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Article

Export decision and formal credit constraints - Evidence in Vietnamese Small and Medium Enterprises

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Abstract: Export participation and restricted access to external formal credit are two factors attracting meticulous attention from researchers and policymakers, especially in developing countries. Exploring the interactive relationship of these factors in both the static and dynamic models is the purpose of this study. The study uses data sets from small and medium-sized manufacturing enterprises (SMEs) in Vietnam for the period 2009 - 2015. The instrumental variable approach is implemented to deal with the endogenous variable problem in the model. The results show an effect of credit constraint on the firms' exporting status, and continuous exports are likely to reduce the limit of credit constraint.

Keywords: Credit constraints, Export, SMEs, Instrumental variable, Probit regression, Vietnam

1. Introduction

Small and medium enterprise (*SMEs*) plays an outstandingly role in the socio-economic development of developing countries such as Vietnam. According to GSO2020 [1], *SMEs* currently account for over 95% of the total number of operating enterprises, contribute about 45% of *GDP*, 31% of total state budget revenue, and create jobs for more than 5 million workers. Therefore, *SME* sector has been identified by the Vietnamese government as a spearhead of economic development[2]. In particular, the Government is interested in promoting the development of *SMEs* to the international market in the period of Vietnam's economic integration. However, *SMEs* face many difficulties especially accessing formal credit externally.

All activities of a firm need to be financed by internal capital or external credit. Therefore, access to external credit plays a dominant role in promoting business activities, including export activities ([44]). Furthermore, [46] indicates that firms' access to finance is likely to impede economic growth. Therefore, credit restriction has not only received the attention of businesses, but also attracted the attention of macroeconomic policy makers. Though, according to *VCCI*[3], only one-third of *SMEs* have access to a bank loan, while three-quarters of these firms had a demand for credit in the period 2012-2017. Consequently, nearly 62% of *SMEs* dissolved or suspended operations due to a lack of finance. This suggests that credit constraints may be an issue strongly hindering the existence and development of *SMEs* in Vietnam. From this perspective, finding a connection between credit constraint and the export status of *SMEs* is a driving force for this study.

This study focuses on four research questions including: *(i) Whether a firm that has fewer problems in credit constraint is an exporter? (ii) Is there a dynamic linkage between credit constraint and a firm's export status? (iii) Does the credit constraint affect enterprises' decision*

[1] General Statistics Office. Vietnamese Enterprises White Book from **2005 to 2020**. Statistic Publishing House: Hanoi, Vietnam, 2020; pp. 25-61.
[2] General Statistics Office. Vietnamese enterprises in the first 15 years of the century (2000-2014). Statistic Publishing House: Hanoi, Vietnam, 2017; pp. 11-24.
[3] Reports on the performance of Government Resolution. Chamber of Commerce and Industry of Vietnam – VCCI. https://en.vcci.com.vn/

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to enter and exit export markets? (iv) Does continuous export improve the credit constraint problem?

This study makes some outstanding contributions. First, in contrast to previous studies on credit constraint in Vietnam ([1], [2], [3], [4], [2]) this research focused on the latter's relationship to exports, an unexploited aspect of research in Vietnam. Second, this study provides an overview of the current state of credit constraints on SMEs in Vietnam. Third, the research has overcome the shortcomings of the data set and succeeded in implementing regression models accurately and efficiently. Finally, the scope of the study is not limited to static model analysis but also highlights the above relationship in the context of dynamic models.

In the remainder of the paper, the literature review is shown in Section 2. Next, Section 3 presents empirical specifications. In which, the data and variables are analysed. The empirical strategy and robustness tests are presented in this section. Subsequently, Section 4 is a conclusion.

2. Literature review

Financial constraint is emphasized as an important determinant of import and export activities, it can hinder or even prevent enterprises from exporting ([7], [8]). Most of the experimental studies in the literature recognized that firms must incur considerable costs if they want to export ([9]). As a result, only an enterprise with sizeable financial capacity has the opportunity to approach foreign customers. These studies highlight one conclusion: firms with financial constraints are less likely to enter international markets. [10] is a pioneer study, presenting a deep investigation of the reverse causality relationship between financial constraints and export market participation. The study made observations on 3 groups of UK manufacturing enterprises, including continuous exporters, never exported, and starters. This group separation allows the study to show the impact of each financial problems in detail. Specifically, the study found no significant difference between the non-exporting group and the start-exporting group in financial terms. However, there is a discrepancy between the group of firms exporting and the group of firms starting to participate. Besides, research also demonstrates that small firms have more limited finances than large ones. Moreover, no clear evidence has been found that an enterprise with a financial advantage will become an exporter. Then, expanding Greenaway's study, [11] tested the model with lagged variables, and those lagged up to 3 years, respectively, to highlight differences in the financial situation of the enterprise before exporting. Moreover, the author further calculates two other indicators for measuring financial constraints. The results show that exporters are firms with higher liquidity in the last year before exporting. In other words, financial constraints as a barrier to participating in export.

In another research stream, some authors research the connection between financial constraints and export but in the opposite direction: whether exports worsen or improve the firm's financial constraint problems ([10], [15], [16], [18], [21]). Results show that enterprises continuing to export bring more stable cash flows. Thus, continuing exports are likely to improve the firm's financial situation. These studies support the view that a firm's export capability is a guarantee of its effective operational ability, allowing enterprises to access formal sources of finance more easily. However, experimental evidence from 12,000 French manufacturers from the period 1993 - 2005 in the study of [11] did not find any connection between the two factors: export and the improvement of financial access. Although using a different method to measure financial constraints , [14] also found no evidence of the improvement of Pakistani firms' financial constraints after entering foreign markets in the short term. Due to the limited data set, his study considers only the first 3 years following commencement of export, for which reason the author does not confirm this conclusion in the long term.

The literature on credit restriction showed that scientists approached this concept based on two methods including qualitative and quantitative methods. First, the qualita-

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tive method is mentioned for the first time in [23]'s study. The author utilized a dataset including 2,971 households in the US to assess the credit restriction problem and its determinants. Using this method, information about credit constraints is determined directly, based on a number of qualitative questions related to loan applications. The author believed that credit restriction is an issue that needs to be analyzed in terms of supply - demand. Therefore, credit restriction is assessed based on the denied credits and the unmet credit need of the household. This method was later adopted by many researchers at the firm level. For examples, [18] and [47] used a financial obstacle perception based on subjective assessments of owners. Accordingly, the financial constraints is assessed on a scale of 0 to 4 (0 is the lowest level when the firm does not face obstacles in accessing finance and 4 is the most severe). Minetti and Zhu (2011) used a survey question on *"Does the firm want to receive more credit at market rates?"* and *"Does the company claim more credit than actually obtained? "* to measure access to credit. However, this qualitative approach also had limitations as these are non-objective assessments from the interviewees ([28]).

Second, the quantitative approach has been used relatively commonly in the credit constraints literature. Researchers utilized a number of finance indicators in a firm's financial statements and balance sheets to represent credit access. [41] used capital structure ratios such as the ratio of financial debt to total assets (both short-term and long-term), and the ratio of long-term financial debt to total financial debt. Firms with this high ratio imply that they are better able to seek outside funding sources than others. However, there are opposite opinions about the statement that financial leverage and liquidity might be used to represent financial constraints. [48] suggested when external finance sources become scarce and difficult to access, the firm's response might be to increase cash reserves. This doing aims to hedge against liquidity risk. Therefore, the high liquidity means that firms can easily access capital is unreasonable. It is necessary to consider the causes and sources of cash flows. Besides, [11] argued that high short-term and long-term financial leverage reflects the firm's ability to access short-term and long-term debt. In other words, this indicator is high, reflecting the enterprise's ability to mobilize external capital. In contrast, credit institutions evaluate the indicator as potential risks. The higher the index, the more risk the firm can take. Therefore, this information can negatively affect the credit institutions' willingness to lend. As a result, it is more difficult for a firm to access capital when the financial leverage is high. More comprehensively, [20] and [42] measured financial constraints based on aggregate information about many aspects such as total assets, profitability, liquidity accounts, solvency, solvency, and external financing costs. The authors combined the criteria into a composite indicator and launch a ranking range from 1 to 10 points, corresponding to a firm's financial constraints level. At the same time, an average value of the indicators is also calculated to measure financial health. Since the financial ratios are audited annually by a reputable company, this method is considered to be relatively objective. However, the authors were concerned about the endogeneity of this measurement. In addition, [4] specified another measurement method based on the credit needs. Accordingly, the author assessed that the debt status only partially reflects the concept of "constraints". In other words, the classification of constrained and non-constrained firms through external debt indicators is incomplete and inaccurate. Firms with no external debt are also likely to experience credit restrictions. The reason is that they do not need funding. At the same time, the author argued that once credit is only partially financed is also a form of credit restriction.

3. Empirical specification

3.1. Data source

Credit constraint is not only a problem for large-scale exporters. SMEs are also shown to be more financially constrained than large firms ([29]). Therefore, this study wants to focus on the analysis of credit constraints on SME data sets. In Vietnam, the

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data set collected by the Ministry of Labor and Invalids and Social Affairs (MOLISA) and the University of Copenhagen, UNU-WIDER is considered the most comprehensive data set on SMEs. It contains a rich collection of information about the firm's general characteristics, financial situation, production characteristics, technology, sales structure, human resources, export status, etc. The survey is conducted every two years on more than 2,500 manufacturing enterprises. The survey's area covers 21 sectors and 10 provinces. The data collected from the survey questionnaires, including many indicators, may have some mistakes, as well as deviations occurring in the reporting and compiling data process. Therefore, before conducting the next research steps, the study data set is first combined from four data surveys from 2009 to 2015. Then, the data set is filtered. Firms that lack information about credit constraints and export are eliminated. Variables that are not intended for this study will be removed. Finally, the remainder for analysis amounts to 10,356 observations for 4 years.

3.2. Dependent and Independent Variables

In this paper, I measure credit constraint via its status on a credit line, credit refused, and demand for credit. The measuring method followed is taken from [23], [5], [4], [44] as present in Fig.1.

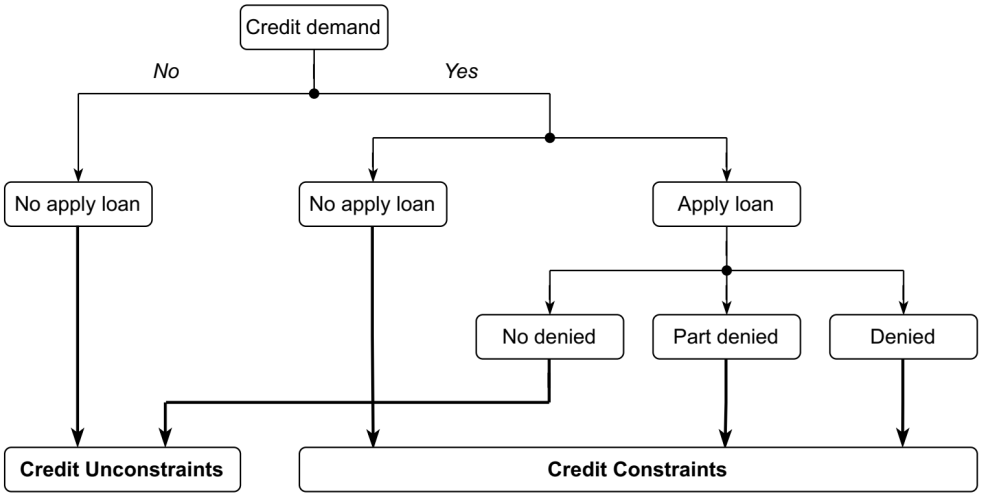

Figure 1. Definition of Credit Constrained and Credit Constrained

In brief, a unconstrainted firm has been granted all loan requirements or those who have not applied for credit because there is absolutely no need. In contrast, constrained firms (i) have been denied credits or, (ii) have only partially accepted, and still have a capital demand or, (iii) need credit but cannot access a loan (denoted as *CC*) is binary, takes a value equal to 1 if the enterprise has a credit constraint, and 0 otherwise. In particular:

$$CC = \begin{cases} 1 \text{ if a firm have been denied credits} \\ 1 \text{ if a firm have only partially accepted, and still have a capital demand} \\ 1 \text{ if a firm need credit but cannot apply a loan} \\ 0 \text{ if a firm is in a line of credit but doesn't have any credit refused} \\ 0 \text{ if a firm doesn't apply for a loan because it does not have demand} \end{cases}$$

By analyzing the sample according to the demand of enterprises on credit, it can be seen that the proportion of enterprises that have demand for external credit accounts for 61.14%, but more than half have problems with collateral and procedures. Therefore, they self-assessed their inability to access capital, they did not register for loans (51.74%). Among the enterprises registering to borrow, although only 17.96% of the enterprises were rejected, there were still 38.76% of the enterprises that were not denied credit but

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still needed credit. Therefore, the data set contained 49.63% of enterprises with credit constraint problems (CC = 1), the rest were enterprises with no credit constraints (CC = 0).

Table 1 also shows the simple t-test of credit status between the exporter and non-exporter groups. The test reports the difference of the mean of credit status between the non-exporter group and exporter group (p<1%) in terms of credit constraint status (Column denoted as 4). The rate of the loan application and denied in the exporter group is near twice as much as in the non-exporter group. For the remaining indicators, the exporters also showed a higher rate. This is an early indication that exporters may have higher capital demand but have yet to meet loan requirements. Hence, they get a higher denied rate and higher credit constraint.

Table 1: Credit status by export status

	Full sample		Exporter		Non-exporter		t-test of diff
	(1)		(2)		(3)		(4)=(3)-(2)
	Obs	Pct	Obs	Pct	Obs	Pct	
Demand for loan	10.356	(61.14)	648	(79.78)	9.658	(59.94)	-10.00***
Apply for loan	10.352	(29.5)	648	(52.01)	9.654	(28.02)	-15.306***
Denied	8.364	(5.11)	553	(9.95)	7.783	(4.75)	-5.37***
Credit constrain	10.356	(49.63)	648	(65.389)	9.658	(48.72)	-7.49***

*Note: Note: This table reports the share of credit status by export status based on authors' calculations from the SMEs Survey in Vietnam. The number of observations denoted Obs, the percentage in parentheses (abbreviated as Pct). *** denotes the level of significance at 1%.*

Besides, this study considers both direct and indirect exporting [4]. An indirect export is the supply of goods to a foreign market through export intermediaries such as agents or brokers. It can be agencies, representative offices, import and export entrustment companies. This type is often favored in small firms because they might not have enough human resources, capital, and experience. Therefore, it isn't easy to export goods directly to foreign countries. Consequently, they need a third party with experience and expertise in exporting to cooperate and develop together. Since more than 97% of Vietnamese enterprises are *SMEs*, indirect export is widespread in Vietnam. It contributed 18% of trade profits in Vietnam ([45]). Therefore, it is necessary to control direct and indirect exports in Vietnam. In this study, the export situation of enterprises is gotten from the question: *"Does your enterprise export (directly or efficiently)?"*. Thus, the export variable is binary, receiving the value one if the enterprise exports, the value 0 otherwise.

3.3. Empirical strategy and results

To discover four research questions that have been mentioned, equations were built based on the method of [10] and [18], especially following [14]'s experimental results on Pakistani enterprises. The reason is that Pakistan is a low-middle-income country, where the government has set the target of industrial exports as a top economic priority in the early stage of the economy. Also, bank credit plays a key role in external financing for the corporate sector, especially in manufacturing, where it is considered to have many difficulties in accessing capital. Therefore, when comparing the Vietnamese economy and the credit constraints in Vietnamese enterprises, it is possible to find some similarities with Qasim's research data.

Firms that have fewer problems in credit constraint are exporters

[4] According to Article 86 of 38/2015/TT-BTC, Indirect exports include processing equipment and semi-finished products; business between domestic enterprises and export processing enterprises or enterprises in non-tariff zones; trading with foreign partners through a 3rd party.

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Model 1 is produced to address the question: whether a less credit constrained enterprise is likely to be an exporter at time t, controlling the firm's characteristic, its location (province) and sector ([10]).

$$EX_{it} = \alpha_1 + \delta_1 \cdot CC_{it} + \gamma_1 \cdot Control_{it} + \epsilon_{it} \quad (1)$$

where subscripts i,t denote firm and year respectively. ϵ_{it} is an error term.

EX_{it} is considered as a binary variable, reflecting the export status of the firm. If the enterprise participates in export activities (EX), it will receive the value of 1. Otherwise, it will receive the value 0.

CC_{it} reflects a firm's obstacles when accessing credit in the formal financial market. This is not an indicator expressed in the balance sheet of Vietnamese enterprises. The measuring method is mentioned in Sec 3.2. This variable is binary, takes value equal to 1 if the enterprise has credit constraint, and 0 otherwise.

$Control_{ijs}$ including size, age, zone, investment, competition, province and sector. They are commonly used in previous studies to examine the interaction of export decisions and credit constraints. In particular: Larger firms tend to rely more on long-term debt and external funding; however, they seem to enjoy easier access to external funding ([30], [31]). Moreover, young enterprises are more likely to have limited access to outside financial sources ([32]). Besides, sector and province play a very important role in defining the credit constraint status of a firm ([33], [34], [35]). For example, enterprises located in big cities and urban areas can more easily access bank capital. Furthermore, investment and competition also bring pressures on higher credit constraint for enterprises ([25], [36]), for instance, firms that are holding investment or facing a lot of competition in the market may be considered riskier, stricter collateral requirements, or higher credit costs.

To solve the endogenous problem of the credit constraint variable, this study uses the Certificate of Land Use Right (CLUR) as an instrumental variable ([4]). The reason is that CLUR is granted and managed by the Government, which makes it easier for credit institutions to control information. Also, this is proof of high-value assets that the enterprise owns. Therefore, credit institutions in Vietnam prefer to use CLUR as a requirement for collateral . Specifically, if the enterprise has the land housing owned by itself (purchased or inherited, undisputed, and follow other guarantee obligations), they can use CLUR as collateral for their loans ([1]). In other words, possessing CLUR creates favorable conditions for enterprises to access loans.

Due to binary dependent variable and the endogenous problem, I apply the Probit method with the instrumental variable to scrutinize the relationship between credit constraints and export decision.

Table 2 presents the results of 2-stage Probit regression, with the selected instrumental variable is the certificate of land use right (CLUR). Column 1 presents the results of the first stage, shows the correlation between the instrumental variable "CLUR" and the credit constrained. The result indicates that CLUR affects the firm's credit constraint, as the correlation coefficient of CLUR is negative and significant (p <1%). Intuitively, it is easier to access formal capital when enterprises have collateral as a form of fixed assets. Besides, the results show that larger or younger firms are more likely to suffer from credit constraint, which is in line with the predictions of previous studies ([34],[35],[36]). Besides, competition and investment adversely affect the ability of firms to access credit, as shown in a positive and statistically significant correlation. The effect of the credit constraint on the export status is reported in Column 2. This is the second stage of the IV Probit model using the CLUR variable as an instrumental variable. The study found a positive correlation between credit constraint and a firm's export status (p <1%). That means if observed at the same time, the more likely a firm is to experience credit problems, the more likely it is to be an exporter. In contrast to the other explanatory variables in the model, competition and investment are inversely related to the status export, in the case where the geography and sector of the firm are controlled. The

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Table 2: Credit constraints and export: results from the IV-Probit approach

	CC_t	EX_t
	Probit (1)	IV (2)
CLUR_t	-0.171*** (0.028)	
CC_t		1.976*** (0.051)***
Firm age	-0.075*** (0.007)	0.004*** (0.001)***
Firm size	0.075*** (0.007)	0.081*** (0.028)
Innovation	0.350*** (0.026)	-0.145*** (0.041)
Competition	0.265*** (0.042)	-0.232*** (0.043)
Province	-0.005*** (0.000)	0.004*** (0.000)
Sector	0.015*** (0.002)	-0.018*** (0.002)
Observation	10.189	10.144
*Note: Standard errors in parentheses. ***, **, * denote significance at 1%, 5%, 10%.*		

coefficient sign here implies the firm has a low ability to be the exporter when they are facing economic constraints and available investment adversely.

In summary, the static model of the correlation between credit constraints and export status shows evidence that exporters have higher likely constrained credit. Besides, a firm characteristic also differs between exporter and non-exporter.

There is a dynamic link between credit constraints and export decisions.

It is a fact that it always takes time for a firm to get the credit external before exporting. For instance, time for a loan application, loan decisions of credit institutes, as well as time for determining the sunk cost entry. Hence, credit constraint has a lagged effect on the export variable ([17]). Therefore, the lagged variables are used in this model. Besides, participation in export markets is closely related to sunk entry costs. To clarify the importance of these costs for the export decision, many scholars agreed that the addition of the lagged export variable (EXi(t-1)) into the model (2) is necessary ([10], [18], [37]). And the coefficient of lagged export status is expected to be positive ([37]).

$$EX_{it} = \alpha_2 + \delta_2 \cdot EX_{i(t-1)} + \gamma_2 \cdot CC_{i(t-1)} + \lambda_2 \cdot Control_{i(t-1)} + \epsilon_{it} \quad (2)$$

where subscripts i,t denote firm and year respectively. ϵ_{it} is an error term.

$EX_{i(t-1)}$ is the previous export status at time (t-1). $Control_{i(t-1)}$ is the vector of the control variables at (t-1). $CC_{i(t-1)}$ is the enterprise credit constraint status at (t-1). Similarly, the IV Probit regression is used to solve the endogenous problem, with the instrument variable as the certificate of land use rights (CLUR).

Accessing external finance sources is a process that takes time, such as time to prepare loan applications, time to assess collateral, etc. Therefore, regression with the lagged explanatory variables is necessary. This study estimates Equation (2) by the two-stage Probit model, with the CLUR variable as an instrumental variable of the model. Results are presented in Table 3.

The results of the first stage are shown in the column (denoted as 1). Coefficients in this lagged variable model show that holding a certificate land use right has a positive impact on firms' ability to formal credit constraint (negative coefficient -0.217, a significance level of 1%). The more certificate of land use rights the enterprises possess, the less the credit constraint incurred. Then, this instrumented credit constraints variable is used in the second stage of the Probit regression. The results shown in column (denoted as 2) indicate the effect of lagged credit constraint (CCt-1) and lagged export status (EXt-1) on the firm's export behavior at the time (t). The correlation coefficient for the lagged

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Table 3: Correlation of the past credit constraint status on exports.

	CC_t-1	EX_t
	Probit (1)	IV (2)
CLUR_t-1	-0.217*** (0.035)	
CC_t-1		1.818*** (0.265)
EX_t-1		1.483*** (0.392)
Firm age	-0.009*** (0.01)	0.002 (0.003)
Firm size	0.07 (0.01)***	0.085 (0.038)**
Innovation	0.367*** (0.034)	-0.146** (0.073)**
Competition	0.272 (0.054)	-0.201** (0.09)
Province	-0.004*** -0.005	0.004*** (0.001)
Sector	0.01*** (0.002)	-0.013 (0.004)
Observation	6.212	6.156

*Note: Standard errors in parentheses. ***, **, * denote significance at 1%, 5%, 10%.*

export status was positive (1,818) and statistically significant, p<1%. This coefficient is nearly equivalent to the coefficient of lagged credit constraint (1,483). This supports the theory that the export decision depends on both the cost of entering the market and the firm's credit constraints in the previous period ([18]). However, the positive coefficient of credit constraint is consistent with the point of view [14]. For firms in developing countries where the capital market still has many shortcomings, the demand for credit increased due to the demand for capital for export but the inability to find external funding resulted in limited credit. Besides, the remaining explanatory variables in the model are statistically significant (at a 1% significance level), except for age and investment variables which have an impact on exports at a 5% significance level. This shows that, when the province and sector are controlled, firm characteristics such as age and size before export have a significant impact on the export decision. Thus, the results indicate that there is a binding relationship between credit constraint and a firm's export status.

Credit constraint affects a decision to start and exit export markets.

To examine hypothesis (3), this study classifies the group of exporters into two subgroups ([18]), including a group of starters (firms change from non-exporting to active exporter), and exiter (firms change from active to no longer export). Then, equations (3) and (4) are regressed by the IV Probit regression, with the instrumental and other explanatory variables similarly to the equations (1- 2):

$$Starter_{it} = \alpha_3 + \delta_3 \cdot CC_{i(t-s)} + \gamma_3 \cdot Control_{i(t-s)} + \epsilon_{it} \quad (3)$$

$$Exiter_{it} = \alpha_4 + \delta_4 \cdot CC_{i(t-s)} + \gamma_4 \cdot Control_{i(t-s)} + \epsilon_{it} \quad (4)$$

Equation 3 estimates the effects of the past credit constraints as well as firm characteristics before the firm enters the export market on the decision to participate in the export market. Equation 4 estimates this effect on the exiting decision of the firm. However, due to the length of the data set (4 years), in this study, s is valid for 1 or 2 years. t is the period when a firm begins to export (equation 3), and it is the period when a firm begins to stop exporting (equation 4).

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The purpose of this section is to determine whether credit constraints in previous operating periods alter the firm's export decisions. These equations focus on starter and exciter groups only, not considering firms that have no export activities or export continuously. All results are shown in Table 4.

Table 4: IV-Probit estimation of credit constraint and start and exit export decision.

	s=1		s=2	
	Starter	Exiter	Starter	Exiter
	(1)	(2)	(3)	(4)
CC_t-s	1.845***	1.662***	1.599***	-0.9
	(0.151)	(0.325)	(0.417)	(1.295)
Firm age	0.003	0.011***	0.002	0.003
	(0.003)	(0.003)	(0.005)	(0.01)
Firm size	0.061*	0.069	0.08	0.187***
	(0.034)	(0.049)	(0.057)	(0.061)
Innovation	-0.181***	-0.141	-0.1825	0.289
	(0.068)	(0.107)	(0.126)	(0.196)
Competition	-0.141	-0.079	-0.244*	-0.119
	(0.099)	(0.148)	(0.135)	(0.27)
Province	0.004***	0.003***	0.004***	-0.01
	(0.000)	(0.001)	(0.002)	(0.004)
Sector	-0.015***	-0.02***	-0.006	-0.015
	(0.004)	(0.006)	(0.007)	(0.019)
Constant	0.009	0.545***	-1.516***	0.392
	(0.523)	(0.187)	(0.013)	(0.252)
Observation	6.212	6.212	5.422	5.422

Note: Standard errors in parentheses.
****, **, * denote significance at one percent, five percent, and ten percent levels respectively.*

First, Equations (3) and (4) are regressed with one-lagged variables (s=1). The regression results of the starter group are shown in the column (denoted as 1), and the results of the exiter group are presented in the column (denoted as 2). Credit constraints are positive, and statistically significant (p<1%) for both starter and exiter, respectively 1,845 and 1,662. Besides, only the logarithm of assets (Sizet-1) and investment in the previous period (Invt-1) are statistically significant, at the significance level of 10% and 1%, respectively. However, most explanatory variables do not explain the possibility of stopping export in the exiter's regression model (p> 10%), except for the firm age variable. Next, Equations (3) and (4) are regressed with two-period lagged variables (s=2). The purpose of this regression is to determine whether 2 years lagged credit constraints (t-2) decreases/ increases the likelihood start exporting/ exiting the market at the current period (t). The results of the starter group are reported in column (denoted as 3), and those of the exiter group are reported in column (denoted as 4). Although the coefficients of the explanatory variables in the regression of starter are mostly insignificant (except the competition variable p< 10%), the 2 years lagged credit constraints affect the decisions to enter export markets. However, this study finds no connection between 2 years of lagged credit constraints and discontinued export (p> 10%). In conclusion, the ability to enter the international market is affected by the past credit situation of the enterprise rather than the ability of the enterprise to stop exporting (the similar results with [14], [18]).

3.4. Robustness Test

As discussed, the previous experimental literature reveals a lot of evidence that a firm's export decisions and financial constraints can be endogenous. To deal with this problem, the study uses an instrumental variable on two-stage Probit regression to determine the impact of credit constraint on export decisions (Equations 1- 4). In

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the main process of this study, the Certificate of Land Use Right (CLUR) was used as an instrumental variable in the model. The purpose of this section is to re-examine the robustness of the instrumental variable models. Thus, all instrumental models in this research perform re-analysis, using an alternative instrumental variable instead of CLUR. [39] researched the external capital demand of firms. The study indicated that due to the imperfect credit market, enterprises although having demand for external credit were however not all qualified to apply for a loan. The reason is that the enterprise itself is not qualified for collateral, and/or the cost of the loan is too high (such as interest rate, transaction cost). Therefore, in parallel to the collateral factors (e.g., assets, holding CLUR), the interest rate of the credit also affects the demand for borrowing or the firm's credit constraint. Besides, according to [40], the interest payment is an important factor representing the cost of debt of the enterprise. In other words, the interest payment represents the firm's actual debt situation. Consequently, a high-interest payment can become a partial financial burden of the enterprise. Therefore, it affects the evaluation of credit institutions of enterprises when there is an appraisal of a loan application. Because a large amount of debt increases the likelihood of insolvency and bankruptcy. Enterprises with high debt (shown by high-interest payment), have less chance of accessing external credit. In other words, they probably encounter credit constraints. Because the interest payment influences credit constraint but does not correlate with the remainder of the model. The interest payment is used as an alternative instrument variable in this section. This variable is measured in the logarithm of the formal interest payment at the end of the year. The applied method in this part is similar to the estimation method of equations (1-4) in the main process of the study. Appropriate values of credit constraint obtained from the first stage regression will be used in the second stage as an important variable in the structural equation. The regression results of credit constraint on the logarithm of interest payment are statistically significant and have positive coefficients (these results are not shown in Table 8). This result is consistent with the statement that the interest payment has an impact on credit constraint. Table 8 summarizes results for the Robustness test model (based on main Equations 1-4), using the logarithm of the interest payment as a substitute IV variable.

Table 5: Correlation between credit constraint and export from Robustness Tests.

	Model 1	Model 2	Model 3		Model 4	
	EX_t	EX_t	Starter	Starter	Exiter	Exiter
			s=1	s=2	s=1	s=2
	(1)	(2)	(3)	(4)	(5)	(6)
CC_t	1.866***					
	(0.261)					
CC_t-1		1.783***				
		(0.394)				
CC_t-s			1.555**	0.238*	0.684	0.031
			(0.725)	(2.463)	(1.434)	(2.449)

Note: Standard errors in parentheses.
****, **, * denote significance at one percent, five percent, and ten percent levels respectively.*

The results in column (denoted as 1 and 2) show that the correlation coefficient of credit constraint with export in Equations 1 and 2, respectively, is positive and statistically significant ($p < 1\%$). This is in line with the results in the base model with IV variable as CLUR. The results in column (denoted as 3 and 4) are displayed in the order of the correlation between the lagged credit constraint (1 year lagged and 2 years lagged) and the firm's decision to enter the export market. These results infer the linkage of the last status of being credit-constrained and starting exports. It seems that firms tend to have credit constraints before engaging in exports. Finally, column (denoted 5 and 6) presents the coefficients of the 1 year lagged and 2 years lagged credit constraint to the decision to stop exporting, respectively. The result obtained from the column

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(denoted as 5) is different from the baseline model. Instead of finding an effect of the one-period lag of credit as in the base model, the Robustness test of the exiter variable on one-year-lagged credit using the logarithm of the interest payment as the substitute IV cannot find evidence of the relationship between these two variables. The Robustness regression also finds no results to support a linkage between the past 2 years' credit status and the decision to exit the export market, as p >10%. In conclusion, when using the interest payment variable as an instrumental variable, results are almost identical to the baseline model.

4. Conclusion

Credit is a concern not only for large businesses but also for small businesses, especially in places where capital markets are not yet completely developed [45]. Vietnamese SMEs often have difficulty in accessing formally external credit. However, in the era of globalization, these enterprises have many opportunities to export to international markets, such that they require capital to enter or develop international markets. Therefore, this study analyses the relationship between credit constraint and export behavior to find a relationship between them. The highlight of this study is the analysis of the interactions of credit constraint and export in both the static and dynamic models. Accordingly, this relationship is carefully evaluated in different aspects. The main results are: (i) there is a difference in credit constraints between the exporter and non-exporter. Firms with credit constraints are more likely to be exporters. (ii) the export decision depends on the firm's credit constraint in the past. (iii) credit constraints in the past impact the behavior of starter, but not the cause of the export suspension. (iv) continually exporting is likely to alleviate the credit constraints of SMEs. Besides, the study also emphasizes the meaning of holding collateral such as certificates of land use rights or holding a considerable amount of debts (indicate at the annual interest payment) on credit constraint. They play an important part in the relationship between export and credit constraint. Moreover, the competition in the industry /sector that the enterprise faces also contributes to the problem of financial constraints. Finally, it should be emphasized that the study indicates the effect of exports on credit constraint in equation (4), but this equation is not intended to study the causal relationship. This suggests an interesting future study examining the causal relationship between firms' access to finance and their export decisions

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Appendix A

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Table 6: Description and measurement of variables

Variable	Definition
Export	Dummy variable. 1 is a firm that is an exporter; 0 otherwise
Demand	Dummy variable. 1 is a firm that had a demand for formal credit; 0 otherwise
Loan	Dummy variable. 1 is a firm that applied for formal credit; 0 otherwise
Denied	Dummy variable.1 is a firm that got any formal credit denied; 0 otherwise
Future loan	Dummy variable. 1 is a firm still has a demand for formal credit; 0 otherwise
Credit constraints	Dummy variable. 1 is a firm that had a demand but cannot apply for a loan; or applied for a loan but got denied, or applied for a loan, did not get denied but still has a demand; 0 otherwise
Firm age	The difference between the surveyed year and the establishment year
Firm size	The logarithm of total assets at the end of the year
Investment (log)	Dummy variable. 1 is a firm that has invested since the last survey; 0 otherwise
Competition	Dummy variable. 1 is a firm that faces competition in its field of activity or has accumulated goods which are difficult to sell; 0 otherwise
Province	Province of firm Sector The main area of business and production activity. 1-digit ISIC
CLUR	Dummy variable.1 is a firm owner who has a Certificate of Land Use Right; 0 otherwise Interest payment (log) The logarithm of total interest payments at the end of the year

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