

# **The Importance of Financial Access on Export Participation: An Evidence from Indonesia Manufacturing Sector<sup>1</sup>**

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This paper analyzes the impact of financial access on export participation for the case of Indonesian manufactures. In self-selection hypothesis, export participation is explained by heterogeneity in productivity. By entering export market, firms are burdened with high cost which force them to be more productive and efficient. Therefore, this paper aims at observing whether firm's access to external finance can increase firm's chances to participate in export. Furthermore, this study also analyses the impact of firm's financial access on export participation through productivity and firm size. This study uses firm-level dataset from Indonesian manufacturing survey dataset. Probit analysis for panel dataset is applied in this study. The result shows that firms with access to external borrowing have higher probability to enter export market. This paper also highlights the importance of firms' productivity and firm size as channels through which financial access explains firms' participation in export.

## **1. Introduction**

Financial access is an important factor for firms' production growth. Improvement in production can be achieved through accumulation of input factors, capital and new technological progress. By accessing external finance, firms obtain funds to make investment thus, improve their production. A study by Rajan and Zingales (1998) mentioned that in the case of developed financial system, firms which were more dependent on external finance would further improve their production.

External finance is essential not only for expanding businesses domestically, but it is also important for expanding products globally. When firms intend to develop their business through exporting, it also requires strong financial capability due to high sunk cost. These firms are facing barriers since entering export market requires such high cost upfront (Roberts and Tybout, 1997, p. 560). These sunk costs include product and market research cost, shipping cost, distribution cost, administration cost, insurance cost, and other fixed cost (Wagner, 2007, p.61). Therefore, exporting firms depend more on external finance since they decide to participate in export (Manova, Wei and Zhang, 2011, p.4).

In self-selection hypothesis, only productive firms are able to become exporters, due to high export cost (Bernard and Jensen, 1999, p.24). There are also several studies relating productivity, financial access and export participation. Better access to finance and higher productivity lead to higher proba-

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bility for firms to become exporter (Berman and Hericourt, 2010, p.206; Feenstra, Li and Yu, 2014, p.743; Ogawa and Tokutsu, 2015, p.2). Berman and Hericourt (2010) highlight that productivity has a positive impact on export participation when firm has access to external finance. In this case, firm with access to external borrowing may induce higher productivity. The self-selection hypothesis explains that higher productive firm will have more chance to participate in export. Therefore, this study intends to examine whether financial access directly impact on firm's export participation. Furthermore, this study also observes the impact of financial access on export participation which can also be analyzed through productivity channel.

In terms of firm size, under asymmetric information, small firms face constraints to access external financial sources. Higher interest rate is burdened to small firms to compensate higher risk in production and business activity. A study by Beck, Demirgüç-Kunt and Maksimovic (2005) discusses that small firms have lack of access to finance due to their less profitable and riskier business. According to Stein, Golland, and Schiff (2010), there is large credit gap in terms of differences between existing credit and total demand for credit, especially for small firms in emerging markets. They estimated that this gap was around USD 2 trillion for small and medium firms (SMEs). Further, data from IFC (International Finance Corporation) shows that 85% of 400 million small and medium firms face credit constraint (Stein et al., 2010, p.3).

As for Indonesia, IFC also shows the same figures that micro, small and medium firms encounter large credit gap. The data shows that the credit gap for micro, small and medium firms (MSMEs) is about USD 165 billion, while the current supply of credit for this category of firm is only about US 56 billion (IFC, 2017). Data from Bank Indonesia also shows that SMEs' bank borrowing shares about 19% of total bank credits in 2015. In this case, many small firms opt for informal finance instead of formal credit scheme due to some constraints, such as difficulties in requirement and procedures for obtaining credit.

Furthermore, SMEs' bank borrowing is charged higher interest rate compared to large firms. Higher risks in smaller firms' business are reflected in large interest rate spread between small and large firms, i.e. 3.4% in 2014 (Bank Indonesia, 2016). Small firms' riskier business is illustrated from its ratio non-performing loan (NPL) which is higher than that of large firms. According to Data from Bank Indonesia, SMEs' NPL ratio is about 4.2%, while Large firms' NPL ratio is around 2.1% in 2015.

From the credit supply side views, formal financial institutions consider SMEs' business as risky investment, since these firms have less experience and own less collateral to secure their default risk (Burger et al., 2015, p.22). SMEs are charged to higher interest rate for bank credit, which results to higher cost (Beck, Demirgüç-Kunt and Martínez Pería, 2011, p.37). As consequences, they make less profit and less financial sources, needed for expanding their business, e.g. investing in capital, human resources and new technologies. These constraints also limit smaller firms to expand their business through export market. Since exporting activities have more risks and require cost upfront, financial access is also important for small firms' export participation (Shinozaki, 2012, p.27; Wignaraja and

Jinjarak, 2015, p.14; Amornkitvikai and Harvie, 2016, p.17). To this extent, this study also want to examine differences in firm size in the analysis of financial access on export participation.

The remainder of this paper is organized as follow. Section 2 discusses several literatures related to the importance of financial access on firms' export participation. Section 3 describes methodology and data in this study. In section 4, analysis and results are elaborated. Last, section 5 summarizes the conclusion of this study.

## **2. Literature Review**

There are several studies discussing about the relationship between financial access and export participation. Firm's financial access directly affects its export participation due to sunk cost incurred in the beginning firm entering export market. Manova, Wei, and Zhang (2011) highlights that exporting firms are more dependent on external financial sources to cover their large expenses on export. To be able to penetrate export market, firms are required to expense such costs so that their product meet standard and taste of destination market (Bernard and Jensen, 1999, p.7). Thus, they need research and development (R&D) cost, marketing cost, transportation, shipping and distribution cost. They also need to deal with tariff, administration and regulation when entering new market in foreign country (Wagner, 2007, p.61). All these sunk costs are inevitable and disbursed upfront (Robert and Tybout, 1997, p.545). Therefore, the direct linkage between financial access and export participation arises due to high sunk cost disbursed upfront when firms entering export market. Firms need to be strong in their financial capacity when entering export market.

In addition to high sunk cost, exporting firms also bear more risks than non-exporting firms; thus, they face more credit constraint than their counterparts (Feenstra, Li, and Yu, 2014, p.729). These risks occur due to uncertainty of exporting activities, such as exchange rate risk and delayed revenue as consequence of production, shipment, and sales time-lag. A study by Feenstra, Li, and Yu (2014) further emphasize that exporting firms' higher default risk may affect their attempt in obtaining external credit.

Prior studies mentioned that in self-selection hypothesis exporting firms are different from domestic oriented firms since exporting firms face more challenges to enter its market; thus, only productive firms self-select into the export market (Wagner, 2007, p.67). Productive firms gaining advantages from efficiently allocating their resource will successfully proceed to penetrate export market (Bernard and Jensen, 1999, p.24). These successful firms are superior to its counterpart as they accomplish certain level productivity to enter export market (Bernard and Jensen, 1995, p.70; Melitz, 2003, p.1695). This hypothesis illustrates that productivity has become important factor in explaining export participation.

In several literatures, productivity also relates to financial access. In developed financial system, firms which are more dependent to external financial source are found to be more productive as they are able to expand their production and make investment (Rajan and Zingales, 1998). In the case of

imperfect financial market, where asymmetric information arises, credit gap occurs as supply of credit cannot fulfill demand for credit. This credit constraint will inhibit firm's production expansion, including expansion through investment and participation in export. Manova et al. (2011) emphasizes that limitation in credit access will hinder firms' productivity; therefore, it may discourage their participation in export. An empirical evidence by Berman and Hericourt (2010) examines indirect effect of financial access on export participation through productivity. This study found that productivity had significant effect on firms' participation in export if they had adequate access to financial source.

There are also linkages between firm size, financial access, and productivity in affecting firm's decision to participate in export. Several studies also discuss about differences in firm size relate to financial access and productivity; thus, it explains export participation (Berman and Hericourt, 2010, p.206; Ogawa and Tokutsu, 2015, p.2). A study by Beck, Demirgüç-Kunt and Maksimovic (2005) found that financial constraints faced by firms significantly explained firms' growth. These constraints, including difficulties in fulfilling formal credit requirements, such as administration and collateral requirements, further increase interest rate on borrowing and widen credit gap. They further emphasized that those constraints negatively affected worse for smaller firms' growth. In addition, Amornkitvikai and Harvie, (2016) also found large gap in productivity between large firms and SMEs as financial constraint arises. As for export participation, Ogawa and Tokutsu (2015) found that better access to financial sources was significant factor in explaining decision to export for both large firms and SMEs.

### 3. Methodology and Data

#### 3.1. Methodology

This current paper aims to examine the importance of financial access on firm's export participation. Probit model for panel data is applied to examine whether financial access explaining firm's probability of export participation. The equations for Probit model for panel data is given as follow.

$$y_{it}^* = \alpha + x_{it} \beta + z_{it} \gamma + \delta_t + u_{it} \quad (1)$$

$$y_{it} = 1[y_{it}^* > 0] \quad (2)$$

$$Prob(y_{it} = 1 | x_{it}) = G(\alpha + x_{it} \beta + z_{it} \gamma + \delta_t + u_{it}) \quad (3)$$

In equation (1), variable  $y_{it}$  represents dependent variable for firm  $i$ 's export participation in year  $t$ . This variable is a dummy variable of 1 if firm participate in export. The parameter  $z_{it}$  is the set of main explanatory variables, such as financial access, productivity, and firm size. In addition, the parameter is the set of control variables, including firm age, and foreign ownership. Lastly, error term  $u_{it}$  and year dummy for controlling economic changes  $\delta_t$  are included in this equation. The probit model is estimated using maximum likelihood estimation and following the assumption of standard normal cumulative distribution function,  $G(\cdot)$ , shown in equation (3).

This study expects for coefficient of the parameter to be positive, i.e.  $\beta > 0$ . It means that positive relationship between the main interest variables, such as financial access, productivity, and firm size, and

the dependent variable, export participation. Several studies, such as Manova and Yu (2016), Berman and Héricourt (2010), and Ogawa and Tokutsu (2015), have estimated positive relationship between financial access and export participation. Firm's productivity is also expected to be positively significant influencing export participation, as explained in the self-selection hypothesis. As for firm size, larger firm is expected to have more chance to participate in export.

This study also intends to examine the indirect impact of financial access on export participation by adding several interaction variables into the model. These interaction variables include interaction between financial access and productivity and interaction between financial access and firm size. The interaction between financial access and productivity is expected to be positively significant to export participation, meaning that higher productive firms will have more chance to participate in export if they have access to external financial source. As for the interaction between financial access and firm size, this study expects that larger firm, in terms of employment size, will have more probability to export, and the chance is greater for large firm having financial access.

In addition, for comparison purposes, this study also conducts pooled probit model regression. For both panel probit regression and pooled probit regression, lagged variables for financial access, productivity and firm size are included. Following Berman and Héricourt (2010), endogeneity test is also conducted for the possibility of endogeneity problem between financial access, productivity and firm size.

### **3.2. Data**

This study intends to observe the importance of financial access in explaining export participation in the case of Indonesian manufacturing firms. Therefore, this study uses firm-level survey data on manufacturing firms from Indonesian Statistics Board. The annual manufacture survey dataset provides information about production factors, such as labor, and capital, production output, firm ownership, firm's year of establishment, export activity. The dataset also reports firm's financial structure, although it is only limited to firm's revenue and expenses. The dataset is gathered from annual survey year 2008 to 2014 consisting of 90,153 observations. It includes 9,986 manufacturing firms, in which about 2,682 of them are exporter.

Probit model for panel data in this study uses balance panel dataset. Data cleaning is conducted for treatment of missing data treatment and that that of outlier. According to Cameron and Triverdi (2010), dropping observations due to some missing data is acceptable if the key variables are important for analysis. There are two procedures to handle missing data on the key variables in this study, such as output, raw material and energy expenses for calculating productivity, and fixed capital, labor. First, dropping the observations if data on key variables are largely missing during the observation years. As for second procedure, this study also conducts interpolation for the key variables which are missing in between observation years. In addition, when calculating data on firm age, this study also drops observations which have no data on year establishment in 2008. Lastly, as for outlier data, this study applies Bacon program for multivariate, i.e. dropping observations of 1% outlier, conducted

## The Importance of Financial Access on Export Participation

**Table 1.** List of Variables and Descriptions

Dependent Variable	Description
Export Participation	Dummy equals to 1 means firm participates in export, otherwise zero
Export Share	Ratio of total export to total output
Independent Variables	
Foreign Ownership	Dummy equals to 1 if firm has foreign-own share
Employment	Total number of worker
Size	Size categorical variables based on total labor, range 1–6
Productivity	Log natural TFP, estimated using Levinsohn and Petrin (2003) Production estimation
Age	Number of establishment year
Financial Access	Dummy equals to 1 if firm pays for interest expense
Emp*FinAcc	Interaction variable between employment and financial access
Prod*FinAcc	Interaction variable between productivity and financial access
Emp*Prod*FinAcc	Interaction variable between employment, productivity and financial access
Size*FinAcc	Interaction variable between size and financial access
Size*Prod*FinAcc	Interaction variable between size, productivity and financial access

Source: Author's compilation.

**Table 2.** Summary of Statistic Descriptive

Variable	Unit	All Firms			Exporter		
		Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Export Participation	Dummy	69902	0.211	0.408			
Export Share	Percentage				18774	50.989	41.086
Foreign Ownership	Dummy	69902	0.079	0.269	18774	0.212	0.409
Employment	Persons	69902	198.120	768.463	18774	464.442	1380.950
Size	Categorical	69902	2.107	1.425	18774	3.124	1.6348
Productivity	Ln(TFP)	69902	11.084	1.456	18774	11.863	1.458
Age	Years	69902	20.549	12.575	18774	20.413	13.381
Financial Access	Dummy	69902	0.394	0.489	18774	0.469	0.499

Source: Authors' calculation.

using STATA. After cleaning data treatment was conducted, the panel data observations used in the model are 69,902 observations.

Table 1 shows list of variables and its description of data, while Table 2 provides summary on descriptive statistics of variables for all manufacturing sector and for exporting firms in manufacturing sector, used as observations in this study. The main explanatory variables included in the probit model explaining export participation are financial access, productivity, and firm size. Financial access is a dummy variable which is equal to 1 if firm pays interest expenses. In this case, firm paying interest expenses has access to external financial source.

Second, productivity as the explanatory variable is estimated using total factor production (TFP) by Levinsohn and Petrin (2003). In estimating this measurement, Levinsohn and Petrin (2003) included intermediate input as a proxy for unobserved shock in production function (Petrin, Poi, and Levinsohn, 2004). Moreover, this study uses total number of employment and BPS manufacturing firm classification to categorize firm by size. Following a study by Wengel and Rodriguez (2006), this study

**Table 3.** Financial Access Distribution of Frequency by Firm Size

Variables	Size						Total
	Medium 1 (20–49);	Medium 2 (50–99);	Medium- Large 1 (100–199);	Medium- large 2 (200–499)	Large 1 (500–999)	Large 2 (1000 and above)	
No	23,361	7,895	5,043	3,473	1,502	1,121	42,395
Percentage (%)	65.7	62.93	57.24	47.56	48.51	43.3	60.65
Yes	12,198	4,650	3,768	3,829	1,594	1,468	27,507
Percentage (%)	34.3	37.07	42.76	52.44	51.49	56.7	39.35
Total	35,559	12,545	8,811	7,302	3,096	2,589	69,902
Percentage (%)	100	100	100	100	100	100	100

Source: BPS Survey on Indonesian Manufacture Sector (2008–2014), Authors' calculation.

categorizes the observed firms into six group, such as Medium 1 (20–49); Medium 2 (50–99); Medium-to-Large 1 (100–199); Medium-to-Large 2 (200–499); Large 1 (500–999); Large 2 (1000 and above). Using these categories, variable firm size is measured as categorical variables.

In addition, Table 3 shows distribution of frequency for manufacturing firms' financial access by its size. This table shows that the shares of medium sized firms having access to external finances are ranging to 34% and 37%, while those for large firms are about 51% and 57%. It illustrates that firms belong to smaller categories have less access to external financial sources.

#### 4. Results and Analysis

This study conducted probit model to examine the importance of financial access on export participation. There are two analysis in this section, i.e. the direct impact of financial access on export participation in Table 4, and the indirect effect of financial access on export participation in Table 5. In examining the direct impact of financial access, Table 4 column [1] to [4] provide the results of pooled probit model, while Table 4 column [5] to [6] display the results of panel probit model.

The results of pooled probit regression show that financial access significantly explains export participation. Firms having financial access have more probability to participate in export than those not having financial access, about 4.7%, shown in Tabel 4 column [1]. The results of panel probit model, shown in column [5] and [6], also consistently show that financial access has significantly direct effect on export participation. In this case, firms having access to external finance have more chance to participate in export by 25% than those not having the access. Previous studies have also proved similar results in estimating the effect of financial access on export participation. A study by Manova (2013) provided that financial constraint negatively influenced firms' decision in export participation, by using cross-country panel data analysis. In the case of developing countries, Berman and Hericourt (2010) found that larger financial access, resembled in higher ratio of total asset to total debts, relates to higher probability of export participation.

Table 4 column [1] and [2] also display positive and significant impact of productivity on export

**Table 4.** Estimation Results of Probit Model

Dependent Variable:	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Export Participation								
Foreign Ownership	0.214***	0.186***	0.222***	0.194***	1.347***	1.362***	1.947***	2.225***
Employment	0.000120***				0.00104***			
Size		0.0795***				0.533***		
Productivity	0.0486***	0.0150***			0.174***	0.135***		
Age	-0.00115***	-0.00181***	-0.00122***	-0.002***	-0.00493	-0.0105***	-0.0107***	-0.021***
Financial Access	0.0470***	0.0304***			0.263***	0.226***		
Employment (t-1)			0.000132***				0.00122***	
Size(t-1)				0.084***				0.499***
Productivity (t-1)			0.0503***	0.152***			0.146***	0.113***
Financial Access(t-1)			0.0468***	0.03***			0.288***	0.275***
Model Regression	Pooled Probit	Pooled Probit	Pooled Probit	Pooled Probit	Panel Probit	Panel Probit	Panel Probit	Panel Probit
Year-specific dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number Observation	69902	69902	59916	59916	69902	69902	59916	59916

t statistics in parentheses = \* p<0.1; \*\* p<0.05; \*\*\* p<0.01."

Coefficient of estimates are marginal effects at means.

Source: Author's estimation.

participation. Consistent to these results of pooled probit model, panel probit model also provides similar findings on the impact of productivity and export participation. Column [5] shows that 17% increase in probability of export participation is associated with one unit increase in productivity. As in self-selection hypothesis, the results in this study support a study by Melitz (2003) which highlights differences in productivity explain firm's participation in export.

As for firm size, both estimation of pooled and panel probit model provide significant and positive effects of firm size on export participation. The result in column [1] shows that an additional employment by 100 persons will increase 1% probability of export participation. Similarly, column [2] also shows that a one-level firm-size upgrade will increase 7.9% probability of export participation. Those numbers illustrate that larger firms have more chance to participate in export. In line with these results, due to constraints in economics scale and financial capability, a study by Gashi, Hashi, and Pugh (2013) also found that small and medium firms had less chance to participate in export.

Both pooled and panel probit model include variables of age and foreign ownership as control variables. The estimation results in Table 4 show that younger firm have more probability to participate in export. A study by Wengel and Rodriguez (2006) also confirmed that younger firms were more likely to participate in export than older firms, for the case of Indonesian small and medium firms. Younger firms adopt new technology and knowledge. They are also more adaptable and flexible in dealing with challenges which are important for surviving when entering export market. As for firms with foreign ownership, they have more probability to become exporter by 18%, compared to those without. In line with this result, for the case of Indonesia, Sjöholm and Takii (2003) also found that foreign affiliated manufacturing firms were more likely to participate in export, compared to domestic-owned firms. Due to their linkage to parent company, these foreign affiliated firms have more advantages in several aspects, such as adopted technology, foreign market network, and stable financial structure. According

**Table 5.** Estimation Results of Panel Probit Model with Interaction Variables

Export Participation	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Foreign	1.35***	1.33***	1.35***	1.37***	1.36***	2.11***	2.11***	2.09***	2.14***	2.54***
Ownership										
Employment	0.0009***	0.001***	0.0009***							
Size				0.49***	0.49***					
Productivity	0.17***	0.16***	0.168***	0.14***	0.13***					
Age	-0.006**	-0.005*	-0.005**	-0.01***	-0.01***	-0.015***	-0.014***	-0.016***	-0.03***	-0.03***
Financial	0.13***	-0.045	0.15***	-0.061	-0.012					
Access										
Emp*FinAcc	0.0005***									
Prod*FinAcc		0.027								
Emp*Prod*			0.00004***							
FinAcc										
Size*FinAcc				0.11***						
Size*Prod*					0.0074***					
FinAcc										
Employment						0.001***	0.001***	0.001***		
(t-1)										
Size (t-1)									0.35***	0.59***
Productivity						0.13***	0.11***	0.12***	0.09***	0.16***
(t-1)										
Financial						0.15***	-0.35	0.16***	-0.13	-0.03***
Access										
(t-1)										
Emp*FinAcc						0.0005***				
(t-1)										
Prod*FinAcc							0.054*			
(t-1)										
Emp*Prod*								0.00004***		
FinAcc										
(t-1)										
Size*FinAcc									0.15***	
(t-1)										
Size*Prod*										0.01***
FinAcc										
(t-1)										
Year-specific dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	69902	69902	69902	69902	69902	59916	59916	59916	59916	59916

Notes: t statistics in parentheses \* p<0.1; \*\* p<0.05; \*\*\* p<0.01; Coefficient of estimates are marginal effects at means.  
Source: Author's estimation.

to Sjöholm and Takii (2003), these key factors are important for their participation in export.

When examining the impact of financial access on export participation, there is possibility of endogeneity bias due to the correlation between the unobserved effects with the other main interested variables in the model, i.e. productivity, and firm size. This study examined the endogeneity test for probit model regression by applying two-stage reduced form regression, which is displayed in Table 6. The result shows that endogeneity existed for both pooled and panel probit model, since the null hypothesis were rejected. As this study apply non-linear model, probit model, using instrumental variable to handle endogeneity bias is challenging, compared to those applying linear model. Therefore, following Berman and Hericourt (2010), this study included lagged variables for the main interested

**Table 6.** Results of Endogeneity Test for Probit Model Regression

Dependent Variable:	[1]	[2]	[3]	[4]
Export Participation				
Foreign Ownership	0.02***	0.183***	2.44***	2.20***
Employment	0.00013***		0.0023***	
Size		0.088***		1.03***
Productivity	0.063***	0.018***	0.37***	0.333***
Age	-0.0013***	-0.0019***	-0.017***	-0.016***
Financial Access	0.058***	0.037***	0.643***	0.623***
u1	-0.036***	-0.0107***	-0.165***	-0.156***
u2	-0.033***	-0.0206***	-0.333***	-0.304***
u3	-0.00007***		-0.0009***	
u4		-0.054***		-0.481***
Model Regression	Pooled Probit	Pooled Probit	Panel Probit	Panel Probit
Fisher Statistics	271.34***	297.40***	117.68***	211.37***
Year-specific dummy	Yes	Yes	Yes	Yes
Number Observation	59916	59916	59916	59916

t statistics in parentheses = “\* p<0.1; \*\* p<0.05; \*\*\* p<0.01.”

Coefficient of estimates are marginal effects at means.

u1, u2, u3, u4 are residuals from the reduced form regression in the first stage.

u1 residual productivity.

u2 residual financial access.

u3 residual employment.

u4 residual size.

Source: Author’s estimation.

variables into the pooled and panel probit model. Table 4 column [3] and [4] shows the results of pooled probit regression with one-year lagged main variables, while column [7] and [8] displays those of panel probit model with one-year lagged main variable. Based on those results, one-year lagged variables for financial access, productivity and firm size are still consistently significant in affecting firm’s participation in export.

This study also examined the indirect effect of financial access on export participation through productivity and firm size by including interaction variables into panel probit model. The results of estimation for panel probit model with interaction variables are displayed in Table 5. First, the result in column [7] shows that firm’s export participation is significantly affected by firms’ previous year higher productivity. Moreover, export participation is also significantly influenced by one-year lagged interaction variable between productivity and financial access. It means that the impact of previous year’s productivity on current export participation is larger for firm having financial access in last years, compared to firm without financial access. In line with the result in this study, self-selection hypothesis highlights that only productive firms can successfully participate in export. Wagner (2007) also mentioned that firms needed to achieve certain level of high productivity before they became exporter. Adding financial constraint as an important factor in explaining export participation, Berman and Héricourt (2010) find that financial constraint limits the impact of productivity on export participation. Supporting their finding, this current study also proves that financial access is crucial for

firm productivity in affecting its decision to export.

Second, as for the indirect effect of financial access on export participation through firm size, this study found that being large size with access to finance, firm would have more chance to participate in export, compared to those without financial access, shown in Table 5, column [1] and [4]. In column [1], by using interaction between employment and financial access, one may analyze that firm expanding its size by 100 employment will have more probability to participate to export by 14%, if it has access to financial source. In contrast, if firm has no access to finance, an expansion in size by 100 employment only increase its probability to export by 9%. In column [4], using interaction variable between size and financial access, the result provides significant parameters which are consistent with that in column [1]. One level upgrade in firm size category will affect an increase in firm's export possibility by 60%, if firm have access to external finance. For firm with no financial access, one level upgrade in firm size category will only impact on firm's export probability by 49%.

Moreover, Table 5 column [3] and [5] show significant results of interaction variables between financial access, productivity and firm size. As for large-sized and high-productivity firm, financial access will induce more possibility for firm to be an exporter. Wagner (1995) discussed the linkage between firm export participation and firm size and found that the impact of firm's production growth on export participation was higher for large firm, compared to smaller firm. This current study added financial access as a factor which linked how large-sized and productive firm might have more chance to participate in export. Being able to access external financial sources, large firm advances higher productivity, due to economies of scale, may have more chance to expand through exporting.

## 5. Conclusion

This study examined the importance of firms' access to external finance on their participation in export. Using a comprehensive firm-level panel dataset from Indonesian manufacturing survey, this study utilized a balance panel dataset, comprising 9,986 manufacturing firms from period of 2008 to 2014, summing up to 69,902 observations. As the results, this study provides a firm-level and country-specific empirical evidence for the importance of financial access in determining firm's participation in export, particularly for the case of Indonesia.

This study analyzed the direct impact of financial access on export participation by applying pooled and panel probit model. The results showed that firm's access to external finance significantly determined its probability to participate in export. The other main variables, such as productivity and firms size, are also positively significant in explaining firm's participation in export. These results supporting self-selection hypothesis explaining that firms' productivity level differences determine their export participation due to the existence of high sunk cost. In line with this, access to financial sources is important for firm as they disburse large sunk cost when they are willing to expand through export market.

Secondly, this study also observed the indirect effect of financial access on export participation

through productivity and firm size. By including interaction variables between the main interested variables, i.e. financial access and productivity, and firm size, into panel probit regression, this study found that for firms having financial access, last year's productivity induced higher probability of export participation, compared to those without financial access. As in self-selection hypothesis, only productive firms are able to enter export market. Wagner (2007) further explained that firms had to accomplish certain level of high productivity before they became exporter. Therefore, it takes lagged time for productivity to affect firms export participation. This result also support the study by Berman and Hericourt (2010) highlighting that the impact of productivity on export participation was limited when financial constraint existed.

This study also showed significant results for the interaction between firm size and financial access on export participation. For those having financial access, firm upgrading into larger size will induce more probability in export participation, compared to those without financial access. It means that being large firms and having financial access are more likely to participate in export. Moreover, the significant results of interaction variables between financial access, productivity and firm size in the panel probit model showed that for large-sized and highly-productive firms, getting sufficient access to finances will induce more possibility for them to be an exporter. In contrast, smaller firms, having more difficulties in accessing external borrowing and being less productive, compared to their larger firms, are less likely to participate in export.

In summary, this study highlights several important empirical evidences on the importance of financial access on export participation. Financial access is not only essential for firms when entering export market due to large sunk cost, but also it increase the chance for firm to participate in export through productivity and firm size upgrading. Compared to large firms, smaller firms are less likely to participate in export, due to lower level of productivity and more barrier to access financial source. Therefore, promoting financial access to induce more manufacturing firms participate in export, especially for smaller firms, is important for Indonesian policy makers in setting their agenda priority. Credit guarantor scheme, and credit risk rating system, along with incentive to ease access to finance are necessary for narrowing the credit gap, especially for those small-sized manufacturing firms with export orientation.

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