Formality and investments: Evidence of Vietnamese SMEs

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ABSTRACT

Business formality is considered a key driver in the development of the private sector in developing countries, which can contribute to enhancing the capacity and competitiveness of firms. The purpose of this paper is to investigate the impact of formality on investments of small and medium-sized enterprises (SMEs) in Vietnam. Different from previous work, we apply a two-stage method with random-effects Probit and Tobit regressions to control for endogeneity surrounding formality and investments. Results show that formality measured by having a tax code fosters all types of investments. However, formality proxied by having a full set of business registration documents decreases total and fixed investments but increases non-fixed investments. Our findings suggest that relaxing complex procedures, enhancing the knowledge of the owner, and improving the ease of doing business play a crucial role in the formalization of Vietnamese SMEs.

1. Introduction

Business formality is considered a key driver in the development of the private sector and business environment in developing countries (Archer, 2019; Bui et al., 2018; Rand et al., 2014). Firms' decision to formalize depends on the net benefits of registration and the costs of money, time, and information (De Mel et al., 2013; McKenzie and Sakho, 2010). Because of lower transaction costs, formally registered firms have better access to suppliers, buyers, credit markets, government subsidies, and other supporting programs (Joshi et al., 2014; Sharma, 2014). Becoming formal enables firms to issue official receipts and invoices for transactions, which leads to higher customer demand (Rand and Torm, 2012). These firms are also able to enforce official contracts, which might increase their investment incentives (Hart, 1995). However, an important trade-off should be considered prior to making a decision to become formal or stay in the informal sector. Formally registering entails high costs of entry and regulatory compliance, compliance with labor and environmental regulations, bureaucratic burden, and the possibility of paying bribes to

government officers (Rand et al., 2014; Sharma, 2014). Apparently, the formality decision can be considered as other firm's investment decisions.

Previous studies have highlighted the important role of formality and investments in firm growth and national economic development (Monteiro and Assunção, 2006; Nguyen et al., 2018a; Nguyen and Dong, 2013; Rand and Torm, 2012). Both formality and investments contribute to enhancing the capacity and competitiveness of firms, which may result in a higher level of performance and growth (Minh et al., 2019; Nguyen et al., 2016a; Nguyet, 2011; Rand and Torm, 2012). Formally registered firms are more likely to perform better with regard to higher profits and investments (McKenzie and Sakho, 2010; Rand and Torm, 2012). However, the association between formality or informality and investments has remained ambiguously.

Monteiro and Assunção (2006) showed that formality, on the one hand, can bring firms more opportunities to increase investments because of lower transaction costs and better access to credit. On the other hand, becoming formal entails certain costs deriving from bribes, which may decrease the number of resources to the investment of formal firms. Regardless of the trade-off to formalize, it cannot negate the crucial role of formality in the development of the private sector in developing countries. Nonetheless, studies on the effect of formality on firm-level investments in these countries are surprisingly scarce.

This current study aims to bridge the research gaps on formality and investments of SMEs in the

case of Vietnam. By employing a sample of more than 6,000 firm-year observations located in ten provinces, we investigate whether formality is a significant factor affecting firm-level investments. Our study examines not only total investments but also provides a further investigation of investments in fixed assets and non-fixed assets of firms. To the best of our knowledge, this is the first study that looks at the relationship between formality and different types of investments in the context of a developing country like Vietnam.

In this study, we consider the endogeneity of our key independent variable–*formality* and address the issue by employing a two-stage method. As formality is a binary variable, we develop a reduced-form equation in the first stage by using the random-effects Probit regression. The fitted values of formality are then obtained after the first stage and used as an instrumented variable in the second stage to capture the effect of formality on investments. This approach considers the construction of *formality* as a binary variable, hence provides more consistent estimated results compared to those produced by using the 2SLS method that would treat *formality* as a continuous variable. The relevance, quality, and validity of the instrumental variables are also checked to ensure consistent and unbiased estimates. Other factors related to firm and owner characteristics are also controlled.

The remaining of this study is structured as follows. Section 2 presents a literature review on formality and its impacts on entrepreneurial activities. Data sources, variables, and sample characteristics are demonstrated in Section 3. Research methods are outlined in Section 4. Section 5 provides empirical results and discussions, followed by a conclusion in Section 6.

2. Literature: Effects of formality on entrepreneurial activities

A number of previous studies have presented the significant effects of formality on firm performances or outcomes by applying various techniques such as propensity score matching (Fajnzylber et al., 2011; Monteiro and Assunção, 2006; Sharma, 2014), mixed methods of two-stage least squares and treatment effects (McKenzie and Sakho, 2010; Rand and Torm, 2012), or a field experiment (De Mel et al., 2013).

By using two-stage least squares and the maximum likelihood estimation of a treatment effects model, McKenzie and Sakho (2010) estimated the effect of tax registration on profits of 469 micro and small enterprises in Bolivia. Tax registration is found to have large effects on the profits of mid-sized firms in the sample. This can be explained by the substantial increases in the customer base as formal firms are able to issue official tax invoices. Adversely, marginal smaller and larger firms have lower levels of profits regardless of their formal status. Fajnzylber et al. (2011) employed data from the 1997 and 2003 Brazilian Survey of the Urban Informal Sector and the 1996 introduction of a

business tax reduction and simplification scheme (SIMPLES) to examine whether formalization affects firm performance in terms of revenues, employment, and capital stock. By applying the regression discontinuity and difference-in-difference approach, the authors find that newly created firms that decide to formally register have better performances, including higher levels of revenue and profit, more workers, and more capital intensity. However, the results might be self-selection biased as the sample only contains newly created firms that decide to formally register but not existing informal firms. Similarly, Sharma (2014) provided evidence on the causal effect of formality on the performance of Indian microenterprises. The kernel-matching estimator shows that formally registered firms have higher sales per employee and value-added per employee than informal firms by 32 and 56 percent, respectively.

Different from previous studies using secondary data, De Mel et al. (2013) implemented a field experiment of 369 firms in Sri Lanka to evaluate their demand for and the consequences of formalization through a treatment-effects method. Accordingly, registration is not mattered by information on the registration process and reimbursement of direct costs. Results from three follow-up surveys of the same firms show that those in the formal sector have higher profits. However, their approach focuses on the benefits of formality for firms already in business but does not evaluate the benefits of registration simplification that encourage entrepreneurs to establish firms and enter the formal sector.

In the case of Vietnam, Rand and Torm (2012) used the Survey of SMEs in 2007 and 2009 to investigate the benefits of formalization to firm profits, investments, credit access, and empowerment of workers. The fixed-effects regressions and propensity score matching are applied to show that becoming officially registered leads to an increase in profits and investments. Accordingly, firms in the formal sector have a higher investment share of 4.2 and 5.4 percentage points depending on the data match. Results from the two-stage least squares method also present that formal firms have a 3.8 percent higher investment share than do their counterparts. This finding is confirmed by Boly (2018) in a study on the benefits of formalization of Vietnamese SMEs between 2005 and 2013. It is presented that formality increases profits, value-added, and revenue of Vietnamese SMEs and that switching firms observe a larger effect of formality on their performances than informal firms.

To the best of our knowledge, there has been no study on the formality of firms in Vietnam that provides two measures of formality and examines the impacts of such measures on firm-level investments. In this current study, two indicators are used to capture formality, that is, whether firms have a tax code and whether firms have a full set of business registration documents, including a

business registration certificate, a tax registration certificate, and a seal engraving permit. Using these two proxies allows us to provide a better understanding of the formalization of firms in Vietnam and the change of its impact on firm investments. We also attempt to address the endogeneity issue surrounding formality and investments by employing the two-stage method to produce consistent estimates.

3. Data, variables, and sample characteristics

3.1. Data

Data are employed from the Survey of Small and Medium Scale Manufacturing Enterprises in Vietnam, which was conducted biennially from 2005 to 2013 with the purpose to gather and analyze data of the private sector in Vietnam (Nguyen et al., 2019; Phan and Archer, 2020). This survey was implemented in ten provinces (Ten provinces include: Ha Noi, Phu Tho, Ha Tay, Hai Phong, Nghe An, Quang Nam, Khanh Hoa, Lam Dong, Ho Chi Minh City, and Long An) across Vietnam under the research cooperation between the Central Institute for Economic Management (Vietnam), Institute of Labor Science and Social Affairs (Vietnam), and the University of Copenhagen (Denmark). This firm-level dataset provides a rich source of information on firm characteristics and history, owner characteristics, production, sales structure, costs and services,

investments and financing, taxes and informal payments, employment, etc.

3.2. Variables

To measure investment activities of SMEs in Vietnam, this paper examines the amount of money that firms invested in fixed assets (land, buildings, equipment, and machinery) and non-fixed assets (research and development, patents, labor training, and others) as well as in general investment activities as a whole.

Table 1 presents the variables used in the research. The regressor of our interest is a formality, proxied by two dummy variables on whether or not firms have a tax code and whether or not firms obtain business registration documents. Following Rand and Torm (2012), we use tax registration to measure the formality of SMEs in Vietnam because of its precision in reflecting the legal status of firms. Further, we use the full set of business registration documents as another measure of a formality given the Vietnamese legislation on business registration of enterprises. As household businesses are registered without a seal, the business registration documents of this ownership exclude a seal engraving permit. The two proxies of formality enable us to provide a comprehensive understanding of the formality of firms in Vietnam.

Table 1: Variable description

Variable	Description
Total investments (log.)	Logarithm of the amount of money that firms invested since the last survey
Fixed investments (log.)	Logarithm of the amount of money that firms invested in fixed assets (including land, buildings, equipment, and machinery) since the last survey
Non-fixed investments (log.)	Logarithm of the amount of money that firms invested in non-fixed assets (including research and development, patents, labor training, investments in other enterprises, working capital, and other investments) since the last survey
Having a tax code	1 if firms have a tax code, 0 otherwise
Having business registration documents (BRDs)	1 if firms have a full set of business registration documents, 0 otherwise
Debt ratio	The ratio of debt to total assets
Firm age	The difference between the surveyed year and year of establishment of firms
Firm size (log.)	Logarithm of total number of employees
Networking	1 if firms are a member of at least one business association, 0 otherwise
Gender of owner	1 if owner is male, 0 otherwise
Age of owner	The difference between the surveyed year and year of birth
Education	1 if the owner completed an undergraduate or a postgraduate program, 0 otherwise
Location	1 if firms are located in urban areas (Ha Noi, Hai Phong, Ho Chi Minh City), 0 otherwise
Provincial competitiveness index	This overall index measures the provincial-level economic governance and business environment in Vietnam
Time to obtain BRDs	Mean of days to obtain business registration documents by year, province, and legal status
Inspection	1 if firms are inspected by government officials, 0 otherwise
Knowledge of enterprise law	Knowledge of the owner about the Law on Enterprises: 1–Good knowledge, 2–Average knowledge, 3–Poor knowledge, 4–No knowledge or interest

In Table 1, we also present three instrumental variables to deal with the endogeneity problem surrounding formality and firm-level investments. Other control variables including firm characteristics (debt ratio, firm age, firm size, networking), owner characteristics (gender, age, educational level), and provincial competitiveness index are added in our analysis of investments (Nguyen et al., 2018b; Rand and Torm, 2012).

3.3. Sample characteristics

Summary statistics are demonstrated in Table 2. As seen, formally registered firms, regardless of the measure of formality, have a higher magnitude of total investments (around 415 million VND), fixed investments (262.5 million VND), and non-fixed investments (152.6 million VND)–than informal firms. This is also described by Monteiro and Assunção (2006) with regard to higher investment

rates and higher amounts invested by registered firms.

Formal firms have a higher debt ratio, on average than informal firms by 4 percent. Rand and Torm (2012) showed that formal firms have better access to credit and are less constrained. Firms in the formal sector have a higher debt ratio than those in the informal sector by 1.5 times. Formal registration enables firms to benefit from key public goods and enforcement of property rights, which brings firms higher chances to participate in the formal credit market. Table 2 also shows that formal firms are substantially large-sized in terms of employees with

1.6 to 2 times, on average, larger than their counterparts. This characteristic is consistent with Rand and Torm (2012) in the case of SMEs in Vietnam, as our sample size does not cover the informal sector as a whole. Firms in the formal sector are two-year younger, more networked, and have more female owners with better educational levels. An important characteristic of formal firms is that they are mostly located in urban cities or provinces with a higher provincial competitiveness index, referring to a more favorable business environment.

Table 2: Descriptive statistics

Variable	Full set		Having a tax code				Having BRDs			
			Yes		No		Yes		No	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Total investments (log.)	6.112	5.845	6.810	6.138	5.137	5.257	7.054	6.223	4.930	5.092
Fixed investments (log.)	4.342	5.498	4.897	5.905	3.567	4.768	4.900	5.985	3.642	4.726
Non-fixed inv. (log.)	3.291	5.259	3.727	5.595	2.681	4.682	4.087	5.786	2.291	4.307
Debt ratio	0.098	0.320	0.115	0.383	0.073	0.197	0.117	0.296	0.074	0.346
Firm age	15.236	10.123	14.365	9.714	16.453	10.550	14.326	9.434	16.379	10.820
Firm size (log.)	1.951	1.131	2.338	1.107	1.410	0.923	2.424	1.133	1.356	0.798
Networking (Yes=1)	0.099	0.299	0.131	0.337	0.055	0.229	0.143	0.350	0.045	0.206
Gender of owner (Male=1)	0.669	0.471	0.646	0.478	0.701	0.458	0.634	0.482	0.714	0.452
Age of owner	46.509	10.420	46.681	10.824	46.268	9.823	46.705	10.981	46.263	9.665
Education	0.250	0.433	0.327	0.469	0.143	0.350	0.362	0.481	0.110	0.313
Location (Urban=1)	0.359	0.480	0.512	0.500	0.144	0.352	0.525	0.499	0.150	0.358
Provincial comp. index	57.060	5.262	58.540	4.930	54.989	5.007	58.904	4.514	54.743	5.218
Time to obtain BRDs (avg.)	22.481	27.083	25.280	28.778	18.567	23.981	21.374	25.703	23.871	28.667
Inspection (Yes=1)	0.330	0.470	0.452	0.498	0.159	0.366	0.427	0.495	0.208	0.406
Knowledge on enterprise law	2.887	1.055	2.570	1.045	3.331	0.897	2.506	1.047	3.367	0.851

4. Research methods

Formality is likely to be an endogenous variable in the analytical equation of firm outcomes because of self-selection bias (McKenzie and Sakho, 2010; Rand and Torm, 2012). The endogeneity can arise in the case of unobserved variables that affect both formality and investments of firms. Time-variant factors such as changes in the law on enterprises or the enactment of business legislation can impact decisions of formalization and investments. Further, the variation of economic conditions or changes in a business environment can be considered as factors that might affect formality and investments (Rand and Torm, 2012). These omitted and unobserved factors can be another channel that causes biased estimates.

To overcome the endogeneity and obtain consistent estimates, we use three variables–average time to obtain a full set of business registration documents by year-province-ownership structure, an inspection of government officials, and knowledge on enterprise law of owners–to work as instruments for tax code and business registration documents. The selected instruments have pointed out to significantly affect the formality of firms (McKenzie and Sakho, 2010; Rand and Torm, 2012) but not to have independent effects on firm-level investments.

In this paper, we apply the two-stage approach to address the endogeneity of formality. In the first stage, we regress formality on a set of instruments and other explanatory variables by using a random-

effects Probit model as a reduced-form equation (Arulampalam, 1999). Fitted values are obtained after the first stage and used as an instrumented formality in the second stage with a random-effects Tobit model; See, for example, Nguyen et al. (2016a; 2016b).

4.1. The first stage: Random-effects Probit model

From the justifications above, the formality of firms is a function of instruments and other factors, described in Eq. 1 as follows:

$$FORM_{it} = \begin{cases} 0 \; if \; FORM_{it}^* \leq 0 \\ 1 \; if \; FORM_{it}^* > 0 \end{cases} \tag{1}$$

where $FORM_{it}$ is a formality of firm i at time t, measured by two binary variables–including whether firms have a tax code or whether firms have a full set of business registration documents.

$FORM_{it}^*$ denotes a latent variable or unobservable variable as follows:

$$FORM_{it}^* = \delta_0 Z_{it} + \delta_1 X_{it} + \varepsilon_{it} \tag{2}$$

where Z_{it} is a vector of instrumental variable which, in this current paper, including three variables: time to obtain business registration documents, an inspection of government officials, and knowledge on enterprise law of owners; X_{it} is a vector of exogenous independent variables; ε_{it} is a classical random error term; $\varepsilon_{it} \sim N(0, \sigma_\varepsilon^2)$.

4.2. The second stage: Random-effects Tobit model

In the second stage, we apply the random-effects Tobit model, or censored regression model, to investigate the impacts of formality on investments. The data generating process can be formed in Eq. 3 as:

$$INV_{it} = \begin{cases} 0 & if \ INV_{it}^* \leq 0 \\ INV_{it}^* & if \ INV_{it}^* > 0 \end{cases} \tag{3}$$

where INV_{it} is investments of firm i at time t and measured by total investments, fixed investments, and non-fixed investments. INV_{it}^* is a latent variable as:

$$INV_{it}^* = \beta_1 FORM_{it}^{IV} + \beta_2 X_{it} + \varepsilon_{it} \tag{4}$$

where $FORM_{it}^{IV}$ is the fitted values of formality, obtained from the first-stage regression; β_1 captures the impact of formality on firm-level investments.

5. Results and discussion

5.1. The first stage

Table 3 reports the results after running the random-effects Probit regression in the first stage. In

this study, we focus on explaining the relevance and validity of instrumental variables instead of analyzing factors affecting formalization. Formality is proxied by having a tax code (Panel A) and business registration documents (Panel B). In Panel A, two variables are used as instruments for tax code, including inspection of government officials and knowledge of the owner on enterprise law. The validity and relevance of these instrumental variables are presented in Table 4. As seen in Table 3, both instruments significantly affect the likelihood of firms to formally register. In Panel B, we select the average time to obtain a full set of business registration documents by year-province-ownership structure to become the instrument for formality. McKenzie and Sakho (2010) and Rand and Torm (2012) highlighted the impact of time costs (the time is taken to obtain municipals licenses) on formalization. As seen in Table 3, this variable has a highly significant and negative influence on the likelihood of firms to formalize. Firms are less likely to formally register if it takes them a long time to obtain the BRCs. The delays in obtaining business licenses and registration are considered bureaucratic problems faced by SMEs (Rand and Tarp, 2010). However, very few enterprises consider obtaining licenses and permit a major hindrance to their growth (Nguyen et al., 2008).

Table 3: The first stage: Determinants of formality using random-effects Probit regression

Variable	Having a tax code (A)		Having BRDs (B)	
	M.E.	S.E.	M.E.	S.E.
Inspection (Yes = 1)	0.674***	(0.080)		
Knowledge on enterprise law	-0.156***	(0.033)		
Time to obtain BRDs (avg.)			-0.012***	(0.002)
Debt ratio	0.014	(0.093)	-0.032	(0.093)
Firm age	0.002	(0.004)	-0.007**	(0.004)
Firm size (log.)	0.454***	(0.052)	0.822***	(0.049)
Networking (Yes = 1)	0.272**	(0.124)	0.388***	(0.130)
Gender of owner (Male = 1)	0.015	(0.079)	-0.143**	(0.069)
Age of owner	0.011**	(0.005)	0.011***	(0.004)
Education	0.314***	(0.080)	0.595***	(0.082)
Provincial competitiveness index	0.065***	(0.008)	0.090***	(0.007)
Location dummy	Yes		Yes	
Year dummy	Yes		Yes	

This table reports the results of factors affecting the likelihood of formality by using random-effect Probit regression. Results of two panels are presented: those having a tax code (Panel A) and those having Business Registration Documents (BRDs) (Panel B). Marginal effects are reported. Asterisks denote significance at 10% (*), 5% (**), and 1% (***). Standard errors are in parentheses.

After the first stage, we perform several tests to check the endogeneity problem between formality and investments as well as to prove the validity and relevance of our instruments (Table 4). χ^2-statistics of the Hausman test in both panels show significant evidence on the endogeneity, implying that formality is indeed endogenous in the three structural equations with different dependent variables. The significance of the Kleibergen-Paap LM statistics suggests a rejection of the null hypothesis of under-identification and indicates that the model is identified, or in other words that the excluded instruments are relevant in both panels. The significance of F-statistics under the weak identification test (17.293 and 105.833 in Panels A and B respectively, with P-value=0.000) provides us

with a rejection of the null hypothesis that the equation is weakly identified or that the excluded instruments are weakly correlated with the endogenous regressors.

5.2. The second stage

Our estimates of the registration impact on firm-level investments are reported in Tables 5 and 6. We first analyze the influence of having a tax code on investments. Columns A1, B1, and C1 show the pooled Tobit estimates with investments, investments in fixed assets, and investments in non-fixed assets, respectively. The marginal effects indicate that, on average, formally registered firms, proxied by having a tax code, have 50.7 percent

higher investments, 39.63 percent higher fixed investments, and 38.7 percent higher non-fixed investments than non-registered firms. Results from the random-effects Tobit regressions shown in columns A2, B2, and C2 confirm this positive sign but with a larger magnitude of coefficients.

Table 4: Tests on endogeneity surrounding formality and investments

	Total investments (log.) (1)		Fixed investments (log.) (2)		Non-fixed investments (log.) (3)	
Panel A: Having a tax code						
Hausman test of endogeneity χ^2	3.133	[0.077]	3.946	[0.047]	5.354	[0.021]
Kleibergen-Paaprk LM statistic (Under-identification test) χ^2	34.345	[0.000]	34.345	[0.000]	34.345	[0.000]
Kleibergen-Paaprk Wald F-statistic (Weak identification test)	17.293	[0.000]	17.293	[0.000]	17.293	[0.000]
Hansen-J statistic (Over-identification test of all instruments) χ^2	0.470	[0.493]	1.442	[0.230]	1.871	[0.171]
Panel B: Having Business Registration Documents (BRDs)						
Hausman test of endogeneity χ^2	17.794	[0.000]	62.117	[0.000]	14.325	[0.000]
Kleibergen-Paaprk LM statistic (Under-identification test) χ^2	210.607	[0.000]	210.607	[0.000]	210.607	[0.000]
Sanderson-Windmeijer multivariate F-test (Weak identification test)	105.833	[0.000]	105.833	[0.000]	105.833	[0.000]

This table reports the tests of endogeneity by two panels: having a tax code (Panel A) and having Business Registration Documents (BRDs) (Panel B). Three columns represent the results of three dependent variables: total investments (Column (1)), fixed investments (Column (2)), and non-fixed investments (Column (3)). P-values are in brackets.

Compared to informal enterprises, formally registered firms have higher fixed investments and non-fixed investments by 39.7 and 41.3 percent, respectively. In the case of Vietnamese SMEs, most enterprises make investments to add to their existing production capacity by replacing old equipment and machinery (fixed investments) and investing in new products and innovation (non-fixed investments) (Rand et al., 2014). Becoming formal by having a tax code contributes to boosting firm-level investments, which is consistent with Rand and Torm (2012) on the positive association of formality and investments. Apparently, our pooled Tobit and random-effects Tobit estimates suggest a significant and positive effect of formality by having a tax code on firm-level investments.

Table 5: The second stage: Impact of having a tax code on investments

Variable	Total investments (log.) (A)		Fixed investments (log.) (B)		Non-fixed investments (log.) (C)	
	(A1)	(A2)	(B1)	(B2)	(C1)	(C2)
	Pooled Tobit	RE Tobit	Pooled Tobit	RE Tobit	Pooled Tobit	RE Tobit
Having a tax code (instrumented)	0.507*	0.527**	0.396*	0.397*	0.387*	0.413*
	(0.259)	(0.264)	(0.222)	(0.232)	(0.223)	(0.227)
Debt ratio	2.098***	1.942***	0.881***	0.810***	1.594***	1.544***
	(0.552)	(0.229)	(0.239)	(0.197)	(0.453)	(0.174)
Firm age	-0.040***	-0.033***	-0.034***	-0.031***	-0.011	-0.010
	(0.010)	(0.009)	(0.008)	(0.008)	(0.008)	(0.007)
Firm size (log.)	1.770***	1.724***	1.353***	1.351***	0.662***	0.644***
	(0.172)	(0.174)	(0.150)	(0.154)	(0.141)	(0.145)
Networking (Yes=1)	0.518*	0.606**	0.269	0.356	0.484**	0.489**
	(0.280)	(0.292)	(0.252)	(0.254)	(0.221)	(0.231)
Gender of owner (Male=1)	0.385**	0.231	0.518***	0.433***	0.117	0.058
	(0.190)	(0.180)	(0.173)	(0.160)	(0.146)	(0.145)
Age of owner	-0.044***	-0.044***	-0.032***	-0.032***	-0.020***	-0.020***
	(0.009)	(0.009)	(0.008)	(0.008)	(0.007)	(0.007)
Education	0.458**	0.451**	0.127	0.088	0.556***	0.561***
	(0.227)	(0.217)	(0.206)	(0.194)	(0.184)	(0.178)
Provincial competitiveness index	-0.115***	-0.085***	-0.153***	-0.140***	0.058***	0.072***
	(0.026)	(0.026)	(0.022)	(0.023)	(0.022)	(0.023)
Location dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.043		0.046		0.038	

This table reports the marginal effects in left-censored regressions of the impact of having a tax code on investments. Dependent variables include total investments (Panel A), fixed investments (Panel B), and non-fixed investments (Panel C). Results from Pooled Tobit are reported (Columns A1, B1, and C1) to compare with those from random-effects Tobit (Columns A2, B2, and C2). Asterisks denote significance at 10% (*), 5% (**), and 1% (***). Standard errors are in parentheses.

Results on the effect of formality on investments look quite interesting when we measure the formality of firms by having a full set of business registration documents, including a business registration certificate, a tax code certificate, and a seal engraving permit. Columns A2, B2, and C2 in Table 6 report our estimates from the random-effects Tobit regression. Accordingly, formality measured by business registration documents negatively affects total investments and investments in fixed assets but remains its positive relationship with investments in non-fixed assets.

In our study, formality, if measured by obtaining business registration documents, becomes more complex. This proxy of formality is tighter than the first measure by having a tax code once we consider

whether a firm is formal. Formally registered firms, given this measure, are required to satisfy more terms and regulations to obtain these certificates, making formalization time consuming and costly (Monteiro and Assunção, 2006). Consequently, it reduces the resources used for investments. The reasons derive from both sides of firms and local governments. From the firm side, the shortage of knowledge on specific laws and government regulations causes the burden of bureaucracy once firms decide to formalize (Rand et al., 2014). The perception and understanding of firm owners on laws and regulations are quite poor and believed to be weaker over time, which results in obstacles once firms decide to become formal.

Table 6: The second stage: Impact of having business registration documents (BRDs) on investments

Variable	Total investments (log.) (A)		Fixed investments (log.) (B)		Non-fixed investments (log.) (C)	
	(A1)	(A2)	(B1)	(B2)	(C1)	(C2)
	Pooled Tobit	RE Tobit	Pooled Tobit	RE Tobit	Pooled Tobit	RE Tobit
Having BRDs (instrumented)	-0.139	-0.520**	-0.784***	-1.086***	1.092***	1.023***
	(0.256)	(0.254)	(0.214)	(0.216)	(0.253)	(0.238)
Debt ratio	2.100***	1.921***	0.847***	0.759***	1.648***	1.598***
	(0.554)	(0.229)	(0.245)	(0.197)	(0.444)	(0.174)
Firm age	-0.040***	-0.035***	-0.037***	-0.035***	-0.006	-0.006
	(0.010)	(0.009)	(0.008)	(0.008)	(0.008)	(0.007)
Firm size (log.)	2.169***	2.435***	2.204***	2.442***	0.002	0.053
	(0.223)	(0.222)	(0.186)	(0.192)	(0.215)	(0.203)
Networking (Yes = 1)	0.719**	0.959***	0.674***	0.879***	0.204	0.242
	(0.281)	(0.296)	(0.255)	(0.257)	(0.233)	(0.236)
Gender of owner (Male = 1)	0.371*	0.165	0.421**	0.285*	0.259*	0.203
	(0.193)	(0.184)	(0.175)	(0.163)	(0.149)	(0.147)
Age of owner	-0.037***	-0.032***	-0.018**	-0.015*	-0.027***	-0.026***
	(0.009)	(0.009)	(0.008)	(0.008)	(0.007)	(0.007)
Education	0.750***	0.996***	0.791***	0.955***	0.013	0.063
	(0.253)	(0.254)	(0.234)	(0.223)	(0.216)	(0.216)
Provincial competitiveness index	-0.063*	0.009	-0.044	0.004	-0.025	-0.005
	(0.033)	(0.032)	(0.028)	(0.027)	(0.030)	(0.029)
Location dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.043		0.047		0.039	

Notes: This table reports the marginal effects in left-censored regressions of the impact of having Business Registration Documents (BRDs) on investments. Dependent variables include total investments (Panel A), fixed investments (Panel B), and non-fixed investments (Panel C). Results from Pooled Tobit are reported (Columns A1, B1, and C1) to compare with those from random-effects Tobit (Columns A2, B2, and C2). Asterisks denote significance at 10% (*), 5% (**), and 1% (***). Standard errors are in parentheses.

Column C2 in Table 6 shows that obtaining business registration documents significantly impacts investments in non-fixed assets, among which firms concentrate on innovation investments. If interpreting innovation as a short-term goal of the firm (Nguyen at al., 2016b), innovation investments are very similar to other business transactions, and formality enables firms to make such transactions in a more favorable way. Moreover, Monteiro and Assunção (2006) documented that the income streams generated from non-fixed factors are more concentrated in the short-run when compared to the other items, leading formal firms to be more forward-looking than their counterparts. Irrespective of the significantly positive effect of formality on non-fixed investments, our finding does not necessarily imply that time costs and informal charges to issue a business registration certificate are good for these investment activities in the long-run. Therefore, releasing barriers to licensing is highly necessary to improve the ease of doing business in Vietnam.

6. Conclusion

Employing a longitudinal dataset from the Survey of Manufacturing SMEs in Vietnam, this paper contributes to the existing literature by investigating the impact of formality on firm-level investments of SMEs in Vietnam. It provides fresh evidence of the association between formality and investments in different categories: Total investments, investments in fixed assets, and investments in non-fixed assets in the case of Vietnam. Our research confirms the results by Rand and Torm (2012) that becoming formality by having a tax code fosters the investment share of SMEs in Vietnam. Besides, we find that formality, if proxied by business registration documents, has significantly negative effects on total investments and fixed investments but a positive impact on non-fixed investments. In this case, becoming officially registered requires firms to satisfy more terms and regulations to obtain certificates, which decreases the number of resources available to investments (Monteiro and Assunção, 2006).

All in all, our study confirms the importance of formality to firm-level investments. Facilitating firms to obtain official certificates might indirectly affect economic growth through the channels of formality and investment (Monteiro and Assunção, 2006). Thus, an improvement in doing business, the efficiency of finance for private firms in Vietnam, and a transparent legal framework highly need to be considered so as to decrease informal charges, which may then result in a higher amount of investments (Yilmaz, 2017). Our study also emphasizes the need to enhance the knowledge and awareness of owners

about the registration procedure in recognition of the firm's potential growth in the formal sector (Rand and Torm, 2012). Further analysis of how individual indicators of the provincial-level business environment affect formality and investments can be taken into account in future studies.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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