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Business environment and labor productivity: The case of the Vietnamese firms

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A B S T R A C T

This paper examines the effects of the business environment on the labor productivity of Vietnamese manufacturing firms in the period of 2010-2018 using enterprise-level panel data drawn from Vietnamese Annual Enterprise Censuses and province-level surveys of the Provincial Competitiveness Index. Results show that in addition to traditional determinants, variables related to ease of business are found to contribute significantly to the labor productivity throughout the sample. The results support the arguments that Vietnam's government policy in building a good business environment plays a crucial role in stimulating the economic growth, especially in terms of a broaden base for the economic development. Empirical studies about the in-depth effects of institutional changes on the labor productivity in the manufacturing industries will be fruitful research agenda.

1. Introduction

Labor productivity of manufacturing firms is a key driver of economic growth, and national welfare (Acemoglu & Zilibotti 2001; Diewert, 2014; El-hadj & Brada, 2009; Barro & Sala-i-Martin, 1995). While the manufacturing firms play an important role in Vietnam (Ngo & Tran, 2020; Nguyen et al., 2020), little is yet known about its labor productivity. On top of that, there is a large literature documenting determinants of labor productivity. However, it is not clear how the business environment (ease for business) contributes to the labor productivity of manufacturing firms. This knowledge gap in the manufacturing sector's labor productivity presents a serious space in the development of manufacturing firms in Vietnam. The current paper, thus, aims to explore the effects of the business environment (ease for business) on the labor productivity of manufacturing firms, using a combination of two national-wide firm-level and provincial-level dataset in 2010-2018, namely the Vietnam Annual Enterprise Census (VAES) and the Provincial Competitiveness Index (PCI).

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The paper is structured as follows. In section 2 we review related literature on the effect of business environment on labor productivity. In section 3 we describe the dataset and methods. In section 4 we present empirical results. The final section summarizes the findings and discusses policy implications and future research.

2. Literature review

Several empirical studies suggest many proximate determinants of labor productivity. In his excellent review paper, Syverson (2011) points out several internal factors relating to higher qualified labor and capital inputs (Ilmakunnas et al., 2004; Sakellaris & Wilson, 2004; Van Biesebroeck, 2003), information technology and R&D (Jorgenson et al., 2005, Jorgenson et al., 2008; Oliner et al., 2007; Aw et al., 2008), product innovation (Bartel et al., 2007; Bernard et al., 2010). External drivers of productivity include such as productivity spillovers (Martin et al., 2011), horizontal linkages (Nichter & Goldmark, 2009), competition (Foster et al., 2008; Ali & Peerlings, 2011), deregulation or proper regulation (Bridgman et al., 2009; Fabrizio et al., 2007; Brown et al., 2006), flexible input markets (Maksimovic & Phillips, 2001; Hsieh & Klenow, 2009; Bartelsman et al., 2009).

The business environment can be seen as a deep determinant of labor productivity. Deep determinants are those which are deeper forces behind common determinants suggested by theoretical literature. North (1994) argued that institutional regulations can stimulate productivity because it reduces transaction costs for firms. Isaksson (2007) points out that institutions are one of the drivers of productivity growth because capital formation and increased resource allocation are only effective within the framework of good institutions. Dixit (2009) states that the practice of law is more important than the enactment of the law for economic growth.

Among empirical studies, Francois and Manchin (2007) have shown evidence of governance quality for the export level, while McCulloch et al. (2013) attempted to seek the role of district public administration of Indonesia in per capita income in the locality. However, McCulloch et al. (2013) do not find strong evidence. Labor productivity enhancement according to economic governance was surveyed by Djankov et al. (2006) with the focus on how business-facilitating regulations reduce business costs. The combination of the productivity of the Indian manufacturing industry and economic reform (licensing) was investigated by Ghosh (2013).

In short, there is a large literature documenting determinants of labor productivity. However, it is not clear how the business environment (ease for business) contributes to the labor productivity of manufacturing firms. This knowledge gap in the manufacturing sector's labor productivity presents a serious space in the development of manufacturing firms in Vietnam.

3. Data and methods

3.1. Data

The first set of data in this paper comes from the firm-level survey for the period 2010-2018, which is collected by the General Statistical Office of Vietnam in the Vietnam Annual Enterprise Census (VAES). The survey collects various firm-level production information such as output, sales, labor, employees, capital, and materials. Many empirical studies employ this dataset, so far, including Ngo et al. (2020), Ngo and Tran (2020) and Ngo and Nguyen (2019). The second data source is from a survey of the Provincial Competitiveness Index (PCI), which were conducted by the Vietnam Competitiveness Initiative in collaboration with the Vietnam Chamber of Commerce and Industry in the same period with the VAES. The survey provides nine institutional sub-indices: First, entry costs including (i) time for firm registration and land acquisition, (ii) time for firms to gain all the necessary licenses needed to start a business as well as the degree of difficulty to obtain such licenses/permits. Second, access to the acquired land and the security of business premises after the land has had been acquired. Third, transparency and access to information, that is whether firms have access to proper planning and legal documents for running their business such as labor and training, whether new policies and laws are communicated to firms sufficiently and predictably implemented. Fourth, the cost of time to deal with regulatory compliance measure e.g. bureaucratic compliance or decisions to implement local regulations. Fifth, informal charges measuring a firm's perception of the corruption from provincial officials. Sixth, distortion offering privileges to state-owned enterprises e.g. incentives, policy, and access to capital and credit sources toward state-owned enterprises. Seventh, private sector development designs services, provinces' private sector business growth promotion programs, development of industrial zones and parks. Eighth, employment and worker training, those provincial authorities promote vocational training and skills development for local firms. Ninth, legal institutions measuring the trust from firms on provincial courts and contract enforcement. The combination of the VAES survey and PCI survey results in a multi-level panel dataset and enables us to assess the effects of easy to the business at the provincial level on the labor productivity of manufacturing firms.

3.2. Methods

Eq. (1) examines the effect of easy for business on labor productivity.

$$LP_{it} = \alpha_0 + \alpha_1 Z_{it} + \alpha_2 PCI + u_{it}, \quad (1)$$

where *i* and *t* indicate firm *i* and at time *t*, respectively. Labor productivity is measured as a ratio of firm-level value-added per working labor. Details are in Nguyen et al. (2020). u_{it} is the error term. *Z* is a vector of firm-level controlling variables (including: physical capital intensity, human capital intensity, and firm size either by capital stocks or the number of laborers). PCI is the Provincial Competitiveness Index.

4. Empirical results

4.1. Data description

Table 1 provides the mean value of labor productivity and several of its potential determinants for labor productivity. The mean level of labor productivity equals VND 6236.28 million in 2010 and VND 2845.33in 2018. Relates to firm-size as measured by the log of the number of workers at the firm at the end of the last fiscal year, firms in 2018 show to have lover level of employment as compared to firms in 2010. With respect to the age of the firm, there is not much difference of the firms in 2010 and 2016 since the dataset is panel. Regarding the total capital stock, there is a decrease in the total fixed assets (in logs) of the firms from 2010 to 2018. An important aspect in the sample related to firms with foreign direct investment shows that the number of FDI firms in 2016 is higher than that in 2010. Other important aspect in the sample related to firms with export activities shows that the number of exporting firms in 2016 is higher than that in 2010. We do not have the information of FDI firms and exporting firms in 2017-2018.

Table 1
Statistical description: firm-level variables, 2010-2018

Variable	2010	2011	2012	2013	2014	2015	2016	2017	2018
Value added per worker (mill. VND)	6236.28	8405.17	9290.01	10396.71	10035.17	11137.83	13724.69	2548.84	2845.33
Labor productivity (ln)	7.9598	8.0777	8.3386	8.4112	8.3775	8.5665	8.5878	6.1836	6.2919
Employment (ln)	2.9594	2.9740	2.7298	2.6839	2.6435	2.5953	2.7812	1.6947	1.7448
Firm's age (ln)	7.6037	7.6039	7.6044	7.6047	7.6045	7.6044	7.6042	na	na
Total fixed assets (ln)	8.6418	8.5267	8.6923	8.7593	8.8135	8.9914	8.8447	8.1147	8.0867
FDI (dummy)	.0808	.0882	.0754	.0786	.0842	.0809	.0936	na	na
Export (dummy)	.1244	.1997	.1555	.1897	.1762	.1923	na	na	na
Number of observations	44,346	45,772	54,276	55,302	57,942	63,633	61,256	591,011	617,828

Note: *** p<0.01, ** p<0.05, * p<0.1. Mean values.
Source: Authors' calculation from VAES 2010-2018

Table 2 provides the mean value of Provincial Competitiveness Index and nine sub-indices of PCI. Overall, nine dimensions of CPI have been improved over the period 2010-2018. However, transparency and access to information (Sub-index 3), support for private sector development (Sub-index 7), employment and worker training (Sub-index 8) have not observed much changes in the sample period.

Table 2
Statistical description: PCI and its components, 2010-2018

Variable	2010	2011	2012	2013	2014	2015	2016	2017	2018
Provincial Competitiveness Index	60.70	60.58	60.69	60.68	60.69	60.71	60.59	64.82	64.78
Sub-index 1: Entry costs	8.15	8.19	8.15	8.15	8.16	8.13	8.18	7.54	7.545
Sub-index 2: Access to the acquired land and the security of land	5.45	5.47	5.42	5.42	5.45	5.40	5.46	6.09	6.12
Sub-index 3: Transparency and access to information	6.34	6.32	6.33	6.33	6.33	6.32	6.32	6.17	6.16
Sub-index 4: The cost of time to deal with regulatory compliance measure	6.38	6.41	6.38	6.38	6.39	6.37	6.41	6.98	6.98
Sub-index 5: Informal charges	5.11	5.16	5.11	5.11	5.13	5.11	5.16	5.76	5.77
Sub-index 6: Distortion offering privileges to state-owned enterprises	4.56	4.62	4.57	4.57	4.59	4.55	4.63	5.55	5.55
Sub-index 7: Support for private sector development	6.16	6.06	6.14	6.14	6.13	6.17	6.05	7.06	7.03
Sub-index 8: Employment and worker training	6.82	6.77	6.84	6.84	6.82	6.87	6.79	6.99	6.98
Sub-index 9: Legal institutions	4.89	4.98	4.90	4.89	4.91	4.87	4.98	5.69	5.71
Number of observations	44,346	45,772	54,276	55,302	57,942	63,633	61,256	591,011	617,828

Note: *** p<0.01, ** p<0.05, * p<0.1. Mean values.
Source: Authors' calculation from VAES 2010-2018

4.2. Regressions results

Tables 3 and 4 provide the regression results for the drivers of labor productivity.

Table 3

Ease for business (PCI) and labor productivity, 2010-2018

VARIABLES	2010	2011	2012	2013	2014	2015	2016	2017	2018
Employment (ln)	-0.309***	-0.190***	-0.285***	-0.245***	-0.159***	-0.136***	-0.118***	-0.306***	-0.282***
	(0.0050)	(0.0060)	(0.0050)	(0.0046)	(0.0052)	(0.0052)	(0.0065)	(0.0064)	(0.0056)
Firm's age (ln)	-16.65***	-32.14***	-8.488***	-11.01***	-10.41***	-6.058***	-2.065	na	na
	(1.411)	(1.814)	(1.450)	(1.310)	(1.587)	(1.439)	(1.615)		
Total fixed assets (ln)	0.415***	0.388***	0.383***	0.360***	0.302***	0.298***	0.369***	0.501***	0.456***
	(0.0048)	(0.0048)	(0.0050)	(0.0046)	(0.0049)	(0.0051)	(0.0056)	(0.0057)	(0.0046)
FDI (dummy)	0.111***	0.115***	0.148***	0.206***	0.302***	0.291***	0.299***	na	na
	(0.0190)	(0.0177)	(0.0175)	(0.0171)	(0.0159)	(0.0166)	(0.0162)		
Export (dummy)	0.146***	0.174***	0.263***	0.220***	0.335***	0.252***		na	na
	(0.0150)	(0.0128)	(0.0138)	(0.0112)	(0.0128)	(0.0122)			
PCI	0.0234***	0.0228***	0.0368***	0.0337***	0.0256***	0.0231***	0.0223***	0.0486***	0.0626***
	(0.0016)	(0.0018)	(0.0016)	(0.0015)	(0.0016)	(0.0018)	(0.0020)	(0.0031)	(0.0032)
10: Food products	4.226***	4.658***	4.618***	4.656***	4.821***	4.580***	4.727***	0.146***	0.192***
	(0.0266)	(0.0252)	(0.0193)	(0.0182)	(0.0249)	(0.0220)	(0.0281)	(0.0318)	(0.0282)
11: Beverages	-0.436***	-0.284***	-0.330***	-0.276***	-0.290***	-0.474***	-0.321***	-0.786***	-0.662***
	(0.0321)	(0.0368)	(0.0239)	(0.0238)	(0.0324)	(0.0314)	(0.0468)	(0.0450)	(0.0450)
12: Tobacco products	5.311***	6.158***	5.923***	5.966***	6.117***	5.656***	5.717***	0.366**	0.400**
	(0.216)	(0.167)	(0.199)	(0.224)	(0.193)	(0.196)	(0.214)	(0.169)	(0.175)
13: Textiles	4.326***	4.756***	4.886***	4.845***	4.850***	4.686***	4.782***	-0.0617*	0.0683**
	(0.0281)	(0.0290)	(0.0244)	(0.0199)	(0.0288)	(0.0243)	(0.0309)	(0.0339)	(0.0315)
14: Wearing apparel	4.354***	4.633***	4.860***	4.949***	4.886***	4.982***	4.915***	-0.0582*	-0.162***
	(0.0260)	(0.0262)	(0.0199)	(0.0170)	(0.0253)	(0.0219)	(0.0296)	(0.0307)	(0.0262)
15: Leather and related products	4.399***	4.596***	4.815***	4.914***	4.966***	4.721***	4.812***	-0.231***	-0.0929***
	(0.0331)	(0.0370)	(0.0251)	(0.0240)	(0.0310)	(0.0276)	(0.0377)	(0.0379)	(0.0336)
16: Wood and products of wood/cork	4.104***	4.508***	4.466***	4.574***	4.577***	4.477***	4.606***	-0.0395	0.0578**
	(0.0271)	(0.0266)	(0.0198)	(0.0183)	(0.0269)	(0.0222)	(0.0301)	(0.0333)	(0.0293)
17: Paper and paper products	4.411***	4.732***	4.837***	4.855***	4.929***	4.769***	4.879***	0.236***	0.344***
	(0.0279)	(0.0286)	(0.0224)	(0.0202)	(0.0275)	(0.0245)	(0.0311)	(0.0338)	(0.0324)
18: Printing and reproduction of recorded media	4.694***	4.854***	4.875***	5.117***	4.961***	4.976***	5.044***	0.0258	0.0837***
	(0.0253)	(0.0262)	(0.0169)	(0.0161)	(0.0254)	(0.0201)	(0.0293)	(0.0300)	(0.0256)
20: Chemicals and chemical products	4.534***	4.826***	4.802***	4.794***	4.914***	4.813***	4.909***	0.0026	0.134***
	(0.0297)	(0.0320)	(0.0221)	(0.0225)	(0.0305)	(0.0275)	(0.0356)	(0.0361)	(0.0327)
22: Rubber and plastics products	4.279***	4.752***	4.916***	4.858***	4.849***	4.749***	4.865***	0.141***	0.263***
	(0.0268)	(0.0260)	(0.0200)	(0.0176)	(0.0254)	(0.0211)	(0.0288)	(0.0302)	(0.0259)
23: Other non-metallic mineral products	4.270***	4.678***	4.497***	4.615***	4.685***	4.614***	4.667***	-0.314***	-0.151***
	(0.0281)	(0.0259)	(0.0206)	(0.0194)	(0.0269)	(0.0227)	(0.0285)	(0.0310)	(0.0274)
24: Basic metals	4.250***	4.700***	4.549***	4.626***	4.723***	4.496***	4.636***	0.557***	0.570***
	(0.0368)	(0.0371)	(0.0322)	(0.0311)	(0.0366)	(0.0339)	(0.0445)	(0.0455)	(0.0482)
25: Fabricated metal products	4.397***	4.707***	4.618***	4.673***	4.772***	4.720***	4.732***	0.0411	0.147***
	(0.0252)	(0.0236)	(0.0169)	(0.0155)	(0.0235)	(0.0187)	(0.0262)	(0.0268)	(0.0217)
26: Computer, electronic and optical products	4.466***	4.590***	4.581***	4.668***	4.668***	4.649***	4.602***	0.0227	0.150***
	(0.0457)	(0.0435)	(0.0395)	(0.0348)	(0.0432)	(0.0457)	(0.0456)	(0.0398)	(0.0371)
27: Electrical equipment	4.338***	4.784***	4.622***	4.772***	4.717***	4.646***	4.728***	0.142***	0.290***
	(0.0351)	(0.0370)	(0.0298)	(0.0267)	(0.0339)	(0.0322)	(0.0361)	(0.0419)	(0.0387)
28: Machinery and equipment n.e.c	4.366***	4.686***	4.660***	4.685***	4.719***	4.684***	4.743***	0.0412	0.113***
	(0.0332)	(0.0319)	(0.0246)	(0.0248)	(0.0337)	(0.0293)	(0.0356)	(0.0365)	(0.0339)
29: Motor vehicles, trailers and semi-trailers	4.393***	4.662***	4.665***	4.766***	4.811***	4.721***	4.740***	0.181***	0.237***
	(0.0542)	(0.0542)	(0.0442)	(0.0472)	(0.0512)	(0.0501)	(0.0508)	(0.0474)	(0.0508)
30: Other transport equipment	4.211***	4.473***	4.385***	4.633***	4.781***	4.612***	4.658***	-0.0578	-0.129**
	(0.0403)	(0.0447)	(0.0435)	(0.0427)	(0.0442)	(0.0500)	(0.0512)	(0.0551)	(0.0575)
31: Furniture	4.208***	4.496***	4.526***	4.715***	4.766***	4.753***	4.715***	-0.257***	-0.113***
	(0.0269)	(0.0267)	(0.0196)	(0.0178)	(0.0266)	(0.0220)	(0.0304)	(0.0310)	(0.0278)
34: Other manufacturing	-0.304***							-0.141***	
	(0.0322)							(0.0393)	
Constant	126.5***	244.0***	63.79***	83.20***	79.33***	46.56***	15.69	-0.651***	-1.229***
	(10.73)	(13.80)	(11.03)	(9.965)	(12.08)	(10.95)	(12.29)	(0.204)	(0.209)
Observations	44,252	41,407	53,994	55,024	44,343	38,532	29,300	47,218	51,351
R-squared	0.813	0.741	0.807	0.815	0.757	0.807	0.769	0.404	0.368
Adjusted R squared	0.813	0.741	0.807	0.815	0.757	0.807	0.769	0.404	0.368

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Industry codes are as follows: 10: Food products; 11: Beverages; 12: Tobacco products; 13: Textiles; 14: Wearing apparel; 15: Leather and related products; 16: Wood and products of wood/cork; 17: Paper and paper products; 18: Printing and reproduction of recorded media; 20: Chemicals and chemical products; 21: Pharmaceuticals, medicinal chemicals; 22: Rubber and plastics products; 23: Other non-metallic mineral products; 24: Basic metals; 25: Fabricated metal products; 26: Computer, electronic and optical products; 27: Electrical equipment; 28: Machinery and equipment n.e.c; 29: Motor vehicles, trailers and semi-trailers; 30: Other transport equipment; 31: Furniture; 33: Repair and installation of machinery and equipment; 34: Other manufacturing.

Source: Authors' calculation from VAES 2010-2018

We explore the determinants of labor productivity in annual samples of all firms with a focus on PCI (Table 3) and its components (Tables 4).

Table 4
Easy of business (PCI components) and labor productivity, 2010-2018

VARIABLES	2010	2011	2012	2013	2014	2015	2016	2017	2018
Employment (ln)	-0.279***	-0.179***	-0.255***	-0.222***	-0.182***	-0.116***	-0.110***	-0.292***	-0.267***
	(0.0054)	(0.0061)	(0.0054)	(0.0051)	(0.0055)	(0.0057)	(0.0066)	(0.0064)	(0.0057)
Firm's age (ln)	-16.71***	-31.76***	-7.460***	-11.07***	-13.45***	-6.360***	-2.645	na	na
	(1.407)	(1.806)	(1.444)	(1.303)	(1.573)	(1.446)	(1.623)		
Total fixed assets (ln)	0.393***	0.384***	0.365***	0.347***	0.341***	0.287***	0.364***	0.498***	0.452***
	(0.0051)	(0.0048)	(0.0053)	(0.0049)	(0.0052)	(0.0054)	(0.0056)	(0.0056)	(0.0046)
FDI (dummy)	0.129***	0.120***	0.152***	0.195***	0.224***	0.281***	0.289***	na	na
	(0.0191)	(0.0180)	(0.0178)	(0.0174)	(0.0167)	(0.0169)	(0.0165)		
Export (dummy)	0.149***	0.162***	0.261***	0.214***	0.278***	0.218***		na	na
	(0.0151)	(0.0128)	(0.0138)	(0.0111)	(0.0125)	(0.0123)			
Sub-index 1: Entry costs	-0.110***	-0.102***	-0.130***	-0.130***	0.154***	-0.184***	-0.178***	0.0588***	0.106***
	(0.0141)	(0.0163)	(0.0144)	(0.0138)	(0.0149)	(0.0158)	(0.0176)	(0.0112)	(0.0115)
Sub-index 2: Access to the acquired land and the security of land	0.0880***	0.0861***	0.164***	0.218***	0.641***	0.149***	0.146***	-0.0683***	-0.164***
	(0.0118)	(0.0134)	(0.0114)	(0.0105)	(0.0126)	(0.0123)	(0.0150)	(0.0129)	(0.0135)
Sub-index 3: Transparency and access to information	0.0961***	0.0707***	0.208***	0.116***	0.183***	0.118***	-0.0087	-0.0123	0.0280
	(0.0155)	(0.0166)	(0.0154)	(0.0137)	(0.0149)	(0.0152)	(0.0178)	(0.0178)	(0.0182)
Sub-index 4: The cost of time to deal with regulatory compliance measure	0.0167	0.0326**	0.0611***	0.00187	-0.132***	0.0175	0.0534***	0.0709***	0.0637***
	(0.0148)	(0.0147)	(0.0125)	(0.0123)	(0.0136)	(0.0146)	(0.0164)	(0.0147)	(0.0152)
Sub-index 5: Informal charges	0.0189	0.0305*	-0.0662***	-0.0605***	-0.259***	-0.0099	-0.0592***	0.105***	0.108***
	(0.0147)	(0.0157)	(0.0135)	(0.0130)	(0.0142)	(0.0157)	(0.0172)	(0.0124)	(0.0129)
Sub-index 6: Distortion offering privileges to state-owned enterprises	-0.131***	-0.101***	-0.140***	-0.0801***	-0.151***	-0.0879***	-0.0399***	0.145***	0.223***
	(0.0121)	(0.0130)	(0.0116)	(0.0109)	(0.0117)	(0.0123)	(0.0143)	(0.0125)	(0.0132)
Sub-index 7: Support for private sector development	0.136***	0.141***	0.139***	0.111***	0.0936***	0.0440***	0.127***	0.0477***	0.0421***
	(0.0089)	(0.0097)	(0.0082)	(0.0083)	(0.0088)	(0.0090)	(0.0108)	(0.0142)	(0.0148)
Sub-index 8: Employment and worker training	0.0070	-0.0221**	0.0142*	0.0425***	-0.0364***	0.0251***	-0.0089	0.0365***	0.0894***
	(0.0086)	(0.0094)	(0.0084)	(0.0082)	(0.0086)	(0.0092)	(0.0108)	(0.0104)	(0.0105)
Sub-index 9: Legal institutions	0.0856***	0.0731***	0.0761***	0.0611***	0.0570***	0.0341***	0.0901***	-0.230***	-0.171***
	(0.0087)	(0.0095)	(0.0089)	(0.0081)	(0.0086)	(0.0092)	(0.0107)	(0.0172)	(0.0173)
10: Food products	4.256***	4.644***	4.645***	4.683***	4.709***	4.602***	4.707***	0.180***	0.264***
	(0.0266)	(0.0255)	(0.0197)	(0.0185)	(0.0231)	(0.0223)	(0.0285)	(0.0320)	(0.0284)
11: Beverages	-0.394***	-0.260***	-0.282***	-0.233***	-0.319***	-0.443***	-0.299***	-0.736***	-0.587***
	(0.0318)	(0.0367)	(0.0240)	(0.0239)	(0.0303)	(0.0316)	(0.0468)	(0.0445)	(0.0442)
12: Tobacco products	5.329***	6.129***	5.926***	5.959***	5.926***	5.681***	5.680***	0.364**	0.419**
	(0.215)	(0.168)	(0.195)	(0.221)	(0.201)	(0.197)	(0.206)	(0.166)	(0.180)
13: Textiles	4.344***	4.760***	4.896***	4.854***	4.827***	4.693***	4.783***	-0.0790**	0.0630**
	(0.0277)	(0.0288)	(0.0242)	(0.0195)	(0.0260)	(0.0242)	(0.0305)	(0.0336)	(0.0313)
14: Wearing apparel	4.330***	4.625***	4.830***	4.932***	4.864***	4.971***	4.914***	-0.0946***	-0.177***
	(0.0258)	(0.0260)	(0.0196)	(0.0168)	(0.0227)	(0.0215)	(0.0294)	(0.0303)	(0.0260)
15: Leather and related products	4.357***	4.561***	4.751***	4.864***	4.892***	4.679***	4.773***	-0.261***	-0.0997***
	(0.0328)	(0.0369)	(0.0251)	(0.0239)	(0.0286)	(0.0276)	(0.0376)	(0.0375)	(0.0332)
16: Wood and products of wood/cork	4.147***	4.534***	4.511***	4.608***	4.525***	4.501***	4.627***	0.0220	0.123***
	(0.0269)	(0.0266)	(0.0201)	(0.0183)	(0.0243)	(0.0222)	(0.0300)	(0.0332)	(0.0292)
17: Paper and paper products	4.435***	4.734***	4.855***	4.857***	4.865***	4.767***	4.868***	0.223***	0.343***
	(0.0275)	(0.0283)	(0.0218)	(0.0198)	(0.0245)	(0.0240)	(0.0308)	(0.0337)	(0.0323)
18: Printing and reproduction of recorded media	4.683***	4.843***	4.859***	5.116***	5.023***	4.966***	5.037***	-0.00827	0.0581**
	(0.0251)	(0.0260)	(0.0167)	(0.0158)	(0.0218)	(0.0198)	(0.0291)	(0.0297)	(0.0253)
20: Chemicals and chemical products	4.544***	4.816***	4.804***	4.803***	4.855***	4.814***	4.892***	0.00314	0.153***
	(0.0294)	(0.0319)	(0.0219)	(0.0222)	(0.0275)	(0.0274)	(0.0354)	(0.0360)	(0.0324)
22: Rubber and plastics products	4.288***	4.741***	4.923***	4.870***	4.854***	4.755***	4.853***	0.125***	0.265***
	(0.0266)	(0.0258)	(0.0196)	(0.0174)	(0.0225)	(0.0209)	(0.0284)	(0.0300)	(0.0258)
23: Other non-metallic mineral products	4.326***	4.712***	4.553***	4.657***	4.608***	4.645***	4.695***	-0.255***	-0.0790***
	(0.0279)	(0.0260)	(0.0209)	(0.0195)	(0.0247)	(0.0228)	(0.0285)	(0.0310)	(0.0273)
24: Basic metals	4.333***	4.745***	4.629***	4.669***	4.696***	4.533***	4.653***	0.597***	0.616***
	(0.0366)	(0.0367)	(0.0320)	(0.0308)	(0.0350)	(0.0337)	(0.0439)	(0.0455)	(0.0479)
25: Fabricated metal products	4.437***	4.727***	4.663***	4.709***	4.797***	4.742***	4.748***	0.0585**	0.175***
	(0.0250)	(0.0235)	(0.0169)	(0.0154)	(0.0207)	(0.0186)	(0.0260)	(0.0267)	(0.0216)
26: Computer, electronic and optical products	4.470***	4.604***	4.602***	4.686***	4.724***	4.669***	4.613***	0.0105	0.131***
	(0.0449)	(0.0433)	(0.0391)	(0.0348)	(0.0425)	(0.0454)	(0.0455)	(0.0398)	(0.0372)
27: Electrical equipment	4.337***	4.777***	4.628***	4.783***	4.789***	4.646***	4.721***	0.0966**	0.247***
	(0.0349)	(0.0370)	(0.0295)	(0.0267)	(0.0304)	(0.0319)	(0.0358)	(0.0420)	(0.0384)
28: Machinery and equipment n.e.c	4.381***	4.689***	4.672***	4.701***	4.740***	4.693***	4.741***	0.0139	0.0997***
	(0.0330)	(0.0317)	(0.0243)	(0.0245)	(0.0305)	(0.0290)	(0.0352)	(0.0363)	(0.0337)
29: Motor vehicles, trailers and semi-trailers	4.424***	4.687***	4.711***	4.812***	4.888***	4.751***	4.764***	0.166***	0.224***
	(0.0550)	(0.0540)	(0.0438)	(0.0470)	(0.0517)	(0.0501)	(0.0505)	(0.0475)	(0.0511)
30: Other transport equipment	4.253***	4.487***	4.440***	4.683***	4.780***	4.647***	4.685***	-0.0351	-0.0988*
	(0.0394)	(0.0446)	(0.0432)	(0.0422)	(0.0466)	(0.0501)	(0.0508)	(0.0545)	(0.0565)
31: Furniture	4.236***	4.503***	4.536***	4.723***	4.684***	4.748***	4.713***	-0.253***	-0.0969***
	(0.0266)	(0.0266)	(0.0194)	(0.0177)	(0.0236)	(0.0217)	(0.0303)	(0.0308)	(0.0276)
34: Other manufacturing	-0.323***							-0.170***	
	(0.0319)							(0.0391)	
Constant	127.4***	241.4***	56.37***	84.26***	100.1***	49.99***	21.17*	1.364***	0.602**
	(10.71)	(13.75)	(11.00)	(9.922)	(11.97)	(11.01)	(12.37)	(0.240)	(0.241)
Observations	44,252	41,407	53,994	55,024	44,343	38,532	29,300	47,218	51,351
R-squared	0.817	0.744	0.813	0.819	0.797	0.810	0.772	0.413	0.378
Adjusted R squared	0.817	0.744	0.813	0.819	0.796	0.810	0.772	0.413	0.378

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Industry codes are as follows: 10: Food products; 11: Beverages; 12: Tobacco products; 13: Textiles; 14: Wearing apparel; 15: Leather and related products; 16: Wood and products of wood/cork; 17: Paper and paper products; 18: Printing and reproduction of recorded media; 20: Chemicals and chemical products; 21: Pharmaceuticals, medicinal chemicals; 22: Rubber and plastics products; 23: Other non-metallic mineral products; 24: Basic metals; 25: Fabricated metal products; 26: Computer, electronic and optical products; 27: Electrical equipment; 28: Machinery and equipment n.e.c; 29: Motor vehicles, trailers and semi-trailers; 30: Other transport equipment; 31: Furniture; 33: Repair and installation of machinery and equipment; 34: Other manufacturing.

Source: Authors' calculation from VAES 2010-2018

First of all, we discuss shortly traditional determinants of labor productivity. About the firm size in terms of employment, our results support the view that there exist a diminishing labor productivity with firm-size (Acs & Audretsch, 1988; Cohen & Klepper, 1996; Diaz & Sánchez, 2008; Pagano & Schivardi, 2003; Söderbom & Teal, 2004; Van Biesebroeck, 2005). Secondly,

about the age of the firm, we find the reverse effect of firm age on productivity. The evidence proves the vintage effect due to younger firms who employing new and improved technology or equipment, and inefficient firms with ages implying lower productivity for the surviving older firms (Bahk & Gort, 1993; Jensen et al., 2001; Jovanovic, 1982). In relation to the role of physical capital in determining labor productivity, regressions in Table 3 show that physical capital has a positive relationship with labor productivity and it is significant at 1 percent level. The outward orientation of the firm as captured by exports and FDI ownership has a positive association with labor productivity. All two variables are significant at 1 percent level in the full-year sample. These results support the empirical findings of Griffith and Simpson (2004) who find a positive effect of export and foreign ownership on labor productivity, respectively. Our most interesting variable is PCI. The empirical results in Table 3 show that the business environment has a positive relationship to the labor productivity. Evidence for this positive relationship is found in all-year samples. This implies that the influential high quality of the business environment makes investors feel encouraged to invest in productivity improvement projects. The result is consistent with findings from Nguyen (2017). Table 4 further present the effects of PCI components on labor productivity. In general, most of PCI components are significant at 1 percent level, except for (1) the cost of time to deal with regulatory compliance measure, and (2) informal charges. Firstly, components "entry cost" and "distortion offering privileges to state-owned enterprises" have significantly negative effects on labor productivity. Secondly, more access to the acquired land and the security of land, transparency and access to information, support for private sector development, employment and worker training, legal institutions gives raise of labor productivity.

5. Conclusions

While the manufacturing firms play a crucial role in Vietnamese economy, little is yet known about its labor productivity, especially the effects of easy for business in the context of institutional transition to the market economy. By combining two national-wide firm-level and provincial-level dataset in 2010-2018, namely the Vietnam Annual Enterprise Census (VAES) and the Provincial Competitiveness Index (PCI), the current paper, thus, aimed to explore the effects of the business environment (ease for business) on the labor productivity of manufacturing firms. Empirical results have shown that the labor productivity of the manufacturing sectors is associated with traditional determinants of labor productivity such as firm size, the age of the firm, physical capital, the outward orientation of the firm as captured by exports and FDI ownership. In addition, importance of ease to business is also found both at the aggregate and disaggregate levels during the study period. The results support the arguments that Vietnam's government policy in building a good business environment plays a crucial role in stimulating the economic growth, especially in terms of a broaden base for the economic development. Empirical studies about the in-depth effects of institutional changes on the labor productivity in the manufacturing industries will be fruitful research agenda.

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