

# Impact Evaluation of Training on Productivity of the Small and Medium Enterprises in Vietnam

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## Abstract

This paper investigates the impact of investment in human capital (off-the-job training in short term) on productivity of the small and medium enterprises (SMEs) by using Propensity Score Matching (PSM) method *with dynamic approach*. The paper employs the data from two surveys on the SMEs in Vietnam in the year of 2009 and 2011 that provide detailed information about training and firm characteristics. The results found that training has significantly positive impact on the productivity of household business, but there is no evidence on the impact of training on productivity of the firms in formal sector in the short run; and there is no evidence on the impact of training activities on productivity in the medium run (*one-or-two-year after training*) for both household business and formal enterprises. Besides, qualitative approach shall be conducted to provide more description on training efficiencies in some specific cases.

**Keywords:** evaluation, matching, propensity score, SMEs, Vietnam, productivity, human capital investment

**JEL Classification:** J21, O15

## 1. Introduction

One of big issues in enhancing productivity of enterprises in Vietnam is the low investment in human capital that leads to employ low quality labor force with old technology. According to Thien et al. (2014), basing on equity criteria, the number of SMEs in Vietnam is 334608 enterprises, accounted for 97.5 percentage of the total number of enterprises. Albeit, major of Vietnamese enterprises with backward technology, low-qualified workforce are positioned in the lowest productivity group of the world, these enterprises do not have appropriate attention in training activities. Indeed, there are approximately 34 percentage of enterprises that have not human resource strategies in 437 investigated enterprises and the trained workers account for merely 30 percentage of labor total number (Tranh, 2013). The other survey on 800 investigated enterprises in 2013 in 6 big provinces and cities conducted by Thien et al. (2014) found that the percentage of enterprises having labor training policy is still at low level (approximately, Hanoi: 20%, HaiPhong: 40%, DaNang: 50%, BinhDuong: 40%, HoChiMinh City: 28%, CanTho: 30%). In comparison to the other countries, Vietnam remains the static advantage with labor endowment and relatively low wages. The low qualified labor leads to low labor productivity with slow improvement. Due to the low qualified but highly endowment labor force (Vietnamese population in 2014 is 90 million people), Vietnamese enterprises have more motivation in employing several old technologies and cheap labor with low skill to enhance their profit. Therefore, the concentrate on exploiting this advantage rather than developing appropriate policies in technology innovation or in training as well as human resource management may be the major obstacle in productivity enhancement, transfer from labor intensive sectors to capital and knowledge intensive sectors as well as the higher value added product development.

Whether investment in training activities may enhance productivity is a great concern to enterprises; however, studies on impact of training on firms' productivity are still inconsistent. Some studies, such as Dearden et al. (2006), found considerable effects of training on productivity. However, Black and Lynch (2001) did not find any impact of training on productivity. These studies tried to establish effects of training on the firms' productivity as the first step in dealing with the argument between necessity of training and uncertainty in the impact of training on firm productivity.

Therefore, this study aims to investigate the impact of off-the-job training activities on the productivity of SMEs in Vietnam. In order to achieve this objective, the research will emphasize on answering the following question:

**Research question: How is the impact of human capital investment (off-the-job training) on the productivity of SMEs?**

This research applies both quantitative and qualitative approaches to answer the research question. The quantitative approach has contribution in measuring the impact of training on firm productivity; meanwhile, qualitative approach provides more obvious and specific information in the impact of training. Therefore, qualitative approach could support quantitative approach in providing explanations on quantitative results and policy implications.

## 2. Literature Review

### 2.1 Theoretical Background of the Impacts of Training on Productivity

Whether the investment in human capital generates growth-enhancing effects on firm productivity is a question of interest to numerous researchers. Starting from the baseline contributions to this field of research, Wright and McMahan (1992) built an analytical framework of the relationship between human resource management and firm performance. Following this study, Tharenou et al. (2007) extended a framework of the causal relationship between training and firm outcomes. (Figure 1)

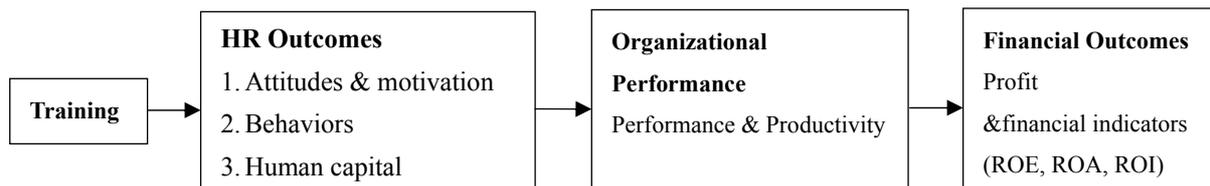


Figure 1. Theoretical model by Tharenou et al. (2007)

The theoretical framework shown in Figure 1 presents an impact of training on firm performance and productivity in general. However, this impact needs to be particularly investigated in several different circumstances. Delery and Doty (1996) suggested investigating this impact under three perspectives including universalistic perspectives, contingency perspectives and configurationally perspectives. As being the fundamental perspective, universalistic perspective proposed that there is a positive relationship between some HR practices such as formal training and firm outcome (Delery & Doty, 1996). Under this perspective, training is believed to have a significant positive impact on organizations' performance. Contingency perspective is considered to be more complicated than universalistic perspective by taking into account the interactions between HR practices and organizational factors or contextual factors (Delery & Doty, 1996). To be consistent with this line, Schuler (1989) suggested that training activities should be conducted together with organizational strategies in order to reap better outcome. Meanwhile, configurationally perspective proposed that there are several ideal types of HR practices that can result in better outcome (Ostroff & Bowen, 2000). The effectiveness of training will be enhanced when training activities are conducted in combination with other complementary HR practices such as careful screening and selection of potential and trainable employees (Barney & Wright, 1998; Baron & Kreps, 1999; Lepak & Snell, 1999).

### 2.2 Basic Framework

The econometric analysis in this paper follows the literature in assuming that technology at firm level can be characterized by a Cobb-Douglas production function (Dearden et al., 2006):

$$Y = A L^{\alpha} K^{\beta} \quad (1)$$

where Y, L, K are added value, labor and capital respectively; A represents technological progress, and  $\alpha$  and  $\beta$  denote the elasticity of added value with respect to capital and labor.

Under the assumption that trained and untrained workers have different productivities, effective labor equation can be written as:

$$L = N^U + \gamma N^T \quad (2)$$

where:  $N^T$  and  $N^U$  respectively denote trained and untrained workers. L denotes effective labor.  $\gamma$  denotes relative productivity of the trained workers; when the trained are more productive than the untrained,  $\gamma$  will be greater than 1.

Substituting equation (2) into (1), then:

$$Y = A (N^U + \gamma N^T)^\alpha K^\beta = A \left[ 1 + (\gamma - 1) \frac{N^T}{N} \right]^\alpha N^\alpha K^\beta \quad (3)$$

where:  $N$  denotes the number of workers.  $\frac{N^T}{N}$  denotes the ratio of trained workers. On the basis of constant returns to scale ( $\alpha + \beta = 1$ ) assumption, the production function in intensive form and labor productivity can be written as follows:

$$\frac{Y}{N} = A \left[ 1 + (\gamma - 1) \frac{N^T}{N} \right]^\alpha \left( \frac{K}{N} \right)^\beta \quad (4)$$

With logarithm transformation, the equation (4) can be expressed as follows:

$$\log \left( \frac{Y}{N} \right) = \log (A) + \alpha (\gamma - 1) \frac{N^T}{N} + \beta \log \frac{K}{N} \quad (5)$$

where: The dependent variable, labor productivity, is measured as the natural logarithm of real added value per employee from the balance sheets;  $\frac{N^T}{N}$  is the proportion of trained workers in an industry; and  $\log \frac{K}{N}$  is measured as the natural logarithm of the real value of tangible fixed assets from the balance sheets (plant and machinery, land and buildings, tools and equipment).

### 2.3 Empirical Studies

Several previous studies in the impact of human capital investment on productivity have mainly applied OLS method for cross-sectional and time-series data, or GMM method for panel data. Employing the panel data of big firms in France and Swiss from 1987 to 1993, Ballot et al. (2001) found that training and R&D are considered as significant inputs that result in higher productivity. To be in line with this, Dearden et al. (2005) indicated that one percentage point increase in training results in an increase in value added per hour by 0.6% by analyzing the panel data at firm level in England. Meanwhile, Konings and Vanormelingen (2011) concluded that an increase in training by 10 percentage points leads to an increase in productivity by 1.4%-1.8% by employing the time-series data from 1997-2006 of Belgium. In Vietnam, Thang et al. (2008) surveyed 196 companies and concluded that firms which implement training activity in 2006 generated an increase in sales and productivity in both manufacturing and non-manufacturing sectors.

Employing OLS method or GMM method for panel data could hardly find the accurate impact of trading on firm productivity because the selection of firms with or without training activities is not a random experiment. Meanwhile, PSM method is suggested to be the most common technique of evaluation impact of programs, projects, policies, and discussed in the training curriculum of World Bank by Khandker et al. (2010). However, there are very few studies employing this method to investigate the impact of training activities on firm productivity. Therefore, this research employed PSM to evaluate the impact of training on firm productivity in order to reduce selection bias issue (using a quasi-experimental design).

### 3. Method

Two measurements of productivity in this study are value added per labor and revenue per labor (similarly to the study of CIEM, 2010). Value added and Revenue is measured by based price in 1994 and labor amount is the total number of full-time employees at the end of the investigated year.

Two following hypotheses will be tested by quantitative method:

**H<sub>1</sub>:** off-the-job training generates increase in value added per labor of SMEs

**H<sub>2</sub>:** off-the-job training results in higher revenue per labor of SMEs

### 3.1 Quantitative Method

In order to evaluate the impact of training on firm productivity, this study mainly applies Propensity Score Matching (PSM) rather than traditional methods, such as multiple regressions because the latter methods are only reasonable in the condition of randomized experiments. The main obstacle in impact evaluation to this study is to identify the potential outcome if the enterprises do not invest in human capital because we hardly find an enterprise that both invest and does not invest in human capital at the same time. Some techniques for impact evaluation such as PSM, DID or Match DID may overcome this obstacle by constructing counterfactual outcomes and then the problem of causal effect of the programs/ associated policies on the outcome is settled. In particular, PSM designs a comparison group based on a model of probability of participation in training by using observed characteristics. The participants are then matched, on the basis of this probability or propensity score, with non-participants. The average treatment effect is then calculated using the mean in difference in outcomes between these two groups (Khandker et al., 2010).

Before evaluating the impact of the human capital investment on productivity via using PSM techniques (Stratification and Kernel Matching method with Bootstrapped standard errors), this study estimates probit model (Appendix A&B) which is considered as intermediary step in PSM, suggested by Khandker et al. (2010). The explanatory variables of this model are shown in Appendix A. Similar to the study of Guidetti and Mazzanti (2007), Forrier and Sels (2003) and Hansson (2007), this model contains the variables of firm and workforce characteristics, contract and policy. Besides, this model also includes the variables of unionization and network or regional factors as in studies of Rosholm et al. (2005) and Hansson (2007) and the variables of labor market factors or technology innovation and business plans as in the studies of Jones (2005), Guidetti and Mazzanti (2007).

This study employs the secondary data of SMEs in Vietnam in 2009 and 2011 for 10 cities/provinces in Vietnam and the balance panel data was used in order to estimate the model. The data of SMEs are conducted by the Central Institute for Economic Management (CIEM) under Ministry of Planning and Investment (MPI), Institute of Labor Science and Social Affairs (ILSSA) under Ministry of Labor, Invalids and Social Affairs (MOLISA); Department of Economics (DoE), Copenhagen University; and Embassy of Demark in Vietnam.

### 3.2 Qualitative Method

After quantitative analysis on the impact of training on firms' productivity, this study aims to reach the further understanding of quantitative results by finding out deeper information of the training impact from some specific cases by qualitative approach. In qualitative methods, we conducted in-depth interviews with: (1) about eight experts (the trainers with experiences in training and consultancy about human resources management, production management, quality management, sales skills...), (2) about ten members of the board of directors, HR directors, foremen at SMEs in industrial sector, (3) about four specialists in charge of training / consultancy from SMEs-supporting agencies such as Chamber of Commerce and Industry of Vietnam (VCCI) in HCM City, SME Supporting Center in the South ... In addition to in-depth interviews, we also applied observation method by attending training courses for SMEs, such as a course for SMEs of the timber industry (SCORE project) organized by VCCI HCM City (May, 2014), a course on occupational safety organized by HCMC Union school (May, 2014), a course organized by VCCI Can Tho on business forecasting techniques for the enterprises in Cantho Province (2011); a workshop on "Introduction about prominent innovative factories" organized by the SME Supporting Center in the South in May, 2014.

## 4. Quantitative Results

### 4.1 Descriptive Statistics in Labour Productivity

Table 1 showed the results of independent sample T-test on the difference in labor productivity (measured using VA per regular full-time labor force in 2008, 2009, 2010) between enterprises with and without training (Information on training was captured form SMEs2009 data). In 2008, labor productivity per annual of formal enterprises was 25.1 million VND per capita, that of formal enterprises with training was 33.1 million VND per capita and that of formal enterprises without training was 23.2 million VND per capita. In the formal enterprises, the difference in productivity between enterprises with and without training was not statistically significant.

For the case of formal enterprises, the difference in labor productivity between the enterprises with training and those without training is not statistically significant. However, for the case of household enterprises in 2008, there is remarkable difference in labor productivity between household enterprises with training and those without training (the difference is 8.1 million VND per capita). For the case of both formal/household enterprises

with training and those without training in 2009 and 2010, the results showed that there is no significant difference in labor productivity.

Table 1. Labor productivity (VA/Labor) of enterprises from 2008 to 2010

	Formal Enterprises				Business households			
	Obs	2008	2009	2010	Obs	2008	2009	2010
Training	119	33.1	32.3	32.6	55	21.8	18.2	19.4
Not training	516	23.2	29.0	30.3	833	13.7	18.0	18.5
combined	635	25.1	29.6	30.7	888	14.2	18.1	18.6
diff		9.8	3.3	2.4		8.1***	0.2	0.9
t		1.365	0.5072	0.3652		3.725	0.0873	0.4602
df		122	613	615		60	70	72
Pr( T  >  t )		0.175	0.612	0.715		0.000	0.931	0.647

Note: \*significant at 10% level, \*\*significant at 5% level, \*\*\*significant at 1% level

Source: Calculated from CIEM data (2010, 2012)

However, the difference in productivity between enterprises with training and those without training may not come from the impact of training because these two groups of enterprises are not similar in terms of firm characteristics. Moreover, the distribution of the enterprises into groups (with and without training program) is not random (this is not the case of random experiment). Such methods as independent sample T-test or normal multiple regression will result in selection bias.

“When the impact of training activities is analyzed, it is better to separate the sample size into formal enterprises in order to observe the impact on each group because there is a big difference in legal characteristics, scales and management style among these two groups.

*(Dr. Nguyen Ngoc Anh, Seminar at Center for Analysis and Forecasting - Vietnam Academy of Social Sciences in Hanoi, March 7, 2013)*

“Method of measuring training is also very important; off-job training activities in household business are much fewer than those in formal enterprises”.

*(Dr. Nguyen Dinh Chuc - CIEM, Seminar at Center for Analysis and Forecasting - Vietnam Academy of Social Sciences in Hanoi, March 7, 2013)*

Figure 2. Reasons to separate sample size into two groups, formal enterprises and household business

#### 4.2 Impact Evaluation of the Human Capital Investment (Training) on Productivity

In the first stage, probit models were conducted on the basis of two different samples since this study aims to investigate two cases for formal and household enterprises. Basing on the results of these models (Appendix A), the study calculates the probability of investment in human capital (Propensity score) for each firm. In the next stage, these propensity scores will be applied to make comparison between treatment units and control units. There are several techniques to compare results of treatment and control group with its own advantage and limitation. This study employed two techniques including Stratification and Kernel Matching method with Bootstrapped standard errors that are better the other one in PSM methods (Khandker, 2010).

Table 2 showed the results on impact of training (in 2008 and the first half of 2009) on labor productivity (in 2008, 2009, 2010) for the case of formal enterprises and household enterprises. Both techniques showed that for the case of formal enterprises, there is no statistical evidence to state that training activities have positive impact on labor productivity in 2008, 2009 or 2010. For the case of household enterprises, training was found to generate increase in labor productivity, specifically value added per labor (VA/labour) in 2008 increase from 32 to 40 percentage points, the revenue per labor in 2008 rises from 35 to 49 percentage points.

Table 2. Average treatment effect for the treated (ATT) of the training using PSM

	Formal enterprises			Household business		
	2008	2009	2010	2008	2009	2010
<b>Stratification method</b>						
<b><i>Labor Productivity</i></b>						
ln(VA/Labour)	0.04 (0.400)	0.003 (0.036)	-0.029 (-0.306)	0.325*** (2.830)	-0.136 (-1.499)	-0.136 (-1.406)
ln(Revenue/Labour)	0.033 (0.240)	0.066 (0.513)	0.069 (0.561)	0.348** (2.207)	-0.119 (-0.945)	-0.143 (-1.049)
<b>Kernel matching &amp; Bootstrapped SE</b>						
<b><i>Labor Productivity</i></b>						
ln(VA/Labour)	0.049 (0.596)	0.000 (0.001)	-0.027 (-0.257)	0.400*** (3.565)	-0.068 (-0.761)	-0.075 (-0.745)
ln(Revenue/Labour)	0.026 (0.183)	0.050 (0.319)	0.066 (0.513)	0.485*** (2.745)	0.012 (0.068)	-0.010 (-0.059)

Notes: \*significant at 10% level, \*\*significant at 5% level, \*\*\*significant at 1% level

+With stratification matching, n.treatment=112, n.control=387 formal enterprises; n.treatment=40, n.control=323 business households

+With Kernel matching & Bootstrapped SE, n.treatment=112, n.control=386 formal enterprises; n.treatment=48, n.control=276 business households ; t-statistics in ( ) Source: Calculated from CIEM data (2010, 2012)

## 5. Qualitative Results

### 5.1 Description on Training Activities of SMEs and the Support from Government and Other Organizations.

#### 5.1.1 Off-the-job Training

We will make some description on some training activities in the firms which had been interviewed. There are training courses that receive technical support from the foreign funds, some others with training assistance from government and some training courses paid by the enterprises.

The first course we made observations is a course on HR management at SCORE project (Note 1). We ask Mr. Hoang, the project coordinator, for his permission to attend the course as a learner for observation, discussion and exchange with the participating companies and as a training assistant for SCORE project for better observation and understanding about the organization method as well as for participation in consulting firms and open discussion with the trainers.

Topics on HR management are attended by four companies; including Lam Hong, Minh Triet, Hiep Si and Mi Gio. The name of these companies has been changed for the purpose of confidence. These companies operate timber processing industry, provide wooden products for the domestic market and exporting (in terms of capital, or number of employees, the company is categorized as SMEs). The employees attending the course include members of the board of directors, HR manager and executives, production manager and production staff.

At the beginning of training course, I made a discussion with Mr. Sang, the main trainers, on my main purpose that is to investigate the firms' training activities, as well as the reasons for the effectiveness or ineffectiveness of the training activities via answers and sharing of these companies with the trainers and the other participants. In addition, I approached and had in-depth interviews with Hiep Si Co. (HR manager and production line manager) and Mi Gio Co. (HR manager and HR executives).

In general, Off-the-job (Off-JT) training activities of SMEs can take place outside, or inside enterprises through training centers or agencies, by experts inside and outside the enterprise. In addition to off-the-job training, the SMEs also implement on-the-job training. On-the-job training (On-JT) is considered as more popular method for firms of industrial sector. On-JT is more popular and suitable in training in management skills, and occupational

safety ... Off-JT is appropriate for such training activities as professional skills for workers, or sales skills for sales people.

Besides the training course at VCCI, in the previous year, Hiep Si Co. sent 8 staff to attend the two-day course at Investment & Trade Promotion Center - Binh Duong Department of Industry and Trade. Training for workers in Hiep Si is mainly in the form of coaching, group guidance at production line. Normally, a production line has one manager and 4 group leader. Trung is manager of a production line (three lines). The new employees are often coached by group leader at each line. New employees will observe and then operate the line under the instructions of the group leader and the supervision of production line manager".

*(Interview with Mr. Diep, HR manager at Hiep Si Co., on May 3, 2014)*

Therefore, for the case of timber processing companies, Off-JT training activities are mainly for the management team. On-JT training is mainly implemented under coaching, supervision, group training for workers.

The enterprises can attend free courses and receive lots of benefits (for example, being consulted when attending at SCORE project courses) due to the sponsor from international organization and other programs using ODA. They also participate in courses organized by Department of Planning and Investment in Provinces/Cities, SMEs Supporting Center, VCCI, Centers of Investment and Trading Promotion, and other private or public training centers.

SMEs Supporting Center (Ministry of Planning and Investment) organized training courses for SMEs in accordance with Circular 05, in the North - Central - South under two types: Direct organization; or association between the training centers with the Departments of Planning and Investment for organization... Training courses include two topics: Business Start-up and Corporate Administration. The business start-up courses normally last 5 days while the Corporate Administration takes place in 7 days. In 2013, the center in the South organized 110 courses; around 30 percent among them are business start-up.

*(Interview with Mr. Lam - SME Supporting Center in the South - Ministry of Planning and*

Off-JT courses outside the firms normally take place in several days, about 2-3 days, some in only 1 day, and some in 7 days. On average, each company has 2-3 employees attending the course.

Business start-up course organized by VCCI Hochiminh City took place in one day. Around 50 students attended this courses (my group research had three members attending this course). This course, trained by profession experts, focused on Business Planning, Business Registration, tax, capital borrowing. In this course, each student was given with the updated directory book of the Vietnam enterprises. We are also provided with the information about the up-coming training courses.

*(Observation in 2013)*

In the three-day course on business forecasting at Can Tho VCCI, there were around 20 students. The participants mainly come from the companies in the sector of seafood processing; some from government agencies, hospital, etc...

*(Observation in 2013)*

The course on "sanitation and occupational safety" organized by the Union school in Hochiminh City took place for 2 Saturdays on February 22, 2014 and March 01, 2014. Each day take place two topics: The first day concentrated in Occupational Safety (Trained by Mr. Huynh Tan Dung, Hochiminh City Department of Labor, War invalids and Social Affairs), Fire Prevention (Trained by Chief of Binh Thanh Fire Protection Policemen); the second day focused on Union and labor safety, working environment and diseases at work.

*(Observation in February and March 2014)*

### 5.1.2 On-the-job Training

Besides external Off-Job training, firms also organize on-job training activities. However, off-job training tends to decrease, and On-job training has tendency to increase more and more. Hereinafter, we will make the description on training activities of two firms, a small-scale company operating in the sector of producing and

distributing cushion (more than 10 employees) and a medium-scale company (more than 300 employees and medium scale of capital) operating in steel industry (Figure 3 & Figure 4).

For the case of the small enterprises, they also pay attention to training activities and, mainly focus on On-JT. Training activities at small firms are originated from the owners' devotion and employees are directed trained by the owners. When the owners have lots of experience, they will be self-confident and have responsibility in training their employees. The firm owners have obvious policies for encouragement, reward and punishment, which results in the effective outcome. This statement is confirmed via an interview with Mr. Nguyen Tien Trung - Director of Basu Co. (operating in cushion business) on March 19 2014. Via this case study, we can observe how Mr. Trung trained his own employees.

- “When the employees attended a 3-month, 5-month, or less-than-one-week off-the-job training courses, provided that the trainer gives good lectures and shares lots of experience, they will only state that the trainer gives good lectures and 90 percent of them will forget all the lessons soon. They do not have deep understanding of what the trainers said, and the most important thing is that they do not know how to apply these lessons into practice. Maybe the experienced employees would learn better and have more understanding about the lectures; but the new one would have difficulties in learning as well as understanding the lectures. However, such off-the-job training courses will provide employees with overview of their job and related skills.”
- “Off-JT may be organized via either inviting an expert to the firms, or sending the employees to be trained at a school/center, but this is not too important. Whether these trainings are effective or not depends on each situation. However, if you want to become a salesperson, they must have practical experience in market. When they first entered their career, they did not know where to start, how to approach the customers and may not know their products well. In different case studies, each employee has different reaction, but the experienced ones know what these reactions result in because they experienced this situation many times (However they are right or wrong, we also give comments and instructions). When they first start the job, they and I go to meet the customers together, then they can observe and support me and I will give them explanations on the reason why a certain work needs to be done and what the purpose is. They will be given opportunities to contact the customers, then I give comments, train them, test them and put forward the objectives, encourage them... coach them... test them... and they gradually become better. They need to be trained from 7 basic steps in sales, route controlling, observing products at the outlets... to setting objectives. When becoming supervisors or managers, they still need to be trained with the other topics, for instance, advanced sales. When doing business, the most important thing is to set up a good relationship and reliability to the customers”.
- “During training process, I share lots of experience, set objectives to them; if they cannot do the jobs, I will have no choice but dismiss them and find substitute employees. Facing that problem, the employees must learn how to work, practise and apply creatively in order to capture the highest results. When studying at off-job training class, they will not such pressure. Moreover, it is a far distance from training to improvement of productivity.”

*(Interview with Nguyen Tien Trung, about 31 years old, Director of Basu Company, March, 2014)*

Figure 3. A case of the small enterprise

At large or medium size enterprises, there are both Off-JT and On-JT, but On-JT is still the main training activity. Off-JT is only a new wind infused into the companies in order to provide the employees with an overview about knowledge and skills related to their job. Moreover this also helps to encourage the employees as well as attach them closely to the company.

- “My company operates in steel industry, including processing which demands for technical skill training, and trading which demands for sales skill training, and there is also training activity for managers.”
  - **On-job training for workers or sales team.** Managers in charge will be responsible for training new employee during the working process. This training type is more effective than off-job training because the managers know the job in detail. In order to become managers, they must have good basic knowledge and lots of experiences related to the job. When training new employees, the managers know all the theory and practice; they also have specialist knowledge, sales skill and they know what their specific demand is and which result they demand from the workers. They can directly evaluate employees. Sales skill training is also trained on job, for instance, how the salespersons meet the clients and how he sells company’s products. Production training is also the same, that is, on-job training. Foreman and production manager will train the employees for essential skills, for instance, how to operate machines at different production lines; and the effectiveness of the result can be observed immediately. It also depends on each employee that firm will have different way of coaching.”
  - **Off-job training.** My company hires external training companies, consultancy agencies, specialists to train our employees for such skills as communication skill, sales skill, or normal skill. These companies also trained the worker for production skills. In my company, external training can cover a wide range of training, but the training programs are general, impractical, and not close to the actual situation of the hiring firms.
  - “In my company, some training courses hire trainers form external sources, and some courses are trained by staff in the company. In my company, we mainly focus on production training (because there are varieties of products), product specification introduction and customers. Trained in such courses, the workers feel the practical usefulness of training activities.”
  - “Therefore, there are two types of training activities in my company” On-job and off-job training for specialist skills and management skills. Off-job training courses are conducted via hiring external training company, but in my opinion, this training type becomes less and less effective than on-job training. Management skill training (for promotion) mainly focus on supplementing and systematizing the mangers’ practical knowledge and experience in more logical way, for instance, CEO training course. For this training type, we normally send our staff to external centers for training.
- (Interview with Ms. Dinh Thi Nga, HR Director, A Steel Manufacturing and Distribution Company, Head office in Binh Thanh District, Hochiminh City, the company’s anonymity is preserved, April 2014)*

Figure 4. A case of the medium-scale company

Another less popular type of training is to hire an intermediary HR service company. With this training type, employees are trained by both companies, including HR Service Company and the hiring company.

In addition to normal training activities, some companies in Industrial Zone (IDZ), Exporting Processing Zone (EPZ) hire labor supply service from an HR service company. The HR service company is in charge of recruiting and training the new employees with basic skills (mainly occupational safety training), and then provide them to the hiring companies in the IDZ, EPZ. The HR service company will be responsible for salary and other welfare policies. The companies in the IDZ, EPZ will train the new staff for operating the machine of each specific production line. Using this training type, it is easy for the companies at IDZ, EPZ to recruit new employees at peak time, or cut down workforce at off-peak hour. This type of labor supply service is similar to that of bodyguard supply companies. I also participate in administration activities at a HR service company.

*(Interview with Ms. Tran Thien Truc Phuong - Lecturer of Human Resource Management, Project Appraisal... at University of Economics and Law, Vietnam National University, Hochiminh City).*

### 5.2 The Effectiveness of Formal Training Activities - Qualitative Approach

In the enterprises (formal registered by enterprises law) which we have interviewed, off-the-job training seems to be more effective and productivity enhanced if these activities are supported by prestigious international associations due to the gain of coordination between the on-the-job training and the off-the-job training and advisory task. For instance, we state the two following cases:

**The case 1.** The enterprise has not gained the positive support from the State or international associations yet.

In an interview with Ms. Nga (the Head of Human Resource) in Steel Company at medium size, the effectiveness of formal training activities is determined by the capability of trainees and the training centre. These activities improve working attitudes, skills of employees more or less; however, the effectiveness is generally inadequate with costs of these activities.

**Question:** During the last two years, have the off-job training courses brought the effectiveness to your enterprise?

**Response:** Yes, certainly; but the effectiveness depends on each employee. Someone has significantly positive change; for instance, in working style, manners, management and awareness. Someone has insignificant or slow change; in this case, I will encourage him and investigate whether his capability is not qualified or he does not try his best in working. Possibly, he could only complete 8 steps (over 10 steps), and someone could complete all 10 steps. Albeit being Head of Department, only some of them who have significant effort and better capability will gain positive change (I will have appointment of these people to a higher position). In sum, these courses made trainees change more or less. They mostly have more significant change in their thinking than in reality, and by the way this is also an intensive effort.

**Question:** What are ineffective and effective courses in your opinion? For instance, how is the course for CEO which you have stipulated?

**Response:** Course for CEO, previously organized by Institute x of the University X of Hochiminh City, is generally appraised to be ineffective by employees. There are many reasons; for instance, one first reason is that the course is so lengthy that the training activities could not be concentrated. In particular, the length of course is fixed in four months; if extension, the length of six months (actually too lengthy) could be acceptable. However, this duration of course is so long that someone could not obtain the certificate after one year following the course, the enterprise could not monitor as well as the trainees is unable to control the time. The second reason is that the course contains too many theoretical lessons while the trainees are more interested in learning experiences on management, logic, realistic lessons. Then the enterprise assigns employees to take a course by private institution Z in Ly Chinh Thang Street. This course has some modules to which the trainees is more satisfactory. Albeit the course is not perfect as employees' expectation, this course provides some more realistic subjects as well as better teachers. For instance, with regarding to the draft of contract or terms in contract, enterprise laws or financial statement...., sales employees enjoy determining whether such terms are good or not; these employees feel that they could learn and apply immediately these points to their jobs. In generally, this course is relatively satisfactory to employees' expectation.

*(Note: The name of training center is kept to be confidential)*

**Case 2.** Three prominent enterprises in innovation, productivity improvement are supported by SMEs Japanese government - assistance scheme; and the cases of four enterprises without good HRM

On 23 May 2014, the SME Supporting Center in the South scheme organized the workshop "*Introduction on innovative prominent factories*" at Center of Vietnam News Agency, 116-118 Nguyen Thi Minh Khai Street, Ho Chi Minh City. I was informed about this workshop by Mr. Lam before three weeks. I acknowledge that the primary goal of the workshop is to introduce innovative prominent factories - the case of enterprises which are sponsored by JICA in assistance scheme on enterprises in supporting industries in Vietnam. This is also an occasion to work out this scheme after 4 year from the beginning. I understand that this workshop is very meaningful to my research; I registered to attend in the workshop to collect information as well as make the interviews with prominent enterprise in the break time or in dinners after the workshop as well as establish the relationship to have further interview with enterprises and experts of the SME Supporting Center in the South.

The prominent enterprises provided the evidence on the effectiveness from attending in training course in Japan (from 2 weeks to 6 months) as well as gaining the advices from Japanese senior expertise volunteers. After the course, during and after advisory process, they designed the implemental plan and did the exercises which are required by the experts. The experts enthusiastically came to the enterprises at most twice a week to make observations, have interviews and give their advices on any issues raised by the enterprises without any concealment. The enterprises have successfully applied the instruments in quality control, 5S, Kaizen, QCC... into reality. They pointed that there are real improvements which are demonstrated by data and figure before and after innovation. Production location is tiny, ordered and

more convenient to production process. Spirits of workers and staffs in the enterprises are better; the direct workers are more creative and have more ideas to be applied. The enterprises have large contract (above 4 billion), make reduction in number of fault products, have a rise in revenue, reduction in costs; therefore, their profit increase and productivity is improved.

*(Observation, Interview with 3 prominent enterprises: An Lac Label Printing Joint stock company, Sakura Plastic Company and Visual Joint stock Company)*

Currently, not only companies in timber industry but also the other companies do not analyze the demand for training thoroughly, which results in difficulties for increasing the company's productivity. Mr. Sang, A training expert of ILO from VCCI Hochiminh City emphasized this reason in Figure 5

- "If training activities are ineffective and do not increase firms' productivity, the main reason is that these activities are improper. It is due to the incorrect analysis of demands for training (for example: So far 4 enterprises in timber industry attending SCORE project have not applied tool for analyzing demands for training).
  - In order to analyze demand for training, where to start? Demand for training assessment Table (9- cell matrix tool). It is necessary to analyze each employee based on results of their current job and capacity; associated with business strategy of the company, department, and other HR management activities. If demand for training is correctly analyzed, the company will burden no cost and train the right staff with the right training
- Interview with Mr. Nguyen Van Sang - An expert with job experience as HR director of Pepsi Co., Tan Hiep Phat Co... and lecturer/ consultant of ILO on the module of HR management at SCORE project, on March 5, 2014 VCCI Hochiminh City*

Figure 5. Comments on the reasons for the ineffectiveness of Off-the-job from a training expert of the International Labour Organization (ILO)

On the occasion coming back to hometown, we conducted a qualitative interview two households in QuangNgai (in the field of confectionery processing and screen printing). Besides, we collected information from two households in Hochiminh City (in the field of industrial sewing). In these households, workers were all trained On-JT, rarely Off-JT as their management skills and work skills were quite simple.

"Here, confections are mainly made in semi-industrial way, complex machines are not required. There are about ten workers; I am the boss and also the salesperson. New workers learn from old ones, and then help me with the work. They are mostly female due to their handiness. They learn fast or slow, depending on each person, and are capable at work after one or two weeks. Not much sales, simple money management, basic numeracy practice, so further study is not necessary for me.

There was someone in Hochiminh City offered to be my selling agent, collecting goods for export...but I was afraid that I do not have enough goods to supply, so I did not accept. Moreover, selling agent in Ho Chi Minh City would not be easy, because the goods is Quang Ngai's specialties. Being small is good; export procedure is very cumbersome so I did not dare."

*(Interview Mrs. Hoa, 39 year old, owner of Hoang Yen confectionery manufacturing facility, Quang Ngai province.)*

**Mrs. Thanh:** "This screen printing facility has about three direct labors, apprenticeship is simple, just watch other people and follow. In addition, I also have a printing company which has about ten workers. This facility is equipped with machines, do all kinds of printing stuff. Newly recruited workers must be skilled at some level, so just a little instruction is needed."

**Mrs. Hanh:** "It is more comfortable working here than in the office, from both time and income perspectives. The company still exists because it still receives orders, some stuffs are better done by screen printing rather than large - scale machines"... "at first I was uncomfortable with the ink odour, but for more than ten years I have had no illness!" (I sat beside her and I could feel a very strong smell of ink, which might affect workers' health)

*(Interview Mrs. Thanh - printing company owner; Mrs. Hanh - printing worker)*

In Hochiminh City, we met Thong, about 35 y/o, owner of a sewing factory (a registered household business) in Tan Phu District. Thong's factory was specialized in supplying clothing products. With

Thong's help, we had known another factory (not registered) which had about 30 industrial sewing machines. Both factories trained their workers on the "one to one" basis. "For newbies, he/she can work after two or three months training by me".

*(Interview Mr. Thong, Mr. Xuan, sewing factory owners)*

The proportion of households have Off-JT training activities is really low (6.3%), and among few industrial production households we'd encountered, few had On-JT ones. As a result, no evidences, or reasons (that can be observed from companies) had been found to explain that Off-JT training activities considerably increase productivity even if there are any of these activities in household business. Despite of that fact, Mr. Lam - personnel at Consulting Department, The SME Supporting Center in the South - proposed reasons he perceived after exposing to some small and medium sized enterprises (in which there were small households):

"Firstly, the smaller the size is, the easier the innovation takes place, if a change is in need, the company can change quickly, day by day, hour by hour. In medium or large sized company, if something needed to be changed, it will be difficult for these to be changed completely in the first trial, even their innovation might cost a lot of time, and changes can only be made in much narrower scope, at some certain stages."

Secondly, as the companies (or household business) are small, initially, productivity is quite low, allowing it to change easily. The scale of a medium sized company may as 100 times larger than a household business."

## **6. Conclusion, Discussion and Further Study**

### *6.1 Conclusion and Discussion*

The findings of this study are originated from the analysis on training activity of surveyed SMEs in 2009. These enterprises which have short term (less than 6 months) training programs for their current employees, or new employees in the survey SMEs2009 stated that they have stable and clear training policies. These training activities might be conducted in the beginning of 2009, 2008, or before 2008, but mainly in 2008.

In sum, there is no statistical evidence to conclude that off-the-job training activities have significant impact on firms' labor productivity for the case of the formal enterprises (in 2008), or in the long run (in 2009 and 2010). This may be due to the fact that their training activities are not well-organized and deliberately evaluated, and their labor-force management skill is not professional or the economic recession which hinder the firms' operation. Moreover, it is not difficult for the firms to recruit good-quality employees in labor market due to currently higher unemployment rate; therefore, the firms do not concentrate on training activities; and consequently, the less effectiveness of training program. The other reason may come from extremely old production technology which is one of main obstacles to enhance productivity. Indeed, Thien et al. (2014) showed that merely 80-90 percentages of machines, technology procedures, currently employed in formal enterprises in Vietnam, are imported; in which 76 percentages of imported technologies were originated from the period of 1950-1960, 75 percentages of machines are out of depreciation, 50 percentages of old machines have been renewed. Besides, investment in technology innovation of Vietnamese enterprises remains at low level, accounted for only 0.2-0.3 percentage of revenue.

Basing on some qualitative information we have approached, some main reasons of the inefficient training activity in the formal business may be: (1) formal enterprises have more concentration on On-JT than Off-JT, (2) SMEs have not good management on Off-JT yet (especially in analysis on training demand) and lack of the appropriate coordination with corporate strategies as well as other HR management activities, (3) old technologies in SMEs lead to the difficulties in enhancing productivity, (4) enterprises have insufficient information of training centers as well as trainers, (5) training centers do not organize good training program when the contents of training are mainly theoretical and weakly coordinated with practices; besides, these centers do not pay attention on consultant activities and evaluation on the application of trainees to enterprises after being trained, (6) difficult economic environment by the effects of global economic recession.

In the other hand, the impact of Off-the-job training on household business seems to be more obvious than that on formal enterprises. Four following reasons may give explanations on considerable effectiveness in training activities at household business. Firstly, household business is very deliberate in investment on off-JT since their budget for off-JT is small. Therefore, this business usually makes a very careful procedure in selecting employees to be trained as well as training centers. Secondly, employees, selected to be trained, are mainly family members who themselves understand the responsibility in enhancing productivity and applying right knowledge after training. Therefore, they have encouragement in studying well and making use of what they learnt in practices. Thirdly, this business has the low current productivity and labor intensive technology; therefore, this business finds it easier for it to improve productivity. Fourthly, this business has few labor, simple

machines, ease in on-JT and changement daily, even in each shift. All of these factors may enable the household business to be easier in enhancing productivity.

This study indicated that the investment in human capital (training) for the case of formal enterprises does not significantly generate any increase in their productivity. This finding is consistent with findings by Black & Lynch (2001) and Storey (2002); however, it is inconsistent with the research by Thang et al.(2008) for the case of firms in Vietnam.

### 6.2 Further Study

The research shall be better if it conducts the impact evaluation of the most recent training activity (in the survey of 2011) on the productivity and then compares with the results of training activities in the survey of 2009 by using DID with PSM, IV. Qualitative information should be applied to explain and reinforce the results. The further study may have deeper analysis on the causes of inefficiency in Off-JT and suggestions on improvement of training activities. Besides, the further study may be continuous in evaluating the impact of On-JT.

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### References

- Acemoglu, D., & Pischke, J. S. (1999). The structure of wages and investment in general investment. *Journal of political Economy*, 107(3), 539-572. <http://dx.doi.org/10.1086/250071>
- Ballot, G., Fathi, F., & Taymaz, E. (2001). Firms' Human Capital, R&D and Performance: A Study on French and Swedish Firm. *Labour Economics*, 8, 443-462. [http://dx.doi.org/10.1016/S0927-5371\(01\)00038-0](http://dx.doi.org/10.1016/S0927-5371(01)00038-0)
- Barney, J. B., & Wright, P. M. (1998). On Becoming a Strategic Partner. *Human Resource Management*, 37, 31-46. [http://dx.doi.org/10.1002/\(SICI\)1099-050X\(199821\)37:1<31::AID-HRM4>3.0.CO;2-W](http://dx.doi.org/10.1002/(SICI)1099-050X(199821)37:1<31::AID-HRM4>3.0.CO;2-W)
- Baron, I. N., & Kreps, D. M. (1999). Consistent Human Resource Practices. *California Management*, 41, 29-53. <http://dx.doi.org/10.2307/41165996>
- Black, S. E., & Lynch, L. M. (2001). How to Compete: The Impact of Workplace Practices and Information Technology on Productivity. *The Review of Economics and Statistics*, 83(3), 434-445. <http://dx.doi.org/10.1162/00346530152480081>
- Central Institute for Economic Management - CIEM. (2010a). *Characteristics of the Vietnamese business climate: Evidence from a SME survey in 2009*. Vietnam: Tai Chinh Publishing House.
- Central Institute for Economic Management - CIEM. (2010b). *The Survey data of SMEs in 2009*.
- Central Institute for Economic Management - CIEM. (2012). *The Survey data of SMEs in 2011*.
- Dearden, L., Reed, H., & Reenen, J. V. (2006). The Impact of Training on Productivity and Wages: Evidence from British Panel Data. *Oxford Bulletin of Economics and Statistics*, 68(4), 397-421. <http://dx.doi.org/10.1111/j.1468-0084.2006.00170.x>
- Delery, J. E., & Doty, D. H. (1996). Modes of Theorizing in Strategic Human Resource Management. *Academy of Management Journal*, 39, 802-835. <http://dx.doi.org/10.2307/256713>
- Dumas, A., & Hanchane, S. (2010). How Does Job-Training Increase Firm Performance? The Case of Morocco. *International Journal of Manpower*, 31(5), 585-602. <http://dx.doi.org/10.1108/01437721011066371>
- Forrier, A., & Sels, L. (2003). Flexibility, Turnover and Training. *International Journal of Manpower*, 24(2), 148-168. <http://dx.doi.org/10.1108/01437720310475402>
- GSO. (2012). *Report on Labor Force Survey in 2011*.
- Guidetti, G., & Mazzanti, M. (2007). Firm-Level Training in Local Economic Systems Complementarities in Production and Firm Innovation Strategies. *The journal of Socio-Economics*, 36, 875-894. <http://dx.doi.org/10.1016/j.socec.2007.01.021>

- Hansson, B. (2007). Company-Based Determinants of Training and the Impact of Training on Company Performance: Results from an International HRM Survey. *Personnel Reviews*, 36(2), 311-331. <http://dx.doi.org/10.1108/00483480710726163>
- Hellerstein, J. K., Neumark, D., & Troske, K. R. (1999). Wages, productivity and worker characteristics: Evidence from plant level production functions and wage equations. *International Economics Review*, 40(1), 95. <http://dx.doi.org/10.1111/1468-2354.00007>
- Jones, J. T. (2005). The Determinants of Training in Australian Manufacturing SMEs. *Education and training*, 47(8), 605-615.
- Khandker, S. R., Koolwal, G. B., & Samad, H. A. (2010). *Handbook on Impact Evaluation - Quantitative Methods and Practices*. The World Bank.
- Konings, J., & Vanormelingen, S. (2011). *The Impact of Training on Productivity and Wages: Firm Level Evidence*. Working paper, IESE Business School and HU Brussels. Retrieved from <http://ftp.iza.org/dp4731.pdf>
- Lepak, D. P., & Snell, S. A. (1999). The Human Resource Architecture. *Academy of Management Review*, 24, 31-48.
- Lucas, R. E. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22(1), 3-42. [http://dx.doi.org/10.1016/0304-3932\(88\)90168-7](http://dx.doi.org/10.1016/0304-3932(88)90168-7)
- Ostroff, C., & Bowen, D. E. (2000). Moving HR to a Higher Level: HR Practices and Organizational Effectiveness. In K. J. Klein, & S. W. Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations* (pp. 211-266). San Francisco, CA: Jossey-Bass.
- Rosholm, M., Nielsen, H. S., & Dabalén, A. (2005). Evaluation of Training in African Enterprises. *Journal of Development Economics*, 84, 310-329. <http://dx.doi.org/10.1016/j.jdeveco.2005.11.008>
- Schuler, R. S. (1989). Strategic Human Resource Management and Industrial Relations. *Human Relations*, 42, 157-184. <http://dx.doi.org/10.1177/001872678904200204>
- Storey, D. J. (2002). Education, Training and Development Policies and Practices in Medium-Size Companies in UK: Do They Really Influence Firm Performance? *Omega - The International Journal of Management Science*, 30, 249-264.
- Thang, N. N., Thu, N. V., & Buyens, D. (2008). *The Impact of Training on Firm Performance: Case of Vietnam*. Working paper, the 7<sup>th</sup> International Conference of the Academy of Human Resource Development, Bangkok, Thailand, Nov. 3-6 2008. Retrieved from [http://www.feb.ugent.be/nl/Ondz/wp/Papers/wp\\_08\\_538.pdf](http://www.feb.ugent.be/nl/Ondz/wp/Papers/wp_08_538.pdf)
- Tharenou, P., Saks, A. M., & Moore, C. (2007). A Review and Critique of Research on Training and Organizational-Level Outcomes. *Human Resource Management Review*, 17, 251-273. <http://dx.doi.org/10.1016/j.hrmr.2007.07.004>
- Thien, T. D., An, P. S., Duong, V. H., Hoang, T. V., Viet, N. V. K., Cong, P. T., ..., Trang, N. Q. (2014). *Vietnam economy: The issues of enterprises sector*. Vietnam: Social Science Publishing House.
- Tranh, N.T. (2013). Competitiveness enhancement of Vietnamese enterprises, *Figures and Events Journal*, 473

## Note

Note 1. SCORE Project (Sustaining Competitive and Responsible Enterprises) financed and technically supported by International Labor Organization (ILO) and implemented through the Vietnam Chamber of Commerce and Industry in Hochiminh City. This project supports firms to improve cooperation between management team and employees towards four main objectives: Boosting quality and Productivity, improving working condition, minimizing the negative impact on the environment, enhancing firms' competitiveness in the domestic and global market and international. The participating enterprises are trained and consulted on five topics: Workplace Cooperation, quality management, productivity and cleaner production, human resource management, occupational safety. (Source: VCCI Hochiminh City).

## Appendix A

Table A1. The expected variables in probit model

	Description	Variable List	Note
<b>I</b>	<b>Dependent variable</b>		
	Investment in human capital (training)		Dummies (1=Yes; 0=No)
<b>II</b>	<b>Independent variables</b>		
1	Total assets	lnassets	Continuous
2	Age of firm	firmage	Continuous
3	Industrial park/zone (IZ)	<i>Industrialpark</i>	Dummy
4	Form of ownership/legal status	<i>cooperative, ltd_jstock</i>	Dummies
5	Percentage of managers, professionals, office workers (%)	Officeworkers,	Continuous
	Share casual labour force of total (%)	casual labour	Continuous
6	Turnover	turnover	Continuous
7	Business plan	<i>Businessplan, restructure</i>	Dummy
8	Constraints to growth	<i>constraints</i>	Dummy
	Does the firm face any major constraints to growth?		
9	Negatively affected by the global economic crisis	<i>crisis</i>	Dummy
10	Member of one or more trade associations	<i>association</i>	Dummy
11	Network	<i>network</i>	Dummy
	Union		
12	Does the enterprise have a local/plant level trade union/employee representative organization?	<i>union</i>	Dummy
13	The long-term attachment	<i>Healthsocialins</i>	Dummies
	Buying social, insurance, health insurance for employees		
14	Labor market	<i>Newspaperad;local authorities; emcenter</i>	Dummies
	How does the enterprise hire workers?		
	Is there any difficulties in recruiting workers with the required/appropriate skill level	<i>diffrecruiting</i>	Dummy
15	Percentage of short-term contracts (%)	Shorttermcon	Continuous
16	Research and development (R&D)	R&D	Continuous
17	Percentage of modern technology (%)	Moderntechnology	Continuous
	Innovation		
	Number of personal computers	computer	
	Sell products via e-trading	<i>etrading</i>	
	Purchase services from outside the enterprise	<i>servoutside</i>	Dummies
18	Automatic job rotation system	<i>jobrotation</i>	(and/or)
	Days of inventory	inventory	Continuous
	Environmental standards certificate	<i>envstandard</i>	
	Major improvements in existing products or changed specification;	<i>improve products</i>	
	Introduction of new production processes/technology		
19	The firm has been involved in training courses supported by the national or international organizations	<i>Foreign donors</i>	Dummy
20	Government assistance	<i>govassistance</i>	Dummy
21	Industrial dummies		Dummies
22	Formal/ household enterprises	<i>Hh formal</i>	Dummy

Notes: Italic variables are dummies

Table A2. Probit model of the determinants on investment in human capital

	Formal enterprises				Household business			
	Coef.	z	Marginal Effects	Mean	Coef.	z	Marginal Effects	Mean
<b>Inassets</b>	0.039	0.53	0.00745	7.304	0.022	0.22	0.00036	5.445
<b>firmage</b>	-0.035***	-2.91	-0.00680	10.729	-0.009	-0.72	-0.00015	15.762
<i>industrialpark</i>	-0.233	-0.99	-0.04023	0.120	-0.370	-0.55	-0.00400	0.018
<i>cooperative</i>	0.218	0.70	0.04663	0.090				
<i>ltd_jstock</i>	-0.654***	-3.40	-0.14571	0.692				
<b>officeworkers</b>	-0.317	-0.52	-0.06110	0.247	-2.377*	-1.93	-0.03950	0.266
<b>casuallabour</b>	0.367	0.98	0.07063	0.112	-1.313	-1.64	-0.02182	0.110
<b>turnover</b>	-0.003	-0.57	-0.00048	-1.318	0.005	0.62	0.00009	-0.714
<i>restructure</i>	0.555**	2.43	0.13448	0.122	0.280	0.62	0.00646	0.045
<i>businessplan</i>	0.319	0.55	0.05077	0.973	0.861	1.47	0.00702	0.896
<i>crisis</i>	0.003	0.02	0.00061	0.805	0.404	1.58	0.00610	0.631
<i>constraints</i>	-0.584**	-2.37	-0.14620	0.917	-0.283	-0.93	-0.00600	0.821
<i>govassistance</i>	-0.024	-0.14	-0.00451	0.376	0.449**	2.02	0.00936	0.334
<i>foreigndonors</i>	-0.031	-0.14	-0.00589	0.147	0.608	1.10	0.02116	0.030
<i>association</i>	0.166	0.90	0.03374	0.240	0.326	0.73	0.00792	0.050
<i>network</i>	-0.071	-0.41	-0.01394	0.721	-0.581***	-2.61	-0.01102	0.541
<i>union</i>	0.382**	2.08	0.08136	0.272	-0.464	-0.52	-0.00447	0.008
<b>shorttermcon</b>	0.006**	2.01	0.00112	13.533	0.011***	3.67	0.00019	28.203
<b>R&amp;D</b>	-6.191	-1.38	-1.19137	0.005	8.434	1.46	0.14015	0.001
<b>moderntechology</b>	-0.586**	-2.08	-0.11271	0.258	0.443	1.18	0.00736	0.235
<i>newspaperad</i>	0.315	1.58	0.06864	0.156				
<i>localauthorities</i>	0.428	1.08	0.10289	0.029				
<i>emcenter</i>	-0.08	-0.31	-0.01484	0.086	0.89*	1.65	0.04426	0.016
<i>diffrecruiting</i>	0.505***	3.14	0.11017	0.288	0.492**	2.00	0.01286	0.158
<i>healthsocialins</i>	0.402**	2.16	0.07558	0.553	0.403	0.89	0.01094	0.030
<i>etrading</i>	-0.201	-0.85	-0.03514	0.120	0.105	0.14	0.00199	0.011
<b>computer</b>	0.063***	3.41	0.01204	3.376	0.157	0.96	0.00261	0.263
<i>jobrotation</i>	0.479**	2.35	0.11160	0.144	1.076***	3.18	0.06052	0.061
<i>servoutside</i>	0.603***	2.59	0.08998	0.841	-0.206	-0.78	-0.00380	0.683
<b>inventory</b>	-0.011	-0.21	-0.00215	3.827	-0.010	-0.13	-0.00016	3.415
<i>improveproducts</i>	-0.049	-0.32	-0.00944	0.587	-0.245	-1.04	-0.00401	0.457
<i>envstandard</i>	0.406**	2.38	0.08763	0.261	-0.156	-0.42	-0.00222	0.088
<i>Industrial dummies</i>	Yes				Yes			
<i>hhformal</i>					1.360***	2.92	0.02065	0.641
cons	-1.482*	-1.69			-3.378***	-2.91		
Mean VIF	1.37				1.46			
VIF max	2.46				4.34			
Pseudo R2	0.30				0.47			
Count R2	0.84				0.95			
Balancing property	Satisfied				Satisfied			
n	569				739			

Notes: Italic variables are dummies; \*significant at 10% level, \*\*significant at 5% level, \*\*\*significant at 1% level ;

Source: Calculated from CIEM data (2010, 2012)

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