Jinjarak, Yothin; Mutuc, Paulo Jose; Wignaraja, Ganeshan

Working Paper

Does finance really matter for the participation of SMEs in international trade? Evidence from 8,080 East Asian firms

ADBI Working Paper, No. 470

Provided in Cooperation with:
Asian Development Bank Institute (ADBI), Tokyo

Suggested Citation: Jinjarak, Yothin; Mutuc, Paulo Jose; Wignaraja, Ganeshan (2014) : Does finance really matter for the participation of SMEs in international trade? Evidence from 8,080 East Asian firms, ADBI Working Paper, No. 470, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:
https://hdl.handle.net/10419/101235

ADBI Working Paper Series

Does Finance Really Matter for the Participation of SMEs in International Trade? Evidence from 8,080 East Asian Firms

Yothin Jinjarak
Paulo Jose Mutuc
Ganeshan Wignaraja

No. 470
March 2014

Asian Development Bank Institute

Yothin Jinjarak is Research Fellow, Asian Development Bank Institute (ADBI), and Reader, SOAS, University of London. Paulo Mutuc is Research Associate, ADBI. Ganeshan Wignaraja is Director of Research, ADBI.

The authors would like to thank participants of the 27 January 2014 ADBI–IMF–FSA Japan International Conference on Financial System Stability, Regulation, and Financial Inclusion for helpful comments on an earlier version of this paper.

The Working Paper series is a continuation of the formerly named Discussion Paper series; the numbering of the papers continued without interruption or change. ADBI's working papers reflect initial ideas on a topic and are posted online for discussion. ADBI encourages readers to post their comments on the main page for each working paper (given in the citation below). Some working papers may develop into other forms of publication.

Suggested citation:

Jinjarak, Y., P. J. Mutuc, and G. Wignaraja. 2014. Does Finance Really Matter for the Participation of SMEs in International Trade? Evidence from 8,080 East Asian Firms. ADBI Working Paper 470. Tokyo: Asian Development Bank Institute. Available: http://www.adbi.org/working-paper/2014/03/28/6218.finance.matter.smes.trade/

Please contact the authors for information about this paper.

Email: yjinjarak@adbi.org, pmutuc@adbi.org, gwignaraja@adbi.org

Asian Development Bank Institute
Kasumigaseki Building 8F
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

Abstract

This paper studies factors associated with firm participation in export markets, focusing primarily on firm size and access to credit, based on a survey sample comprising observations of 8,080 small and medium enterprises (SMEs) (with fewer than 100 employees) and non-SME firms in developing East Asian countries across sectors. The main findings suggest the interdependent relationships between export participation, firm size, and access to credit. SMEs participating in export markets tend to gain more access to credit, while potential scale economies (firm sizes) of SMEs are positively associated with participation in export markets. The estimation results also point to the supportive influences of foreign ownership, worker education, and production certification on export participation, and the positive effects of financial certification, managerial experience, and collateral/loan value on access to credit for SMEs.

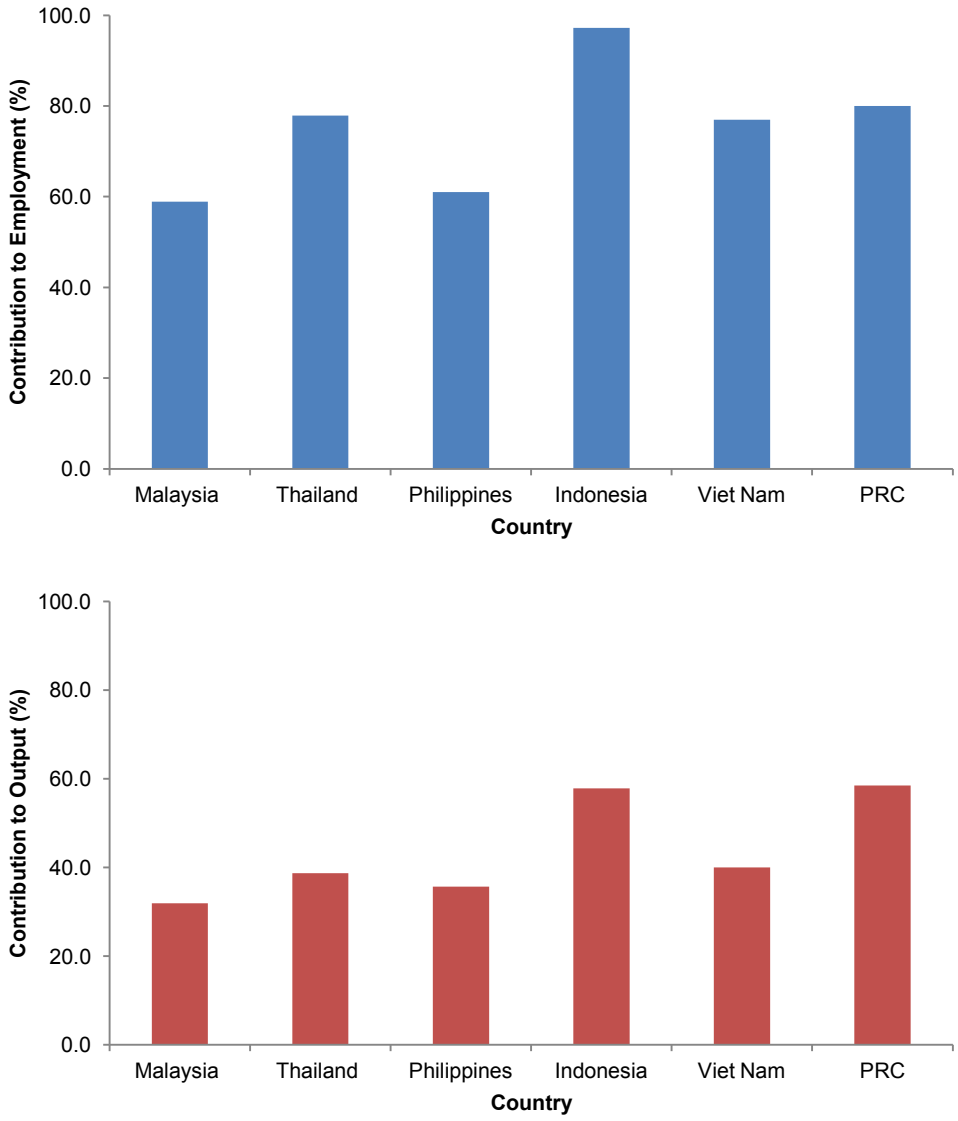
JEL Classification: D22, E44, F14, L16, O14

Contents

1. INTRODUCTION

This paper studies the relationship between export participation, firm size, and sources of finance, focusing on small and medium enterprises (SMEs) in developing East Asian countries. SMEs, seen as the backbone of production, employment, and poverty reduction in East Asian economies, have returned to the spotlight due to the role they play in the continuing expansion of trade globalization across the region and in the recovery of the world economy following the 2007–2009 financial crises.

Figure 1: SME Contribution to Employment and Output



PRC = People's Republic of China.

Sources: Authors' calculations based on data from ASEAN 2011; Runckel & Associates 2011; UNESCAP 2011; Philippines Department of Trade and Industry; Xinhua News Agency 2009.

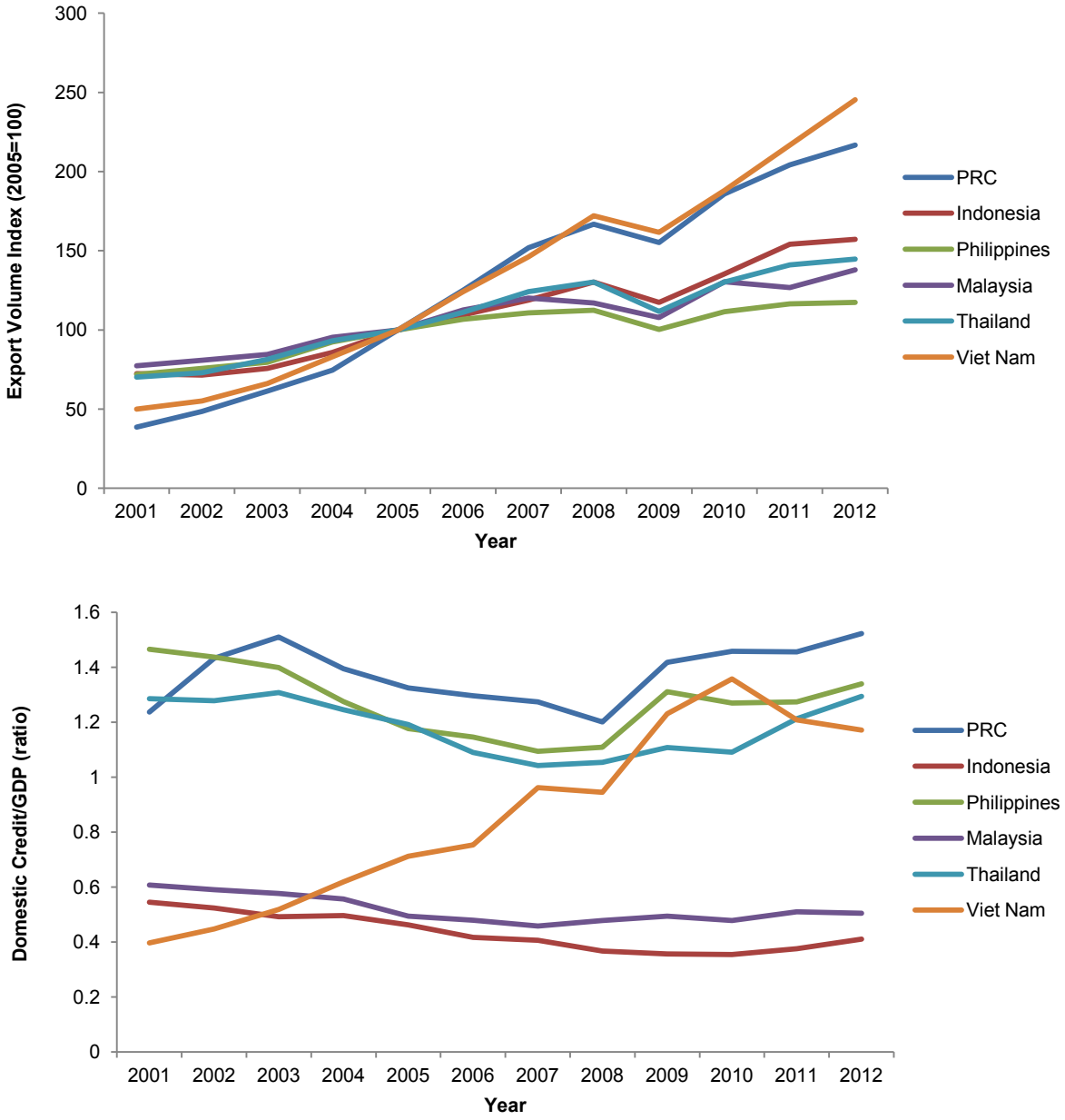
Focusing on firms in the economies of the Association of Southeast Asian Nations (ASEAN) and the People's Republic of China (PRC), Figure 1 shows that SMEs

contribute to a considerable portion of domestic employment and total output. A sizable body of research has analyzed export participation, firm size, and access to credit, however not much has been done on integrating the linkages between these variables. Further, research on the contribution of SMEs to export participation is scarce and sometimes contentious (Wignaraja, 2013a and 2013b). This is despite the stylized fact that SMEs account for a significant proportion of firms, employment, and output in developing economies.

More importantly, overall, SMEs appear to make a less-than-expected contribution to international trade relative to their size or employment contributions to domestic economies (see Harvie, Narjoko, and Oum [2010] for the case of ASEAN). It is possible that the average SME is smaller than the threshold size required to gain sufficient economies of scale for competing in export markets. Export participation may be undermined by the shortage of access to credit that would help overcome the fixed costs of entering market. The lack of export participation of SMEs may also be due to multiple market failures in relation to SME development and local entrepreneurship, which may be mitigated by appropriate policies (Lim and Kimura 2010).

This body of research stands alongside what is now a well-known sizable gap between the credit-related needs of SMEs and the amount actually made available to them by formal financial institutions. This credit gap, according to the International Finance Corporation (IFC) (Stein et al. 2013), is $1.5 trillion–$1.8 trillion globally, with about 17 million firms, representing more than 60% of all SMEs, reporting that their credit needs are partially or completely unmet. Notably, the share of un-served or underserved firms among all SMEs is the highest in East Asia, where the figure is close to 70% (8 million firms). For ASEAN and the PRC, the IFC estimates the total credit gap to be $100.6 billion, with an average credit gap of $426,696.5 per SME.

Figure 2: Exports and Financial Deepening



PCR = People's Republic of China.

Source: Authors' calculations on data from the Economist Intelligence Unit.

Likewise, it has to be noted that trade and financial development appear to be connected at the macro level. A well-developed financial sector, for instance, can add to a comparative advantage in sectors that are more reliant on external financing (Hur et al. 2006). Empirically, there is some evidence that economies with more developed financial sectors tend to also be net exporters in manufacturing sectors that enjoy high economies of scale (Beck 2002). Figure 2 plots the relationship between exports and financial deepening in ASEAN and the PRC, in which the two variables appear to have moved together in a positive direction over the past decade. This pattern supports the broad importance of finance in ensuring continued growth in the export participation of

these economies, especially if SMEs are to become more important and brought into the production for international markets.

Motivated by the observed contrast between large contributions to employment and output of SMEs, and their small participation in international trade in developing countries, this paper undertakes firm-level, cross-country empirical analysis of factors affecting the participation of SMEs in ASEAN economies and the PRC in export markets. Given the abovementioned gap between supply and demand for credit among SMEs, the empirical focus of this paper is on exploring the links between export participation, firm size, and access to credit, drawing on recent empirical literature on international trade, financial economics, and industrial organization.

Broadly speaking, the paper belongs to the strand of firm-level empirical work aligned with the "new-new" trade theory of Melitz (2003), which emphasizes firm heterogeneity and the importance of sunk costs in firm export behavior.[1] The analysis adds to the literature in important ways. First, the sample covers a large population of SMEs in major developing East Asian countries, mostly firms with fewer than 100 employees, and is inclusive of a wide range of industrial sectors in 5 ASEAN economies (Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam) and the PRC, based on a survey dataset compiled by the World Bank Enterprise Surveys.

Second, given the increasing role of production networks and the potential participation of SMEs in these networks, the analysis takes a comprehensive approach at analyzing the data, exploiting the presence of multiple, comparable indicators and firm-level determinants across the sample countries. After filtering the raw data, the econometric estimation is carried out on 8,080 firms, of which 70% are SMEs (firms with fewer than 100 employees, consistent with Organisation for Economic Co-operation and Development [OECD] statistics [OECD 2010]). We estimate the association between export participation, firm size, and access to credit, across countries and industries, using several regression specifications and variable definitions, as well as empirically allowing for reverse feedback among the variables.

The rest of this paper is organized as follows. Sections 2 and 3 provide a discussion of related literature and describe the data and empirical framework. Section 4 reports baseline results and robustness checks. Section 5 discusses the economic significance of the results and policy implications. Section 6 concludes.

2. RELATED LITERATURE

In this section, we briefly discuss some recent studies that explore the relationship between access to credit, firm size, and export participation, which has become more relevant in view of the global financial crisis of 2007–2009. The crisis, aside from leading to a considerable decline in global gross domestic product (GDP), came with a significant reduction in the volume of international trade among advanced and emerging economies alike (Baldwin 2009). While most of this decrease is attributed to a drop in demand for tradable products (by up to 80% [Eaton et al. 2011]), it has been noted in the literature that tightened credit conditions during the crisis may have contributed to the decline by discouraging some trade transactions that would have otherwise taken place (Asmundson et al. 2011; Feenstra et al. 2011).

[1] That is, only firms which are productive enough can shoulder the considerable sunk costs that come with serving overseas markets.

Access to credit is especially important for firms that export or want to export because exporting generally requires more working capital and sunk costs. This is because it is associated with expenses—in particular, fixed costs to enter the foreign markets—that do not usually arise when selling domestically (e.g., marketing and distribution costs, compliance with product quality and safety standards, due diligence for foreign investments, and shipping duties, among others [see also Contessi and de Nicola 2012]).[2] Bernard and Jensen (2004), for example, find that entry costs matter in determining US manufacturing firms' propensity to export.

At the macro level, proceeding from the work of King and Levine (1993), there is now an understanding that finance can accelerate economic growth by channeling savings to entrepreneurs and making large-scale risk sharing possible. There has also emerged a broad consensus that a relationship between finance and trade exists, even as the direction of causality is not agreed upon. That is, while economies that are more financially developed have higher export shares, a country's comparative advantage—which is associated with its overall dependence on external finance—can also in turn have an effect on its level of financial development (e.g., Beck 2002; Hur et al. 2006; Do and Levchenko 2007; Becker et al. 2013).

On the other hand, the microeconomic evidence for the importance of finance to firm export behavior, whether measured at the extensive (export participation) or intensive margins (export volume or value), is relatively new. Based on novel US manufacturing plant-level panel data, Bernard and Jensen (2004) argue that plant-specific characteristics—especially that of having exported in previous years—account for most of the likelihood of exporting. Bellone et al. (2010) report that, in the case of French firms, the probability of exporting is positively affected by better access to external finance. Furthermore, they find that less-credit-constrained firms self-select into exporting to foreign markets compared to non-exporting competitors, even before beginning exports and despite being generally better off financially. Berman and Hericourt (2010), using World Bank investment climate survey data spanning multiple countries and around 5,000 firms, similarly argue that better access to credit significantly impacts the decision to export. Conversely, Egger and Kesina (2013) study the case of the PRC and find support for a negative relationship between exports and credit constraints. Interestingly, however, self-reported liquidity constraints do not seem to affect export or foreign direct investment (FDI) activities among German firms, as proposed by Ardnt et al. (2012).

If, as according to new trade theory, firm characteristics matter, what firms then are more likely to export? Muûls (2008), in a study examining the link between credit constraints and the extensive margin in Belgian panel data, has reported that more productive and less-credit-constrained firms are more likely to be exporters. Bernard et al. (2010), drawing from a developing country sample covering 28 Eastern Europe and Central Asian nations, observe that firms which are older, foreign-owned, and more productive are not only more likely to start exporting, but also tend to self-select and stay as exporters. Manova et al. (2011) show that foreign-owned firms and joint ventures are more successful exporters in the PRC. In the case of Japan, Todo (2011) finds similar path dependence in export participation—i.e., firms that have exported in preceding years tend to continue to do so.

[2] The literature makes a distinction between trade credit and trade finance: the former refers to agreements allowing buyers to pay suppliers at a later date; the latter to trade-related borrowings from financial institutions. In this paper, "access to credit" refers jointly to trade credit and trade finance, since we make references to both in the empirical sections.

3. DATA AND EMPIRICAL FRAMEWORK

We begin with firm-level survey data, based on the World Bank Enterprise Surveys, comprising 8,681 firms, of which the PRC accounts for 2,700 firms, Indonesia for 1,444 firms, Malaysia for 1,115 firms, the Philippines for 1,326 firms, Thailand for 1,043 firms, and Viet Nam for 1,053 firms. To arrive at the final sample there are filtering steps involved. Specifically, we exclude the following:

- observations without information about the number of employees (24 observations dropped);
- observations without information about domestic sales, exports, or indirect exports (47 observations dropped);
- observations without information about sources of access to credit for working-capital finance (347 observations dropped);
- observations without information about the year firm operations began (121 observations dropped);
- observations without information on whether financial statements were checked and certified by external auditors (81 observations dropped); and
- observations without information about the firm's affiliated sector (12 observations dropped).

The final sample has 8,080 firms, of which 5,588 firms have fewer than 100 employees and are classified as SMEs, in keeping with OECD statistics. Subsequently, alternative thresholds of firm size and SME classification will be allowed in the formal regression analysis.

Histograms of distributions of firm-level observations in the sample are examined for (a) export participation, based on the fraction of domestic (national) sales, indirect exports, and direct exports; (b) firm size, as measured by the number of full-time employees; and (c) access to credit, according to non-internal funds, bank loans, non-bank loans, trade credit (credits and advances), and other sources of finances.[3] The histograms show that domestic sales account for the majority of sales (50%–80%) for firms in our sample, suggesting limited export participation. The right-skewed firm-size distributions of the histograms also suggest that most of the surveyed firms are small and medium-sized, with more than 80% having fewer than 1,000 full-time employees. It is also evident in the data that firms in the sample depend mainly on internal funds as their source of credit for working capital finance.

3.1 Summary Statistics

The main constraint facing research on SMEs in developing countries is the dearth of data at the firm level across sectors, and the use of different definitions of an SME (e.g., based on employment, sales, assets, or value of equipment). Motivated by the importance of the relationship between firm size and international trade (i.e., di Giovanni and Levchenko 2012, 2013), we use firm-size threshold as a benchmark for studying SMEs. This paper uses firm-level data of enterprises from the World Bank's Enterprise Surveys to investigate the links between export participation, firm size, and

[3] Available upon request.

access to credit. This data set contains the most detailed and recent firm-level data currently available for a large number of developing countries.

We focus on developing East Asian countries, especially on ASEAN member countries and the PRC, given their increasing importance in Asia as well as the data availability and coverage for the variables of interest. Except for Malaysia and Thailand, of which the data are derived from the 2006 survey, the firm-level observations are from the 2011 survey; the difference in the survey years is addressed in the estimation. The Enterprise Surveys use stratified random sampling with replacement, based on face-to-face interviews using a common questionnaire conducted with business owners and senior managers of firms.[4]

While we make use of the latest available data for estimating the relationship between access to credit and firm characteristics for the PRC and ASEAN, our analysis is limited to making inferences based on single-year survey rounds. Also, we do not include a measure of productivity given its absence from the surveys—although in this instance, perhaps it could be argued (and as will be seen in the results) that access to credit *is* the measure of firm productivity. Table 1 reports summary statistics of the firm-level observations for the whole sample, the SME sample (fewer than 100 full-time employees), and the non-SME sample. As shown, the majority of firms are SMEs, with an average firm size is fewer than 200 employees for the whole sample. SMEs tend to export less, be younger, depend more on internal financing, have a lower concentration of foreign ownership, have a lower level of worker education, have fewer certified financial statements, be unlikely to have ISO certification, and have lower collateral to loan value in their applications to access credit lines.

[4] Details of the data procedures are available upon request.

Table 1: Summary Statistics of Firm-level Observations

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Whole Sample					
SME indicator	8,080	0.69	0.46	0	1
Firm size (employees)	8,080	190.46	759.42	2	30000
Export participation	8,080	18.68	33.84	0	100
Age	8,080	19.06	11.38	1	126
Bank borrowing	8,080	14.91	26.33	0	100
Non-bank borrowing	8,080	0.95	6.68	0	100
Trade credit	8,080	6.31	16.99	0	100
Access to credit (non-internal)	8,080	29.05	36.01	0	100
Foreign ownership	8,080	0.19	0.39	0	1
Foreign license	8,080	1.00	0.07	0	1
Patent	8,080	1.00	0.05	0	1
Worker education	8,080	0.09	0.29	0	1
Financially certified	8,080	0.62	0.49	0	1
ISO certification	8,080	0.37	0.48	0	1
Managerial experience	8,080	13.61	9.97	0	70
Collateral/Loan value	8,080	19.03	43.52	0	250
SME (employees<100)					
Firm size (employees)	5,588	33.75	27.07	2	100
Export participation	5,588	11.60	27.68	0	100
Age	5,588	18.03	10.67	2	101
Bank borrowing	5,588	13.03	25.21	0	100
Non-bank borrowing	5,588	0.99	7.03	0	100
Trade credit	5,588	5.99	16.81	0	100
Access to credit (non-internal)	5,588	26.71	35.28	0	100
Foreign ownership	5,588	0.13	0.34	0	1
Foreign license	5,588	1.00	0.07	0	1
Patent	5,588	1.00	0.05	0	1
Worker education	5,588	0.06	0.24	0	1
Financially certified	5,588	0.55	0.50	0	1
ISO certification	5,588	0.25	0.43	0	1
Managerial experience	5,588	13.23	9.73	0	70
Collateral/Loan value	5,588	15.44	39.18	0	250
Non-SME (employees>100)					
Firm size (employees)	2,492	541.87	1300.07	101	30000
Export participation	2,492	34.56	40.38	0	100
Age	2,492	21.38	12.54	1	126
Bank borrowing	2,492	19.12	28.23	0	100
Non-bank borrowing	2,492	0.88	5.81	0	100
Trade credit	2,492	7.01	17.38	0	100
Access to credit (non-internal)	2,492	34.29	37.07	0	100
Foreign ownership	2,492	0.33	0.47	0	1
Foreign license	2,492	1.00	0.07	0	1
Patent	2,492	1.00	0.03	0	1
Worker education	2,492	0.15	0.36	0	1
Financially certified	2,492	0.78	0.42	0	1
ISO certification	2,492	0.63	0.48	0	1
Managerial experience	2,492	14.45	10.45	0	60
Collateral/Loan value	2,492	27.07	51.05	0	250

SME = small and medium-sized enterprise.

Source: Authors' calculations on data from the World Bank Enterprise Surveys.

3.2 Estimation Methodology

To examine the association between export participation, firm size, and access to credit, controlling for firm-level characteristics, we use the following linear equation as the baseline specification:

$$y_{it} = X'_{it}\beta + \varepsilon_{it}$$

where *i* denotes the firm; *t* denotes the year; *y* denotes the dependent variable, which, in this paper, focuses on export participation; and *X* is the vector of firm characteristics, including firm size and access to credit as the focal determinant variables, together with the firm's age (based on the start year of first operation), and other firm-level controls, including foreign ownership, foreign license, patent, worker education, financial certification, International Organization for Standardization (ISO) certification, managerial experience, and collateral-to-loan value.

To measure export participation, we use an export share of output (continuous variable) as the main dependent variable, and a dummy variable for export participation (binary variable; 1 if exporting and 0 otherwise) as the alternative dependent variable. To capture variation in the data across countries and sectors, we run the estimation separately for each country (addressing the different survey years across countries) and each sector (according to their capital intensity, i.e., labor intensive, capital intensive, and services; as the reliance on external credit can vary across sectors), as well as for a pooled sample of countries and sectors.[5] To verify the sensitivity of our results, we explore the estimation with and without sector and country fixed effects, and use tobit, probit, and ordinary least squares (OLS), to provide a battery of regression results and empirical specifications.

[5] Subject to data availability, textiles, leather, garments, and food are classified as labor-intensive sectors. Metals and machinery, electronics, chemicals and pharmaceuticals, wood and furniture, non-metallic and plastic materials, auto components, and other manufacturing are classified as capital-intensive sectors. Retail and wholesale trade, hotels and restaurants, and other services are classified as services sectors.

4. ESTIMATION RESULTS

4.1 Baseline Regressions

Results by Country, Sector, Firm Size, and Collateral Type

As shown in Table 2, at the country level, the estimation results show that SMEs tend to export smaller proportions of their output, compared to non-SMEs, most notably in Indonesia, Philippines, and Viet Nam. Access to bank borrowing is positively associated with more exports in the PRC and Indonesia, while trade credit is positively associated with more exports as a percentage of output in the PRC, Malaysia, and Viet Nam. At the sector level, our results suggest that SMEs export far less in labor intensive sectors relative to capital intensive sectors. The effect of access to bank borrowing on export participation is most significant in labor intensive and services sectors. Non-bank borrowing is most significant in capital intensive sectors; and trade credit most significant in labor intensive sectors. Pooling the observations across countries, excluding firms from the PRC (due to the country's size), also gives estimation results that are broadly consistent with the country-level and sector-level regressions. Hence, these results suggest the overall importance of access to credit for export participation among SMEs (subject to variations in importance of the different sources of credit access) in developing East Asian countries, and the relative disadvantage these SMEs face as they attempt to enter the foreign markets.

Table 2: Baseline Estimates on the Determinants of Export Participation

							Pooling Countries, excluding PRC		
Y = Export Participation	**PRC**	**Indonesia**	**Malaysia**	**Philippines**	**Thailand**	**Viet Nam**	**Labor Intensive**	**Capital Intensive**	**Services**	**All**
SME indicator	-31.04	-157.41	-62.84	-197.55	-67.25	-108.83	-131.04	-76.20	-74.90	-104.16
	(4.61)***	(13.64)***	(4.86)***	(21.11)***	(5.40)***	(10.12)***	(7.24)***	(4.03)***	(29.41)**	(3.73)***
Age	.17	-.36	-.72	-2.63	.03	-.56	-.77	-.73	.01	-.50
	(.26)	(.42)	(.23)***	(.58)***	(.26)	(.37)	(.25)***	(.16)***	(.91)	(.14)***
Bank borrowing	.43	.45	-.01	-.27	.03	.05	.33	.00	.70	.20
	(.14)***	(.22)**	(.07)	(.32)	(.08)	(.13)	(.09)***	(.06)	(.38)*	(.05)***
Non-bank borrowing	-.27	-.03	.11	-.38	.01	.00	.39	.50	-5.77	.37
	(.41)	(.76)	(.21)	(1.13)	(.69)	(1.00)	(.41)	(.24)**	(7.25)	(.21)*
Trade credit	.66	.12	.20	-.74	-.06	.74	.40	.10	-.08	.26
	(.19)***	(.33)	(.11)*	(.35)**	(.12)	(.28)***	(.15)***	(.09)	(.61)	(.08)***
Constant	-45.39	4.57	75.00	114.30	36.19	36.16	67.59	49.43	-178.49	41.50
	(6.12)***	(13.83)	(7.23)***	(20.77)***	(7.46)***	(11.28)***	(8.02)***	(5.15)***	(44.15)***	(4.41)***
Sigma	81.53	102.57	67.78	188.87	67.39	107.26	100.79	83.88	157.54	95.50
	(3.04)***	(7.27)***	(2.45)***	(13.88)***	(2.64)***	(5.76)***	(3.97)***	(2.25)***	(22.29)***	(2.11)***
Pseudo R-squared	.01	.10	.03	.05	.03	.04	.07	.03	.02	.04
Observations	2,523	1,324	1,078	1,173	959	1,023	1,808	2,901	848	5,557

PRC = People's Republic of China, SME = small and medium-sized enterprise.

Note:

This table reports baseline regression results. The dependent variable is *Export Participation*, measured as the percentage of output share exported. The estimation methodology is tobit, using Export Participation = 0 as a left-censoring point and Export Participation = 100 as a right-censoring point. The firm-level observations from the sample countries are derived from different survey years based on the World Bank Enterprise Surveys. Subject to data availability, textiles, leather, garments, and food are classified as labor-intensive sectors; metals and machinery, electronics, chemicals and pharmaceuticals, wood and furniture, non-metallic and plastic materials, auto components, and other manufacturing are classified as capital-intensive sectors; and retail and wholesale trade, hotels and restaurants, and other services are classified as services sectors. Standard errors are in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 3: Baseline Estimates According to Firm Size

	Firm Size (Number of Employees)		
Y = Export Participation	**<100**	**>100 & 500<**	**>500**
Age	-.28	-.11	-.61
	(.19)	(.16)	(.22)***
Bank borrowing	.43	.15	-.05
	(.08)***	(.07)**	(.12)
Non-bank borrowing	.24	.59	.31
	(.28)	(.31)*	(.58)
Trade credit	.49	.27	.32
	(.11)***	(.11)**	(.20)
Labor intensive industries	72.69	130.00	127.99
	(6.60)***	(8.91)***	(15.43)***
Capital intensive industries	80.31	106.06	96.78
	(6.16)***	(8.42)***	(14.99)***
Constant	-152.50	-98.53	-38.63
	(7.54)***	(8.85)***	(15.43)**
Sigma	109.44	74.70	68.27
	(3.14)***	(2.16)***	(3.28)***
Pseudo R-squared	.02	.03	.03
Observations	5,588	1,948	544

Note: This table reports baseline regression results. The dependent variable is *Export Participation*, measured as the percentage of output share exported. The estimation methodology is tobit, using Export Participation = 0 as a left-censoring point and Export Participation = 100 as a right-censoring point. The firm-level observations from the sample countries are derived from different survey years based on the World Bank Enterprise Surveys. Standard errors are in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Table 4: Baseline Estimates According to Type of Collateral Used in the Loan Applications

Y = Export Participation	Collateral Type		
	Properties and Equipment	Account Receivables	Personal Assets
Age	-.04	.46	-.34
	(.22)	(.43)	(.71)
Bank borrowing	.20	.34	.39
	(.09)**	(.17)**	(.23)*
Non-bank borrowing	.49	.59	.06
	(.36)	(.71)	(.84)
Trade credit	.40	.27	.89
	(.19)**	(.33)	(.40)**
Labor intensive industries	95.25	97.71	100.36
	(8.95)***	(15.47)***	(18.90)***
Capital intensive industries	67.11	46.44	60.05
	(8.28)***	(13.72)***	(17.57)***
Constant	-102.50	-78.10	-133.86
	(9.68)***	(15.94)***	(24.18)***
Sigma	77.92	61.21	102.21
	(3.22)***	(5.01)***	(8.85)***
Pseudo R-squared	.03	.05	.02
Observations	1,422	254	471

Note: This table reports baseline regression results. The dependent is *Export Participation*, measured as the percentage of output share exported. The estimation methodology is tobit, using Export Participation = 0 as a left-censoring point and Export Participation = 100 as a right-censoring point. The firm-level observations from the sample countries are derived from different survey years based on the World Bank Enterprise Surveys. Standard errors are in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Is the effect of access to credit—specifically, bank borrowing, non-bank borrowing, and trade credit—the same across firms at different sizes and levels of collateral/loan value? Re-estimating the regressions by firm size (Table 3) and by collateral type (Table 4), we observe that the importance of bank borrowing and trade credit on export participation declines significantly with firm size, and that access to credit via bank borrowing matters for the export share regardless of the collateral type. It can also be seen that larger collateral or loan values are positively associated with larger export shares, an issue that is examined in the following sub-section.

4.2 Robustness Checks

Including Sector and Country Fixed Effects, and Pooled Regressions

We next provide a battery of robustness checks. First, we re-estimate the regression with sector and country fixed effects (Table 5). Including sector fixed effects in the country-level regression does not change the main findings. Furthermore, we find that firms in the labor-intensive sectors tend to export more than the capital-intensive firms, which in turn export more than the services firms in the PRC, Indonesia, and Viet Nam, though these patterns are not universal as can be seen in the results for Malaysia, the Philippines, and Thailand. Pooling data across countries, excluding the PRC (again, due to the country's size), and including country fixed effects, we find that access to credit via bank borrowing becomes marginally and positively associated with export share in service sectors, while trade credit remains most significant in the service sectors. As the service sectors gain increasing shares of employment and output in

developing East Asian countries, these additional results, while they are supportive of the baseline findings, suggest that attempts to accelerate growth of trade in service sectors may also require countries to better accommodate SMEs on credit needs and constraints.

Comparing the export participation of firms across countries, Viet Nam has a notable higher export share in the labor-intensive sectors; Malaysia in the capital-intensive sectors, and Philippines in the services sectors. These findings are consistent with the broad, observable trends in the region. Labor-intensive sectors accounted for most of the employment growth and the growing share of total exports in Viet Nam throughout the 2000s (McCaig and Pavcnik 2013). Manufactured goods—mostly in the electrical and electronics industries—make up roughly two-thirds of Malaysia's exports and close to 30% of its GDP (Lee, 2011). For the Philippines, which has emerged as a hub for information communications technology and business process outsourcing, the service sectors now make up more than half of total output (Noland et al. 2012).

Table 5: Robustness Check I—Including Sector and Country Fixed Effects, and Pooled Regressions

							Pooling Countries, excluding PRC			
Y = Export Participation	**PRC**	**Indonesia**	**Malaysia**	**Philippines**	**Thailand**	**Viet Nam**	**Labor Intensive**	**Capital Intensive**	**Services**	**All**
SME indicator	-21.21	-148.84	-59.85	-175.80	-65.70	-81.65	-123.96	-72.46	-71.68	-98.57
	(4.51)***	(13.14)***	(4.82)***	(19.57)***	(5.32)***	(8.76)***	(7.18)***	(3.83)***	(28.77)**	(3.64)***
Age	.18	-.50	-.61	-2.94	-.04	-.54	-.51	-.99	-.64	-.72
	(.25)	(.42)	(.23)***	(.57)***	(.26)	(.33)	(.25)**	(.16)***	(.96)	(.14)***
Bank borrowing	.46	.43	-.02	-.46	.01	.06	.11	-.11	.78	.03
	(.14)***	(.21)**	(.07)	(.31)	(.08)	(.12)	(.09)	(.06)*	(.40)*	(.05)
Non-bank borrowing	-.35	.07	.12	-.19	.07	.06	.16	.19	-6.38	.05
	(.41)	(.75)	(.21)	(1.14)	(.68)	(.92)	(.41)	(.23)	(7.95)	(.21)
Trade credit	.71	.11	.18	-.72	-.04	.59	.27	-.11	-.34	.02
	(.19)***	(.32)	(.11)*	(.33)**	(.12)	(.25)**	(.15)*	(.09)	(.60)	(.08)
Labor intensive industries	69.92	80.25	-21.78	132.13	18.60	141.75				
	(6.63)***	(19.03)***	(4.93)***	(24.17)***	(5.03)***	(13.38)***				
Capital intensive industries	49.90	61.94		174.08		80.68				
	(5.43)***	(18.80)***		(22.30)***		(12.61)***				
Indonesia							-51.56	-74.43	-99.18	-61.03
							(10.67)***	(6.34)***	(32.19)***	(5.37)***
Malaysia							14.25	21.58		36.80
							(10.29)	(5.06)***		(4.76)***
Thailand							1.53	-24.59		1.22
							(10.36)	(5.40)***		(4.95)
Viet Nam							35.59	-36.00	-50.13	-7.90
							(10.61)***	(6.21)***	(26.91)*	(5.15)
Constant	-88.42	-57.61	77.99	-12.49	30.44	-62.94	65.21	76.33	-124.98	54.30
	(7.88)***	(21.94)***	(7.21)***	(24.72)	(7.53)***	(15.09)***	(11.60)***	(6.34)***	(42.92)***	(5.64)***
Sigma	78.34	100.24	67.02	175.79	66.41	93.61	97.12	77.68	153.44	91.41
	(2.90)***	(7.09)***	(2.42)***	(12.85)***	(2.61)***	(4.96)***	(3.81)***	(2.07)***	(21.65)***	(2.01)***
Pseudo R-squared	.03	.11	.03	.08	.03	.08	.08	.05	.03	.06
Observations	2,523	1,324	1,078	1,173	959	1,023	1,808	2,901	848	5,557

PRC = People's Republic of China, SME = small and medium-sized enterprise.

Note:

This table reports baseline regression results. The dependent is *Export Participation*, measured as the percentage of output share exported. The estimation methodology is tobit, using Export Participation = 0 as a left-censoring point and Export Participation = 100 as a right-censoring point. The firm-level observations from the sample countries are derived from different survey years based on the World Bank Enterprise Surveys. Standard errors are in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations.

Alternative Dependent Variable Specifications, Estimation Methods, Firm Size Measures, and Interaction Terms

To further allow for alternative empirical specifications we provide estimates using tobit, probit, and OLS, using different measures of firm size and using interaction terms of firm size and access to credit (Table 6). In the pooled sample, we find that the probability of export participation is positively associated with access to bank borrowing and trade credit in a probit regression. Using firm size instead of an SME dummy variable, we find that export share is positively associated with firm size nonetheless. In addition, based on the interaction terms, access to credit via bank and non-bank borrowing and trade credit becomes more significantly and positively associated with export participation, as firm size increases.

Table 6: Robustness Check II—Alternative Dependent Variable Specifications, Estimation Methods, Firm Size Measures, and Interaction Terms

Y = Export Participation	Tobit	Probit	OLS	Tobit	Probit	OLS	Tobit	Probit	OLS
	Y = Export Share (left censored)	Y = 1 if Export and 0 otherwise	Y = Export Share	Y = Export Share (left censored)	Y = 1 if Export and 0 otherwise	Y = Export Share	Y = Export Share (left censored)	Y = 1 if Export and 0 otherwise	Y = Export Share
SME indicator	-72.27	-.90	-21.54						
	(2.84)***	(.03)***	(.88)***						
Age	-7.09	-.02	-2.90	-3.21	.03	-1.83	-3.33	.02	-1.86
	(1.37)***	(.02)	(.37)***	(1.42)**	(.02)	(.40)***	(1.42)**	(.02)	(.39)***
Bank borrowing	1.80	.05	.05	3.90	.07	.66	3.77	.07	.62
	(1.26)	(.02)***	(.41)	(1.31)***	(.02)***	(.42)	(1.31)***	(.02)***	(.42)
Non-bank borrowing	.32	.02	.01	.27	.02	-.00	.45	.06	.22
	(1.26)	(.02)	(.30)	(1.31)	(.02)	(.33)	(1.33)	(.02)***	(.33)
Trade credit	2.25	.05	.26	2.70	.05	.41	2.73	.08	.46
	(1.22)*	(.02)***	(.39)	(1.28)**	(.02)***	(.40)	(1.29)**	(.02)***	(.40)
Number of employees				13.58	.21	4.95	14.99	.37	5.48
				(1.12)***	(.02)***	(1.25)***	(1.20)***	(.03)***	(1.06)***
x Bank borrowing							.61	.12	.80
							(1.30)	(.02)***	(1.05)
x Non-bank borrowing							5.74	.34	2.54
							(2.31)**	(.10)***	(.98)***
x Trade credit							5.81	.32	2.32
							(1.84)***	(.05)***	(.94)**
Constant	-73.00	-.73	17.20	-129.77	-1.33	1.86	-128.99	-1.32	1.91
	(4.70)***	(.05)***	(.90)***	(5.01)***	(.05)***	(.66)***	(4.99)***	(.05)***	(.66)***
Sigma	87.79			93.05			92.77		
	(1.66)***			(1.77)***			(1.76)***		
Pseudo R-squared	.06	.20	.18	.04	.15	.13	.04	.15	.13
Observations	8,080	8,080	8,080	8,080	8,080	8,080	8,080	8,080	8,080
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

OLS = ordinary least squares, SME = small and medium-sized enterprise.Note:

This table reports baseline regressions. The estimation methodologies used are tobit (Export Participation = 0, left-censoring point, Export Participation = 100, right-censoring point), probit (P(Y=1 if Export Participation > 0)), and OLS. The firm-level observations from sample countries are derived from different survey years. Explanatory variables are standardized. Standard errors are in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations on data from the World Bank Enterprise Surveys.

Since export participation, firm size, and access to credit are likely to be interdependent factors in firm behavior, we next examine the two-way feedback among these variables more directly in the estimation. The seemingly unrelated regression (SUR) analysis is done for these three variables, with and without sector and country fixed effects, with an alternative set of controls with additional variables (Table 7). We now add together bank borrowing, non-bank borrowing, and trade credit, and dub this total sum the access to credit variable. We find that our main findings on the determinants of export participation remain intact: firm size and access to credit are positively associated with export share, suggesting a two-way feedback. Additionally, we also find that collateral/loan value is positively linked to access to credit, but negatively related to firm size. Lastly, access to credit as a dependent variable is positively associated with collateral/loan value. Overall, these results are supportive to the results reported in the baseline regressions. That is, access to credit significantly impacts export participation and, in this regard, SMEs are at a relative disadvantage compared to non-SMEs. Export participation, in turn, is positively associated with more access to credit of firms.

Table 7: Robustness Check III—Two-Way Feedback via Seemingly Unrelated Regressions

		(I)			(II)			(III)	
SUR Estimation	**Export Share**	**Firm Size**	**Access to Credit**	**Export Share**	**Firm Size**	**Access to Credit**	**Export Share**	**Firm Size**	**Access to Credit**
Age	-.014	.070	2.180	-.042	.091	-.017	-.013	.069	.033
	(.011)	(.011)***	(.380)***	(.011)***	(.012)***	(.389)	(.011)	(.011)***	(.390)
Firm size (employees)	.215		.248				.216		.298
	(.010)***		(.373)				(.010)***		(.350)
Access to credit	.005	.000					.004	.000	
	(.000)***	(.000)					(.000)***	(.000)	
Export share		.239	5.899					.235	3.282
		(.012)***	(.390)***					(.012)***	(.374)***
Labor intensive industries				.461	.125	2.428		.062	
				(.030)***	(.033)***	(1.029)**		(.032)*	
Capital intensive industries				.231	.055	2.784		.009	
				(.028)***	(.030)*	(.937)***		(.029)	
Indonesia				.036	-.005	6.671			7.045
				(.037)	(.040)	(1.261)***			(1.241)***
Malaysia				.505	-.090	37.763			37.832
				(.044)***	(.048)*	(1.505)***			(1.484)***
Philippines				.221	-.203	12.077			12.108
				(.036)***	(.039)***	(1.222)***			(1.221)***
Thailand				.022	.008	37.437			37.776
				(.066)	(.072)	(2.246)***			(2.215)***
Viet Nam				.368	.097	31.749			31.368
				(.036)***	(.039)**	(1.224)***			(1.222)***
Foreign ownership	.722	-.046	-3.854	.670	.143	-6.742	.723	-.045	-8.939
	(.028)***	(.031)	(1.037)***	(.029)***	(.031)***	(.983)***	(.028)***	(.031)	(1.013)***
Foreign license	-.187	.110	8.242	-.156	.070	1.755	-.185	.114	1.723
	(.163)	(.172)	(5.751)	(.159)	(.172)	(5.388)	(.163)	(.172)	(5.387)
Patent	-.226	.058	11.242	-.102	-.047	9.325	-.223	.061	9.581
	(.240)	(.253)	(8.483)	(.234)	(.254)	(7.949)	(.240)	(.253)	(7.950)
Worker education	.152	-.029	5.308	.100	.023	-1.198	.154	-.027	-1.509
	(.038)***	(.040)	(1.337)***	(.038)***	(.041)	(1.281)	(.038)***	(.040)	(1.279)
Financially certified	-.002	.090	1.169	.086	.159	4.380	-.001	.094	4.106
	(.023)	(.024)***	(.812)	(.026)***	(.028)***	(.879)***	(.023)	(.024)***	(.881)***
ISO certification	.149	.274	-6.224	.257	.299	-.334	.148	.280	-.786
	(.023)***	(.024)***	(.804)***	(.024)***	(.026)***	(.818)	(.023)***	(.024)***	(.814)
Managerial experience	.001	.003	.047	.002	.003	.179	.001	.003	.176
	(.001)	(.001)**	(.040)	(.001)**	(.001)**	(.039)***	(.001)	(.001)**	(.039)***
Collateral/Loan value	-.000	-.001	.309	.001	-.001	.138	-.000	-.001	.138
	(.000)	(.000)**	(.010)***	(.000)	(.000)*	(.015)***	(.000)	(.000)**	(.015)***
Constant	.064	-.344	4.919	-.470	-.317	-6.638	.065	-.375	-4.033
	(.238)	(.251)	(8.416)	(.236)**	(.255)	(7.988)	(.238)	(.253)	(7.953)
Pseudo R-squared	.132	.045	.176	.192	.052	.284	.134	.046	.279
Observations	8,080	8,080	8,080	8,080	8,080	8,080	8,080	8,080	8,080
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

ISO = International Organization for Standardization, SUR = seemingly unrelated regression.

Notes:

This table reports additional regressions. The estimation methodology is seemingly unrelated regressions (SUR), using *Export Participation* (export share), *Firm Size*, and *Access to Credit* as the dependent variables. The firm-level observations from sample countries are derived from different survey years based on the World Bank Enterprise Surveys. Standard errors are in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

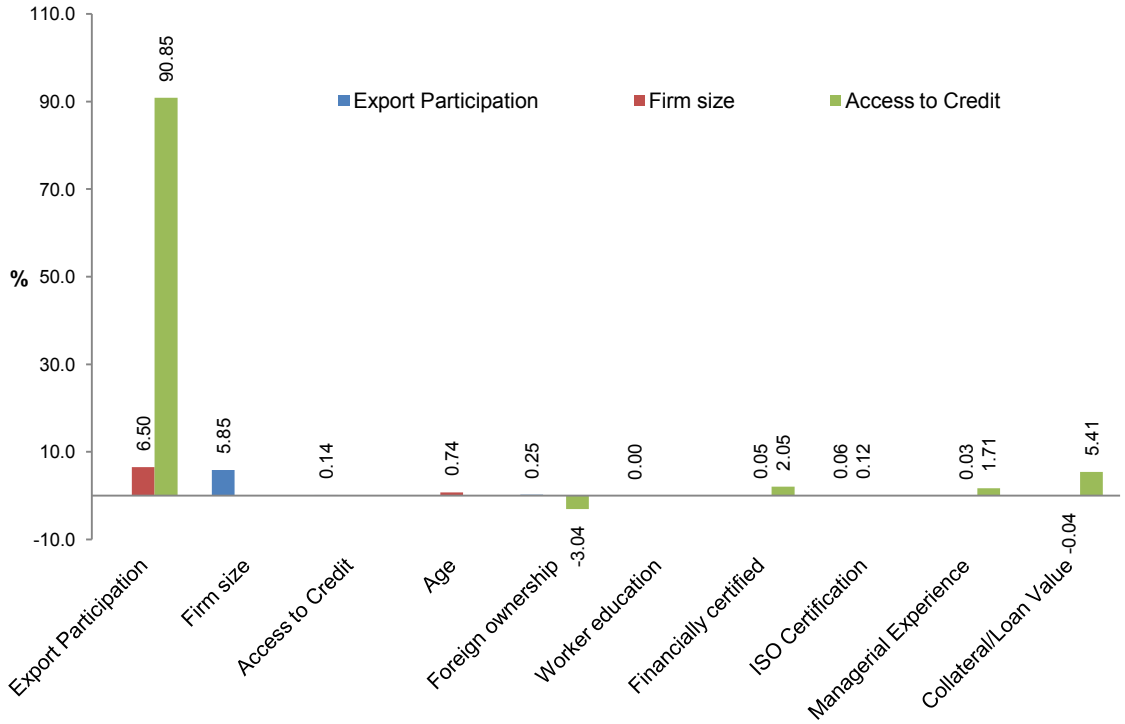
Source: Authors' calculations.

5. ECONOMIC SIGNIFICANCE AND POLICY IMPLICATIONS

5.1 How Large are the Drivers of Export Participation, Firm Size, and Access to Credit for SMEs?

We summarize our estimation results by considering the effects of a one-standard-deviation increase in each of our control variables from the SUR analysis on the variation of export participation, firm size, and access to credit. As shown in Figure 3, the influence of the control variables on export participation is driven mostly by firm size (6%). The variation in firm size is in turn positively affected by export participation (7%). Most significant is the effect on access to credit: export participation, financial certification, managerial experience, and collateral/loan value increase access to credit by 90%, 2%, 2%, and 5%, respectively. Foreign ownership is negatively associated with the use of external credit (–3%), driven by the ample internal financial resources of foreign-affiliated firms.

Figure 3: Economic Significance of the Estimation Results for SMEs



Source: Authors' calculations.

5.2 Policy Implications: Can SMEs Participate in Export Markets, Gain Scale Economies, and Access More Credit?

To supplement the study with a different method of data analysis, Table 8 provides the eigenvectors from the principal component analysis of the main variables used in the

regressions of the previous sections. Using an eigenvalue of 1 as a criterion, we examine six resulting principal components or factors for the whole sample. As shown in the table for the whole sample, the first principal component is associated with access to credit, collateral/loan value, foreign ownership, export participation, and the SME indicator; this pattern suggests that these variables tend to vary together in the data. The second principal component meanwhile is linked to access to credit, the SME indicator, ISO certification, firm size, bank borrowing, and trade credits. The third principal component is comprised of managerial experience, having a foreign license or patent, firm size, bank borrowing, and access to credit. The fourth component is correlated with having a foreign license, patent, foreign ownership and managerial experience. The fifth principal component is composed of bank borrowing, trade credit, non-bank borrowing, financial certification, firm size, and managerial experience. Finally, the sixth factor is correlated with firm age, non-bank borrowing, worker education, and ISO certification.

Table 8: Principal Components Analysis on the Firm-Level Data

Principal Components (Whole Sample)																
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Unexplained
SME indicator	-0.33	0.37	-0.19	0.04	0.11	0.05	-0.02	0.05	0.06	-0.09	0.29	0.17	0.15	0.74	0.09	0
Firm size (employees)	0.17	-0.30	0.23	-0.08	-0.14	-0.08	0.01	-0.18	-0.76	-0.01	0.33	0.13	0.14	0.20	0.04	0
Export Participation	0.31	-0.21	-0.03	0.03	-0.11	-0.08	0.14	-0.55	0.31	-0.23	0.00	0.12	-0.50	0.30	0.10	0
Age	0.16	-0.01	0.21	-0.28	0.22	0.67	0.16	0.12	-0.11	-0.31	-0.29	-0.17	-0.05	0.23	-0.22	0
Bank borrowing	0.26	0.33	0.33	-0.23	-0.51	-0.08	-0.06	0.09	0.20	0.00	0.07	0.03	0.12	0.05	-0.14	0
Non-bank borrowing	0.04	0.11	0.12	-0.06	0.34	-0.39	0.81	0.14	-0.03	-0.04	0.03	0.02	0.01	-0.03	0.00	0
Trade credit	0.22	0.24	0.02	-0.03	0.63	-0.17	-0.40	-0.27	-0.16	0.21	-0.11	-0.08	-0.11	0.04	-0.09	0
Access to Credit (non-internal)	0.40	0.45	0.21	-0.15	0.00	-0.17	-0.06	-0.03	0.03	0.06	0.00	-0.02	0.09	0.02	-0.02	0
Foreign ownership	0.34	-0.16	-0.26	0.20	0.12	0.06	0.05	-0.25	0.23	-0.22	0.13	-0.04	0.70	-0.06	-0.22	0
Foreign license	0.01	0.07	0.37	0.58	0.02	0.12	0.04	0.01	0.05	0.05	0.37	-0.58	-0.13	0.05	-0.01	0
Patent	0.00	0.06	0.40	0.56	0.05	0.11	0.01	0.01	-0.01	0.02	-0.33	0.62	0.08	0.00	-0.05	0
Worker education	0.27	-0.01	-0.24	-0.01	-0.01	0.40	0.24	0.03	0.06	0.73	0.24	0.20	-0.11	0.02	-0.11	0
Financially certified	0.29	-0.18	-0.07	0.05	0.19	-0.12	-0.24	0.57	0.09	-0.29	0.38	0.25	-0.28	-0.02	-0.26	0
ISO certification	0.19	-0.43	0.10	0.02	0.00	-0.25	-0.08	0.33	0.16	0.31	-0.36	-0.21	0.17	0.48	0.16	0
Managerial Experience	-0.12	-0.21	0.45	-0.32	0.30	0.16	-0.09	-0.07	0.35	0.05	0.33	0.16	0.16	-0.14	0.44	0
Collateral/Loan Value	0.39	0.21	-0.25	0.17	-0.03	0.17	0.02	0.20	-0.16	-0.18	-0.06	-0.01	0.01	-0.10	0.74	0
Principal Components (SME Sample)																
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Unexplained
Firm size (employees)	0.23	0.41	0.06	0.31	-0.17	-0.09	0.03	-0.24	0.04	-0.52	0.01	-0.33	-0.50	-0.14	-0.01	0
Export Participation	0.21	0.25	0.05	0.08	-0.03	-0.07	-0.20	0.75	-0.21	0.02	-0.41	0.13	0.19	0.11	0.01	0
Age	0.12	-0.09	-0.25	0.32	0.56	-0.28	0.06	-0.15	-0.29	-0.30	-0.01	0.01	0.37	-0.26	-0.01	0
Bank borrowing	0.33	-0.30	-0.06	0.27	-0.45	-0.37	0.00	-0.01	-0.03	0.23	0.11	0.07	0.03	-0.13	0.54	0
Non-bank borrowing	0.07	-0.12	-0.03	0.15	0.06	0.44	0.81	0.27	-0.08	0.00	0.02	-0.01	-0.05	-0.01	0.17	0
Trade credit	0.26	-0.18	-0.02	0.07	0.19	0.63	-0.46	-0.03	0.25	-0.19	-0.05	-0.04	0.07	-0.07	0.38	0
Access to Credit (non-internal)	0.49	-0.37	-0.04	0.18	-0.18	0.12	-0.04	0.02	0.07	0.05	0.10	0.01	0.03	0.00	-0.72	0
Foreign ownership	0.31	0.27	0.08	-0.27	0.27	0.02	-0.08	0.21	-0.19	0.27	0.67	0.00	-0.12	-0.24	0.04	0
Foreign license	0.02	-0.11	0.65	0.12	0.17	-0.10	0.04	0.00	0.09	0.22	-0.09	-0.63	0.22	0.00	0.00	0
Patent	0.00	-0.12	0.65	0.13	0.15	-0.08	0.03	-0.03	0.06	-0.20	0.02	0.65	-0.18	-0.06	0.00	0
Worker education	0.24	0.09	-0.17	-0.19	0.26	-0.29	0.21	0.11	0.78	0.07	-0.16	0.06	-0.02	-0.12	0.01	0
Financially certified	0.28	0.34	0.03	0.05	0.06	0.17	0.06	-0.45	-0.19	0.47	-0.47	0.14	-0.12	-0.23	-0.03	0
ISO certification	0.04	0.50	0.09	0.25	-0.25	0.13	0.10	-0.17	0.23	-0.06	0.28	0.15	0.61	0.17	-0.02	0
Managerial Experience	-0.17	0.05	-0.16	0.61	0.31	-0.02	-0.13	0.06	0.13	0.37	0.15	0.04	-0.30	0.43	-0.01	0
Collateral/Loan Value	0.45	-0.02	0.04	-0.28	0.14	-0.12	0.10	-0.22	-0.16	-0.16	-0.03	-0.02	-0.03	0.74	0.14	0

ISO = International Organization for Standardization, SME = small and medium-sized enterprise.

Source: Authors' calculations on the World Bank Enterprise Surveys of firms in the PRC, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam.

Repeating the analysis for the SME sample and applying the same eigenvalue criterion yields the same number of principal components (six).The first factor varies with access to credit, collateral/loan value, bank borrowing, foreign ownership, and financial certification. The second component is related to ISO certification, firm size, export participation, foreign ownership, bank borrowing, and financial certification. The third component is linked to having a foreign license and a patent. The fourth component is accounted for by managerial experience, firm size, firm age, bank borrowing, collateral/loan value, foreign ownership, and access to credit. The fifth factor is composed of bank borrowing, firm age, managerial experience, and foreign ownership. The sixth component, finally, is linked to trade credits, bank borrowing, non-bank borrowing, worker education, and firm age.

Based on different methods of data analysis, we are able to draw some policy implications from the formal regression (Sections 4.1–4.2) and the principal component analysis (Section 5.2) for SMEs. Both sets of empirical results point to the interdependence of export participation, firm size, and access to credit. The estimation results suggest that SMEs participating in export markets tend to have more access to credit, and the principal component analysis supports this finding. In addition, SMEs can gain from scale economies (firm size) by participating in the export markets, potentially induced by higher competition and necessary production upgrading. The results also suggest, although not as strongly as the first result, that foreign ownership and worker education positively influence export participation, and that financial certification may lead to better access to credit for SMEs.

6. CONCLUSIONS

This paper studies factors associated with SME participation in export markets, in particular the links between firm size and access to credit. We base our empirical analysis on formal regressions, supplemented with principal component analysis, using firm-level observations covering more than 8,000 firms, both SMEs (with fewer than 100 employees) and non-SMEs, across developing East Asian countries and sectors.

Across a wide variety of empirical tests, we show that export participation, firm size, and access to credit are interdependent. We find that SMEs participating in the export markets tend to have more access to credit, and, more importantly, that external credit—particularly bank borrowing—matters for export participation. We also find some evidence for foreign ownership and worker education positively influencing export participation, and financial certification having a similar, positive impact on access to credit for SMEs. Also, we observe that firm size, among other firm-specific characteristics, seems to be the most critical for export participation and access to credit. Specifically, larger firms tend to export more of their output while having access to more external credit relative to SMEs.

Overall, the broad picture painted by these estimates adds to the earlier studies done in the countries we cover. In the PRC, Ayyagari et al. (2010) find that “firms with bank financing grow faster than similar firms.” In Indonesia, Wengel and Rodriguez (2006) observe that firms with more access and use of credit export a higher share of their output. In Malaysia and the Philippines, Harvie et al. (2011) suggest that there is a gap between what firms intend to borrow and the amount of credit available to them, and that this gap appears to be more sizable for smaller firms. In Thailand, it has been found that having better financial information raises firm performance among SMEs (Sarapaivanich and Kotey 2006). In Viet Nam, SMEs involved in production networks

"have more opportunities to obtain trade credits and other financial resources" (Nguyen and Ramachandran, 2006). More importantly, our results imply that SMEs can potentially gain more scale economies (via firm size) by participating in the export markets (potentially induced by higher competition and necessary production upgrading).

The results reported here are, admittedly, exploratory. In this regard, we think there are several ways to meaningfully build on the analysis we present, although these would require the availability of much more detailed firm-level data for a greater number of years. For instance, firm surveys across time and within and across countries would enable more definitive and precise inferences regarding the impact of access to external credit on export participation, and vice versa. Incorporating measures of firm productivity would, similarly, improve the reliability of the estimates. Adding input–output data would also considerably enrich the analysis, because such data would allow us to see how firms across sectors are actually linked to each other, and by extension, what tangible impacts can be expected from changing any number of firm credit-related policy variables.

Finally, our results suggest that policymakers will need to pay closer attention to policy issues related to small firms, particularly those concerning enterprise growth, credit policy, taxation, and financial regulation. Simply making more credit available to SMEs is not a straightforward solution, since credit support measures may undermine efforts to institutionalize credit risk assessment and crowd out incentives to restructure firms that do not perform well. In Japan, for example, an International Monetary Fund (IMF) study has found that SMEs with credit guarantees take longer to repay their current debt and are more likely to make losses compared to those without credit guarantees (Shin 2014). The case of Thailand may be instructive in this regard as Thai SMEs have relatively better access to credit than the rest of our sample. This may be because the Central Bank of Thailand guards against providing excessive support and, when it has extended support, has done so primarily via reductions in credit transaction costs (i.e., lower prepayment charges and cancellation fees) and the provision of better information (Wangtal 2014).

Our findings raise several intriguing policy questions with respect to SMEs. How important are medium-sized firms to developing Asia, and what are the barriers that prevent SMEs from "graduating" to larger sizes (the missing middle)? Given that export participation among SMEs is associated with having external credit, should credit policy toward firms be broad-based or targeted toward specific firms or sectors? In light of the evidence that many firms have unmet or largely unserved credit needs, what roles should central banks play in regulating financial institutions for financial inclusion? Finally, what complementary policies are needed to promote SME participation in export markets? These are questions that emerge from the findings of this paper and will be increasingly important for policymakers moving forward.

REFERENCES

Association of Southeast Asian Nations. 2011. SME data for ASEAN. http://www.asean.org/communities/asean-economic-community/category/data-and-statistics

Asmundson, I., T. Dorsey, A. Khachatryan, I. Niculcea, and M. Saito. 2011. Trade and Trade Finance in the 2008–09 Financial Crisis. International Monetary Fund Working Paper 11/16. Washington, DC: International Monetary Fund.

Ayyagari, M., A. Demirgüç-Kunt, and V. Maksimovic. 2010. Formal Versus Informal Finance: Evidence from China. *Review of Financial Studies* 23(8): 3048–3097.

Baldwin, R., ed. 2009. *The Great Trade Collapse: Causes, Consequences and Prospects*. Centre for Economic Policy Research.

Beck, T. 2002. Financial Development and International Trade: Is there a Link? *Journal of International Economics* 57(1): 107–131.

Becker, B., J. Chen, and D. Greenberg. 2013. Financial Development, Fixed Costs, and International Trade. *Review of Corporate Finance Studies* 2(1): 1–28.

Bellone, F., P. Musso, L. Nesta, and S. Schiavo. 2010. Financial Constraints and Firm Export Behaviour. *The World Economy* 33(3): 347–373.

Berman, N., and J. Héricourt. 2010. Financial Factors and the Margins of Trade: Evidence from Cross-Country Firm-Level Data. *Journal of Development Economics* 93(2): 206–217.

Bernard, A., and B. Jensen. 2004. Why Some Firms Export. *Review of Economics and Statistics* 86(2): 561–569.

Bernard, A., A. Stabilito, and J. Donghoon Yoo. 2010. Access to Finance and Exporting Behavior in Transition Countries. Kiel Institute for the World Economy Working Paper No. 456. Kiel, Germany: Kiel Institute for the World Economy.

Contessi, S., and F. de Nicola. 2012. What Do We Know About the Relationship between Access to Finance and International trade? Working Paper 2012-054. St. Louis, United States: Federal Reserve Bank of St. Louis.

Department of Trade and Industry. 2011. SME data for the Philippines. http://www.dti.gov.ph/dti/index.php?p=321.

Do, Q.-T., and A. A. Levchenko. 2007. Comparative Advantage, Demand for External Finance, and Financial Development. *Journal of Financial Economics* 86(3): 796–834.

Eaton, J., S. Kortum, B. Neiman, and J. Romalis. 2011. Trade and the Global Recession. NBER Working Paper No. 16666. Cambridge, MA: National Bureau of Economic Research.

Economist Intelligence Unit. 2013. GDP, exports, and domestic credit data. Available at http://www.eiu.com

Egger, P., and M. Kesina. 2013. Financial Constraints and Exports: Evidence from Chinese Firms. *CESifo Economic Studies* 59(4): 676–706.

Feenstra, R.C., Z. Li, and M. Yu. 2011. Exports and Credit Constraints Under Incomplete Information: Theory and Evidence from China. NBER Working Paper No.16940. Cambridge, MA: National Bureau of Economic Research.

di Giovanni, J., and A. A. Levchenko. 2012. Country Size, International Trade, and Aggregate Fluctuations in Granular Economies. *Journal of Political Economy* 120(6): 1083–1132.

di Giovanni, J., and A. A. Levchenko. 2013. Firm Entry, Trade, and Welfare in Zipf's World. *Journal of International Economics* 89(2): 283–296.

Harvie, C., D. Narjoko, and S. Oum. 2010. Firm Characteristic Determinants of SME Participation in Production Networks. ERIA Discussion Paper Series 2010-11. Jakarta, Indonesia: Economic Research Institute for ASEAN and East Asia (ERIA).

——— (eds.) 2011. Small and Medium Enterprises Access to Finance in Selected East Asian Economies. Research Project Report 2010-14. Jakarta, Indonesia: ERIA.

Hur, J., R. Manoj, and Y. E. Riyanto. 2006. Finance and Trade: A Cross-Country Empirical Analysis on the Impact of Financial Development and Asset Tangibility on International Trade. *World Development* 34(10): 1728–1741.

King, R. G., and R. Levine. 1993. Finance, Entrepreneurship and Growth: Theory and Evidence. *Journal of Monetary Economics* 32(3): 513–542.

Lee, C. 2011. Trade, Productivity, and Innovation: Firm-Level Evidence from Malaysian Manufacturing. *Journal of Asian Economics* 22(4): 284–294.

Lim, H., and F. Kimura. 2010. The Internationalization of Small and Medium Enterprises in Regional and Global Value Chains. ADBI Working Paper Series No. 231. Tokyo: Asian Development Bank Institute.

Manova, K., S.-J. Wei, and Z. Zhang. 2011. Firm Exports and Multinational Activity Under Credit Constraints. NBER Working Paper No. 16905. Cambridge, MA: National Bureau of Economic Research.

McCaig, B., and N. Pavcnik. 2013. Moving Out of Agriculture: Structural Change in Vietnam. NBER Working Paper No. 19616. Cambridge: MA: National Bureau of Economic Research.

Melitz, M. 2003. The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity. *Econometrica* 71(6): 1695–1725.

Muûls, M. 2008. Exporters and Credit Constraints. A Firm-Level Approach. Working Paper No. 139. Brussels: National Bank of Belgium.

Nguyen, T. D. K., and N. Ramachandran. 2006. Capital Structure in Small and Medium-Sized Enterprises: The Case of Vietnam. *ASEAN Economic Bulletin* 2(2): 192–211.

Noland, M., D. Park, and G.B. Estrada. 2012. Developing the Services Sector as Engine of Growth for Asia: An Overview. Peterson Institute for International Economics Working Paper 12-18. Washington, DC: Peterson Institute for International Economics.

Organisation for Economic Co-Operation and Development. 2010. *SMEs, Entrepreneurship and Innovation*. Paris: Organisation for Economic Co-Operation and Development.

Runckel & Associates. *Business in Asia*. 2011. Small Medium Enterprise (SME) in Viet Nam. Available at http://www.business-in-asia.com/vietnam/sme_in_vietnam.html

Sarapaivanich, N., and B. Kotey. 2006. The Effect of Financial Information Quality on Ability to Access External Funds and Performance of SMEs in Thailand. *Journal of Enterprising Culture* 14(3): 219–239.

Shin, J. 2014. Finance to SMEs in Japan and Asia. Presentation at the JFSA–ADBI–IMF International Conference on Financial System Stability, Regulation and Financial Inclusion (27 January 2014).

Stein, P., O. P. Ardic, and M. Hommes. 2013. Closing the Credit Gap for Formal and Informal Micro, Small, and Medium Enterprises. International Finance Corporation. Available at http://www.cgap.org/blog/closing-credit-gap-micro-small-and-medium-enterprises

Todo, Y. 2011. Quantitative Evaluation of the Determinants of Export and FDI: Firm-level Evidence from Japan. *The World Economy* 34(3): 355–381.

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). 2011. SME data for Viet Nam. Available at http://www.unescap.org/tid/publication/aptir2596_chap7.pdf

Wangtal, S. 2014. SMEs Finance in Thailand. Presentation at the JFSA–ADBI–IMF International Conference on Financial System Stability, Regulation and Financial Inclusion (27 January 2014).

Wengel, J. and E. Rodriguez. 2006. SME Export Performance in Indonesia After the Crisis. *Small Business Economics* 26(1): 25–37.

Wignaraja, G. 2013a. Can SMEs participate in global production networks? Evidence from ASEAN firms. In *Global Value Chains in a Changing World*, edited by D. K. Elms and P. Low. Geneva, Switzerland: World Trade Organization Secretariat.

Wignaraja, G., 2013b. Do SMEs Matter in Asian Production Networks? In *The Future of the World Trading System: Asian Perspectives*, edited by R. Baldwin, M. Kawai, and G. Wignaraja. Centre for Economic Policy Research.

The World Bank. Enterprise Surveys. Available at http://www.enterprisesurveys.org

Xinhua News Agency. 2009. SME data for the PRC. Available http://english.gov.cn/2009-12/27/content_1497851.htm