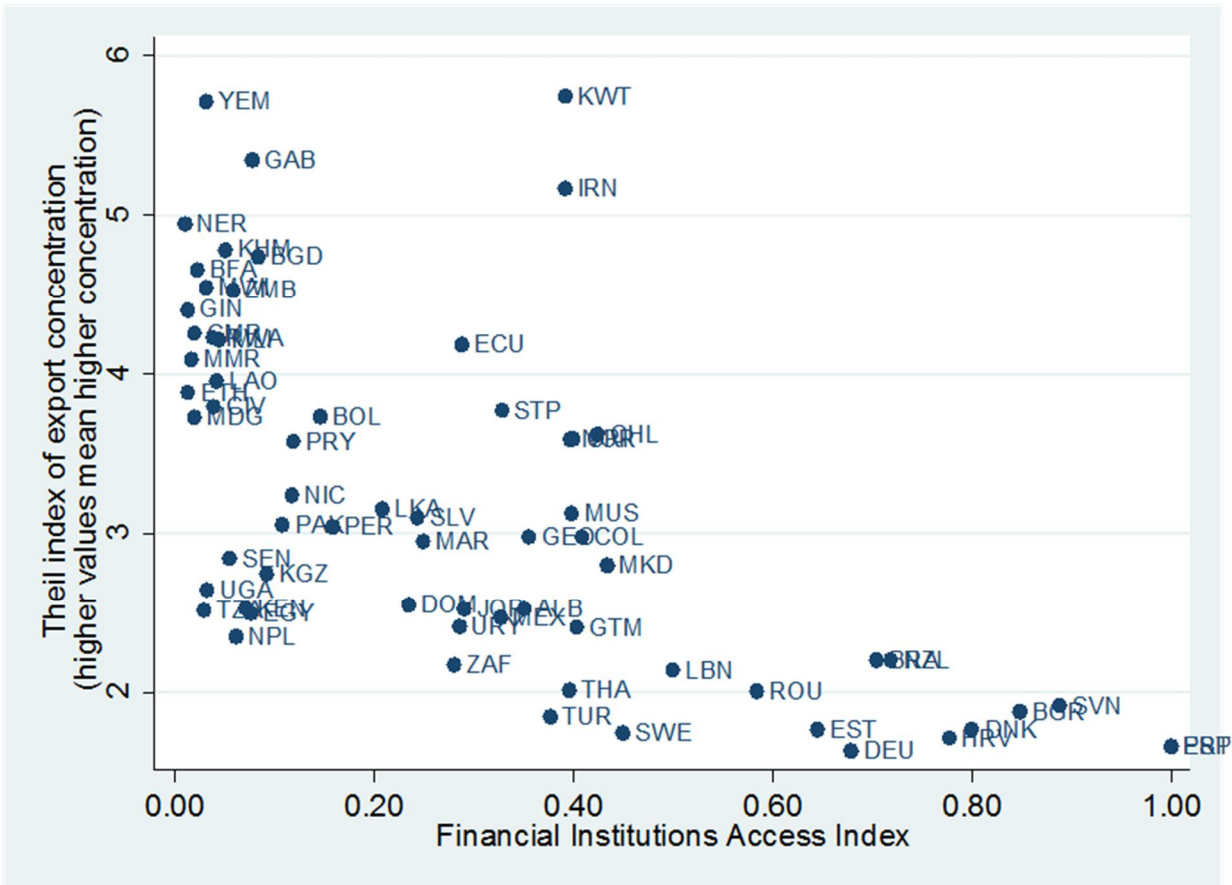


Figure A10. Macrolevel export concentration and access to banking services, 65 countries