

## SENIORITY PAY, TURNOVER AND JOB TRAINING IN KOREA

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*The Korean blue-collar workers have seniority-based pay stronger than the Japanese one. The seniority pay, however, is not the result of on-the-job training, and it does not function as incentive to reduce turnover in Korean labor market for blue-collar workers. The analysis in this paper shows that high returns to tenure have very little to do with intra-firm training and do not incur low level of turnover in Korea. Contrary to conventional theories, high seniority pay, low turnover and high investment in training undertaken by the firm do not reinforce each other in Korea.*

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Keywords: Seniority Pay, Tenure, Turnover, On-the-job Training,  
Human Capital

### I. INTRODUCTION

The focus of this paper is on the seniority pay system with special reference to labor mobility and job training in Korea. A lot of large companies usually have incremental pay scales based on seniority even in developing countries. Most theories and empirical research also show that firms with seniority based pay systems have low turnover rates and high level of intra-firm job training.<sup>1)</sup>

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<sup>1</sup> Knight & Sabot(1982) argue that even in developing country, firm specific skills account for the low turnover rates of modern sector. Economic development creates a stable and committed proletariat possessing the skills needed by the modern sector of the economy and seniority pay is demanded to keep these skilled workforce, which reduces turnover rates.

This virtuous circle of high seniority pay, low turnover and high on-the-job training is most remarkable in Japan. Mincer & Higuchi(1988) argue that firm-specific on-the-job training results in relatively steeper wage trajectories in Japan and that it is the basic proximate reason for the strong degree of workers' attachment to the firm in Japan. They also insist that the reason for the emphasis on firm-specific human capital formation in Japanese firms is the rapid economic growth and technical progress.

This paper is to test if this virtuous linkage between seniority pay, on-the-job training and low turnover rate exists in Korea using the survey data on Korean firms. The conclusion is that the virtuous linkage do not exist in Korea even though Korea also experienced rapid economic growth just as Japan and has similar cultural and institutional settings to those of Japan. This suggests that the steeper wage profiles in Korea should be explained in the context of specific practices of wage determination and socio-economic conditions of economic development in Korea rather than in terms of general theory based on individual's micro-economic behavior.

## II. WAGE PROFILE AND TURNOVER IN KOREA AND JAPAN

Figure 1<sup>2)</sup> shows that seniority pay system is prevalent in Korea not less than in Japan.<sup>3)</sup> The tenure profiles of Korea are steeper than those of Japan both in blue collar and in white collar. Moreover, there is little difference in tenure-wage profiles between blue collar and white collar in Korea contrary to those of Japan. Even workers with low possibilities of on-the-job training have seniority wage profiles in Korea. Figure 2 shows that drivers in Korean manufacturing companies, who have low possibilities of on-the-job training have steeper tenure-wage profiles as well.

These findings indicate that Korean male blue collar workers have seniority pay scales. Most conventional theories predict that the mobility of workers with steeper tenure-wage profiles is low.<sup>4)</sup> This prediction, however, does not work well in Korea. The quit ratio of Korean manufacturing workers is almost twice as high as that of Japanese counterparts even in large establishments as of 1990(See Table 1). The percentage of workers with more than 15 years of

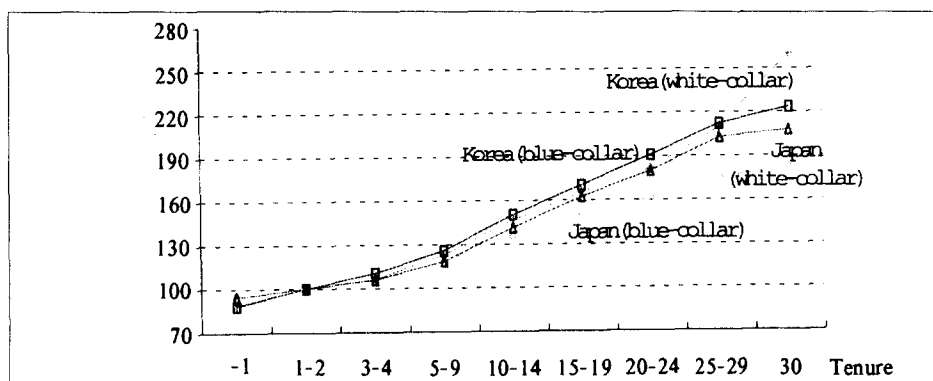
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<sup>2</sup> The data used in designing these figures are Basic Survey on Wage Structure(Chingin Kozo Kihon Chosa, Ministry of Labor, Japan) and Occupational Wage Survey(Jigjong Imgun Siltae Chosa, Ministry of Labor, Korea). These two survey data are extremely similar in the coverage scope, method, and items of survey.

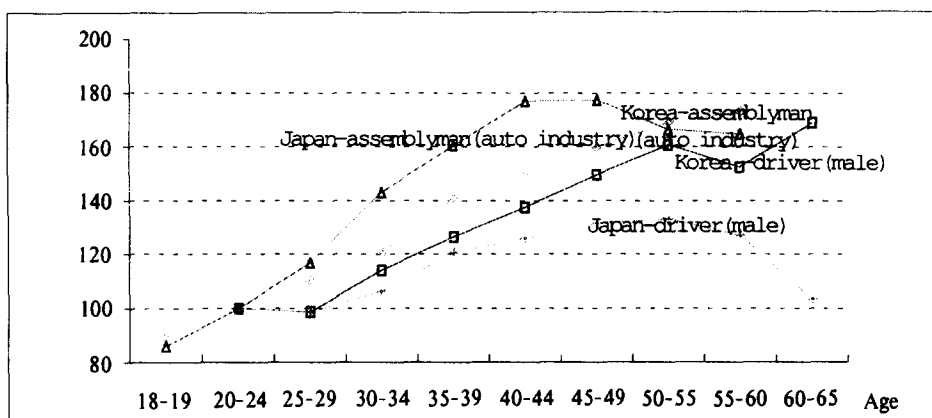
<sup>3</sup> Some previous studies(Kim 1992, Park 1985, Ahn 1982, Koike1981) also found that the wage profiles of Korea were more seniority-based than those of Japan. Most of the studies, however, depended on age-wage profiles rather than tenure-wage profiles based on pre-1980 data except Kim(1992).

<sup>4</sup> Seniority pay is to recoup the investment in training workforce by the firm(Becker, 1964), or to provide incentive to work and not to shirk(Lazear, 1981) or to prevent high turnover workers from applying(Salop & Salop, 1976). Most of these models posit that seniority pay would reduce turnover.

[Figure 1] Wage By Tenure (Manufacturing, male worker, 1990)



[Figure 2] Wage By Age, Occupation (Manufacturing, 1990)



tenure is only 6.9 percent in male blue collar workers of Korean large companies while it is 57.8 percent in Japan as of 1990. It is a big differential even though Korea has shorter experience of industrialization. It is already 26.5 percent in Japan as of 1965. Korean workers have been protected from most kinds of dismissal under the law and lay-offs for business restructuring have been limited in Korea (Park & Lee, 1994, p.47). Nonetheless, Korean workers have very high level of mobility. The practice of lifetime employment has not been usual for blue collar male workers even in the large Korean companies at least before the great labor struggle year 1987. Korean manual workers, who were not allowed to organize unions and could not voice their own rights in the workshops for a long time, have used 'exit' device to express dissatisfaction. They did not opt for job security at the cost of immediate high earnings.

[Table 1] Monthly Quit Ratio of Japan and Korea (Manufacturing sector)

	5-29	30-99	(Size of Establishment)		500-
			100-299	100-499 300-499	
Japan					
1990	1.8	1.6		1.3	1.2
1980	1.7	1.5		1.5	1.1
Korea					
1990	6.0	5.5	4.3	3.0	2.4
1980	6.4	6.9	6.2	5.5	4.5
Korea(male blue collar workers)					
1990	7.4	7.1	5.1	3.2	1.8
985	6.6	6.9	5.5	4.3	2.7
1980	7.4	7.8	6.6	5.6	4.2

Sources: Ministry of Labor of Korea, Monthly Labor Statistics Report, various issues.  
Ministry of Labor of Japan, Monthly Labor Statistics Report, various issues.

In sum, there is a big discrepancy between wage structure and employment practice in Korea from the viewpoint of conventional theories such as human capital theory. The steeper tenure-wage profile in Korea does not contribute to increasing workers' attachment to the firms.

### III. JOB TRAINING, TURNOVER AND RETURNS TO TENURE IN KOREA

In the above section, I just described and predicted that returns to seniority has little to do with low turnover rates in Korea. This section will investigate if the relatively high returns to tenure in Korea can be explained in the light of on-the-job hypothesis.

Mincer and Higuchi(1988) have found that the relations between wage-tenure profiles and turnover rates are relatively strong in Japan and weak in the US. They conclude that as much as two-thirds of the differential in turnover between the two countries is explained by the differences in the steepness of the tenure-wage profiles. Contrary to this conclusion, Levine(1993) find no evidence that establishments with high levels of training have either higher returns to tenure or lower levels of turnover and establishments with higher returns to tenure have lower levels of turnover. They have tested the following two basic predictions of human capital theory-duality hypothesis-with different results.

- i ) Intensive on-the-job training results in steeper tenure-wage profiles.
- ii ) High returns to tenure reduces turnover rates.

As Mincer and Higuchi(1988) say, this is a testable proposition in contexts other than the US-Japan comparison. This section is to test this duality

hypothesis using the Korean data and the method of Mincer and Higuchi (1988) and Levine(1993). This section will also test the internalization hypothesis of Koike(1981, 1996) which argue that skill is formed within firms through the on-the-job training.

### 3.1. Data

The data used here are from The Survey on the Skill Formation in Korean Manufacturing Plants with 50 or more employees in the chief industrial areas of Korea(Seoul, Incheon, Kyungki, Kyungpuk, and Kyungnam), which was conducted by the Korean Labor Institute in 1992. It is based on 306 on-the-spot questionnaires and 3,124 worker questionnaires. That is, these data are composed of two parts: 1) one from the structured interview with managers about plants characteristics(Plant-Data) 2) the other from the questionnaires to workers(Individual-Data I). The number of collected individual questionnaire is limited to 10-20 per establishment in the Individual-Data I. It does not make sense to estimate returns to tenure of each establishment with this limited sample size. Thus, wage data of each establishment were taken from the Occupational Wage Survey(Ministry of Labor, Korea) and merge them with the Plant-Data creating new data set(Individual-Data II), but the number of the corresponding establishments is only 47.

### 3.2. Variables

There are a lot of items in the questionnaire about job training and skill formation. Of all the items, 11 were selected to create four job training measures and three skill measures at the individual-level, and four job training measures at the plant-level. Table 2 presents the descriptive statistics of those measures.

[Table 2] Descriptive Statistics (Mean and Standard Deviation)

	MEAN	SD
<i>Individual-level data</i>		
LW: Log of basic wage	12.9743	0.2663
EXP: age-education-6, in years	12.8883	7.2830
EXPSQ: EXP squared	219.1131	242.3214
TEN: length of service at plant, in years	5.7447	4.4813
TENSQ: TEN squared	53.0692	78.0839
EDU: years of schooling	11.8268	1.2813
MAR: marital status, 1 if married, 0 else	0.6150	0.4867

*On the job training measurers at the individual level*

TIME REQUIRED TO TRAIN	0.8214	0.9297
Time for a beginner to become well qualified for your job, in years		
FORMAL VOCATIONAL TRAINING	0.1161	
experience of vocational training within the firm? 1 if yes, 0 if no		
IMPORTANCE OF ON-THE-SPOT LEARNING	0.8754	1.0074
2=very important; 1=somewhat; 0=a little; -1=not so; -2=not at all;		
SKILL LICENSE	0.2498	
Do you have a skill grade license? 1 if yes, 0 if no		

*Skill measures at the individual level*

WORK-RELATED KNOWLEDGE	0.1123	
1. Do you know the exact cause of the trouble with your work?		
2. Can you disassemble and assemble your equipment and machinery?		
3. Do you understand the overall working of your factory?		
1 if answers to question 1,2,3 are all yes, 0 if other		
SKILL LEVEL	1.0068	1.0736
-2=laborer; -1=trainee; 0=single-skilled worker;		
1=high-quality single-skilled worker or multi-skilled worker;		
2=high-quality multi-skilled worker or technical multi-skilled worker;		
SKILL UPGRADE	0.6970	
1 if the current skill level is higher than the skill level		
at the time of entering company, 0 else		
TIME REQUIRED TO TRAIN BY TENURE: interaction(product)	68.3502	124.5577
FORMAL VOCATIONAL TRAINING BY TENURE:	0.8792	3.0574
IMPORTANCE OF ON-THE-SPOT LEARNING BY TENURE:	5.2426	8.6564
LICENSE BY TENURE:	1.1274	2.9446
WORK-RELATED KNOWLEDGE BY TENURE:	0.8770	2.8895
SKILL LEVEL BY TENURE:	6.8199	8.9613
SKILL UPGRADE BY TENURE:	4.2566	4.6248
TIME REQUIRED TO TRAIN $\geq 2$ and TENURE $\geq 3$	0.0622	
1 if time to train is greater than 2 years		
and tenure is more than 3 year or more, 0 else		
TIME REQUIRED TO TRAIN $\geq 3$ and TENURE $\geq 5$	0.0189	
1 if time to train is greater than 3 years and tenure is more than 5 year or more, 0 else		

*Plant-level data*

SIZE OF ESTABLISHMENT DUMMIES	
S3: 1 if $100 \leq$ the number employees $< 300$ , 0 else	0.3212
S4: 1 if $300 \leq$ the number employees $< 500$ , 0 else	0.0997
S5: 1 if $500 \leq$ the number employees, 0 else	0.3545
UNION: 1 if being unionized, 0 else	0.5011

## INDUSTRY DUMMIES (23 INDUSTRIES) OMITTED

*On the job training measures at plant level*

TIME REQUIRED TO TRAIN <sub>plant</sub>	3.1425	2.3331
time for unskilled workers to become skilled workers, in years		
IN-PLANT VOCATIONAL TRAINING	0.2407	
1 if plant has in-plant vocational training facilities, 0 else		
IMPORTANCE OF INFORMALLY TRAINED WORKERS	0.6624	
Are internally trained workers more important than others?		
1 if more important; 0 if the same; -1 if less important		
JOB ROTATION	0.2533	0.7985
1=frequent job rotation; 0=occasional job rotation; -1=no job rotation		
TIME REQUIRED TO TRAIN <sub>plant</sub> BY TENURE: interaction		
(product)	19.6010	26.2567
IN-PLANT VOCATIONAL TRAINING BY TENURE: interaction	1.6157	3.7793
IMPORTANCE OF INFORMALLY TRAINED WORKERS BY		
TENURE:	4.0489	4.7950
JOB ROTATION BY TENURE:	1.1257	6.0109

TIME REQUIRED TO TRAIN for job is frequently used to measure the required time of on-the-job training for an incumbent job (Levine 1993, Brown 1989). It is from the question, how long does it take for beginners to become well qualified for the incumbent job. IMPORTANCE OF ON-THE-SPOT LEARNING and FORMAL VOCATIONAL TRAINING are chosen as measures of informal and formal job training. In particular, SKILL LICENSE is used as a measure of job training although it is not a measure of on-the-job training. The skill grade license system has been one of the two major pillars of Korean job training system together with the vocational training system<sup>5)</sup> that includes IN-PLANT VOCATIONAL TRAINING, which will be used as one of the on-the-job training measures at the plant-level.

As a plant-level on-the-job training measure, TIME REQUIRED TO TRAIN<sub>plant</sub> measures the time for unskilled workers to become skilled at the plant. IMPORTANCE OF INFORMALLY TRAINED WORKERS and IN-PLANT VOCATIONAL TRAINING are taken as measures of informal and formal job training at the plant-level. JOB ROTATION, which is frequently regarded as an important job training device of the Japanese production system,

<sup>5</sup> Since 1967, there have been three types of vocational training in Korea. 1) public vocational training, conducted by central and local government 2) in-plant vocational training, conducted by private enterprises 3) authorized training, implemented and financed by a non-profit organization under government authorization. The in-plant training requires private firms with 150 or more employees to train a fixed number of skilled workers internally every year. Otherwise, they have to pay a certain amount of levy.

is also taken.

As skill measures at the individual-level, SKILL LEVEL is created based on skill categories. The categories include 'laborer', 'trainee', 'single-skilled worker', 'high-quality single-skilled worker', 'multi-skilled worker', 'high-quality multi-skilled worker', 'technical multi-skilled worker'<sup>6)</sup> and 'others'. The survey also asked workers what categories they belonged to at the time they joined their companies and at the time they answered the questionnaires. SKILL UPGRADE can be created from this question showing if the skill level of incumbent job is up-graded or not compared with the skill level at the time of joining the company. WORK-RELATED KNOWLEDGE measures the intellectual skill in Koike's terminology.<sup>7)</sup> Intellectual skill is the knowledge of the structure, function, and mechanism of machines and products. It is required to reduce the cause of production problems such as unusual operations and to eliminate them. Production workers share this knowledge with engineers and technicians in the integrated system in which the workers staffing production lines are in charge of both usual and unusual operations like in Japan. WORK-RELATED KNOWLEDGE comes from the question, 'how much knowledge do you have about your work, machinery and plant?'.

### 3.3. Basic Wage Equations with Job Training Measures

Table 3 presents coefficients of wage equations with and without job training and skill controls for male blue collar workers. The log of basic wage is regressed on a function of demographic and human capital variables, plant characteristic variables such as plant size, union organization and industry dummies. Table 3 includes individual-level job training and skill variables while Table 4 includes plant-level job training variables. Column (i) in Table 3 presents the result from a standard log-wage equation specification and column (ii) and (iii) include the training and skill measures with column (iii) also adding the interactions of those measures with tenure. The wage equations of Table 4 are identical to those in Table 3, except that the plant-level measures of on-the-job training are included instead of individual ones.

The results seem to be a little different from those of typical regressions using the national data. The tenure coefficients in these wage equations are relatively low compared with those of the wage equations using national data. It is because the dependent variable in this regression includes only basic wage.<sup>8)</sup>

<sup>6)</sup> Technical multi-skilled worker' is defined in the questionnaire as worker skilled in several areas as well as having work-related theoretical knowledge and comprehensive decision-making ability(Park 1996, p.257)

<sup>7)</sup> There is a detailed explanation about the intellectual skill in chapter 4 of Koike(1996).

<sup>8)</sup> The basic wage is used because the information on wage components in the survey data is not accurate. The wage data are not from wage ledgers but from individual questionnaire. It is difficult for employees to calculate their wage components exactly on survey questionnaire. Moreover, Korean companies usually have very complicated wage packages.



[Table 3] Wage Equations with Individual-level Job Training and Skill Measures: OLS Model

Independent variables	(i)	(ii)	(iii)
CONSTANT	12.2819*** (0.0772)	12.3609*** (0.0761)	12.3490*** (0.0775)
EXP	0.0263*** (0.0030)	0.0237*** (0.0029)	0.0237*** (0.0030)
EXPSQ	-0.0005*** (0.0000)	-0.0005*** (0.0000)	-0.0005*** (0.0000)
TEN	0.0259*** (0.0042)	0.0249*** (0.0042)	0.0288*** (0.0045)
TENSQ	-0.0003 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)
EDU	0.0244*** (0.004)	0.0211*** (0.0047)	0.0209*** (0.0047)
MAR	0.0346** (0.0160)	0.0383** (0.0156)	0.0392** (0.0157)
UNION	-0.0321*** (0.0122)	-0.0300** (0.0119)	-0.0304** (0.0119)
S3	-0.0495*** (0.0164)	-0.0576*** (0.0160)	-0.0572*** (0.0161)
S4	-0.0933*** (0.0230)	-0.1044*** (0.0225)	-0.1024*** (0.0227)
S5	-0.0164 (0.0173)	-0.0319* (0.0170)	-0.0322* (0.0171)
TIME REQUIRED TO TRAIN		0.0336*** (0.0060)	0.0376*** (0.0113)
FORMAL VOCATIONAL TRAINING		-0.0057 (0.0167)	-0.0286 (0.0283)
IMPORTANCE OF ON-THE-SPOT LEARNING		0.0031 (0.0052)	-0.0017 (0.0086)
SKILL LICENSE		0.0405*** (0.0125)	0.0572*** (0.0205)
WORK-RELATED KNOWLEDGE		0.0066 (0.0171)	0.0249 (0.0340)
SKILL LEVEL		0.0222*** (0.0058)	0.0294*** (0.0088)
SKILL UPGRADE		-0.0609*** (0.0129)	-0.0424** (0.0200)
TIME REQUIRED TO TRAIN BY TENURE			-0.0000 (0.0001)
FORMAL VOCATIONAL TRAINING BY TENURE			0.0036 (0.0032)
IMPORTANCE OF ON-THE-SPOT LEARNING BY TENURE			0.0008 (0.0012)
LICENSE BY TENURE			-0.0032 (0.0031)
WORK-RELATED KNOWLEDGE BY TENURE			-0.0027 (0.0039)
SKILL LEVEL BY TENURE			-0.0014 (0.0013)
SKILL UPGRADE BY TENURE			-0.0036 (0.0029)
TIME REQUIRED TO TRAIN $\geq 2$ and TENURE $\geq 3$			-0.0153 (0.0340)
TIME REQUIRED TO TRAIN $\geq 3$ and TENURE $\geq 5$			0.0111 (0.0507)
R-square	0.4960	0.5246	0.5275
N	1307	1307	1307

Note: Dependent variable is log monthly basic earnings. Standard deviations are in parentheses. 23 industry dummies are omitted from the table. \*\*\* Statistically significantly different from zero at the 1% level. \*\* Statistically significantly different from zero at the 5% level. \* Statistically significantly different from zero at the 10% level.

[Table 4] Wage Equations with the Plant-level Job Training Measures: OLS-Model

Independent variables	(i)	(ii)	(iii)
CONSTANT	12.2921*** (0.0785)	12.3150*** (0.0784)	5.4102*** (0.0803)
EXP	0.0260*** (0.0030)	0.0259*** (0.0030)	0.0259*** (0.0030)
EXPSQ	-0.0005*** (0.0000)	-0.0005*** (0.0000)	-0.0005*** (0.0000)
TEN	0.0259*** (0.0042)	0.0262*** (0.0042)	0.0237*** (0.0046)
TENSQ	-0.0003 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)
DEU	0.0237*** (0.0049)	0.0241*** (0.0048)	0.0242*** (0.0048)
MAR	0.0353** (0.0163)	0.0366** (0.0163)	0.0378** (0.0163)
UNION	-0.0346*** (0.0124)	-0.0360*** (0.0124)	-0.0373*** (0.0122)
S3	-0.0486*** (0.0169)	-0.0511*** (0.0169)	-0.0510*** (0.0173)
S4	-0.0929*** (0.0233)	-0.0791*** (0.0235)	-0.0796*** (0.0235)
S5	-0.0153 (0.0176)	-0.0110 (0.0190)	-0.0096 (0.0191)
TIME REQUIRED TO TRAIN <sub>plant</sub>		0.0060** (0.0025)	0.0029 (0.0040)
IN-PLANT VOCATIONAL TRAINING		-0.0157*** (0.0153)	0.0140 (0.0233)
IMPORTANCE OF INFORMALLY TRAINED WORKES		-0.0347*** (0.0125)	-0.0355* (0.0200)
JOB ROTATION		0.0200*** (0.0071)	0.0028 (0.0110)
TIME REQUIRED TO TRAIN <sub>plant</sub> BY TENURE			0.0004 (0.0004)
IN-PLANT VOCATINONAL TRAINING BY TENURE			-0.0047* (0.0028)
IMPORTANCE OF INFORMALLY TRAINED WORKES BY TENURE			0.0006 (0.0029)
JOB ROTATION BY TENURE			0.0028* (0.0014)

Note: Dependent variable is log monthly basic earnings. Standard deviations are in parentheses. 23 industry dummies are omitted from the table. \*\*\* Statistically significantly different from zero at the 1% level. \*\* Statistically significantly different from zero at the 5% level. \* Statistically significantly different from zero at the 10% level.

Allowances and bonus are usually more related to tenure than basic wage in Korea. Most coefficients of the log-'basic wage' equations using national data are extremely similar in size to those of these equations.<sup>9</sup> This indicates that our data is enough well sampled to represent the national population.

One of the interesting finding is that the union effect on wages is negative even though the voice effect of unionization has increased since 1987. Most analyses of Korean researchers showed that this negative union effect is due to the strong union threat effects.

The job training and skill measures do not have consistent effects on wage as predicted. TIME REQUIRED TO TRAIN and SKILL LICENSE have significant effects on wages, but formal and informal vocational training measures have no significant effects.

As for TIME REQUIRED TO TRAIN, the result is very similar to that of the previous research using the U.S. and Japanese data. Mincer and Higuchi (1988) indicate that an additional year with training raised wage growth in the firm by 4-5 percent over the year both in cross sections and over time. It is about 3.4 percent in my analysis. In the results of Levine(1993, p735), an increase in TIME REQUIRED TO TRAIN of 1 standard deviation increases wages by 3 percent both in the U.S. and Japan, which is as large as returns to education of 2 years. It is 3.12 percent and 1.5 years each in my analysis. In case of job skill measures, SKILL LEVEL has a significant coefficient, but WORK-RELATED KNOWLEDGE does not.

Table 4 presents the coefficient of wage equations with plant-level job training measures. The results are not different. One of the interesting finding is that the plants with JOB ROTATION get their workers wage gains. On-the-job training in the form of job rotation increases wages significantly.

<sup>9</sup> The wage equations for male blue collar workers using national data(Occupational Wage Survey) are as follows.

Dependent variable	basic wage	total wage (= basic wage + allowances + bonus)
INTERCEPT	12.0780	12.1813
EXP	0.0208	0.0221
EXPSQ	-0.0004	-0.0004
TEN	0.0256	0.0567
TENSQ	-0.0001	-0.0010
EDU	0.0219	0.0275
MAR	0.0466	0.0751
UNION	0.0206	0.0256
S3	-0.0422	0.0412
S4	-0.0928	0.1020
S5	0.1005	0.2951
R-square	0.3358	0.5784
N	40,824	40,824

Note: All coefficients are statistically significant at 1% level.

### 3.4. Test of Internalization Hypothesis

The distinctive feature of skill formation in Japan is the internalization of skill formation. It means that skill is formed based on formal in-plant vocational training or on-the-job training rather than formal education, out-of-plant vocational training institutes or experience in other firms(Koike, 1981, pp.7-14). Koike(1980) also argued that Korean companies had the feature of internalization of skill formation even though to a less degree than the Japanese companies and that it was the cause of the steeper wage-age profiles in Korea. The evidence he brought forward is that the in-plant vocational training which, he think, is related to on-the-job training. The skill grade license system which, he think, represents general skill formation is not important particularly in the large chemical or machinery industries in Korea.

The findings in my analysis of wage equations, however, do not support the internalization hypothesis of skill formation in Korea.

First, Koike's argument implies that on-the-job training should be rewarded with wage premium. That is, on-the-job training should have positive effects on wages. However, the on-the-job training variables of my analysis have no significant effects on wages at the individual-level as well as at the plant-level. The coefficients of FORMAL VOCATION TRAINING and IMPORTANCE OF ON-THE-SPOT LEARNING are not significant(See Table 3 Column ii). Moreover, the plant-level on-the-job training variables such as IN-PLANT-VOCATIONAL TRAINING, and IMPORTANCE OF INFORMALLY TRAINED WORKERS have significant negative effects on wages(See Table 4 Column ii).<sup>10)</sup>

Second, one peculiar picture in the wage equations is that SKILL LICENSE has significantly great effect on wage. It is not unusual that Korean companies determine starting wages considering skill license together with sex, educational background and work experience. Of the two pillars of Korean formal training institutions, only the skill license system has positive effect on wage.

Third, the significantly negative coefficient of SKILL UPGRADE calls our attention. It implies that those who acquire their skills outside the firm rather than those who upgrade their skills within the firm have wage gains.

These findings support the prediction that Korean skill formation system, if any, is externalized rather than internalized. Some stylized facts about the job training and labor market in Korea provide evidences for the externalization hypothesis.

First, general education and out-of-plant job training systems(vocational training institute and skill grade license system) which were initiated by the

<sup>10</sup> Park(1996) argues that the reason for the low insignificant coefficients of job training variables in the wage equations is that the trained workers have to pay the training cost. However, it is not usual custom in Korean companies for workers to bear the training cost.

state had relatively great meaning in the early stage of industrialization through 1980. They were particularly instrumental in providing a large pool of semi-skilled workers for labor-intensive light industries and the beginning heavy industries.<sup>11)</sup>

Second, most production employees admit that the usual way of training was informal learning from either co-workers or senior workers (Jeong, 1995, p. 246). However, it is close to on-the-spot learning rather than the structured on-the-job training. Most of on-the-spot skill and knowledge were acquired spontaneously by workers themselves even with little incentive or support provided by the companies. Korean companies make little effort to structure on-the-job training. The practice of job rotation and multi-skill training has not been diffused (Park & Lee, 1994). Participation in small-group activities such as quality circles was much less popular in Korea than in Japan (Jeong, 1995). Korean firms have not been keen on on-the-job-training and the weakness of unions and low levels of job security deter formation of firm-specific skill (Ryu, 1994). Korean managers did not feel the necessity of employee's on-the-spot knowledge. The managers are more likely to make decisions unilaterally without workers' participation over factory problems.

Third, Korean companies' low degree of interest in vocational training can be found in the decreasing role of the mandatory in-plant training system which was supposed to provide job-related skills for production workers. While those employers who have more than 150 employees are required to provide a certain level of in-plant vocational training, only about 20 percent of them opted to design and deliver training programs to their own employees. The rest simply chose to pay the levy to the government instead. The proportion of firms opting to build in-plant training facilities rather than to pay training levies has gradually dropped during the last 15 years from 66.5 percent in 1977 to 18.8 percent in 1991 (Lee, 1992).

Fourth, the practice of poaching characterized Korean labor market. Large firms have tended to poach experienced employees, in particular skilled production workers and technical workers from small and medium firms. Even managers in the advanced sector had to up-bid the pay of skilled workers when demands for skills increased in particular when firms were set up or during the boom period. The more rapid pace of industrialization in Korea and the greater government pressure to expand production rapidly created such a turbulent labor market (Bai & Form, 1986 p.122).

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<sup>11</sup> The education level of male blue collar workers reached Japanese one as of 1990. The percentage of those with high-school education or more (12 educational years or more) in manufacturing sector is 63.5 percent in Korea, 64.8 percent in Japan. As for large firms, it is 68.0 percent for Korea, 70.8 percent for Japan.

### 3.5. Test of the Duality Hypothesis

The fact that skill formation system is externalized means that job training has little to do with higher returns to tenure and lower turnover rates. Our findings in the wage equations also support this argument.

First, most of job training by tenure and skill by tenure interaction variables have negative or insignificant coefficients in the column(iii)s of Table 3, 4. Only JOB-ROTATION BY TENURE has positive one at the 10 percent level. These results imply that the wage-tenure profiles are not steeper in highly trained workers or plants with higher training.

Second, the coefficient of tenure does not decrease a lot when the job training and skill measures are included. The coefficient of tenure has been lowered down from 0.0259 to 0.0249. The total returns to 7 years of tenure declines from 16.6 percent to 16.4 percent while it is from 19 percent to 14 percent in the US and from 13 percent to 10 percent in Japan(Levine, 1993 p.735). This suggests that tenure variables in the wage equations capture the pure returns to seniority rather than job training.

Third, the coefficients on (TIME REQUIRED TO TRAIN $\geq$ 3 and TENURE $\geq$ 5) and (TIME REQUIRED TO TRAIN $\geq$ 2 and TENURE $\geq$ 3) are not significant. These interactions are included because job training are usually permitted to those with higher tenure. The results indicates that wages for workers whose jobs require high levels of training are not higher than others even after sufficient tenure had occurred to permit that training.

Fourth, the duality hypothesis that the plants with higher degree of job training do not necessarily give higher returns to tenure which reduce turnover rates is not accepted in this analysis. To test this hypothesis, the returns to tenure across different plants have to be first estimated. In the next step, they can be regressed on the job training variables. Following the method of Mincer and Higuchi(1988), I include plant dummy variables interacted with tenure (PLANT<sub>*i*</sub> TEN<sub>*i*</sub>) together with plant dummies(PLANT<sub>*i*</sub>) in the standard wage equations(Individual-Data II was used in this procedure).

$$\ln W = a_0 + a_1 \dot{EXP} + a_2 \dot{EXPSQ} + a_3 \dot{TEN} + a_4 \dot{TENSQ} + a_5 \dot{EDU} + a_6 \dot{MAR} \\ + \sum \beta_i \dot{PLANT}_i + \gamma_i \dot{(PLANTN_i TEN_i)} + \epsilon \dots \dots \dots (1)$$

The respective coefficients on these variables measure plant-specific returns to tenure( $r_i$ ) and differential plant wage levels( $\beta_i$ ). That is,  $r_i$  measures the increase in wage that the average employee enjoys by remaining at the plant 1 more year while  $\beta_i$  measure plant wage premiums. Then, the plant-specific returns to tenure are regressed on job training measures at the plant-level. The results are shown in Table 5. Plant-specific quit rates are also regressed and the results are presented in Table 6.

[Table 5] The Effects of Job Training on Returns to Tenure in Korea  
(For manufacturing blue collar male workers, 1992)

	(i)	(ii)
CONSTANT	-0.0254 (-2.3)	-0.1330*** (-5.0)
TIME REQUIRED TO TRAIN <sub>plant</sub>	-0.0012 (-0.1)	-0.0001 (-0.0)
IN-PLANT VOCATINONAL TRAINING	0.0091 (0.7)	0.0167 (1.1)
IMPORTANCE OF INFORMALLY TRAINED WORKERS	-0.0135 (-1.4)	-0.0163* (-1.9)
JOB ROTATION	0.0082 (1.4)	0.0078* (1.7)
CAPITAL INTENSITY		0.0127*** (4.7)
LOG OF SIZE		0.0094** (2.5)
UNION		-0.0036 (-0.3)
R-square	0.1063	0.5002
F-value	1.22	5.00
N	46	46

Note: Dependent variable is estimated returns to tenure. Standard deviations are in parenthesis.

\*\*\* Statistically significantly different from zero at the 1% level. \*\* Statistically significantly different from zero at the 5% level. \* Statistically significantly different from zero at the 10% level.

[Table 6] The Effects of Job Training on Quit Rate  
(at the plant level, for blue collar workers, 1992)

	(i)	(ii)
CONSTANT	15.3275 (1.7)	2.9235 (0.1)
TIME REQUIRED TO TRAIN <sub>plant</sub>	0.6555 (0.2)	1.0812 (0.3)
IN-PLANT VOCATINONAL TRAINING	9.1016 (0.9)	9.9502 (0.7)
IMPORTANCE OF INFORMALLY TRAINED WORKERS	10.6733 (1.4)	11.7428 (1.3)
JOB ROTATION	2.4847 (0.5)	3.6332 (0.7)
CAPITAL INTENSITY		3.1189 (1.1)
LOG OF SIZE		-1.7317 (-0.4)
UNION		9.8666 (1.0)
R-square	0.0808	0.1132
F-value	0.791	0.547
N	46	46

Note: Dependent Variable is yearly quit ratio at the plant-level. Standard deviations are in parenthesis. \*\*\* Statistically significantly different from zero at the 1% level. \*\* Statistically significantly different from zero at the 5% level. \* Statistically significantly different from zero at the 10% level.

[Table 7] Effects of Returns to Tenure on Quit Rate(at the industry-level, manufacturing sector, 1990)

Dependent variable	Monthly quit ratio			
	Production Worker		Non-production Worker	
	Male	Female	Male	Female
CONSTANT	3.298*** (5.565)	4.432*** (13.909)	2.350*** (7.966)	2.840*** (9.652)
ERT	-9.860 (-0.279)	-20.025* (-1.892)	-9.015 (-0.836)	-20.086* (-1.845)
EWP	-10.050*** (-3.655)	-4.667*** (-2.900)	-2.313** (-2.252)	-2.484** (-2.268)

Notes: The dependent variable is monthly quit ratio at the industry-level. The independent variables are also industry-level variables. ERT is estimated returns to tenure at the industry-level and EWP is estimated industry wage premium. 25 three-digit industries in manufacturing sector is used. The data source for quit-ratio at the industry-level is Monthly Labor Survey(Korean Labor Ministry). The independent variables are estimated using Occupational Wage Data(Korean Labor Ministry). t-values are in parenthesis.

The plant-level job training measures are not good to predict plant-specific returns to tenure as well as quit-rates. The results show that it is difficult to reject the null hypothesis that the job training measures have no effects on returns to tenure and quit rates. TIME REQUIRED TO TRAIN<sub>plant</sub> and IMPORTANCE OF INFORMALLY TRAINED WORKERS have also negative effects on the returns to tenure and all job training variables have positive effects on the quit rates even though they are insignificant. Even if size, capital intensity, and union organization are controlled, the results are not changed. Some different specifications were also performed to test robustness. When mean-values of individual job training measures across the plants are used instead of plant-specific measures, the results are not changed. The regression for estimating returns to tenure was also rerun without less than 2 year tenure workers. Even in that case, the better results were not obtained.

The hypothesis that higher returns to tenure reduce turnover rates is also tested. In this test, industry-level data are used. It is because the data on industry-level quit rates are more reliable than the plant-level data. The quit rates at the industry-level in 1990 are regressed on the estimated industry-specific returns to tenure and differential industry wages. The results are shown in Table 7. They are consistent with those of Levine(1993) not those of Mincer and Higuchi(1988). The coefficients on returns to tenure are not significant for male blue collar workers or male white collar workers. It is difficult to find clear evidence to prove that higher returns to tenure increase workers' attachment to the firm. However, the estimated wage premiums have significant negative coefficients, which implies that the wage premiums at the industry-level reduce turnover rates. The plant-level relations between quit rates and estimated returns to tenure and estimated wage premium were also investigated,



but no significant coefficients were not found even in that case.

These results indicate that the high returns to tenure for Korean production workers have very little to do with on-the-job training contrary to the expectations of human capital theory. The duality hypothesis is not accepted in Korea. The results are consistent with those of Levine(1993) not those of Mincer and Higuchi(1988). Levine(1993) put an emphasis on the nonpecuniary aspects of job as well as wage profiles. That is, workers who are highly trained receive better working conditions as a reward for their higher productivity. On the contrary, Mincer and Higuchi(1993) argue that rapid economic growth and technological changes in Japan in the post-war decades caused the steeper wage growth in the firm and the resulting lower turnover in Japan compared to that in the US. They also say that job training is increased in industries which experience more rapid long-term productivity growth. Korea also experienced rapid economic growth and technological changes inducing productivity growth. There was an argument that Korean large firms importing technology from Japan had an internal labor market and low turnover rates to prompt on-the-job training.<sup>12</sup> But this was not the full story of Korea. It makes no good sense to think that the employment practices were also imported from Japan. Life-time employment, seniority-merit wage system and the structured on-the-job training were the outcome of the conflicts between management and workers in Japan. Korean managers were aware of this system but they chose not to(Bai and Form, 1986, p.122). Even though Korean firms imported foreign technologies, the need for training workforce within the firms was not strong. It is well known that the practice of poaching skilled workforce characterizes Korean labor market. Large firms have tended to poach experienced employees, in particular skilled production workers and technical workers from small and medium firms. On the contrary, the rapid economic growth and authoritative industrial relations deter firms from structuring on-the-job training and internal labor markets for blue-collar workers in Korea at least before 1987.

## VI. CONCLUDING REMARKS

The above analysis shows that the steeper tenure-wage profile or higher returns to tenure is not always to recoup the investment in training workforce and that it does not always contribute to reducing turnover and enhancing

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<sup>12</sup> Amsden(1991) also points out that there was great need of information sharing and cooperation between work groups or between workers to fully utilize expensive imported technologies in Korea and the relative high wages in large firms of chemical and heavy industries promoted learning by doing in workshops. Korea followed Japanese production practices since Korea imported capital equipment and technology extensively from Japan and learning by doing in workshops was as important in Korea as in Japan.

workers attachment to the firms in Korea. The higher returns to tenure in Korea can not be explained by the productivity of workers with high level of human capital. Then, what made the seniority pay so strong in Korea? The higher incidence of seniority pay implies that wage determining process is very simplified and standardized in Korea. That is, some wage determining factors in particular seniority explain a larger part of wage distributions and the wage determining processes are not greatly different between occupations, skill grades. What made the wage determining process so simple and standardized in Korean firms?

First, Korean managers use easily visible personal factors as signals of wage determination. This means that Korean companies were lacking in taylorism and bureaucracy. Even the most modern plants in Korea did not have detailed forms of job analysis and well-organized wage tables. While taylorist and fordist management systems have been practiced in some large scale assembly-line production facilities since late 1970s(Kim,1988), but generally without the adequate supporting system such as job analysis and job evaluation(Park & Lee, 1994, p.49).

Under these circumstances of no objective standard for wage determination, easily visible personal factors, in particular, seniority may be a good standard. In case it is very difficult to measure the productivity of workers and the degree of devotion to work and loyalty to the firm, hiring workers on the basis of visible individual characteristics seems to be natural. While Japan has developed taylorism in their own way, Korean managers have ignored taylorism.

Second, the simplification and standardization strategies of wage determination together with the authoritarian management were devices for controlling workers and secure industrial peace in workshops. It is well-known that the Korean management were very concerned about the stability of their factory just as the state also has stressed industrial peace so much.<sup>13)</sup> Simplification and standardization strategies contributed to enhancing visible equity between workers and gave Korean managers easy way to control the production workers and induce their effort. To Korean managers, stabilization of input factors was more important than learning by doing of blue-collar workers and the efficiency of work organization.

These facts suggest that the cause and effect of seniority wage could be explained differently according to the conditions of labor market and industrial relations in each country.

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<sup>13</sup> Ryu(1994) also pointed out that the Korean state and managers were concerned with not merely having the 'right' wages(market clearing wages-low wages) but minimizing capital-labor conflict to secure 'industrial peace'(i.e. good investment climate).

## REFERENCES

- Ahn, Chun-sik, *Comparison of the Lifetime Employment System in Japan and Korea*, Tokyo: Ronso-sha(in Japanese), 1982.
- Amsden, A., "South Korea's Record Wage Rates: Labor in Late Industrialization," *Industrial Relations*, Vol.29. No.1, 1991.
- Bai, Kyu-Han and W. Form, "Payment Strategy in South Korea's advanced economic sector," *American Sociological Review*, Vol. 51, 1986.
- Becker, G.S., *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, New York: Columbia Univ. Press(for NBER), 1964.
- Brown, J., "Why do Wages increase with Tenure? On-the-Job Training and Life-Cycle Wage Growth observed within Firms," *The American Economic Review*, Vol.79, No.5, 1989.
- Hashimoto, M. and J. Raisian, "Employment Tenure and Earnings Profiles in Japan and the United States," *The American Economic Review*, Vol. 75, No. 4, 1985.
- Jeong, Iwhan, "The change of internal labor market and industrial relations in Korean manufacturing sector," Unpublished Ph.D. dissertation, Seoul National University(in Korean), 1992.
- Jeong, Jooyeon, "The Failure of Recent State Vocational Training Policies in Korea from a comparative Perspective," *British Journal of Industrial Relations*, Vol. 33, No. 2, 1995.
- Kim, Byung-Whan, *Seniority Wage System in the Far East, Confucian influence over Japan and South Korea* Aldershot Brookfield Avebury, 1992.
- Kim, Hyung-Ki, *Labor and Monopoly Capital*, Seoul: Kachi, (in Korean), 1988.
- Knight, J.B. and R.H. Sabot, "From Migrants to Proletarians: Employment Experience, Mobility and Wages in Tanzania," *Oxford Bulletin of Economics and Statistics*, Vol.44, No.3, 1982.
- Koike, Kazuo, *Kankoku no Rodosijo - kogyoka to shokuren keisei(The labor situation of Korea-Industrialization and Skill Formation)*, Tokyo: Japan Institute of Labor (in Japanese), 1980.
- Koike, Kazuo, *tsushokigyo no shukuren(The skill of small firms)*, Tokyo(in Japanese), 1981.
- Koike, Kazuo, *The economics of work in Japan*, Tokyo: LTCB International Library Foundation, 1996.
- Lazear, E., "Agency, Earnings Profiles, Productivity, and Hours Restrictions," *The American Economic Review*, Vol. 71, No. 4, 1981.
- Lee, Joo-Hoo, "Vocational Training and Industrial Competitive Power: Seoul," *Korea development Institute(in Korean)*, 1992.
- Levine, D.I., "Worth waiting for? Delayed compensation, training, and turnover in the United States and Japan," *Journal of Labor Economics*,

- Vol. 11, No. 4, 1993.
- Lynch, L.M., "Private sector training and the earnings of young workers," *The American Economic Review*, Vol. 82, No.1, 1992.
- Mincer, J. and Y. Higuchi, "Wage Structure and Labor Turnover in the United States and Japan," *Journal of the Japanese and International Economies*, Vol.2, 1988.
- Ono, Akira, "Two Competing Hypothesis for the Nenko Wage System," *Hitotsubashi Journal of Economics*, Vol.28, 1987.
- Park, Duk-Je, "A study on Seniority Wages in Korea," unpublished Ph.D. dissertation, Seoul National University(in Korean), 1985.
- Park, Young-Bum & M.B. Lee, "Economic development, globalization, and practices in industrial relations and human resource management in Korea, in V.A. Kochan, and R. Lansbury, eds.," *Employment Relations in the Growing Asian Economies*, London: Routhledg, 1994.
- Park, Joon-Sik, "New Managerial strategy and the changes of the factory regime in Korea," *Asian Perspective*, Vol.19, No.2, 1995.
- Park, Ki-Seong, "Economic growth and multi-skilled workers in manufacturing," *Journal of Labor Economics*, Vol. 14, No. 2, 1996.
- Ryu, Jong-il, "Changing capital-labour relations in South Korea, in Juliet Schor, and Jong-Il You, eds.," *Capital, the state, and labour: a global perspective*, Aldershot, UK; University Press, 1994.
- Salop, J. and S. Salop, "Self-Selection and Turnover in the Labor Market," *Quarterly Journal of Economics*, November, 1976.