

A Service of

ZBW

Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre for Economics

Tung Nhu Nguyen

Article

Productivity effect of efficiency wages at small and medium-sized manufacturing enterprises: The case of Vietnam

Global Business & Finance Review (GBFR)

Provided in Cooperation with:

People & Global Business Association (P&GBA), Seoul

Suggested Citation: Tung Nhu Nguyen (2023) : Productivity effect of efficiency wages at small and medium-sized manufacturing enterprises: The case of Vietnam, Global Business & Finance Review (GBFR), ISSN 2384-1648, People & Global Business Association (P&GBA), Seoul, Vol. 28, Iss. 6, pp. 130-144,

https://doi.org/10.17549/gbfr.2023.28.6.130

This Version is available at: https://hdl.handle.net/10419/305931

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.



https://creativecommons.org/licenses/by-nc/4.0/

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



WWW.ECONSTOR.EU



GLOBAL BUSINESS & FINANCE REVIEW, Volume. 28 Issue. 6 (NOVEMBER 2023), 130-144 pISSN 1088-6931 / eISSN 2384-1648 | Https://doi.org/10.17549/gbfr.2023.28.6.130 © 2023 People and Global Business Association

GLOBAL BUSINESS & FINANCE REVIEW

www.gbfrjournal.org

Productivity Effect of Efficiency Wages at Small and Medium-Sized Manufacturing Enterprises: the Case of Vietnam

Tung Nhu Nguyen[†]

Ph.D., School of Business, International University - Vietnam National University Ho Chi Minh City, Vietnam

ABSTRACT

Purpose: This paper aims to investigate whether efficiency wages for production workers have a positive effect on labor productivity in Vietnam's manufacturing SMEs.

Design/methodology/approach: The research analyzes the panel data of manufacturing SMEs collected by UNU-Wider in Vietnam in 2011, 2013, and 2015.

Findings: The panel-data analysis results for 6,953 observations show that efficiency wages increase labor productivity.

Research limitations/implications: The scope of this study is limited to Vietnam's manufacturing SMEs. Future studies should include replicating the research model in the service sectors and other countries.

Originality/value: Previous studies on Vietnamese manufacturing SMEs did not disclose the impact of efficiency wages on firm-level labor productivity using the SME panel datasetVietnam's. The novelty of this study is the introduction of the efficiency wages as an explanatory variable forto labor productivity. The study results shed light on organizational behavior in rational salary decisions. Many of SMEs have decided to pay lower than the average sector wage. NeverthelsessStill, the regression analysis indicates that salary growth improves per-worker productivity. This discovery allows researchers to investigate why SMEs have decided not to raise worker wages significantly while wage increases helps boost labor productivity. As a practical contribution, the study result recommends that for higher labor productivity at lower labor costs, manufacturing SMEs can raise their workers' salaries based on the average sector wage instead of benchmarking them with the average nation-level wages.

Keywords: Labor productivity, Efficiency wage, Small and medium-sized enterprises, Manufacturing, Vietnam

I. Introduction

The linkage between factors of production and labor productivity has long received attention from researchers, professionals, and policy-makers (Ugur et al., 2016). A new research trend in productivity is related to the impact of efficiency-driven initiatives on firm- and plant-level labor productivity (Sartal et al., 2020). From the efficiency view, enterprises with limited capital are interested in using labor efficiently (Tran & Santarelli, 2014). This study focuses on the productivity of small and medium-sized enterprises because they play a vital role in economic growth in most nations (Wijayanti et al., 2016). However, given its resource difficulties, a manufacturing SME needs to use its workers efficiently to maximize outputs per direct labor. The quality of labor is crucial for achieving labor

© Copyright: The Author(s). This is an Open Access journal distributed under the terms of the Creative Commons Attribution Non-Commercial License (https://creativecommons.org/licenses/by-nc/4.0/) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.



Received: Jul. 17, 2023; Revised: Aug. 8, 2023; Accepted: Aug. 21, 2023

[†] Corresponding author: Tung Nhu Nguyen E-mail: nntung@hcmiu.edu.vn

efficiency (Huynh et al., 2022). To retain quality labor, an SME must address the problem of setting an attractive wage.

Furthermore, recent studies have found a correlation between efficiency wages, defined as the ratio of the average firm-level wage to the average sector wage, and productivity (Ranjan & Raychaudhuri, 2011; Sartal et al., 2020; Syverson, 2011). Nevertheless, there is still a need for further research on this link. Although related studies have indicated that wage growth depends on productivity improvement (Berger et al., 2022; Meager & Speckesser, 2011), relatively few have examined the reverse causality, specifically the effect of efficiency wages on labor productivity at the firm level in different country contexts (Akerlof, 1984; Meager & Speckesser, 2011; Yellen, 1984). Exploring whether various organizational conditions yield different results on the same research design causes curiosity among researchers. For example, in a study in Spain, the positive effect of efficiency wages on productivity is only significant for supervised workers but insignificant for unsupervised workers (Giménez-Nadal et al., 2021). To the best of knowledge of the author of this paper, no previous studies in Vietnam have expanded the production function to include efficiency wages as an input variable for labor productivity inat small-sized manufacturing firms using panel data.

This article investigates the effect of efficiency wages on firm-level labor productivity. SMEs need to recognize the benefits of hiring and retaining professionals through attractive remuneration despite their financial constraints. Our choice of research on the issue of labor productivity in manufacturing firms is consistent with previous studies analyzing high-performance work systems (Datta et al., 2005; Sartal et al., 2020).

The efficiency wage is higher than the average industry wage because it is based on the competency and skills of the employee, not on the industry wage (Krueger & Summers, 2015). Higher salaries not only incentivize workers to work more effectively for their employers but also play a vital role in the whole economy because the workers have more income to buy more products and services. Morally, firms must pay good wages for their employees to purchase nutritional food to be healthy (Riveros & Bouton, 1994). In the era of the Anthropocene, this aim serves the trendy theme for social justice for workers in low-income countries (Biggeri & Tapia, 2023). Unfortunately, there has been a shortage of studies on the role of efficiency wages in productivityoriented SMEs in developing nations (Love & Roper, 2015).

This paper extends the production model with efficiency wages as a new explanatory variable. The study contributes to adapting the productivity model in the peculiar context of Vietnam, which has started its market-oriented economy in the socialist direction after its economic reform ("doi moi") in 1986 (Huynh et al., 2022). Firms in a transitional economy such as Vietnam possess different characteristics from those in developed countries, drawing research interest (Peng, 2000). Despite its recent impressive income growth, one of Vietnam's problems is that its labor productivity is nearly 20 times lower than Singapore's and worse than most regional countries such as Malaysia, Thailand, China, and the Philippines (Kenichi et al., 2021). Moreover, an OECD report indicates that Vietnam stands lower than Singapore, Malaysia, Thailand, Indonesia, and the Philippines in productivity, technology, and innovation.¹⁾

SMEs play a significant role in the economic development of Vietnam. According to the General Statistics Office of Vietnam, SMEs employ approximately 80% of the labor force, but their labor productivity is up to four times lower than that of larger firms (GSO, 2018). Despite their significant contributions, SMEs in Vietnam need to overcome various challenges, including the shortage of skilled labor. To attract and retain the workforce, SMEs must recognize the importance of reasonable wages.

OECD Policy Assessment Framework consists of 8 dimensions for ASEAN SMEs: 1) productivity, technology, and innovation;
 Environmental policies; 3) Access to finance; 4) Access to market and internalization; 5) Institutional framework; 6) Legislation, regulation, and tax; 7) Entrepreneurial education and skills; 8) Social enterprises and inclusive SMEs. Source: OECD (2018).

However, due to their small scale, the question is whether paying extra cash for workers is worthwhile as this salary policy increases costs for financially struggling SMEs.

The organization of this paper continues with a related literature review, which lays the foundation for the proposed conceptual model. After the literature review, the research methodology is discussed for model specification and data analysis approaches. Next, the results section presents the outputs of the panel data analysis and relevant discussion. Finally, the conclusions also mention some significant contributions of this study to theory and policy -makers.

II. Literature Review

A. Efficiency Wages and Productivity

Efficiency wage refers to the level of pay for a worker a firm chooses such that it minimizes the cost per efficiency unit (Yellen, 1984). It is founded on the shirking model, positing that a highly paid employee would not shirk from work and quit his job because he wants to avoid paying the opportunity cost of his current financial benefits (Goldsmith et al., 2000). From the behavioral perspective, the principles of efficiency wages are constructed on the concept of employer-employee psychological contracts, such as gift exchange (Akerlof, 1984; Sartal et al., 2020). This concept holds that an employee is willing to contribute more to his employer in exchange for higher salaries. Above-average salaries create a financial incentive for workers to work harder and produce more, generating higher outputs for the firm. Solow (1979) believes that higher wages lead to workforce loyalty and hence firms' productivity.

From economics view, economists for efficiency wage theory believe that a firm should pay wages for marginal productivity. That is, wages are based on the competency and skills of the employee, or the real wage, not on the industry wage (Krueger & Summers, 2015; Yellen, 1984). A real wage for a worker reflects his competency and skills and measures living standards. When the worker receives real wages, he can afford all the necessities for living, leading to more spending and stimulating the demand for products and services. This contribution of real wages to an economy stemmed from the classical economics literature as early as Adam Smith in the 18th century (Smith, 1776).

The efficiency wage is also considered an input price for a firm's optimization process. Riveros and Bouton (1994) postulated that a firm first chooses a salary that minimizes the average cost of an efficiency unit of labor. After that, the firm selects the level of inputs for profit maximization given the efficiency wage and other input prices. Firms may find it profitable to increase wages even if no external party is punishing them for not doing so (Krueger & Summers, 2015; Mühlau & Lindenberg, 2003). Workers do not quit their jobs because they perceive that they may not receive higher pay in other organizations. Good salaries not only reduce the turnover rate but also increase staff loyalty. Therefore, a company adopting the principle of efficiency wages saves money on recruitment and training.

From the health perspective, a worker can live a healthier life with a higher income because he eats well and stays well. As a result, he will be more productive. According to nutritional theories, there are positive associations among high wages. health and productivity, and workers' health in developing nations (Riveros & Bouton, 1994). Workers in developing countries must buy more nutritional food to be healthier for better work performance. If their firms pay them sufficient money to eat nutritious food, they have more energy to increase their output rate. Therefore, the costs of higher payments to employees are canceled off by increased outputs. Unfortunately, in poorer nations, most populations live at the subsistence level of income, which cannot guarantee nutrition and energy for hard work (Haque, 1995; Riveros & Bouton, 1994). This health problem may partially explain poor labor productivity in developing countries.

Nevertheless, the theory of efficiency wage contradicts the results of previous studies that wage change is the outcome of changes in a firm's profitability and productivity, not the other way around (Blanchflower et al., 1996; Bloom & Reenen, 2010). Some scholars argue that the wage-productivity relationship is reciprocal. This argument means that higher labor productivity is likely to reduce labor input. For example, when a firm has set up a process or technology for high volume per production run (e.g., product-focused or assembly lines), labor does not contribute much to productivity; hence, any change in wages does not matter (Mankiw, 2020). On the other hand, firms with low profit and productivity may seek to reduce labor costs, including salaries.

From the above literature, we hypothesize that paying workers above-average wages positively impacts productivity. However, there are some challenges to this proposition. First, if a company pays higher wages for many periods without increased productivity as a return, it may become less competitive in cost leadership. Another challenge to this theory is the business environment and the characteristics of organizations. For example, Romer (2001) posited that in an economy with a high unemployment rate, employees tend to be loyal to their current employer even when they are not well paid. For the manufacturing sectors, when the demand for products declines, the demand for workers slumps, and production workers fear that they cannot find another job, so they accept remaining where they are because switching costs may be too high. In addition, one of the notable characteristics of SMEs is family-based. Family members working for their own enterprises may still work hard, even on weekends, even though they are not highly paid, especially when their businesses are in financial trouble.

B. Related Studies

Hypotheses related to efficiency wages have been tested in different countries, and the test results have been mixed. For example, in the US, a study in the restaurant industry showed that a raised minimum wage significantly increased firm productivity (Kim & Jang, 2019). A panel-data analysis offor 4,090 observations for the period 2001-2009 in manufacturing plants in the US also confirmed the positive effect of efficiency-driven initiatives, including efficiency wages, on labor productivity (Sartal et al., 2020).

However, the relationship between these two variables was weak in China (Zhang & Liu, 2013). In addition, a survey on urban efficiency wages in France and Spain for the period 2009-2010 revealed a mixed association between wages and leisure, a substitute measure for shirking at work (Giménez-Nadal et al., 2021). On the one hand, the research found that the higher monthly earnings an employee made, the more leisure he enjoyed, leading to less work efforts and lower productivity. On the other hand, this finding is only significant among nonsupervised workers in Spain. It implied that nonsupervised workers were prone to shirking at work, no matter how much more they earned, while supervised workers were more disciplined. It suggests that a supervision mechanism is critical to ensure that workers make efforts at work. This finding also showed that when workers with long commuting time received higher wages, they were more likely to reduce their shirking action, increasing labor productivity. The author of this paper argued that increased wages were financial incentives for workers who have to commute far from the workplace. Shirking behavior is not only caused by the lack of motivation. Sometimes this action is waged by labor unions. Min and Yi (2017) argued that lower wages made labor unions encourage workers to shirk from work, leading to lower employee productivity due to their strikes.

Dosi et al. (2020) found a positive relationship between the elasticities of wages per employee and those of labor productivity across firms for the period 1998 - 2007 in China using the quantile regression method (10th and 90th percentiles of the labor productivity growth rate). The pooled and dynamic quantile estimation results showed that a 1% increase

in productivity was associated with a 0.3% increase in wages. A panel-data analysis of 179 Indian microfinance institutions collected over the period 2010-2018 under a fixed-effects model showed that efficiency wage had a solid significant positive effect on employees' productivity as well as outreach (client coverage). Specifically, a unit increase in efficiency wage generated a 7%-9% increase in outreach productivity (Mia et al., 2022). In Europe, a plant-level analysis of 4,090 observations using panel data for the period 2001 - 2009 in Spain revealed that efficiency wages led to an increase in sales of 37.3% per worker (Giménez-Nadal et al., 2021). This study used the GMM estimation method to solve the possible endogeneity problem of explanatory variables, which may occur in the labor productivity model.

Ford Motor Corporation adopted efficiency-wage theory to achieve its production objectives. Specifically, as early as 1914, this automobile corporation doubled the daily pay for its workers from \$2.35 to \$5 (Raff & Summers, 1986). This salary policy was surprising because during this period, the unemployment rate in the US was high, and Ford did not need to raise wages to attract workers (Raff & Summers, 1986). However, the company implemented a high-wage policy. This experience at this giant company proved that top management at this giant company recognized the theory of efficiency wages, and they adopted it to maximize the output rate.

In the context of Vietnam, Le (2020) found that convenience store productivity depends on average wages. However, the effect of efficiency wages on labor productivity has not yet been published for Vietnamese manufacturing SMEs. This research gap provides a reason for our hypothesis that efficiency wages (or over-average wages) increase labor productivity in manufacturing SMEs.

In sum, the relationship between wages and labor productivity has been theoretically established and empirical studies have been conducted in some countries. Numerous previous studies related to this research topic were biased toward the position that wages should be set according to productivity (Berger et al., 2022; Krueger & Summers, 2015; Meager & Speckesser, 2011). However, fairly few studies have considered efficiency wages as a management input for productivity growth and examined the reverse causality, especially the effect of efficiency wages on labor productivity at the firm level in low and middle-income countries. Exploring whether various organizational conditions yield different results on the same research design causes curiosity to the author of this research.

C. Hypothesis Development

Our proposed model stems from the Cobb-Douglas production function:

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta}$$

where Y_{it} , K_{it} , L_{it} , and A_{it} , are the total output, capital, labor and total factor productivity of firm *i* in year *t*, respectively; α and β are the elasticities of output with respect to capital and labor.

Dividing both sides by L, we obtain:

$$\frac{Y_{it}}{L_{it}} = A_{it} \left(\frac{K_{it}^{\alpha}}{L_{it}^{\alpha}}\right) L_{it}^{\alpha+\beta-1}$$

Taking the natural logarithm of both sides, we have:

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \alpha \ln\left(\frac{K_{it}}{L_{it}}\right) + (\alpha + \beta - 1)\ln L_{it} + \ln A_{it}$$

Where:

 Y_{it}/L_{it} is *labor productivity*, the ratio of sales revenue to the total number of full-time workers at firm *i* in year *t*.

 K_{it}/L_{it} is *capital intensity*, the ratio of physical assets to the number of full-time workers at firm *i* in year *t*.

 L_{it} is *Firm Size*, measured by the total number of full-time workers at firm *i* in year *t*.

 A_{it} is represented by *Efficiency Wage* as a management practice at firm *i* in year *t* (Ranjan & Raychaudhuri, 2011; Sartal et al., 2020; Syverson, 2011).

Based on the above production equation model, we formulate the following hypotheses:

- **Hypothesis 1:** Capital Intensity has a positive effect on Labor Productivity
- **Hypothesis 2:** Firm Size has a positive effect on Labor Productivity.
- **Hypothesis 3:** Efficiency Wage has a positive effect on Labor Productivity

We extend the above equation with professional share (*Professional*) and its interaction with efficiency wage. *Professional* refers to the percentage of professionals in a firm's workforce. Professionals are staff members who have completed college or university education. They form intellectual capital which generates intellectual capital efficiency and improves industrial firm performance (Nguyen & Nghiem, 2023). Based on this extension, we develop the Hypothesis 4 as follows:

Hypothesis 4: Professional Share increases the positive impact of Efficiency Wage on Labor Productivity.

We test the four hypotheses developed as above in the contextual conditions of Vietnam. Our scope of research is limited to Vietnamese manufacturing SMEs, whose characteristics are portrayed as below.

D. Characteristics of Vietnamese Manufacturing SMEs

In Vietnam, firms are formal when they have an "Enterprise Code Number" or Business Registration Certificate. The rate of local SMEs' formalization (business registration) increased over time (Brandt et al., 2016). In a 2015 SME survey conducted by United Nations University-Wider, 97% of the surveyed SMEs were formal, an increase of 27% from 2013. However, up to 97% of informal SMEs

were micro-sized or less than ten employees. These unregistered micro-sized SMEs had difficulty accessing formal loans from financial institutions, as the government's policies encouraged firms to give loans to formal businesses (Brandt et al., 2016). The UNU-Wider survey also revealed that most domestic manufacturing SMEs made labor-intensive products (e.g., garment production). Therefore, labor costs (including wages, insurance, and training) create a financial burden, pressuring them to utilize labor and equipment efficiently. When SMEs are suppliers in supply chains, their buyers, typically largerbigger manufacturers, require them to reduce costs, improve quality and implement responsiveness (Yoo, 2016).

Vietnamese SMEs have dramatically grown over the last decades. The General Statistics Office of Viet Nam recorded an average annual increase of approximately 20% in local SMEs and the private sector from 2003 to 2017 (GSO, 2018). SMEs play a significant role in the economic development of Vietnam. According to the General Statistics Office of Vietnam, SMEs employ approximately 80% of the labor force. Still, related data have indicated that Vietnam's manufacturing SMEs face a problem of low labor productivity. The gap in labor productivity between them and large-sized SMEs hasis persistently getting bigger increased over the last decades. For example, large-sized enterprises" labor productivity, measured in net revenue per employee, wasis 1.5 and 4.5 times greater than that of micro and small-sized enterprises in 2018 (GSO, 2018).

Government assistance to Vietnamese SMEs can be categorized into financial incentives and technical support (Hansen et al., 2009). For example, financial incentives include tax breaks or reductions for R&D activities, while technical support assists SMEs with human resource training, export promotion initiatives, and quality or technology programs (Hansen et al., 2009). The following section presents the model of this research for a Vietnamese SME dataset.

III. Methodology

A. Model Specification

From the list of proposed hypotheses developed from Literature Review, we express the following equation (with all variables in logarithmic form) for the study model:

$$\begin{split} Labor \textit{Productivity}_{it} &= \beta_{0+}\beta_1\textit{Capital Intensity}_{it} \\ &+ \beta_2\textit{FirmSize}_{it} + \beta_3\textit{Efficiency Wage}_{it} \\ &+ \beta_4\textit{Professional}_{it}^*\textit{Efficiency Wage}_{it} \\ &+ a' T_{t+}\epsilon_{it} \end{split}$$

In Equation 1, the subscript *i* denotes enterprises and *t* represents time periods. $\beta_0, \beta_1, \beta_2, \beta_3$ and β_4 are regression parameters. *T* is time dummy and ϵ is the error term.

LaborProductivity is the ratio of sales revenue to the total number of full-time workers. *Capital Intensity* is the ratio of physical assets to the number of full-time workers. *FirmSize* is measured by the total number of full-time workers. *EfficiencyWage* is the ratio of the average firm-level wage to the average sector wage (Ranjan & Raychaudhuri, 2011; Sartal et al., 2020; Syverson, 2011).

B. Data

We use secondary data to compute the model variables. The first secondary data come from SME surveys designed and gathered by the United Nations University-Wider (UNU-Wider) in collaboration with the Ministry of Labor, the Invalid and Social Affairs of Vietnam (MOLISA), the Central Institute of Economic Management (CIEM) and the University of Copenhagen. We use these panel data for 2011, 2012, and 2015 (UNU-WIDER, 2018). For each round of the surveys, they published survey reports that described sampling methods on the website of UNU-Wider. The firm population includes formally registered and informally registered enterprises in all manufacturing sectors (Brandt et al., 2016).

This study's second secondary data source comes from the Annual Year Books published by Vietnam's General Statistics Office (2011, 2013, and 2015 statistical yearbooks). We use the information on average monthly wages for production workers in each of the manufacturing sectors Vietnam's (General Statistics Office, 2015) to generate the new variable of efficiency wage, which is the ratio of average wages of production workers in a firm to the average salaries of the sector to which that firm belongs (Table 1).

C. Model Estimation Strategy

We used the econometric approach for this study. We aim to explore the relationships between a vector of explanatory variables and only one outcome variable, i.e., labor productivity, for which the approach's Cobb⁻Douglas production function is well used (Chiang & Cheng, 2014).

A panel-data model requires the selection of an appropriate estimation strategy among ordinary least squares (OLS), random-effects (RE), or fixed-effects (RE) options. OLS estimation may cause inconsistent and biased estimators due to the correlation between observable inputs and unobserved productivity shocks (Rovigatti & Mollisi, 2018). To select an appropriate panel-data estimation strategy, we conduct the Breusch-Pagan Lagrangian multiplier test and Hausman test (Baum, 2006; Stock & Watson, 2012). If the null hypothesis of the LM test is rejected, the panel model can be used. For the Hausman test, a fixed-effects model is preferred if its null hypothesis is rejected (Baum, 2006; Stock & Watson, 2012).

Previous studies on labor productivity using panel data mainly adopted the fixed-effects model or generalized methods-of-moment because the ordinary least squares (OLS) model does not consider the influence of the lagged variable (e.g., the labor productivity of the previous period) (e.g., Sartal et al., 2020). Given our dataset with only three time periods (2011, 2013, and 2015), we prefer to follow panel-data analysis comparing the test results of OLS, RE, and FE estimation. Among these techniques, FE estimator is consistent in a true fixed-effects model, while OLS and RE estimators are inconsistent (Greene, 2012). For consistency, we conduct postestimation diagnostic tests (Breusch-Pagan Lagrangian multiplier test and Hausman test) to to support the FE estimation.

In addition to the FE estimation strategy, previous studies on labor productivity typically followed first-difference (FD) estimation, which assumes the serially uncorrelated first-differences (Sartal et al., 2020). The FD method is helpful in solving the unobservable heterogeneity across SMEs (variable omission problems) (Hsiao, 2014; Wooldridge, 2011). However, first-difference estimation is more relevant for datasets with large T (many individuals) and small N (few time periods). This paper does not proceed with the first-different estimation for our dataset with small T and large N.

Another possible estimation method for datasets with many entities, few time periods but unbalanced pannels is system-GMM (Flannery & Hankins, 2013). This method helps resolve the endogeneity of explanatory variables through instrumental variables. However, the system-GMM estimation requires many lags of dependent and independent variables (Roodman, 2009). In the GMM method, different lags (e.g., many lags of labor productivity) are included in the estimation model. However, this method may generate an asymptotically inefficient estimator due to the lack of moment conditions implied by the error term (Wooldridge, 2011). Due to the limited number of lags, we cannot exploit deeper lags as instruments for the differenced lag of the model variables (i.e., lack of more than two lags of differenced labor productivity) as needed for the system-GMM method.

Furthermore, unit-root and cointegration tests are

SN	Sector	2015	2013	2011
1	Food and beverages	7,963	6,560	3,233
2	Tobacco	12,820	11,334	7,630
3	Textiles	6,365	5,489	3,075
4	Apparel	6,585	4,701	2,824
5	Leather	5,127	4,550	2,632
6	Wood	4,937	3,926	2,277
7	Paper	6,468	5,204	4,469
8	Publishing and printing	6,347	5,737	4,660
9	Refined petroleum etc.	11,480	12,440	13,143
10	Chemical products etc.	9,239	8,561	5,345
11	Rubber	7,037	6,060	3,436
12	Nonmetallic mineral products	6,440	5,700	3,519
13	Basic metals	8,751	6,674	4,007
14	Fabricated metal products	7,328	6,324	3,857
15	Electronic machinery, computers, radio	7,465	6,133	3,731
16	Motor vehicles etc.	7,385	6,041	4,195
17	Other transport equipment	7,454	7,240	3,828
18	Furniture, jewelry, music equipment, wa	6,172	4,961	2,891
19	Recycling etc.	5,977	4,677	2,881

Table 1. Average sector wages (Unit in 1,000 VNDs)

Source: Vietnam's General Statistics Office.

Note: Oonly the data for manufacturing sectors displayed.

widely used for times series (many time periods), but not for cross-sectional series (Kiani & Ahmed, 2013). Our dataset has many cross-sectional units but very small number of time periods, we can ignore unit-root and cointegration tests (Enders, 2010; Gujarati & Porter, 2009; Kiani & Ahmed, 2013).

In summaryTo sum up, we will run OLS, RE, and FE estimations. We prefer the FE estimation method because the FE estimator is consistent and efficient with our dataset of many individuals but small time periods (Hsiao, 2014). After the diagnostic tests, we will decide whether FE estimation is more relevant. basic metals. Only 8.7% were in hi-tech sectors such as computers, office equipment, electric devices, telecommunication devices, and motor vehicles.

Figure 2 points out the difference in average efficiency wages among the hi-tech, medium-tech and low-tech sectors.

Overall, all surveyed SMEs paid less than the sector average, regardless of which technological sector (hi-tech, medium-tech, or low-tech) they fall under because their efficiency wage (the ratio of a firm's average wage to the sector average) is less than one. Low-tech SMEs paid less than hi-tech and mediumtech SMEs (in 2015 and 2011).

Percentage of SMEs by Technology-Classified Sector



Figure 1. SMEs by technology classifications

IV. Results and Discussion

A. Descriptive Statistics

Table 2 shows the descriptive statistics of the panel data for 2011, 2013, and 2015.

Figure 1 shows that 63% of the surveyed SMEs operate in the low-tech classification, making simple products such as food and beverages, textiles, apparel, footwear, and furniture. Approximately 28% of them were in the medium-tech classification, which is for producing chemical products, plastic products, and

Tat	ole	2.	Descriptive	statistics
-----	-----	----	-------------	------------

Variable	Obs	Mean	Std. Dev.	Min	Max
Sales per Worker 2011	7,500	321,626	2,711,207	2,500	133,400,000
Sales per Worker 2013	7,578	306,841	499,653	-	11,280,000
Sales per Worker 2015	7,923	464,101	3,146,374	4,500	128,300,000
Efficiency Wage 2011	7,449	1	0	-	6
Efficiency Wage 2013	5,943	1	0	-	10
Efficiency Wage 2015	7,755	0	0	0	2
Labor Productivity (ln)	7615	12.197	.905	7.824	18.709
Capital Intensity (ln)	7,666	5.281	1.311	916	9.911
Firm Size (ln)	7,674	1.804	1.164	0	7.438
Efficiency Wage (ln)	7,032	-1.1	1.35	-7.395	2.259
Proshare (%)	7,683	.033	.07	0	.771

Note: sales unit in million VNDs

Capital Intensity, the ratio of physical assets to total full-time employment in 2015, is approximately VND 388 million (or approximately US\$16,000 per worker). The sample statistics on efficiency wages indicate that the wage increase in manufacturing SMEs has not caught up with the average growth rate of nation-level wages in production sectors.

In 2015, 24% of business owners or managers who responded to the questionnaire had completed college or university education, indicating that SMEs have a limited number of professionals in the

Efficiecy Wages by Year and Sector

Figure 2. Efficiency wages by year and sector

workplace. Only approximately 17% of observations reported training investment for human capital development. In 2015, about 30% of respondents acknowledged that training for existing workers aims to help workers use new production technology, 24% of them perceived that training would increase workers' productivity, and 21% believed that existing workers need training to provide them with enough skills to perform their work.

Firm Size, measured by total full-time employment, shows that up to 73% of enterprises are medium-sized



Figure 3. Box plots of efficiency wage

Table 3.	Ordinary	Least	Squares	(OLS),	Fixed-E	ffects	(FE),	and	Random-Effect	s (RE)	estimation	results
Depender	nt Variable	e: Labo	or Produc	tivity (S	Sales per	Work	(ter					

• `	1 /		
VARIABLES	(1)	(2)	(3)
	OLS	FE	RE
Capital Intensity (ln)	0.221***	0.209***	0.233***
	(0.00834)	(0.0172)	(0.00976)
Firm Size (ln)	0.109***	-0.150***	0.0984***
	(0.0120)	(0.0361)	(0.0139)
Efficiency Wage (ln)	0.0804***	0.0279*	0.0672***
	(0.00869)	(0.0144)	(0.00921)
Professionals (%)	2.300***	0.293	1.475***
	(0.270)	(0.251)	(0.221)
(Efficiency Wage)*(Professionals)	1.654***	0.200	0.936***
	(0.415)	(0.291)	(0.304)
Constant	10.89***	11.43***	10.84***
	(0.0551)	(0.134)	(0.0640)
Observations	6,953	6,953	6,953
R-squared	0.214	0.102	
Number of firmID		3,445	3,445

Robust standard errors in parentheses (clustered in firmID) *** $p{<}0.01,$ ** $p{<}0.05,$ * $p{<}0.1$

(50-199 employees), 6% small-sized (10 to 49 workers), and 21% microsized (fewer than 10 workers).

Figure 3 shows the box plots of the efficiency wages for our panel data of 2011, 2013, and 2015. The reference line (value = 1) means that the firm's average wage equals the sector average wage. Figure 3 reveals that most surveyed SMEs pay less than average sector wages.

B. Estimation Results

Table 3 shows the estimation outputs for the ordinary least squares (OLS), fixed-effects (FE) and random-effects (RE) models. We gain the following results from the model selection tests described in the methodology section.

The Breusch and Pagan Lagrangian multiplier test for random effects results in a p-value less than 0.05, suggesting that we reject the null hypothesis that there is no panel effect. Thus, we can use the panel model. In addition, for the Hausman test, because the null hypothesis is rejected (p-value < 0.05), the fixed-effects model is preferred (Baum, 2006).

Because the appropriate estimation model is fixed-effects (FE), we interpret its FE estimation results. Table 3 (FE Model) shows that the set of independent variables, including Capital Intensity, Firm Size, and Efficiency Wage, significantly affect Labor Productivity.

We can interpret the regression outputs in Model 2 (FE) in Table 3 as follows. A unit of increase in the natural logarithm of the capital-labor ratio increases the natural logarithm of labor productivity by 0.21 at the 1% level, with other variables held constant. We can also interpret that a one percent

change in capital intensity induces a 0.21 percent increase in labor productivity. Similarly, a one percent change in Efficiency Wage induces a 0.03 percent increase in labor productivity at the 10% level.

In contrast, a one percent change in Firm Size induces a decrease in Labor Productivity at 0.15 percent at the 1% level. This finding is consistent with previous studies on productivity, reporting that firms constantly recruit workers to generate more products as demanded in an emerging economy. However, in the long run, the increase in Firm Size will decrease Labor Productivity (Le, 2020).

When we add the interaction between Efficiency Wage and Professionals (*Efficiency Wage*Professionals*) in the model, we do not find any significant impact of professionals on the influence of *Efficiency Wage* on labor productivity in the FE Model. However, this moderator is significant at the 1% level in the OLS model.

Table 4 indicates the results of hypothesis tests from the fixed-effects (FE) model.

V. Conclusion

In sum, we have explored how efficiency wages affect sales per worker in addition to classical input variables, including capital intensity, firm size, and professional shares at Vietnamese manufacturing SMEs. The fixed-effects (FE) estimation analysis results for 6,953 observations show that efficiency wages and capital intensity increase labor productivity. In contrast, an increase in firm size, measured by the number of full-time workers, decreases labor

 Table 4. Hypothesis test results (FE model)

Hypotheses	Conclusions
H1: Capital Intensity has a positive effect on Labor Productivity	Accepted
H2: Firm Size has a negative effect on Labor Productivity	Accepted
H3: Efficiency Wage has a positive effect on Labor Productivity	Accepted
H4: Professional Share has a positive effect on the relationship between Efficiency Wage and Labor Productivity	Rejected

productivity. This finding is consistent with previous studies on productivity, reporting that in the long run, the increase in firm size will decrease firm labor productivity (Le, 2020). Furthermore, we do not find any significant impact of professionals on the influence of efficiency wages on labor productivity in the FE Model.

Several conclusions for productivity-committed SMEs can be drawn from the study findings. First, increasing wages for production workers is significant in raising labor productivity. This influence of efficiency wage suggests that extra pay for workers is offset by reduced labor-related costs and workforce loyalty for greater production volume. It suggests that an SME should consider the average sector wages to set its worker wages rather than the average wage of all sectors. Some sectors pay much higher than others because of their characteristics of highertechnology requirements. However, most SMEs (63% in our sample) produce low-tech outputs requiring sophisticated work skills. Therefore, an SME should use the average wage of the low-tech sector to set its efficiency wage to save labor costs. It suggests that depending on each manufacturing sector, SMEs should motivate workers by raising wages relative to the average sector. This wage-setting policy can save some labor costs for SMEs while increasing the output rate.

Second, there is no evidence that the more professionals there are, the better the SME labor productivity. Workers in labor-intensive manufacturing sectors typically work on simple manual tasks that do not require higher-education knowledge and skills (e.g., critical thinking). This new finding belies the classical concept that firms should recruit many professionals for better organizational performance. This is not in line with previous studies about the necessity of "professionalizing the firm by hiring" (Verbeke & Kano, 2012) or "learning by hiring" (Mouel, 2019). Future studies need to investigate the reasons for this phenomenon. A possible reason is that as most Vietnamese manufacturing SMEs are contracted in low-tech sectors (e.g., textile, garment, food processing), workers with general or technical

skills are likely to be sufficient for simple tasks. Therefore, if an SME recruits many workers with college or university education, there may be no room for them to apply their higher-education knowledge and skills.

The novelty of this study is the introduction of the efficiency wage as an explanatory variable to labor productivity. The study results shed light on organizational behavior in rational salary decisions. Specifically, the differences in efficiency wages among SMEs reveal that firms have different wage-setting policies for workers. Many of them have decided to pay lower than the average sector wage. Still, the regression analysis indicates that salary growth improves per-worker productivity. This discovery allows researchers to investigate why SMEs have decided not to raise worker wages significantly while wage increases helps boost labor productivity.

Our contribution to theory is that an increase in efficiency wage, the ratio of the firm's average wage for workers to the average sector wage, would increase output per worker. The study reinforces the efficiency wage theory, which states that productive firms pay employees based on their competency and skills, not on minimum or average industry wages (Krueger & Summers, 2015). Based on this concept, human resources departments should not abandon austerity policies and adjust salary policies such that worker wages are typically above those of their competitors. With sufficient income, workers will be able to purchase enough healthy food and necessities, which are essential for maintaining stable and even better productivity at their workplaces. On the shop floor, managers should rethink new ways to use healthy labor efficiently to compensate for higher labor costs. For example, they may modify production processes to maximize outputs per work hour. For this objective, management can apply optimization techniques such as assembly line balancing, job prioritization, resource leveling, and time utilization.

As a managerial implication, the study results explore how commitment-based organizations can use financial incentives to encourage workers' work efforts, commitment, and productivity (Datta et al., 2005; Mühlau & Lindenberg, 2003). In practice, high-performing companies have adopted the concept of efficiency wages. These firms design and use high-performance work systems, including human resources practices to enhance work discipline, commitment and productivity (Datta et al., 2005). In these organizations, individuals and teams must adhere to the human resources practices, such as financial incentives, as investments for productivity (Datta et al., 2005). For example, as a steel factory manager as early as the 19th century, Frederick Taylor, well-known as the scientific management father, applied higher wage policies as a financial incentive. In 1914, Ford Motor Corporation doubled its daily wage for workers. To cancel off the increasing labor costs, Ford applied assembly line balancing to reduce idle time for efficiency (Raff & Summers, 1986).

As a contribution to policy-makers, the findings of this study provide evidence that minimum wage policies for manufacturing SMEs should not be considered as a result of a top-down approach. Instead, this study provides empirical proof that any company, regardless of firm size, should set a minimum wage, which may be raised to higher levels than that of same-industry competitors if a firm wants to save labor costs and increase productivity.

In addition to its implications for managers and policy-makers, the study results benefit society. Organizations that adopt the policies of efficiency wages help reduce the costs of unemployment payments because they retain workers, hence reducing unemployment in society, and lessening the pressure for unemployment benefits. This benefit aligns with the literature on efficiency wages (Meager & Speckesser, 2011). Another benefit of efficiency wages for businesses and society is that over-average wages satisfy labor unions, who are responsible for maximizing worker salaries. Happy labor unions prevent workers from strikes that slow down, stagnate production progress, or disrupt public services (Min & Yi, 2017).

Finally, the study benefits the body of knowledge in efficiency-wage theories, and management studies. First, it proves that productivity is not exogenous, as assumed in the microeconomic literature (Meager & Speckesser, 2011). Basic microeconomic theories hold that wage growth should adjust to productivity growth, which is assumed to be exogenous (Meager & Speckesser, 2011). However, the efficiency-wage theory, supported by this research, confirms that wage increases cause labor productivity improvement. In other words, productivity growth is not exogenous. In addition, expanding the production function to include the efficiency-wage as an explanatory variable lays an interesting foundation for future research that will consider efficiency-driven management practices as independent variables for productivity.

This study has limitations. A firm's policy for efficiency wages is just among management practices. For example, proposed efficiency-driven initiatives should consist of efficiency wages, inventory turnover, and material efficiency (Sartal et al., 2020). Future studies should collect data for these measures to test whether this bundle of efficiency practices significantly affects firm- and plant-level labor productivity. In addition, this research scope is limited to Vietnam. Future studies should include model replication in other contexts for theoretical confirmation.

References

- Akerlof, G. (1984). Gift exchange and efficiency wages: four views. *American Economic Review*, 74, 78-83.
- Baum, C. F. (2006). An introduction to modern econometrics using Stata. STATA Press. p. 341.
- Berger, D. W., Herkenhoff, K., & Mongey, S. (2022). *Minimum wages, efficiency and welfare* (University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2022-10). doi:10.2139/ssrn.4013843
- Biggeri, M., & Tapia, H. (2023). Human security in the anthropocene: a new base for action. *Journal of Human Development and Capabilities*, 24(2), 1-10. doi:10.1080/1 9452829.2023.2196061
- Blanchflower, D. G., Oswald, A. J., & Sanfey, P. (1996). Wages, profits, and rent-sharing. *Quarterly Journal of Economics*, 111(1), 227-251. doi:10.2307/2946663
- Bloom, N., & Reenen, J. Van. (2010). Human resource management and productivity. In Social Research (Vol.

982, Issue 982, p. 90). National Bureau of Economic Research.

- Brandt, K., Rand, J., Sharma, S., Tarp, F., & Trifković., N. (2016). Characteristics of Vietnamese business environment - evidence from an SME Survey in 2015. UNU-WIDER.
- Chiang, Y. H., & Cheng, E. W. L. (2014). Estimating contractors' efficiency with panel data: Comparison of the data envelopment analysis, Cobb-Douglas and translog production function methods. *Construction Innovation*, 14(3), 274-291. doi:10.1108/CI-07-2013-0033
- Datta, D. K., Guthrie, J. P., & Wright, P. M. (2005). Human resource management and labor productivity: Does industry matter? *Academy of Management Journal*, 48(1). doi:10.5465/AMJ.2005.15993158
- Dosi, G., Enrica, M., & Yu, X. (2020). The wage-productivity nexus in the world factory economy. *World Development*, 129, 104875. doi:10.1016/j.worlddev.2020.104875
- Enders, C. K. (2010). Applied missing data analysis. Guilford Press.
- Flannery, M. J., & Hankins, K. W. (2013). Estimating dynamic panel models in corporate finance. *Journal of Corporate Finance*, 19, 1-19.
- Giménez-Nadal, J. I., Molina, J. A., & Velilla, J. (2021). Testing urban efficiency wages in France and Spain. In *Empirical Economics* (Vol. 61, Issue 4). Springer Berlin Heidelberg. doi:10.1007/s00181-020-01928-x
- Goldsmith, A. H., Veum, J. R., & Darity, W. (2000). Working hard for the money? Efficiency wages and worker effort. *Journal of Economic Psychology*, 21(4), 351-385. doi: 10.1016/S0167-4870(00)00008-8
- Greene, W. H. (2012). *Econometric analysis* (7th ed.). Prentice Hall.
- GSO. (2018). Statistical Year Book.
- Gujarati, D. N., & Porter, D. C. (2009). Basic econometrics. In *Basic Econometrics* (5th ed.). McGraw-Hill Irwin.
- Hansen, H., Rand, J., & Tarp, F. (2009). Enterprise growth and survival in Vietnam: Does government support matter? *Journal of Development Studies*, 45(7), 1048-1069. doi: 10.1080/00220380902811025
- Haque, N. (1995). Efficiency Wage Hypothesis. *The Indian Economic Journal*, 42(4), 32-42. doi:10.1177/0019466219 950403
- Hsiao, C. (2014). Analysis of panel data (Issue 54). Cambridge University Press.
- Huynh, V., Ngoc, P., & Quyen, N. (2022). The effect of institutions on productivity spillovers from FDI to domestic firms: evidence in Vietnam. *Global Business and Finance Review*, 27(3), 28-40.
- Kenichi, O., Nguyen, T. D., Pham, H. T., & Bui, L. T. T. (2021). Vietnam productivity report: Identifying growth challenges and exploring a way forward. Viet Nam Institute for Economic and Policy Research.
- Kiani, S. H., & Ahmed, E. M. (2013). The impact of e-commerce on labor productivity in Iranian manufacturing

SMEs. Middle East Journal of Scientific Research, 15(7), 1005-1020. doi:10.5829/idosi.mejsr.2013.15.7.2001

- Kim, H. S., & Jang, S. S. (2019). Minimum wage increase and firm productivity: Evidence from the restaurant industry. *Tourism Management*, 71, 378-388.
- Krueger, A. B., & Summers, L. H. (2015). Efficiency wages and the inter-industry wage structure. *Econometrica*, 56(2), 259-293.
- Le, T. (2020). Factors affecting labor productivity of employee in an Asian emerging market: Evidence in Vietnamese retail sector. *International Journal of Business and Globalization, 24*(4), 513-528. doi:10.1504/IJBG.2020.10 6956
- Love, J. H., & Roper, S. (2015). SME innovation, exporting and growth: A review of existing evidence. *International Small Business Journal: Researching Entrepreneurship*, 33(1). doi:10.1177/0266242614550190
- Mankiw, N. G. (2020). *Principles of macroeconomics*. Cengage learning.
- Meager, N., & Speckesser, S. (2011). Wages, productivity and employment: A review of theory and international data. In *European Employment Observatory Thematic Expert Ad-Hoc Paper* (pp. 1-73). Institute for Employment Studies.
- Mia, M. A., Pellegrina, L. D., Zhang, C., & Sangwan, S. (2022). Efficiency wage and productivity in the Indian microfinance industry: A panel evidence. *IIM Kozhikode Society and Management Review*, *11*(2), 235-252. doi: 10.1177/22779752211061203
- Min, C. H., & Yi, S. S. (2017). Labor union and real earnings management. *Global Business and Finance Review*, 22(4), 31-50. doi:10.17549/gbfr.2017.22.4.31
- Le Mouel, M. (2019). *Knowledge-based capital and firm* productivity. Technische Universität Berlin.
- Mühlau, P., & Lindenberg, S. (2003). Efficiency wages: Signals or incentives? An empirical study of the relationship between wage and commitment. *Journal of Management* and Governance, 7(4), 385-400. doi:10.1023/A:10262612 23790
- Nguyen, N. T., & Nghiem, V. T. (2023). Intellectual capital and financial performance of industrial firms in emerging countries: Empirical evidence from Vietnam. *Global Business and Finance Review*, 28(2), 107-122. doi:10.1754 9/gbfr.2023.28.2.107
- Peng, M. W. (2000). Business strategies in transition economies. Sage.
- Raff, D., & Summers, L. H. (1986). Did Henry Ford pay efficiency wages? National Bureau of Economic Research.
- Ranjan, P., & Raychaudhuri, J. (2011). Self-selection vs learning: Evidence from Indian exporting firms. *Indian Growth and Development Review*, 4(1), 22-37. doi:10.1108 /17538251111124981
- Riveros, L. A., & Bouton, L. (1994). Common elements of efficiency wage theories: What relevance for developing countries? *The Journal of Development Studies*, 30(3),

696-716. doi:10.1080/00220389408422333

Romer, D. (2001). Advanced macroeconomics. McGraw-Hill.

- Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*. 9(1). doi:10.1177/1536867x0900900106
- Rovigatti, G., & Mollisi, V. (2018). Theory and practice of total-factor productivity estimation: The control function approach using stata. *Stata Journal*, 18(3), 618-662. doi: 10.1177/1536867x1801800307
- Sartal, A., Rodríguez, M., & Vázquez, X. H. (2020). From efficiency-driven to low-carbon operations management: Implications for labor productivity. *Journal of Operations Management*, 66(3), 310-325. doi:10.1002/joom.1060
- Smith, A. (1776). An inquiry into the nature and causes of the wealth of nations. McMaster University Archive for the History of Economic Thought.
- Solow, R. M. (1979). Another possible source of wage stickiness. Journal of Macroeconomics, 1(1), 79-82.
- Stock, J. H., & Watson, M. W. (2012). Introduction to econometrics. Bosten: Pearson. doi:10.1016/j.foodpol.201 0.03.001
- Syverson, C. (2011). What determines productivity? Journal of Economic Literature, 49(2), 326-365. doi:10.1257/jel.49.2. 326
- Tran, H. T., & Santarelli, E. (2014). Capital constraints and the performance of entrepreneurial firms in Vietnam. *Industrial and Corporate Change*, 23(3), 827-864. doi: 10.1093/icc/dtt030
- Ugur, M., Trushin, E., Solomon, E., & Guidi, F. (2016).

R&D and productivity in OECD firms and industries: A hierarchical meta-regression analysis. *Research Policy*, 45(10). doi:10.1016/j.respol.2016.08.001

- UNU-WIDER. (2018). Viet Nam SME Survey. https://www.wi der.unu.edu/database/viet-nam-sme-database
- Verbeke, A., & Kano, L. (2012). The transaction cost economics theory of the family firm: Family-based human asset specificity and the bifurcation bias. *Entrepreneurship Theory and Practice*, *36*(6), 1183-1205. doi:10.1111/j.154 0-6520.2012.00545.x
- Vietnam's General Statistics Office. (2015). Year book.
- Wijayanti, A. W., Wahyono, B., & Rozaq, M. K. A. (2016). The linkages between entrepreneurial orientation, market orientation toward MSMEs performances. *Global Business* and Finance Review, 21(2), 100-108. doi:10.17549/gbfr.20 16.21.2.100
- Wooldridge, J. (2011). Econometric analysis of cross-section and panel data (Issue November). The MIT Press. doi:10.1515/humr.2003.021
- Yellen, J. (1984). Efficiency Wage Models of Unemployment. *The American Economic Review*, 74(2), 200-205. doi: 10.1093/acprof:oso/9780199279166.003.0003
- Yoo, J. (2016). OEM Participation in SME Suppliers' New Product Development Efforts. *Global Business and Finance Review*, 1(Spring), 88-101.
- Zhang, J., & Liu, X. (2013). The evolving pattern of the wage—labor productivity nexus in China: Evidence from manufacturing firm-level data. *Economic Systems*, 37(3), 354-368.