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Workplace training in Myanmar: Determinants and wage returns[*]

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Abstract

Using linked employer-worker panel data from Myanmar, we estimate wage returns to workplace training. First, we document a low prevalence of training in manufacturing enterprises. Second, we find the wage premium associated with training of about 7%, which is in the range found in other South-East Asian countries. Third, we show that workplace training is offered selectively to workers and when this is the case, the wage gap between trained and untrained workers doubles. Fourth, we find that previous training does not contribute to higher present wage, which indicates low transferability of workplace training in Myanmar. While this setup may benefit employers, workers get short-lived benefits from training, which do not carry throughout the working life. Fifth, we find a convex profile of the returns to training with respect to education and that specific industries such as food, apparel and printing lend themselves more to the benefits from training. Considering the wage return as a lower bound of productivity gains from training, our results suggest that government support of workplace training programs could help increase performance of the manufacturing sector in Myanmar.

Keywords: training, wage, manufacturing, Myanmar

JEL codes: J31, J16, M53, O53

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1. Introduction

Labour markets today increasingly value knowledge and skills as technological advancements modify the nature of many jobs. Performing some tasks requires an ever-increasing level of technical skills. Think, for example, of manufacturing workers who need to adapt to using semi-automated instead of manual tools, or instead of using hand tools, they need to program automated machines to do their job. In parallel, current workplaces put more emphasis on the ability to combine technical and non-technical skills, such as communication, collaboration, or empathy to advance one's career. As people spend more time on the job, it is expected that they take supervisory or management roles for which they need to develop specific skills. New kinds of occupations emerge globally due to globalization. Driven by a search for low labour costs, loose environmental and social regulation, international companies have relocated their operations to developing countries, shedding some jobs in developed and creating new, mainly manufacturing jobs in developing countries. This process has drastically increased demand for specific occupations and skills, which are typically outside the formal schooling system and require acquisition through workplace training.

Improving the employee skills base is an important strategic component of enterprise performance and competitiveness, which, in turn, contributes to increasing the overall economic growth. Yet many firms, especially micro, small and medium enterprises (MSMEs) in developing countries, do not regularly invest in workplace training. Some of the main reasons for underinvestment in training include high worker turnover, difficulties with financing training, and a low expected return on the investment in training (Almeida and Aterido 2015). From the worker's perspective, training imparts a positive value in current labour markets increasingly focused on knowledge and skills, but it is not costless. Even if the fees are paid by the employer, participating in training courses takes time and effort, so workers may not reap the benefits immediately. Enrolling in training programs is not attractive if the wage remains unchanged, so it becomes worthwhile exploring empirically whether workplace training can raise worker wages.

The hesitation to invest in training—both at the firm and the worker level—has been detected in empirical studies, some of which showing that, even in developing countries, workplace training results in workers receiving higher wages (Bjerge, Torm, and Trifkovic 2021; Almeida and de Faria 2014; Kahyarara and Teal 2008; Rosholm, Nielsen, and Dabalen 2007). However, some of the studies find no such effects (Xiao 2002; Yamauchi, Poapongsakorn, and Srianant 2009; Ng 2005). As the evidence varies across countries, the failure to reach a common conclusion on the benefits of training could indicate that underlying labour market structure, system of qualifications, or workplace relations play a role. This indicates that it can be worthwhile engaging in a single-country analysis of the returns to training, especially if the country in case is Myanmar.

Despite strong economic growth in the last decade, Myanmar is still a relatively closed economy with the formal educational and training systems suffering from decades of underinvestment. During the State Law and Order Restoration Council reign from 1988 to 2011, all higher-education institutions were closed for years at a time. Consequently, only 5.6% of adults in Myanmar have upper secondary school and only 7% have university as the highest completed level of education in 2017 (World Bank 2020). Around 30% of the labour force has no formal education, while only 2% received some vocational training (MOLIP and ILO 2016). The technical and vocational education and training system is also assessed as inferior when compared to other South-East Asian countries and largely operates without the input from the private sector, employers' or workers' organisations (Milio, Garnizova, and Shkreli 2014; ILO 2020). As in many other

developing countries, enterprises in Myanmar indicate that low level of skills among the employees severely restricts firm performance (Berkel et al. 2018; Hansen et al. 2020). The need for additional labour force training has also been recognized as one of the crucial components of the MSME development policy in Myanmar (Government of Myanmar 2015). As a way of bridging the gap between formal education and work-related skills, the National Skill Standards Authority (NSSA) started issuing skills certificates that place workers in one of the four different levels of skills, from semi-skilled workers to supervisors.

In this paper, we aim to answer several questions about workplace training in manufacturing MSMEs in Myanmar. First, we ask which firms offer training and which workers gets trained. Second, we ask what the returns to training are. Third, we ask if there are differences in the returns to different types of training, where we compare on- and off-the-job training, prior and current training, and certified and non-certified training. Fourth, we ask whether the return to training depends on gender and overall worker skills. Finally, we investigate returns to training across various industries, which most likely influences the nature of training administered in different establishments.

We find a very low prevalence of workplace training in Myanmar: 6% of manufacturing workers received some form of workplace training. Using linked employer-worker data, which enable controlling for time-invariant unobservable characteristics of workers, we obtain that training is associated with about 7% higher hourly wage. Zooming in on the firms that train, we can estimate the returns from training at the constant productivity level. This gives us higher coefficient estimates, namely that training is associated with about 14% higher worker wages and that attending one additional training session amounts to about 1% higher hourly wage. We find an indicative evidence of greater returns to certified as opposed to non-certified training, which implies a demand for skills guarantees in the Myanmar labour market. We also find that the effect of training is not complementary with education and working experience, indicating that training could mitigate formal skills deficiencies among manufacturing workers. We find greater wage gains from current than previous training, which indicates that workplace training in Myanmar appears to be largely firm specific and not easily transferable. Employers may adopt this approach to prevent large labour turnover, which implies that the benefits from training for workers stay at the current workplace and may not last throughout the working life.

The evidence presented in this paper points to wage gains for trained as opposed to untrained workers, which under the perfect markets assumption indicates that employer-provided training could play a role in increasing productivity of manufacturing workforce. Given the serious financial constraints faced by MSMEs in Myanmar (Hansen et al. 2020), our results suggest that government support for development and implementation of workplace training programs would be important for increasing performance of manufacturing MSMEs in Myanmar.

Our paper contributes to the literature examining the link between training and wages in developing countries (Almeida and de Faria 2014; Bjerge, Torm, and Trifkovic 2021; Rosholm, Nielsen, and Dabalen 2007; Xiao 2002). We depart from earlier studies by taking into account different forms of training. We make use of a large linked employer-worker panel data set that contains information on the incidence, the length and the type of training. The data also contain worker-level information about previous training, so we can distinguish between returns to prior and current training. We also have information about certified training, which we also relate to worker outcomes. As educational and training systems produce a shortage

of qualified workers, the enterprise investment in training is expected to play an important role in the structural transformation process and yet, the effect of training in Myanmar has not been researched so far. The empirical research on SMEs in Myanmar has until now investigated industrial agglomeration, returns to export, formalisation, business practices and access to finance (Danquah and Sen 2021; Hansen, Rand, and Trifković 2021; Hansen et al. 2021a; Falco et al. 2021; Min and Kudo 2013; Rand et al. 2019; Tanaka 2019; Mueller, Schmidt, and Kirkleeng 2020).

In the next section, we summarize the key theoretical and empirical insights about the impact of workplace training on worker wages. In section 3, we describe the data and show summary statistics. Section 4 contains our estimation strategy. We show results in section 5, separating the analysis of the determinants of training and the returns from training. Sections 6 concludes.

2. Literature review

Training during employment plays a vital role in skill acquisition and productivity gains. Theoretical work suggests that returns from investment in employee training can accrue both to employees as real wage gains and to employers as productivity gains (see, e.g., Becker 1964). In practice, however, both wage and productivity gains from training are not given. They will vary based on the structure of the labour and product markets and based on the training type, that is, whether the firm or the employee bear the costs of training and whether the training is general or specific.

In a perfectly competitive labour market, wages will be equal to the value of marginal product and can be taken as a direct (albeit a lower bound) measure of productivity gains[1], but with imperfect competition, employees can be remunerated less (or more) than their marginal product (Dearden, Reed, and Reenen 2006). If the training is general, firms will be reluctant to invest in it, as general skills can be taken elsewhere and there would be no additional returns for the firm (Becker 1964). Observing an empirical regularity that most firm-sponsored training programmes contain a general component, Acemoglu and Pischke (1999a; 1999b) suggest that under market imperfections, general skills become firm specific because trained workers are not paid their full marginal product when changing employment. If the training is firm-specific, employers will be motivated to invest under expectations of higher firm productivity, but productivity gains from such training may not be passed on to employees in the form of higher wages (Becker 1964). Theory suggests further that in an imperfect labour market, labour turnover will be lower when workers receive firm-specific training than when the training is transferable (Green et al. 2000). However, a trained worker may stay with the current employer even if the wage is not raised as much as the marginal product after the training, if any restrictions to mobility are in place. For example, there may only be a few other employers offering work or it can be difficult for potential employers to assess worker's skills as efficiently as current employer can.

Most of the empirical evidence on the impact of training on wages comes from developed countries. For example, Lynch (1992) and Veum (1999) find evidence of a significant impact of firm-sponsored training on wages for both male and female workers in the US. Pischke (2001) distinguishes between on- and off-the-job training and finds that returns to training during work hours are smaller than the returns during

[1] As wages have to be paid out of productivity gains, wage premium from training is usually a lower bound of the potential productivity increase due to search frictions, certain labour market institutions (e.g. unions, minimum wages), asymmetric information or imperfect competition (Dearden, Reed, and Reenen 2006; Jones, Kalmi, and Kauhanen 2012).

leisure hours in Germany, particularly for women. Frazis and Loewenstein (2005) adjust the estimates for endogeneity in training and find large positive private returns to formal training in the US. Studies from other countries follow suite (Blundell et al. 1999; Parent 2003; Bartel 1995; Colombo and Stanca 2014; Görlitz 2011; Mincer 1991). Finally, in a meta-study of papers studying returns to training published between 1981 and 2010, Haelermans and Borghans (2012) find the average wage effect of on-the-job training of 2.6%. However, returns vary by types of training and trainees' age, with the age group below 35 having a higher effect size than other age groups.

Unlike in the case of developed countries, where most studies find that training results in workers receiving higher wages, the studies from developing countries show mixed effects. Almeida and de Faria (2014) find significant wage returns to work-related training, which amount to 7.7% higher wages in Malaysia and 4.5% in Thailand. Using matched employer-employee data from Ghana, Görg et al. (2007) show that workers with on-the-job training have higher earnings, mainly in firms with a high degree of foreign ownership. Rosholm et al. (2007) find a positive average effect of longer training spells on wages of trained employees in African enterprises. Kahyarara and Teal (2008) reach a similar conclusion in Tanzania. Comparing the effectiveness of vocational and on-the-job training, Alfonsi et al. (2019) find greater benefits of subsidized vocational training in Uganda due to an enhanced skills transfer. Using longitudinal employee data from China, Xiao (2002) shows that on-the-job training provided by employers does not automatically contribute to annual wage growth at either individual or firm level. It, however, contributes to indirect wage increases through firm-recognized job performance measures. Ng (2005) finds no general effect of on-the-job training on earnings in manufacturing firms located in Shanghai, while only female workers experience a 2% return from off-the-job training. Yamauchi et al. (2009) find significant returns to employees of both on- and off-the-job training for workers employed in large Thai manufacturing enterprises, but the returns are attenuated by the length of past work experience. Bjerge et al. (2021) find that trained female employees get a higher wage compared to untrained men, but a lower wage compared to trained male employees, indicating that firm-sponsored on-the-job training may not be sufficient in closing the gender wage gap in Vietnam.

Similarly, evidence of wage returns from past training on wages is mixed. Lynch (1992) provides evidence that previous off-the-job training has a positive impact on wages for both white females and males in the US. Others find more nuance across gender and age groups. For example, Dolton (1994) indicates that previous on-the-job training increases wages by, on average, 3% for males, while Hill (2001) finds a 7% wage premium from past training for mature women. In contrast, Kahyarara and Teal (2008) find no evidence that wage returns from past workplace training are significantly different from zero in Tanzania.

3. Data description

Data used in the analysis are from the nationally representative Myanmar Enterprise Monitoring Survey (MEMS) conducted in 2017 and 2019 (Hansen et al. 2020). The sample includes 2,496 non-state enterprises and 6,722 of their employees in 2017 and 2,497 enterprises and 5,017 employees in 2019. The data are representative of about 70,000 firms and about 950,000 employees in the manufacturing sector in Myanmar.

Enterprises were selected using a stratified sampling approach from 35 townships from all 15 regions and states in Myanmar, including the Nay Pyi Taw Union Territory. The sampling frame was based on the lists of active enterprises in each municipality. We focused only on enterprises from the manufacturing sector

(2-digit codes 10–33 in the Myanmar Standard Industrial Classification (MSIC)). As around one-third of enterprises were registered as rice mills (MSIC code 1063), we stratified the population into rice mills and other manufacturing. In 2017, firms were selected at random from previously randomly selected townships within each state/region using probability proportional to size sampling. In 2019, all firms still in operation were re-interviewed and a subset of firms was selected from updated municipal lists to replace those firms that stopped operating between 2017 and 2019. Informal enterprises (i.e., enterprises that are not on the lists kept by the municipalities) are also included in the sample. They are sampled through on-site identification when the enumerator is on the location to interview a formal enterprise. As the total population of informal firms is not known, the sample is not representative of informal enterprises, which comprise 15 and 10% of the sample in 2017 and 2019, respectively. Between one and eight production workers were interviewed per enterprise, depending on its size. In enterprises that do not employ external workers, the sample includes family members working in the enterprise. More detailed information about the sampling is available in Berkel et al. (2018) and Hansen et al. (2020).

The data include information about enterprise performance such as revenue, value added, number of employees, labour costs, material costs, and the capital stock. The data also contain a number of key variables about the owner or manager and employees, such as gender, age, and education. Information about workers is also detailed and includes, among other, their sex, age, wages, working hours, education level, and tenure. All questions refer to the situation in the previous calendar year, whereas the economic accounts contain information on two consecutive years before the survey.

The data also include rich information on training incidence, duration and type, which allows us to obtain measures of training at both the extensive and the intensive margin. Our main measure of training is a dummy that takes value one if a worker has had any number of on- or off-the-job training spells, and zero otherwise. We also observe the number of times a worker has attended on- or off-the-job training, so we can analyse training intensity. Finally, training duration is measured as the number of days spent in on- or off-the-job training.

Firms that do not employ any workers were excluded from the data set (47 in total), as were the firms with incomplete information on worker wages and working hours. This left 3,372 observations (2,086 firms in unbalanced and 1,286 firms in balanced panel) and 8,864 observations in the linked employer-worker data, which include 7,509 workers in unbalanced and 1,355 workers in balanced worker sample.

3.1. Summary statistics

Table 1 shows summary statistics for the key worker and enterprise variables. An average production worker in our sample earns 804 Kyats per hour.[2] The average proportion of trained workers is 6%, which is a consequence of very few firms offering training to their workers. Some 2.5% of firms generally train their workers, and in such firms, 49% of workers are trained. Nevertheless, the prevalence of training in Myanmar is much smaller than in neighbouring countries such as Thailand and Vietnam. In Thailand, a study on the impact of training on worker wages shows that 52% of employees get workplace training

[2] The national minimum wage was set in 2018 at 600 Kyat per hour, which is approximately equivalent to 1.5 million Kyat per year.

(Almeida and de Faria 2014). In Vietnam, 21% of employees received training (Bjerge, Torm, and Trifkovic 2021). Among the trained workers, only 1% has been trained in both 2017 and 2019.

The highest training incidence is observed in electrical equipment and pharmaceutical industries (37.5% and 27.3%, respectively), while the lowest can be encountered in manufacture of non-metallic minerals (1.3%), as shown in Figure A1 in the Appendix.[3] As expected, the highest training rates are observed in Yangon Region (9.1%), as shown in Figure A2 in the Appendix.

The proportion of workers with on-the-job training is 5%, while 2% have been trained off-the-job. The prevalence of training has decreased since 2017, which is driven by a sharp decline in on-the-job training. Trained workers have on average attended about three training sessions, which mainly took place in their place of work. The proportion of workers that received training at an earlier job is 1%. The prevalence of certified training is 2%, while less than 1% of workers attended a training that awards the National Skill Standards Authority (NSSA) certificate. This is not a surprise as the NSSA had very few activities before 2018. About one-half of workers reports a wage increase after on-the-job training, while about one-quarter reports the same for off-the-job training.

Women make 34% of all interviewed workers. An average worker from the sample has 34 years and just above three years of working experience. Most of the workers have stopped their education at the primary school level (39%), which corresponds to five years of schooling. Further 30% have stopped at middle school, which translates into 8 years of schooling. Exactly 10% of workers do not have formal education. At the opposite end is 6% of workers with a college, Bachelor's or Master's degree.

An average firm in the sample has an average stock of assets worth 30.8 million Kyats per employee[4] and employs 13.7 employees on average. Enterprises have been operating for about 18 years on average. The proportion of informal firms is 12%, while family firms comprise about one-third of the sample. Out of total workforce, about one-quarter are women. Between 2017 and 2019, capital stock, employment, and female worker share have increased, while the share of informal and family firms has decreased.

Table 1 also shows main characteristics of enterprise owners and managers. Firm owners are predominantly male, on average 50 years old and have around 14 years of working experience. In terms of education, about 20% of enterprise owners or managers have not progressed beyond the primary school. A similar proportion of respondents has stopped their education at the middle-school level. About 30% of enterprise owners or managers have either Diploma, Bachelor's or Master's degree, so they on average appear to have more schooling than workers.

3.2. Statistical differences

Table 2 shows the test statistics for unconditional differences in key characteristic of training and non-training firms, while Table 3 shows the unconditional differences between trained and untrained workers. In terms of firms, we find that training and non-training enterprises are similar with respect to only two

[3] There is no training in several industries, such as leather, paper, printing, coke and petroleum, basic metals, motor vehicles, transport equipment and repair and installation.

[4] Real values. 1 USD was around 1,242 Kyats in 2016 and 1,430 Kyats in 2018 (the questions refer to these two years).

characteristics, namely the amount of capital and the number of years they have been operating. Enterprises that train and enterprises that do not train their workers are significantly different with respect to employment, ownership type, and owner characteristics such as age, working experience and education. Training enterprises tend to be larger and fewer of them are registered as a family firm. They are owned by younger, female and more educated owners and join business associations more frequently. We also find that trained workers have significantly higher wage than untrained workers (870 compared to 800 Kyat per hour) and that training is more common among female workers and those with more tenure, but not those with the longer overall working experience. Finally, training is increasing in the education level, which is a common finding in literature (Almeida and de Faria 2014).

As indicated in Table 1, we observe four different groups of workers: those that have been trained only in 2017, those that have been trained only in 2019, those that were trained in both years, and those that were never trained. Based on the data for all surveyed workers, Table 4 shows how these four groups of workers differ in terms of their main observable characteristics. We find that workers trained in both periods have the largest wage and that those trained only in 2019 have a larger wage than the non-trained and those trained only in 2017. We also see that the share of trained female workers has significantly increased over time and that female workers are most common among those that received training in both periods. When comparing workers in terms of tenure, we see that those trained in both periods have the longest tenure (of almost 10 years), which is close to that of workers trained only in 2017. Both of these groups have a significantly longer tenure than non-trained workers and workers trained only in 2019. The always-trained workers have almost the same level of working experience as the never-trained workers, who further have a significantly longer experience than those trained only in 2017 and those trained only in 2019.

Written employment contracts are on average rarely provided in Myanmar (Hansen et al. 2020), but they are quite common among the always-trained workers, where every second worker has a formal contract. Each other group of workers is significantly less likely to have an employment contract: 33% of those trained in 2019, 22% of those trained in 2017, and 4% of the never-trained workers have a formal contract. In-kind wage contributions are a common wage supplement in Myanmar (Hansen, Rand, and Trifković 2021), but they are not as common among the never-trained workers as among other groups of workers. In particular in-kind wage benefits are some 25 percentage points more common among the always-trained and workers trained only in 2019 than among the never-trained workers. The identified groups of workers also vary in terms of education. The never- and always-trained workers are significantly more likely not to have any formal education than those trained only in 2017 or those trained only in 2019. The never-trained workers have to a larger degree than any other group stopped their education at the primary school level. The largest segment of the workers trained only in 2017 has completed high school, while those trained only in 2019 have the highest rate of completion of tertiary education.

The comparison of the same groups of workers based on the balanced worker panel shown in Table 5 conveys a similar picture in which we observe a significant increase in the wage level between 2017 and 2019; more training among female workers; more tenure, working experience, formal contracts and in-kind payments among those trained in both as opposed to those trained in only one period; and higher high school and tertiary degree completion rates among those trained in only one as opposed to those trained in both periods. This comparison indicates that workers in our sample become increasingly dissimilar when we move from those trained in only one as opposed to those trained in both periods or to those never trained.

Characteristics such as wage, female, in-kind payments and tertiary education increase over time with the training decision, while characteristics such as tenure, experience, full-time employment, formal contracts, and primary and high school completion vary negatively with the training incidence over time.

4. Empirical strategy

Consistent with our interest in understanding which variables determine selection into workplace training, we run a series of regressions at the worker level. We assume that, conditional on the enterprise deciding to train its workers, workers make a decision on whether or not to participate in training if the anticipated gain is greater than the costs associated with participation:

$$TR_{ijt} = \begin{cases} 1 \; if \; \pi_{ijt} > 0 \\ 0 \; otherwise \end{cases} \qquad (1)$$

TR_{ijt} is a dummy variable that equals one if a worker *i* in firm *j* participated in workplace training during the year prior to the survey and π_{ijt} are the net benefits from participating in training. While π_{ijt} is unobservable, we assume that it is a linear function of several observable enterprise and worker characteristics, such that: $\pi_{ijt} = \delta W_{ijt} + \varphi E_{jt} + \mu_j + \omega_t + \xi_{ijt}$, where W_{ijt} is a vector of worker *i*'s characteristics, E_{jt} is a vector of enterprise characteristics, μ_j are firm fixed effects, ω_t is time fixed effect and ξ_{ijt} are unobserved worker characteristics. Thus, the probability of a worker participating in training is a function of both enterprise and worker characteristics:

$$Pr(TR_{ijt}) = Pr\,(\vartheta_{ijt} > \beta\delta W_{ijt} - \varphi E_{jt} - \mu_j - \omega_t - \xi_{ijt}) \qquad (2)$$

We estimate equation (2) using both linear and non-linear probability models. All estimations include worker and enterprise characteristics commonly used in related literature (Almeida-Santos and Mumford 2005; Almeida and de Faria 2014; Ariga and Brunello 2006). Worker characteristics include age, sex, tenure and working experience of the worker, being a full-time worker, having an employment contract, receiving an in-kind wage contribution, and education level. Enterprise characteristics include: real value of assets per employee, number of permanent workers, operating as a family firm, (good) business practices, business association membership, receiving government assistance, being inspected by tax authorities, owners' gender, age, risk preferences, working experience and education, location (state/region) and industry dummies.

We also estimate the wage premium at the individual worker level as in the following equation, where individual wages depend on both worker attributes and enterprise characteristics:

$$w_{ijt} = \beta_0 + \beta T_{ijt} + \rho X_{ijt} + \tau F_{jt} + \theta_t + \varepsilon_{ijt} \qquad (3)$$

where w_{ijt} is the natural logarithm of real hourly wage of worker *i* in firm *j* at time *t*. Our main variable of interest is job training (T_{ijt}), which is defined as an indicator variable for whether the worker has received any training in his/her current job. In an alternative specification, T_{ijt} takes a form of a continuous variable that measures the number of training spells, based on which we can obtain the intensive margin of the impact of training on worker wages. X_{ijt} is a vector of worker *i*'s characteristics and F_{jt} is a vector of firm characteristics, which are the same as in Eq. 2, θ_t is a time fixed effect and ε_{ijt} is the error term.

We control for the size of enterprise (both in terms of capital and labour) as it has been established in literature that firm size is one of the main determinants of worker wages (Troske 1999; Schmidt and Zimmermann 1991; Abowd, Kramarz, and Margolis 1999). We control for firm ownership type, as family firms pay on average lower wages (Bassanini et al. 2013) and formality (measured by the tax authority inspections), as wages in formal firms tend to be higher than wages in informal firms (Meghir, Narita, and Robin 2015). We also control for management quality measured as a number of beneficial business practices applied by the enterprise due to its established importance for overall firm performance (McKenzie and Woodruff 2017; Hansen et al. 2021b; Falco et al. 2021). We expect that otherwise better-performing firms will invest more in skills development of their works.

Since training is costly for enterprises, they are highly interested in safeguarding the investment. One way of doing this could be through a specific design of employment contracts that, for example, impose a binding employment period after training to prevent workers from leaving the enterprise before the investment in training can be recouped. As it is common in many other developing countries, Myanmar has a poor record of legal enforcement in labour markets (Ediger and Fletcher 2017). However, it can be that enterprise owners use informal mechanisms for contract safeguarding and preventing high employee turnover and poaching. Inspired by literature on the importance of social capital for informal contract enforcement (MacLeod 2007; Kandori 1992), we include controls for whether the enterprise has received government assistance for training and whether the enterprise is a business association member. We interpret the variable for receiving the government assistance for training to signal stronger ties with the government and relevant local institutions, which workers may take as an indication of better contract enforcement possibilities for enterprises with local political connections. In a similar vein, business association membership of the enterprise proxies for the role of community sanctions that help prevent contract dishonouring by the workers. We control for a range of owners' characteristics such as gender, age, risk preferences, working experience and education, as it is known that they play an important role in wage setting. For example, female-owned enterprises will pay higher wages (Cardoso and Winter-Ebmer 2010) and better-educated managers more likely hire well-educated workers (Rosenbaum 2002).

In terms of worker characteristics, we control for sex, age, tenure and cumulative work experience as the key variables in the standard human capital earnings function (Mincer 1974; Blinder 1973). We also include a series of indicator variables for different levels of education (from primary to tertiary education) since educational attainment explains a large part of the variation in earnings (Mincer 1974; Spence 1973). While education represents general knowledge and skills, tenure and experience relate to industry- or firm-specific knowledge and skills workers may benefit from (Kor and Sundaramurthy 2009; Livingston 1971). More educated workers tend to be faster learners and tend to get more training, which is taken in earlier studies as an indication of complementarity between on-the-job training and education (Pischke 2001; Biggs 1995). In instances when training accompanies technical change, demand for skilled labour with greater adaptive skills and absorptive capabilities will increase (Mainga, Hirschsohn, and Shakantu 2009; Yamauchi, Poapongsakorn, and Srianant 2009). However, empirical work has also shown that education and training can be negatively correlated (Ng 2005; Ariga and Brunello 2006) or that workers across all educational levels have the same likelihood of being trained (Goux and Maurin 2000).

In estimating Eq. (3), one should take note that β does not measure the causal effect of training on worker wage, as it is likely affected by bias from selection into training both by enterprises that make a non-random decision about whether or not to train their workers and by workers who decide whether or not to participate in training. We use firm and worker fixed effects to address potential bias due to time-invariant unobservable enterprise and worker heterogeneity, assuming that the error term ε_{ijt} consists of an unobserved component μ_{ijt} and an idiosyncratic component ϵ_{ijt}, that is, $\varepsilon_{ijt} = \mu_{ijt} + \epsilon_{ijt}$, where the unobserved component μ_{ijt} (comprising the worker fixed effect α_i and the firm fixed effect η_j) is correlated with the decision to participate in training. The augmented equation takes the following form:[5]

$$w_{ijt} = \alpha_i + \beta T_{ijt} + \rho X_{ijt} + \tau F_{jt} + \eta_j + \theta_t + \varepsilon_{ijt} \qquad (4)$$

After including firm and worker fixed effects, some bias may remain and it can arise from time-varying unobservable heterogeneity, which can shift our estimates upwards or downwards. The upward bias could come from unobserved productivity shocks, such as a change in effort, while the downward bias could come from increased participation in training when wages are declining. However, the size of bias from time-varying unobservables is usually assumed to be minimal in case of short panels with slow-changing variables of interest. Besides, Sauermann and Stenberg (2020) compare experimental and observational estimates of the returns to training and find that non-experimental estimates depart from the true effect size by only 7.5% after including individual fixed effects to capture individual-specific unobservable heterogeneity. The implications are that our findings are not necessarily causal, as we can only identify conditional correlations between our variables of interest, but we are confident that the bias that remains in our estimates is rather small given our estimation strategy.

Thanks to the linked employer-worker data, we can distinguish whether firms train all or only selected workers, so we estimate equations (3) and (4) on a sub-sample of firms that train at least one worker. This enables estimating wage premiums from training at the constant level of firm productivity.

We also estimate the wage premium from different types of training, e.g. from on- and off-the-job training by estimating the following equation:

$$w_{ijt} = \alpha_i' + \iota T_{jt}^{on} + \nu T_{jt}^{off} + \rho' X_{ijt} + \tau' F_{jt} + \eta_j' + \theta_t' + \varepsilon_{ijt}' \qquad (5)$$

where ι is the wage premium associated with on-the-job training, ν is the wage premium associated with off-the-job training, α_i' is an individual fixed effect, η_j' are firm fixed effects, θ_t' is a time fixed effect and ε'_{ijt} is a random error term. We use the analogous specification to compare the returns to prior and current training. All estimations are with cluster-robust standard errors at the firm level.[6]

[5] We also estimate equations with only firm fixed effects.

[6] As the sampling procedure included randomly selecting survey townships, we test the robustness of our findings by clustering the standard errors at the township level. We find that the results are not sensitive to clustering of standard errors (available upon request).

5. Results

5.1. Determinants of training

Table 6 shows which enterprise and worker characteristics determine the training incidence for any type of training. The final two columns show the determinants of on- and off-the-job training. We show the results from a linear probability model (LPM) with state/region and industry fixed effects interacted with year fixed effects, the LPM results with firm fixed effects, and the LPM results with worker fixed effects. The final three columns show estimates with firm and worker fixed effects using the balanced panel of workers. All estimations control for key worker and enterprise characteristics.[7]

In terms of enterprise characteristics that determine the training incidence, we find that the number of full-time permanent workers seem to play a role, but not in the estimation with firm fixed effects. The likelihood of offering training to workers increases with owner's age, management quality assessed through the number of business practices applied by the enterprise, business association membership, receiving government assistance for training and being inspected by the tax authorities. The likelihood of offering workplace training to workers is higher among owners who have completed high school than among owners without formal education. Owners with primary or middle school are, however, less likely to implement training programs than uneducated owners. Compared to the food industry, training is more probable in the following industries: textiles, wearing apparel, wood, fabricated metal products, electrical equipment, printing, rubber and plastics, basic metals, motor vehicles and furniture, some of which are related to foreign investments, such as textiles, wearing apparel and furniture.

In terms of worker characteristics, consistent across columns (4) and (5) in Table 6 is that the likelihood of receiving training increases with previous training and tenure, while gender does not seem to play a role. This could arise because of a practice of rewarding those who have been employed for longer and a higher risk associated with the investment in training of newly employed workers who may be more likely to change jobs. Indeed, we obtain that the likelihood of training decreases with the owner's preparedness to take risks. Training is also positively associated with higher levels of education, namely high school and tertiary degrees, which suggests complementarities between prior human capital and training. This in particular holds for off-the-job training (column (10)), while the incidence of on-the-job training increases with any type of education apart from tertiary (column (8)). As noted elsewhere (Brunello 2001), more educated workers tend to take jobs with higher skill requirements and having a greater learning capacity, they are more likely to obtain training than less educated workers in occupations with lower skill requirements. Looking to safeguard their investment, firms are more likely to offer training to more educated workers (Albert, García-Serrano, and Hernanz 2010), which may generate a virtuous circle in human capital investments, whereby high skill workers get further training opportunities, longer tenure and higher wages (Lynch and Black 1998). Finally, we obtain that business association membership is positively associated with on-the-job training, while technical assistance from the government for training positively predicts off-the-job training, both of which indicate a possibility for local institutions to safeguard

[7] Estimations with firm fixed effects exclude time-constant enterprise characteristics such as industry, location, owner's sex and education, as well as characteristics that change uniformly over time for all, such as owner's age (as this variable is calculated by subtracting the birth year from the survey year), experience and education (as it is not likely that there will be frequent changes in the level of education over two years). Estimations with workers fixed effects exclude time-constant characteristics such as prior training and education, as well as age, tenure and experience that increase uniformly with time.

the investment in training through perceptions about increased enforcement of employment contracts through owner's informal local ties or reputation.

5.2. Wage effects

Table 7 shows the results of estimating the wage equation (Eq. 3) for all firms in the sample and the balanced sample at the firm and at the employee level. The first column reports the estimation results on the relationship between training and hourly wages for the full sample by applying ordinary least squares (OLS). The second column reports the results for balanced sample with firm fixed effects and the third column shows the results for balanced sample with employee fixed effects.

The estimates reported in column (1) show that training is significantly associated with real hourly worker wages when controlling for key enterprise and worker characteristics. The coefficient implies that training associates with 7.3% (100*[exp(0.07)-1]) higher real hourly wages for trained as compared to untrained workers. Accounting for time-invariant unobserved firm characteristics reduces the coefficient size, indicating about 5.5% higher wages for trained employees (column (2)). Controlling for time-invariant unobserved employee heterogeneity yields a slightly larger smaller coefficient, indicating that training is positively associated with 6.9% higher wage (column (3)). Estimation with both firm and worker fixed effects in column (4) shows a positive association between training and 7% higher wages. The size of estimates in our study is in a range that is comparable to earlier studies. Almeida and de Faria (2014) found 7.7% higher hourly wage from on-the-job training in Malaysia, and a 4% higher hourly wage in Thailand.

Table 7 also shows the results on the association between training and wages at the intensive margin. We obtain a positive association between training intensity (the number of training spells) and wages, as shown in columns (5) and (6). The size of the coefficient implies that attending one additional training session is positively associated with a wage increase of about 1%.[8]

Apart from deciding whether to offer training at all, firms also decide whether to train selectively, that is, whether they will train all or specific workers. Training selectivity has been identified as one of the sources of training under-provision, as firms may only involve a limited number of employees in training, usually those appointed at key positions or those deemed as having high potential (Kupets 2018; Neirotti and Paolucci 2013). Restricting the sample to 'training firms' (those that train at least one worker) allows comparing outcomes of trained and untrained workers in a training firm, which enables understanding whether training selectivity plays a role in determining gains from training. In Table 7, we look at the effect of training on worker wages in training firms. As expected, we obtain higher coefficients than in the full-sample estimates. The coefficients in columns (8) and (9) indicate that training is associated with about 8-13.8% higher worker wages. The results for training intensity are similar to the full-sample estimates, where the specification with firm fixed effects shows that the benefit from attending one additional training session is positively associated with 1% higher hourly wage (column (11)). This result indicates that enterprises in Myanmar train selectively and that internal decisions on who gets trained in an enterprise could be a source of wage inequality among workers.

[8] We do not estimate the equivalent equation with worker fixed effects as the training incidence per worker does not change much in the observed two-year period.

5.3. Different types of training

5.3.1. On- and off-the-job training

When we differentiate between on- and off-the-job training, as shown in Table 8, we obtain a significantly positive association between on-the-job training and worker wages. The estimates show that participation in on-the-job training programmes is associated with 6.3% higher wage in all firms and with 13.5% higher wage in training firms. Participating in off-the-job training does not seem to yield any significant benefits. Prior studies have also found heterogeneous returns depending on the type of training. For example, Ng (2005) finds wage gains of about 2% from off-the-job training for female workers and no significant gains from on-the-job training. Yamauchi et al. (2009) find positive returns to both on- and off-the-job training for workers in large Thai manufacturing enterprises and Bjerge et al. (2021) find that on-the-job training contributes positively to the wage gain of trained female as compared to untrained male employees in Vietnam. In terms of training duration, we obtain that one extra day of training is associated with 0.5% higher hourly wage.

5.3.2. Prior training

As most training spells produce some transferable skills, we test for the presence of knowledge spillovers in manufacturing firms in Myanmar. We investigate the impact of past workplace training on current and starting wage at the same enterprise, and the relative importance of current compared to previous training.[9] The results in Table 9 show that previous training does not contribute significantly to increasing worker wages (columns (1) and (2)) and that it is negatively associated with the starting wage at the enterprise (columns (5) and (6)). When comparing the effects of current and previous training, we find that a positive effect of current training on wages remains after controlling for prior training (columns (3) and (4)). These findings indicate that employers are not rewarding prior training of their employees, as they potentially doubt that they can capture spillover effects on productivity from their employees' previous training. What follows is that workplace training in Myanmar likely contains a large specific component that is not transferable from one firm to another. Think, for example, that a training in an enterprise in apparel industry may include instructions on how to operate a specific sewing machine, that another enterprise in the same industry could be using a different machine and that a worker changing employment may need to be trained again on how to operate a sewing machine. For the employee, our results mean that the benefits from training are tied to the current workplace and that the training premiums may not accumulate throughout the working life.[10]

5.3.3. Certified training

The visibility and portability of training potentially increase if workers obtain certificates for attending training. Higher visibility and portability of training, in turn, may decrease worker retention (Dietz and Zwick 2020). We therefore analyse whether having any or a training certificate issued by the NSSA affects the wage level. This analysis is conducted with a cross-section from 2019, as the information about certified

[9] This analysis is conducted on the unbalanced worker panel with firm fixed effects, because the prior training variable does not change over time and it would be omitted in estimations with worker fixed effects as we do not follow workers when they change employment.

[10] An important case to investigate would be career advancement within firm, but our data are not suitable for that kind of analysis, as we do not observe exact work position of each worker. However, when controlling for the professional function of each worker that is available only in 2019 data, we obtain that training is associated with 11.7% higher worker wage in an estimation with firm fixed effects. The results are available upon request.

training is not available before that. The results in Table 10 show that after controlling for key firm and worker characteristics, any kind of certified training is positively associated with worker wages (columns (1) and (2)). The wage estimates are robust to including firm fixed effects. The NSSA certified training is also positively associated with higher worker wages, but the estimate is not significant in the specification with firm fixed effects (columns (3) and (4)). These findings indicate a need for specific forms of guarantees of labour force quality in Myanmar, which is understandable given the low skill base in the manufacturing sector.

5.4. Training, gender and other skills

Gender wage gap has been documented in numerous studies across the world (Goldin 2014; Redmond and Mcguinness 2019; Olivetti and Petrongolo 2016; Lee and Wie 2017; Manning and Swaffield 2008). There is also evidence on gender training gap, as women workers are found to be less likely to participate in employer-provided training (Pischke 2001; Barron, Black, and Loewenstein 1993). Following Bjerge et al. (2021), we estimate whether workplace training can contribute to closing the wage gap between women and men workers. The results of estimation with firm and worker fixed effects shown in column (3) in Table 11 reveal that on average wages of women workers are not significantly lower than wages of men when workplace training is taken into consideration.[11]

It is considered that education is one of the most important sources of skill formation, which also improves the ability of individuals to acquire various professional competences (Rosen, 1976, Mincer, 1962, Heckman, 2000). Education and training are considered complements in the labour market, which indicates that better educated individuals will be more involved in obtaining training. Work experience in the current firm measures the level of firm-specific skills a worker has. Besides being an important determinant of worker wage, tenure also affects the likelihood of training participation as employers prefer to train workers that have stayed longer with the firm. We therefore investigate whether the effect of training on current wages changes with employee skills, measured as years of work experience in the current firm and the level of education.[12] As the data do not contain information on the years of schooling, but only education levels, we interact the training dummy variables with different levels of education, keeping the employees without any formal education as a comparison category. This allows us to capture differential benefits from training for employees with different levels of skills. First, we obtain that training does not contribute to higher wages of workers with longer tenure in the estimation with worker fixed effects, as shown in column (6). Second, the effect of training increases with educational attainment. Whereas workers with completed primary school can expect about 1% higher wage after participating in training, workers with tertiary degree can expect about 16% higher wage. However, workers with no formal education have the greatest return from training. The results indicate that training is associated with 56% higher wage among uneducated workers. The results in column (6) indicate that even though there is some complementarity between training and education in Myanmar, training can substitute a complete lack of education and improve the outcomes of least skilled workers. This indicates that by raising wages of the least skilled workers, training can improve income distribution in the economy.

[11] See Hansen, Rand and Win (2020) for a more careful analysis of the gender wage gap in manufacturing SMEs in Myanmar.

[12] We also assessed the effect of training on wages depends on the overall work experience. We do not report these results as we obtained estimates that are statistically not different from zero.

5.5. Returns to training in different industries

One of the shortcomings of our data is that we do not observe the exact nature of training activities workers participate in, which is a common drawback of the workplace training literature. Our estimates so far show the return to training on average and this average masks heterogeneity across industries, which likely require different skills profiles. Some industries may be geared more towards manual skills, such as, for example, carving a lacquered dinnerware, while others require precision with semi-automated tools, such as, for example textile cutting for various items of clothes. Moreover, workers in the same industry may get different kinds of training (compare, for example, a textile cutter and a seamstress). That is why we estimate the returns to training for different industries observed in our sample. We first compare the returns to eight different groups of industries and then to each industry identified at the 2-digit level of Myanmar Standard Industrial Classification (MSIC). In each case, we keep rice milling (MSIC code 1063) separate from other industries as the activities they perform differ greatly from the activities in other food industry enterprises. The results of estimations with firm and worker fixed effects are shown in Tables 12 and 13. We obtain that training is negatively associated with wages in rice mills, while the association is positive in other food industry establishments. Training is also positively associated with working in the apparel industry and printing. The association between training and wages is also negative in the beverage and coke and refined petroleum industries.

6. Conclusion

Skilled and knowledgeable workforce is highly valued in labour markets today, as it significantly contributes to enterprise performance and growth. Especially when opportunities for educational systems to produce skilled workers are limited, workplace training is expected to fill in the gap and increase the employee skills base. However, judging by the studies from different countries (Bassanini et al. 2007; Almeida and Aterido 2015), the investment in workplace training is below the optimal level. Particularly MSMEs in developing countries do not regularly invest in workplace training and at the same time complain about the lack of skills of their workforce. Policymakers share their concerns, recognizing the imbalance between the demand and the supply of skills in the market and attempting to design policies that would address this problem. One possible way of addressing the skills imbalance is developing job-relevant skills of the workforce through the supported investment in workplace training.

To increase our understanding of the use and importance of workplace training in a setting with a severely constrained formal educational system and underperforming private sector, we have examined several issues related to workplace training in manufacturing MSMEs in Myanmar. First, we document the prevalence and the determinants of different types of training. Second, we made an attempt at estimating the effect of training on worker wages using econometric methods that address bias from selection into training based on time-constant unobservable enterprise and worker characteristics. Third, we investigated possible differential returns to various types of training. Fourth, we analysed whether the returns to training depend on gender and overall worker skills. Finally, we estimated the returns to training in various industries.

Our analysis has revealed several important findings. First, we find a set of enterprise and worker characteristics that increase the likelihood of participating in training. Worker's level of education, attending previous training and tenure, as well as management quality, business association membership, receiving government assistance for training and being inspected by the tax authorities are among the most important training determinants. These findings indicate that enterprise owners are interested in closely

protecting the investments in training first by selecting workers with possibly higher capacity for learning who will stay longer with the enterprise and second by relying on informal mechanisms for contract enforcement.

Second, we obtain that training is associated with about 7% higher hourly wages for manufacturing workers in Myanmar. Attending one additional training session amounts to about 1% higher hourly wage, while one additional day of training results in 0.5% higher hourly wage. Looking at the sub-sample of 'training firms' we obtain that training is associated with about 14% higher worker wages. This finding highlights that training is offered selectively in MSMEs in Myanmar.

Third, looking at different types of training, we find that participation in on-the-job training programmes is associated with about 6% higher wage, while participating in off-the-job training does not seem to yield any significant benefits. We also find that certified training is associated with larger wage returns than non-certified training and that employers do not reward prior training.

Fourth, we do not find that the wage returns to training depend on worker's sex or tenure, but they do depend on the level of education. Workers with no formal education can potentially realise the greatest gains from training, followed by those with tertiary degree and declining thereafter for every other educational degree. This result indicates a specific type of complementarity between training and education in Myanmar, but it also indicates that training can substitute a complete lack of education and improve the outcomes of least skilled workers. From a broader perspective, this result indicates that by raising wages of the least skilled workers, training could improve the income distribution in the economy.

Finally, we obtain highly mixed results on the returns to training in different industries. Whereas we obtain a positive association between training and wages in food, apparel and printing industries, the association between training and wages is negative in rice-milling, beverage, and coke and refined petroleum industries. While we cannot unpack the exact contents of different training sessions, this result has helped account for training across by industries.

Taken together, our findings indicate that job training offered to employees in the Myanmar manufacturing firms is largely firm specific and it is not easily transferable from one to another job. Employers potentially make this choice to prevent a large labour turnover, while workers seem to receive only short-lived benefits from training, failing to accumulate skills that are relevant throughout the working life. This is an important finding especially in contexts of weak formal education systems, where job training can play a key role in human capital accumulation and consequently economic growth. Taking the wage return as a lower bound of productivity gains from training, our results suggest that government support of workplace training programs could help increase performance of the manufacturing sector in Myanmar.

Our main results are obtained after controlling for production factors and other standard firm and owner characteristics, including employee and owner skills, and unobservable time-invariant employee and firm heterogeneity. However, some potential bias from time-varying unobservable heterogeneity may remain, so we do not necessarily interpret our results as causal. Further research could incorporate an exogenous source of variation in the training incidence to estimate the causal impact of workplace training on wages.

References

Abowd, John M., Francis Kramarz, and David N. Margolis. 1999. "High Wage Workers and High Wage Firms." *Econometrica* 67 (2). [Wiley, Econometric Society]: 251–333.

Acemoglu, Daron, and Jorn-Steffen Pischke. 1999a. "The Structure of Wages and Investment in General Training." *Journal of Political Economy* 107 (3): 539–572.

Acemoglu, Daron, and Jorn-Steffen Pischke. 1999b. "Beyond Becker: Training in Imperfect Labour Markets." *The Economic Journal* 109 (453): 112–142.

Albert, Cecilia, Carlos García-Serrano, and Virginia Hernanz. 2010. "On-the-Job Training in Europe: Determinants and Wage Returns." *International Labour Review* 149 (3): 315–341. doi:10.1111/j.1564-913X.2010.00089.x.

Alfonsi, Livia, Oriana Bandiera, Vittorio Bassi, Robin Burgess, Imran Rasul, Munshi Sulaiman, and Anna Vitali. 2019. *Tackling Youth Unemployment: Evidence from a Labour Market Experiment in Uganda*. eopp64. STICERD - Development Economics Papers - From 2008 This Series Has Been Superseded by Economic Organisation and Public Policy Discussion Papers. Suntory and Toyota International Centres for Economics and Related Disciplines, LSE. https://ideas.repec.org/p/cep/stidep/eopp64.html.

Almeida, Rita, and Reyes Aterido. 2015. "Investing in Formal On-the-Job Training: Are SMEs Lagging Much Behind?" *IZA Journal of Labor & Development* 4 (1): 8.

Almeida, Rita, and Marta de Faria. 2014. "The Wage Returns to On-the-Job Training: Evidence from Matched Employer-Employee Data." *IZA Journal of Labor & Development* 3 (1): 1–33.

Almeida-Santos, Filipe, and Karen Mumford. 2005. "Employee Training and Wage Compression in Britain." *The Manchester School* 73 (3): 321–342. doi:https://doi.org/10.1111/j.1467-9957.2005.00449.x.

Ariga, Kenn, and Giorgio Brunello. 2006. "Are Education and Training Always Complements? Evidence from Thailand." *ILR Review* 59 (4). SAGE Publications Inc: 613–629. doi:10.1177/001979390605900405.

Barron, John M., Dan A. Black, and Mark A. Loewenstein. 1993. "Gender Differences in Training, Capital, and Wages." *The Journal of Human Resources* 28 (2): 343–364.

Bartel, Ann P. 1995. "Training, Wage Growth, and Job Performance: Evidence from a Company Database." *Journal of Labor Economics* 13 (3). The University of Chicago Press: 401–425. doi:10.1086/298380.

Bassanini, Andrea, Alison Booth, Giorgio Brunello, Maria De Paola, and Edwin Leuven. 2007. "Workplace Training in Europe." In *Education and Training in Europe*, edited by Giorgio Brunello, Pietro Garibaldi, and Etienne Wasmer, 143–323. Oxford, UK: Oxford University Press. https://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780199210978.001.0001/acprof-9780199210978-chapter-9.

Bassanini, Andrea, Thomas Breda, Eve Caroli, and Antoine Rebérioux. 2013. "Working in Family Firms: Paid Less but More Secure? Evidence from French Matched Employer-Employee Data." *ILR Review* 66 (2). SAGE Publications Inc: 433–466. doi:10.1177/001979391306600206.

Becker, Gary. 1964. *Human Capital: A Theoretical and Empirical Analysis*. New York, NY: Columbia University Press and the NBER.

Berkel, Hanna Mareen, Marcelo Cardona, Henrik Hansen, John Rand, Paula Castro Rodriguez, Neda Trifkovic, Evert de Witte, Helge Zille, Khin Swe Latt, and Finn Tarp. 2018. *Myanmar Micro, Small, and Medium Enterprise Survey 2017: Descriptive Report*. Helsinki: Central Statistical Organization Myanmar and UNU-WIDER.

Biggs, Tyler. 1995. *Training, Technology and Firm-Level Efficiency in Sub-Saharan Africa*. 41970. Washington, DC: The World Bank. http://documents.worldbank.org/curated/en/1995/08/8907248/training-technology-firm-level-efficiency-sub-saharan-africa.

Bjerge, Benedikte, Nina Torm, and Neda Trifkovic. 2021. “Can Training Close the Gender Wage Gap? Evidence from Vietnamese SMEs.” *Oxford Development Studies* 49 (2). Routledge: 119–132. doi:10.1080/13600818.2021.1883572.

Blinder, Alan S. 1973. “Wage Discrimination: Reduced Form and Structural Estimates.” *The Journal of Human Resources* 8 (4). [University of Wisconsin Press, Board of Regents of the University of Wisconsin System]: 436–455. doi:10.2307/144855.

Blundell, Richard, Lorraine Dearden, Costas Meghir, and Barbara Sianesi. 1999. “Human Capital Investment: The Returns from Education and Training to the Individual, the Firm and the Economy.” *Fiscal Studies* 20 (1): 1–23.

Brunello, Giorgio. 2001. *On the Complementarity between Education and Training in Europe*. SSRN Scholarly Paper ID 273040. Rochester, NY: Social Science Research Network. doi:10.2139/ssrn.273040.

Cardoso, Ana Rute, and Rudolf Winter-Ebmer. 2010. “Female-Led Firms and Gender Wage Policies.” *ILR Review* 64 (1). SAGE Publications Inc: 143–163. doi:10.1177/001979391006400107.

Colombo, Emilio, and Luca Stanca. 2014. “The Impact of Training on Productivity: Evidence from a Panel of Italian Firms.” *International Journal of Manpower* 35 (8). Emerald Group Publishing Limited: 1140–1158. doi:10.1108/IJM-08-2012-0121.

Danquah, Michael, and Kunal Sen. 2021. “Informal Institutions, Transaction Risk, and Firm Productivity in Myanmar.” *Small Business Economics*, January. doi:10.1007/s11187-020-00441-w.

Dearden, Lorraine, Howard Reed, and John Van Reenen. 2006. “The Impact of Training on Productivity and Wages: Evidence from British Panel Data*.” *Oxford Bulletin of Economics and Statistics* 68 (4): 397–421. doi:10.1111/j.1468-0084.2006.00170.x.

Dietz, Daniel, and Thomas Zwick. 2020. “The Retention Effect of Training: Portability, Visibility, and Credibility.” *The International Journal of Human Resource Management* 0 (0). Routledge: 1–32. doi:10.1080/09585192.2020.1737835.

Dolton, P. J., G. H. Makepeace, and J. G. Treble. 1994. “Measuring the Effects of Training in the Youth Cohort Study.” In *The Market for Training: International Perspectives on Theory, Methodology and Policy*, edited by R. McNabb and K. Whitfield. Avebury: Ashage Publishing Ltd.

Ediger, Laura, and Chris Fletcher. 2017. *Labor Disputes in Myanmar: From Workplace to Arbitration Council*. San Francisco: BSR.

Falco, Paolo, Henrik Hansen, John Rand, Finn Tarp, and Neda Trifkovic. 2021. *Good Business Practices Improve Productivity in Myanmar’s Manufacturing Sector: Evidence from Two Matched Employer-Employee Surveys*. WIDER Working Paper. Helsinki: UNU-WIDER.

Frazis, Harley, and Mark A. Loewenstein. 2005. “Reexamining the Returns to Training: Functional Form, Magnitude, and Interpretation.” *The Journal of Human Resources* 40 (2): 453–476.

Goldin, Claudia. 2014. “A Grand Gender Convergence: Its Last Chapter.” *American Economic Review* 104 (4): 1091–1119.

Görg, Holger, Eric Strobl, and Frank Walsh. 2007. “Why Do Foreign-Owned Firms Pay More? The Role of On-the-Job Training.” *Review of World Economics / Weltwirtschaftliches Archiv* 143 (3): 464–482.

Görlitz, Katja. 2011. “Continuous Training and Wages: An Empirical Analysis Using a Comparison-Group Approach.” *Economics of Education Review* 30 (4): 691–701.

Goux, Dominique, and Eric Maurin. 2000. “Returns to Firm-Provided Training: Evidence from French Worker–Firm Matched Data1.” *Labour Economics* 7 (1): 1–19.

Government of Myanmar. 2015. *Small and Medium Enterprise Development Policy*. Nay Pyi Taw.

Green, Francis, Alan Felstead, Ken Mayhew, and Alan Pack. 2000. “The Impact of Training on Labour Mobility: Individual and Firm-Level Evidence from Britain.” *British Journal of Industrial Relations* 38 (2): 261–275. doi:10.1111/1467-8543.00162.

Haelermans, Carla, and Lex Borghans. 2012. “Wage Effects of On-the-Job Training: A Meta-Analysis.” *British Journal of Industrial Relations* 50 (3): 502–528. doi:10.1111/j.1467-8543.2012.00890.x.

Hansen, Henrik, John Rand, Finn Tarp, and Neda Trifkovic. 2021a. “On the Link Between Managerial Attributes and Firm Access to Formal Credit in Myanmar.” *The European Journal of Development Research*.
Hansen, Henrik, John Rand, Finn Tarp, and Neda Trifkovic. 2021b. “On the Link Between Managerial Attributes and Firm Access to Formal Credit in Myanmar.” *The European Journal of Development Research*, January. doi:10.1057/s41287-020-00318-4.
Hansen, Henrik, John Rand, and Neda Trifković. 2021. *Traditional and Modern Employee Benefits in Myanmar’s Manufacturing Sector*. WIDER Working Paper 41/2021. Helsinki: UNU-WIDER.
Hansen, Henrik, John Rand, and Ngu Wah Win. 2020. *The Gender Wage Gap in Myanmar: Adding Insult to Injury?* 20–05. *DERG Working Paper Series*. DERG Working Paper Series. University of Copenhagen. Department of Economics. Development Economics Research Group (DERG). https://ideas.repec.org/p/kud/kuderg/2005.html.
Hansen, Henrik, Bjørn Sørensen, Stewart McGill, Beatrice Gibertini, Neda Trifković, John Rand, Finn Tarp, et al. 2020. *Myanmar Micro, Small and Medium Enterprise Survey 2019*. Helsinki, Finland: UNU-WIDER, University of Copenhagen and Central Statistical Organization.
Hill, Elizabeth T. 2001. “Post-School-Age Training among Women: Training Methods and Labor Market Outcomes at Older Ages.” *Economics of Education Review* 20 (2): 181–191.
ILO. 2020. *State of Skills Myanmar*. Geneva: International Labour Organization.
Jones, Derek C., Panu Kalmi, and Antti Kauhanen. 2012. “The Effects of General and Firm-Specific Training on Wages and Performance: Evidence from Banking.” *Oxford Economic Papers* 64 (1). Oxford Academic: 151–175. doi:10.1093/oep/gpr013.
Kahyarara, Godius, and Francis Teal. 2008. “The Returns to Vocational Training and Academic Education: Evidence from Tanzania.” *World Development* 36 (11): 2223–2242.
Kandori, Michihiro. 1992. “Social Norms and Community Enforcement.” *The Review of Economic Studies* 59 (1). [Oxford University Press, Review of Economic Studies, Ltd.]: 63–80. doi:10.2307/2297925.
Kor, Yasemin Y., and Chamu Sundaramurthy. 2009. “Experience-Based Human Capital and Social Capital of Outside Directors.” *Journal of Management* 35 (4). SAGE Publications Inc: 981–1006. doi:10.1177/0149206308321551.
Kupets, Olga. 2018. “Employer-Provided Training, Innovation and Skills in Post-Soviet Countries.” *Economics of Transition and Institutional Change* 26 (4): 725–768. doi:10.1111/ecot.12162.
Lee, Jong-Wha, and Dainn Wie. 2017. “Wage Structure and Gender Earnings Differentials in China and India.” *World Development* 97 (C). Elsevier: 313–329.
Livingston, J. Sterling. 1971. “Myth of the Well-Educated Manager.” *Harvard Business Review*, January 1. https://hbr.org/1971/01/myth-of-the-well-educated-manager.
Lynch, Lisa M. 1992. “Private-Sector Training and the Earnings of Young Workers.” *The American Economic Review* 82 (1): 299–312.
Lynch, Lisa M., and Sandra E. Black. 1998. “Beyond the Incidence of Employer-Provided Training.” *Industrial and Labor Relations Review* 52 (1). Sage Publications, Inc.: 64–81. doi:10.2307/2525243.
MacLeod, W. Bentley. 2007. “Reputations, Relationships, and Contract Enforcement.” *Journal of Economic Literature* 45 (3). American Economic Association: 595–628.
Mainga, Wise, Philip Hirschsohn, and Winston Shakantu. 2009. “An Exploratory Review of the Relationship between Enterprise Training and Technology Upgrading: Evidence from South African Manufacturing Firms.” *The International Journal of Human Resource Management* 20 (9): 1879–1895.
Manning, A., and J. Swaffield. 2008. “The Gender Gap in Early-Career Wage Growth.” *Economic Journal* 118 (530): 983–1024.
McKenzie, David, and Christopher Woodruff. 2017. “Business Practices in Small Firms in Developing Countries.” *Management Science* 63 (9): 2967–2981. doi:10.1287/mnsc.2016.2492.

Meghir, Costas, Renata Narita, and Jean-Marc Robin. 2015. “Wages and Informality in Developing Countries.” *The American Economic Review* 105 (4). American Economic Association: 1509–1546.

Milio, Simona, Elitsa Garnizova, and Alma Shkreli. 2014. *Assessment Study of Technical and Vocational Education and Training (TVET) in Myanmar*. 994870513402676. *ILO Working Papers*. ILO Working Papers. International Labour Organization. https://ideas.repec.org/p/ilo/ilowps/994870513402676.html.

Min, Aung, and Toshihiro Kudo. 2013. “New Government’s Initiatives for Industrial Development in Myanmar.” In *Economic Reforms in Myanmar: Pathways and Prospects*, edited by H. Lim and Y. Yamada, 39–84. Bangkok: Bangkok Research Center.

Mincer, Jacob. 1974. *Schooling, Experience, and Earnings*. NBER Books. National Bureau of Economic Research, Inc.

Mincer, Jacob. 1991. “Job Training: Costs, Returns, and Wage Profiles.” In *Market Failure in Training?*, edited by David Stern and Jozef M. M. Ritzen, 15–39. Studies in Contemporary Economics. Berlin, Heidelberg: Springer. doi:10.1007/978-3-642-76986-3_2.

MOLIP and ILO. 2016. *Report on Myanmar Annual Labour Force Survey 2015*. Nay Pyi Taw, Myanmar: Ministry of Labour, Immigration and Population and International Labour Organization. https://www.mopfi.gov.mm/sites/default/files/upload_pdf/2020/08/LFS-English-Report-_17-11-2016.pdf.

Mueller, Valerie, Emily Schmidt, and Dylan Kirkleeng. 2020. “Structural Change and Women’s Employment Potential in Myanmar.” *International Regional Science Review* 43 (5). SAGE Publications Inc: 450–476. doi:10.1177/0160017620925139.

Neirotti, Paolo, and Emilio Paolucci. 2013. “Why Do Firms Train? Empirical Evidence on the Relationship between Training and Technological and Organizational Change.” *International Journal of Training and Development* 17 (2): 93–115. doi:https://doi.org/10.1111/ijtd.12003.

Ng, Ying Chu. 2005. “Training Determinants and Productivity Impact of Training in China: A Case of Shanghai.” *Economics of Education Review* 24 (3): 275–295.

Olivetti, Claudia, and Barbara Petrongolo. 2016. “The Evolution of Gender Gaps in Industrialized Countries.” *Annual Review of Economics* 8 (1). Annual Reviews: 405–434.

Parent, Daniel. 2003. “Employer-Supported Training in Canada and Its Impact on Mobility and Wages.” *Empirical Economics* 28 (3): 431–459. doi:10.1007/s001810200140.

Pischke, Jörn-Steffen. 2001. “Continuous Training in Germany.” *Journal of Population Economics* 14 (3): 523–548.

Rand, John, Finn Tarp, Neda Trifkovic, and Helge Zille. 2019. *Industrial Agglomeration in Myanmar*. wp-2019-3. *WIDER Working Paper Series*. WIDER Working Paper Series. World Institute for Development Economic Research (UNU-WIDER). https://ideas.repec.org/p/unu/wpaper/wp-2019-3.html.

Redmond, Paul, and Seamus Mcguinness. 2019. “The Gender Wage Gap in Europe: Job Preferences, Gender Convergence and Distributional Effects.” *Oxford Bulletin of Economics and Statistics* 81 (3). Department of Economics, University of Oxford: 564–587.

Rosenbaum, Paul R. 2002. *Observational Studies*. Springer Series in Statistics. New York, NY: Springer New York.

Rosholm, Michael, Helena Skyt Nielsen, and Andrew Dabalen. 2007. “Evaluation of Training in African Enterprises.” *Journal of Development Economics* 84 (1): 310–329.

Sauermann, Jan, and Anders Stenberg. 2020. *Assessing Selection Bias in Non-Experimental Estimates of the Returns to Workplace Training*. 13789. *IZA Discussion Papers*. IZA Discussion Papers. Institute of Labor Economics (IZA). https://ideas.repec.org/p/iza/izadps/dp13789.html.

Schmidt, Christoph M., and Klaus F. Zimmermann. 1991. “Work Characteristics, Firm Size and Wages.” *The Review of Economics and Statistics* 73 (4). The MIT Press: 705–710. doi:10.2307/2109410.

Spence, Michael. 1973. “Job Market Signaling.” *The Quarterly Journal of Economics* 87 (3): 355–374.

Tanaka, Mari. 2019. “Exporting Sweatshops? Evidence from Myanmar.” *The Review of Economics and Statistics* 102 (3). MIT Press: 442–456. doi:10.1162/rest_a_00827.

Troske, Kenneth R. 1999. “Evidence On The Employer Size-Wage Premium From Worker-Establishment Matched Data.” *The Review of Economics and Statistics* 81 (1). MIT Press: 15–26.

Veum, Jonathan R. 1999. “Training, Wages, and the Human Capital Model.” *Southern Economic Journal* 65 (3): 526–538.

World Bank. 2020. *Myanmar Living Conditions Survey 2017: Socio-Economic Report*. Washington, DC: World Bank Group. https://documents.worldbank.org/en/publication/documents-reports/documentdetail.

Xiao, Jin. 2002. “Determinants of Salary Growth in Shenzhen, China: An Analysis of Formal Education, on-the-Job Training, and Adult Education with a Three-Level Model.” *Economics of Education Review* 21 (6): 557–577.

Yamauchi, Futoshi, Nipon Poapongsakorn, and Nipa Srianant. 2009. “Technical Change and the Returns and Investments in Firm-Level Training: Evidence from Thailand.” *The Journal of Development Studies* 45 (10): 1633–1650.

Figures and Tables

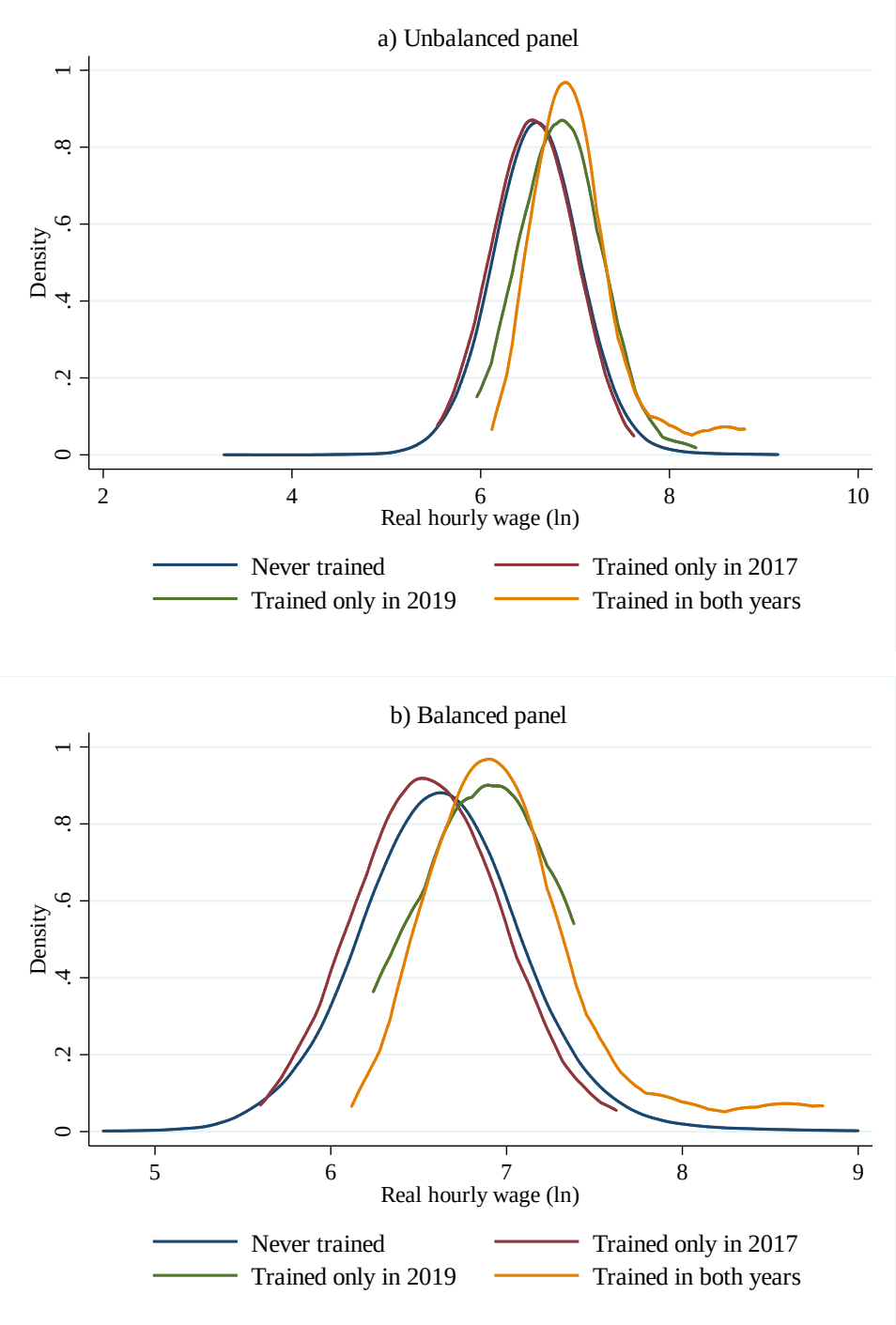

Figure 1: Wages of workers by training status

Table 1: Summary statistics

	2017	2019	Both years	Both years, balanced
Real hourly wage	722.29	901.10	804.17	839.40
Training				
Share of trained workers	0.07	0.04	0.06	0.08
Share of never trained workers	0.93	0.96	0.94	0.92
Share of workers trained only in 2017	0.07	0.00	0.04	0.06
Share of workers trained only in 2019	0.00	0.03	0.01	0.01
Share of workers trained in both years	0.00	0.01	0.00	0.01
Share of trained workers in a training firm	0.66	0.32	0.49	0.50
Share of workers with on-the-job training	0.07	0.03	0.05	0.08
Share of workers with off-the-job training	0.02	0.02	0.02	0.03
Number of training spells (if trained)	3.10	2.94	3.05	3.65
Number of on-the-job training spells (if trained)	2.46	2.14	2.36	2.97
Number of off-the-job training spells (if trained)	0.64	0.79	0.69	0.67
Share of workers with previous job training	0.01	0.01	0.01	0.00
Share of workers with certified training	n.a.	0.02	0.02	0.03
Share of workers with NSSA certified training	n.a.	0.00	0.00	0.01
Increase in wage after the training				
After on-the-job training	0.32	0.57	0.45	0.40
After off-the-job training	0.13	0.31	0.23	0.28
After more than one type of training	0.51	0.09	0.29	0.28
Worker's characteristics				
Age	32.75	33.84	33.25	35.18
Share of women	0.33	0.32	0.33	0.35
Tenure (years)	7.38	6.18	6.83	8.42
Prior experience (years)	2.61	3.88	3.19	3.28
Full time worker	0.97	0.95	0.96	0.95
Formal contract	0.05	0.06	0.06	0.06
Payment in kind	0.47	0.41	0.44	0.43
Share of workers without formal education	0.08	0.13	0.10	0.10
Share of workers with primary school	0.35	0.45	0.39	0.42
Share of workers with middle school	0.32	0.28	0.30	0.29
Share of workers with high school	0.20	0.08	0.14	0.13
Share of workers with college/Bachelor's/Master's degree	0.06	0.06	0.06	0.06
Observations	4805	4059	8864	2710
Enterprise variables				
Assets (million Ky. per employee)	28.66	33.32	31.01	31.13
Employment	15.41	16.44	15.93	15.94
Firm age	19.04	17.98	18.50	19.09
Family firm	0.30	0.24	0.27	0.26
Business association member	0.14	0.04	0.09	0.10
Business practices score	0.31	0.27	0.29	0.30
Relative wage compression	0.89	0.92	0.90	0.91
Government assistance for training	0.01	0.02	0.02	0.02
Inspected by tax authorities	0.51	0.56	0.54	0.55
Owner's characteristics				
Owner's age	50.01	48.68	49.34	49.28
Owner's experience	12.84	15.42	14.14	14.28
Female owner	0.29	0.31	0.30	0.30
Share of owners without formal education	0.00	0.04	0.02	0.02
Share of owners with primary school	0.19	0.18	0.19	0.17
Share of owners with middle school	0.24	0.23	0.23	0.23
Share of owners with high school	0.18	0.16	0.17	0.17
Share of owners with college/Bachelor's/Master's degree	0.35	0.37	0.36	0.37
Share of owners with other education type	0.04	0.02	0.03	0.03
Owner's preparedness to take risks	5.80	5.83	5.81	5.79
Observations	1669	1703	3372	2572

Notes: The question about certified training was introduced in the 2019 survey. All monetary variables are adjusted for the cost of living over time in different areas of Myanmar.

Table 2: Key differences between trained and untrained workers (t-test)

	Untrained	Trained	Difference	t-value
Real hourly wage	800.30	869.76	-69.46	-3.54***
Female worker	0.32	0.47	-0.15	-6.68***
Employee's age	34.27	35.36	-1.09	-2.20**
Tenure (years)	6.72	8.70	-1.97	-7.51***
Prior experience (years)	3.24	2.38	0.85	3.47***
Previous training				
Worker's education level				
No education	0.11	0.03	0.08	5.58***
Primary school	0.40	0.22	0.18	7.94***
Middle school	0.30	0.27	0.03	1.50
High school	0.14	0.27	-0.13	-8.27***
College/Bachelor's/Master's	0.05	0.21	-0.15	-14.14***
Observations	8370	494	8864	

Table 3: Key differences between training and non-training firms (t-test)

	Non-training	Training	Difference	t-value
Assets (million Ky. per employee)	30.83	33.82	-2.99	-0.55
Employment	12.50	67.03	-54.53	-20.73***
Firm age	18.51	18.49	0.02	0.02
Family firm	0.28	0.11	0.17	5.29***
Business association member	0.08	0.26	-0.19	-9.43***
Owner's age	49.45	47.66	1.79	2.16**
Owner's experience	14.26	12.45	1.81	2.62***
Owner female	0.29	0.39	-0.10	-2.93***
Owner’s risk-taking score	5.83	5.53	0.30	1.76*
Owner's education level				
No education	0.02	0.00	0.02	2.16**
Primary school	0.20	0.04	0.15	5.57***
Middle school	0.24	0.13	0.11	3.74***
High school	0.17	0.22	-0.05	-1.86*
College/Bachelor's/Master's	0.35	0.60	-0.25	-7.50***
Other	0.03	0.01	0.02	1.37
Observations	3160	212	3372	

Table 4: Differences in key worker characteristics by training status change (t-test)

	(1) Never trained	(2) Trained only in 2017	(3) Trained only in 2019	(4) Trained in both years	t-test values (1) vs. (2)	(1) vs. (3)	(1) vs. (4)	(2) vs. (3)	(2) vs. (4)	(3) vs. (4)
Real hourly wage (MMK)	800.30	750.82	1,020.72	1,410.11	2.15**	-5.75***	-9.06***	-7.32***	-7.75***	-2.74***
Female worker	0.32	0.39	0.59	0.75	-2.52**	-6.31***	-5.81***	-3.95***	-4.50***	-1.80*
Worker's age	33.20	34.53	32.36	34.63	-2.21**	0.86	-0.84	1.95*	-0.05	-1.54
Tenure (years)	6.65	8.10	8.19	10.85	-4.56***	-2.95***	-4.67***	-0.16	-3.00***	-3.16***
Prior experience (years)	3.24	2.30	2.36	3.15	3.15***	1.79*	0.10	-0.13	-1.09	-1.03
Previous training	0.00	0.06	0.20	0.00	-15.40***	-30.45***	0.33	-4.39***	1.63	3.14***
Full time worker	0.96	0.97	0.99	1.00	-1.43	-1.87*	-1.34	-1.19	-1.05	-0.58
Formal contract	0.04	0.22	0.33	0.50	-14.62***	-14.65***	-14.02***	-2.33**	-3.96***	-2.00**
Payment in kind	0.43	0.66	0.69	0.68	-8.18***	-5.75***	-3.12***	-0.72	-0.24	0.20
Worker's education level										
No education	0.11	0.01	0.04	0.13	5.58***	2.29**	-0.38	-2.01**	-4.52***	-1.89*
Primary school	0.40	0.22	0.23	0.20	6.61***	3.74***	2.59***	-0.26	0.31	0.43
Middle school	0.30	0.28	0.24	0.28	0.85	1.46	0.39	0.84	0.09	-0.42
High school	0.14	0.34	0.12	0.13	-10.61***	0.65	0.22	4.85***	2.83***	-0.14
College/Bachelor's/Master's	0.05	0.14	0.37	0.28	-6.97***	-15.03***	-6.29***	-5.46***	-2.23**	1.05
Observations	8,370	334	120	40						

Table 5: Differences in key worker characteristics in a balanced worker panel (t-test)

	(1) Never trained	(2) Trained only in 2017	(3) Trained only in 2019	(4) Trained in both years	t-test values (1) vs. (2)	(1) vs. (3)	(1) vs. (4)	(2) vs. (3)	(2) vs. (4)	(3) vs. (4)
Real hourly wage (MMK)	833.13	755.56	1,018.56	1,410.11	2.07**	-2.27**	-7.45***	-4.55***	-5.66***	-1.63
Female worker	0.34	0.44	0.72	0.75	-2.63***	-4.56***	-5.51***	-2.94***	-3.61***	-0.29
Worker's age	35.19	35.53	33.16	34.63	-0.40	1.11	0.35	1.20	0.51	-0.77
Tenure (years)	8.31	9.27	9.03	10.85	-1.95*	-0.68	-2.69***	0.23	-1.69*	-1.82*
Previous training	0.00	0.04	0.00	0.00	-6.94***	0.25	0.28	1.13	1.26	.
Prior experience (years)	3.34	2.62	1.69	3.15	1.64	1.75*	0.23	1.03	-0.60	-1.44
Full time worker	0.95	0.99	0.97	1.00	-2.10**	-0.48	-1.45	0.75	-0.72	-1.12
Formal contract	0.04	0.18	0.16	0.50	-7.57***	-3.06***	-13.51***	0.33	-4.36***	-3.22***
Payment in kind	0.42	0.63	0.66	0.68	-5.32***	-2.75***	-3.31***	-0.26	-0.50	-0.17
Worker's education level										
No education	0.11	0.02	0.00	0.13	3.55***	1.98**	-0.33	0.79	-3.06***	-2.11**
Primary school	0.44	0.25	0.16	0.20	4.74***	3.21***	3.02***	1.09	0.60	-0.47
Middle school	0.29	0.26	0.31	0.28	0.88	-0.26	0.22	-0.63	-0.22	0.34
High school	0.11	0.34	0.09	0.13	-8.42***	0.34	-0.23	2.84***	2.71***	-0.41
College/Bachelor's/Master's	0.05	0.14	0.44	0.28	-4.70***	-9.92***	-6.46***	-4.15***	-2.14**	1.44
Observations	2,483	155	32	40						

Table 6: Determinants of training

	Firm LPM (1) Training	Firm LPM (2) Training	Firm FE (3) Training	LPM (4) Training	Firm FE (5) Training	Worker FE (6) Training	Worker + firm FE (7) Training	Firm FE (8) On-the-job training	Worker + firm FE (9) On-the-job training	Firm FE (10) Off-the-job training	Worker + firm FE (11) Off-the-job training
Assets/empl., log	0.001	-0.000	-0.004	0.006***	0.003	0.004	0.004	0.004	0.006	-0.002	-0.003
	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)
Employment, ln	0.040***	0.032***	0.005	0.019***	-0.022	-0.025	-0.025	-0.017	-0.022	-0.011	-0.008
	(0.005)	(0.005)	(0.008)	(0.004)	(0.014)	(0.018)	(0.019)	(0.014)	(0.018)	(0.007)	(0.010)
Business association member	0.072***	0.059***	0.045**	0.064***	0.084***	0.115***	0.115***	0.084***	0.106***	-0.012	-0.008
	(0.018)	(0.018)	(0.020)	(0.010)	(0.023)	(0.025)	(0.025)	(0.023)	(0.025)	(0.015)	(0.017)
Owner's preparedness to take risks	0.005***	0.004***	0.002	-0.002	-0.010***	-0.016***	-0.016***	-0.010***	-0.015***	-0.005***	-0.006***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Family firm	-0.002	-0.003		-0.003							
	(0.006)	(0.005)		(0.005)							
Firm age	-0.000	-0.000		0.000							
	(0.000)	(0.000)		(0.000)							
Owner's age	0.001**	0.001**		-0.000							
	(0.000)	(0.000)		(0.000)							
Owner's experience (years)	-0.000	-0.000		-0.000							
	(0.000)	(0.000)		(0.000)							
Owner female	0.006	0.008		-0.000							
	(0.007)	(0.007)		(0.005)							
Business practices		0.047***	0.054***	-0.007	-0.015	-0.018	-0.018	-0.022	-0.034	-0.024*	-0.048***
		(0.014)	(0.018)	(0.009)	(0.023)	(0.027)	(0.027)	(0.022)	(0.027)	(0.014)	(0.018)
Relative wage compression		-0.015	0.018	-0.027*	-0.008	-0.022	-0.022	-0.001	-0.008	-0.013	-0.036*
		(0.018)	(0.018)	(0.014)	(0.013)	(0.029)	(0.029)	(0.012)	(0.027)	(0.010)	(0.021)
Government assistance for training		0.201***	0.056	0.146***	0.057	0.235***	0.235***	0.038	0.199***	0.042	0.103**
		(0.058)	(0.092)	(0.031)	(0.065)	(0.058)	(0.059)	(0.064)	(0.054)	(0.045)	(0.050)
Inspected by tax authorities		0.014**	0.017**	0.015***	-0.003	-0.003	-0.003	-0.003	-0.002	0.008	0.011
		(0.007)	(0.008)	(0.005)	(0.012)	(0.013)	(0.013)	(0.011)	(0.012)	(0.007)	(0.009)
Female worker				0.015**	-0.005			-0.004		-0.001	
				(0.006)	(0.007)			(0.006)		(0.005)	
Worker's age				0.000	0.000			0.000		-0.000	
				(0.000)	(0.000)			(0.000)		(0.000)	
Tenure (years)				0.001***	0.001*			0.001		0.001*	
				(0.000)	(0.001)			(0.001)		(0.000)	
Prior experience (years)				0.000	-0.000			-0.001		0.001	
				(0.000)	(0.001)			(0.001)		(0.000)	
Previous training				0.450***	0.375***			0.313***		0.250***	
				(0.055)	(0.094)			(0.096)		(0.093)	
Primary School				0.024***	0.010			0.011*		0.002	

				(0.005)	(0.006)			(0.006)		(0.003)	
Middle School				0.029***	0.012			0.013*		0.002	
				(0.006)	(0.007)			(0.007)		(0.004)	
High School				0.058***	0.031***			0.029***		0.012**	
				(0.009)	(0.009)			(0.008)		(0.006)	
College/Bachelor's/Master's				0.082***	0.040**			0.023		0.034***	
				(0.015)	(0.016)			(0.014)		(0.011)	
Full time worker				-0.010	0.003	0.014	0.014	0.001	0.014	0.003	0.007
				(0.008)	(0.015)	(0.024)	(0.024)	(0.014)	(0.024)	(0.004)	(0.009)
Formal contract				0.105***	0.002	-0.000	-0.000	-0.007	-0.002	0.033	0.018
				(0.018)	(0.032)	(0.050)	(0.050)	(0.031)	(0.047)	(0.025)	(0.049)
Payment in kind				0.018***	0.008	0.006	0.005	0.010	0.001	-0.005	-0.004
				(0.005)	(0.010)	(0.015)	(0.015)	(0.008)	(0.014)	(0.007)	(0.011)
Constant	-0.131***	-0.115**	0.028	-0.107***	0.095	0.177*	0.178*	0.065	0.137	0.116**	0.180***
	(0.046)	(0.049)	(0.067)	(0.039)	(0.086)	(0.103)	(0.104)	(0.087)	(0.102)	(0.054)	(0.067)
Owner's education	Yes	Yes	No	Yes	No	No	No	No	No	No	No
Year x State/Region FE	Yes	Yes	No	Yes	No	No	No	No	No	No	No
State/Region FE	Yes	Yes	No	Yes	No	No	No	No	No	No	No
Year x Industry FE	Yes	Yes	No	Yes	No	No	No	No	No	No	No
Industry FE	Yes	Yes	No	Yes	No	No	No	No	No	No	No
Year x Rice mill FE	Yes	Yes	No	Yes	No	No	No	No	No	No	No
Rice mill	Yes	Yes	No	Yes	No	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3372	3372	2572	8864	8723	2710	2704	8723	2704	8723	2704
R^2	0.15	0.18	0.03	0.26	0.07	0.11	0.68	0.08	0.68	0.04	0.57

Notes: Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 7: Wage returns to workplace training

	All firms						Training firms				
	OLS	Firm FE	Worker FE	Worker + firm FE	OLS	Firm FE	OLS	Firm FE	Worker FE + firm FE	OLS	Firm FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln
Training	0.071***	0.055**	0.067**	0.068**			0.066**	0.072**	0.129***		
	(0.019)	(0.024)	(0.034)	(0.034)			(0.026)	(0.030)	(0.047)		
Training (no.)					0.012***	0.014**				0.012***	0.010*
					(0.003)	(0.006)				(0.004)	(0.006)
Owner's education	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No
Employee education	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker controls	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	Yes
Year x State/Region FE	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No
State/Region FE	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No
Year x Industry FE	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No
Industry FE	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No
Year x Rice mill FE	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No
Rice mill	Yes	No	No	No	Yes	No	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8864	8723	2710	2704	8864	8723	1012	1008	450	1012	1008
R^2	0.30	0.17	0.20	0.73	0.30	0.11	0.46	0.27	0.76	0.46	0.26

Notes: Dependent variable is the log of real hourly wage. Firm controls include: assets, employment, firm age, family firm indicator, business association membership, receiving government assistance, being inspected by tax authorities, owner's age, experience, preparedness to take risks, sex and education level. Estimations with firm fixed effects exclude firm age, family firm indicator, owner's age, experience, sex and education level. Worker controls include: worker's age, sex (female), education level, tenure, years of total work experience, full-time worker indicator, having a formal contract and in-kind wage supplement. Estimations with worker fixed effects exclude worker's age, sex (female), education level, tenure and years of total work experience. Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 8: Wages and training type

	All firms					Training firms				
	OLS	Firm FE	Worker FE	Worker + firm FE	Worker + firm FE	OLS	Firm FE	Worker FE	Worker + firm FE	Worker + firm FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln
On-the-job training	0.042*	0.025	0.060*	0.061*		0.025	0.059*	0.127**	0.127**	
	(0.022)	(0.027)	(0.036)	(0.036)		(0.026)	(0.035)	(0.049)	(0.050)	
Off-the-job training	0.039	0.060*	-0.015	-0.015		0.039	0.029	-0.032	-0.032	
	(0.032)	(0.034)	(0.041)	(0.041)		(0.037)	(0.036)	(0.045)	(0.046)	
Duration of on-the-job training (days)					0.005**					0.005**
					(0.002)					(0.002)
Duration of off-the-job training (days)					-0.001					-0.001
					(0.001)					(0.001)
Owner's education	Yes	No	No	No	No	Yes	No	No	No	No
Employee education	Yes	Yes	No	No	No	Yes	Yes	No	No	No
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker controls	Yes	Yes	No	No	No	Yes	Yes	No	No	No
Year x State/Region FE	Yes	No	No	No	No	Yes	No	No	No	No
State/Region FE	Yes	No	No	No	No	Yes	No	No	No	No
Year x Industry FE	Yes	No	No	No	No	Yes	No	No	No	No
Industry FE	Yes	No	No	No	No	Yes	No	No	No	No
Year x Rice mill FE	Yes	No	No	No	No	Yes	No	No	No	No
Rice mill	Yes	No	No	No	No	Yes	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8864	8723	2710	2704	2704	1012	1008	450	450	450
R^2	0.30	0.17	0.20	0.73	0.74	0.46	0.26	0.33	0.76	0.78

Notes: Dependent variable is the log of real hourly wage. Firm and worker controls are the same as in Table 7. Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 9: Prior training, current and starting worker wages

	OLS	Firm FE	OLS	Firm FE		
	(1)	(2)	(3)	(4)	(5)	(6)
	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Starting hourly wage, ln	Starting hourly wage, ln
Previous training	0.091**	0.042	0.059	0.022	-0.305***	-0.221**
	(0.043)	(0.047)	(0.042)	(0.046)	(0.076)	(0.086)
Training			0.071***	0.055**		
			(0.019)	(0.024)		
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Worker controls	Yes	Yes	Yes	Yes	Yes	Yes
Year x State/Region FE	Yes	No	Yes	No	Yes	No
State/Region FE	Yes	No	Yes	No	Yes	No
Year x Industry FE	Yes	No	Yes	No	Yes	No
Industry FE	Yes	No	Yes	No	Yes	No
Year x Rice mill FE	Yes	No	Yes	No	Yes	No
Rice mill	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8864	8723	8864	8723	8861	8720
R^2	0.30	0.17	0.30	0.17	0.23	0.16

Notes: Firm and worker controls are the same as in Table 7. Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 10: Certified training and worker wages

	OLS	Firm FE	OLS	Firm FE
	(1)	(2)	(3)	(4)
	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln
Training certificate	0.319***	0.117*		
	(0.056)	(0.063)		
NSSA training certificate			0.364**	0.080
			(0.182)	(0.114)
Firm controls	Yes	No	Yes	No
Worker controls	Yes	Yes	Yes	Yes
State/Region FE	Yes	No	Yes	No
Industry FE	Yes	No	Yes	No
Rice mill	Yes	No	Yes	No
Observations	4059	3627	4059	3627
R^2	0.24	0.80	0.24	0.80

Notes: NSSA stands for National Skills Standards Authority. Estimates based on 2019 data. Firm and worker controls are the same as in Table 7. Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 11: Does the return to training depend on gender and worker skills?

	OLS	Firm FE	Worker + firm FE	OLS	Firm FE	Worker + firm FE	OLS	Firm FE	Worker + firm FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln	Real hourly wage, ln
Training # Female worker	0.149***	0.070*	0.086						
	(0.034)	(0.040)	(0.061)						
Training # Tenure (years)				0.008**	0.009**	0.009			
				(0.004)	(0.004)	(0.006)			
Training # Primary School							-0.256***	-0.200*	-0.436***
							(0.086)	(0.121)	(0.053)
Training # Middle School							-0.235***	-0.158	-0.393***
							(0.085)	(0.123)	(0.064)
Training # High School							-0.223***	-0.139	-0.387***
							(0.084)	(0.124)	(0.070)
Training # College/Bachelor's/Master's							-0.089	-0.060	-0.299***
							(0.089)	(0.126)	(0.078)
Training	0.001	0.024	0.030	0.002	-0.024	-0.018	0.273***	0.194	0.446***
	(0.026)	(0.029)	(0.039)	(0.034)	(0.043)	(0.061)	(0.078)	(0.122)	(0.053)
Female worker	-0.235***	-0.166***	-0.024	-0.225***	-0.161***		-0.225***	-0.160***	
	(0.010)	(0.012)	(0.059)	(0.010)	(0.012)		(0.010)	(0.012)	
Tenure (years)	0.004***	0.006***		0.003***	0.006***	0.002	0.004***	0.006***	
	(0.001)	(0.001)		(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	
Primary School	-0.003	0.004		-0.002	0.004		0.002	0.008	0.027
	(0.014)	(0.016)		(0.014)	(0.016)		(0.014)	(0.016)	(0.028)
Middle School	0.029*	0.040**		0.029**	0.041**		0.033**	0.042***	0.079**
	(0.015)	(0.016)		(0.015)	(0.016)		(0.015)	(0.016)	(0.032)
High School	0.019	0.033*		0.020	0.035**		0.023	0.034*	0.077*
	(0.016)	(0.018)		(0.016)	(0.018)		(0.017)	(0.018)	(0.045)
College/Bachelor's/Master's	0.102***	0.097***		0.104***	0.097***		0.085***	0.086***	-0.026
	(0.021)	(0.024)		(0.021)	(0.024)		(0.022)	(0.025)	(0.113)
Constant	5.928***	6.289***	6.467***	5.922***	6.287***	6.460***	5.918***	6.283***	6.424***
	(0.081)	(0.134)	(0.150)	(0.081)	(0.134)	(0.150)	(0.081)	(0.134)	(0.148)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year x State/Region FE	Yes	No	No	Yes	No	No	Yes	No	No
State/Region FE	Yes	No	No	Yes	No	No	Yes	No	No
Year x Industry FE	Yes	No	No	Yes	No	No	Yes	No	No
Industry FE	Yes	No	No	Yes	No	No	Yes	No	No
Year x Rice mill FE	Yes	No	No	Yes	No	No	Yes	No	No
Rice mill	Yes	No	No	Yes	No	No	Yes	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8864	8723	2704	8864	8723	2704	8864	8723	2704
R^2	0.31	0.17	0.73	0.31	0.17	0.73	0.31	0.17	0.74

Notes: Firm and worker controls are the same as in Table 7. Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 12: Wage returns to training by industry groups

	Rice mill	Food, beverages and tobacco	Textiles, apparel and leather	Wood, paper and printing	Coke, chemicals, rubber and minerals	Metal	Elect. eq., machinery and motor vehicles	Furniture and other manufacturing
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Training	-0.227*	0.106*	0.199**	-0.096	0.305**	-0.765***	-0.060	0.047
	(0.122)	(0.056)	(0.080)	(0.125)	(0.122)	(0.269)	(0.142)	(0.264)
Observations	142	1154	360	358	188	198	164	140
R^2	0.78	0.78	0.69	0.74	0.73	0.75	0.71	0.74

Notes: Estimations with firm and worker fixed effects. Firm and worker controls are the same as in Table 7. Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Table 13: Wage returns to training by industry (only significant estimates are shown)

	Rice mill	Food	Beverages	Wearing apparel	Printing	Coke and refined petroleum
	(1)	(2)	(3)	(6)	(15)	(17)
Training	-0.227*	0.139**	-0.209*	0.415**	1.631**	-0.783***
	(0.122)	(0.069)	(0.106)	(0.171)	(0.697)	(0.270)
Observations	142	960	100	74	86	134
R^2	0.78	0.76	0.88	0.88	0.75	0.74

Notes: Estimations with firm and worker fixed effects. Firm and worker controls are the same as in Table 7. Robust standard errors in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Appendix

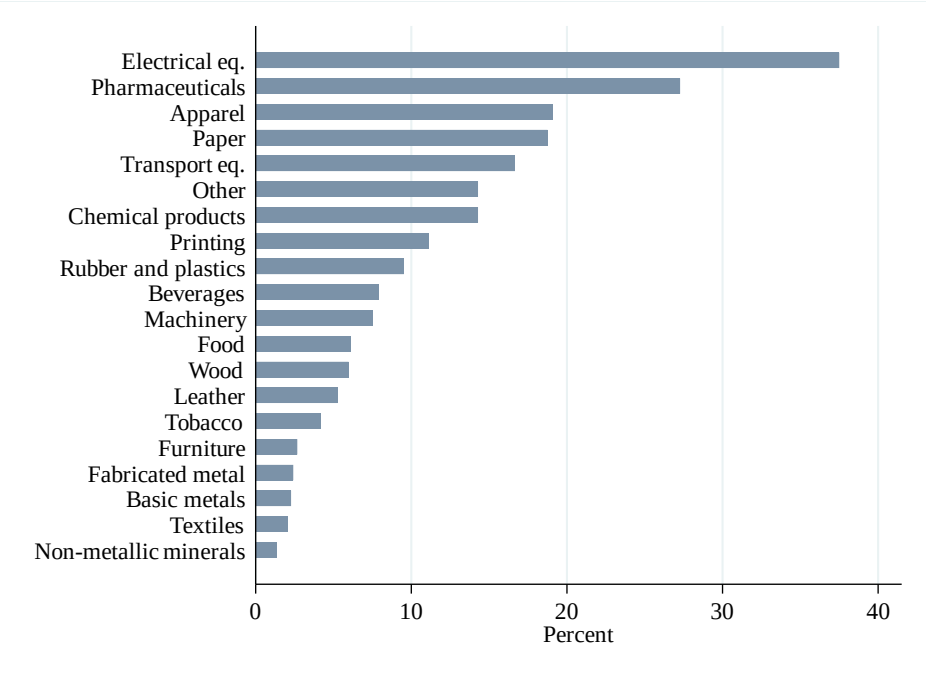

Figure A1: Prevalence of training in different industries

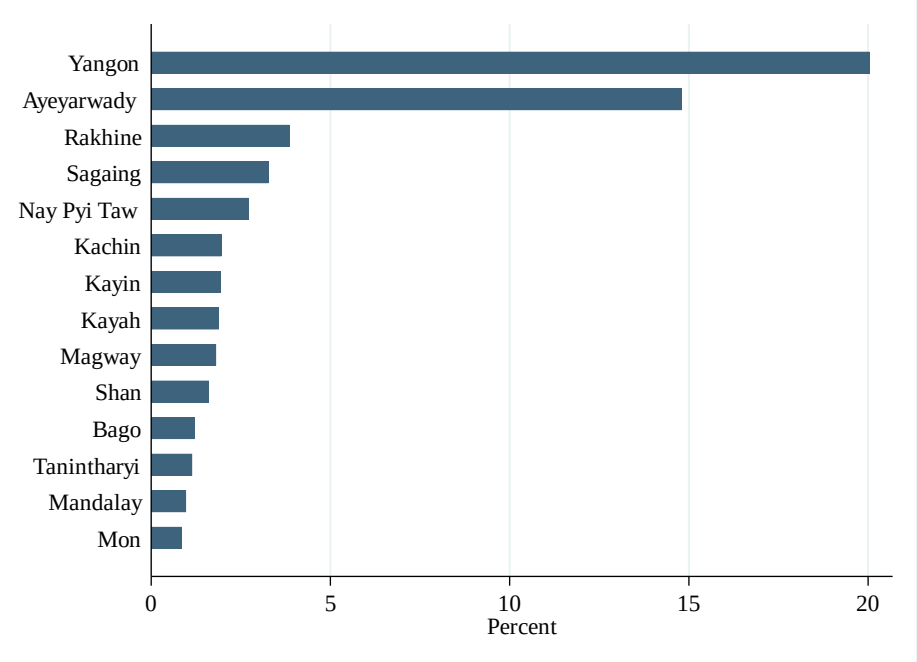

Figure A2: Prevalence of training in different regions/states of Myanmar