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Abstract

The optimal human resource and skill development strategy is one important factor of economic success. This paper, therefore, analyzes industry-specific differences in the training provision between engineering and retailing companies in Japan and focuses in particular on the initial training provision for intermediate skills at the firm level. Based on 11 in-depth interviews in the retailing and the engineering sector in Japan, we find that gross training costs per basic trainee are significantly higher in engineering than in retailing. However, not only the engineering companies, but also their employees bear higher costs than their counterparts in retailing. The absolute and relative entrance wages for production employees are significantly lower than the entrance wages of employees in sale. Even though wages in engineering increase significantly stronger within the first five years, the absolute and relative wages in engineering remain still significantly lower. The results relate to the qualification levels of new trainees and the career paths.

Introduction

Training can determine corporate and organizational performance as well as individual earnings and career development. The optimal human resource and skill development strategy is dependent on different factors such as the economic and overall institutional environment as well as on industry-specific skill requirements and firm-level institutions (e.g., Genda, 2004; Kawaguschi, 2006; for overview of Japan-specific studies see Table in the appendix).

While previous research has mainly focused on characteristics of the recipients of training, the effect of training on wage and labor turnover, the amount of and the participation rate in different forms of training, this paper is interested in industry-specific differences in the training provision between engineering and retailing companies in Japan and focuses in particular on the initial training provision for intermediate skills at the firm level.

The analysis is based on 11 interviews in the retailing and the engineering sector in Japan. While the ratio of on- to off-the-job training shows no significant differences between engineering and retailing, we find that gross training costs per basic trainee are significantly higher in engineering than in retailing. However, not only the engineering companies, but also their employees bear higher costs than their counterparts in retailing. The absolute and relative entrances wages differ significantly from those in retailing. Even though wage increases within the first five years are significantly higher in engineering than in retailing, absolute and relative wages in engineering are still significantly lower. The results relate to the qualification levels of new trainees and the career paths, which are longer for production workers in engineering than for sales employees in retailing, especially when these sales employees have a university degree.

The paper is structured as follows: firstly, the current situation of training provision in Japanese companies is presented. The subsequent section presents the theoretical and empirical training literature and derives hypotheses for engineering and retailing companies in Japan. The data description gives an overview of the sample characteristics. The subsequent analysis section tests the hypotheses, and the final section critically assesses and discusses the results.

Official Data on the State of Training Provision in Japan

This section gives a general overview of the historic and current state of training provision in terms of training expenses and training forms in Japan. We use two surveys on skill development in Japanese companies conducted by the Ministry of Health, Labour and Welfare (MHLW, former Ministry of Labour): the General Survey on Working Conditions (*shūrōjōkensōgōchōsa*) and the Human Resource Development Survey (*nōryokukaihatsukihonchōsa*)[1]. The first survey provides information on training expenses for off-the-job training (OFFJT), the second survey analyzes systematically the provision of OFFJT and on-the-job training (OJT).

The General Survey on Working Conditions surveys regular employees of companies with more than 30 employees and gives information on labor expenses and its breakdown, thus providing data on the training expenses relative to the whole labor cost. Training expenses are defined as "costs of training facilities, remuneration to teachers, participation fee to lecture meetings, and expenses for studying in Japan or abroad". These training expenses incur off the working place, and are therefore similar to cost for OFFJT (Ōki, 2003).

According to the official data from the Ministry of Health, Labour and Welfare, the thorough cost-cutting of the 1990s resulted in a decrease in training expenses as a proportion of the whole labor cost budget (including wages) from 0.36% in 1991 to 0.27% in 1995, where it leveled off until 2002, in 2006 the expenses went up to 0.33%. When excluding the data of the bubble period (1988 and 1991), the average training expenses over time are approximately 0.3% of the labor cost budget (Ōki, 2003) thus indicating the great importance of training in Japan. The data is illustrated in a solid line in Figure 1[2].

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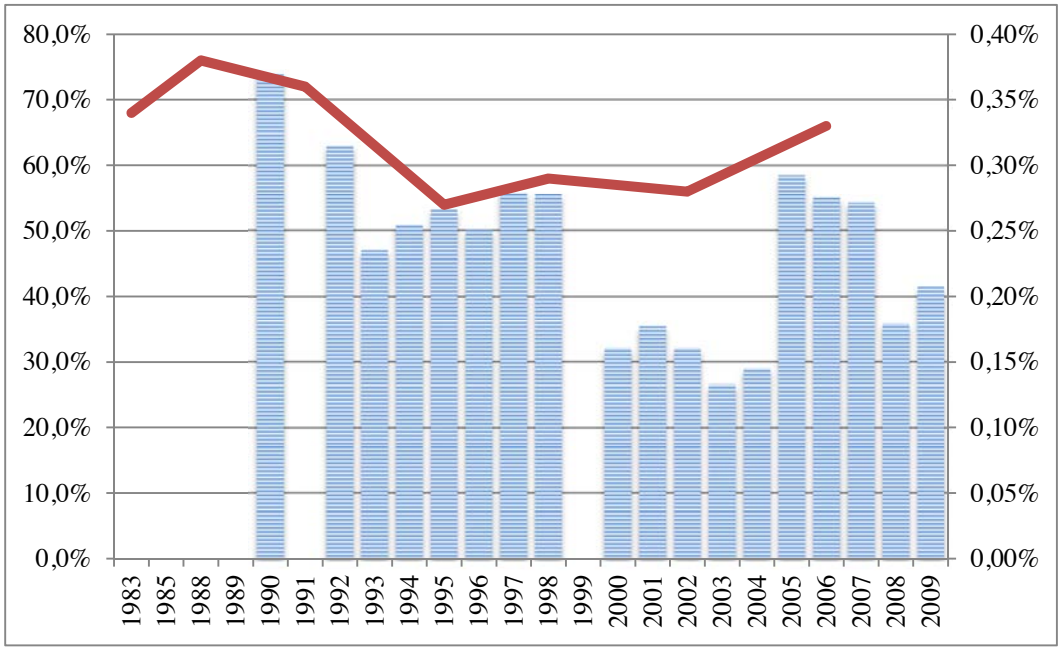
1 Until 2000 the equivalent of the Human Resource Development Survey was the Fact-finding Survey on Private Training (*minkankyōikukunrenjittaichōsa*) surveyed by the Ministry of Labour. The equivalent of the General Survey on Working Conditions was the Comprehensive Survey on Wage and the Working Hour System (*chinkinrōdōjikanseidosōgōchōhōkoku*) until 1999.

2 The whole labor cost budget itself is subject to fluctuations. From this perspective, the share of training is relatively stable.

Figure 1 OFFJT Expenses and Participation Share



Notes: Employees that received OFFJT during the last year (axis left-hand side) are represented by the dashed bars, share of expenses for OFFJT from whole labor cost budget (axis right-hand side) is represented by the solid line

Source: Assembled from the General Survey on Working Conditions, Human Resource Development Survey and their corresponding earlier surveys, the Fact-finding Survey on Private Training and the Comprehensive Survey on Wage and the Working Hour System. The surveys were conducted by the Ministry of Health, Labour and Welfare (MHLW, 1999-2010; Ministry of Labour, 1989-1999a, b).

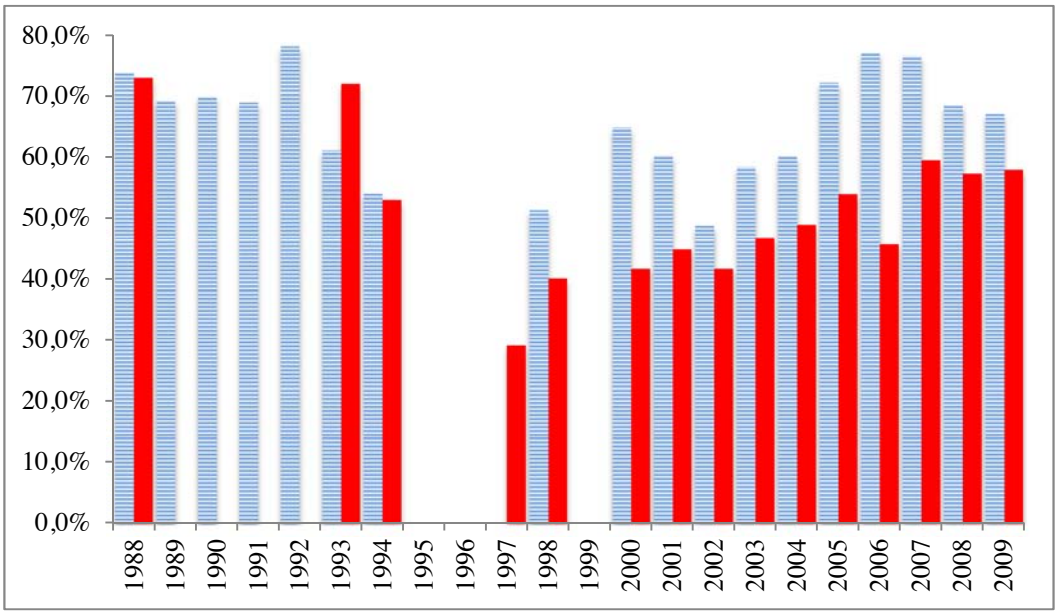
The two most established forms of training in Japanese companies are broad and deep OJT and complementarily short-term OFFJT (Koike, 2005). The Human Resource Development Survey grasps the state of training provision during the respective previous year by surveying firms and employees. However, due to major changes in scale and scope of the survey[3], we cannot use the data as a panel study and follow the development of training provision over all years.

3 The Ministry of Labour initiated the survey in 1979 (Comprehensive Survey on Wage and Working Hour System), surveying companies with more than 30 employees. In 2000 the MHLW renamed the survey and charged the Japanese Institute for Labour Policy and Training (JILPT) with the realization of the survey. In 2005 the survey got back to the MHLW, but the JILPT changed the survey from an employee basis to a company basis, and the method of extraction of employee samples changed as well. There was especially a discrepancy in the response rate: in 1997, the response rate from companies was 56.3%, and from employees 54.5%, in contrast, in 2003 these figures fell to 14.1% of the companies and 11.5% of the employees. The response rate rebounded in after 2005, since the previous approach was applied. Since 2005 the survey includes non-regular workers as well (Kurosawa 2010, 596, footnote 2).

Nevertheless, since strategic OJT and OFFJT were surveyed almost every year, the tendency of the national average of these important indicators can be derived. In this survey, OFFJT is defined as "training that is conducted by temporarily leaving usual work"[4]. Systematic OJT is defined as training that is conducted while staying at the usual working place. It is carried out on the basis of a plan that determines the responsible person, the subject, the period and the content of the training, and is thus labeled as "systematic" (Kurosawa, 2010).

The development of OJT and OFFJT, based on the employee survey, is shown in Figure 2. The participation rate in OFFJT over the respective previous year fell from more than 70% in 1990 to around 54% in the mid 1990s. The low participation rate from 2000 to 2004 reflects changes in the survey: companies with less than 30 employees were added to the sample and the method of extraction of the employees was changed.

Figure 2 Provision of OFFJT and Systematic OJT as Reported by the Firm



Notes: OFFJT represented by dashed bars, systematic OJT represented by solid bars

Source: see Figure 1.

4 From 2000 until 2004, the definition of OFFJT in the employee survey was: "training obtained through an own decision on the basis of an order of the company or a senior".

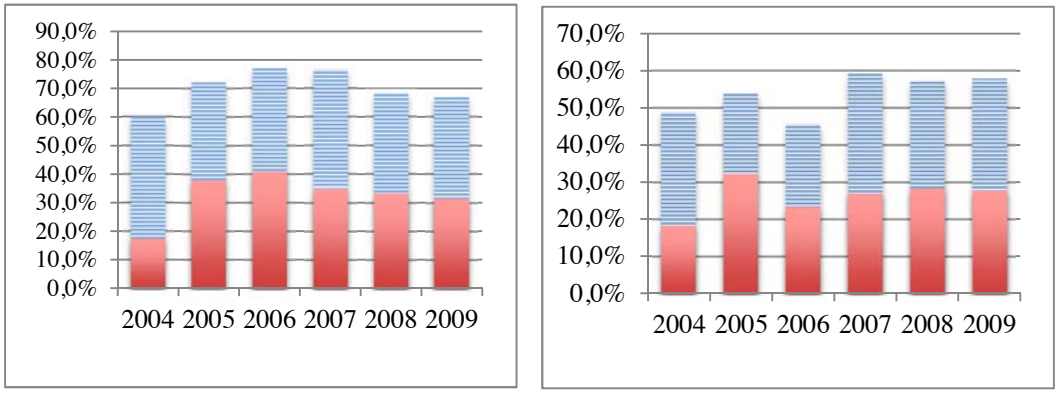
From 2005 onwards the figures are comparable again. OFFJT participation was again over 70% in the mid 2000s. A little drop in OFFJT provision can be observed in 2008 and 2009 during the international financial crisis. The share of companies that conduct OJT increased during the financial crisis years from about 45% to almost 60%[5], thus indicating different cost structures for the two training forms.

Beside cyclical effects, another influential factor on training provision is also the employment of non-regular workers (*hiseisha-in*). Non-regular workers include many types of employees, including part-timers, contract workers, dispatched workers, seasonal workers, and *freeters*. The employment of non-regular employment is rising. While in 1987, 82.4% of the workforce was employed as regular workers (*seisha-in)*, characterized by holding a long-term contract and enjoying social benefits, this share fell to 72.8% in 2001 and even after the economy regained strengths, the tendency continued, so that in 2007 only 66.5% of the employees held a regular contract (Kurosawa, 2010).

According to Sasajima (2009) major differences between regular and non-regular workers exist. Firstly, in terms of employment security: since the contracts of non-regular workers are limited, they can easily be laid off during turndowns. Secondly, in terms of training: long-term training provision is limited to regular workers. The high labor turnover of non-regular workers decreases the incentive to invest in their training due to the shorter period in which they can recoup training expenses. According to the Human Resource Development Survey, which includes non-regular workers since 2005, training provision for non-regular workers is about half the level of regular workers. Figure 3 shows the provision of OJT and OFFJT for regular (dashed bars) and non-regular workers (solid bars).

5 These figures represent regular workers only, training of non-regular workers is not taken into account.

Figure 3 OFFJT (left) and OJT (right) of Regular and Non-Regular Employees



Notes: OFFJT is on the left-hand side and OJT on the right-hand side, training provision for regular employees is represented by dashed bars, training provision for non-regular workers is represented by solid bars.
Source: Assembled from the Human Resource Development Survey and the Fact-finding Survey on Private Training. The surveys were conducted by the Ministry of Health, Labour and Welfare (MHLW, 1999-2010; Ministry of Labour, 1989-1999a, b).

In sum, the data of the two main surveys of the MHLW provide evidence for the importance of training and stress the strong occurrence of OJT and OFFJT. The next section reviews the theoretical and empirical literature on training and derives our hypotheses for Japanese engineering and retailing companies.

Theory and Hypotheses

Different theoretical approaches concerning training and training investments exist. The most famous one is Becker's (1975) distinction between general and firm-specific human capital investment. In his model general human capital is not only useful for the current employer, but also for other companies, because it increases the employee's marginal productivity in general. Specific training investment has, in its most extreme form, no effect on the employee's productivity in other companies. Consequently, the employee has to bear the full costs of general human capital investment, while the company is willing to share the costs arising from specific training.

Combining the dichotomous concept of general and firm-specific training

(Becker, 1975) and the distinction between the training types of OJT and OFFJT, Lynch (1992) shows that OJT is used to convey firm-specific knowledge, e.g. to procure business experience, whereas OFFJT provides more general knowledge, e.g., the theoretical background. In other words, OJT means learning the knowledge and skills required for the job while actually doing jobs. OJT, therefore, includes the accumulation of business experiences and usually involves various transfers within firms (job rotation) to strengthen and to spread vocational abilities. OFFJT conveys knowledge and skills, which would not be acquired in the course of everyday duties. OFFJT at Japanese companies can be classified into i) training that focuses on 'rank' across departments in the company organization (training by rank); and ii) training that focuses on 'specialist fields' in jobs (training by specialty) (JILPT, 2012).

Various researchers argue that most human capital investment in Japan is of a firm-specific type due to long-term employment and OJT provision (see e.g. Blinder & Krueger, 1996; MacDuffie & Kochan, 1995). Contrastingly, Toda and Higuchi (2005) find that much investment is of a general character, since many employees think that they could use their knowledge and skills in the same profession in other firms.

When analyzing the determinants of both the amount and the kind of training (general/specific, OJT/OFFJT), various sector-specific factors seem important, such as skill level and the technological level. Research suggests that differences in the incidence and intensity of training prevail over industries: training provision is especially low in low-skilled, low-pay industries such as the textile industry in manufacturing and the retail trade industry in services (see e.g., Lynch, 1994; Booth & Zoega, 2000). Technological change and knowledge intensity seem to have an influence as well. Industries with high-technological change, that from a logical viewpoint demand more flexible skills, are characterized by higher training provision (Asplund, 2005) and the transfer to a 21st century knowledge-based economy requires a shift to more OFFJT (Kosugi, 2006).

Building on previous literature, we argue that skill requirements of the

retailing and the engineering industries are different, therefore, leading to different training strategies for new employees. Whereas in engineering the handling of machines requires high skills and problem-solving capacity of production workers, the work of shop floor personnel involves rather basic skills, as e.g. in Japan the use of honorific language skills. Higher skills require more training and thus higher training expenses per head. Therefore, training costs (gross value) of new employees in engineering are expected to be higher than in retailing.

Hypothesis 1: The training costs per new employee (basic trainee) are higher in engineering companies than in retailing companies.

Furthermore, the ratio of OJT and OFFJT in initial training for new entrants in the two industries may differ, meaning that certain occupations tend to be mainly associated with a particular type of training. Previous empirical results are contradicting. On the one hand, Kurosawa (2001) shows contrasting patterns in the distribution of informal and formal training across occupations and firm characteristics: Production workers usually receive (longer) informal training. Clerical workers and supervisors usually receive formal training in general and formal routine training in particular. On the other hand, Kurosawa (2006) finds that although the total duration of OFFJT in the engineering is shorter than in the service industry, the provision of OFFJT is higher in the engineering sector than in any other one. A high technological level triggers the provision of formal OFFJT, and vice versa. As the retailing sector is at a lower technological level than engineering, we expect:

Hypothesis 2: The ratio of OJT to OFFJT is higher in retailing companies than in engineering companies.

When analyzing who bears the training costs, Toda and Higuchi (2005) find that the employee pays one part of firm-specific human capital investment in the first years through a wage cut. On the other hand, they find no significant influence of

general human capital training on wage. These results contradict Becker's theory that states, as shown above, that the employee who fully pays for general training can reap the returns of that general human capital investment. However, it is in line with more recent research that introduces labor market imperfections such as asymmetric information in the model (see for example Katz & Ziderman, 1990; Loewenstein & Spletzer, 1998 and 1999; Acemoglu & Pischke, 1998; Booth & Bryan, 2002; Toda & Higuchi, 2005 for Japan).

To analyze the aspect of who bears the costs of initial training in engineering and retailing, we need to take into account the entrance wage and the wage growth of the employees. As we expect higher training costs per employee and a higher share of (more general) OFFJT training for production workers than for shop floor employees in retailing, the wage of production workers in engineering should be comparatively lower.

Hypothesis 3: The entrance wage of new employees is lower in engineering than in retailing companies.

Yet, when it comes to wage growth the opposite pattern is supposed to appear. Since production workers can use their newly acquired skills, and work more efficiently, this productivity increase should be reflected in wage growth.

Hypothesis 4: Wage growth in the first 5 years is higher in engineering companies than in retailing companies.

Data and descriptive statistics

The data for Japan are part of a five country-comparison that gathered data in Germany, Switzerland, the United Kingdom (Ryan et al., 2011) as well as in Japan and the United States of America. The data were collected by interviews conducted in person with senior managers (HR/personnel/training managers, or

others) in engineering and retailing companies. These two industries were chosen due to their size, their economic importance (Table 1, both sectors cover about 35.9% of employment in Japan), and their differences in production technology and skill requirements.

Table 1 Employment figures of engineering and retailing sectors in Japan

Industry	Number (,000)	Share of employment (%)
Engineering	10'486	17.0
Retailing	11'105	18.0
All	61'530	35.9

Source: Population Census 2005, all employment types included. Engineering is synonymously used for manufacturing.

To concentrate more narrowly on defined subsectors, 4-digit Standard Industrial Classification (SIC) codes were used to select companies. In the subsector engineering the study concentrates on establishments that produce pumps, turbines, compressors. We also included one motor vehicle parts company. In the retailing sample it focuses on department, grocery, and shoe stores.

The corporate structure of Japan led to difficulties in limiting the sample in engineering to the chosen subsectors. Therefore, four big corporations were included where pumps and turbines were only a part of the production. During the interviews with these big corporations, supplementary questions were asked to concentrate on pumps and turbines. The interviews took place in the Kantō region from May 2009 to August 2009 primarily, and one additional interview was held in December 2009[6].

The study focuses on intermediate occupational levels that are achieved in apprenticeship in Germany, Switzerland and partly in the UK, whereas in Japan and the USA, these skills are mainly gained through company-provided OJT and OFFJT. The two intermediate occupational levels surveyed are skilled front-line staff (production workers and sales staff) and first-line management (defined for

6 The part of interviews to Japanese companies is subsidized by the Grant-in-Aid for Scientific Research© (Head: Prof. Dr. Shiho Futagami) from the Japan Society for the Promotion of Science (JSPS).

engineering as production supervisors, and for retailing as department managers in large stores or store managers in small ones, Ryan et al., 2011). Detailed questions were asked on aspects of training, earnings, and qualification systems.

The analysis of this study is limited to the Japanese data to keep the institutional environment constant. Overall, 5 interviews were conducted in the retailing industry, and 7 in the engineering industry, out of which 6 are used in the study due to missing data in several key variables. Employment figures of the whole firm and for sales respectively production related employees only are shown in Table 2. One very large retailing company has a considerable impact on the average in the retailing sample.

Table 2 Employment in engineering and retailing in the sample

Company	**Total Employment**	**Production Related Employment**	**Company**	**Total Employment**	**Sales Related Employment**
Engineering			**Retailing**		
1	4'714	707	7	8'266	6'879
2	9'192	2'022	8	352	312
3	577	214	9	3'368	2'511
4	867	140	10	4'377	3'872
5	2'034	1'099	11	76'624	72'320
6	1'546	1'000			
Mean	3'155	863.7	**Mean**	18'597	17'179
Median	1'790	853.5	**Median**	4'377	3'872

Note: includes non-regular employees
Source: own fieldwork

The first important variable is the training costs per new employee. All companies have a formal budget for training expenses. When having a look at the costs per basic trainee in production respectively sales, the average budget per person is 8.348 Euro per year in engineering and 94 Euro per year in retailing[7]. The differences between the firms regarding training expenses per employee are immense (Table 3), reaching from 112.5 Euro to over 26.250 Euro in engineering

[7] One retailing and one engineering company could not provide the data on this figure.

and from 7.5 Euro to 225 Euro in retailing.

Table 3 Training costs (gross value) per basic trainee in engineering and retailing

Training costs per basic trainee		**Training costs per basic trainee**	
Engineering		**Retailing**	
Mean	8'347.5	**Mean**	93.8
Median	4'500.0	**Median**	71.3
Min	112.5	**Min**	7.5
Max	26.250.0	**Max**	225.0
N	5	**N**	4

Source: own fieldwork

When asked for the percentage of OFFJT during the first year of initial training, figures show that companies in engineering and retailing mostly concentrate on OJT. When putting OJT and OFFJT in a relation, we find that engineering companies offer on average 22 times more OJT than OFFJT. Retailing companies have with 18 times a similar value (Table 4). Initial training in retailing firms is shorter (on average 8.7 months and more limited than in engineering where the training time is on average about twice as long with 16.7 months on average).

Table 4 Ratio of OJT to OFFJT in the first year of initial training in engineering and retailing

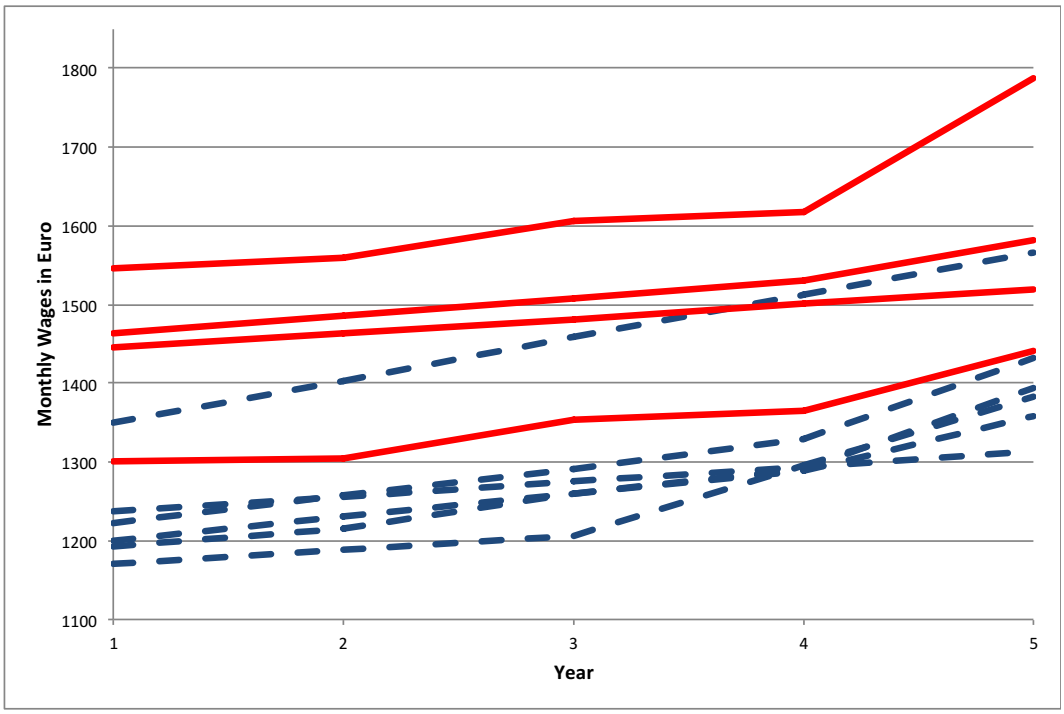
Ratio of OJT/OFFJT		**Ratio of OJT/OFFJT**	
Engineering		**Retailing**	
Mean	22.0	**Mean**	18.4
Median	8.5	**Median**	19.0
Min	1.0	**Min**	9.0
Max	99.0	**Max**	30.3
N	6	**N**	5

Source: own fieldwork

Entrance wages (base pay) for production workers and sales persons show no clear differences, even though wages in engineering tend to be lower. The developments of absolute wages are shown in Figure 4, where retailing is marked

by solid lines, and engineering is marked by dotted lines[8].

Figure 4 Development of monthly wages during the first 5 years (in Euro)



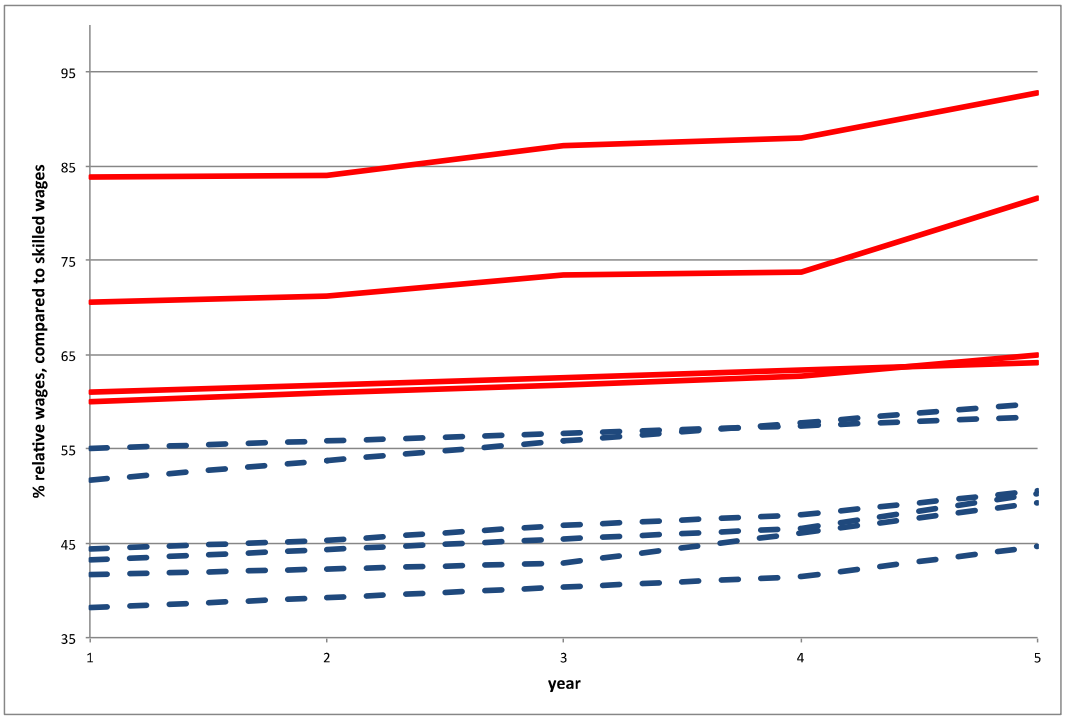
Notes: dotted lines: engineering companies, solid lines: retailing companies

Another interesting feature of the wage curves in Figure 4 are the wage increases. In some companies, wages increase heavily after particular years, in other companies wage increases are more constant. Wage increases usually take place when the new employees are promoted to the next level in the internal qualification system.

Beside absolute wages, we also focus on relative wages (trainee wage compared to average wage of all skilled employees). These relative wages give an impression of whether employees bear a part of the training costs. Figure 5 shows that the relative wages are much lower in engineering than in retailing, thus indicating that engineering employees invest in their training by lower wages during the first years, but reap the returns when climbing up the company-internal career ladder.

[8] One retailing company could not provide the necessary information.

Figure 5 Development of relative monthly wages during the first 5 years (in Euro)



Notes: dotted lines: engineering companies, solid lines: retailing companies

Wage increases are already high within the first five years (Table 5). The mean wage growth is 14.6% in engineering and 10% in retailing. However, in year five the absolute and relative wages in particular are still lower in engineering than in retailing (Figure 5).

Table 5 Wage growth first to fifth year

Wage growth in %		**Wage growth in %**	
Engineering		**Retailing**	
Mean	14.6	**Mean**	10.0
Min	6.1	**Min**	5.2
Max	18.3	**Max**	15.7
N	6	**N**	4

Source: own fieldwork

Analysis

This section analyzes the hypotheses using nonparametric tests that require less stringent assumptions regarding sample size than parametric statistics. Nonparametric statistics are applied when the functional form of the distributions is unknown (Kvam &Vidakovic, 2007). Accordingly, the distribution of the dependent variable can be skewed, or non-normal (Pett, 1997). Nonparametric measures emphasize on rank ordering of scores or on frequencies of data. Hypotheses, therefore, do not concentrate on population means. Consequently, a sample size of 20 and less is not unusual for nonparametric statistics (Pett, 1997). Nonparametric tests are, therefore, used in this study to compare dichotomous groups (Mann-Whitney U-Test).

Hypothesis 1 argues that the training costs per employee are higher in engineering than in the retailing industry due to higher skill requirements in engineering. We can support this hypothesis on the basis of a Mann-Whitney U-Test. Engineering firms spend significantly more on training (Table 6), which is conform with the assumption that the work of the employees needs higher skills.

Table 6 Results of Hypotheses 1

Hypothesis	**1**
Variable	Training cost per basic trainee in Euro
Mean	
Engineering	8'347.5
Retailing	93.8
p-value	0.0275

Part of the explanation might also be the sector-specific differences in terms of part-time employees and turnover. Due to the higher share of part-time contracts (70% in retailing to 1.2% in engineering) and a higher turnover (19% in retailing to 1.5% in engineering), retailing companies cannot afford to invest much in the training as these investments may leave the company soon again. Even though

various explanations beside the skill argument exist, our results support our hypothesis that engineering companies have higher gross costs of training per new employee than retailing companies.

In our Hypothesis 2, we refer to the expectation that the ratio of OJT to OFFJT is higher in the retailing than in the engineering sector, again due to different qualification needs. However, we find no significant differences in the ratio of OJT to OFFJT in the first training year between the two sectors (Table 7).

Table 7 Results of Hypotheses 2

Hypothesis	**2**
Variable	Ratio OJT/OFFJT
Mean	
Engineering	22.0
Retailing	18.4
p-value	0.1956

When going into detail, we find that differences between companies are huge, especially in engineering. While some comparatively smaller engineering companies mainly provide OJT, larger engineering companies tend to offer their employees more OFFJT (up to 50%) as part of a special training program for new entrants. In retailing, OFFJT ranges from 3.2% to 10%. Therefore, the OJT/OFFJT ratio seems not only by the sector and qualification needs but also by the size and the financial possibilities of the company.

Hypothesis 3 argues that the entrance wages in retailing are higher than in engineering and the results support our hypothesis, when taking absolute and relative entrance wages into account (Table 8).

Table 8 Results of Hypotheses 3

Hypothesis	**3**	
Variable	Entrance wages p. month (absolute in Euro)	Entrance wages (relative in %)
Mean		
Engineering	1'228.8	45.7
Retailing	1'438.2	68.9
p-value	0.0190	0.0105

Part of the explanation is that typical regular entrants in the retailing industry hold a university degree, whereas contrastingly, in the engineering industry, all production workers are high school graduates. One retailing company provided the wages of their university graduates. The starting wages were the same for everybody in the first two years. From the third year onwards the wage increase for university graduates was extremely steep (increase of 75% from the first to the fifth year). These figures support the argument that the higher wages in retailing are related to a difference in the qualification level of new employees.

Another explanation is the difference in the career path, which in itself is very dependent on the company. However, a general tendency can be observed. In retailing, university graduates experience the shop floor profession for approximately 5-13 years (depending on the company) before being promoted to a responsible supervisory position (e.g., sales person in charge of a department section, e.g. clothing or a small shop manager). In engineering, production workers who all come from high-school need about 6-7 years to get at least a little supervisory responsibility (e.g., T-level jobs include skilled work and sometimes some group leader activities for small groups). However, to become a foreman, thus to get the supervision over the whole workplace, it takes up to 20 years. As responsibility increases faster in retailing than engineering, so do wages.

Beside the qualification and career path aspects, wage differences can also be explained by the fact that engineering employees seem to bear a higher share of the training costs. When taking into account the significantly lower relative

wages, the data suggest that not only the engineering companies have higher training costs (see hypothesis 1) but also their employees. To check this suggestion, we tried a Spearman correlation test and found a significant negative relationship between the training costs of companies and the relative wages within the first five years (Spearman's rho -0.64, p-value 0.086). This results means that the more the company invests, the more also the employees invest in training in the form of lower wages.

Finally, Hypothesis 4 focuses on wage growth. We find a significant difference in wage growth between the industries within the first 5 years (Table 9).

Table 9 Results of Hypotheses 4

Hypothesis	**4**
Variable	Wage growth first to fifth year (in %)
Mean	
Engineering	14.6
Retailing	10.0
p-value	0.0881

However, even though wages increase significantly stronger in engineering than in retailing within the first five years, the absolute and relative wages are still significantly lower in year five (Table 10). The results again relate to the shared training costs and the career paths, which are longer in engineering.

Table 10 Differences in wages in year 5

Variable	**Wages in year 5 (absolute in Euro)**	**Wages in year 5 (relative in %)**
Mean		
Engineering	1'407.8	52.2
Retailing	2'136.2	75.9
p-value	0.0330	0.0105

Conclusion

While previous research has mainly focused on characteristics of the recipients of training, the amount of and the participation rate in OJT and OFFJT, and on the effect of training on wage in Japan, this paper aimed on sector-specific difference in training costs of companies for initial training, training forms in the first year, and entrance wages as well as wage growth for new production and sales employees. For that purpose, we interviewed engineering and retailing companies in Japan. The results indicate that the gross training costs per new employee, the (absolute and relative) entrance wages, and the wage growth differ significantly between engineering and retailing. No significant difference between sectors has been found for the ratio of OJT and OFFJT.

These results give important insights into the training strategies of engineering and retailing companies in Japan. Firstly, the choice of training types in engineering seems to differ mainly because of size and the willingness and possibility of companies to offer structured OFFJT training. Secondly, the basic training costs per employee are significantly higher in engineering than in retailing. However, we thirdly show that not only companies in engineering have higher training costs but also their employees: The absolute and relative entrances wages are significantly lower in engineering than in retailing. Part of the story is a difference in terms of qualification, but we find also a positive relationship between the training costs of the companies and the training costs of the employees (the higher the company's costs, the lower the relative wages). Even though the wage increase within the first five years is significantly higher in engineering, their wages are still significantly lower in the fifth year. The results relate to the career paths, which are longer in engineering than in retailing, especially when the employees are university graduates.

One limitation of these results is the small sample size. Nonparametric statistics have been shown to be adequate methods to analyze such data. Nevertheless, the results could be influenced by unusual observations or underestimated variability. Regarding future research, an incorporation of more companies and industries could bring meaningful insights regarding training

provision. Interesting further aspects would also be differences in gender, or training provision to non-regular workers.

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Appendix

Table A-1 Overview of training literature with Japanese data

Study	Data	Research question	Main Results
Kurosawa (2001)	Kitakyushu City Data	What determines who receives training and how much training is received? Impact of training on growth of workers' earnings?	Training provision and intensity determined by union status, occupation, education, age and past job experience
			Positive influence of informal training on wage growth
			Positive correlation between growth and formal training
Ōki (2003)	Several data from JILPT and MHLW	How much do firms invest in training? How is it determined?	Human capital investment is triggered by the ratio of university graduates, the attitude towards training, the ratio of workers over 45 years, and the number of regular workers
Genda (2004)	SME Data	Which companies have a positive attitude towards training? How do companies evaluate training? Who receives training?	Positive influence on training provision of an optimistic growth perspective, lack of financial pressure and an OJT system where seniors guide juniors
			Positive correlation between recruiting of fresh graduates and training provision
Toda & Higuchi (2005)	Keio Household Panel Survey, Japan Panel Survey of Consumers	Which employees receive training? What characterizes firm-provided training (general/specific human capital)? What is the influence of training on wage and labor turnover?	Much less training provision for part-time employees. No difference in gender and education when controlling for industry and profession
			Firms pay for general education, employees accept a wage cut for firm-specific investment
			Since 1997 turnover decrease due to training
			Mixed results for influence on wage
Kawaguchi (2006)	Japan panel Survey of Consumers	What determines participation in firm-initiated training? What are the effects of training on wage growth and labor turnover?	Positive influence of education and full time work on training reception of employees
			Positive influence of training on wage growth
Kosugi (2006)	Human Resource Development Survey	What are the reasons for a decrease in training provision, in particular in OJT?	Influence of performance, industry, the employment of irregular workers, and the external labor market on training provision
Kurosawa (2006)	Human Resource Development Survey	In which employees do firms invest? Is this tendency different due to performance and size of the companies?	Influence of firm-level factors on OFFJT provision as a whole, but this effect disappears when looking from the perspective of individuals
			Individual factors that influence OFFJT reception: gender, age, education
Satō (2010)	Survey on Working and Learning	How did training provision change? What is the state of training provision now?	Provision of OFFJT smaller for irregular workers
			Differences in OJT provision is small between regular and irregular workers
			Big differences among firms regarding training provision for irregular workers
Kurosawa (2010)	Survey on Working and Learning	How big is the effect of company-based and self-development training on future employment and wage? How long does the effect remain? Is it different	For men self-development training reduces the probability of unemployment after 10-20 years
			For women recent OFFJT decreases the probability of unemployment and self-development training has a positive

		regarding gender and age?	influence on wage after 10 years
			Effects of OFFJT on wage not confirmed
Hara (2010)	Survey on working and Learning	How much training have Japanese companies been providing to their employees since the 1970s?	Reception of OFFJT is lower in the first half of the 2000s than in the 1970s
			Training environment and career advice is important
			Bigger influence of training environment on irregular workers
Fujimoto & Ōki (2010)	Survey on Skill Development and Maintenance	How has skill development changed in the engineering industry? Influence on training?	Increased importance of knowledge how to rationalize the production process
			Increase in OFFJT