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Access to credit and labour productivity: a new insight from Vietnamese firms

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ABSTRACT

This study aims to examine the impact of access to credit on labour productivity of Vietnamese firms. We use panel data from the Small and Medium Sized Manufacturing Enterprises Survey in Vietnam between 2007 and 2015 to conduct an analysis of how access to credit affects firm-level productivity. By applying two-stage least-squares regression method, we find that access to credit is statistically associated with a set of characteristics of firms, owner, and business environment. We also find that credit access has a significantly positive impact on firm's labour productivity. Accordingly, better credit access leads to an improvement in labour productivity. Policy implications are discussed.

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1. Introduction

It is firmly believed that credit is a crucial issue in operating and running enterprises. 'Without adequate access to financing, the staying power of the business and its potential for growth is jeopardised' (Rahaman, 2011, p. 709).¹ Hence, credit and expanding credit access are among key factors of firm's growth and development (Phan & Archer, 2020). It is essential for firms to have access to external credit as their self-funding or internal capital is often insufficient for their business operations (Khandker et al., 2013). Particularly for SMEs, they have a high demand for access to external financing to run their business, create new products, enhance employees' knowledge and skills, and equip more production facilities (Atieno, 2009). Nevertheless, it has never been straightforward for SMEs to obtain credit and other banking services at affordable rates (Rahaman, 2011). This group of enterprises appears to be more credit rationed than do larger firms (Nguyen et al., 2019; Tran & Santarelli, 2013).

Our study is motivated by the Pecking Order theory (Myers, 1984) and the M-M theory (Modigliani & Miller, 1958) which mainly focus on the connection between firms' capital structure and their business and investment decisions. The theories lay the foundation for researchers and practitioners to gain an understanding of firms' preferences in using debt over equity. As such, firms prefer using financing from internal sources due to the adverse selection problem. With regard to external financing sources, they prioritise using debt over equity to utilise the cheaper cost of capital and the tax shield's benefit. Apparently, firms remain their preferences for using internal financing, such as retained earnings, then debt, and equity. From the theoretical background, we have come up with two research questions what might affect a firm's access to credit, especially in the context of a developing country like Vietnam where the financial markets remain imperfection; and whether access to credit affects labour productivity

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at the firm level? The questions are arisen with the purpose to, first, discover the determinants of having access to credit in the case of Vietnamese SMEs by categorising the factors into three groups—firm characteristics, owner characteristics, and business environment characteristics. Second, we aim to analyse the effect of access to credit on labour productivity.

Previous studies highlight that credit is a key factor in the growth and development of small and medium-sized enterprises (Akoten et al., 2006; Phan & Archer, 2020; Rand et al., 2009). These enterprises form a large part of the private sector in most countries, particularly in developing ones like Vietnam.² In Vietnam, SMEs account for 95% of total enterprises nationwide, create about 77% of total employment, and contribute up to 48% of GDP (VCCI, 2013). Regardless of their significance in the economy, SMEs appear to face multiple risks, such as loss of major suppliers, failure of a partnership, competitiveness from other enterprises, etc. Among the obstacles that SMEs have confronted, the shortage of and difficulty in access to capital are likely to be the most serious problems, followed by the competitiveness, the restriction on the demands for products, the difficulties in land access, and business premises (Clusel et al., 2013). A study by Nguyen et al. (2019) affirms that SMEs often encounter more financial obstacles than do their large counterparts—such as inadequate collateral, high interest rate, or complex process of credit application.

SMEs are considered the weakest and the most vulnerable group once the economy is fluctuated as their operations mainly rely on the borrowing funds (Clusel et al., 2013). SMEs seek credit from formal and informal financial sources. The former arises from institutional venture capital financing, initial public offering, loans from commercial banks and other formal financial institutions, etc. The latter includes borrowing from friends, family members, relatives, private moneylenders, and trade creditors. This type of financing offers SMEs a simpler process of access to credit, non-bureaucracy, low transaction costs and lending interest rates, and high flexibility of repayment conditions (Cao, 2014). Our study aims to examine the probability of firms to have credit access in the context of Vietnam and to analyse the impact of credit access on a firm's labour productivity. We employ a longitudinal dataset sourced from two surveys including the Vietnam SME Survey and the Provincial Competitiveness Index. We measure a firm's credit access by a dummy variable in which a firm is considered to have credit access if it obtained either short-term or long-term loans or if a firm had informal loans. The combination of formal and informal financing allows us to make a comprehensive analysis of the probability of SMEs having credit access as well as to examine the effect of both capital sources on firm performance. We apply a two-stage regression method with the random-effects logit in the first stage and the random-effects instrumental variable regression in the second stage to address the endogeneity issues.

Our findings are expected to play an important role in assisting the policy makers to facilitate SMEs to have better access to credit. Our study contributes to the literature by examining firms' access to credit from formal and informal sources. We find that credit access is affected by the characteristics of firms, owner, and business environment. Further, we find that credit access has a positive impact on firm's labour productivity. Accordingly, better credit access leads to an improvement in labour productivity. Our study provides fresh insight for researchers, practitioners, local and/or central government policy makers in improving the local-level economic governance to facilitate credit accessibility and foster labour productivity of SMEs.

The remainder of the study is organised into five sections. Section 2 presents literature from previous studies on access to credit and its impacts on firm performance. Section 3 outlines data description and research methods. Section 4 presents empirical results. Section 5 concludes.

2. Literature review

Literature highlights that small and medium enterprises in emerging countries seek financing from internal and/or external financial markets to run their businesses as well as invest in business operations (e.g. Archer, 2021; Hoang & Otake, 2014; Trinh et al., 2017).³ Due to market imperfection, asymmetric information problems, agency risk, and limited collateral availability, small firms appear to be more credit rationed in the formal financial markets than their counterparts (Stiglitz & Weiss, 1981; Wellalage & Locke, 2016). Therefore, they are likely to seek financing from alternative sources that arise from family members, friends, or moneylenders, or rely on equity funds, also known as funding from owners (Hoang &

Otake, 2014). For example, Beck et al. (2008) explore data from 3000 enterprises in 48 countries and find that small firms are slightly dependent on formal loans but heavily reliant on internal and informal capital than are larger firms. A study by Cao (2014) shows that in developing countries like Vietnam, mobilising capital from informal sources is the most familiar and favourable choice for SMEs, especially during the start-up stage of business. CIEM (2014) shows that borrowing from informal sources occupied 80% of the number of SMEs' loan applications.

Previous studies show that having access to credit has a significant impact on firm performance (e.g. Buyinza & Bbaale, 2013; Lan et al., 2016; McPherson & Rous, 2010; Rahaman, 2011). A wide range of proxies has been used to capture firm performance. Tran and Santarelli (2013) use annual income and growth of sales as proxies for firm performance. Akoten et al. (2006) measure firm performance by current profitability and employment growth rate and find that credit access is not a crucial factor affecting the performance of garment firms in Kenya. Rahaman (2011) uses employment growth and sales growth to represent firm growth and affirms that access to internal funding significantly affects the growth of firms. Shinozaki (2012) indicates a negative impact of low credit access on firm SME survival and growth rates. Khandker et al. (2013) find that limited credit access may decrease the profit margin of microenterprises in Bangladesh.

Further empirical evidence on the link between credit access and performance is discussed. In general, better access to credit is associated with the ability of enterprises to finance their business expansion and to allocate resources to their most profitable projects (Motta, 2020), resulting in a higher level of firm performance. For example, Buyinza and Bbaale (2013), in a study conducted for five East African Community countries, show that credit-access firms have 0.2–0.3 percentage-points higher level of business performance than their counterparts.⁴ Using a sample of developing countries in the Middle East and North Africa (MENA), Kinda et al. (2011) confirm that satisfactory access to financing is a core factor contributing to the productive performance of an enterprise.⁵ In a study on access to finance by small and medium enterprises in Tanzania, Kira and He (2012) indicate that better credit access supports SMEs in utilising assets to enhance their productivity. As well, Motta (2020) aims to investigate the impact of both lack of access to external finance and project quality on labour productivity of firms in Brazil. By using cross-sectional firm-level data from the World Bank Enterprise Surveys, the author finds that small and medium firms having limited access to external financing (those that applied for bank loans but were denied) have lower levels of labour productivity than those obtaining bank loans.

Bose et al. (2020) employ a rich dataset of Indian firms to examine whether easing access to foreign financing impacts firms' productivity. The authors show that firms with access to foreign financing have better production and innovation networks, which fosters their performance and exporting intensity, resulting in better productivity than those with domestic sources of financing only. In a study on credit constraints and productivity of SMEs in Canada, Cao and Leung (2020) find that financial constraints and the estimated total factor productivity are negatively correlated, suggesting that firms being financially constrained are less productive than their counterparts. Apparently, capital access, particularly medium and long-term financing, is one of the uppermost determinants of firm performance (Bloom et al., 2010).

In the context of emerging Asia, the growth of a firm is captured by the total annual sales value (Shinozaki, 2012). It is indicated that credit access, especially to the formal system, has a significantly positive relationship with the profit level of enterprises. Using data from the Vietnamese SMEs survey, Giang et al. (2019) examine the causal effect of access to finance on productivity of total factor productivity of Vietnamese SMEs and find that the ability of firms to secure formal credit from a formal financial institution increases their total factor productivity. In particular, firms having access to credit have a higher level of total factor productivity by ~9% than their counterparts. In the same vein, Jin et al. (2019) analyse the relationship between financial constraints and productivity using firm-level data from Chinese manufacturing industries. The authors find that ~90% of firms experience difficulties in having access to financing from external sources. The authors also find that access to credit, or financial constraints, have a non-monotonic impact on firm productivity. As such, financial constraints enhance productivity for mildly financially constrained firms and hinder productivity if the constraints exceed a threshold when productivity reaches the maximum level.

In a study on Vietnam, Tran and Santarelli (2013) use business operating profit and growth of sales to represent the business performance of Vietnamese SMEs. Interestingly, firms with limited credit access

secure a higher level of business earnings and sales growth than their counterparts. The reasons come from the sufficient development of the informal credit market in Vietnam and the low debt share of surveyed enterprises, which implies the little preference of Vietnamese SMEs for external debt. From our perspectives, such the measures mentioned above are highly sensitive to exogenous shocks and thus, offer a rather unstable proxy of performance.

To the best of our knowledge, there are very few studies examining the impact of credit access on labour productivity, determined as output per labour input. The flow of labour from low-productivity activities to high-productivity activities is a key driver of development (Xuefeng & Yaşar, 2016). By virtue of the importance of labour productivity in firm performance and growth, our study aims to investigate the labour productivity of SMEs in Vietnam under the effect of their credit access. This is a significant contribution of this research to bridge the gap in literature regarding the relationship between capital and labour productivity, which are the two most important factors in firm dynamics and growth.

3. Data and research methods

3.1. Data

This study employs data from two surveys conducted in Vietnam, namely the Vietnam SME Survey and the Provincial Competitiveness Index (PCI) Survey. The first survey was biennially carried out from 2007 to 2015 in ten cities and provinces across Vietnam (Ha Noi, Phu Tho, Ha Tay, Hai Phong, Nghe An, Quang Nam, Khanh Hoa, Lam Dong, Ho Chi Minh City, and Long An).⁶ This was the research collaboration among the Central Institute for Economic Management (CIEM, Vietnam), the Institute of Labour Science and Social Affairs (ILSSA) (MOLISA, Vietnam), and the University of Copenhagen (Denmark), under the sponsorship of the Danish International Development Agency (DANIDA). The purposes of these joint research efforts between Vietnam and Denmark were to collect data and provide fresh evidence on the actual dynamics and growth of the private sector in Vietnam during nearly one decade.⁷

The second data source comes from the Vietnam Provincial Competitiveness Index Survey, conducted annually since 2005 under the collaboration between the Vietnam Chamber of Commerce and Industry (VCCI) and the United States Agency for International Development (USAID). The PCI data is provincial-level and used to assess the governance quality of a local province in constructing a favourable business environment for the development of private enterprises. This survey has covered many aspects of the Vietnam's business environment, including entry costs for business start-up, easy access to land, a transparent business environment and equitable business information, informal charges, time costs for bureaucratic procedures and inspections, proactive and creative provincial leadership in dealing with obstacles for enterprises, developed and high-quality business support services, labour training policies, fair and adequate legal procedures.

Combining data from two surveys enables us to generate a unique longitudinal data set at firm level and at the provincial level. Information from 10 among 64 provinces in the second data source is taken into account in accordance with those in the first source, in the corresponding years,⁸ to ensure the consistency when merging data from two separate sources.

3.2. Research methods

We apply the two-stage regression method to address the proposed research questions. In the first stage, we run the random-effects logit regression to identify determinants of credit access of SMEs. This regression is selected as we explore time-invariant variables in our models, including the gender of the owner, the educational level, and the area where a firm is located (rural provinces or urban cities). This approach ties in an assumption of no correlation between the entity's error term and the independent variables, which allows time-invariant variables to play a role as predictors (Breusch et al., 2011; Tran & Santarelli, 2013). Since access to credit is likely an endogenous variable in the output of firms (Tran & Santarelli, 2013), in the second stage, we employ the method of instrumental variables and two-stage least squares for panel-data models using random-effects estimator to examine whether access to credit

has an influence on firm's labour productivity. This method is efficient in dealing with the endogeneity issues of credit and measurement error (Baum et al., 2007).

In this study, *distance* and *credit history* are selected as instrumental variables to deal with the endogeneity issues. The former is the distance from the firm to the most important creditor in terms of loan size, while the latter is the credit status if the firm has borrowed from the lenders before. Ellis et al. (2010) show that borrowers far from creditor or bank branches are more likely to be significantly supply-constrained than those close to bank branches. This affects the possibility that borrowers have access to financing. Further, Krasniqi (2010) states that firms with a history of borrowing from a bank are more likely to receive credit because of the alleviation of asymmetric information between the lender and the borrower. Hence, we use the distance to creditor, measured by the time and cost to get to the nearest bank branch, and credit history as instrumental variables.

3.2.1. Stage 1: Random-effects logit model

Considering ATC_{it} is access to credit of firm i at time t . This dummy variable takes the value of 1 if a firm obtained either short-term or long-term formal loan(s) or if a firm had informal loan(s), and 0 otherwise.⁹ ATC_{it} is an observed dependent variable and is a function of another variable that is not measured, ATC_{it}^* . This latent variable is used to determine the values of the observed dichotomous dependent variable ATC_{it} .

$$ATC_{it}^* = \beta X_{it} + v_i \quad (1)$$

where: $v_i \sim N(0, \sigma^2)$. ATC_{it}^* is unobserved and called a latent variable, related to the observed dichotomous variable ATC_{it} by:

$$ATC_{it} = \begin{cases} 1, & \text{if } ATC_{it}^* > 0 \\ 0, & \text{otherwise} \end{cases} \quad (2)$$

Or:

$$\log \left(\frac{Pr(ATC_{it} = 1)}{Pr(ATC_{it} = 0)} \right) = \beta X_{it} \quad (3)$$

$$odds_{it} = \frac{ATC_{it}^*}{1 - ATC_{it}^*} \quad (4)$$

3.2.2. Stage 2: Instrumental variable regression with random-effects estimator

Following Chamberlain and Imbens (2004) and Tran and Santarelli (2013), we use the two-stage least squares random-effects instrumental variable regression in the second stage to examine whether access to credit affects the labour productivity of firms. The model is demonstrated as in Equation (5):

$$LP_{it} = \alpha_0 + \alpha_1 ATC_{it} + \alpha_2 X_{it} + \alpha_3 Z_{it} + \varepsilon_{it} \quad (5)$$

$$\text{For random effects: } LP_{it}^* = (LP_{it} - \theta_i \overline{LP_i}) \quad (6)$$

$$\varepsilon_{it} = u_i + e_{it} \quad (7)$$

where Z_{it} is a subset of instrumental variables including distance (dis_{it}) and credit history (his_{it}) that

$$ATC_{it} = \delta_0 + \delta_1 dis_{it} + \delta_2 his_{it} + c_{it} \quad (8)$$

IV estimation with two instruments dis_{it} satisfies $E[e_{it}|dis_{it}, c_i] = 0$ and $cov(dis_{it}, c) = 0$, and his_{it} satisfies $E[e_{it}|his_{it}, c_i] = 0$ and $cov(his_{it}, c) = 0$.

where LP_{it} is the logarithm of labour productivity of firm i at time t , calculated by the ratio of revenue to the number of labours of a firm; dis_{it} is the distance to the most important creditor regarding the size of loans of firm i at time t ; his_{it} is the credit history of firm i at time t if it has borrowed from the main creditor; ATC_{it} is access to credit of firm i at time t ; α_1 is the parameter which estimates the effect of credit accessibility on firm's labour productivity; X_{it} in Equations (1) and (5) is the vector of variables of firm i at time t , grouped as follows:

- Firm characteristics include firm age, assets (log.), formal registration, investment, network size, distance, credit history.
- Owner characteristics include Party member, owner's age, gender, educational level.
- Business environment characteristics include location (urban or rural), PCI ranking.

Details of variables used in this study are provided in Table A1 in the Appendix A.

Apparently, with the advantage of time-invariant variables included in the models, the random-effect regressions are used in both stages. The characteristics of firms, owners, and business environment are important in capturing the determinants of a firm's accessibility to credit and its influence on labour productivity over years.

4. Empirical results and discussion

4.1. Descriptive statistics

A summary of descriptive statistics of all variables is presented in Table 1. As seen, the average labour productivity in logarithm was 11.39 in the period 2007–2015, which equals to 178,494 thousand VND. Put another way, the revenue per employee of a firm was, on average, 178,494 thousand VND or ~8500 USD. SMEs had an average age of 15 years and total assets of 4,090,086 thousand VND or 194,766 USD, while the average age of the owner was 46.5. The PCI of these firms, on average, was 57.06 in the period, suggesting the average PCI index of provinces listed in Vietnam's SME Survey in measuring the provincial competitiveness as a factor of the economic growth at the local level.

Table 2 shows the differences in labour productivity and firm size by total assets between firms that had access to credit and those that did not. On average, the former has a higher level of labour productivity than does the latter. Although the group of access-to-credit firms is outnumbered by their counterparts in terms of scale, its average labour productivity and total assets are still higher. The average labour productivity of the ATC group was 231,024 thousand VND (11,000 USD) while that of the NATC group was 143,111 thousand VND (6815 USD). Likewise, firm size measured by total assets of the ATC group, on average, was around 295,543 USD, which is 2.3 times higher than that of their counterparts.

Table 1. Descriptive statistics of variables.

Variable	Mean	Std. Dev	Min	Max
Labour productivity (log.)	11.388	1.332	−0.059	18.135
Access to credit	0.402	0.490	0.000	1.000
Firm age	15.236	10.123	1.000	75.000
Assets (log.)	13.650	1.824	4.595	19.567
Registration	0.582	0.493	0.000	1.000
Investment	0.543	0.498	0.000	1.000
Network size	32.308	39.875	0.000	978.000
Distance	0.684	0.809	0.000	2.000
Credit history	0.305	0.460	0.000	1.000
Party member	0.095	0.293	0.000	1.000
Owner's age	46.509	10.420	17.000	94.000
Gender (Male = 1)	0.669	0.471	0.000	1.000
Education	0.250	0.433	0.000	1.000
Location (Urban = 1)	0.359	0.480	0.000	1.000
PCI ranking	31.233	15.758	3.000	62.000
Number of observations	6080			

Table 2. Labour productivity and firm size by access to credit.

Variable	Access to credit (ATC)		Non-access to credit (NATC)	
	Mean	Std. Dev	Mean	Std. Dev
Labour productivity (thousand VND)	231,024.20	1,569,839	143,111.40	242,097.80
Labour productivity (log.)	11.53	1.30	11.29	1.34
Total assets (thousand VND)	6,206,400	17,500,000	2,664,634	9,030,910
Total assets (log.)	14.07	1.84	13.37	1.76
Number of observations	2445		3630	
Percent	40.25		59.75	

Table 3. First stage regression: determinants of access to credit.

Variable	Random-effects logit		Pooled logit		Correlated random-effects logit	
	Coef	Odd Ratios	Coef	Odd Ratios	Coef	Odd Ratios
	[1]	[2]	[3]	[4]	[5]	[6]
Firm age	−0.007 (0.006)	0.993 (0.006)	−0.007 (0.004)	0.993 (0.004)	−0.003 (0.007)	0.997 (0.007)
Assets (log.)	0.195*** (0.035)	1.215*** (0.043)	0.164*** (0.028)	1.178*** (0.033)	0.170*** (0.059)	1.185*** (0.070)
Registration	0.123 (0.116)	1.131 (0.131)	0.077 (0.099)	1.080 (0.107)	0.282* (0.145)	1.325* (0.192)
Investment	1.201*** (0.106)	3.323*** (0.351)	1.094*** (0.088)	2.987*** (0.263)	1.071*** (0.121)	2.917*** (0.353)
Network size	0.001*** (0.0004)	1.001*** (0.0004)	0.001*** (0.0004)	1.001*** (0.0004)	0.002*** (0.001)	1.002*** (0.001)
Distance	2.432*** (0.100)	11.379*** (1.136)	2.173*** (0.080)	8.785*** (0.704)	2.239*** (0.105)	9.384*** (0.984)
Credit history	0.595*** (0.113)	1.813 (0.206)	0.545*** (0.097)	1.725*** (0.168)	0.395*** (0.125)	1.484*** (0.185)
Party member	0.437*** (0.166)	1.549*** (0.257)	0.411*** (0.134)	1.508*** (0.201)	0.440*** (0.167)	1.553*** (0.259)
Owner's age	−0.007 (0.005)	0.993 (0.005)	−0.005 (0.004)	0.995 (0.004)	0.000 (0.008)	1.000 (0.008)
Gender (Male = 1)	−0.150 (0.107)	0.861 (0.092)	−0.127 (0.088)	0.880 (0.077)	−0.310** (0.148)	0.734** (0.108)
Education	0.020 (0.115)	1.020 (0.118)	−0.016 (0.103)	0.985 (0.101)	0.074 (0.139)	1.077 (0.150)
Location (Urban = 1)	−1.098*** (0.145)	0.333*** (0.048)	−0.938*** (0.111)	0.392*** (0.044)	−0.884*** (0.152)	0.413*** (0.063)
PCI ranking	−0.008** (0.003)	0.992** (0.003)	−0.007** (0.003)	0.993** (0.003)	−0.007* (0.004)	0.993* (0.004)
Intercept	−4.927*** (0.527)	0.007*** (0.004)	−4.259*** (0.405)	0.014*** (0.006)	−4.337*** (0.699)	0.013*** (0.009)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Mundlak correction	No	No	No	No	Yes	Yes
Observations	6080	6080	6080	6080	6080	6080

This table presents the determinants of credit access. Dependent variable is access to credit. Columns [1], [3], and [5] denote the values of coefficients in random-effects logit, pooled logit, and correlated random-effects logit regressions, respectively. *, **, and *** denote significance at the 10, 5, and 1% levels, correspondingly. Robust standard errors are in parentheses shown in Columns [2], [4], and [6].

In the context of Vietnam, firms with better access to credit appear to have typical characteristics, including a higher level of total assets that derive from their larger economic scale, a higher volume of sales, a wider networking with banking institutions, more fixed assets to use as collaterals, thus they are more likely to secure bank loans than their counterparts (Le, 2012).

4.2. Empirical results

4.2.1. The first stage: Access to credit

As discussed previously, we apply the random-effects logit model in the first stage to discover the determinants of access to credit of SMEs in Vietnam. The result from running the random-effects logit regression is demonstrated in Table 3.

In this stage, we find no significant relationship between the *firm age* and the possibility that firms have access to credit, which is consistent with Rand (2007). It is argued that the older firms have lower demands for credit than the younger ones, explained by the firm life-cycle. At the point that older firms overcome their life-cycle, it would increase their likelihood of self-financing instead of having external credit access. Also, *registration* under the Law on Enterprises has no significant impact on the probability of firms having credit access. It suggests no significant evidence of access to external capital funding in case a firm had Business Registration Application—including Business Registration Certificate, Tax Code Registration, and Seal Engraving Permit. This finding is inconsistent with Tran and Santarelli (2013) that firms' formal registration under the Law enables them to have credit access more easily and then they are less likely to be credit rationed.

Firm size, proxied by the logarithm of total assets, is positively correlated with the likelihood of firms having credit access at the 1% significance level. Specifically, bigger firms are 1.2 times more likely to

have access to credit than smaller ones, which can be explained by two reasons. First, larger firms have more demand for external financing (Rand, 2007) because they plan to invest in many activities to expand their business. When their demand for funds is substantial, they are more likely to seek external financing and have access to credit. Second, larger firms with high value of assets are more likely to satisfy the collateral requirements of the lenders (Buyinza & Bbaale, 2013). Hence, their applications for loans are preferably approved regardless of the financing sources. The positive effect of firm size on a firm's credit access is consistent with earlier studies by Le (2012) and Cao (2014).

At the 1% level of significance, firms making *investment* are 3.3 times more likely to have credit access than those which did not. These firms often have more demand for capital to invest in both short-term and long-term activities. According to Aghion et al. (2010), short-term loans are mobilised for investments in working capital, input purchase, or wage costs while long-term loans are required for land, buildings, equipment or machinery, and research and development. Firms that have made any investment often have sufficient assets to become collaterals, hence have better access to finance.

Network size has a positive impact on the possibility that a firm has access to credit at the 1% significance level, which is consistent with Nguyen and Luu (2013). Accordingly, firms that are members of business associations are more likely to have loan applications approved, suggesting that more networking increases the ability of firms to approach credit. Networking helps firms improve their relationships with other firm members and with banks or lenders, hence reducing financial obstacles for firms when having access to credit (Tran & Santarelli, 2013). Likewise, we find that *distance* has a statistically positive relationship with a firm's credit access, suggesting that firms are more likely to have credit access from far lenders. This is inconsistent with Ellis et al. (2010) that factors from the supply side, such as far distance to banks may preclude firms from having credit access. In the context of Vietnam, creditors, particularly commercial banks, normally set up their transaction offices in the commune- or district-level administrative units, providing several primary services, such as savings, withdrawal, and opening accounts. If firms intend to borrow credit, they often go to bank branches or bank's headquarters, which are normally located in centred areas and may be far from enterprises. Bank branches or headquarters are functional to lend firms, then firms may obtain a sufficient amount at the requested time.

The credit history of firms significantly positively affects the probability that firms have credit access. Firms with previous loan payment history appear to establish and maintain their creditworthiness with the lenders, which alleviates the asymmetric information and makes those firms more likely to receive loans (Krasniqi, 2010). Thus, firms having a credit history with the lenders are more likely to receive credit than their counterparts, as highlighted by Nguyen and Luu (2013).

With regard to the owner characteristics, firms whose owner is a member of the Communist Party are more likely to have credit access. Notably, the odd ratio of this variable is 1.55, which suggests that Party-member owners have a higher probability of having access to credit than non-Party members by 1.55 times. This finding is inconsistent with Nguyen and Luu (2013) who find no significant evidence on the relationship between the Communist Party owner of a firm and the likelihood that the firm has credit access. Besides, we find no significant effect of *age of owner*, *gender*, and *educational level* of the owner on the firm's accessibility to capital.

In terms of Business environment characteristics, it is indicated that *location* and *PCI ranking* negatively affect the credit accessibility of firms. Accordingly, firms located in urban cities are 0.33-times less likely to have access to capital than those located in rural provinces. Rand (2007) indicates that many rural household firms have the necessary certificate of land use right and use it as collateral when applying for loans. However, 'the situation in urban areas is more complex, and the possibilities to use land-holding rights as collateral are more limited' (Rand, 2007, p. 3). The shortage of collateral is one of the biggest obstacles that affect the access to finance of firms (Le, 2012). Regarding *PCI ranking*, the result shows a negative relationship between the ranking and the access to credit, suggesting that those located in provinces with a higher ranking or better PCI are less likely to have credit access. This finding is in line with Cao (2014) that a favourable business environment helps SMEs reduce their dependence on external credit. However, Le (2012) finds no statistical impact of PCI on the probability of SME business having access to credit.

4.2.2. The second stage: Access to credit and labour productivity

The instrumental variable regression for panel data using random-effects estimator is applied in the second stage to analyse how access to credit affects labour productivity of firms. Evidence from the literature also shows that borrowers far from creditors or bank branches are more likely to be significantly supply-constrained than those close to bank branches (Ellis et al., 2010). This affects the possibility that borrowers have access to financing. Regarding credit history, Krasniqi (2010) shows that firms with a history of borrowing from a bank appear to receive credit because of the alleviation of asymmetric information between the lender and the borrower. Thus, we follow the literature to use the distance to creditor and credit history as instruments to address endogeneity. Tests for endogeneity issues are presented in Table 4 and results of IV regressions are shown in Table 5.

The result from Durbin-Wu-Hausman test for endogeneity of regressors produces the χ^2 statistic of 5.551 with p -value of 0.018, as shown in Table 4, which is <0.05 , thus we reject the null hypothesis that the regressor is not endogenous. In fact, our key independent variable (*access to credit*) is endogenous, thus the endogeneity issue needs to be addressed.

We demonstrate Sanderson-Windmeijer test of excluded instruments to test for the significance of excluded instruments, χ^2 statistics is smaller than 0.05, suggesting that we reject the null hypothesis that the instruments are bias estimators (Sanderson & Windmeijer, 2016). This confirms the significance of our instruments in the regressions.

We perform Kleibergen-Paap LM test for under-identification to test the null hypothesis that the instruments have insufficient explanatory power to predict the endogenous variable(s) in the model for identification of the parameters. As shown in Table 4, a small value of p -value statistics (< 0.05) indicates a rejection of the null indicates and confirms that the model parameters are identified.

Last, we show Hansen-J test for overidentification of all instruments to test whether the instruments are valid, for example, uncorrelated with the error term, and whether the excluded instruments are correctly excluded from the estimated equation. As p -value is >0.10 , we cannot reject the null hypothesis, which suggests that our instruments are valid and that are correctly excluded from the estimated equation.

Table 5 demonstrates the significant effect of access to credit on firm-level labour productivity. As demonstrated, *credit access* positively affects a firm's labour productivity at the 1% significance level, suggesting that the level of labour productivity of firms with access to credit is 24.7% higher than that of their counterparts. Access-to-credit firms would be more likely to improve their financial capability to engage in other activities and expand their business. Besides, credit access enables firms to purchase and apply modern technology in production or to invest in new profitable projects, which is an efficient way to increase the labour productivity. Our finding is consistent with Akoten et al. (2006) and Giang et al. (2019) regarding the positive relationship between access to finance and productivity. Firms with better credit access are more likely to perform better (Akoten et al., 2006). The result is also consistent with Buyinza and Bbaale (2013) that the performance of firms benefits from their credit access. Apparently, the causal impact of access to capital on productivity re-affirms the importance of finance in economic growth.

Result from the t -test shown in Table 6 supports the finding that firms with access to credit have a higher level of labour productivity than their peers. At the 1% significance level, the t -test result indicates the negative difference between mean logarithm of labour productivity of non-credit access firms and that of credit access ones.

Table 4. Testing for endogeneity.

	$\chi^2(1)$	p -Value
	[1]	[2]
Durbin-Wu-Hausman test for endogeneity of regressors	5.551**	[0.018]
Sanderson-Windmeijer test of excluded instruments	840.390***	[0.000]
Kleibergen-Paap rk LM test for underidentification	559.350***	[0.000]
Hansen-J test for overidentification of all instruments	0.572	[0.449]

This table presents the test for endogeneity. Dependent variable is labour productivity. Columns [1] and [2] denote χ^2 and p -value, respectively. **, and *** denote significance at the 5% and 1% levels, correspondingly. p -Value is shown in brackets.

Table 5. Second stage IV regression: access to credit and labour productivity.

Variable	Random-effects IV		Fixed-effects IV		Pooled OLS IV	
	[1]	[2]	[3]	[4]	[5]	[6]
Access to credit	0.247***	(0.058)	0.241***	(0.066)	0.242***	(0.054)
Firm age	−0.007***	(0.002)	0.001	(0.002)	−0.010***	(0.002)
Assets (log.)	0.165***	(0.012)	0.142***	(0.030)	0.169***	(0.014)
Registration	0.106**	(0.041)	0.041	(0.037)	0.118***	(0.041)
Investment	−0.042	(0.039)	−0.028	(0.039)	−0.056	(0.038)
Network size	0.0004**	(0.000)	0.0002	(0.000)	0.001**	(0.000)
Party member	−0.025	(0.058)	0.006	(0.069)	−0.037	(0.053)
Owner's age	−0.006***	(0.002)	−0.006**	(0.003)	−0.005***	(0.002)
Gender (Male = 1)	0.074**	(0.036)	−0.026	(0.054)	0.111***	(0.034)
Education	0.082**	(0.039)	0.082	(0.051)	0.072*	(0.038)
Location (Urban = 1)	0.278***	(0.049)			0.248***	(0.043)
PCI ranking	0.001	(0.001)	0.003**	(0.001)	0.0003	(0.001)
Intercept	8.744***	(0.175)			8.702	(0.177)
Year effects	Yes		Yes		Yes	
R-squared	0.130		0.134		0.198	
Number of observations	6080		6080		6080	

This table presents the impact of access to credit on labour productivity. Dependent variable is labour productivity. Columns [1], [3], and [5] denote the values of coefficients in random-effects IV, fixed-effects IV, and pooled OLS IV regressions, respectively. *, **, and *** denote significance at the 10, 5, and 1% levels, correspondingly. Robust standard errors are in parentheses shown in Columns [2], [4], and [6].

Table 6. Difference of labour productivity by access to credit.

	Non-access to credit	Access to credit	t-Stat
Observations	3630	2445	
Mean	11.2909	11.5334	−6.9861***
Standard error	0.0223	0.0263	
Standard deviation	1.3439	1.3003	

This table presents the difference of labour productivity by access to credit. Dependent variable is labour productivity. *** denotes significance at the 1% level. The main hypothesis is the difference between mean logarithm of labour productivity of non-credit access firms and that of credit access ones. The t -test hypothesis is H_0 : difference = 0, and H_1 : difference < 0.

From Table 5, the effects of *firm age* and *owner's age* are both interestingly negative, suggesting that younger firms and younger owners have better performance. This finding is consistent with Tran and Santarelli (2013) who find that aging has a negative relationship with firm performance, or that it has less valuable contributions to the performance of firms because older owners or older firms prefer to be settled down rather than investing in new venture projects to make revenue. Regarding *firm size*, it has a positive impact on labour productivity at the 1% significance level, implying that a 1% increase in assets' value leads to 16.5% increase in labour productivity. When a firm invests in assets, for example in research and development activities, it can facilitate staff members increasing knowledge and skills or upgrade and replace new technologies, which in turn results in higher productivity—consistent with Tran and Santarelli (2013).

Formal registration and *network size* of firms are positively correlated with the labour productivity, while *investment* is found to have no significant impact on a firm's labour productivity. At the 5% level of significance, registered firms under the Law on Enterprises have a higher level of productivity than unregistered ones by 10.6%. This finding is consistent with Fajnzylber et al. (2011) that newly created firms under the formality status have higher levels of revenue and profits, hire more employees, and are more capital intensive. Further, the official registration enables firms to issue VAT invoices, which leads to an increase in customer demand. Thus, registered firms are more likely to have better revenue than their counterparts and better labour productivity as a result. The positive relationship between the formal registration of firms and their performance is also affirmed by Tran and Santarelli (2013). Network size positively affects the productivity but at a very small level. The participation of firms in professional associations helps them increase the productivity, which is consistent with Nguyen and Luu (2013) that business networking proves its efficiency in boosting firm growth.

Gender and *educational level* of the owner are found to have a positive association with labour productivity. Accordingly, male-owned firms have a higher level of productivity than female-owned ones by 7.4%. Male owners often have more work experience and are willing to invest in venture business alternatives to make revenue (Fairlie & Robb, 2009). The work experience of male owners and their willingness to take risks make their firm revenue better, resulting in better productivity. Besides, firms whose

owner completed an undergraduate or a postgraduate program are performed a higher level of labour productivity by 8.2% than those whose owner had no professional education or graduated from a vocational college or a technical secondary school. It can be explained that the owner's qualifications might help firms improve their business strategies and orientations. Therefore, these enterprises are more likely to have better structural and financial management, which likely increases their revenue and labour productivity. In the context of Vietnam, highly educated owners are active to seek investments, expand networking, and engage in activities that may bring benefits to their firms in the long run. This finding is consistent with Akoten et al. (2006) and Tran and Santarelli (2013).

With regard to the business environment characteristics, no significant relationship between *PCI ranking* and firm-level labour productivity is found, which is consistent with Le (2012). However, at the 1% level of significance, *location* has a positive association with the labour productivity. Firms located in urban areas have a higher level of labour productivity by 27.8% than firms in rural areas. The reasons come from the characteristics of firms located in urban and rural areas. Accordingly, enterprises located in urban areas—with bigger markets, high population, and business density, high quality of Internet access, and close distance to big or international markets (Smallbone et al., 2003)—are advantageous in supplying their products and services compared to firms in rural areas. Hence, their revenue is likely to be higher than that of rural firms. Furthermore, location in urban cities increases a firm's probability to be equipped with modern technology, which may positively affect their productivity in manufacturing. Therefore, urban firms have a higher level of labour productivity than their counterparts.

We also provide further empirical evidence by considering industry-level competition and firm growth as a proxy to capture overall economic activity, presented in Table 7. In Panel A, we take into account

Table 7. Further empirical results on access to credit and labour productivity.

Variable	Random-effects IV		Fixed-effects IV		Pooled OLS IV	
	[1]	[2]	[3]	[4]	[5]	[6]
Panel A: Competition						
Access to credit	0.064***	(0.015)	0.059***	(0.017)	0.065***	(0.015)
Firm age	−0.007***	(0.002)	0.001	(0.002)	−0.010***	(0.002)
Assets (log.)	0.154***	(0.013)	0.139***	(0.018)	0.157***	(0.012)
Registration	0.085**	(0.041)	0.042	(0.050)	0.090**	(0.040)
Investment	−0.059	(0.040)	−0.041	(0.043)	−0.076*	(0.041)
Network size	0.000**	(0.000)	0.000	(0.000)	0.001***	(0.000)
Industry-level competition	0.517***	(0.139)	−1.176	(4.593)	0.492***	(0.110)
Party member	−0.012	(0.058)	0.011**	(0.073)	−0.022	(0.054)
Owner's age	−0.006***	(0.002)	−0.006	(0.003)	−0.005***	(0.002)
Gender (Male = 1)	0.070*	(0.036)	−0.029*	(0.048)	0.107***	(0.033)
Education	0.080**	(0.039)	0.081	(0.045)	0.069*	(0.039)
Location (Urban = 1)	0.282***	(0.050)			0.259***	(0.041)
PCI ranking	0.001	(0.001)	0.003**	(0.002)	0.000	(0.001)
Intercept	8.559***	(0.204)	10.214**	(3.982)	8.551***	(0.180)
Year effects	Yes		Yes		Yes	
R-squared	0.201		0.123		0.202	
Panel B: Firm growth						
Access to credit	0.064***	(0.015)	0.059***	(0.017)	0.065***	(0.015)
Firm age	−0.007***	(0.002)	0.001	(0.002)	−0.010***	(0.002)
Assets (log.)	0.161***	(0.012)	0.138***	(0.018)	0.166***	(0.011)
Registration	0.104**	(0.041)	0.040	(0.050)	0.115***	(0.040)
Investment	−0.055	(0.040)	−0.042	(0.043)	−0.069*	(0.041)
Network size	0.000**	(0.000)	0.000	(0.000)	0.001***	(0.000)
Firm growth	0.268***	(0.046)	0.238***	(0.049)	0.291***	(0.048)
Party member	−0.015	(0.058)	0.014	(0.073)	−0.026	(0.054)
Owner's age	−0.006***	(0.002)	−0.006**	(0.003)	−0.005***	(0.002)
Gender (Male = 1)	0.076**	(0.036)	−0.029	(0.048)	0.115***	(0.033)
Education	0.079**	(0.039)	0.081*	(0.045)	0.066*	(0.039)
Location (Urban = 1)	0.288***	(0.050)			0.260***	(0.041)
PCI ranking	0.001	(0.001)	0.004**	(0.002)	0.000	(0.001)
Intercept	8.879***	(0.181)	9.191***	(0.269)	8.830***	(0.165)
Year effects	Yes		Yes		Yes	
R-squared	0.203		0.172		0.204	

This table presents the impact of access to credit on labour productivity. Dependent variable is labour productivity. Columns [1], [3], and [5] denote the values of coefficients in random-effects IV, fixed-effects IV, and pooled OLS IV regressions, respectively. *, **, and *** denote significance at the 10, 5, and 1% levels, correspondingly. Robust standard errors are in parentheses shown in Columns [2], [4], and [6]. Number of observations is 6080.

the firm's competition at the industry level based on their main area of business and production activity. In Panel B, we use firm growth to capture economic activity, in which firm growth is estimated as the difference between the logarithm of growth in year t and that in year $t-1$. Results in both panels A and B show that with the consideration of industry-level competition and firm growth, respectively, our variable of interest—instrumented access to credit—has a positive impact on labour productivity at the 1% significance level. In particular, results show that firms having access to credit have a higher level of labour productivity by 6% than their counterparts. Further, in Panel A, industry-level competition has a positive effect on labour productivity, suggesting that firms facing competition have higher productivity than those who do not. This finding is consistent with previous studies that competition motivates firms in the production of additional innovation products (Shi et al., 2020), which leads to an increase in labour productivity (Woltjer et al., 2021). In Panel B, we find a positive relationship between growth and labour productivity, suggesting that firms with a higher growth rate have a higher level of labour productivity than their peers. Our finding is consistent with Choi and Choi (2017) who show that firms with high growing rates tend to be more productive as a result of higher capital intensity and more skilled workers.

5. Conclusions

5.1. Findings and contributions

This research brings several key empirical findings and contributions to the literature on credit access and firm performance. *First*, firm's credit access is measured by a dummy variable, in which a firm is considered to have credit access if it obtained either short-term or long-term loans or if it had informal loans. The investigation of both formal and informal financing enables us to comprehensively analyse the probability of firms having credit access as well as the effect of both capital sources on firm-level labour productivity.

Second, a longitudinal dataset on manufacturing SMEs scattered across Vietnam is generated by using data from a biennial SME survey from 2005 to 2013 and an annual PCI survey. The unique detailed dataset allows us to do a long-term analysis of the determinants of access to credit and the impact of credit access on labour productivity of SMEs in Vietnam. Although the Vietnam SME Survey data has been previously applied in several studies on credit and performance (Nguyen & Luu, 2013; Phan et al., 2015; Rand, 2007; Tran & Santarelli, 2013), this paper, to the best of our knowledge, is the first to make use of every available wave to create a long-term panel dataset for analyses. A unique dataset of SMEs and the business environment in Vietnam is constructed with the purpose to offer a comprehensive picture of the two most vital factors of SMEs' dynamics and growth, namely credit access and labour productivity.

Third, a two-stage regression method is applied to discover the determinants of credit access and its influence on labour productivity of firms. The instrumental variable regression for panel data is applied in the second stage as an efficient tool to overcome the problems of endogeneity. Two instrumental variables, captured by the distance from the firm to the most important creditor in terms of loan size and by credit history of firms, prove their validity as they are correlated to the likelihood of firms having credit access but not associated with the firm's labour productivity.

Fourth, this study finds that among SMEs, larger firms are more likely to have credit access than the counterparts. Besides, those making investment are 3.3-times more likely to have credit access than those who did not. Firms participating in more business associations are more likely to approach credit. Credit history and the distance from firms to the most important creditor in terms of loan size positively affect credit access. In terms of owner characteristics, firms whose owners are members of the Communist Party are more likely to have access to capital, while no significant effects of age, gender, and educational level of the owner on the firm's credit accessibility are found. With regard to the business environment, urban location, and PCI ranking negatively affect the likelihood that firms have credit access.

Fifth, we find that credit access has a positive effect on a firm's labour productivity. Credit-accessed firms have a higher level of productivity by 24.7% than their counterparts, affirming that better access to credit leads to better firm performance in the case of SMEs in Vietnam. Moreover, firm labour productivity is positively affected by a series of variables including firm size, registration under the Law on

Enterprises, network size, gender, education of the owner, and urban location. Conversely, firm age and owner's age have negative impacts on the productivity.

5.2. Policy recommendations

It is believed that the relationship between financing and SME growth is like the wheels of a car as the synchronisation of all components leads to a balanced and sustainable development of firms in particular and of the economy in general (Shinozaki, 2012). Therefore, one of the top priorities of each country, especially the developing nations, is to facilitate SMEs in their business to promote the national economic growth. To do so, adequate credit plays a crucial role in the survival and growth of firms, suggesting the importance of financial accessibility for the private sector's development on the side of a balanced global economy. Because SMEs have different demands for credit at different business stages, the efficiency of lending and the diversification of credit mechanisms should be essentially improved and tailored to facilitate SMEs having access to credit.

In the case of Vietnam, from the recognition of SMEs' difficulties in having credit access, the Draft Law of Supporting SMEs by the Vietnamese government intends to modify terms and conditions for both formal lenders and SMEs. Accordingly, the SME-supporting agents will help the firms have access to credit more easily by consulting loan applications, planning feasible business projects, and guiding them to use loans effectively. It is stipulated that commercial banks set up the proportion of loans for SMEs to be at least 30% of the total loan portfolio. To make this rate of funding, commercial banks should focus more on SME clients by offering banking products and services, credit bank guarantee, discount, financial leasing, and other credit operations in accordance with the size and characteristics of SMEs.

With regard to labour productivity, policies should focus on pursuing sustainable employment growth by increasing efficiency and productivity of the labour force. It is necessary to invest in human capital and provide workers with appropriate training programmes and education opportunities to enhance their existing knowledge and skills that meet the requirements of employers (Meyer-Boehm, 2002). Besides, incentives-related policies should be considered because of their positive impact on labour productivity. In sum, policy implications mentioned above are expected to assist the policy makers in Vietnam with inclusive viewpoints in facilitating SME access to credit and increasing firm labour productivity.

Notes

1. Akoten et al. (2006, p. 941) affirm that 'better access to credit improves firm performance'.
2. In Asian countries, SMEs take up to 90% of all enterprises and create 50–80% of all jobs.
3. Earlier studies on access to credit of firms pay separate attention to formal credit or informal credit (e.g. Buyinza & Bbaale, 2013; Cao, 2014; Le, 2012; McPherson & Rous, 2010).
4. Five East African Community countries include Uganda, Kenya, Rwanda, and Burundi.
5. Countries in Middle East and North Africa (MENA) include Algeria, Egypt, Morocco, Oman, Lebanon, Saudi Arabia, and Syria.
6. Although Ha Tay has been merged into Ha Noi since 2008, it has still been used as a separate province to ensure the consistency of the sample over years and make it comparable to previous surveys.
7. No further survey has been undertaken, and therefore, there is no additional data, since 2015.
8. The 2006 PCI is used instead of 2005 because it covered all cities and provinces in the country, including Phu Tho and Lam Dong, which were not surveyed in the 2005 PCI. As the first PCI survey was carried out in late October 2005, information and indices of the 2006 PCI is well-matched with those of 2005 (Van Vu et al., 2018).
9. We acknowledge that under the value zero, it mixes firms with access to credit and those without. A firm may not have a loan because it does not need it, not because it cannot get it. The zero value might include both firms that applied for a loan and were rejected and those that never applied because they did not need it. Given the data availability, it is not straightforward to disentangle the two types of firms.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, Van Thu Pham, upon reasonable request.

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Appendix A

Table A1. Description of variables.

Variable	Definition	Literature
<i>Dependent variable</i>		
Labour productivity (log.)	The ratio of revenue to the number of labours of a firm.	Xuefeng & Yaşar, 2016; Waheed, 2017
<i>Independent variables</i>		
Access to credit	Dummy variable, taking 1 if a firm obtained either short term or long term formal loan(s) or if a firm had informal loan(s), and 0 otherwise.	Le, 2012; Nguyen & Luu, 2013; Tran & Santarelli, 2013
Firm age	The age of firm in years, calculated by the difference between the survey year and firm's establishment year.	Motta, 2020; Rahaman, 2011
Assets (log.)	Firm economic size, measured by the logarithm of total assets.	Rahaman, 2011
Registration	Dummy variable, taking 1 if a firm registered under the Law on Enterprises or if a firm has Business Registration Application and 0 otherwise.	Archer, 2021; Wellalage & Locke, 2016
Investment	Dummy variable, taking 1 if a firm has made any investment since the last survey and 0 otherwise.	Tran & Santarelli, 2013
Network size	The number of business associations which a firm is a member of.	Tran & Santarelli, 2013
Party member	Dummy variable, taking 1 if the owner is a member of the Communist Party and 0 otherwise.	Nguyen & Luu, 2013
Owner's age	The age of owner/manager in years, calculated by the difference between the surveying year and the owner's year of birth.	Nguyen et al., 2019
Gender	Dummy variable, taking 1 if owner's gender is male and 0 if female.	Motta, 2020; Nguyen et al., 2019
Education	Dummy variable, taking 1 if the owner completed an undergraduate or a postgraduate program and 0 otherwise (No professional education, Vocational education, Technical secondary education).	Nguyen et al., 2019; Nguyen & Luu, 2013
Urban	Dummy variable, taking 1 if a firm is located in urban cities (Ha Noi, Hai Phong, Ho Chi Minh City) and 0 otherwise.	Nguyen & Luu, 2013
PCI ranking	The ranking of a province based upon its overall score of Provincial Competitiveness Index.	Cao, 2014; Le, 2012
<i>Control variables</i>		
Distance	Ordered variable, taking 0 if no distance, 1 if the distance is below 5 km, and 2 if the distance is above 5 km.	Ellis et al., 2010
Credit history	Dummy variable, taking 1 if a firm has borrowed from the main creditor (formal or informal) before and 0 otherwise.	Krasniqi, 2010