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Abstract

Using the Färe-Primont index and instrumental variable fixed effect estimation for the data of small and medium-sized enterprises (SMEs), this study considers if receiving government financial support enables SMEs in Vietnam to become more productive. The paper discovers no evidence of linkage between financial support and firm productivity. However, access to financial support improves technological progress and growth in firm scale but has a negative effect on improvement in technical efficiency. The estimation results reveal that the use of productivity as an aggregated index in previous studies may hide the real effect of government support on firm productivity.

Keywords Financial support, productivity, small and medium-sized enterprises, Vietnam

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1. Introduction

There is no agreement among scholars whether government support hinders or greases the wheels of firm productivity in transition economies. On the one hand, institutional theory supports the grease-the-wheels hypothesis of government subsidies and emphasizes that the support of government acts as a catalyst for external investment (e.g., Takalo & Tanayama, 2010). In addition, government support improves workforce skills in developing, reconfiguring or modifying production (Chen & Huang, 2009; Madsen & Ulhøi, 2005). Also, improvement in staff quality, thanks to government support, diminishes the amount of inputs used in production by reducing waste and identifying inefficient and unproductive aspects of a firm's production (Kou, Chen, Wang, & Shao, 2016). In other words, firms use fewer resources, such as human resources and capital, to produce the same level of output. As a result, enterprises with government support increase R&D and thus improve their productivity (Wu, 2017).

By contrast, a rent-seeking perspective suggests that government support may hinder firm productivity, especially in developing countries, a result of the fact that corruption is very common in such countries. Consequently, government support may be distributed ineffectively when the granting of subsidies is based on political connections rather than a firm's contribution to society (Vu, Tran, Nguyen, & Lim, 2018). As a result, government subsidies may not promote a firm's adoption of innovative activities to improve firm productivity and efficiency.

On the basis of these theoretical perspectives, empirical results concerning the role of financial support on firm productivity are inconclusive. For example, the study by Barajas, Huergo, and Moreno (2017) supports the grease-the-wheels view of government financial aid in Spain. Their results indicate that government financial assistance is important for SME productivity. However, Morris and Stevens (2010) show that what may be termed the spoke-in-the-wheels perspective holds for the productivity of firms receiving New Zealand government support programs. By contrast, Maggioni, Sorrentino, and Williams (1999) reveal that a government support program show mixed results for the performance of new firms in Italy.

Interestingly, it should be noted that when considering the effect of government support on firm productivity, approaches to productivity measurement are not uniform. For example,

while labor productivity is used in several previous studies (e.g. Morris & Steven, 2010), other studies use Levinsohn and Petrin's approach. However, such approaches do not allow for the decomposition of TFP growth into technological progress, technical change, and scale efficiency change (O'Donnell, 2012a, 2012b). If productivity is considered to be a black box, detailed investigation of the role of government financial support on productivity decomposition is limited.

This paper contributes to the literature in several respects. First, it provides the first evidence of the impact of government financial support on the productivity of small and medium-sized enterprises (SMEs) in a transitional economy.[2] Second, by using the Färe-Primont index, it is the first investigation to consider the impact of government financial support on each component of TFP. Decomposing TFP is necessary because it can provide a more detailed picture of the influence of government support on productivity. We have evidence of a positive linkage between financial support and scale efficiency as well as technical progress, but financial support has a negative impact on technical efficiency. These findings may potentially reconcile the mixed reports in the literature.

The remainder of this paper is structured as follows. The next section discusses our estimation strategy and sources of data. The empirical results obtained are interpreted and discussed in the fourth section, and the final section provides a conclusion.

2. Data and methodology

2.1 Data

This study will use three cycles of the latest firm-level data surveys on non-state small and medium-sized manufacturing enterprises in Vietnam, conducted during the 2011-2015 period by UNU-WIDER in collaboration with the University of Copenhagen and a range of Vietnamese government agencies. Each survey cycle covers some 2,600 firms, of which a significant number had been visited in previous cycles. The surveys cover 10 provinces in Vietnam, following a stratified random sampling method according to ownership structure, to ensure the representation of different types of non-state firms, both formally registered and

[2]Vietnamese SMEs are defined as enterprises with an annual workforce not greater than 300 employees (Decree No. 90/2001/ND-CP).

informal firms. Information about firm outputs and inputs, reported by the SMEs in monetary terms, is included in the data. Thus, we are able to compute productivity and its decomposition. This data panel also contains information about various business aspects of the surveyed SMEs, including their characteristics, production activities, and government financial support received.

The second data source is the Provincial Competitiveness Index (PCI) surveys. These surveys are conducted annually by USAID and VCCI (Vietnam Chamber of Commerce and Industry). The surveys provide a detailed account of various specific aspects of the business environment in Vietnam, including entry costs, land access and security of tenure, transparency and access to information, time costs, informal charges, policy bias, proactivity of provincial leadership, business support services, labor and training, and legal institutions.

These two datasets supply sufficient data for the analysis not only of government financial support for SMEs but also business environment on firm productivity and decomposition.

2.2. Methods

According to several previous studies (e.g., Hansen, Rand, & Tarp, 2009), the empirical model measuring the effect of financial support on productivity and its components is expressed in the following reduced functional form:

$$Y_{it} = \beta_1 + \beta_2 GS_{it} + \beta_3 X_{it} + \beta_4 Z_{it} + \varepsilon_{it} \quad (1)$$

Where Y_{it} denotes TFPE (total factor productivity) or its decomposition. Total factor productivity (TFPE) and its decomposition, including RME (technical progress), OTE (technical efficiency) and OSE (scale efficiency), will be calculated on the basis of methodology proposed by O'Donnell (2012a, 2012b).[3] GS_{it} is the main interest variable reflecting the specific aspects of government financial support for firm *i* in the year *t*.

Following the literature, vector X_{it} represents the control variables, such as firm size, firm age, innovation, and export status (e.g., Grazzi, 2012). Also, the diverse business environments (Z_{it})

[3] For details of the calculation of TFP and its decomposition, see Appendix 1.

in which firms operate may have varying effects on the linkage between financial support and firm productivity, as well as its decomposition (Vu et al., 2018). As discussed previously, the business environment dimensions include nine specific indexes, which are assigned a score from 0 to 100, corresponding to the lowest to the highest quality of institution. Consequently, these indexes are also included in the model.

In terms of methodology, financial support can be endogenous. Hence, in the proposed study, following Fisman and Svensson (2007), we add an instrumental variable (IV) by mean value of the financial support of industries in the same year, location, and sector. This instrumental variable may be appropriate because the likelihood of obtaining government support is greater when an SME is located in a commune with a higher level of exposure to government support. In fact, many empirical studies (McKenzie & Rapoport, 2007; Mont & Nguyen, 2013; Vu & Cuong, 2018) have applied so-called internal IVs. In addition, to control for unobserved characteristics, we utilize IV methods for the panel dataset, including two steps. First, equation (2) is estimated in a reduced form to get the fitted values of government financial support, as below:

$$\mathrm{GS}_{it} = \beta_1 + \beta_2 M_{it} + \beta_3 X_{it} + \beta_4 Z_{it} + \eta_{it} \quad (2)$$

Where M_{it} shows the district-sector-time average of government financial support. Second, Y_{it} is estimated with the fitted values from the first-stage regression of Equation 2 with other exogenous factors.

3. Empirical results and discussion

Table 1 presents the baseline estimation of the effect of government financial assistance on productivity and its decomposition. Using pooled data estimations, the results from columns 1-4 of Table 1 show that there are insignificant linkages between financial support and dependent variables. However, it should be noted that the pooled-OLS regression method may yield a biased estimation when unobservable characteristics and the potential endogeneity of financial support in the models are not controlled for. Accordingly, we take these problems into account by using fixed-effect instrumental variable estimations.

Table 1: Impact of financial support on productivity and its decomposition

VARIABLES	TFPE	OTE	OSE	RME
	(1)	(2)	(3)	(4)
Financial support	-0.002	-0.017	0.002	0.011
	(0.010)	(0.011)	(0.004)	(0.013)
Ln firm size	0.042***	0.030***	0.043***	0.031***
	(0.003)	(0.003)	(0.002)	(0.004)
Ln firm age	-0.033***	-0.039***	-0.005***	-0.014**
	(0.004)	(0.005)	(0.002)	(0.006)
Innovation	0.015***	0.011*	-0.003	0.014*
	(0.005)	(0.006)	(0.002)	(0.008)
Export	0.036***	0.057***	-0.055***	0.015
	(0.013)	(0.014)	(0.007)	(0.016)
Low tech sectors	-0.036***	-0.017***	0.003	-0.053***
	(0.005)	(0.006)	(0.002)	(0.007)
Year 2013	-0.002	0.018**	-0.005*	-0.029***
	(0.006)	(0.007)	(0.003)	(0.009)
Year 2015	0.001	0.013*	-0.004	-0.004
	(0.006)	(0.007)	(0.003)	(0.009)
Constant	0.319***	0.482***	0.887***	0.733***
	(0.013)	(0.016)	(0.007)	(0.019)
Observations	4,382	4,382	4,382	4,382
R-squared	0.138	0.068	0.242	0.048

Notes: Robust standard errors are in parentheses. *,**,*** significant at 10%, 5%, 1% respectively. The base categories are medium-high tech sectors, year 2011. Ln: natural logarithm.

Table 2: Fixed effect instrumental variable estimations

VARIABLES	TFPE	OTE	OTE	OSE	OSE	RME	RME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Financial support	0.020	-0.035*	-0.043**	0.022***	0.017**	0.068***	0.068***
	(0.015)	(0.021)	(0.021)	(0.007)	(0.007)	(0.021)	(0.021)
Lnfirm size	-0.059***	-0.018**	-0.017**	0.057***	0.057***	-0.117***	-0.119***
	(0.006)	(0.008)	(0.008)	(0.003)	(0.003)	(0.008)	(0.008)
Lnfirm age	-0.004	-0.030*	-0.033*	-0.003	-0.004	0.028*	0.029*
	(0.012)	(0.017)	(0.017)	(0.006)	(0.006)	(0.017)	(0.017)
Innovation	0.004	0.002	-0.002	-0.002	-0.004*	0.005	0.006
	(0.005)	(0.007)	(0.007)	(0.002)	(0.002)	(0.007)	(0.007)
Export	0.075***	0.077***	0.071***	-0.023**	-0.024**	0.065**	0.067**
	(0.020)	(0.028)	(0.027)	(0.009)	(0.009)	(0.028)	(0.028)
Entry cost			0.013		-0.008		-0.003
			(0.015)		(0.005)		(0.015)
Land access			0.007		-0.001		0.017*
			(0.010)		(0.003)		(0.010)
Transparency			0.028**		0.013***		0.006
			(0.012)		(0.004)		(0.012)
Time cost			-0.031**		0.012***		0.024*
			(0.012)		(0.004)		(0.012)
Informal cost			0.001		-0.001		-0.005
			(0.009)		(0.003)		(0.009)
Favor state			0.029***		-0.004		0.004
			(0.007)		(0.003)		(0.008)
Dynamic leader			-0.003		-0.003		-0.010
			(0.006)		(0.002)		(0.006)
Labor training			-0.041***		-0.015***		-0.000
			(0.014)		(0.005)		(0.014)
Legal frame			-0.020*		0.007*		0.041***
			(0.012)		(0.004)		(0.012)
Observations	4,317	4,317	4,317	4,317	4,317	4,317	4,317
R-squared	0.042	0.004	0.028	0.139	0.152	0.075	0.088
Number of panels	1,522	1,522	1,522	1,522	1,522	1,522	1,522
Instrumental variables	District-sector-time average of government financial support	District-sector-time average of government financial support	District-sector-time average of government financial support	District-sector-time average of government financial support	District-sector-time average of government financial support	District-sector-time average of government financial support	District-sector-time average of government financial support
Test of weak IV (Cragg-Donald Wald F statistic)	1358.91	1358.91	1312.71	1358.92	1312.71	1358.92	1312.71
[Stock-Yogo critical value at 10 percent]	16.38	16.38	16.38	16.38	16.38	16.38	16.38

Notes: The dependent variable is firm productivity and its decomposition. Robust standard errors are in parentheses. *,**,*** significant at 10%, 5%, 1% respectively, year dummies and technological level dummies are controlled in the model.

Using invalid and weak instrumental variables may yield biased estimates. Hence, statistical tests to confirm the validity of the IV candidates are presented in Table 2. It should be noted that the Cragg-Donald Wald F statistic values are always greater than the reported Stock-Yogo weak identification critical value of 16.38. Hence, we can reject the null hypothesis of weak-instrument robust inference for financial support. These findings indicate that our instruments are valid.

The second-stage regression reports a totally different picture when unobserved characteristics and the endogenous problem of financial support are controlled for. Column 1 of Table 2 indicates an insignificant linkage between government financial support and firm productivity. Interestingly, however, the coefficients relating to the role of financial support on each TFP's decomposition are different. Specifically, while financial assistance has a negative effect on technical efficiency, it has a positive influence on scale efficiency and technical progress. Columns 4-6 of Table 2 show that when the probability of accessing government financial support goes up by 1%, a firm is also likely to achieve a nearly 2 percentage point higher scale efficiency and nearly 7 percentage point higher technical progress than its counterparts without such financial support from the government.

The findings about the positive effect of financial support on technical progress and scale efficiency may be explained as follows. Since small and medium-sized enterprises (SMEs) in Vietnam are often small scale with limited financial resources, these characteristics prevent them from engaging in R&D activities (Rand, 2007; Cuong et al., 2010). Thus, government financial support is expected to provide additional resources for SMEs to conduct R&D activities, and this in turn will enhance technological progress and scale promotion. However, the empirical evidence is inconsistent with a recent study conducted by Cin, Kim, and Vonortas (2017). Their results show that firms receiving government support demonstrate superior efficiency compared to SMEs without such support.

Regarding firm characteristics, while firm size has a negative influence on productivity and its decomposition, the export status of firms contributes to productivity growth through certain important mechanisms. First, as discussed by Fu (2005), exports help firms to improve their efficiency as they learn about export processes and gain new knowledge and information. In addition, technology spillovers can be gained in the learning-by-doing process with foreign partners through export activities.

Finally, since there is a great difference in business quality environment indexes across provinces, these indexes are controlled for. Our results in Table 2 show that a transparent business environment has a positive impact on firm productivity. Given the fact that the practice of "informal payments" is widespread in Vietnam, many SMEs have to pay bribes simply to be able to operate (Vu et al., 2018). However, training labor has a negative effect on firm efficiency. This may be that current labor training programs and content are out of date and do not match the real needs of enterprises. Thus, the findings imply that improvement in transparency and the quality of labor training are essential factors in improving productivity and its decomposition.

4. Summary conclusions and implications

Focusing on SMEs in a transitional economy, the present study attempts to shed light on the role of government financial support on firm productivity by empirically analyzing the effect of the former on the latter and the decomposition of productivity. While several studies consider the effect of financial support on firm performance, this study provides the first evidence of the influence of government financial support on firm productivity and its decomposition.

Fixed-effect instrumental variable approaches are employed to overcome problems associated with the endogeneity of financial support and unobserved heterogeneity for a data panel of Vietnamese SMEs. The study suggests that there is an insignificant linkage between financial support and firm productivity. However, the role of financial support is different for each component of productivity. The estimation results are statistically valid and robust, indicated by a number of diagnostic tests. More importantly, the findings imply that using TFP as an aggregated index obscures the real effect of financial support on firm efficiency. Also, government policy will plan only limited intervention to improve productivity when they do not have detailed evidence of the relationship between financial support and firm productivity.

Appendix 1: Measurement of TFP growth and its components

TFPE is calculated as the ratio between an aggregate output to an aggregate input. According to O'Donnell (2012a, 2012b), productivity is decomposed into OTE, OSE and RME, as in the equation below:

$$TFPE_{it} = OTE_{it} * OSE_{it} * RME_{it} \quad (6)$$

As shown in Figure 2, TFP_{it} is equal to the ratio of the OA to OE curve; OTE_{it} is measured as the ratio between the OA to the OB curve. OSE_{it} is the ratio between the OB to OG curve; and RME is a value equal to the ratio of the OG to the OE curve.

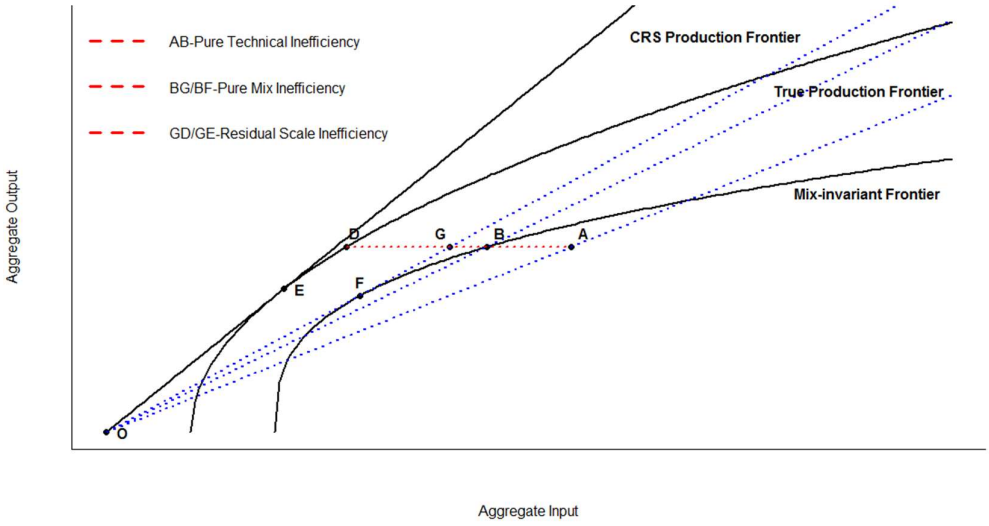

Figure 1. Assessing TFP and its decomposition using the Färe-Primont index.

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