



# Government financial support and firm productivity in vietnam

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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.

JEL codes:

## 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 and Tanayama, 2010). In addition, government support improves workforce skills in developing, reconfiguring or modifying production (Chen and Huang, 2009; Madsen and 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 et al., 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 et al., 2018; Tsai et al., 2019). 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, a study by Barajas et al. (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. Also, this finding is found in the study in China (Yan and Li, 2018; Harris and Li, 2019). However, Morris and Stevens (2010) show that what may be termed the

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spoke-in-the-wheels perspective holds for the productivity of firms receiving New Zealand government support programs. By contrast, [Maggioni et al. \(1999\)](#) 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 and 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.<sup>1</sup> 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.<sup>2</sup> 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 method

### 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 2600 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 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. Method

According to several previous studies (e.g., [Hansen et al., 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 \(2012a, 2012b\)](#) (see more in [Appendix 2](#));  $GS_{it}$  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 control variables, such as firm size, firm age, innovation, and export status (e.g., [Grazzi, 2012](#)). Also, the diverse business environments ( $Z_{it}$ ) 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 and Rapoport,](#)

<sup>1</sup> Vietnamese SMEs are defined as enterprises with an annual workforce not greater than 300 employees (Decree No. 90/2001/ND-CP).

<sup>2</sup> According to [O'Donnell \(2012a\)](#), well-known indexes (e.g., Malmquist TFP indexes) cannot be used to reliably measure TFP change and its decomposition because these approaches create biased estimations.

**Table 1**  
Impact of financial support on productivity and its decomposition.

| VARIABLES         | TFPE<br>(1)          | OTE<br>(2)           | OSE<br>(3)           | RME<br>(4)           |
|-------------------|----------------------|----------------------|----------------------|----------------------|
| Financial support | -0.002<br>(0.010)    | -0.017<br>(0.011)    | 0.002<br>(0.004)     | 0.011<br>(0.013)     |
| Ln firm size      | 0.042***<br>(0.003)  | 0.030***<br>(0.003)  | 0.043***<br>(0.002)  | 0.031***<br>(0.004)  |
| Ln firm age       | -0.033***<br>(0.004) | -0.039***<br>(0.005) | -0.005***<br>(0.002) | -0.014**<br>(0.006)  |
| Innovation        | 0.015***<br>(0.005)  | 0.011*<br>(0.006)    | -0.003<br>(0.002)    | 0.014*<br>(0.008)    |
| Export            | 0.036***<br>(0.013)  | 0.057***<br>(0.014)  | -0.055***<br>(0.007) | 0.015<br>(0.016)     |
| Low tech sectors  | -0.036***<br>(0.005) | -0.017***<br>(0.006) | 0.003<br>(0.002)     | -0.053***<br>(0.007) |
| Year 2013         | -0.002<br>(0.006)    | 0.018**<br>(0.007)   | -0.005*<br>(0.003)   | -0.029***<br>(0.009) |
| Year 2015         | 0.001<br>(0.006)     | 0.013*<br>(0.007)    | -0.004<br>(0.003)    | -0.004<br>(0.009)    |
| Constant          | 0.319***<br>(0.013)  | 0.482***<br>(0.016)  | 0.887***<br>(0.007)  | 0.733***<br>(0.019)  |
| Observations      | 4382                 | 4382                 | 4382                 | 4382                 |
| R-squared         | <b>0.138</b>         | <b>0.068</b>         | <b>0.242</b>         | <b>0.048</b>         |

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

2007; Mont and Nguyen, 2013; Vu and 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, Eq. (2) is estimated in a reduced form to get the fitted values of government financial support, as below:

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

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 Eq. (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.

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 and Appendix 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 (Wooldridge, 2009).

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 et al. (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

**Table 2**  
Fixed effect instrumental variable estimations.

| VARIABLES                                       | TFPE<br>(1)  | OTE<br>(2)   | OTE<br>(3)   | OSE<br>(4)   | OSE<br>(5)   | RME<br>(6)   | RME<br>(7)   |
|---|--|--|--|--|--|--|--|
| Financial support                               | 0.020<br>(0.015)   | -0.035*<br>(0.021)   | -0.043**<br>(0.021)  | 0.022***<br>(0.007)  | 0.017**<br>(0.007)   | 0.068***<br>(0.021)  | 0.068***<br>(0.021)  |
| Ln firm size                                    | -0.059***<br>(0.006)   | -0.018**<br>(0.008)  | -0.017**<br>(0.008)  | 0.057***<br>(0.003)  | 0.057***<br>(0.003)  | -0.117***<br>(0.008)   | -0.119***<br>(0.008)   |
| Ln firm age                                     | -0.004<br>(0.012)  | -0.030*<br>(0.017)   | -0.033*<br>(0.017)   | -0.003<br>(0.006)  | -0.004<br>(0.006)  | 0.028*<br>(0.017)  | 0.029*<br>(0.017)  |
| Innovation                                      | 0.004<br>(0.005)   | 0.002<br>(0.007)   | -0.002<br>(0.007)  | -0.002<br>(0.002)  | -0.004*<br>(0.002)   | 0.005<br>(0.007)   | 0.006<br>(0.007)   |
| Export  | 0.075***<br>(0.020)  | 0.077***<br>(0.028)  | 0.071***<br>(0.027)  | -0.023**<br>(0.009)  | -0.024**<br>(0.009)  | 0.065**<br>(0.028)   | 0.067**<br>(0.028)   |
| Entry cost                                      |  |  | 0.013<br>(0.015)   |  | -0.008<br>(0.005)  |  | -0.003<br>(0.015)  |
| Land access                                     |  |  | 0.007<br>(0.010)   |  | -0.001<br>(0.003)  |  | 0.017*<br>(0.010)  |
| Transparency                                    |  |  | 0.028**<br>(0.012)   |  | 0.013***<br>(0.004)  |  | 0.006<br>(0.012)   |
| Time cost                                       |  |  | -0.031**<br>(0.012)  |  | 0.012***<br>(0.004)  |  | 0.024*<br>(0.012)  |
| Informal cost                                   |  |  | 0.001<br>(0.009)   |  | -0.001<br>(0.003)  |  | -0.005<br>(0.009)  |
| Favor state                                     |  |  | 0.029***<br>(0.007)  |  | -0.004<br>(0.003)  |  | 0.004<br>(0.008)   |
| Dynamic leader                                  |  |  | -0.003<br>(0.006)  |  | -0.003<br>(0.002)  |  | -0.010<br>(0.006)  |
| Labor training                                  |  |  | -0.041***<br>(0.014)   |  | -0.015***<br>(0.005)   |  | -0.000<br>(0.014)  |
| Legal frame                                     |  |  | -0.020*<br>(0.012)   |  | 0.007*<br>(0.004)  |  | 0.041***<br>(0.012)  |
| Observations                                    | 4317   | 4317   | 4317   | 4317   | 4317   | 4317   | 4317   |
| R-squared                                       | 0.042  | 0.004  | 0.028  | 0.139  | 0.152  | 0.075  | 0.088  |
| Number of panels                                | 1522   | 1522   | 1522   | 1522   | 1522   | 1522   | 1522   |
| 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. Ln: natural logarithm.

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. Furthermore, these findings also imply that tax exemptions, interest rate subsidies and investment incentives may be important driving factors to improve firm efficiency, especially in the present context of the outbreak of the Covid-19 pandemic that has triggered world-wide concern about the survival of SMEs.

## 5. Author statement

We would like to confirm that the above mentioned manuscript has not previously been published and that has not been submitted for publication elsewhere, that is publication is approved by all authors and by the responsible authorities where the work was carried out, and that if accepted, it will not be published elsewhere including electronically in the same form, in any language, without the written consent of the copyright-holder.

## Declaration of Competing Interest

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare absence of conflicting interests with the funders.

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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.frl.2020.101667](https://doi.org/10.1016/j.frl.2020.101667).

## Appendix 1: Descriptive statistics of main variables in the model

| Variables      | 2011 |      | 2013 |      | 2015 |      |
|----------------|------|------|------|------|------|------|
|                | Mean | SD   | Mean | SD   | Mean | SD   |
| TFPE           | 0.30 | 0.18 | 0.28 | 0.17 | 0.28 | 0.16 |
| OTE            | 0.44 | 0.20 | 0.44 | 0.20 | 0.43 | 0.20 |
| OSE            | 0.95 | 0.08 | 0.94 | 0.09 | 0.94 | 0.10 |
| RME            | 0.73 | 0.24 | 0.70 | 0.24 | 0.72 | 0.24 |
| finansup       | 0.09 | 0.29 | 0.10 | 0.30 | 0.05 | 0.21 |
| lnsize         | 1.72 | 1.11 | 1.67 | 1.10 | 1.64 | 1.11 |
| lnage          | 2.42 | 0.66 | 2.64 | 0.56 | 2.80 | 0.49 |
| inno           | 0.46 | 0.50 | 0.21 | 0.41 | 0.37 | 0.48 |
| Export         | 0.05 | 0.21 | 0.06 | 0.24 | 0.06 | 0.25 |
| Entry cost     | 8.63 | 0.30 | 7.36 | 0.45 | 8.02 | 0.48 |
| Land access    | 5.74 | 0.91 | 6.22 | 0.62 | 5.13 | 0.73 |
| Transparency   | 5.97 | 0.44 | 5.66 | 0.38 | 6.18 | 0.31 |
| Time cost      | 6.15 | 0.72 | 5.65 | 0.71 | 6.22 | 0.58 |
| Informal cost  | 6.33 | 0.91 | 5.68 | 0.85 | 4.79 | 0.75 |
| Favour state   | 5.58 | 1.39 | 6.20 | 0.81 | 6.22 | 0.54 |
| Dynamic leader | 4.24 | 1.04 | 5.26 | 1.00 | 4.33 | 0.46 |
| Labor training | 5.17 | 0.48 | 5.77 | 0.57 | 6.60 | 0.66 |
| Legal frame    | 5.79 | 0.36 | 4.94 | 0.78 | 5.39 | 0.66 |
| Observations   | 1459 |      | 1476 |      | 1447 |      |

## Appendix 2: 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:

$$TFPE_{it} = OTE_{it} * OSE_{it} * RME_{it}$$

As shown in Fig. 1,  $TFP_{it}$  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.

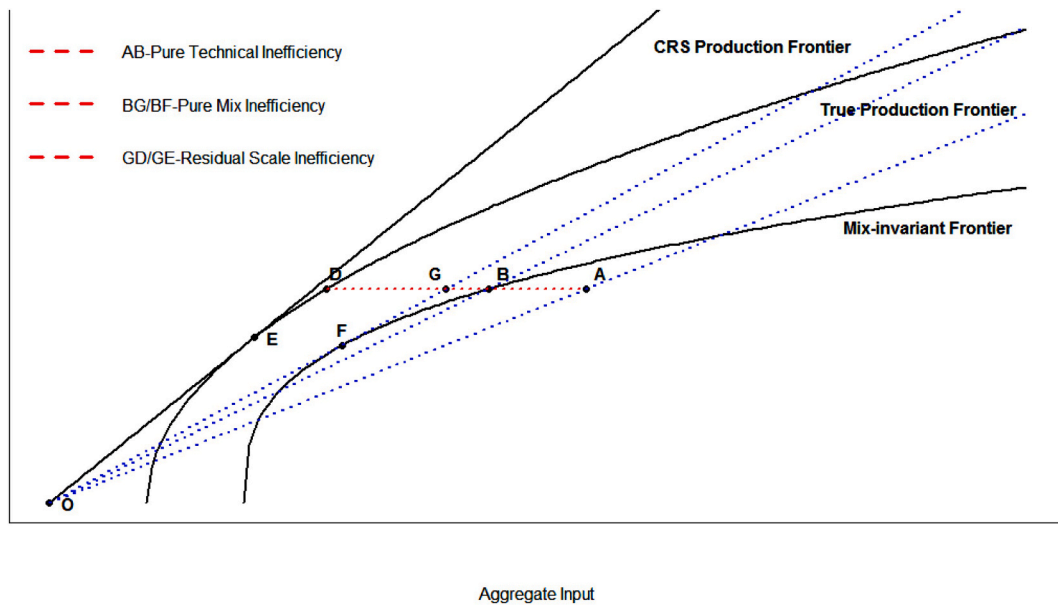


Fig. 1. Assessing TFP and its decomposition using the Färe-Primont index.

Appendix 3: The first stage of instrumental variable estimations

| VARIABLES        | Financial support<br>(1) | Financial support<br>(2) |
|------------------|--------------------------|--------------------------|
| Instrument       | 0.983***<br>(0.027)      | 0.982***<br>(0.027)      |
| Ln firm size     | 0.018*<br>(0.011)        | 0.018*<br>(0.011)        |
| Ln firm age      | 0.032<br>(0.022)         | 0.032<br>(0.022)         |
| Innovation       | -0.008<br>(0.009)        | -0.008<br>(0.009)        |
| Export           | 0.095***<br>(0.036)      | 0.096***<br>(0.036)      |
| Entry cost       |                          | 0.007<br>(0.019)         |
| Land access      |                          | 0.000<br>(0.013)         |
| Transparency     |                          | 0.001<br>(0.016)         |
| Time cost        |                          | -0.009<br>(0.016)        |
| Informal cost    |                          | -0.001<br>(0.011)        |
| Favour state     |                          | -0.003<br>(0.010)        |
| Dynamic leader   |                          | 0.003<br>(0.008)         |
| Labor training   |                          | -0.001<br>(0.018)        |
| Legal frame      |                          | 0.000<br>(0.016)         |
| Constant         | -0.114*<br>(0.059)       | -0.115<br>(0.227)        |
| Observations     | 4382                     | 4382                     |
| R-squared        | 0.342                    | 0.342                    |
| F-statistics     | 1358.92                  | 1312.71                  |
| Number of panels | 1587                     | 1587                     |

Notes: Robust standard errors are in parentheses. \*\*\*, \*\*, \* significant at 10%, 5%, 1% respectively, year dummies and technological level dummies are controlled in the model. Ln: natural logarithm.

## References

- Barajas, A., Huergo, E., Moreno, L., 2017. Public support to business R&D and the economic crisis: Spanish evidence. Retrieved from <https://mpa.ub.uni-muenchen.de/81529/>.
- Chen, C.J., Huang, J.W., 2009. Strategic human resource practices and innovation performance - The mediating role of knowledge management capacity. *J Bus Res* 62 (1), 104–115.
- Cin, B.C., Kim, Y.J., Vonortas, N.S., 2017. The impact of public R&D subsidy on small firm productivity: evidence from Korean SMEs. *Small Business Economics* 48 (2), 345–360.
- Cuong, T.T., Rand, J., Torm, N., Chieu, T.D., McCoy, S., Bjerger, B., 2010. *Dac Diem Moi Truong Kinh Doanh o Vietnam / Characteristics of the Vietnamese Business Environment: Evidence from a SME Survey in 2009*. CIEM, Hanoi, Viet Nam.
- Fisman, R., Svensson, J., 2007. Are corruption and taxation really harmful to growth? Firm level evidence. *J Dev Econ* 83 (1), 63–75.
- Fu, X., 2005. Exports, technical progress and productivity growth in a transition economy: a non-parametric approach for China. *Appl Econ* 37 (7), 725–739.
- Grazzi, M., 2012. Export and firm performance: evidence on productivity and profitability of Italian companies. *Journal of Industry, Competition and Trade* 12 (4), 413–444.
- Hansen, H., Rand, J., Tarp, F., 2009. Enterprise growth and survival in Vietnam: does government support matter. *J Dev Stud* 45 (7), 1048–1069.
- Harris, R., Li, S., 2019. Government assistance and total factor productivity: firm-level evidence from China. *Journal of Productivity Analysis* 52 (1–3), 1–27.
- Kou, M., Chen, K., Wang, S., Shao, Y., 2016. Measuring efficiencies of multi-period and multidivision systems associated with DEA: an application to OECD countries' national innovation systems. *Expert Syst Appl* 46, 494–510. <https://doi.org/10.1016/j.eswa.2015.10.032>.
- Madsen, A.S., Ulhøi, J.P., 2005. Technology innovation, human resources and dysfunctional integration. *Int J Manpow* 26 (6), 488–501.
- Maggioni, V., Sorrentino, M., Williams, M., 1999. Mixed consequences of government aid for new venture creation: evidence from Italy. *Journal of Management and Governance* 3 (3), 287–305.
- McKenzie, D., Rapoport, H., 2007. Network effects and the dynamics of migration and inequality: theory and evidence from Mexico. *J Dev Econ* 84 (1), 1–24.
- Mont, D., Nguyen, C., 2013. Does parental disability matter to child education? Evidence from Vietnam. *World Development*, 48 88–107.
- Morris, M., Stevens, P., 2010. Evaluation of a New Zealand business support programme using firm performance micro-data. *Small Enterprise Research* 17 (1), 30–42.
- O'Donnell, C.J., 2012 a. An aggregate quantity framework for measuring and decomposing productivity change. *Journal of Productivity Analysis*, 38 255–272.
- O'Donnell, C.J., 2012 b. Nonparametric estimates of the components of productivity and profitability change in U.S. agriculture. *Am J Agric Econ* 94, 873–90.
- Rand, J., 2007. Credit constraints and determinants of the cost of capital in Vietnamese manufacturing. *Small Business Economics* 29 (1–2), 1–13.
- Takalo, T., Tanayama, T.J.T.J.o.T.T., 2010. Adverse selection and financing of innovation: is there a need for R&D subsidies. *J Technol Transf* 35 (1), 16–41.
- Tsai, L.-C., Zhang, R., Zhao, C., 2019. Political connections, network centrality and firm innovation. *Finance Research Letters* 28, 180–184. <https://doi.org/10.1016/j.frl.2018.04.016>.
- Vu, V.H., Cuong, L.K., 2018. Does government support promote SME tax payments? New evidence from Vietnam. *Finance Research Letters*.
- Vu, V.H., Tran, T.Q., Nguyen, V.T., Lim, S., 2018. Corruption, types of corruption and firm financial performance: new evidence from a transitional economy. *Journal of Business Ethics* 148 (4), 847–858.
- Wooldridge, J.M., 2009. *Introductory econometrics: A modern Approach*. Cengage Learning, Mason, OH.
- Wu, A., 2017. The signal effect of Government R&D Subsidies in China: does ownership matter. *Technological Forecasting Social Change* 117, 339–345.
- Yan, Z., Li, Y., 2018. Signaling through government subsidy: certification or endorsement. *Finance Research Letters* 25, 90–95.