KAIZEN for Managerial Skills Improvement in Small and Medium Enterprises: An Impact Evaluation Study in a knitwear cluster in Vietnam

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1. Introduction

The last four decades have witnessed a large number of successful cases of industrial development in Asia but probably an equally large number of failures in other developing countries. While the international development community has not been enthusiastic about assisting industrial development, the governments of developing countries are eager to see the development of their industries. In a series of recent papers, Lin (2010) and Lin and Monga (2010a, 2010b) propose that "industrial policies" be rethought to promote industrial development in view of its utmost importance for poverty reduction. They argue that governments should provide information, which is characterized as a public good, compensate for externalities, and coordinate improvements in the "hard" and "soft" infrastructure that are needed for private sectors to grow. In short, so far as markets fail, there is room for productive government policies to support industrial development.

The good news is that there has been considerable progress in development economics research in this area. The availability of longitudinal micro-level data and experimental data on firms in developing countries has increased drastically, which has generated considerable research results. Now evidence that firms in developing countries are faced with severe market failure problems is amply available. Using World Bank's Enterprise Survey data, for example, Eifert, Gelb and Ramachandran (2008) show that the cost of doing business is particularly high in Sub-Saharan Africa due to the insufficient supply of infrastructure and public services. Randomized and natural experiment studies by de Mel, McKenzie and Woodruff (2008) and Banajee and Duflo (2005), among others, present clear evidence on financial market failures and severe consequent credit constraints. Given these results, a natural question arises as to what institutions in the private sector in developing countries emerge to counteract the market failures hindering industrial development.

One obvious institution is industrial clusters, i.e., the geographic concentration of firms producing similar and related products. The geographic proximity within a cluster reduces monitoring costs and other transaction costs associated with the division of labor among firms. The cluster attracts buyers, suppliers, and workers because of reduced search costs. Because of these and other advantages of localization economies, industrial clusters have been spontaneously formed in a wide range of countries and sectors. Nonetheless, some market failures are too complex for such grass roots institutions to cope with. According to a series of case studies by Sonobe and Otsuka (2006, 2011), in most developing countries, a major constraint on industrial development is the shortage of managerial human capital. As a firm expands its size of operation and improves the quality of its products, management

becomes increasingly complicated and difficult. For industries to achieve sustainable growth, therefore, the stock of managerial human capital must increase. Investment in this capital is likely to be grossly sub-optimal since rampant imitation of new knowledge and the poaching of knowledgeable human resources from rivals in clusters reduce private returns far below social returns. If this is the case, a policy that corrects this market failure should be prescribed and linked with other effective measures toward cluster-based industrial development.

This paper presents the preliminary results of our ongoing study of such a corrective policy intervention in cluster-based industrial development. At the center of this study is a field experiment that we are conducting in a knitwear cluster in Ha Noi (previously Ha Tay) and a rolled steal cluster in Bac Ninh in Vietnam. In these clusters, we conducted baseline surveys of firms from April to July 2010 and then provided classroom training programs for entrepreneurs in June to August of the same year. The evaluation of the training impacts is expected to reveal whether entrepreneurs in clusters possess basic knowledge of management before the training, what characterizes the entrepreneurs who are more willing and able to absorb new knowledge, whether the training can change entrepreneurs' attitudes toward learning management knowledge, how much entrepreneurs can learn from a short-period training program, and whether the benefit of the training program exceeds its cost, among others.

This paper is based on the firm data collected through the baseline survey and the first post-training survey we conducted in La Phu from September to November 2010. The consistency of our findings across these study sites is striking. Although we do not have post-training data on business performance, which is too early to measure, the classroom training has already improved the management practices of a number of the training participants. The effects of the training are affected by the quality of the instructors and their preparation including their preliminary knowledge of the business activities of the participants. The training was provided to entrepreneurs free of charge. At the baseline survey and the post-training survey, we asked if they were willing to pay about 3 million VND to participate in classroom training for three weeks. At every study site, the participants became much more willing to pay after the training than before, and even the nonparticipants (who were either randomized-out entrepreneurs or those who had been invited but did not participate) became more willing to pay.

This paper is organized as follows. Section 2 reviews the case studies of cluster-based industrial development and their policy implications, followed by a review of the related

empirical studies based on large-scale surveys of firms conducted in a number of developing countries.   Section 3 explains the sampling scheme at the study site, the training contents, and some features of the questionnaires used in the baseline survey and the first post-training survey.   Sections 4 to 7 present the descriptive analysis, estimates of short-run impacts of the classroom training.   Section 8 concludes the paper with a summary of the findings.

2. A review of the emerging literature

Widespread and persistent poverty in the majority of developing countries is one of the most serious issues currently facing the world.   In order to reduce poverty in low-income economies, ample employment opportunities must be created for the poor.   To achieve this, the development of labor-intensive industries is the key, as agriculture can provide only limited employment opportunities.   Indeed, although the Green Revolution in Asia increased grain production dramatically, it had modest effects on labor demand (David and Otsuka 1994).   As a result, it was not the increased labor employment opportunity in agriculture but rather in the non-agricultural sector that directly contributed to the poverty reduction in Asia (Otsuka, *et al*., 2009).   The central question is how to promote the development of labor-intensive industries in such countries.

The commonly accepted neoclassical presumption is that "industrial policy" does not work (Pack and Saggi, 2006), and thus governments have to do little to promote industrial development beyond the provision of infrastructure such as roads, electricity, and communication systems.   This presumption is incorrect, however, because there are several important sources of market failure which governments can address.   First, transaction costs between manufacturing enterprises (e.g., assemblers and parts-suppliers) and between such enterprises and traders are known to be high, particularly in developing countries.   Due to asymmetric information and imperfect contract enforcement, adverse selection, cheating, and hold-ups may occur, thus negatively affecting the functioning of the market (e.g., Akerlof, 1970; Williamson, 1985; Hart and Moore, 1990).   Second, innovative knowledge spills over, as is emphasized in the endogenous growth literature (e.g., Romer, 1986).   Such knowledge is often tacit and, hence, not patentable or tradable, and thus the markets would not work in this case.   The result is under-investment in the creation of new productive ideas.   Third, in the recent literature, the importance of managerial capital and management practices to firm performance is being revaluated (Bloom and Van Reenen, 2007, 2010; Bruhn *et al*., 2010; Syverson, 2010).   Sonobe and Otsuka (2006, 2011) reveal that entrepreneurs' managerial human capital plays a critical role in industrial development, as it affects innovation.   As

with ordinary human capital, investment in managerial human capital is likely to be socially sub-optimal due to inaccessibility to finance. This problem is exacerbated by information spillovers, which thwart the incentive to innovate (Arrow, 1962). Thus, there is clearly room for government intervention to promote industrial development through the correction of such market failures.[1]

2-1. Case studies of cluster-based industrial development

In our observations, most, if not all, of the indigenously developed industries in low-income countries are cluster-based, in which a number of small and medium enterprises producing similar and related products are located in a small neighborhood. Huang and Bocchi (2008) and Schmitz and Nadvi (1999), as well as many other studies, report that there are a large number of industrial clusters in East and South Asia and Latin America. Even in SSA, such industrial clusters are ubiquitous (e.g., McCormick, 1999). Such clusters attract enterprises as they reduce the transaction costs between manufacturing enterprises and between manufacturers and traders.[2] Indeed within the cluster, asymmetric information regarding the trustworthiness of potential trading partners is not as serious as outside the cluster. Under such conditions, dishonest behavior is likely to be detected and heavily punished. As a result, market transactions are promoted. Given this scenario, the government may support the formation of industrial clusters by investing in industrial zones and marketplaces (Sonobe *et al*. 2002, 2004; Ding, 2007; Ruan and Zhang, 2009).

Information spillover or imitation is rampant in industrial clusters. As a result, the social return to creating and introducing new knowledge, which encompasses the development of new superior products, production methods, marketing channels, and internal management systems, exceeds the private return, resulting in a socially sub-optimal level of investment in new innovative knowledge, if left to free market forces. Thus, governmental support for innovation may be warranted, as in the case of the Industrial Technology Research Institute in Taiwan (Hong and Gee, 1993). Note that "innovation" here refers to "imitative innovation" or "improvement" but not to the "innovation" that leads to creative destruction in the sense of Schumpeter (1950).

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[1] In the pioneering study of industrial clusters by Marshall (1920), inter-enterprise transactions and information spillovers are considered to be important sources of agglomeration economies, in addition to the formation of skilled labor market. Yet, the roles of innovations and managerial human capital are not recognized.
[2] Sonobe and Otsuka (2011) present some empirical evidence that traders play a critically important role in the development of industrial clusters.

In order for an enterprise to grow, its manager must be an entrepreneur, who constantly strives for new innovations. To become a dynamic entrepreneur, the manager must invest in his/her managerial human capital; however, insufficient financial resources may preclude this. It seems to us that gross under-investment in managerial human capital is a major constraint on efficient enterprise management in low income countries. Here too, there is ample room for productive support by the government.

Although not unique to the development of industrial clusters, another area where the government can potentially play a critical role is the provision of low-interest loans due to the mal-functioning of credit markets (e.g., Beck *et al*., 2009; Karlan and Morduch, 2009). While we agree with this basic argument, we would also like to point out that successfully grown enterprises were rarely dependent on subsidized credit in East Asia, particularly in the early stage of development when low-quality products are produced (Sonobe and Otsuka 2006).

In sum, the fact that so many industries in developing countries are clustered, even though the government does not provide any support, and that there are potentially useful roles to be played by the government warrant the careful empirical study of cluster-based industrial development.

A particularly important question is why SSA has largely failed to develop dynamically growing industrial clusters. Is it possible to promote industrial development in this region? If so, what is the appropriate development strategy? The surprising result of our East Asian study is that there are large similarities in the pattern of *successful* cluster-based industrial development across industries and across the three East Asian countries. The development process of a cluster is divided into three stages; (1) initiation of new industry, (2) quantity expansion accompanying the increasing number of new firms producing the same or almost the same low-quality products, and (3) quality improvement achieved by the introduction of new improved production methods, materials, and parts, new marketing systems, and improved internal management.

In our observations a swarm of imitators enters the industry and sells their products on the same local markets. In this way, an industrial cluster is formed. Because of the "excessive" entry of new enterprises, however, the supply of products exceeds the demand, resulting in lower product prices and declining profitability in this quantity expansion phase. This triggers competition based around the improvement of the quality of the products. It is important to note that although productivity growth is slow in the quantity expansion phase, the expansion of the size of the market induces the division of labor between assemblers and

parts-suppliers (Stigler, 1951; Ruan and Zhang, 2009), and attracts traders, engineers, and designers.

The success of the quality improvement requires the use of high-quality parts and materials, and the employment of more experienced and skilled workers, so that the cost of production increases. More often than not, however, consumers do not immediately perceive the quality improvement, and thus the new products cannot command high prices in the market. Thus, how to convey the quality information to consumers is the key issue that the innovative entrepreneur must resolve. Commonly the establishment of brand names and the development of new direct marketing channels such as operation of own shops and direct sales to wholesalers, supermarkets, and department stores, are critical development strategies. The establishment of trust-based long-term subcontracting relationships with parts-suppliers also becomes important, as the new products often require differentiated parts and components, which embody new ideas. In addition, stricter control of product quality and monitoring of workers must be implemented. Successful quality improvement leads to the dramatic transformation of the industry with a smaller number of much larger enterprises, partly because non-innovative enterprises are forced to exit and partly because innovative enterprises expand their scale of operation. Once these multi-faceted improvements of production methods and enterprise management are implemented successfully, large innovative enterprises emerge, and they often export their improved products to high income countries.

While Schumpeter (1912) enumerated the improvement of products, production methods, production organization, and marketing as major components of innovation, Sonobe and Otsuka (2006, 2011) argue that these components are complementary. Sonobe and Otsuka argue that such multifaceted innovations can be carried out only by highly educated entrepreneurs or entrepreneurs endowed with rich managerial human capital.

We named this development pattern the "East Asian Model of Cluster-Based Industrial Development" (Sonobe and Otsuka, 2006). A question arises, however, as to whether such a development pattern is really unique to East Asia. Thus, we have since undertaken case studies of village-based garment and steel-bar clusters in Vietnam, of the spectacularly developed and exceedingly large garment cluster in Bangladesh, and of the steadily growing electrical fittings cluster in Pakistan. Although differences exist in the development pattern among the four cases and between these cases and those in East Asia studied earlier, the similarities are much more striking. Thus, we concede that the term "East Asian Model" is a misnomer.

2-2. Evidence from large scale surveys and field experiments

Since the early 1990s, several research programs, increasing the World Bank's Regional Program on Enterprise Development (RPED), have conducted large-scale surveys of manufacturers in a number of developing countries. Each survey traced a large number of firms over time, yielding panel data. The data sets built by these surveys have generated considerable research output. Mead and Liedholm (1998), Bigsten and Söderbom (2006) and Nichter and Goldmark (2009) provide excellent literature reviews.

First, these survey data indicate clearly that most African firms, compared with their counterparts in other developing countries, grow slowly even when they are young, and they cease to grow early.[3] Moreover, Bigsten et al. (1999) and Mazumdar and Mazaheri (2003) among others find that African firms' investment is not sensitive to changes in profits. The elasticity of investment with respect to profits is small for relatively large firms and not particularly large even for small firms. These findings are supportive of the previous argument about the quantity expansion phase of cluster development. That is, without having achieved multifaceted innovations, firms face rapidly diminishing returns because of stagnant technology and management.

Second, it is clear from the large-scale survey data sets from developing countries that firms with better educated owners and managers perform better. A number of studies on African firms suggest that secondary and university education are closely and positively associated with firm growth (e.g., McPherson, 1996; Mead and Liedholm, 1998; Ramachandran and Shah, 1999; Mengistae, 2006). Similar results have been obtained from studies in other parts of the developing world (e.g., Nichter and Goldmark, 2009). While evidence for the positive association between entrepreneurs' education levels and firm performance is overwhelming, the question of what types of education are conducive to firm growth has remained open.

Thus, both case studies of cluster-based industrial development and large-scale surveys of firms in developing countries suggest the importance of managerial capabilities as a major determinant of firm performance, but they fall short of offering conclusive evidence. One reason is the absence of accurate measures of the quality of management. Another

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[3] Note that we are not saying that African firms have a distinct pattern of firm growth. On the contrary, their pattern is essentially the same as the one observed in other parts of the world; that is, older and larger firms are more likely to survive but they tend to grow more slowly than younger and smaller firms, as predicted by the theoretical models developed by Jovanovic (1982), Hopenhayn (1992), and Ericson and Pakes (1995).

reason is the difficulty in establishing a causal relationship. Recently, however, major breakthroughs have been achieved. First, Bloom and Van Reenen (2007) apply a consistent method of evaluating key management practices used by industrial firms to 732 medium-sized firms in four developed countries. Bloom and Van Reenen (2010) gather management practice measures from nearly 6000 firms in 16 countries including Brazil, China and India. They find a strong association between management practices and indicators of firm performance and significant cross-country and within-country variations in management practices.

Second, a number of researchers have begun field experiments that allow causal inference. Klinger and Schündeln (2007) find in three countries in Central America that small firms participating in NGO-sponsored business training programs are more likely to set up new businesses or expand existing businesses than nonparticipants. In a similar study by Karlan and Valdivia (2011) in Peru, basic business training was offered to entrepreneurs running micro enterprises who were randomly selected from female members of a group lending program. The training program is found to reduce the likelihood of dropping out from the lending program, thereby inducing greater client retention for the lender.

Using data on female entrepreneurs in India, Field, Jayachandran, and Pande (2010) explore how traditional institutions constrain starting and expanding small businesses. By providing a two-day financial literacy and business skill training session to poor self-employed female entrepreneurs, they find that the training leads to significant increases in borrowing and business income but that the training effect is heterogeneous and only statistically significant for Hindu women.

In a related study, Drexler, Fischer, and Schoar (2010) offer two types of financial training to micro entrepreneurs in the Dominican Republic. The sample was divided into three groups. While the first group received standard accounting training, the second group received more rudimentary training and the third group did not receive any treatment and served as a control group. These results indicate that while the standard accounting training did not produce any discernible effect on business practices and performance, the rudimentary training improved business practices and performance significantly.

Bruhn, Karlan, and Schoar (2010b) and Bloom et al. (2010b) look at the effects of management consultancy services, which provide more customized solutions to client firms than classroom training. Bruhn, Karlan, and Schoar's (2010b) randomized controlled experiment was carried out in Mexico. They find that the small enterprises that had received the subsidized services improved business practices significantly, but that the

measured impacts on their business performances were only marginally significant.   Bloom et al. (2010) study the effects of year-long management consultancy services offered to large textile firms in India.   They find substantial improvements in management practices, productivity, and product quality at the treated plants.

The results of these field experiments indicate clearly that many small firm entrepreneurs have inadequate knowledge of management.   Although managers of larger firms are more knowledgeable, their knowledge of management is far from the state-of-the-art level.   Thus, these field experiments provide strong evidence that managerial human capital is grossly under-invested in.

3. Design of the study

The present study features KAIZEN training.   KAIZEN is an approach to productivity improvement, and it is applicable to any productive activities including marketing and accounting.   However, KAIZEN is most commonly to applied to production management. The previous experiments involving management training focused on financial literacy and business planning but did not include production management training.   The only exceptions are our previous experiments in Ghana and Kenya, and the experiment involving the year-long training of managers of large firms in India by Bloom, Eifert, McKenzie, Mahajan, and Roberts (2010b).   Thus, a comparative analysis of the effectiveness of KAIZEN-style production management training for small and medium enterprises across the two study sites in Vietnam is a salient feature of our study.

KAIZEN enables managers and workers to identify and solve problems hindering production improvement and encourages them to continue challenging increasingly difficult problems (Imai, 1997).   Our training programs can cover only the very elementary part of KAIZEN.   In this section, we first attempt to summarize what that part of KAIZEN entails. While production management training is a focus of our program, we believe that entrepreneurs should acquire various aspects of management knowledge comprehensively since the transition from the quantity expansion phase to the quality improvement phase requires multifaceted innovations.

3-1. Training contents
3-1-1. The very elementary part of KAIZEN

A good starting point for productivity improvement is to recognize that there are value adding operations and non-value adding operations.   Taking the knitwear enterprise as an

example, the time spent looking for scissors and transporting work in progress from one room to another is completely non-value adding from the customers' point of view. Just by putting work in progress in a basket and cleaning the floor, enormous amount of time spent removing dirt and waste threads from garment products can be reduced drastically. It is easy to imagine that the small workshop has excessive inventories of finished products and work in progress, which is not value adding obviously.

To reduce non-value adding operations, the entrepreneurs and their workers have to identify such operations. It is difficult to get started, however, since there are so many non-value adding operations everywhere in the workshop. Thus, it is often useful to begin by introducing 5S, which is named after the corresponding Japanese words whose Romanized expressions begin with the letter "s". They are translated as sorting, setting in order, systematic cleaning (or shining), standardizing, and sustaining (or self-discipline). Actually, the first 2S (i.e., sorting and setting in order) or 3S will have strong effects on the work environment in small enterprises, according to Japanese KAIZEN experts with extensive experiences in Southeast Asia. Sorting means distinguishing necessary items from unnecessary items, such as broken tools and old materials which have been kept in the workshop but will never be used, and disposing of the unnecessary items. Just by implementing sorting activities, congestion in the workshop is mitigated. Setting in order is to induce workers to return tools and bring in materials to the designated places by labeling and arranging the storage system such that first-in-first-out is realized. This reduces search time drastically. After these activities called 2S are applied, the workshop becomes better organized, which will induce the entrepreneurs and workers to continue to keep the workshop tidy.

The very elementary part of KAIZEN, therefore, consists of the introduction of the concept of non-value adding operations, the concepts of 5S, and a few concrete methods of implementing 2S or 3S.

3-1-2. Classroom training
We share the basic idea with Milgrom and Roberts (1990) who argue that technology and management are complementary in the operation of modern manufacturing enterprises. Thus, enterprises in industrial clusters need to achieve multifaceted innovations in order to grow in a sustainable fashion, and, accordingly, the entrepreneurs need multifaceted training of management including business strategy, marketing, and production management (see below for further discussion). Whether each training program should be multifaceted or

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specialize in one of the aspects of management is an open question, however. In the present study, we try both types, by providing a multifaceted training program in classroom and an on-site training specializing in KAIZEN. The effectiveness of each type of training is examined by dividing the sample of, say, 100 entrepreneurs, into four groups: 25 are treated with both types of training, 25 with only classroom multifaceted training, 25 with only on-site KAIZEN training, and 25 with no training. In other words, both training programs have 50 participants with the overlap of 25 entrepreneurs.[4]

The classroom multifaceted training program consists of three modules: Entrepreneurship, Business Strategy, and Marketing; Production Management (KAIZEN); and Record Keeping and Costing. Modules 1 and 3 are based on the improve-your-business (IYB) and start-your-business (SYB) training program developed by the International Labor Organization (ILO).

3-2. Study site and sampling

Our study site in Hatay Province is a village cluster of knitwear producers adopting a decentralized system in which the most labor-intensive process, i.e., knitting, is contracted out to hundreds of subcontractors, who are farmers in the adjacent villages. Their final products are marketed in large cities in Vietnam through traders and exported to East Europe by *Vietkieu*, overseas Vietnamese traders.

The name of the village under study is La Phu, which is located in the west of Hanoi, as shown in Figure 3.3. In the 1970s, two cooperatives were set up in the village, and the two SOEs contracted out garment production to these cooperatives. When the *Doi Moi* (renovation) policies liberalized the domestic market and encouraged private production in 1986, many households in La Phu began producing simple knitwear garments. In 1991, the cooperatives in the village were closed because the SOEs stopped contracting out following the collapse of the Soviet Union market. The knitting machines of the cooperatives were given to their member households. The resulting expansion of the production capacity of La Phu attracted a number of petty traders from Hanoi and other provinces, who began not only the marketing of garments made in La Phu but also bringing materials, mainly China-made, from Hanoi to La Phu.

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[4] A possible problem with this arrangement is that the 25 entrepreneurs who receive no treatment become uncooperative during our follow-up survey. Without data on their performance, treatment effects cannot be evaluated in a satisfactory way. To elicit information from them, we plan to offer audio and visual training materials to them after the questionnaire survey.

In the early 1990s, exporting knitwear made in La Phu to East Europe and Russia was started by *Vietkieu* who were born in La Phu.   These merchants went to Russia and Eastern Europe in the late 1980s and started small businesses, among which garment trading was the most common business.   Nam, Sonobe, and Otsuka (2010) explain the details of the development process of this village cluster.   More recently, however, *Vietkieu*'s roadside retail shops in Russia were ejected, and knitwear producers in La Phu have lost their Russian market.   For the last few years, moreover, their domestic market has been dull because of warmer-than-normal winters.   As a result, not a few knitwear entrepreneurs closed their knitwear workshops and shifted their business activities to the production of confectionery and crackers, which is another traditional business in this village.   We are interested to explore how the KAIZEN training can improve the productivity of the decentralized knitwear production system and revive the knitwear business in the village cluster.   We newly conducted the baseline survey in July 2010.   We selected 180 entrepreneurs randomly from the list provided by the commune government office and obtained data from 161 entrepreneurs.

3-3. Questionnaire

We collected data through personal interviews with the sample entrepreneurs.   In the two study sites, we have used basically the same questionnaires with some adjustments to the local conditions.

3-3-1.Business practice questions

The questionnaire poses questions concerning business practices.   Many of them are yes-no questions.   One may analyze the answers to these questions individually, but doing so may not offer any insight.   In such a case, we try to use an aggregate score.   Suppose that there are questions about keeping records of specified types of transactions.   Some respondents may answer yes only to sales, and some may answer yes to both sales and input purchases.   The score for the former respondents is 1, and that for the latter is 2.   In this way, we can create a score ranging from 0 to 6 regarding the question of keeping records.

The questions about business practices are classified into five groups concerning record keeping, marketing, quality inspection, KAIZEN related activities, and access to banking services and the use of e-commerce.   Whenever reasonable, we attempt to use aggregated scores in the regression analyses, while keeping in mind that it is debatable whether the use of simple scores is appropriate.

Bloom and Van Reenen (2007, p. 1362) recommend the use of open questions rather than closed questions in order to evaluate the enterprise's "actual practices rather than its aspirations, the manager's perceptions, or the interviewer's impressions." We agree with them completely.

3-3-2. Willingness-to-pay (WTP) questions

Although no previous experiments on managerial training have attempted to do so, it seems highly useful to collect data on the willingness of both participants and nonparticipants to pay for the training program. Our questionnaires ask whether the respondents are willing to pay about 3 million VND for participation in the classroom training. This amount is lower than the actual cost of hiring local consultants and renting a venue for the 15 day training program, but we expect that as teaching materials are established, the unit cost will go down to this level or even lower in future.

It is well known that respondents to WTP questions tend to exaggerate their willingness to pay because payment or purchase is not real but hypothetical. The gap in WTP between the two cases is called the hypothetical bias. Blumenschein, Blomquist, Johannesson, Horn, and Freeman (2008), however, find evidence that contingent valuation with certainty statements removes hypothetical bias. The hypothetical bias is removed by counting the respondents who answer "definitely sure" as willing to pay and to take those who answer "probably sure" as unwilling. Although we are interested in the demand or WTP for training at various prices, the original authors answered in personal communication that it is inadvisable to use this method in the case of multiple prices. Thus, we focused on 3 million VND and asked the definitely-sure question in both baseline and follow-up surveys.

3-3-3. Production and cost questions

Since the majority of small enterprises do not keep records of transactions, it is difficult to collect accurate data on financial variables, such as sales revenues and production costs. Such data, however, are indispensable to perform cost-benefit analyses, which would facilitate policy prescription. In the baseline survey, we collected data on annual sales revenue, material cost, utility cost, subcontracting cost, and labor cost by asking each entrepreneur about the number of pieces sold and their prices by product type, material inputs and material prices, wages and allowances paid to workers and apprentices, and so on by the type of month (i.e., busy, normal, and slack months). In so doing, we tried to maximize the accuracy of the financial data. In the first follow-up survey, these data were not collected

because sales revenues and production costs during the short period of time after the baseline survey were difficult to obtain and to interpret in view of the seasonality in market demand.

3-4. Impact evaluation method: randomization and estimation

In estimating the impacts of the classroom training program, we follow one of the most commonly-used methods to be explained below. Persons are in either one of two possible states: one is associated with receiving treatment and the other is not. Let $D = 1$ if a person is in the treatment state, and $D = 0$ otherwise. His or her outcome (i.e., management practice adoption or business results) in the treatment state is denoted Y_1, and that in the other state is Y_0. The observed outcome, Y, is defined as $Y = DY_1 + (1 - D)Y_0$. The benefit from participating in the training program for this person is $Y_1 - Y_0$. This is not observable since the same person cannot be in both states simultaneously. The majority of the evaluation studies estimate the mean of $Y_1 - Y_0$ across the participants, which is called the average effect of treatment (ATT) on the treated and defined as

$$ATT = E(Y_1 - Y_0 | X, D = 1), \qquad (1)$$

where X is the observable variables that may affect the outcomes. The difference in the average observed outcomes between the treated and the untreated may be written as

$$E(Y | X, D = 1) - E(Y | X, D = 0) = E(Y_1 | X, D = 1) - E(Y_0 | X, D = 0)$$
$$= ATT + E(Y_0 | X, D = 1) - E(Y_0 | X, D = 0). \qquad (2)$$

The difference between the second term and third term on the most right-hand side is a selection bias, which would be nil if the persons were randomly selected into the two states.

Thus, if we can randomize participation, the impact evaluation amounts to calculate the difference of observable means $E(Y | X, D = 1) - E(Y | X, D = 0)$. However, participation cannot be randomized since we cannot force the invited entrepreneurs to participate in the training program. It is up to them to decide whether to participate. Instead, we randomize invitation. As shown in Table 1, throughout this report, we mean by treatment group the group of the entrepreneurs who are invited to the training program, and by control group the group of the entrepreneurs who are randomized out. It is interesting to explore what characterize the entrepreneurs with higher propensity to participate in training. The opportunity cost of participation would be lower for entrepreneurs with unsuccessful businesses, whereas the expected benefit may be higher for those with higher education since they are likely to have more capacity to absorb knowledge from the same training program. To explore this issue, we estimate a probit model of participation by using the sample of the treatment group and the entrepreneur's background attributes as explanatory variables.

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Moreover, since we have data on both *X* and *Y* before the training as well as after the training, we will extend the regression to a panel context.

To confirm the potential advantage of the use of panel data, consider the difference-in-difference estimator

$$DID = E(Y^A - Y^B | X, D = 1) - E(Y^A - Y^B | X, D = 0)$$
$$= E(Y_1^A - Y_0^B | X, D = 1) - E(Y_0^A - Y_0^B | X, D = 0), \qquad (6)$$

where superscripts *A* and *B* denote the time periods after and before the training, respectively. With these superscripts, the definition of *ATT* in equation (1) may be rewritten,

$$ATT = E(Y_1^A - Y_0^A | X, D = 1).$$

It is easy to show that *DID* consists of *ATT* and the differences in selection bias:

$$DID = ATT + E(Y_0^A - Y_0^B | X, D = 1) - E(Y_0^A - Y_0^B | X, D = 0)$$
$$= ATT + B^A(X) - B^B(X), \qquad (7)$$

where $B^A(X)$ and $B^B(X)$ are selection biases after and before the training, i.e.,

$$B^A(X) = E(Y_0^A | X, D = 1) - E(Y_0^A | X, D = 0)$$
$$B^B(X) = E(Y_0^B | X, D = 1) - E(Y_0^B | X, D = 0).$$

Although it is not necessarily the case, $B^A(X) - B^B(X)$ is likely to be smaller (in absolute value) than $B^A(X)$, and accordingly, *DID* is likely to be closer to ATT than single difference in observed outcomes $E(Y | X, D = 1) - E(Y | X, D = 0)$ in equation (2).

This section concludes with a remark about our focus on means, such as *ATT* as evaluation parameters. While most evaluation studies, including ours, look at means, there are other evaluation parameters derived from the distribution of outcome (see, for example, Heckman, Smith and Clements (1997)). Suppose that there is great heterogeneity in management training effects among entrepreneurs. Some entrepreneurs can assimilate only a little from a management training program, but the knowledge acquired from the same program may allow some others to reform management practices one after another and increase profits steadily. In such a case, the goal of the management training program may not be to raise the average level of all the participants but to nurture exceptionally talented entrepreneurs, who cannot be identified before providing training to a number of entrepreneurs. Appropriate evaluation parameters in this case would not be means. Currently, we are weighing possible evaluation parameters.

4. Case of knitwear cluster in Vietnam

4-1. Descriptive analysis

4-1-1. Basic characteristics

Basic socio-economic characteristics of owners and firms are presented in Table 2, separately for the treatment group (i.e., those who were invited to the classroom training) and controlled group (those who were not). The p-values for t-test on the means between two groups are also presented in the last column. The first five variables (age, male, years of schooling, previous training experience, and years of firm's operation) are not significantly different between the two groups. Owners tend to be in their forties and female owners are relatively common. Average schooling is about eight years and firms' average length of operation is about ten years. Only ten percent of them have participated in training programs before.

For the variables which show the size of firms, there seems to be significant difference between the two groups, despite the fact that the invitation was randomly offered. Both the initial capital and the number of permanent workers (which includes the number of family members engaged in the business) tend to be larger for the controlled group than the treatment group. The number of seasonal workers between the two groups is not statistically different. In this industry, approximately ten to twenty permanent workers are hired in one firm with a few more temporary workers.

To take a closer look at the firm's performance, we present sales revenues, material costs, value-added, labor cost, and gross profit (i.e., value added minus labor cost) for the two groups over the last three years in Table 3. We observe that for all the variables, the difference between the two groups is not significant, supporting the success of random sampling in assigning invitation. A typical firm in this industry receives the revenue of approximately 200,000 to 300,000 USD per year and earns the profit of 15,000 to 30,000 USD per year. The total labor cost here includes the imputed costs for the family members. Note that the numbers for 2010 are small relative to other years and also include many negatives in this table as it captures the information of only the first six months of the year. Thus, although some have incurred costs, the sales of the products may have not taken place, particularly before the Christmas season.

4-1-2. Willingness-to-pay

Table 4 reports the respondents' willingness-to-pay to participate in classroom and onsite training programs for two groups and for both before and after the classroom training. We have found that before the training program, their willingness-to-pay were not statistically different between the two groups both for the classroom and onsite training programs. About fifteen to twenty percent of the respondents in both groups answered "Yes definitely"

to pay three million VND (approximately 156 USD) to participate in the classroom training, while the proportion was slightly lower for the onsite training program in the range of five to ten percent.

However, after the program, we find that the proportion of respondents in the treatment group who answered "Yes, definitely" to classroom training increased dramatically, from twenty to fifty percent.   Among the control group, the increase in the proportion was minor, from fourteen to seventeen percent.   The difference in their answer between these two groups is statistically significant at one percent level.   This significant increase is most likely due to the change in their perception on the usefulness of such classroom training program, after they have actually participated.

4-1-3. Business practices

Tables 5 to 10 report various business practices adopted by knitwear firms.   We observe from Table 5 that presents the firm's practice of keeping business records in detail that the proportion of firms which separate household and firm's expenses was significantly lower for the treatment group at five percent (vs. fourteen percent for control group) before the classroom training.   However, the proportion increased for the treatment group after the training, probably due to their learning from training, and the difference between the two groups became insignificant ex post.   The last row presents the score for the business records, i.e., the total number of cases in which record is kept.   The scores were again not statistically different between the two groups both before and after the training.

Table 6 shows the practices on sales promotion.   The last row shows whether the company issues invoices with their names, and this proportion for the treatment group increased greatly after the training from fifty-five percent to sixty-six percent.   The increase in the control group was only by one percent.   The difference between the two groups became statistically significant at three percent level.

Table 7 shows the practices of quality improvement.   We did not find important changes in the adoption of these practices before and after the training in both groups, except for whether or not to inform quality defects to all workers.   In the treatment group, the proportion increased from twenty-four percent to thirty-four percent while it remained the same at eighteen percent for control group.   The difference between the two groups became significant after the training program.

Practices for marketing strategy are summarized in Table 8.   Firm owners tend to recognize their strength relative to their competitors (about eighty percent in both groups) and

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their pricing approach (as high as ninety-seven percent), while they do not seem to know their customers well (two percent). The proportion of owners who have specific sales target increased greatly for the treatment group from thirty-three percent to sixty percent after the training, while it only increased by one percent for the control group. As a result, the difference became statistically significant at two percent level. The total score for the marketing strategy, however, increased for the treatment group by 0.5 point, while it increased only by 0.02 for control group. Thus, their difference after the training became statistically significant, suggesting the impact of training on their practices.

Table 10 reports the practices for KAIZEN activities. In this table we find many cases of statistical significance in the performance after the training program. Before the program, no company in the treatment group had a shop layout map, but the proportion increased by one percent after the training. For the control group, the proportion remained the same at three percent. Firm owners in the treatment group are more likely to designate a certain place for their major tools after the training. The proportion of those who store major tools in a fixed place without key increased from thirty to sixty percent for the treatment group, while it remained the same at forty percent for the control group. Thus, the difference in the proportion became statistically significant at one percent level after the training. The proportion of raw materials kept in a designated place tripled for the treatment group after the training, while it remained almost the same for the control group. But since the proportion was higher for the control group originally, the difference between the two groups was not significant even ex post. The proportion of raw materials and scraps kept separately increased by six-fold (five to thirty-four percent) for the treatment group but doubled (five to ten percent) for the control group after the training. The difference is thus statistically significant at one percent level.

The likelihood that the workshops are cleaned frequently increased for the treatment group from one to four percent. The dominant practices are to clean the floor when it is necessary, but some companies seem to have adopted daily-cleaning after the training. Frequency of machine maintenance also increased for the treatment group, while the proportion remained the same for the control group, suggesting the impact of training program. The proportion of firms which designate someone for machine maintenance also increased for the treatment group, even though the impact was not reflected in the statistical significance. Frequency of meetings with all production workers to make the communication smooth among the workers also increased for the treatment group, whereas it remained the same for the control group. The difference is statistically significant at ten

percent level after the training.   Finally, the total score for the KAIZEN activities increased by one point from 2.6 to 3.6 for the treatment group, while it increased only by 0.06 point from 2.91 to 2.97 for the control group after the training program.   Overall, owners in the treatment group seem to have adopted KAIZEN practices well after the training.

4-2. Short-run impacts of the classroom training

4-2-1. Who participated in the program?

As aforementioned, while the invitation to the training is randomly offered, the actual participation in the training depends upon individual's decision.   Thus, it would be worthwhile to examine who tend to self-select and participate in the training programs given the random invitation.   Table 11 shows the probit estimation on the status of participation in classroom training.   In all models, we find that the owner's age and gender are statistically significant, suggesting that it is younger male owners who tend to participate in the classroom training.   Male owners are about twenty percent more likely to participate in the training program given the invitation.   Being younger by one year increases the probability of participating by one to two percent.   In columns (3) and (4), the coefficients of the number of permanent workers in the previous year are positive and significant, indicating that the larger the employment size, the more likely that the owners participate in the training program.   The possible reasons could be that because of the larger scale of operation, the owners feel more profitable to manage the business better.   The coefficients of education and the number of relatives abroad are negative in all models.   Although they are not significant, they may be weakly suggesting that the ones with more education and better connection to world market do not feel the need to learn business management.

Table 12 shows the estimates of the same models as in Table 6-10 with a different dependent variable, i.e., the number of days attended.   We used the two-limit Tobit estimation here as the dependent variable is restricted between zero and fifteen days.   We again find that the effect of the owner's age is negative and statistically significant, suggesting that younger owners tend to attend more often.   It could be due to the lower opportunity cost for these younger owners or simply because they are more eager to learn given their longer expected horizon.

4-2-2. Willingness-to-pay for participating in trainings

Tables 13 and 14 report the regression results on the estimation of the respondents' willingness-to-pay to participate in classroom and training programs.   As previously

mentioned, when the answer to the question was "yes," we asked them a follow-up question to examine the certainty of their answer. The dependent variables in models in columns (1) and (3) are equal to one if their answers were "yes" for the first question and "definitely" in the second question, and equal to zero otherwise. In columns (2) and (4), the dependent variables equal to one if their answer to the first question were "yes" and equal to zero otherwise.

As expected from the results of the descriptive Table 4, we find that having participated in the training program indeed increases their willingness to pay for the trainings. The impacts are consistently positive for all four models, while they are statistically significant at one percent level for the classroom training (both for "yes definitely" and "yes" in column (1) and (2)) and at ten percent level for "yes definitely" for onsite training. The same results are obtained in both RE-IV and FE-IV, i.e., the results are robust even when all the time-invariant fixed effects of individuals were taken into account. The magnitude of coefficient was higher for those who answered "yes definitely" than those who answered "yes." Those who have participated in the training program changed their perception about the value of obtaining new knowledge on managerial skills after the training. Interestingly, their change in the perception also increased their willingness-to-pay for the onsite trainings, which they have not experienced yet. These results are consistent with our a priori prediction about the demand for knowledge.

In Table 14, we used the percentage of attendance to the classroom training instead of the zero-one participation status to examine whether the difference in the degree of commitment (or seriousness/eagerness to learn new knowledge) matters to their willingness-to-pay. We again find that the coefficients on "% attendance x after" are consistently positive for all models, while they are statistically significant at one percent level for classroom training (both for "yes definitely" and "yes") and at ten percent level for "yes definitely" of onsite training. Again, the results are robust to the choice of RE-IV model or FE-IV model. The results here confirm our prior hypothesis that having exposed to new knowledge on managerial skills and understood the value of obtaining it, firm owners increase their demand for new knowledge.

4-2-3. Firm's performance

Tables 15 to 17 show the results of the regressions on the firm's performance variables, using the log of revenue, log of value-added, and log of profit, respectively, as dependent variables. As the information in 2010 was only for the first six months and not

comprehensive as discussed earlier, we only used data in years 2008 and 2009. The first column shows the base model, while the second to fourth columns add scores for the business practices as an explanatory variable. First note that in all these models treatment variable is insignificant, indicating that the randomization of invitation was successfully done. Also in all models, the numbers of relatives abroad and the years of firm's operation have positive and statistically significant effects on the revenue at one or five percent level. Having one more relative abroad contributes to increasing the revenue by as much as fifty percent, while having one more year of operation increases revenue by five percent. In model (1), the effect of previous training experience is also positive and statistically significant, showing the effect of increasing the revenue by seventy-five percent *ceteris paribus*. Although the significance level becomes lower, the training experience is consistently positive and significant in models (3) and (4). The magnitudes of coefficients are also less in the range of thirty-five to forty-five percent. Overall, we find the training experience has positive effects on the firm's performance.

Columns (2) to (4) include scores for business practices. As correlation between business records and KAIZEN activities was about 0.45, including both of these variables in the same regression may introduce a high multicollinearity. Thus, we estimated alternative models excluding either variable in columns (3) and (4). While all the scores are positive in all models, scores for business records and KAIZEN activities in particular are statistically significant, at one or five percent levels. These provide some evidence on the link between these business practices and firm's performance and the positive relations between them. Thus, the adoption of each business practice merits attention especially when the analysis is on the short-run impact and it is difficult to observe the monetary impact, which typically takes time to realize.

Table 16 shows the same regression using a different measure of performance, the log of value-added, as the dependent variable. As may be expected, similar results were obtained. The effect of the number of relatives was positive and statistically significant at one percent level in all models. The previous training experience is not significant, although the coefficients remain positive. The coefficients of years of operation are also positive but statistically significant only in column (1). The effects of the scores for business records are again positive and statistically significant, but other scores were not.

Table 17 uses the log of profit as the dependent variable. The results are similar to Table 16. The number of relatives abroad (i.e., having more connection to global markets) is consistently significant through all the models in the three tables, and this seems to be the

key in achieving high performance in this sector, as was found by Nam, Sonobe, and Otsuka (2010).

4-2-4. Firm's business practices

Tables 18 to 25 present estimation results of the impact of training program on business practices, utilizing the panel data and controlling for various factors. Since the participation is endogenous in the model, we instrument it with the randomly-offered invitation status. We do not report the first-stage regressions here, but we would like to point out that the instrumental variable (treatment) is significant. We estimated the random-effects-IV (RE-IV) model and fixed-effects-IV (FE-IV) model for each dependent variable of business practice. For the FE-IV, we only report the most important coefficient, which is the interaction term of participation status and time dummy indicating the participation after training, as other variables except for dummy for post-program survey ("after") are time-invariant and thus dropped.

The impacts of training on the business record practices are reported in Table 18. We find that "the participation x after variable," which shows the difference-in-differences impact of the training, was positive and statistically significant in column (1), suggesting the positive impact of training on separating the household's and firm's expenses. It was significant in both RE-IV and FE-IV, indicating that this positive impact of training is robust, taking into account all the time-invariant fixed effects of the individual. This variable was also positive in other models between columns (2) to (4), which examine whether the firm keeps records of purchase, inventory, and wage payment. Among other control variables, years of education was positive and significant in all models, showing that the better educated owners adopt these practices more actively. Previous training dummy was positive and significant in column (1), which examines whether the owner separates the household and business expenses.

The impacts on sales promotion practices are shown in Table 19. In these models, the participation x after term was positive and statistically significant in column (4), indicating that the training had impacts of increasing the proportion of those firms which issue invoices with the company's names. The result is robust for both the RE-IV and FE-IV estimations. In this table, the number of relatives abroad is positive and statistically significant in columns (1), the expense on advertisement, and (2), having a signboard in front of the shop. These results show that those well-connected respondents tend to spend more on the sale promotion activities. Training experience is also positive and significant in column (2), suggesting the

positive impact of training on the adoption of sales promotion practices.

The impacts on quality improvements are reported in Table 20. In this table, we find that the training impact was significantly positive in column (3), which is concerned with the question of whether the owner tells quality defects to all workers, and column (4), which is related to the question of whether the customers' complaints are recorded. These results are robust in both RE-IV and FE-IV. In other models, the coefficients of the training are all positive but their statistical significance levels were lower. Among other variables, we find that the previous training experience is positive in keeping records of quality defect (column (2)), having been born in the village has positive effects on informing the quality defects to all workers (column (3)), and younger owners and firms with longer years of operation tend to keep record of workers' attendance.

The impacts on marketing strategy are examined in Table 21. Here we find positive and statistically significant impacts of training on all outcome variables except for the model (2). After having participated in the training program, the owners tend to become better at describing the strength of their workshops, have sales target and are able to describe it clearly, and prepare growth plans and are able to describe them clearly. These results are again robust to the choice of RE-IV or FE-IV estimations. Among other control variables, previous experience of training has positive and statistically significant effects on having specific sales target and growth plans. Considering that the outcome variables in this table are mostly related to the awareness of the owner on the importance of marketing and planning, it can be said that participation in classroom training programs have direct and quick impacts on these cognitive factors.

The regression analyses of the impacts on KAIZEN activities are presented in Tables 22 to 24. The positive impacts of classroom trainings are observed in many dimensions of KAIZEN activities, such as keeping the major tools or raw materials in designated places (column (2) and (3) in Table 22), segregating raw materials and scraps clearly (column (4) in Table 22), cleaning the floor in the workshops frequently (column (3) in Table 23), maintaining machines frequently (column (4) in Table 23), and holding meetings with all workers (column (2) and (3) in Table 24). By nature, KAIZEN activities are relatively simple, not costly, and, hence, quick to be implemented. We believe that this is the main the reason why we found positive impacts of training on many of KAIZEN activities even in the short-run.

Among other explanatory variables, education has positive and significant effects on many of the KAIZEN practices, such as whether major tools and raw materials are kept in

designated places, raw materials and scraps are kept separately, someone is designated for maintenance of all activities, and meetings are held with all workers. Previous training experience also has positive impacts on having workshop layout map, keeping raw materials in designated places, storing raw materials and scraps separately, designating someone for maintenance of all activities, and holding meetings with all workers.

Table 25 summarizes these training impacts on various business practices using scores. We clearly confirm that the training impacts are indeed very strong – they are consistently positive and statistically significant in the all the cases at one percent level. This is important evidence that demonstrate that those who have participated in the training program have actually altered their business practices shortly after the training. These scores are positively associated with firms' long-run performance measures such as revenue, value-added, and gross profit. Thus, in the long-run, we could expect that these changes in their business practices are likely to exert positive impacts on their performances.

5. Summary and concluding remarks

The analysis of the knitwear village in Hatay, Vietnam shows that the participants in the classroom training have changed their valuation of learning new knowledge about business management after the training. This change in their perception about the value of obtaining new knowledge due to classroom training participation also affected their valuation about the onsite training program, even though they have not experienced at the time of post-program survey. We also found that the various business practices have positive effects on firms' performance indicators. It is also interestin that by participating in the classroom training, the participants have actually changed many of their business practices after training

In short, the entrepreneurs in our sample in the study site knew little about standard business practices and attached low value to learning management, but the training program has improved the participants' business practices and their recognition of the importance of management knowledge, which influences the nonparticipants' recognition to some extent through spillover effects. The effects of these programs on business performance may roughly correspond to their short-run private benefits. It is possible to estimate, under moderate assumptions, the magnitudes of the spillover effects and market stealing effects, i.e., the benefit of and loss from the training to nonparticipants. We are hoping to carry out a cost-benefit analysis of the management training program. If the social benefit of the training programs proves to exceed the training cost, further experiments will be warranted in order to explore to what extent such findings are generalized and how to combine

management training with other interventions that are intended to contribute to industrial development, such as the provision of low-interest loans to small enterprises and the construction of industrial zones for expanding enterprises.

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Table 1. Sample size, randomized assignment, and participation in Ha Tay

Sample size	161
Treatment group	91
Participants	54
Refusers	37
Control group	70

Table 2. Basic characteristics of firm owners and firms by group

		Treated		Controlled		p-value
		mean	c.v.	mean	c.v.	for *t*-test
Age	years	41.08	0.22	40.77	0.26	0.84
Male	%	36	1.33	37	1.31	0.91
Years of schooling	years	7.91	0.33	8.53	0.38	0.19
Have received training before	%	14	2.46	10	2.97	0.46
Years of operation	years	10.26	0.45	9.47	0.51	0.29
Initial capital	USD	8026.8	1.19	23635.7	2.16	0.01
Number of workers:						
permanent (2008)	#	10.32	1.68	18.53	2.04	0.07
temporary (2008)	#	4.30	1.60	6.01	1.65	0.20
permanent (2009)	#	10.79	1.65	19.04	2.08	0.08
temporary (2009)	#	4.41	1.58	5.77	1.71	0.31
permanent (2010)	#	8.55	2.50	17.27	2.32	0.08
temporary (2010)	#	1.93	2.51	3.16	2.65	0.25

Table 3. Firm's performance in 2008-10 by group (in USD)

	Treated			Controlled			p-value
	mean	median	s.d.	mean	median	s.d.	for *t*-test
2008							
Sales revenue	206614	117000	237836	302138	95700	499200	0.14
Material cost	178694	83730	266524	253025	76200	433328	0.21
Value-added	27920	16218	109134	49113	12645	236679	0.49
Labor cost	15522	6300	52655	15910	6000	30554	0.96
Profit	13812	11778	133410	36042	9348	246147	0.51
2009							
Sales revenue	203937	136200	208585	279630	104595	413539	0.16
Material cost	167775	92442	218924	252513	86673	422931	0.13
Value-added	36162	23982	127648	27117	8496	194638	0.74
Labor cost	17367	8400	49298	18646	7920	36448	0.86
Profit	19435	18696	150727	10134	5190	216359	0.77
2010							
Sales revenue	41971	0	143349	84664	2850	198106	0.13
Material cost	47004	12245	157957	88440	14210	186789	0.14
Value-added	-5033	-2253	72280	-3776	-2435	79734	0.92
Labor cost	6528	2050	20397	7585	1890	19491	0.75
Profit	-11454	-3318	84966	-10651	-2648	86810	0.96

Table 4. Means of willingness-to-pay by group (%)

	Treated		Controlled		p-value for *t*-test	
	Before	After[a]	Before	After[a]	Before	After[a]
Classroom Training						
Yes definitely sure	19.8	50.5	14.3	17.1	0.357	0.000

[a] After the classroom training program but before the onsite training program.

Table 5. Means of business recordkeeping practices by group

	used for score		Treated		Controlled		p-value for *t*-test	
			Before	After	Before	After	Before	After
Separate expenses for HH and business	1	%	5.5	14.3	14.3	15.7	0.073	0.803
Keep records of:								
sales	1	%	100	100	100	100	-	-
purchases	1	%	96.7	97.8	94.2	92.8	0.464	0.153
inventory	1	%	11.0	14.4	15.7	15.7	0.390	0.826
wage payment	1	%	84.6	85.6	78.6	78.6	0.334	0.261
debt and its payment	1	%	100		100			
Score for business records[a]								
Mean	6		3.978	4.124	4.029	4.044	0.680	0.559
C.V.			0.154	0.182	0.217	0.224		

[a] The total number of cases in which record was kept.

Table 6. Means of sales promotion activities by group

		Treated		Controlled		p-value for *t*-test	
		Before	After	Before	After	Before	After
Expenses on advertisement	mil. VND	0.220	0.220	2.186	2.029	0.178	0.218
Have signboards in front of shop	%	8.8	11.0	12.9	15.7	0.419	0.390
# of signboards in city	#	0.011	0.066	0.071	0.114	0.122	0.516
Issue invoices/receipts with enterprise name	%	54.9	65.9	47.1	48.6	0.330	0.028

Table 7. Means of quality improvement practices by group[a]

	used for score	Treated		Controlled		p-value for *t*-test	
		Before	After	Before	After	Before	After
Third-party (other than the worker himself) quality inspection done before sales	1	94.5	98.9	97.1	98.6	0.401	0.855
Keep records of quality defect	1	2.2	5.5	7.1	8.6	0.157	0.459
Inform cases of quality defect to all workers	1	24.2	34.1	18.6	18.6	0.390	0.025
Keep records of customers' complaints		2.6	13.9	8.5	8.2	0.197	0.303
Keep records on the workers' attendance	1	80.2	81.3	81.4	81.4	0.848	0.986
Score for quality improvement:							
Mean	4	2.011	2.198	2.043	2.071	0.763	0.238
C.V.		0.327	0.320	0.327	0.311		

[a]The numbers are percentages except for scores, which is the total number of cases in which owner's answer was positive.

Table 8. Means of marketing strategies by group[a]

	used for score	Treated		Controlled		p-value for *t*-test	
		Before	After	Before	After	Before	After
Owner knows the types of their customers well	1	2.2	2.2	0.0	0.0	0.158	0.158
Owner is aware of their strengths relative to their competitors	1	74.7	83.5	80.0	80.0	0.429	0.572
Owner knows his pricing approach well	1	96.7	97.8	98.6	98.6	0.430	0.715
Owner has sales or profit target in this year	1	33.0	60.0	40.0	41.4	0.363	0.020
If yes, that target is described well		40.0	46.3	39.3	41.4	0.957	0.672
Owner has specific plans for growth in coming years	1	31.9	40.7	34.3	34.3	0.749	0.410
If yes, that plan is described well		17.2	23.7	25.0	25.0	0.504	0.909
Score for marketing strategy:							
Mean	5	2.385	2.844	2.529	2.543	0.324	0.042
C.V.		0.394	0.341	0.355	0.346		

[a] The numbers are percentages except for scores

Table 9. Means of financial management by group[a]

	used for score	Treated Before	Controlled Before	p-value for *t*-test Before
Sell through internet	1	0.0	0.0	-
Sales revenue paid before or on delivery	1	59.8	59.0	0.868
Payment to materials paid before or on delivery	1	90.9	91.5	0.843
Score for finance management:				
Mean	3	1.502	1.501	0.978
C.V.		0.234	0.251	

[a] The numbers are percentages except for scores, which is the total number of cases in which owner's answer was positive.

Table 10. Comparison of KAIZEN practices between group[a]

	used for score	Treated 1 year ago	Treated Current	Controlled 1 year ago	Controlled Current	p-value for *t*-test 1 yr ago	p-value for *t*-test Current
Have workshop layout map	1	0.0	1.1	2.9	2.9	0.159	0.444
Major tools stored in a fixed place with key	1	2.2	2.2	2.9	2.9	0.795	0.795
Major tools stored in a fixed place without key		30.8	60.4	40.0	40.0	0.229	0.010
Major tools not stored in a fixed place		67.0	37.4	57.1	57.1	0.204	0.013
Raw materials kept in designated place	1	5.5	15.4	11.4	12.9	0.192	0.649
Raw materials and scraps kept separately	1	5.5	34.1	5.7	10.0	0.953	0.000
Work flow line is very efficiently determined	1	4.4	4.4	7.1	7.1	0.469	0.469
Removes scrap and cleans the floor							
Daily		1.1	4.4	0.0	0.0	0.320	0.045
Weekly	2	0.0	1.1	0.0	0.0		0.320
Monthly		1.1	1.1	0.0	0.0	0.320	0.320
When needed	1	97.8	93.4	100	100	0.158	0.014
Workers maintain machines							
Daily		3.3	8.9	4.3	4.3	0.759	0.237
Weekly	2	1.1	4.4	2.9	2.9	0.448	0.593
Monthly		1.1	3.3	0.0	0.0	0.320	0.083
When needed	1	94.4	83.3	92.9	92.9	0.688	0.060
Have someone for machine maintenance*	1	3.3	5.5	4.3	4.3	0.749	0.724
Hold meetings with all the production worker:							
Weekly	2	0.0	0.0	1.4	1.4	0.321	0.321
When needed	1	2.2	15.4	7.1	7.1	0.157	0.095
Never		97.8	84.6	91.4	91.4	0.089	0.182
Score for KAIZEN activities:							
Mean	15	2.611	3.622	2.914	2.971	0.189	0.015
C.V.		0.493	0.489	0.531	0.531		

[a] The numbers are percentages except for scores, which is the total number of cases in which owner's answer was positive.

Table 11. Estimated Probit models of the classroom training participation of the invited entrepreneurs[a]

	(1)	(2)	(3)	(4)
	Participation in Classroom Training			
Age	-0.015**	-0.014**	-0.020***	-0.019**
	(2.12)	(2.05)	(2.62)	(2.47)
Male	0.210*	0.216*	0.193*	0.197*
	(1.83)	(1.90)	(1.66)	(1.69)
Education	-0.007	-0.007	-0.026	-0.022
	(0.30)	(0.29)	(1.02)	(0.87)
Born in the village	0.038	0.018	0.022	0.173
	(0.12)	(0.06)	(0.06)	(0.44)
# relatives abroad	-0.106	-0.104	-0.119	-0.069
	(1.00)	(0.99)	(1.21)	(0.68)
Training experience	0.028	0.018	-0.091	-0.058
	(0.17)	(0.11)	(0.53)	(0.32)
Years of operation	0.004	0.002	0.000	-0.016
	(0.33)	(0.15)	(0.02)	(1.09)
Revenue (09, mil.usd)		0.235	-0.157	-0.110
		(0.85)	(0.46)	(0.31)
# permanent workers (09)			0.013*	0.016*
			(1.74)	(1.82)
Initial capital (000usd)				-0.016**
				(2.32)
Observations	91	91	91	91
Pseudo R-squared	0.07	0.07	0.10	0.14
Wald chi2	7.97	9.19	12.11	16.42*

[a] Reported coefficients are marginal effects.

Robust z-statistics are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 12. Estimated two-limit Tobit models of the classroom training attendance of the invited entrepreneurs[a]

	Number of days attended			
	(1)	(2)	(3)	(4)
Age	-0.186**	-0.181**	-0.241**	-0.225**
	(2.19)	(2.16)	(2.57)	(2.38)
Male	1.620	1.651	1.268	1.235
	(1.18)	(1.21)	(0.93)	(0.90)
Education	-0.132	-0.129	-0.325	-0.263
	(0.44)	(0.43)	(1.03)	(0.83)
Born in the village	-1.635	-1.793	-1.379	0.875
	(0.56)	(0.62)	(0.39)	(0.20)
# relatives abroad	-1.643	-1.631	-1.766	-1.093
	(1.00)	(0.99)	(1.14)	(0.70)
Training experience	0.180	0.065	-1.386	-1.035
	(0.08)	(0.03)	(0.57)	(0.43)
Years of operation	0.084	0.065	0.040	-0.196
	(0.54)	(0.42)	(0.26)	(1.11)
Revenue (09, mil.usd)		2.289	-2.430	-1.662
		(0.73)	(0.65)	(0.43)
# permanent workers (09)			0.150	0.182*
			(1.59)	(1.73)
Initial capital (000usd)				-0.219***
				(2.87)
Observations	91	91	91	91
Pseudo R-squared	0.02	0.02	0.03	0.05
F-statistics	0.89	0.85	0.98	1.49

[a] Reported coefficients are censored marginal effects.

  Robust *z*-statistics are in parentheses.

   * significant at 10%; ** significant at 5%; *** significant at 1%

Table 13. Impacts of classroom training participation on the willingness-to-pay (FE-IV/RE-IV) [a]

	Classroom	
	Yes definitely	Yes
	(1)	(2)
FE-IV		
Participation x After	0.469***	0.346***
	(5.37)	(4.35)
RE-IV		
Participation x After	0.469***	0.346***
	(5.37)	(4.35)
Participation	0.088	0.213**
	(0.87)	(1.96)
Age	-0.001	-0.001
	(0.38)	(0.33)
Male	-0.006	-0.064
	(0.11)	(0.98)
Education	0.007	0.014
	(0.64)	(1.16)
Born in the village	0.202	0.287*
	(1.40)	(1.82)
Relatives abroad	-0.025	-0.008
	(0.62)	(0.18)
Training experience	0.038	-0.027
	(0.45)	(0.30)
Years of operation	0.001	0.000
	(0.08)	(0.07)
After dummy	0.029	0.015
	(0.75)	(0.41)
Constant	-0.066	-0.153
	(0.28)	(0.59)
Observations	318	318
Number of ID	159	159
Wald chi2	103.77	74.18
Prob>chi2	0.00	0.00

[a] Absolute values of z-statistics are in parentheses.
  * significant at 10%; ** significant at 5%; *** significant at 1%.
  These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 14. Impacts of classroom training attendance on the willingness-to-pay (FE-IV/RE-IV) [a]

	Classroom	
	Yes definitely	Yes
	(1)	(2)
FE-IV		
%Attendance x after	0.004***	0.003***
	(5.23)	(4.27)
RE-IV		
%Attendance x After	0.004***	0.003***
	(5.23)	(4.27)
%Attendance	0.001	0.002*
	(0.84)	(1.89)
Age	-0.001	-0.001
	(0.42)	(0.38)
Male	0.012	-0.042
	(0.20)	(0.63)
Education	0.006	0.013
	(0.54)	(1.04)
Born in the village	0.199	0.284*
	(1.34)	(1.73)
Relatives abroad	-0.024	-0.007
	(0.58)	(0.15)
Training experience	0.047	-0.016
	(0.54)	(0.17)
Years of operation	0.000	0.000
	(0.06)	(0.04)
After dummy	0.026	0.012
	(0.63)	(0.32)
Constant	-0.056	-0.142
	(0.23)	(0.53)
Observations	318	318
Number of ID	159	159
Wald chi2	98.28	70.66
Prob>chi2	0.00	0.00

a Absolute values of *z*-statistics are in parentheses.
 * significant at 10%; ** significant at 5%; *** significant at 1%.
 These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 15: Estimated random effect models of sales revenue[a]

	ln (revenue)			
	(1)	(2)	(3)	(4)
Treatment (invited)	0.231	0.205	0.168	0.262
	(1.27)	(1.19)	(0.97)	(1.44)
Age	-0.010	-0.021**	-0.017*	-0.017
	(0.93)	(2.12)	(1.72)	(1.57)
Male	0.153	-0.027	0.007	0.067
	(0.88)	(0.16)	(0.04)	(0.39)
Education	0.051	-0.035	-0.018	0.012
	(1.53)	(1.02)	(0.52)	(0.34)
Born in the village	0.213	0.023	0.110	-0.044
	(0.38)	(0.04)	(0.23)	(0.07)
# relatives abroad	0.506***	0.401***	0.400***	0.468***
	(3.78)	(3.16)	(3.28)	(3.26)
Training experience	0.744***	0.347	0.423*	0.470*
	(2.87)	(1.58)	(1.86)	(1.91)
Years of operation	0.055***	0.046**	0.046**	0.050**
	(2.67)	(2.39)	(2.35)	(2.47)
Year 2009[b]	-0.090*	-0.063	-0.067	-0.072
	(1.86)	(1.25)	(1.32)	(1.44)
Scores for:				
Business records		0.604***	0.666***	
		(3.95)	(4.52)	
Quality improvement		0.037	0.069	0.146
		(0.24)	(0.44)	(1.01)
Marketing strategy		0.016	0.024	0.110
		(0.17)	(0.25)	(1.17)
Financial management		0.163	0.152	0.059
		(0.66)	(0.62)	(0.23)
KAIZEN activities		0.136**		0.202***
		(2.16)		(3.09)
Constant	10.663***	9.071***	8.741***	10.401***
	(12.07)	(8.54)	(8.70)	(9.74)
Observations	313	299	301	301
Number of ID	158	151	152	152
Wald chi2	49.71***	129.78***	103.96***	64.67***

[a] Robust z-statistics are in parentheses.
  * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 16. Estimated random effect models of value-added[a]

| | ln (value-added) | | | |
	(1)	(2)	(3)	(4)
Treatment (invited)	0.363	0.311	0.282	0.398
	(1.48)	(1.25)	(1.16)	(1.53)
Age	-0.016	-0.023*	-0.023	-0.019
	(1.06)	(1.68)	(1.59)	(1.30)
Male	0.150	0.022	0.047	0.096
	(0.64)	(0.09)	(0.20)	(0.39)
Education	0.016	-0.064	-0.067	-0.007
	(0.24)	(1.05)	(1.09)	(0.10)
Born in the village	0.833**	0.767*	0.777*	0.673
	(2.02)	(1.79)	(1.76)	(1.44)
# relatives abroad	0.650***	0.542***	0.545***	0.617***
	(4.17)	(3.43)	(3.47)	(3.71)
Training experience	0.418	0.081	0.125	0.247
	(1.25)	(0.23)	(0.36)	(0.69)
Years of operation	0.049*	0.037	0.035	0.042
	(1.77)	(1.37)	(1.32)	(1.50)
Year 2009[b]	0.034	0.082	0.075	0.072
	(0.43)	(1.04)	(0.96)	(0.89)
Scores for:				
Business records		0.675***	0.694***	
		(3.54)	(3.81)	
Quality improvement		0.003	0.012	0.201
		(0.02)	(0.07)	(1.05)
Marketing strategy		-0.011	-0.016	0.094
		(0.10)	(0.13)	(0.75)
Financial management		0.326	0.301	0.173
		(0.97)	(0.90)	(0.47)
KAIZEN activities		0.036		0.102
		(0.35)		(0.92)
Constant	9.101***	7.130***	7.182***	8.491***
	(8.03)	(5.97)	(5.80)	(6.46)
Observations	238	226	228	227
Number of ID	130	123	124	124
Wald chi2	30.75***	59.93***	59.23***	33.89***

[a] Robust z-statistics are in parentheses.

  * significant at 10%; ** significant at 5%; *** significant at 1%.

[b] Base year is 2008.

Table 17. Estimated random effect models of gross profit[a]

				ln (profit)
	(1)	(2)	(3)	(4)
Treatment (invited)	0.315	0.210	0.154	0.316
	(1.05)	(0.71)	(0.53)	(1.03)
Age	-0.007	-0.017	-0.014	-0.013
	(0.43)	(1.04)	(0.88)	(0.78)
Male	0.010	-0.126	-0.092	-0.070
	(0.03)	(0.42)	(0.31)	(0.23)
Education	0.031	-0.046	-0.049	0.000
	(0.43)	(0.67)	(0.72)	(0.00)
Born in the village	1.063	1.088	1.185	0.836
	(1.64)	(1.42)	(1.52)	(1.14)
# relatives abroad	0.641***	0.554***	0.570***	0.583***
	(4.38)	(3.32)	(3.48)	(3.55)
Training experience	0.483	0.266	0.316	0.368
	(1.38)	(0.66)	(0.82)	(0.92)
Years of operation	0.078**	0.056	0.051	0.068*
	(2.20)	(1.61)	(1.44)	(1.95)
Year 2009[b]	-0.120	-0.060	-0.072	-0.072
	(1.15)	(0.59)	(0.71)	(0.70)
Scores for:				
Business records		0.474**	0.544**	
		(2.11)	(2.51)	
Quality improvement		0.084	0.103	0.190
		(0.36)	(0.45)	(0.77)
Marketing strategy		-0.084	-0.090	0.019
		(0.57)	(0.60)	(0.13)
Financial management		0.089	0.054	0.020
		(0.20)	(0.12)	(0.04)
KAIZEN activities		0.111		0.179
		(0.77)		(1.30)
Constant	8.120***	7.187***	7.123***	8.031***
	(6.12)	(4.21)	(4.12)	(5.23)
Observations	215	204	206	205
Number of ID	120	113	114	114
Wald chi2	30.82***	38.95***	39.88***	29.73***

[a] Robust *z*-statistics are in parentheses.
  * significant at 10%; ** significant at 5%; *** significant at 1%.
  In computing profit, the cost of family labor is imputed.
[b] Base year is 2008.

Table 18. Impacts of classroom training participation on business recordkeeping practices (FE-IV/ RE-IV) [a]

	Separate expenses for HH & business	Purchase	Keep records of: Inventory	Wage Payment
	(1)	(2)	(3)	(4)
FE-IV				
Participation x After	0.123**	0.044	0.056	0.019
	(2.05)	(1.43)	(1.54)	(0.87)
RE-IV				
Participation x After	0.123**	0.044	0.056	0.018
	(2.05)	(1.43)	(1.53)	(0.86)
Participation	-0.095	0.044	-0.025	0.101
	(1.27)	(0.77)	(0.31)	(1.00)
Age	0.002	0.001	0.007**	0.001
	(0.70)	(0.80)	(2.45)	(0.23)
Male	0.149***	-0.029	0.165***	-0.050
	(3.35)	(0.83)	(3.23)	(0.77)
Education	0.023***	0.011*	0.041***	0.032***
	(2.80)	(1.66)	(4.25)	(2.66)
Born in the village	-0.121	0.163*	0.004	0.028
	(1.12)	(1.90)	(0.04)	(0.18)
# relatives abroad	-0.003	0.023	0.057	0.042
	(0.11)	(0.93)	(1.63)	(0.95)
Training experience	0.305***	0.030	0.097	-0.013
	(4.86)	(0.60)	(1.34)	(0.14)
Years of operation	-0.003	-0.001	-0.001	0.016**
	(0.68)	(0.29)	(0.14)	(2.35)
After dummy	0.015	-0.015	-0.000	0.000
	(0.54)	(1.08)	(0.00)	(0.00)
Constant	-0.086	0.649***	-0.542***	0.321
	(0.49)	(4.63)	(2.68)	(1.25)
Observations	318	316	317	317
Number of ID	159	158	159	159
Wald chi2	77.05	10.59	65.85	16.13
Prob>chi2	0.00	0.39	0.00	0.10

[a] Absolute values of *z*-statistics are in parentheses.
 * significant at 10%; ** significant at 5%; *** significant at 1%.
 These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 19. Impacts of classroom training participation on sales promotion activities (FE-IV/ RE-IV) [a]

	Expense on advertisement (1)	Signboard in front of shop (2)	# signboards in city (3)	Invoice with enterprise's name (4)
FE-IV				
Participation x After	0.327	-0.013	0.018	0.160**
	(1.16)	(0.29)	(0.17)	(2.46)
RE-IV				
Participation x After	0.324	-0.013	0.018	0.160**
	(1.13)	(0.29)	(0.17)	(2.46)
Participation	-2.928	-0.014	-0.107	0.193
	(1.40)	(0.18)	(1.09)	(1.42)
Age	0.076	0.007***	0.004	0.001
	(1.08)	(2.74)	(1.62)	(0.25)
Male	1.895	-0.003	0.051	0.142*
	(1.41)	(0.07)	(0.97)	(1.68)
Education	0.366	0.033***	0.015	0.001
	(1.46)	(3.76)	(1.51)	(0.05)
Born in the village	6.261*	0.175	0.219*	-0.176
	(1.92)	(1.55)	(1.72)	(0.85)
# relatives abroad	2.799***	0.070**	0.036	0.077
	(3.04)	(2.21)	(1.00)	(1.32)
Training experience	3.014	0.260***	0.219***	0.066
	(1.59)	(3.96)	(2.95)	(0.55)
Years of operation	-0.107	-0.004	-0.011*	0.000
	(0.75)	(0.71)	(1.88)	(0.05)
After dummy	-0.192	0.029	0.044	0.015
	(1.49)	(1.53)	(0.90)	(0.50)
Constant	-10.421**	-0.615***	-0.386*	0.485
	(1.96)	(3.34)	(1.85)	(1.45)
Observations	317	318	318	318
Number of ID	159	159	159	159
Wald chi2	30.31	59.11	27.26	31.68
Prob>chi2	0.00	0.00	0.00	0.00

[a] Absolute values of *z*-statistics are in parentheses.
  * significant at 10%; ** significant at 5%; *** significant at 1%.
  These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 20. Impacts of classroom training participation on quality improvement practices (FE-IV/ RE-IV) [a]

	Third-party quality inspection (1)	Record quality defect (2)	Tell defects to all workers (3)	Record customers' complaint (4)	Record workers' attendance (5)
FE-IV					
Participation x After	0.049	0.031	0.167**	0.191**	0.019
	(1.03)	(0.73)	(2.51)	(2.55)	(0.87)
RE-IV					
Participation x After	0.049	0.031	0.167**	0.189**	0.019
	(1.03)	(0.73)	(2.51)	(2.51)	(0.87)
Participation	-0.039	-0.083	0.107	-0.105	-0.011
	(0.86)	(1.42)	(0.92)	(1.24)	(0.10)
Age	-0.002	0.002	0.004	-0.002	-0.007**
	(1.54)	(1.29)	(1.11)	(0.61)	(1.96)
Male	0.039	0.028	-0.045	0.018	0.050
	(1.56)	(0.79)	(0.62)	(0.36)	(0.73)
Education	-0.002	0.001	0.009	0.007	0.013
	(0.42)	(0.17)	(0.70)	(0.75)	(1.02)
Born in the village	-0.047	0.072	0.320*	-0.066	0.132
	(0.77)	(0.84)	(1.83)	(0.61)	(0.80)
# relatives abroad	0.006	-0.000	0.044	-0.010	0.069
	(0.34)	(0.01)	(0.88)	(0.30)	(1.49)
Training experience	0.001	0.208***	-0.070	0.051	0.098
	(0.03)	(4.20)	(0.69)	(0.70)	(1.02)
Years of operation	0.003	-0.001	-0.003	0.002	0.016**
	(0.94)	(0.27)	(0.43)	(0.49)	(2.25)
After dummy	0.015	0.015	-0.000	-0.001	0.000
	(0.69)	(0.78)	(0.00)	(0.03)	(0.00)
Constant	1.073***	-0.134	-0.325	0.124	0.660**
	(10.71)	(0.97)	(1.14)	(0.69)	(2.46)
Observations	318	318	318	247	318
Number of ID	159	159	159	126	159
Wald chi2	11.13	27.88	22.16	19.37	17.38
Prob>chi2	0.35	0.00	0.01	0.04	0.07

[a] Absolute values of *z*-statistics are in parentheses.
  * significant at 10%; ** significant at 5%; *** significant at 1%.
  These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 21. Impacts of classroom training participation on marketing strategies (FE-IV/ RE-IV) [a]

	Strength of workshop described clearly (1)	Pricing approach described clearly (2)	Have sales target (3)	Sales target described clearly (4)	Have specific growth plans (5)	Growth plan described clearly (6)
FE-IV						
Participation x After	0.148***	0.019	0.428***	0.278**	0.148**	0.188*
	(2.63)	(0.87)	(4.79)	(2.25)	(2.35)	(1.68)
RE-IV						
Participation x After	0.148***	0.019	0.429***	0.228*	0.148**	0.176
	(2.63)	(0.87)	(4.76)	(1.80)	(2.35)	(1.53)
Participation	-0.082	-0.062*	-0.106	-0.029	-0.048	-0.217
	(0.74)	(1.65)	(0.83)	(0.19)	(0.37)	(1.19)
Age	0.003	-0.003**	0.000	0.005	-0.009**	0.010
	(0.89)	(2.11)	(0.11)	(0.86)	(2.08)	(1.56)
Male	-0.139**	-0.028	0.114	0.135	0.032	0.110
	(2.00)	(1.22)	(1.48)	(1.20)	(0.39)	(0.90)
Education	0.006	-0.000	0.010	0.034*	-0.004	0.000
	(0.45)	(0.11)	(0.70)	(1.71)	(0.30)	(0.02)
Born in the village	0.108	0.261***	-0.046	-0.304	0.278	0.141
	(0.64)	(4.65)	(0.25)	(1.02)	(1.43)	(0.33)
# relatives abroad	0.020	-0.026*	-0.031	0.111	0.024	0.048
	(0.42)	(1.67)	(0.58)	(1.35)	(0.44)	(0.52)
Training experience	0.093	0.031	0.286***	0.044	0.272**	0.130
	(0.95)	(0.96)	(2.63)	(0.34)	(2.40)	(0.95)
Years of operation	-0.005	0.000	0.000	0.013	-0.010	-0.004
	(0.63)	(0.00)	(0.05)	(1.13)	(1.19)	(0.28)
After dummy	-0.000	-0.000	0.015	0.035	0.000	-0.000
	(0.00)	(0.00)	(0.37)	(0.52)	(0.00)	(0.00)
Constant	0.594**	0.865***	0.254	-0.119	0.520	-0.314
	(2.15)	(9.45)	(0.83)	(0.26)	(1.64)	(0.62)
Observations	318	318	317	137	318	113
Number of ID	159	159	159	81	159	61
Wald chi2	22.23	46.40	72.74	27.31	28.46	12.17
Prob>chi2	0.01	0.00	0.00	0.00	0.00	0.27

[a] Absolute values of *z*-statistics are in parentheses.
 * significant at 10%; ** significant at 5%; *** significant at 1%.
 These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 22. Impacts of classroom training participation on kaizen practices I (FE-IV/ RE-IV) [a]

	Have workshop layout map (1)	Major tools stored in a fixed place (2)	Raw materials kept in a fixed place (3)	Raw materials & scraps kept separately (4)
FE-IV				
Participation x After	0.019	0.500***	0.142**	0.407***
	(0.87)	(6.31)	(2.26)	(4.65)
RE-IV				
Participation x After	0.019	0.500***	0.142**	0.407***
	(0.87)	(6.31)	(2.26)	(4.65)
Participation	-0.059*	-0.104	-0.040	-0.027
	(1.76)	(0.85)	(0.54)	(0.35)
Age	0.001	0.003	0.005**	0.002
	(0.83)	(0.81)	(2.32)	(0.87)
Male	0.030	0.126*	0.064	0.104**
	(1.48)	(1.67)	(1.51)	(2.48)
Education	0.004	0.038***	0.034***	0.031***
	(1.03)	(2.69)	(4.26)	(3.93)
Born in the village	0.021	0.043	0.108	0.110
	(0.43)	(0.23)	(1.04)	(1.07)
# relatives abroad	-0.016	0.051	0.044	-0.036
	(1.11)	(0.98)	(1.50)	(1.25)
Training experience	0.099***	-0.025	0.176***	0.160***
	(3.41)	(0.23)	(2.92)	(2.70)
Years of operation	-0.001	0.005	-0.002	0.008*
	(0.53)	(0.62)	(0.51)	(1.90)
After dummy	0.000	-0.000	0.015	0.044
	(0.00)	(0.00)	(0.52)	(1.12)
Constant	-0.066	-0.178	-0.538***	-0.503***
	(0.81)	(0.60)	(3.18)	(3.01)
Observations	318	318	318	318
Number of ID	159	159	159	159
Wald chi2	21.80	112.44	69.68	133.19
Prob>chi2	0.02	0.00	0.00	0.00

[a] Absolute values of *z*-statistics are in parentheses.
  * significant at 10%; ** significant at 5%; *** significant at 1%.
  These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 23. Impacts of classroom training participation on kaizen practices II (FE-IV/ RE-IV) [a]

	Removes scraps & cleans floor:			Maintain machines:		
	Daily	Weekly	When needed	Daily	Weekly	Monthly
	(1)	(2)	(3)	(4)	(5)	(6)
FE-IV						
Participation x	0.056	0.019	-0.074*	0.093**	0.056	0.037
After	(1.53)	(0.87)	(1.79)	(2.03)	(1.54)	(1.24)
RE-IV						
Participation x	0.056	0.019	-0.074*	0.093**	0.056	0.037
After	(1.53)	(0.87)	(1.79)	(2.03)	(1.54)	(1.24)
Participation	0.016	0.001	-0.045	-0.032	-0.034	0.020
	(0.49)	(0.05)	(1.11)	(0.51)	(0.74)	(0.68)
Age	0.001	0.000	0.000	0.003*	0.001	-0.001
	(1.00)	(0.34)	(0.29)	(1.78)	(0.67)	(0.63)
Male	-0.035*	-0.008	0.056**	-0.007	-0.007	-0.019
	(1.93)	(1.20)	(2.46)	(0.19)	(0.25)	(1.11)
Education	0.003	0.002	0.001	-0.004	0.001	0.007**
	(0.83)	(1.36)	(0.19)	(0.57)	(0.25)	(2.10)
Born in the village	0.020	0.008	-0.075	0.028	0.034	0.006
	(0.46)	(0.49)	(1.35)	(0.31)	(0.50)	(0.15)
# relatives abroad	-0.001	-0.000	-0.047***	-0.014	-0.008	-0.002
	(0.10)	(0.10)	(2.99)	(0.57)	(0.44)	(0.17)
Training experience	0.002	-0.007	0.010	0.007	-0.001	-0.037
	(0.10)	(0.71)	(0.32)	(0.14)	(0.03)	(1.57)
Years of operation	0.001	-0.000	0.000	-0.001	-0.001	0.004**
	(0.27)	(0.08)	(0.01)	(0.18)	(0.47)	(2.44)
After dummy	-0.000	-0.000	-0.000	-0.000	0.000	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.073	-0.024	1.039***	-0.076	-0.034	-0.069
	(1.01)	(0.83)	(11.50)	(0.52)	(0.31)	(1.03)
Observations	318	318	318	316	316	316
Number of ID	159	159	159	158	158	158
Wald chi2	11.69	5.39	24.51	15.13	6.58	16.60
Prob>chi2	0.31	0.86	0.01	0.13	0.76	0.08

[a] Absolute values of *z*-statistics are in parentheses.
 * significant at 10%; ** significant at 5%; *** significant at 1%.
 These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 24. Impacts of classroom training participation on KAIZEN practices III (FE-IV/RE-IV) [a]

	Someone designated for maintenance of all machines	Hold meetings with all workers	
		When needed	Never
	(1)	(2)	(3)
FE-IV			
Participation x After	0.037	0.222***	-0.222***
	(1.24)	(3.37)	(3.37)
RE-IV			
Participation x After	0.037	0.222***	-0.222***
	(1.24)	(3.37)	(3.37)
Participation	0.003	-0.041	0.070
	(0.06)	(0.64)	(1.08)
Age	0.003**	0.005**	-0.005***
	(2.08)	(2.50)	(2.67)
Male	0.038	0.035	-0.053
	(1.27)	(1.00)	(1.46)
Education	0.024***	0.020***	-0.022***
	(4.28)	(3.02)	(3.24)
Born in the village	0.087	0.137	-0.146*
	(1.20)	(1.62)	(1.66)
# relatives abroad	-0.007	0.016	-0.007
	(0.35)	(0.65)	(0.30)
Training experience	0.090**	0.118**	-0.169***
	(2.15)	(2.40)	(3.32)
Years of operation	0.001	-0.001	0.002
	(0.46)	(0.29)	(0.39)
After dummy	-0.000	-0.000	0.000
	(0.00)	(0.00)	(0.00)
Constant	-0.415***	-0.451***	1.488***
	(3.54)	(3.26)	(10.38)
Observations	318	318	318
Number of ID	159	159	159
Wald chi2	41.25	58.28	68.03
Prob>chi2	0.00	0.00	0.00

[a] Absolute values of *z*-statistics are in parentheses.
 * significant at 10%; ** significant at 5%; *** significant at 1%.
 These specifications fail to meet the asymptotic assumptions of the Hausman test.

Table 25. Impacts of classroom training participation on scores of business practices (FE-IV/RE-IV) [a]

	Business Record	Quality Improvement	Scores for: Marketing Strategy	KAIZEN Practices	Total
	(1)	(2)	(3)	(4)	(5)
FE-IV					
Participation x After	0.245***	0.265***	0.749***	1.587***	2.765***
	(2.64)	(2.70)	(6.13)	(8.51)	(9.70)
RE-IV					
Participation x After	0.243***	0.265***	0.749***	1.587***	2.781***
	(2.59)	(2.70)	(6.07)	(8.51)	(9.71)
Participation	0.032	-0.026	-0.266	-0.354	-0.665
	(0.18)	(0.14)	(1.12)	(1.00)	(1.17)
Age	0.011*	-0.002	-0.005	0.029**	0.031
	(1.82)	(0.43)	(0.61)	(2.46)	(1.64)
Male	0.235**	0.072	-0.027	0.378*	0.663*
	(2.13)	(0.65)	(0.18)	(1.70)	(1.85)
Education	0.107***	0.021	0.016	0.190***	0.331***
	(5.21)	(1.04)	(0.59)	(4.52)	(4.91)
Born in the village	0.065	0.476*	0.618*	0.797	1.988**
	(0.24)	(1.78)	(1.71)	(1.48)	(2.28)
# relatives abroad	0.118	0.119	-0.023	0.035	0.252
	(1.56)	(1.57)	(0.22)	(0.23)	(1.03)
Training experience	0.419***	0.237	0.718***	0.806**	2.194***
	(2.68)	(1.52)	(3.42)	(2.56)	(4.34)
Years of operation	0.011	0.015	-0.015	0.011	0.021
	(0.96)	(1.24)	(0.94)	(0.48)	(0.56)
After dummy	0.001	0.029	0.015	0.059	0.102
	(0.03)	(0.67)	(0.27)	(0.70)	(0.79)
Constant	2.341***	1.275***	2.064***	-1.003	4.762***
	(5.33)	(2.92)	(3.51)	(1.14)	(3.34)
Observations	313	318	317	316	310
Number of ID	158	159	159	158	157
Wald chi2	86.40	38.85	110.79	242.29	326.23
Prob>chi2	0.00		0.00	0.00	0.00

[a] Absolute values of *z*-statistics are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

These specifications fail to meet the asymptotic assumptions of the Hausman test.