

Labor productivity of household businesses in Vietnam



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ABSTRACT

This study aims to investigate the factors affecting the labor productivity of household businesses in Vietnam. By using data from the 2015 Small and Medium Scale Manufacturing Enterprises in Vietnam, the authors found that labor productivity was affected by a number of firms' and owners' characteristics, including firm size, firm age, investment, competition, networking, female share, salary, and owner's age. The study further examined the effects of these determinants on labor productivity through different quantiles (25th, 50th, and 75th quantiles). Policy implications were discussed.

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1. Introduction

In the context of international integration and global competition, enhancing a firm's labor productivity is a decisive factor to boost the competitiveness of the national economy, especially for developing countries like Vietnam, where the market likely remains labor-intensive. Basically, labor productivity reflects the capacity of an agent, such as a country or a firm, in generating wealth. The efficiency of a specific worker in the production process is often measured by the number of products or the value created in a unit of time or the amount of time that a worker spends producing a unit of product. Thus, increasing labor productivity plays a vital role in the economic growth of each country in the world. According to the General Statistics Office of Vietnam, labor productivity contributed about 89% of GDP growth in 2017, which was 23.3% and 27% higher than that in the periods 1990-2000 and 2000-2012, respectively. Specifically, the labor productivity of Vietnam's economy at 2017 current prices was estimated at VND93.2 million per worker.

However, Vietnam's current level of labor productivity is still relatively low compared to other countries in the region. According to the 2011 Purchasing Power Parity, Vietnam's labor

productivity in 2017 reached US\$10,232, equivalent to 7.2% of Singapore's, 18.4% of Malaysia's, 36.2% of Thailand's, and 55% of the Philippines'. Thus, enhancing labor productivity for Vietnamese firms is an important topic so that we can catch up with other countries in the region and contribute to the poverty reduction campaign (Hoang et al., 2014; Jenkins, 2004; Nguyen et al., 2018). This study aims to examine the factors affecting the labor productivity of Vietnamese household businesses through answering the following research question: "What are determinants of labor productivity of household businesses in Vietnam?"

By employing data from the Survey of Small and Medium Scale Manufacturing Enterprises in Vietnam in 2015, this study found that firm's and owner's characteristics, including firm size, firm age, investment, competition, networking, female share, salary, and owner's age are associated with labor productivity.

The study is organized as follows. Section 2 presents a literature review. Section 3 highlights data and methods. Section 4 reports results, including both descriptive statistics and empirical results. Section 5 concludes.

2. Literature review

Labour productivity has been of researchers' interest, especially in the context of developing countries like Vietnam, where the labor market is usually intensive (Ho, 2014; Ha et al., 2019; Minh et al., 2019; Nguyet, 2011; Nguyen et al., 2015; Tran and La, 2018; Vinh, 2019). According to the neoclassical growth model introduced by Solow

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(1957), labor productivity is driven by total factor productivity (TFP) and capital deepening, which has been acknowledged as one of the key determinants of economic growth in the long run. For example, [Nguyet \(2011\)](#) relied on fixed and random-effects models to examine the impact of technology facilities and development investments on labor productivity as well as the determinants of productivity of Vietnamese enterprises. The author highlighted that the effects of information technology facilities and development investments on labor productivity were driven by contextual moderating factors.

[Ho \(2014\)](#) used the EKS method introduced by [Eltető and Köves \(1964\)](#) to generate transitive multilateral comparisons to estimate the determinants of agricultural TFP levels across 60 provinces in Vietnam. The author documented several important findings, including capital intensity of Vietnam's agricultural sector, a higher productivity level of provinces in South Vietnam, the importance of labor mobility in resources accumulation in agriculture and TFP growth; and the factors affecting agricultural TFP (including land quality, farm size, and land fragmentation).

[Minh et al. \(2019\)](#) used Olley–Pakes static and dynamic productivity decomposition methods to measure TFP growth and job reallocation in the Vietnamese manufacturing industry after the 1986 political-socio-economic reform Doi Moi. The authors indicated two main reasons for TFP growth, including the within-firm productivity and net entry components. In Vietnam, household businesses are defined as privately owned economic organizations, or also called individual business establishments, under the Law on Enterprise. In particular, a household business has a definite address and operates with at least one full-time employee ([GSO, 2015](#)).

A report by [CIEM \(2016\)](#) showed that household enterprises occupy the largest share of all surveyed enterprises, with 63 percent, of which 81% are micro firms. In Vietnam, household firms are less likely to make new investments compared to other forms of legal status. This group also has lower access to credit and appears to stay in the informal sector. Because of small size, particularly micro-firms that have less than or equal to 10 employees, the labor productivity of this group tends to be lower than other forms of businesses.

Different from previous studies, our paper uses another measure of labor productivity as per-worker output, as used by [OECD \(2001\)](#). This approach allows us to capture the optimal allocation of input quantities in the production process rather than focusing on technical efficiency as in TFP-related studies ([Topalova and Khandelwal, 2011](#)).

3. Data and methods

3.1. Data

Data are sourced from the most newly conducted Survey of Small and Medium Scale Manufacturing

Enterprises in Vietnam in 2015. The survey was the research collaboration among several parties, including the Central Institute for Economic Management (CIEM Vietnam), the Institute of Labour Science and Social Affairs (ILSSA Vietnam), the Development Economics Research Group (DERG) at the University of Copenhagen (Denmark), and the United Nations University (UNU-WIDER Finland). Data were collected from around 2,500 enterprises via face-to-face interviews with firm's managerial representatives in nine provinces of the country: Ha Noi (including Ha Tay), Hai Phong, Ho Chi Minh City, Phu Tho, Nghe An, Quang Nam, Khanh Hoa, Lam Dong, and Long An ([Table 1](#)).

Data and information cover almost all firm-related issues, such as enterprise history, household characteristics, production characteristics, sales structure and export, employment, investments and credit, networks, economic constraints, and potentials, among others. The survey has been widely used in previous studies on SMEs in Vietnam ([Archer, 2019](#); [Hansen et al., 2009](#); [Rand, 2007](#); [Nguyen et al., 2019](#)).

As the main purpose of this study is of household firm's labor productivity, we rely on legal status to generate a household-owned dataset and eliminate other observations that are non-household owned. The sample consists of 1,662 household observations.

3.2. Methods

3.2.1. Variable description

This study follows literature to identify a vector of a firm's and owner's characteristics to determine factors affecting firm performance under the form of labor productivity ([Nguyen et al., 2016](#); [2018](#); [Nguyen and Phan, 2015](#); [Phan, 2011](#)). A variable description is presented in [Table 2](#), in which the dependent variable–labor productivity–is measured by the logarithm of the ratio of revenue to total employees.

This study explores a set of independent variables, including firm size (SIZE), firm age (F_AGE), debt (DEBT), investment (INV), technology (TECH), competition (COMP), formality (FORM), networking (NW), female share (FEMS), training (TRAIN), salary (SAL), male (MALE), owner's age (O_AGE), and sector (SEC).

Table 1: Household businesses by province ([CIEM, 2016](#))

Province	Frequent	Percent	Cumulative
Ha Noi	120	7.22	7.22
Phu Tho	223	13.42	20.64
Ha Tay	306	18.41	39.05
Hai Phong	107	6.44	45.49
Nghe An	267	16.06	61.55
Quang Nam	130	7.82	69.37
Khanh Hoa	58	3.49	72.86
Lam Dong	65	3.91	76.77
Ho Chi Minh City	287	17.27	94.04
Long An	99	5.96	100

3.2.2. Methods

This study uses the Ordinary Least Square to evaluate the determinants of labor productivity of household firms in Vietnam. The model is given as:

$$\log LP_i = \beta_0 + \beta_1 SIZE_i + \beta_2 F_AGE_i + \beta_3 DEBT_i + \beta_4 INV_i + \beta_5 TECH_i + \beta_6 COMP_i + \beta_7 FORM_i + \beta_8 NW_i + \beta_9 FEMS_i + \beta_{10} TRAIN_i + \beta_{11} SAL_i + \beta_{12} MALE_i + \beta_{13} O_AGE_i + \beta_{14} SEC_i + error$$

in which variables are defined in Table 2.

Table 2: Variable description

Variables	Description
Dependent variable	
Labor productivity logLP	The logarithm of the ratio of revenue to total employees
Independent variables	
Firm size SIZE	The logarithm of total assets
Firm age F_AGE	The difference between the survey year and year of establishment
Debt DEBT	The logarithm of total liabilities
Investment INV	Dummy variable; =1 if a firm had an investment; =0 otherwise
Technology TECH	Dummy variable; =1 if a firm had innovation activity; =0 otherwise
Competition COMP	Dummy variable; =1 if a firm faced competition in the field of activity; =0 otherwise
Formality FORM	Dummy variable; =1 if a firm is formally registered; =0 otherwise
Networking NW	Dummy variable; =1 if a firm is a member of at least one business association; =0 otherwise
Female share FEMS	The share of the female labor force to total employees
Training TRAIN	Dummy variable; =1 if a firm normally trains existing workers; =0 otherwise
Salary SAL	The logarithm of the average monthly wage for a production worker
Male (Yes = 1) MALE	Dummy variable; =1 if the owner is male; =0 if female
Owner's age O_AGE	The difference between the survey year and year of birth of the owner
Sector SEC	Sector of business

Further, this study uses quantile regressions, known as median regression, to estimate the median of the dependent variable–labor productivity (LP), conditional on the values of the independent variables.

4. Results

4.1. Descriptive statistics

Table 3 shows the descriptive statistics, including mean, standard deviation, minimum, and maximum values, of all variables used in this study to examine the factors affecting the household's labor productivity in Vietnam. Notably, the mean of labor productivity was 5.023 (in logs), while the firm size was, on average, 6.306 (in logs). The average age of household businesses was approximate 19 years. Averagely, total debt reached 1.171 (in logs). 42% of households made the investment, while 31% engaged in innovation activities. On average, 85% of households faced competition in their business fields. In terms of formality, 45.3% of firms reported that they are formally registered. Only 4.5%, on average, had networked with at least one business association. The share of the female labor force was 38.1%, on average. This study only recorded 2.3% of households doing training for existing workers. The salary for one production worker was 6.687 (in logs) on average. 64.6% of household firms were owned by male entrepreneurs. The average age of the owner was 48 years old.

(DEBT), investment (INV), competition (COMP), formality (FORM), networking (NW), female share (FEMS), salary (SAL), male (MALE), owner's age (O_AGE), are significantly associated with labor productivity (LP) at 5% significance level. The absolute value of each pair of variables is smaller than 0.8, suggesting no serious problem of multicollinearity. Two variables–technology (TECH) and training (TRAIN)–have no significant relationship with labor productivity.

Table 3: Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
logLP	1,646	5.023	0.793	0.811	11.346
SIZE	1,662	6.306	1.475	1.504	10.729
F_AGE	1,660	18.637	10.577	2.000	61.000
DEBT	1,662	1.171	2.004	-0.693	8.269
INV	1,662	0.420	0.494	0.000	1.000
TECH	1,662	0.310	0.463	0.000	1.000
COMP	1,662	0.850	0.358	0.000	1.000
FORM	1,662	0.453	0.498	0.000	1.000
NW	1,662	0.045	0.206	0.000	1.000
FEMS	1,662	0.381	0.281	0.000	1.000
TRAIN	1,662	0.023	0.150	0.000	1.000
SAL	1,662	6.687	1.811	4.585	9.210
MALE	1,662	0.646	0.478	0.000	1.000
O_AGE	1,662	48.451	10.222	21.000	89.000

4.2.2. Regression results

Table 5 presents results from the OLS regression regarding factors affecting the labor productivity of household businesses in Vietnam. The results show that OLS is relevant to $F(31, 1612)=15.24$ at a 1% significance level. The results can be demonstrated as:

- Firm size has a significant and positive effect on labor productivity with coefficient=0.161 (P-value <0.01), showing that a 1% increase in firm size leads to a 16.1% increase in labor productivity of Vietnamese household businesses. This finding is opposite to the finding by Okoye et al. (2008), who

4.2. Empirical results

4.2.1. Correlation matrix

Table 4 reports the correlation matrix of variables. As indicated, a number of variables, including firm size (SIZE), firm age (F_AGE), debt

showed a negative effect of size on labor productivity.

- Adversely, firm age is significantly and negatively associated with labor productivity with

coefficient=-0.005 (P-value<0.01), suggesting that the older the business is, the lower the productivity level it has.

Table 4: Correlation matrix

Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]
1. logLP	1.000						
2. SIZE	0.354*	1.000					
3. F_AGE	-0.101*	0.017	1.000				
4. DEBT	0.128*	0.152*	-0.071*	1.000			
5. INV	0.086*	-0.026	-0.047	0.491*	1.000		
6. TECH	0.035	0.002	0.034	0.078*	0.069*	1.000	
7. COMP	0.160*	0.157*	-0.052*	0.065*	0.072*	-0.031	1.000
8. FORM	-0.166*	-0.289*	0.120*	-0.080*	0.007	0.069*	-0.077*
9. NW	-0.053*	0.067*	0.012	0.048	0.005	0.013	-0.040
10. FEMS	-0.210*	-0.151*	0.065*	-0.124*	-0.126*	-0.041	-0.097*
11. TRAIN	0.020	0.051*	-0.029	0.070*	0.025	0.019	0.031
12. SAL	0.279*	0.528*	-0.079*	0.167*	0.097*	0.033	0.153*
13. MALE	0.099*	0.078*	-0.030	0.115*	0.100*	0.049*	0.047
14. O_AGE	-0.095*	0.079*	0.345*	-0.062*	-0.103*	0.044	-0.114*
Con							
	[8]	[9]	[10]	[11]	[12]	[13]	[14]
8. FORM	1.000						
9. NW	0.079*	1.000					
10. FEMS	0.081*	0.087*	1.000				
11. TRAIN	-0.018	-0.014	-0.036	1.000			
12. SAL	-0.251*	0.035	-0.286*	0.103*	1.000		
13. MALE	0.033	0.001	-0.440*	0.038	0.064*	1.000	
14. O_AGE	0.052*	0.072*	0.099*	-0.050*	-0.129*	0.036	1.000

Note: * p < 0.05

- Investment has a significant and positive relationship with labor productivity with coefficient=0.073 (P-value<0.10). This result implies that household businesses making an investment are more productive than those without investment by 7.3%. Our finding is in line with [Gorodnichenko and Schnitzer \(2013\)](#) regarding a positive relationship between investment in technology and productivity.
- Because the coefficient COMP is significant and positive, it is suggested that businesses facing competition in their business field have a higher level of labor productivity by 16.7% than those having no competition. According to [Gorodnichenko and Schnitzer \(2013\)](#), competition fosters firms to engage more in innovation, which increases labor productivity.
- The coefficient NW is significant and negative (coef. =-0.147, P-value<0.1), showing that family businesses having networking are less productive than those without networking by 14.7%. This is probably because networking did not really help household businesses improve their labor productivity.
- FEMS has a significant and negative relationship with labor productivity (coef. =-0.299, P-value<0.01), implying that a 1% increase of female share in the labor force decreases labor productivity by nearly 30%. This finding is consistent with [Heshmati and Rashidghalam \(2018\)](#), who showed that a higher female proportion in the labor force reduced labor productivity.
- Salary is significantly and positively associated with labor productivity with coefficient=0.035 (P-value<0.01). This result suggests that any increase

in salary helps encourage workers to perform better and enhance labor productivity, which is in line with [Micallef \(2016\)](#).

- The age of the owner has a significant and negative impact on labor productivity with coefficient=-0.004 (P-value<0.05), suggesting that the older the owner, the lower the productivity level the business.

Table 5: Factors affecting labor productivity: OLS regression

Variables	Coefficient	S.E.	t-stats
SIZE	0.161***	(0.015)	10.750
F_AGE	-0.005***	(0.002)	-2.630
DEBT	0.015	(0.010)	1.420
INV	0.073*	(0.042)	1.760
TECH	0.057	(0.038)	1.480
COMP	0.167***	(0.050)	3.330
FORM	-0.049	(0.038)	-1.310
NW	-0.147*	(0.087)	-1.690
FEMS	-0.299***	(0.084)	-3.570
TRAIN	-0.101	(0.119)	-0.850
SAL	0.035***	(0.012)	2.840
MALE	0.051	(0.042)	1.230
O_AGE	-0.004**	(0.002)	-2.270
Obs.	1,644		
F(31, 1612)	15.24***		
Adj. R-squared	0.212		

Notes: * p<0.1; ** p<0.05; *** p<0.01. Standard errors are in parentheses. Sector dummies are included

Next, we perform a simultaneous quantile regression of labor productivity at the 25th quantile, 50th quantile, and 75th quantile. As reported in [Table 6](#), at 0.25 quantile, firm size (SIZE), competition (COMP), and salary (SAL) are significantly and positively associated with labor productivity, while networking (NW), female share (FEMS), and owner's age (O_AGE) have an adverse impact.

At 0.50 quantile, we can see a slight difference in the factors. While firm size (SIZE), competition (COMP), and salary (SAL) remain their significant and positive nexus with labor productivity of household businesses, formality (FORM), networking (NW), female share (FEMS) have a reverse relationship.

At 0.75 quantile, only firm size (SIZE) and competition (COMP) are found to be significantly and positively linked with labor productivity. Adversely, firm age (F_AGE), networking (NW), and female share (FEMS) show a significant and negative impact on productivity.

Table 6: Simultaneous quantile regression

Variables	25 th quantile		50 th quantile		75 th quantile	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
SIZE	0.124***	(0.021)	0.144***	(0.014)	0.172***	(0.024)
F_AGE	-0.002	(0.004)	-0.003	(0.003)	-0.005**	(0.002)
DEBT	0.009	(0.015)	0.006	(0.009)	0.021	(0.014)
INV	0.085	(0.052)	0.039	(0.037)	0.064	(0.048)
TECH	0.064	(0.049)	0.039	(0.045)	0.072	(0.053)
COMP	0.211***	(0.078)	0.129**	(0.055)	0.167**	(0.084)
FORM	0.009	(0.046)	-0.078**	(0.033)	-0.033	(0.054)
NW	-0.181**	(0.085)	-0.254**	(0.115)	-0.335**	(0.149)
FEMS	-0.233**	(0.111)	-0.358***	(0.106)	-0.342***	(0.120)
TRAIN	-0.081	(0.137)	-0.115	(0.162)	-0.096	(0.132)
SAL	0.076***	(0.016)	0.029**	(0.012)	0.008	(0.016)
MALE	0.080	(0.051)	0.055	(0.057)	-0.026	(0.045)
O_AGE	-0.006**	(0.003)	-0.005	(0.003)	-0.002	(0.002)
Obs.	1,644		1,644		1,644	
Pseudo R ²	0.142		0.115		0.113	

Notes: * p<0.1; ** p<0.05; *** p<0.01. Standard errors are in parentheses. Sector dummies are included

5. Conclusion

Employing data from the 2015 SME Survey in Vietnam, the study investigated factors affecting the labor productivity of over 1,600 household enterprises by using OLS and quantile regressions. The results showed that labor productivity was driven by a number of determinants, including firm size (SIZE), firm age (F_AGE), investment (INV), competition (COMP), networking (NW), female share (FEMS), salary (SAL), and owner's age (O_AGE). Our findings provided a comprehensive picture of the determinants of labor productivity of household businesses in Vietnam, which suggests policy implications to help firms enhance their labor productivity. For example, the local government may support firms in doing business through an investment channel and a better salary policy as a foundation for firms to improve their salary level. This can be helpful in enhancing a firm's labor productivity. Our study remains a limitation that opens room for further research: We are limited in exploring one-year data only. Thus future studies can expand the scope by using panel data of the SME Survey.

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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