Training Opportunities for "Marginal Workers" in Japan

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Abstract

Using microdata from the 2007 *Employment Status Survey*, this study empirically examines the situation concerning workers' participation in employer-provided training and in self-development (activities pursued by workers to improve their skills on their own). Controlling for individuals' attributes, we estimate the probabilities that workers pursue either kind of training, focusing in particular on how much lower the training probabilities for marginal workers (women, the less educated, and nonregular workers) are than for the relevant reference groups. Further, employing a standard human capital theory framework, we test the hypothesis that workers' predicted labor market attachment – that is, how much time a worker will spend in the labor market – and, similarly, workers' remaining tenure – that is, how many years a worker will continue to work for their present employer – determines employer-provided training and self-development. We find the following. First, controlling for age, employer size, years of tenure, industry, and occupation, the training probabilities for women, the less educated, and nonregular workers are lower than for the relevant reference groups. The differences are particularly large for employer-provided training. On the other hand, for self-development, there is almost no difference by sex, and the differences by age and by employer size are also small. In addition, differences in employer-provided training probabilities across levels of educational achievement and employment status are largest for the young. Second, while greater predicted labor market attachment increases participation in job training at the initiative of both employers (i.e., employer-provided training) and workers themselves (i.e., self-development), longer predicted remaining tenure increases participation in job training mainly at the initiative of employers. Third, the disadvantages for women and the less

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educated with regard to employer-provided training diminish to some extent once we control for labor market attachment and remaining tenure. However, the disadvantages for nonregular workers remain largely unchanged even when controlling for labor market attachment and remaining tenure.

1 Introduction

An issue that in recent years has attracted growing attention in Japan is that although the share of women and nonregular employees in the workforce has increased, job training opportunities for them remain limited when compared to male and regular employees. Yet, as numerous studies have shown, job training and skill development play a central role in the formation of job skills and consequently are a key element underpinning wages (e.g., Kurosawa, 2001; Kawaguchi, 2006). Thus, as has been pointed out, the fact that so-called "marginal workers" such as women and nonregular employees receive little job training and skill development is an important reason for wage inequality.

To examine differences in the participation in job training by sex and employment status, Hara, Kurosawa, and Yamamoto (2009), for example, looked at employer-provided training for nonregular employees directly employed by firms on fixed-term contracts (part-time, casual, and contract workers) using the *Basic Survey of Human Resources Development* by the Ministry of Health, Labour and Welfare.[3] Among other things, they showed that even at the same workplace, there exist large differences between regular and nonregular employees in terms of the probability that they would attend off-the-job training courses and the time spent on training courses, and those differences are smaller at workplaces with well developed human resource management systems. Meanwhile, Kosugi and Kimura (2009), using, like the present study, the 2007 *Employment Status*

3 However, although the Basic *Survey* of Human Resources Development provides comprehensive information on job training and skill development in Japan, it suffers from a number of limitations. For example, the survey focuses only on private enterprises and establishments that employ 30 or more people on a regular basis. As a result, it covers less than one-tenth of all establishments and less than half of all employees. Moreover, the survey also does not include temporary workers (i.e., workers employed on a daily basis or for a determined period within a month who were employed for less than 18 days in either of the two months before the day of the implementation of the survey). Further, while the survey does ask firms and establishments questions on dispatched and workers, no information on individuals is available. Finally, the survey also does not include those not in employment.

Survey by the Ministry of Internal Affairs and Communications, and focusing on the young, examined the relationship between their employment status and job career on the one hand and job skill development on the other. They found that the percentage of so-called "freeters" (job-hopping part-timers) that did any training provided by the employer or any self-development, i.e., pursued activities to improve their skills on their own, was much lower than that for regular employees.

These studies clearly illustrate the low rates of participation in job training by women and nonregular workers. The purpose of this study is to look at the reasons for this low participation rate from the perspective of economic theory by examining the patterns of employer-provided job training as well as self-development using microdata from the 2007 *Employment Status Survey*, which has a wider coverage of workers than the *Basic Survey of Human Resources Development*. Specifically, we estimate the probability that a worker did any training or self-development controlling for individual attributes and examine how this probability differs particularly for marginal workers (women, less-educated workers, and nonregular workers).

Standard human capital theory suggests that because job training represents investment in the future, important determinants of such investment are how much longer a given worker will remain in the labor market and how much longer that worker will continue to work for a specific firm. This is because the longer a worker is expected to remain in the labor market, the longer the payback period for any such investment in human capital will be. In addition, standard human capital theory also suggests that where, for technological reasons or because of market frictions, skills are firm-specific, the costs involved in human capital investment will be paid by firms or shared between firms and employees in the form of lower wages (see, e.g., Acemoglu and Pischke 1998, 1999). Under these circumstances, firms are likely to investment more in employees that are expected to stay at the firm for a longer time.

These predictions of human capital theory are well known, but empirical investigations of these issues are scarce. An important reason for this is that it is difficult to gauge future expectations from existing data sources. One notable example is Royalty (1996), who used the panel data of the *National Longitudinal Survey of Youth 1979* of the United States to estimate job-to-job and job-to-nonemployment turnover probabilities and showed that the estimated probabilities provide a

good explanation of the probability of receiving training. In this paper, we take a somewhat similar approach, although we have to rely on cross-section data. What we do is to calculate the "attachment index" for each worker, that is, how much time each worker can be expected to spend in the labor market until retirement by adding up the average working time until the standard retirement age for each of the worker's attributes. In addition, we similarly calculate each worker's expected "remaining tenure," that is, how many more years each worker can be expected to continue to work at the current firm. Greater attachment to the labor market as a whole implies a longer payoff period for investment in general human capital and we would therefore expect this to be associated with more job training initiated by both employers and workers themselves. On the other hand, because longer remaining tenure implies a longer payoff period for firm-specific human capital investment, we would expect this to be associated with more job training initiated mainly by employers. In order to test these hypotheses, we examine to what extent these indicators proxying the length of the payoff period of investment explain differences in job training participation by sex and by employment status.

The main conclusions of our analysis are as follows. First, when we hold workers' age, size of employer (measured in terms of the number of employees), tenure, industry, and occupation fixed, the job training probabilities for women, the less educated, and nonregular workers are smaller than for the respective reference groups. The difference is particularly large for employer-provided training. On the other hand, with regard to self-development, there is almost no difference by sex, and differences by workers' age and size of employer are also small. Moreover, differences in job training probabilities for employer-provided training by educational attainment and employment status are greater among the young.

Second, whereas differences in the expected degree of workers' labor market attachment (i.e., the predicted future employment period overall) affect participation in both employer-provided training and training initiated by workers themselves (self-development), differences in remaining tenure (i.e., the predicted future employment period at a particular firm) mainly affect participation in employer-provided job training.

Third, expected labor market attachment and expected remaining tenure, i.e., the proxy

variables for the payoff period of human capital investment, explain more than half of the difference between men and women in the probability of participation in employer-provided training. In contrast, these proxy variables explain very little of the difference in training probabilities between regular and nonregular workers. These results suggest that a considerable part of the difference in job training participation between men and women is due to differences in the length of the payoff period of investment, but the differences in job training participation between regular and nonregular workers arise largely because the type of work they are engaged in differs and there are fundamental differences between the two groups in the quality and quantity of required human capital accumulation.

The remainder of this study is organized as follows. In Section 2, we outline the data we use and start our analysis by presenting the ratios of workers involved in training (employer-provided and self-development) for each worker attribute based on an aggregation of our microdata. In Section 3, we then estimate training probabilities controlling for worker attributes. Next, in Section 4, we test various hypotheses regarding the relationship between labor market attachment and remaining tenure on the one hand and job training on the other and look at the extent to which this influences the training probabilities for marginal workers. Section 5 concludes.

2 Data and basic patterns

The source of our data is the 2007 *Employment Status Survey*, which surveys job training and self-development useful for work conducted in the preceding one year. Distinguishing between whether training was conducted at the initiative of the employer or the worker himself, it provides a breakdown of such training into the following categories: (a) training at the workplace (this category applies only to employer-provided training); (b) attendance of college or graduate school courses; (c) attendance of courses at a special training school or other vocational school; (d) attendance of courses at a public occupational skills development facility; (e) attendance of short courses or seminars; (f) participation in study group meetings or workshops; (g) taking distance learning courses; (h) self-learning (this category applies only to self-development), and (i) other. In this study, we will refer to training initiated by the employer as “employer-provided training” and

training initiated by the worker as "self-development."

To start with, we calculate the training ratios by workers' attributes. We limit our sample to those aged 15-59 and exclude those in enrolled in full-time education. Moreover, we exclude from all occupied persons company executives, the self-employed (with or without employees), family workers, and those doing piecework at home, because their work status is somewhat different in nature from the concept of a "worker" we focus on here. As for those not in employment, we only include those wishing to work. Furthermore, we exclude observations for individuals where we think there are recording errors.[4] We then calculate the training ratio for each of a number of aggregate categories, distinguishing by sex, age group, educational attainment, etc.[5] We do so for a sample consisting of occupied persons and those not in employment but wishing to work as well as a subsample consisting only of occupied persons, and for the latter calculate training ratios for additional aggregate categories, distinguishing by industry, occupation, size of employer (measured in terms of the number of employees) and tenure.

Table 1 shows, for the comprehensive sample consisting of occupied persons and those not in employment but wishing to work, the training ratio by sex, employment status, educational attainment, and age bracket in five-year intervals. As Table 1 indicates, the job training ratio for women is about 10 percentage points lower than that for men, and this difference is mainly due to differences in participation in employer-provided training. The training ratios for nonregular employees are lower than those for regular employees, with the difference being more pronounced for employer-provided training. Because the ratio of those not in employment receiving employer-provided training is, for obvious reasons, very low, the job training ratio for this group is also very low. Nevertheless, a closer look shows that when it comes to self-development, the ratio is higher than that for part-time and casual workers and not that different from dispatched workers. Looking at educational attainment, both the employer-provided training ratio and the

4 For example, cases where the years of tenure are greater than 45, the age at which the present job was taken up is less than 15, etc.

5 For the calculation, we use the simple number of observations for occupied persons plus those not in employment but wishing to work, occupied persons only, as well as for each aggregate category. The training ratios for each category as well as the average age and tenure are calculated as weighted averages.

self-development ratio increase with the level of education, and the size of the discrepancies between the different groups is quite striking. Next, by age group, we find that the training ratio overall is highest for those in their 20s and early 30s and then gradually declines with age. However, taking a closer look, we find that with regard to employer-provided training, the ratio is highest, at 35.8 percent, for those in their early 20s and then declines, but it remains stable at around 30 percent for those in their 30s to early 50s, pointing at a pattern in which employed workers continuously receive employer-provided training. On the other hand, self-development peaks at around 25 percent for those in their late 20s, then remains stable at around 20 percent for those in their 30s and 40s, and then declines again for those in their 50s.

Next, Table 2 shows the training ratios for occupied persons only, considering additionally training ratios by industry (broken down into 16 broad industry categories), by occupation (broken down into 10 broad occupational categories), by size of employer (in terms of number of employees), and by years of tenure in five-year brackets. Although the gap between women and men is somewhat smaller than in Table 1, the overall pattern for sex, employment status, education, and age group remains virtually unchanged by focusing on occupied persons only. By industry, the highest ratios can be found in the education and learning support sector; moreover, employer-provided training is particularly widespread in finance and insurance as well as electricity, gas, heat supply, and water, while self-development is especially common in medical, health care and welfare as well as information and communications. By occupation, the overall ratio is high for specialist and technical occupations as well as administrative and managerial occupations, with employer-provided training especially widespread in administrative and managerial occupations and self-development especially widespread in specialist and technical occupations. By size of employer, the larger the employer, the higher is the training ratio. Although this applies to both types of training, the pattern is particularly pronounced for employer-provided training. The highest ratios, though, are found for those working at government offices.

Finally, looking at the role of tenure, contrary to our expectation that investment in job training would concentrate on those with a shorter tenure, we find that the longer workers have been working for their current employer, the higher is the ratio of those doing any training, with a peak of

about 50 percent for those with a tenure of 25-29 years. We suspect that this reflects increased training for career development within firms, such as in the form of management training programs, as is indicated by the different patterns for employer-provided training and self-development, with the latter being relatively stable at around 20 percent and showing comparatively little variation across tenure groups. Overall, the patterns with regard to training ratios for the different aggregate categories by sex, age group, education, or employment status confirm once again that training ratios for marginal workers (women, nonregular workers, and the less educated) are low.

3 Estimation of training probabilities

Next, using probit estimation, we examine the probability that workers will do any employer-provided training or self-development, controlling for the attributes discussed in Section 2. To begin with, we use the pooled sample consisting of occupied persons and those not in employment but wishing to work in order to discover to what extent being in employment affects training probabilities. In the next step, we then confine our sample to occupied persons only to examine how workplace attributes such as industry, occupation, and employer size affect training probabilities.[6]

Starting with the pooled sample, we use as dependent variables of our probit estimation whether a person received employer-provided training or not and whether a person engaged in any self-development or not. As explanatory variables, we include a female dummy, employment status dummies (setting regular employees as the reference group), education dummies (with high school graduates as the reference group), and dummies for five-year age brackets (with 20-24 year-olds as the reference group). Table 3 shows the estimation results. In contrast with Tables 1 and 2, where the training ratio for women was lower than that for men, here we find that the probability of receiving employer-provided training is actually higher for women, and this difference is statistically significant. For self-development, the coefficient is even larger and indicates that the probability of this kind of training is 2.6 percentage points higher for women than for men.

Turning to the employment status, we find that the training probabilities for nonregular workers

6 For basic statistics of the variables, refer to Appendix Tables 1(a) and 1(b).

are lower than those for regular workers, and the difference is larger for employer-provided training than for self-development. Among nonregular workers, the probabilities are lowest for part-time and casual workers. For example, the probability of receiving employer-provided training is roughly 20 percentage points lower for such workers than for regular employees. For contract employees, the gap vis-à-vis regular employees is roughly half the size of that of part-time and casual workers (8 percentage points). As for those not in employment, it is only natural that their probability of receiving employer-provided training is very small: it is 30 percentage points below that for regular employees. On the other hand, when it comes to self-improvement, the gap vis-à-vis regular workers for those not in employment is only 3 percentage points, which is a smaller gap than that for part-time and casual workers and for dispatched workers. It could be said that this shows that those not in employment but wishing to work engage in self-development to improve their employability.

Turning to the effects of educational attainment, we find that even when we hold other factors fixed, the training probabilities of the highly educated are very high both with regard to employer-provided training and self-development. This is a phenomenon already well documented in previous research on Japan, the United States, Germany, and other countries. As highlighted by Altonji and Spletzer (1991), it can be interpreted as suggesting that because for those with greater learning ability the rate of return to education and job training is higher, there is a positive correlation between years of education and receiving job training. In addition, we find that differences in training probability by educational attainment are more pronounced for self-development than for employer-provided training.

Looking at the role of age, the results generally indicate that the younger workers are, the more likely they are to receive training. However, that probability does note decline monotonically with age, and for employer-provided training the probability is actually highest for those in their 40s and early 50s. For self-development, the probability declines with age from the 40s onward.

Next, limiting our sample to occupied persons and using the same dependent variables as above, we conduct the same estimation but in addition to the female dummy and the employment status, education, and age group dummies, we also include employer size (using workers working for firms

with 1-9 employees as the reference group) and tenure, i.e., the number of years a worker has worked for the present employer (using 0-4 years as the reference group). The estimation results are presented in Table 4, with column (2) showing the results when the dummies to control for industry (major classification, 16 industries), column (3) showing those when the dummies to control for occupation (major classification, 10 occupations), and column (4) showing those when both sets of dummies are included.

Starting again by looking at the female dummy, we find that for employer-provided training, the coefficient is positive when the industry and occupation dummies are not included, but becomes negative when they are. Especially controlling for industry has a large impact on the coefficient. This indicates that it is likely that women tend to work in industries where the probability of receiving training is high. On the other hand, when it comes to self-development, there are almost no differences between men and women once industry and occupation are controlled for. As for the employment status, the probability of receiving employer-provided training is lower for nonregular than for regular employees, but when it comes to self-development, the differences by employment status are much smaller. Next, looking at the role of education, we find that the higher the educational attainment, the higher is the training probability. However, when the industry and occupation dummies are included, that difference becomes considerably smaller. This means that more highly educated workers are more likely to work in industries and occupations where the training probability is high. Moreover, the differences by educational attainment are larger for self-development than employer-provided training. This suggests that, as mentioned earlier, it is likely that the return on learning a new skill is higher for the more educated. Looking at the effect of age, while the probability of employer-provided training decreases with age from the late 20s onward, for self-development no significant differences can be observed until the early 40s.

Turning to the role of employer size, the results indicate that the larger the employer, the higher is the training probability. The probability of receiving employer-provided training is about 30 percentage points higher for workers at firms with more than 1,000 employees or at government offices than for workers at firms with fewer than 10 employees. However, with regard to self-development, differences by employer size are quite small. Next, looking at tenure, the

probability of employer-provided training increases with tenure and reaches a peak in the neighborhood of 30-39 years. This is a finding that differs from our theoretical expectation and implies that workers receive continuous employer-provided training as part of a process of career development with length of service. The fact that this pattern can also be found in the estimation including the occupation dummies and hence a dummy for administrative and managerial occupations suggests that this employer-provided training for career development continues to takes place across occupations.[7] On the other hand, the longer workers' tenure, the less likely it is that they engage in self-development.

Summarizing these findings, we can say that the training probabilities of women, less educated workers, and nonregular workers are still lower when controlling for age, employer size, tenure, industry, and occupation. The differences are particularly large when it comes to employer-provided training. And comparing the results for these groups of marginal workers, the disadvantage is largest for nonregular workers. On the other hand, when it comes to self-development, there is almost no difference between the sexes, while differences by age or size of employer are also small. Taken together, these results suggest that the probability of receiving employer-provided training is noticeably smaller for women, those at small firms, those not in employment, and nonregular employees, though on the other hand it seems that women and those employed at small firms compensate for this by pursuing self-development. In contrast, the difference between the less educated and the better educated is even greater for self-development than for employer-provided training.

To examine the relatively large differences in employer-provided training probabilities by sex, employment status, and education in greater detail, we additionally estimate the coefficients separately for each age group (Appendix Table 2). Doing so, we find that for women, the negative estimated value is largest for those in their 30s. With regard to education, the positive value for the highly educated becomes more pronounced for the young. And with regard to the employment status, we find that for part-time and casual workers and for dispatched workers, the negative

7 Pischke (2001) arrives at a similar finding regarding this kind of continuous training, showing that in Germany training remains high for workers into their 40s.

estimated values are especially large for those in their 20s. These results indicate that differences in training probability by educational attainment and employment status are more pronounced among the young.

4 The relationship between labor market attachment, remaining tenure, and job training

4.1 Theoretical framework and empirical methodology

According to standard human capital theory models, the amount of investment in general human capital at a particular point in time is determined by the marginal rate of return on investment and marginal cost. The marginal rate of return on investment is determined by the length of the payoff period, the future price of human capital, and workers' learning ability. On the other hand, marginal cost of investment is mainly determined by the opportunity cost of training, that is, the current wage rate.

When human capital is firm-specific as a result of technological factors or market frictions, there is a divergence between workers' outside option (the wage rate in the labor market) and their marginal productivity because they cannot sell those skills to other firms. Depending on the bargaining power of the firm, the firm reaps part of this divergence as rent and the discounted present value of that rent determines the amount of human capital investment undertaken by the firm. The discounted present value of that rent depends on workers' remaining employment period, the future value of commodities made with firm-specific human capital, workers' learning ability, and the difficulty with which workers can switch jobs (i.e., the degree of market friction).

The purpose here is to examine whether we can explain the differences in training probabilities for marginal workers found in the preceding section with differences in workers' remaining employment period. Differences in training probabilities between men and women and across workers with different employment statuses are often explained with differences in expected employment periods in the labor market and/or lengths of employment at a specific firm. Royalty (1996), as mentioned above, using the *National Longitudinal Survey of Youth* panel dataset of the United States, examined the effect of turnover probabilities on receiving job training. Specifically,

she estimated turnover probabilities, that is, the probability of staying in the current job, of job-to-job turnover, and of job-to-nonemployment turnover, and compares the estimated[8] training probabilities when job turnover probabilities are included and when they are not. She finds that the probability of receiving employer-provided training is higher for men, but when turnover probabilities are included, that effect declined by 25 percent.[9] She also shows that, on the other hand, the probability of receiving employer-provided training for the highly educated is no longer significantly higher when turnover probabilities are taken into account.

The approach we take in this study is to examine whether differences in the length of future employment and differences in predicted years of tenure with a specific firm can explain training probabilities, and moreover, to what extent they explain differences in training probabilities of marginal workers. Specifically, we examine whether, as human capital theory predicts, differences in the length of future employment (expected labor market attachment) affect the probabilities of both employer- and worker-initiated training and, moreover, whether differences in remaining employment at the same firm (expected remaining tenure) affect the probability mainly of employer-initiated training. In addition, we examine to what extent taking these factors into account changes the gap in training probabilities of marginal workers vis-à-vis their reference groups.

4.1.1 The attachment index (AI)

Even if they change their job, the more workers are attached to the labor market (that is, work for a longer period or more hours), the higher is their incentive to participate in training and raise their job skills. To gauge this labor market attachment, we calculated the total amount of time each worker can be expected to spend in the labor market, i.e., whether he or she can be expected to continue working for many years, and taking into account whether he or she works full-time or part-time, by adding the average labor time until standard retirement age for each of the attributes of each worker.

8 Setting those receiving no training as the reference group, she conducted multinomial probit regressions between training conducted by the employer and off-the-job training (vocational training school, business school, courses, etc.).

9 I.e., the coefficient for the male dummy declined from 0.011 to 0.008.

Specifically, we divide the sample of 15-59 year-olds (sample A) into 442 groups according to their attributes (age, sex, education). In this sample, in contrast with the sample used in Sections 2 and 3, we include those in full-time education. This time, occupied persons also include company executives, the self-employed (with or without employees), family workers, and those doing piecework at home, while those not in employment also include those not wishing to work. We want to calculate the average annual working time for each group (in the case of those not in employment we apply zero). Further, dividing the cumulative annual working hours until age 59 of each group by 2000 hours (corresponding to one year of full-time work, i.e. 40 hours per week times 50 weeks), we construct the attachment index (AI).[10] Next, we divide the sample of occupied persons used in the estimation in Section 3 (sample B) into groups according to the same attributes (age, sex, education) (415 groups). We then apply the AI of a particular group in sample A to each of the same 415 groups in sample B. Further, from the AI we then construct a set of interval dummies (from 0 to 15).[11]

This index is an indicator showing how many years a worker of a given sex and with a given education will work in the period that remains from his or her age until age 59. It should be noted that what we are doing here is to take the average employment patterns for the observations in the *Employment Status Survey* and assume that the cross-section observations represent the observations of the employment patterns for individuals over time. This is a strong assumption, but it is a standard one made, for example, in estimations of wage functions using cross-section data.

4.1.2 The remaining tenure (RT)

In the case that for some reason a skill acquired through job training is not perfectly valued in the market, firms will have an incentive to invest in workers because workers will not change their job even if the firm does not offer a wage increase commensurate with the increase in skill, thus allowing the firm to reap profits that exceed the cost of the investment. Consequently, how long a

10 For example, in the case of a 15 year old, we sum up the work time for each year from age 16 to 59. For a 59 year-old, we set it to 0. The AI value shows the corresponding years of full-time employment.

11 The 0 interval dummy is for AI values from 0 to less than 1, the 1 interval dummy is for AI values from 1 to less than 2, etc., while the 15 interval dummy is for AI values of 15 and greater.

worker with given attributes is expected to continue working for the present employer is likely to be an important determining factor of employer-provided training. Therefore, as our second measure, we calculate the expected remaining tenure (RT) for each attribute, which gauges how long a worker with given attributes can be expected to continue working for the present employer.

Specifically, we use the sample of occupied persons from Sections 2 and 3 (labeled sample B in the preceding subsection) and divide this into 6,151 groups according to workers' attributes (sex, education, employment status, industry, size of employer, and whether workers entered a firm directly upon graduation).[12] Because for some groups the number of observations may be very small, we employ not the average years of tenure but the median to avoid any distortion from outliers. We subtract from the median value of years of tenure for each group the actual years of tenure and set this as remaining tenure (RT). If the value thus obtained is negative, we set RT to zero. Moreover, we use a dummy that takes a value of 1 if RT is set to zero to represent strong attachment to a firm that is unascertainable from workers' observable attributes. In addition, we also construct interval dummies (from 0 to 15) from RT.[13]

The reason that we distinguish whether workers took up their current employment directly upon graduation is that there is a strong tendency for fresh graduate recruits to follow a career path through promotion within the firm, while mid-career recruits represent a much more fluid working force and can be expected to subsequently follow a career through job changes. Here, we mechanically regard as having started their present job as fresh graduate recruits those for whom the age at which they took up the job (current age minus years of tenure) was 15-16 years in the case of junior high school graduates, 18-19 years in the case of high school graduates, 20-21 years in the case of graduates of vocational schools, junior colleges, or technical colleges, and 22-25 in the case of graduates of colleges and graduate schools.

Figure 1 shows the distribution as well as the average and median for the RT of 30-year old male regular employees who graduated from college or graduate school, with the upper panel for fresh graduate recruits and the lower panel for mid-career recruits. Whereas the RT of graduate

12 We do not consider occupation as one of workers' attributes because workers' occupation can change with age, such as when they change into administrative and managerial occupations.
13 The RT interval dummies are constructed in exactly the same way as the AI interval dummies.

recruits is around 12 years, that for mid-career recruits, even though they otherwise have the same attributes in terms of sex, education, and employment status, is strikingly lower at around 2 years. Based on this, we expect that those recruited upon graduation are in jobs in which they will continue to work for a long time and the probability that they receive employer-provided training is consequently high.

4.2 AI, RT, and training probabilities

We start by looking at the relationships between AI and RT on the one hand and training probabilities on the other. As before, we use a probit estimation, with the dependent variables being whether a person received employer-provided training or not and whether a person engaged in any self-development or not. As explanatory variables, we use the interval dummies for AI and RT.

The results are presented in Figures 2 and 3, which on the horizontal axis show the values of the interval dummies and on the vertical axis the size of the coefficient (training probabilities) from the probit estimation. As can be seen, for AI, the higher the index (i.e., the greater the predicted future labor market attachment), the higher is the training probability. What is more, there are no great differences in the shapes of the curves for employer-provided training and for self-development. For RT, we also find that the higher the value, the higher is the training probability, but there is a considerable difference in the shapes of the curves for the two types of training. That is, whereas the probability of employer-provided training displays a steep increase, the probability of self-development moves sideways until 6 years of RT and after that rises relatively gently. This result shows that whereas greater length of future employment as represented by AI is associated with an increase job training at the initiative of both workers and firms, greater length of predicted employment at a specific firm, represented by RT, is associated mainly with an increase in job training at the initiative of firms.

The preceding results show that the length of the expected payoff period for investment in human capital affects participation in job training. But what we also want to know is what explanatory power the various factors determining training probabilities have. In Section 3, we showed that the training probabilities for marginal workers such as women, nonregular employees,

and the less educated were significantly lower than for the reference groups. Moreover, it is sometimes claimed that these patterns are attributable to the fact that the attachment of marginal workers to the labor market as a whole and to a specific firm is comparatively low and that a long investment payoff period cannot be expected. Therefore, in our next step, we look at the extent to which the negative coefficient for marginal workers changes when we estimate training probabilities controlling for AI and RT. If short expected investment payoff periods explain why the job training probabilities of marginal workers are low, then we would expect that by controlling for the AI and RT variables, the gap vis-à-vis the references groups, that is, the size of the negative coefficient, should shrink.

Table 5 shows the estimation result for the probabilities of employer-provided training and self-development using sex, employment status, and education as explanatory variables. Moreover, we also include the industry, employer size, and fresh graduate recruit dummies used for the construction of groups in the calculation of RT. This is to take into account the possibility that these factors directly affect workers' job training probability through technological aspects of production activities and worker heterogeneity. The results in columns (1) and (3) do not include AI and RT, while those in columns (2) and (4) do.

Comparing the results for employer-provided training, we find that in column (1) the difference between men and women is 3.5 percentage points, but by controlling for AI and RT in column (2), the different shrinks by two-thirds to 1.4 percentage points. That is, more than half of the difference between men and women in the probability of receiving employer-provided training can be explained by the two factors of how much longer someone will continue to be employed in the labor market (AI) and how much longer he or she will continue to work for the present employer (RT). On the other hand, only about one-fifth of the low training probability for the less educated can be explained by these factors. This suggests that while the length of the investment payoff period explains some of the difference in training probabilities by level of educational attainment, a large part of the difference is due to differences in the returns from job training (that is, differences in learning efficiency) and differences in the discount rate for future earnings. Finally, for nonregular workers, the differences do not diminish even when AI and RT are included. We suspect

that a large part of the difference in training probabilities between regular and nonregular workers is due to differences in the type of work they do and the resulting need or otherwise for long-term skill formation.

In sum, our results indicate that differences in labor market attachment and expected remaining tenure at the present employer affect training probabilities in a way that is consistent with the predictions of human capital theory. Moreover, the results show that these factors partly explain the low training probabilities for women and the less educated. However, concerning the low training probability of nonregular workers, other factors are more important. While we do not clearly know the reasons for the difference in training probabilities between regular and nonregular workers, what we now do know is that this difference cannot be explained with differences in expectations regarding their future employment behavior. Our hunch therefore is that there are fundamental differences in the need for skill accumulation in the work of regular and nonregular employees that bring about the large differences in job training probabilities.

5 Conclusion

Using microdata from the 2007 *Employment Status Survey*, this study empirically examined the situation concerning workers' participation in employer-provided training and in self-development. We began by calculating training ratios for different worker attributes and then, controlling for individuals' attributes, estimated training probabilities. Doing so, we particularly focused on how much lower than for the relevant reference groups the participation probabilities for marginal workers (women, the less educated, and nonregular workers) were. Further, employing a standard human capital theory framework, we investigated for each worker attribute how differences in participation in employer-provided training and in self-development could be explained. Specifically, calculating each workers' expected labor market attachment – that is, how much time that worker will spend in the labor market until retirement – and, similarly, each worker's remaining tenure – that is, how many years each worker with given attributes will continue to work for his/her present employer – we examined the relationship of these variables with training probabilities. Further, we estimated to what extent these factors explain the low training

probabilities of marginal workers.

Our main findings were as follows. First, controlling for age, employer size, years of tenure, industry, and occupation, we found that training probabilities for women, the less educated, and nonregular workers were lower than for the relevant reference groups. The differences were particularly large for employer-provided training. On the other hand, for self-development, there was almost no difference by sex, and the differences by age and by employer size were also small. This pattern could be interpreted as suggesting that women and workers at small firms try to make up for receiving less employer-provided training through self-development. On the other hand, the differences between the less educated and the better educated were even greater for self-development than for employer-provided training. A likely explanation for this is that learning ability and discount rates for future earnings differ across those with different levels of educational attainment. In addition, we found that differences in employer-provided training probabilities across levels of educational achievement and employment status were greatest for the young.

Second, we estimated the relationship between training probabilities on the one hand and, on the other, workers' attachment to the labor market, represented by the attachment index (AI), and how long a worker can be expected to continue working for his current employer, represented by remaining tenure (RT). The results indicated that the higher the AI (i.e., the greater the predicted future labor market attachment), the higher are the training probabilities. In addition, there were no great differences in the shapes of the curves for employer-provided training and self-development For RT, we also found that the higher the value, the higher is the training probably, but the slope of the curve showing the effect of RT was much greater for employer-provided training than for self-development. Conforming with the predictions of human capital theory, this shows that whereas greater length of future employment increases job training participation at the initiative of both workers and employers, differences in predicted years of employment at a specific firm raise job training participation mainly at the initiative of firms. Moreover, these results suggest that there is firm-specificity in the formation of skills through employer-provided training due to technology-related factors and/or market frictions.

Third, the disadvantages for women and the less educated with regard to employer-provided

training diminish once we control for AI and RT in the estimation. On the other hand, for nonregular workers, the negative coefficient remains largely unchanged even when controlling for AI and RT.

Based on the above results, we can derive the following policy implications and issues for future research.

First, although it appears that women are more likely to be employed in occupations or industries with a high training probability, once we control for employment status and educational attainment in the same industry or occupation, women's training probability is still lower than that for men. This can be thought to be an example of statistical discrimination arising from differences in work duties and, based on this, differences in expected future employment spans. Consequently, policies to promote that women remain in employment will simultaneously have the effect of reducing the gap between women and men in job training participation.

Second, although part of the overall difference in training probabilities by educational attainment can be explained by the fact that the better educated tend to be employed in occupations with higher training probabilities, there remain differences even in the same industry or occupation. This is possibly because educational attainment captures unobserved differences such as with regard to individual learning ability or the discount rate for future earnings. Consequently, efforts should be made from the stage of school education onward to raise individuals' learning ability.

Third, we found that the higher the labor market attachment (AI) and the longer the remaining tenure at a firm (RT), the higher is the probability of job training. Especially for high values of RT, a remarkable rise in the training probability is observed. This shows that marginal workers, for whom RT is low, have little hope of receiving employer-provided training. On the other hand, although such workers do not receive much employer-provided training, the probability that they engage in self-development is also low. It would therefore be difficult to claim that the fact that they receive insufficient employer-provided training is compensated for by self-development. This suggests that in order to raise the skills and hence the incomes of marginal workers, further policy measures are required to provide training opportunities that serve as an alternative to employer-provided training.

Fourth, the low training probabilities for nonregular workers show almost no change even when we control for RT and AI. Moreover, although RT and AI partly explain the low training probabilities for women and the less educated, gaps remain even when controlling for these two factors. This shows that the scarcity of training opportunities for marginal workers has deep-seated reasons other than attachment to the labor market and the expected length of work for a particular employer. Although at this point in time it is only conjecture, a likely reason seems to be that marginal workers are only assigned to tasks that require little training to begin with. The fact that differences in training probabilities by employment status are all the larger for the young, who have many training opportunities, is likely to give rise to large differences in the subsequent accumulation of job skills. These findings mean that more in-depth research on the causes of disparities in job training between regular and nonregular workers is necessary.

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Tables & Figures

Table 1: Job training ratios, occupied persons and persons not in employment but wishing to work (%)

		Any job training (employer-provided or self-development)	Employer-provided training	Self-development
Occupied persons plus persons not in employment but wishing to work		38.7	29.9	19.5
Sex	Male	43.6	35.3	20.3
	Female	33.5	24.2	18.8
Employment status	Regular employees	47.9	40.3	22.5
	Part-time and casual workers	22.5	15.1	11.5
	Dispatched workers from temporary labor agencies	29.6	16.9	17.9
	Contract employees	40.6	29.1	21.7
	Persons not in employment	18.8	4.7	15.9
Education	Primary or junior high school	16.4	12.5	6.0
	Senior high school	29.8	23.8	11.8
	Vocational school, junior college	41.5	31.3	22.2
	College, graduate school	57.5	43.9	33.8
Age	Average	38.4	38.7	37.8
	15 to 19	33.4	26.7	12.1
	20 to 24	45.7	35.8	22.9
	25 to 29	44.3	33.0	24.7
	30 to 34	40.2	29.8	21.8
	35 to 39	37.7	28.3	19.5
	40 to 44	38.6	30.1	19.5
	45 to 49	39.7	31.7	19.5
	50 to 54	35.8	29.1	16.3
	55 to 59	29.8	24.0	13.0

Source: Authors' calculation based on data from the 2007 *Employment Status Survey*, Ministry of Internal Affairs and Communications.

Table 2: Job training ratios, occupied persons (%)

		Any job training (employer-provided or self-development)	Employer-provided training	Self-development
Occupied persons		41.7	33.6	20.1
Sex	Male	44.8	37.1	20.2
	Female	37.7	29.3	19.9
Employment status	Regular employees	47.9	40.3	22.5
	Part-time and casual workers	22.5	15.1	11.5
	Dispatched workers from temporary labor agencies	29.6	16.9	17.9
	Contract employees	40.6	29.1	21.7
Education	Primary or junior high school	17.9	14.9	5.5
	Senior high school	32.1	26.8	11.8
	Vocational school, junior college	45.4	36.0	23.2
	College, graduate school	59.3	47.0	33.9
Age	Average	38.5	38.7	37.9
	15 to 19	36.7	32.0	11.3
	20 to 24	48.2	39.5	23.1
	25 to 29	47.2	36.7	25.4
	30 to 34	43.9	34.2	22.7
	35 to 39	41.5	32.7	20.4
	40 to 44	41.8	33.9	20.2
	45 to 49	42.2	35.0	19.8
	50 to 54	38.2	32.0	16.6
	55 to 59	32.1	26.9	13.2
Industry	Agriculture, forestry and fisheries	21.7	13.7	11.8
	Mining, construction	35.2	27.8	15.2
	Manufacturing	34.4	28.6	13.3
	Electricity, gas, heat supply and water	63.6	55.5	28.3
	Information and communications	52.4	38.7	30.9
	Transport	28.5	23.9	9.9
	Wholesale and retail trade	33.1	26.5	13.9
	Finance and insurance	62.9	55.8	27.8
	Real estate	44.1	31.2	25.7
	Eating and drinking places, accommodations	23.6	15.4	12.4
	Medical, health care and welfare	59.1	49.2	33.2
	Education, learning support	69.3	56.6	43.6
	Compound services	58.9	54.2	20.5
	Services not elsewhere classified	40.3	30.2	20.9
	Government not elsewhere classified	58.3	49.7	27.5

(continued)

		Any job training (employer-provided or self-development)	Employer-provided training	Self-development
Occupation	Specialist and technical workers	66.3	54.2	40.6
	Administrative and managerial workers	65.8	60.0	27.6
	Clerical workers	42.8	33.1	21.3
	Sales workers	41.0	34.3	16.8
	Service workers	37.8	29.0	18.8
	Security workers	57.8	49.5	25.0
	Agriculture, forestry and fishery workers	24.5	15.8	13.4
	Transport and communication workers	25.9	22.2	7.9
	Production process and related workers	28.9	23.9	10.2
Size of employer (number of employees)	1 to 9 persons	25.2	15.3	14.6
	10 to 29	29.4	21.3	14.7
	30 to 99	33.9	25.9	16.1
	100 to 299	40.4	32.9	18.4
	300 to 499	44.7	36.7	20.3
	500 to 999	47.2	39.7	21.1
	1000 and over	51.1	43.9	22.6
	Government	64.3	55.9	34.9
Tenure	Average	11.5	12.3	10.5
	0 to 4 years	38.7	28.6	20.7
	5 to 9	39.5	31.9	19.2
	10 to 14	41.2	34.4	18.7
	15 to19	44.8	38.1	19.8
	20 to 24	48.8	42.5	22.0
	25 to 29	50.9	45.5	21.9
	30 to 34	49.5	44.0	20.6
	35 to 39	44.1	39.5	16.0
	40 and over	35.1	31.1	10.8

Source: See Table 1.

Table 3: Job training probabilities, occupied persons and persons not in employment but wishing to work

		Employer-provided training	Self-development
	Female	0.007 (0.002)	0.026 (0.001)
Employment status	Regular employees (reference)		
	Part-time and casual workers	-0.196 (0.001)	-0.072 (0.001)
	Dispatched workers from temporary labor agencies	-0.170 (0.003)	-0.035 (0.003)
	Contract employees	-0.080 (0.003)	-0.001 (-0.003)
	Persons not in employment	-0.292 (0.001)	-0.031 (0.002)
Education	Primary or junior high school	-0.108 (0.003)	-0.069 (0.002)
	Senior high school (reference)		
	Vocational school, junior college	0.099 (0.002)	0.104 (0.002)
	College, graduate school	0.167 (0.002)	0.214 (0.002)
Age	15 to 19	0.035 (0.008)	0.000 (-0.006)
	20 to 24 (reference)		
	25 to 29	-0.043 (0.003)	-0.009 (0.002)
	30 to 34	-0.058 (0.003)	-0.019 (0.002)
	35 to 39	-0.056 (0.003)	-0.024 (0.002)
	40 to 44	-0.036 (0.003)	-0.017 (0.002)
	45 to 49	-0.023 (0.003)	-0.019 (0.002)
	50 to 54	-0.037 (0.003)	-0.033 (0.002)
	55 to 59	-0.061 (0.003)	-0.044 (0.002)
	Observations	427,558	427,558
	Pseudo R2	0.111	0.067

Notes: Marginal effects at the means of the independent variables. Standard errors robust to some types of misspecification in parentheses.

Table 4: Job training probabilities, occupied persons

		Employer-provided training				Self-development			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Female	0.024	-0.036	-0.014	-0.037	0.035	0.000	0.000	-0.009
		(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(-0.002)	(-0.002)	(0.002)
Employment status	Regular employees (reference)								
	Part-time and casual workers	-0.193	-0.171	-0.185	-0.168	-0.075	-0.062	-0.064	-0.056
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	Dispatched workers from temporary labor agencies	-0.199	-0.171	-0.176	-0.163	-0.044	-0.020	-0.018	-0.012
		(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
	Contract employees	-0.102	-0.100	-0.096	-0.096	-0.016	-0.017	-0.010	-0.012
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Education	Primary or junior high school	-0.077	-0.067	-0.061	-0.062	-0.064	-0.059	-0.053	-0.052
		(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
	Senior high school (reference)								
	Vocational school, junior college	0.108	0.059	0.063	0.047	0.105	0.069	0.063	0.054
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	College, graduate school	0.126	0.085	0.068	0.064	0.187	0.151	0.130	0.124
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	15 to 19	0.019	0.032	0.019	0.031	-0.021	-0.015	-0.020	-0.015
		(0.009)	(0.009)	(0.009)	(0.009)	(0.007)	(0.007)	(0.007)	(0.007)
	20 to 24 (reference)								
	25 to 29	-0.050	-0.049	-0.048	-0.048	0.002	0.003	0.003	0.003
		(0.003)	(0.003)	(0.003)	(0.003)	(-0.003)	(-0.003)	(-0.003)	(-0.003)
	30 to 34	-0.073	-0.073	-0.070	-0.072	0.002	0.004	0.004	0.003
		(0.003)	(0.003)	(0.003)	(0.003)	(-0.003)	(-0.003)	(-0.003)	(-0.003)
	35 to 39	-0.083	-0.086	-0.081	-0.084	-0.003	-0.003	-0.002	-0.003
		(0.003)	(0.003)	(0.003)	(0.003)	(-0.003)	(-0.003)	(-0.003)	(-0.003)
	40 to 44	-0.075	-0.083	-0.076	-0.082	-0.002	-0.005	-0.003	-0.005
		(0.003)	(0.003)	(0.003)	(0.003)	(-0.003)	-0.003	-0.003	(0.003)
	45 to 49	-0.077	-0.087	-0.076	-0.086	-0.010	-0.015	-0.009	-0.013
		(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	50 to 54	-0.101	-0.110	-0.097	-0.107	-0.028	-0.031	-0.024	-0.028
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	55 to 59	-0.126	-0.133	-0.122	-0.131	-0.041	-0.044	-0.037	-0.040
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)

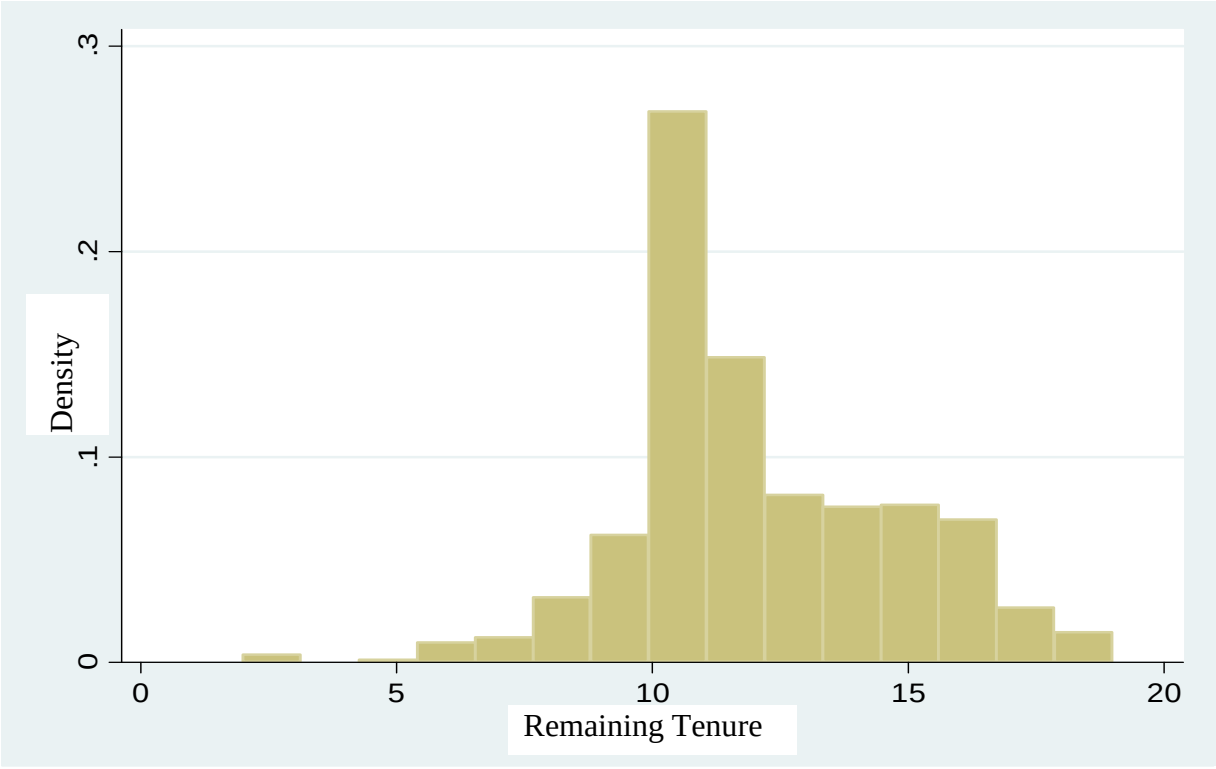
(continued)

		Employer-provided training				Self-development			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Size of employer (number of employees)	1 to 9 persons (reference)								
	10 to 29	0.090	0.084	0.085	0.082	-0.003	-0.005	-0.006	-0.006
		(0.004)	(0.004)	(0.004)	(0.004)	-0.002	(0.002)	(0.002)	(0.002)
	30 to 99	0.140	0.136	0.135	0.134	0.002	-0.001	-0.002	-0.001
		(0.003)	(0.004)	(0.004)	(0.004)	(-0.002)	(-0.002)	-0.002	-0.002
	100 to 299	0.201	0.200	0.195	0.198	0.009	0.008	0.004	0.006
		(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	-0.002	(0.003)
	300 to 499	0.243	0.244	0.238	0.241	0.023	0.026	0.018	0.023
		(0.004)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)
	500 to 999	0.258	0.266	0.255	0.262	0.026	0.035	0.022	0.030
		(0.004)	(0.005)	(0.004)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)
	1000 and over	0.300	0.314	0.304	0.309	0.043	0.060	0.046	0.054
		(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
	Government	0.362	0.287	0.316	0.278	0.118	0.047	0.065	0.037
		(0.004)	(0.005)	(0.004)	(0.005)	(0.003)	(0.004)	(0.003)	(0.004)
Tenure	0 to 4 years (reference)								
	5 to 9	0.020	0.022	0.020	0.021	-0.024	-0.023	-0.025	-0.024
		(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
	10 to 14	0.029	0.036	0.032	0.035	-0.032	-0.028	-0.031	-0.029
		(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
	15 to 19	0.042	0.055	0.042	0.052	-0.028	-0.021	-0.030	-0.025
		(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
	20 to 24	0.070	0.081	0.066	0.076	-0.017	-0.011	-0.023	-0.018
		(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
	25 to 29	0.093	0.100	0.086	0.094	-0.010	-0.007	-0.019	-0.015
		(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
	30 to 34	0.099	0.105	0.089	0.096	-0.005	-0.002	-0.016	-0.012
		(0.005)	(0.005)	(0.005)	(0.005)	(-0.003)	(-0.003)	(0.003)	(0.003)
	35 to 39	0.098	0.108	0.085	0.098	0.002	0.007	-0.010	-0.005
		(0.006)	(0.006)	(0.006)	(0.006)	(-0.004)	(-0.004)	(0.004)	(-0.004)
	40 and over	0.084	0.092	0.071	0.083	0.006	0.010	-0.005	-0.001
		(0.010)	(0.010)	(0.010)	(0.010)	(-0.008)	(-0.008)	(-0.008)	(-0.008)
Industry dummies		No	Yes	No	Yes	No	Yes	No	Yes
Occupation dummies		No	No	Yes	Yes	No	No	Yes	Yes
Observations		374,468	374,468	374,468	374,468	374,468	374,468	374,468	374,468
Pseudo R2		0.109	0.135	0.125	0.140	0.080	0.103	0.104	0.111

Notes: See Table 3.

Figure 1. Remaining Tenure: 30 year-old male regular employees graduated from college or graduate school

Fresh graduate recruits (median=12.000, mean=12.126)



Mid-career recruits (median=2.000, mean=2.203)

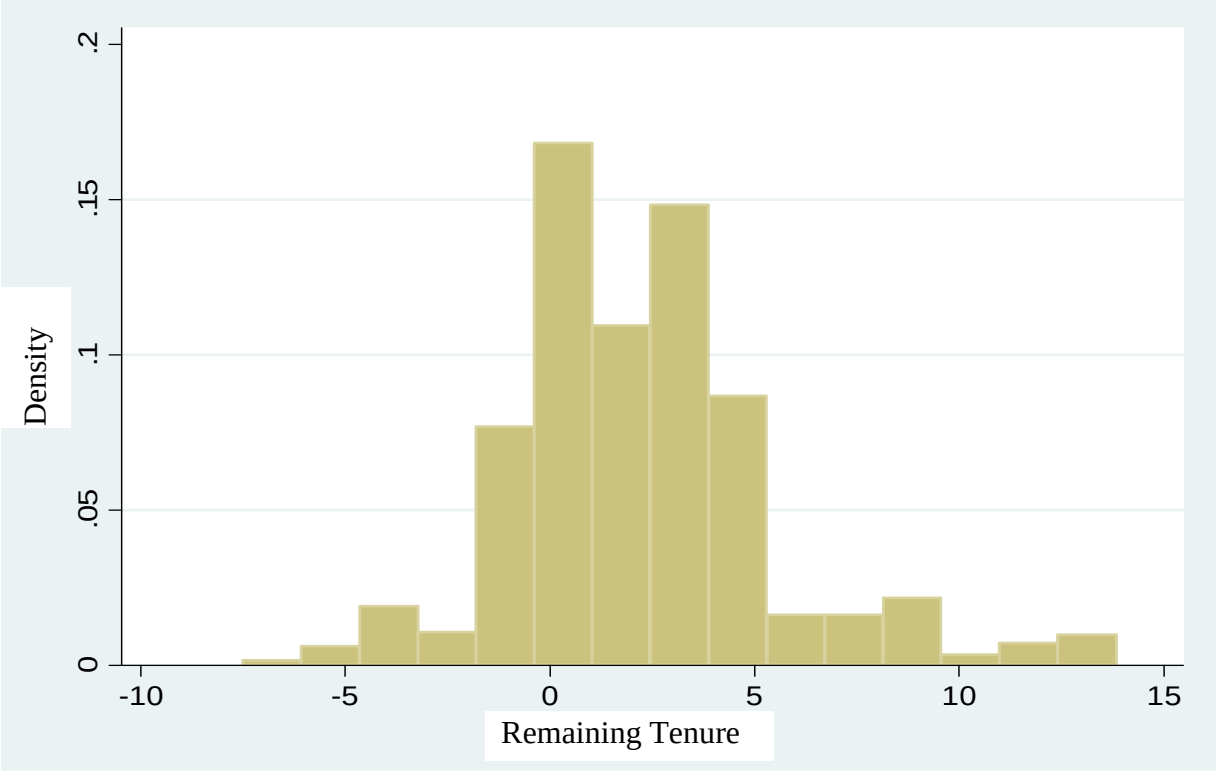
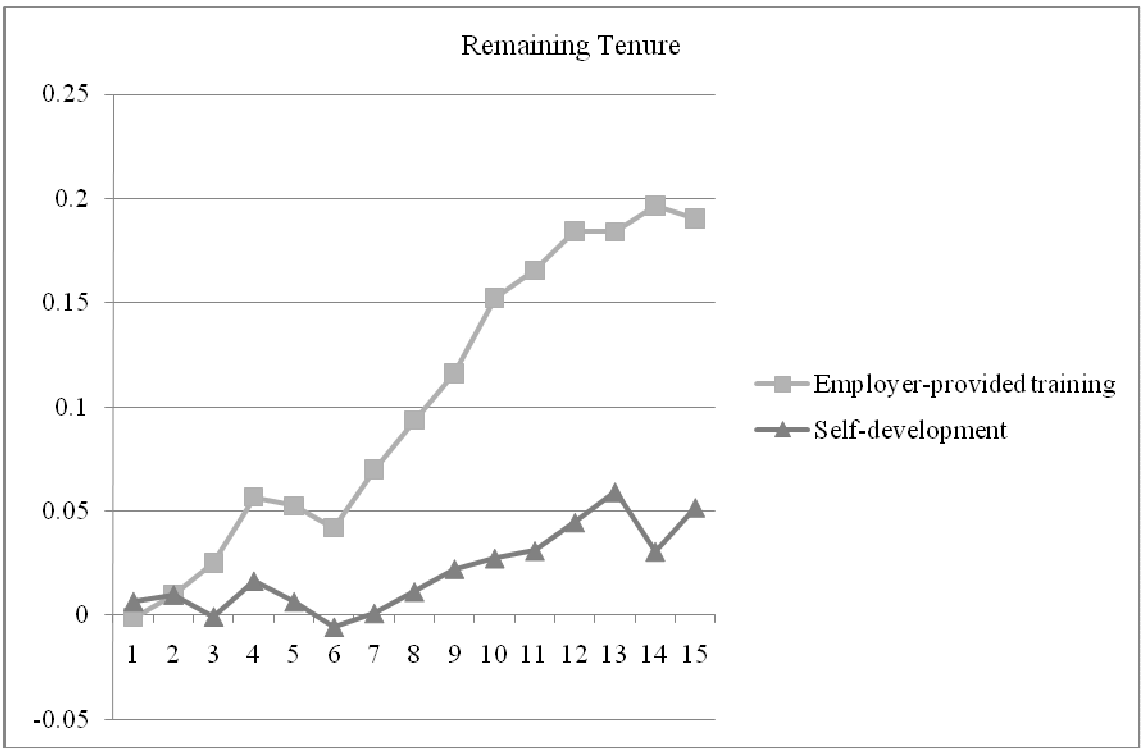


Figure 2: The Attachment Index (AI) and training probabilities

Note: All coefficients are significant.

Figure 3. Remaining Tenure (RT) and training probabilities



Note: The coefficients for "Employment-provided training" are significant for RT values from 2 and up. The coefficients for "Self-development" are significant for RT values of 1, 2, 4, and 8 and up.

Table 5: The Attachment Index (AI), Remaining Tenure (RT), and training probabilities

	Employer-provided training		Self-development	
	(1)	(2)	(3)	(4)
Female	-0.035	-0.014	0.001	0.006
	(0.002)	(0.002)	-0.002	(0.002)
Regular employees (reference)				
Part-time and casual workers	-0.186	-0.185	-0.060	-0.058
	(0.002)	(0.002)	(0.002)	(0.002)
Dispatched workers from temporary labor agencies	-0.174	-0.180	-0.005	-0.007
	(0.004)	(0.004)	-0.004	(0.004)
Contract employees	-0.108	-0.111	-0.011	-0.011
	(0.003)	(0.003)	(0.003)	(0.003)
Primary or junior high school	-0.070	-0.057	-0.064	-0.059
	(0.003)	(0.003)	(0.002)	(0.003)
Senior high school (reference)				
Vocational school, junior college	0.063	0.054	0.076	0.072
	(0.002)	(0.002)	(0.002)	(0.002)
College, graduate school	0.075	0.065	0.157	0.154
	(0.002)	(0.002)	(0.002)	(0.002)
AI	No	Yes	No	Yes
RT	No	Yes	No	Yes
Observations	374,468	374,468	374,468	374,468
Pseudo R2	0.133	0.135	0.100	0.103

Note: Industry, size of employer, and new graduate dummies are also included in every estimation.

Appendix Table 1(a). Basic statistics, occupied persons and persons not in employment but wishing to work

N=427,558

		Mean	Std. Dev.	Min.	Max.
	Female	0.499	0.500	0	1
Employment status dummies	Regular employees (reference)	0.611	0.488	0	1
	Part-time and casual workers	0.183	0.387	0	1
	Dispatched workers from temporary labor agencies	0.024	0.152	0	1
	Contract employees	0.043	0.204	0	1
	Persons not in employment	0.124	0.330	0	1
Education dummies	Primary or junior high school	0.076	0.266	0	1
	Senior high school (reference)	0.469	0.499	0	1
	Vocational school, junior college	0.233	0.422	0	1
	College, graduate school	0.211	0.408	0	1
Age group dummies	Age	40.6	11.271	15	59
	15 to 19	0.011	0.104	0	1
	20 to 24	0.079	0.269	0	1
	25 to 29	0.112	0.315	0	1
	30 to 34	0.134	0.340	0	1
	35 to 39	0.136	0.342	0	1
	40 to 44	0.127	0.332	0	1
	45 to 49	0.129	0.335	0	1
	50 to 54	0.130	0.336	0	1
	55 to 59	0.145	0.352	0	1

Appendix Table 1(b). Basic statistics, occupied persons

N＝374,468

		Mean	Std. Dev.	Min	Max
	Female	0.464	0.499	0	1
Employment status dummies	Regular employees (reference)	0.697	0.460	0	1
	Part-time and casual workers	0.209	0.407	0	1
	Dispatched workers from temporary labor agencies	0.027	0.162	0	1
	Contract employees	0.050	0.217	0	1
Education dummies	Primary or junior high school	0.070	0.255	0	1
	Senior high school (reference)	0.468	0.499	0	1
	Vocational school, junior college	0.228	0.419	0	1
	College, graduate school	0.222	0.416	0	1
Age group dummies	Age	40.8	11.242	15	59
	15 to 19	0.010	0.099	0	1
	20 to 24	0.078	0.269	0	1
	25 to 29	0.111	0.314	0	1
	30 to 34	0.130	0.336	0	1
	35 to 39	0.133	0.339	0	1
	40 to 44	0.127	0.333	0	1
	45 to 49	0.133	0.339	0	1
	50 to 54	0.133	0.340	0	1
	55 to 59	0.145	0.352	0	1
Size of employer (number of employees) dummies	1 to 9 persons (reference)	0.138	0.345	0	1
	10 to 29	0.136	0.343	0	1
	30 to 99	0.159	0.366	0	1
	100 to 299	0.136	0.343	0	1
	300 to 499	0.056	0.230	0	1
	500 to 999	0.061	0.240	0	1
	1000 and over	0.189	0.391	0	1
	Government	0.118	0.322	0	1
Tenure dummies	Duration Engaged in Work	11.47	10.677	0	44
	0 to 4 years (reference)	0.382	0.486	0	1
	5 to 9	0.169	0.374	0	1
	10 to 14	0.120	0.325	0	1
	15 to19	0.108	0.310	0	1
	20 to 24	0.069	0.253	0	1
	25 to 29	0.062	0.241	0	1
	30 to 34	0.050	0.218	0	1
	35 to 39	0.033	0.177	0	1
	40 and over	0.008	0.089	0	1
	New graduates dummies	0.235	0.424	0	1
	AI	11.73	8.409	0.0	32.8
	RT	-1.73	8.353	-42.9	35.0

Appendix Table 2. Probability of receiving employer-provided training by age group

		15 to 19	20 to24	25to29	30 to34	35to39	40to44	45to49	50to54	55to59
	Female	-0.042	-0.013	-0.022	-0.065	-0.053	-0.036	-0.023	-0.012	-0.027
		(0.018)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Employment status	Regular employees (reference)									
	Part-time and casual workers	-0.246	-0.227	-0.215	-0.174	-0.164	-0.149	-0.165	-0.145	-0.117
		(0.017)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.005)
	Dispatched workers from temporary labor agencies	-0.214	-0.192	-0.193	-0.169	-0.157	-0.146	-0.131	-0.104	-0.079
		(0.022)	(0.012)	(0.009)	(0.010)	(0.010)	(0.013)	(0.015)	(0.018)	(0.017)
	Contract employees	-0.080	-0.114	-0.122	-0.076	-0.106	-0.084	-0.078	-0.098	-0.056
		(0.036)	(0.010)	(0.008)	(0.010)	(0.010)	(0.011)	(0.011)	(0.009)	(0.008)
Education	Primary or junior high school	-0.077	-0.045	-0.024	-0.027	-0.046	-0.052	-0.089	-0.066	-0.053
		(0.024)	(0.015)	(0.014)	(0.012)	(0.012)	(0.013)	(0.012)	(0.008)	(0.006)
	Senior high school (reference)									
	Vocational school, junior college		0.109	0.057	0.044	0.043	0.037	0.044	0.051	0.041
			(0.008)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
	College, graduate school		0.148	0.098	0.069	0.064	0.057	0.071	0.060	0.030
			(0.010)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
	Observations	3,670	29,380	41,428	48,706	49,738	47,718	49,762	49,795	54,268
	Pseudo R2	0.138	0.126	0.120	0.115	0.131	0.146	0.164	0.167	0.150

Note: Tenure, size of employer, industry, and occupation dummies are also included in every estimation.