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University or job training: Korea and Germany compared

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Abstract

This study is the first to empirically compare the economic returns of human capital in South Korea and Germany. The study, based on the Mincer earnings model (1974), tested whether the wage gap between university graduates and those with lower educational levels is wider in South Korea than in Germany, due to differences in job training. The study estimated the wage gaps by employing random effects and quantile regressions, along with ordinary least squares. The data, which was taken from the “Korean Labor and Income Panel Study” and the “German Socio-Economic Panel,” covered the period 2004-2007 for males. The effects of university degrees on wages were about 40 percent higher than those of upper secondary school qualifications in both countries. However, this gap seemed to be wider in South Korea when observing individual heterogeneity. The effects of job training completed two years prior were 17–31 percent in Germany and 2.7–10 percent in Korea. In the case of job training completed one to six years earlier, German training also demonstrated stronger effects on wages in the longer term. The results revealed that training compensated for any educational wage differentials more strongly in Germany than in South Korea.

Keywords: Job training; university; education; wage differential; Korea; Germany.

INTRODUCTION

Excessive demand for university education is a serious social issue in South Korea (henceforth Korea). Since 2004, more than 80 percent of all high school graduates have gone on to university or junior college. This number peaked at 83.8 percent in 2008, although only 56.1 percent of all graduates found jobs with a permanent/regular working contract one year after graduation (Korean Educational Development Institute, 2009a). The percentage of the total registered unemployed population who had graduated from university was 12.6 percent in 2000 and 22.4 percent in 2010 (Korean Statistical Information Service, 2011). Kim et al. (2010) found that the oversupply of university graduates began in 1994. In 2009, approximately 10 percent of

university graduates had low-skilled jobs in relation to their qualifications.

When considering this disproportionately high demand for university entrance, Korean education experts have become concerned about the lack of vocational education at the senior high school level. The German vocational education system (the *Duales System*) is recognized as an effective labour market instrument that helps keep the youth unemployment rate low and provides an adequate supply of skilled workers (Gill and Dar, 2000: 485). Germany is unique among OECD countries in that it has more people aged between 45 and 54 enrolled in tertiary education (26 percent) than younger people aged between 25 and 34 (24 percent). The corresponding figures in Korea are 23 percent for the older age group and 58 percent for the younger age group (OECD, 2010). Based on these facts, Korean education experts proposed a vocational education system similar to the German model and in March 2010, 21 “*Meister* senior high schools” opened (Ministry of Education, Science and Technology, 2011).

Abbreviations

GSEOP German Socio-Economic Panel
KLIPS Korean Labor and Income Panel Study
RE Random Effects Regression

Since 1961, however, the job training system in Korea worked in cooperation with Germany (Ministry of Government Legislation, 2011). The job training system established using the German experience, effectively supported the industrialization of Korea. In the 1990s, the level of school education in Korea improved rapidly, while vocational education and training quickly lost its status in the labour market. Attempts to implement the German dual system in Korea in the 1980s and 1990s did not improve the quality of vocational education and training, and ultimately ended in failure (Chang and Kim, 1995; Jeong, 1995). We were interested to find out whether the recent introduction of the German vocational school system could enhance vocational schooling and reduce the inefficient demand for university education in Korea. This question led to compare the education and job training systems in Korea and Germany and analyze their effects on the labour market.

Studies on human capital and the labour market in Korea have drawn comparisons with the German vocational education model. The section of the German literature relevant to the vocational training system and the reform policy on vocational education (Münch, 1994; Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie, 1997; Reuling and Hanf, 2003) has been translated and made available to experts in Korea. Kim (1998) studied the development of vocational training in Germany and how it could be used to establish similar policies in Korea. Funk (2005) reported on the current situation and future prospects of the vocational training system in Germany. Unfortunately, neither of these studies focused on the economic returns that German education and vocational training delivered. This paper is the first to empirically compare the economic returns attributable to education and job training in Korea and Germany.

The main focus of this study is to ask why university education is considered so much more important in Korea than in Germany. Koreans often assume that the wage differential between university graduates and workers with a lower educational level is wider in Korea than it is in Germany. The main reason why this is indeed true is that the German dual system enables workers with a low level of formal education to qualify as technical experts, which reduces the earnings gap between university graduates and senior high school graduates (Kim, 2006). The result is a drop in the degree of competition for university entrance. We have adopted this hypothesis as a possible solution to the main question in the study.

This study, which is based on the Mincer earnings model (1974), estimates the wage differentials in the university level of education and job training in Korea and Germany, using the datasets for males taken from the “Korean Labor and Income Panel Study” (KLIPS) and the “German Socio-Economic Panel” (GSEOP) for 2004–2007. To compare the wage differentials, we adopted the

same estimation framework for both countries and assessed the relative differences of empirical results. Descriptive analysis of the variables of interest was used to determine the directions of bias in their estimates – whether upwards or downwards – that may arise due to individual heterogeneity. By means of random effects (RE) and quantile regressions, along with ordinary least squares (OLS), it was discovered that, in both countries, university degrees had an approximately 40 percent greater effect on wages than those of upper secondary school qualifications. However, this wage gap seemed to be wider in Korea when analyzing individual heterogeneity. The effect of job training completed during the year before last under consideration is apparently higher in Germany (17–31 percent) than in Korea (2.7–10 percent). Job training completed one to six years ago under consideration also exhibited stronger long-term effects in Germany than in Korea. The minimal effect of job training may excessively increase the demand for university education in Korea.

The rest of this paper is organized as follows. Section 2 sheds light on the school education and vocational training systems in the two studied countries, while Section 3 describes the data and methodology that this study employed. Section 4 presents the empirical findings, and Section 5 discusses the results of the study. Section 6 concludes the paper.

SCHOOL EDUCATION AND JOB TRAINING IN KOREA AND GERMANY

Education

School education in Korea involves six years of elementary school, three years of junior high school, and three years of senior high school, followed by either two years of junior college or four years of university. The elementary school system is equivalent to the *Grundschule* in Germany, which is classified as the primary level of education defined by the International Standard Classification of Education-97 (ISCED-97 level 1) (ISCED-97 is a framework defined by UNESCO to collect and report data on educational programs). Three years of junior high school in Korea, which is almost the same as *Hauptschule*, *Realschule*, or *Gymnasium* in Germany, is equivalent to the lower secondary level of education, ISCED-97 level two. Senior high school is the upper secondary level of education, classified as ISCED-97 level 3, which is divided into academic high school (ISCED-97 level 3A) and vocational high school (ISCED-97 level 3C) in Korea. The academic high school is comparable to the *Gymnasiumoberstufe* or *Fachgymnasium* in Germany, while vocational high school is comparable to the *Berufsschule*, *Berufsfachschule*, *Berufsoberschule*, or *Fachoberschule* (Jung, 2011: 78).

After completing senior high school, most students in Korea enter two to three years of junior college or a four-year bachelor's course at university. Junior college, classified as ISCED-97 level 5B, is the first stage of tertiary education, with practical, technical, and occupation-specific courses in a short curriculum. In Germany, the higher vocational education at *Fachschule* is classified as level 5B. Bachelor's courses are classified as ISCED-97 level 5A (1st). Post-graduate education involves a two-year master's course, ISCED-97 level 5A (2nd), and is the first stage of an extended tertiary education. In Germany, *Fachhochschule* and *Universität*, ISCED-97 level 5A, make up the first stage of tertiary education. The University of Applied Sciences (*Fachhochschule*), which lasts three or four years, places greater emphasis on vocational practice than the *Universität*. Educational courses at *Universität* usually take between five and 6.5 years to complete. In line with the Bologna Accords (1999), Germany recently introduced bachelor and master's courses in universities. Doctoral courses constitute the second stage of tertiary education, ISCED-97 level 6, in both countries.

Job training

In Germany, the Federal Institute for Vocational Training (BIBB) provides rules and programs for vocational training at the upper secondary education level. This dual system is run in cooperation with the Federal Government and individual states, as well as other social partners. The social partners consist of industry chambers, employers, and trade unions, which participate in developing standards for vocational training, controlling examinations, and awarding all qualifications (Hippach-Schneider et al., 2007). Entrance into the dual system is open to graduates from all kinds of lower secondary level schools. The three years of vocational education within this system is carried out both in workplaces and in vocational schools. Students participate in vocational training in a workplace for three or four days a week, and are taught for one or two days a week in vocational school. Upon completion of the vocational training in a workplace, students have to pass an examination, which qualifies them to specialize in any one of 349 accredited occupations (Bundesinstitut für Berufsbildung, 2010). In 2004, approximately 52.5 percent of the relevant age group in Germany acquired an accredited job that required training in the dual system.

In Germany, advanced job training is comprised of nationwide standardized promotional training, refresher training and retraining, on-the-job company training, as well as job training undertaken at one's own initiative. Advanced job training at school is carried out on a part-time or full-time basis at the *Fachschule* (ISCED-97 level 5B). The Federal Ministry of Education and Research (BMBF) reported that, in 2003, approximately 26 percent

of the population aged between 19 and 65 participated in advanced job training (Kuwam et al., 2006). Approximately 12 percent of the population aged between 25 and 64 took part in informal job-related continuing education and training. The expected duration of this training was 398 hours per annum in Germany (OECD, 2007: 353).

In Korea, vocational training in upper secondary education is planned and carried out by a committee comprising representatives of central government, regional governments, job training institutes, employers, and employees according to the Law Promoting Vocational Education and Training (1997) and the Rule concerning Vocational Training of Schools (1999). This vocational training in the workplace usually lasts between 34 hours and six months over the three years of schooling. Unlike in Germany, no master curriculum or national standard controls the quality of vocational training. Trainees do not receive a certificate on completion of their vocational training. The role and competence of social partners in Korea, especially chambers of industry and employers who are aware of the demand for skills in the labour market and provide and inspect training programs, are not adequately developed compared to those in Germany. In 2010, about 25 percent of senior high school students completed vocational schooling; 19 percent of these graduates from vocational schools participated directly in the labour market. Approximately 71 percent of graduates from vocational schools went on to junior college or university (Korean Educational Development Institute, 2010a, 2010b). Pupils at vocational schools generally concentrate on preparing for their entrance examination to college or university, rather than on acquiring occupational skills.

In Korea, the main form of vocational training is informal job training for adults, undertaken after the completion of schooling. There is no advanced job training at school for adults, such as that in the *Fachschule* in Germany. The participation rates in informal job training for all adults in 2002 and 2003 were 4.67 percent and 5.13 percent, respectively. Half of these individuals received job training of five days or less (Lee et al., 2006: 37). Based on the method used in the Eurostat AES (Adult Education Survey), the participation rate in informal job-related continuing education and training for adults between the ages of 25 and 64, including apprenticeships, reached 14.3 percent in 2009. The estimated duration of this informal training in Korea was 106.2 hours per annum (Korean Educational Development Institute, 2009b).

Certain factors make it possible to compare the educational and job training systems in Korea and Germany. In Germany, job training is divided into three classifications: vocational training in the dual system, advanced job training at school, and other training on or off the job. The Korean job training consists of appren-

ticeships and other training on or off the job. This study excludes advanced job training at school in Germany and makes the common category of job training in both systems. The heterogeneity of job training in the two countries would then be mainly related to how the apprenticeship is structured. In Germany it is conducted at school, while in Korea it commences after the completion of formal schooling. The former has a standardized program and duration, while the programs and durations in the latter vary according to their providers. Therefore, this study confirmed the different effects that the differences in job training systems have on wages, mainly, with and without the dual system. With regard to the education system, our comparisons have identified significant variances concerning the educational program and purpose at the same ISCED-97 level 5B between the two countries. Therefore, in order to evaluate the impact of higher level education, we focused on the effect of university education. As a reference group for university degrees, we chose an educational qualification acquired from upper secondary but lower than tertiary schooling. In both countries, these programs are oriented towards preparing individuals for tertiary education and/or qualifying them for occupations (Jung, 2011; Table 2.4). In making this selection of vocational and educational qualification, we categorized comparable job training and educational programs in the two countries.

METHODS, DATA, AND DESCRIPTIVE STATISTICS

Methods and data

This study, which is based on the Mincer earnings model (1974), employs RE and quantile regression and OLS to estimate the effect that educational and job training have on wages in Korea and Germany. Data used is from two panel surveys: the “Korean Labor and Income Panel Study” (KLIPS) and the “German Socio-Economic Panel” (GSOEP). The RE solves the problem of serial correlation in these panel datasets. The quantile regression made it possible for us to analyze different regression curves along with the various distributional points of log wages (Koenker and Bassett, 1978). This feature allows more comprehensive comparisons with other estimation methods. This study provided estimates for the five quantiles of the wage distribution: at the 10th, 25th, median, 75th, and 90th quantiles.

Estimating the effects of school education and job training using Mincer's model requires that consideration be given to measurement errors, omitted ability, and self-selection biases (Griliches, 1977; Heckman, 1979; Blackburn and Neumark, 1995; Ashenfelter et al., 1999). However, in a comparative study that employs different survey data, it is rarely possible to find the same variables and techniques that would commonly enable these

biases to be corrected. Therefore, the initial focus of this study was to identify the relative differences in educational and job training effects on wages between the two countries, under the same empirical framework, rather than totally removing these biases. However, in employing this strategy we faced a more challenging problem: the sizes of the measurement error, the omitted ability, and the self-selection biases were dependent upon the different social conditions in Korea and Germany. We had to determine how differently those biases influence wages in Korea and Germany. In order to detect the different magnitudes of the biases attributable to the variables of interest (that is, university degree and job training), we utilized descriptive analysis, considered the social conditions in Korea, and applied the theory of human capital investment. This enabled us to identify some plausible inferences concerning these biases that would help us support the comparison of the estimation results between the two countries.

The empirical analysis takes the 2004–2007 data concerning male employees between the ages of 18 and 55 from KLIPS and GSOEP. KLIPS, published by the Korea Labor Institute (KLI), is the first longitudinal survey of the labour market and income activities of households and individuals in Korea. In terms of design and management, the data can be compared to a set of successful longitudinal surveys conducted in industrialized countries, including the “Panel Study of Income Dynamics” (PSID) in the United States, the “British Household Panel Survey” (BHPS), and GSOEP. With regard to individual incomes, KLIPS primarily reported the net monthly wages and salaries from workers principal jobs. Since 2004, KLIPS has also reported current gross wages, which are comparable to the individual wage variable in Germany (Korea Labor Institute, 2008). In our estimation, gross wages were used as the dependent variable for the period 2004–2007.

The GSOEP is carried out by the German Institute for Economic Research (DIW). The data consists of several samples from A to H. Sample ‘A’ covers “Residents in West Germany (the Federal Republic of Germany (BRD)).” Sample B covers “Foreigners in West Germany” and Sample C covers “German Residents in East Germany (the German Democratic Republic (DDR)).” Sample D for “Immigrants”, was launched in 1994/95. In addition, Sample F, “Innovation,” and Sample G, “Oversampling of High Income,” have emerged since 2002. Samples E and H, “Refreshment,” were sampled independently of the ongoing panel from the population of private households in Germany (German Socio Economic Panel, 2009a). In order to acquire comparable estimation results concerning the effects of school education and the job training in Korea and West Germany, our study only used Sample A, which covered “Residents in West Germany.” In order to exclude the unobserved effects of having a foreign background, we removed observations for those people whose mother and/or father immigrated

Table 1. Descriptive Statistics for the Korean Data KLIPS (6208 observations for males aged between 18 and 55)

Variable	Mean	Std. Dev	Min	Max
In hourly gross wage	1.9693	0.6069	-1.48282	5.49504
Age	37.2756	8.2901	18	55
Tenure	6.1671	6.6326	0	37
Education level				
Under junior high school	0.0288	0.1674	0	1
Junior high school	0.0726	0.2596	0	1
Senior high school	0.4095	0.4918	0	1
Junior college	0.1627	0.3691	0	1
University	0.3264	0.4689	0	1
Job training completed in the survey period before last	0.1553	0.3622	0	1
Household head	0.7457	0.4355	0	1
Having children	0.5702	0.4951	0	1
Marital				
Single	0.2775	0.4478	0	1
Married	0.6910	0.4621	0	1
Widowed	0.0024	0.0491	0	1
Divorced	0.0240	0.1531	0	1
Separated	0.0050	0.0705	0	1
Public sector	0.0564	0.2307	0	1
Overtime	0.3544	0.4784	0	1
Firm size				
Under 5 employees	0.1055	0.3072	0	1
5-9	0.1073	0.3095	0	1
10-99	0.3272	0.4692	0	1
100-999	0.2202	0.4144	0	1
1000 and more	0.2399	0.4270	0	1
Year				
2004	0.2339	0.4233	0	1
2005	0.2448	0.4300	0	1
2006	0.2537	0.4352	0	1
2007	0.2676	0.4427	0	1

Note: The description of 16 regional dummies and 33 industry dummies is omitted.

from another country. In addition, in order to estimate the effects of German school education and job training, we also excluded data for those who attended school or had job training abroad. We also excluded the data for people who migrated from East Germany to West Germany or vice versa in order to avoid contaminating the estimation results due to the unobserved effect of this migration. In this way, only data for West Germans with a West German educational and job training background was sampled. However, the study included data for young males between the ages of 18 and 24 in order to estimate the effects of job training in the German dual system.

Descriptive statistics

The main variables used were the hourly wages of individuals as the dependent variable and education and job training as the explanatory variables. In addition, age was used as a proxy variable for general human capital, and tenure as a proxy variable for firm-specific human capital (Rosen, 1972; Killingsworth, 1982; Altonji and Shakotko, 1987; Dustmann and Meghir, 2005). The present study also generated the same control variables relating to individual, family, and firm characteristics from both datasets (see Tables 1 and 2). We obtained 6208 observations for 2728 individuals from KLIPS, and 3858 observations for 1308 individuals from GSOEP. The

Table 2. Descriptive Statistics for the German Data GSOEP (3858 observations for males aged between 18 and 55)

Variable	Mean	Std. Dev.	Min	Max
In hourly gross wage	2.6835	0.5580	-0.68279	4.63134
Age	39.6532	8.8435	18	55
Tenure	11.8855	9.5920	0	41.4
Education level				
Under general elementary	0.0041	0.0643	0	1
General elementary	0.1400	0.3470	0	1
Qualification for university and/or middle vocational qualification	0.5143	0.4999	0	1
Higher vocational qualification	0.1304	0.3368	0	1
University	0.2112	0.4082	0	1
Job training completed in the calendar year before last	0.0171	0.1297	0	1
Household head	0.6566	0.4749	0	1
Having children	0.4798	0.4997	0	1
Marital				
Single	0.2885	0.4531	0	1
Married	0.6216	0.4851	0	1
Widowed	0.0026	0.0509	0	1
Divorced	0.0700	0.2552	0	1
Separated	0.0174	0.1306	0	1
Public sector	0.2553	0.4361	0	1
Overtime	0.6265	0.4838	0	1
Firm size				
Under 5 employees	0.0417	0.2000	0	1
5-19	0.1332	0.3399	0	1
20-99	0.1685	0.3743	0	1
100-1999	0.3478	0.4763	0	1
2000 and more	0.3087	0.4620	0	1
Year				
2004	0.2807	0.4494	0	1
2005	0.2553	0.4361	0	1
2006	0.2273	0.4192	0	1
2007	0.2367	0.4251	0	1

Note: The description of 16 regional dummies and 28 industry dummies is omitted.

dependent variable, the natural log of hourly wages, averaged 1.969 with a standard deviation of 0.607 in Korea, and 2.683 with a standard deviation of 0.558 in Germany.

Education

The point of the current paper was to compare wage differentials in educational qualifications between senior high school and university graduates in Korea with the comparable German educational levels. In order to proceed, we classified the different educational levels of schooling in both countries into five equivalent categories,

utilizing information from the ISCED-97 (see Table 3). Level 1 is equivalent to an educational level lower than graduation from lower secondary education in Korea and Germany. Level 2 corresponds to completion of lower secondary education. Level 3, the reference variable, signifies completion of upper secondary to lower than tertiary levels of education (40.95 percent of observations in Korea; 51.43 percent of observations in Germany). Level 4 consists of a completed junior college education in Korea and a completed advanced vocational qualification at school in Germany (16.27 percent in Korea; 13.04 percent in Germany). Level 5 comprised those people who hold a bachelor's degree from a university or higher in Korea, or a diploma from a univer-

Table 3. Classification of Educational Levels.

Classification	ISCED	Korea	Germany
Level 1 Educational level lower than completed lower secondary Schooling	- ISCED 1 Primary level	Lower than elementary schooling or inadequate Elementary school	Inadequate (<i>Anderer Abschluss</i>) No degree (<i>ohne Abschluss verlassen</i>)
Level 2 Completed lower secondary level education	ISCED 2 Lower secondary level	Junior high school	General elementary degree (<i>Haupt/Realchulabschluss</i>)
Level 3 Completed upper secondary and lower than tertiary level education	ISCED 3 Upper secondary level ISCED 4 Post-secondary non-tertiary	Senior high school	Qualification for college/university or middle vocational qualification (<i>Fach-/Abitur or Beruf. Abschluss</i>) Qualification for college/university and middle vocational qualification (<i>Beruf. Abschluss nach absolv. allg. Schule</i>)
Level 4 Completed junior college or higher vocational education	ISCED 5B First stage of tertiary education	Junior college	Higher vocational qualification (<i>Höherer beruflicher Abschluss: Meister, Techniker</i>)
Level 5 Bachelor's degree at university or higher degree	ISCED 5 First stage of tertiary education ISCED 6 Second stage of tertiary education	Bachelor Master Doctor at university	Higher education: University+ (<i>Fach-/Hochschule or Universität</i>)

Source: OECD (1999); German Socio Economic Panel (2009b); Korea Labor Institute (2008).

sity of applied sciences (*Fachhochschuldiplom*) or higher in Germany. Level 5 included 32.64 percent of observed Koreans and 21.12 percent of observed Germans.

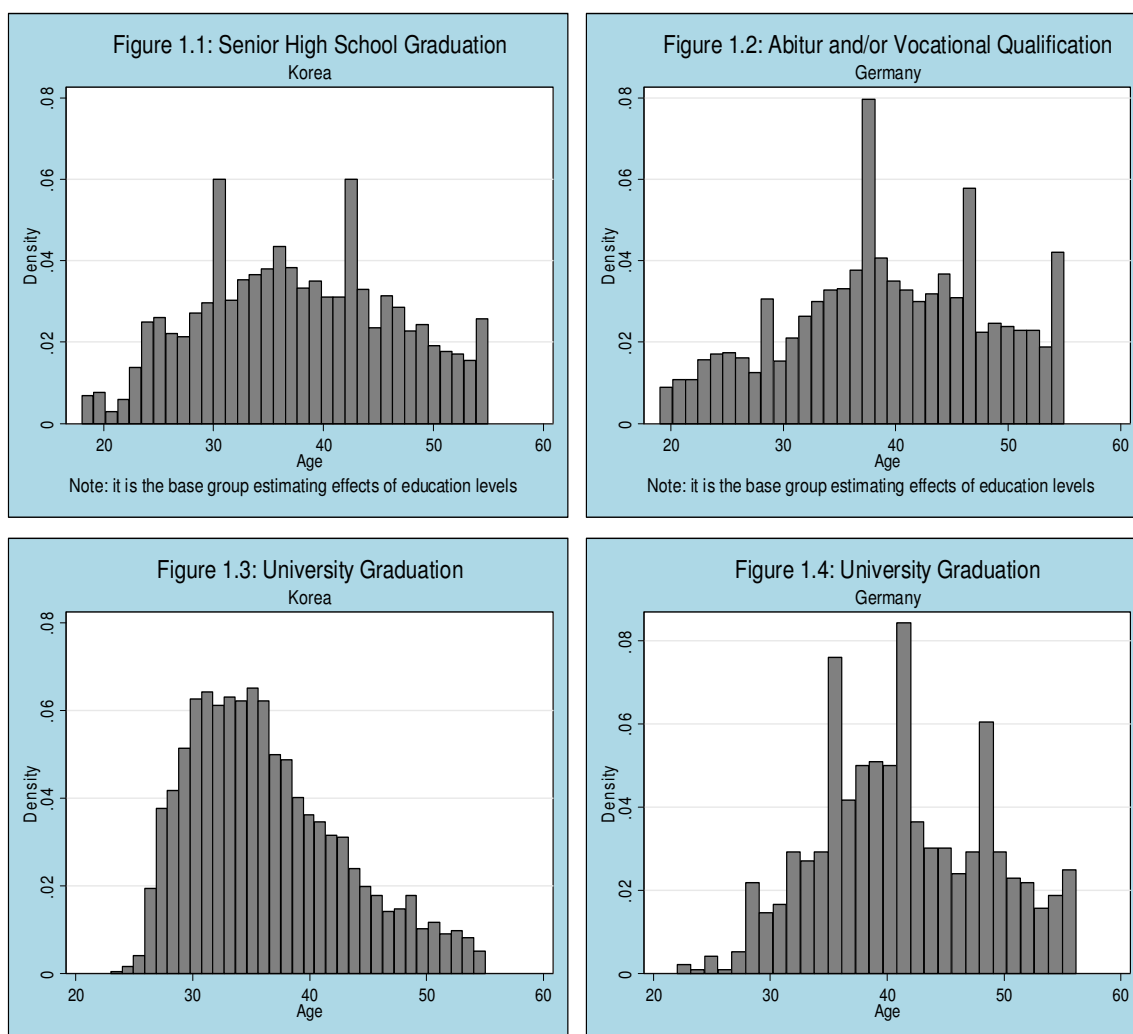
With regard to individual heterogeneity, this study examined the distribution of university graduates by age and found a remarkably skewed figure from the Korean dataset compared with that for Germany (see Figure 1). 52 percent of those with university degrees belong to the age group younger than 36 years in Korea, compared to only 22 percent in Germany. This younger group went on to university when the interest in university education started to increase in Korea in the early 1990s. In 1990, the enrolment rate for junior college and university was 33.2 percent, while it has risen in recent years to over 80 percent (Korean Educational Development Institute, 1990–2009). This social development is a result of increasing investment in the higher level of education on the part of Korean families. Over the years, university education in Korea has become generalized: it is no longer an elite level of education promises more able pupils a chance to enhance their earnings. The high proportion of young university graduates has reduced upward biases due to unobserved ability and self-selection that are attributable to the variable of university degrees in Korea, unlike in Germany.

Through careful classification of different educational levels in schooling, we confirmed a noticeable qualitative difference in school education between the two countries.

In order to identify the general effect of education on wages, apart from the effects of university education, we also generated variables for an educational year, which is the cumulative standard length of education in each country at the end of program (see Tables 4 and 5). Using the educational year as a basis, we obtained 6208 observations in Korea and 3832 in Germany. The average number of years of education is 13.3 in Korea and 12.5 in Germany, with standard deviations of 2.66 for both countries.

Job Training

In order to estimate the effect that job training has on wages, we generated dummy variables of completed job training in the survey period before last under consideration for the Korean dataset, and completed job training during the calendar year before last under consideration for the German dataset. The question concerning job training in KLIPS was, “*Since the last interview, have you done any vocational education or training in order to get a job, start your business, or enhance productivity?*” The comparable job training variable in GSOEP could be determined by posing a question such as, “*Did you finish schooling, vocational training, or university education (in the last calendar year)?*” Furthermore, a subordinate question relating to



Note The Korean data, taken from Korean Labor and Income Panel Study, includes a total of 6208 observations for males aged between 18 and 55. The German data, taken from German Socio-Economic Panel, includes a total of 3858 observations for males aged between 18 and 55.

Figure 1. Age Distribution of the Educational Levels in the Sample Data.

Table 4. Educational Duration in Germany

Educational program		Cumulated years
Schooling program	No degree	7
	Lower school degree	9
	Intermediary school	10
	Degree for a professional college	12
	High school degree	13
	Other	10
Occupational training program	Apprenticeship	1.5
	Technical schools (incl. health)	2
	Civil servants apprenticeship	1.5
	Higher technical college	3
	University degree	5

Source: German Socio Economic Panel (2009b).

Note: The educational duration is the sum of cumulated years of schooling and years of occupational training. The cumulated years are standard length of schooling or training at the end of the program.

Table 5. Educational Duration in Korea

Educational program	Cumulated years
No schooling	0
Elementary	6
Middle school	9
High school	12
Junior college	14
Bachelor at University	16
Master	18
Doctor	21+

Source Korea Labor Institute (2008).

Note The cumulated years are standard length of schooling at the end of the program.

“type of education or training” could also be posed. The types of vocational education and training are: apprenticeship (*Lehre*), full-time vocational school (*Berufsfachschule*, *Handelsschule*), school for health care professions (*Schule Gesundheitswesen*), trade and technical schools for vocational education (*Meister-Technikerschule*, etc.), training for public employees (*Beamtenausbildung*), company retraining, further training, and “other”. Of these, apprenticeships, company retraining, further training, and “other” are comparable to the Korean situation in job training, so we included them in generating the German job training variable. The advanced job training at school, classified as educational level 4, was excluded from the job training category. The figures for completed job training are 15.53 percent in Korea and 1.71 percent in Germany. The exclusion of the advanced job training at school and the inclusion of only completed job training reduced the proportion of job training in the German dataset. Using only employed males in Korea increased this proportion in the Korean dataset.

As an illustration of the distribution of job training between educational levels, 61 percent of job training participants in Korea completed junior college or university (that is, levels 4 and 5), while the corresponding figure in Germany is approximately 11 percent. According to the assumption that more able and motivated individuals tend to achieve a higher level of education, and that these individual characteristics are accompanied by high earning potential – as implied by the theory of human capital – the effects of job training must be highly correlated with positive self-selection and contain a stronger upward bias in Korea than in Germany.

Investment in human capital usually has an effect on wages during several periods or throughout life (Becker, 1962). In order to identify the long-term effects of job training, we considered any job training completed in earlier years. Using the dummy variables of job training completed one to six years ago, we obtained 1945 observations for Korea and 3266 observations for Germany. The breakdown of observations for completed

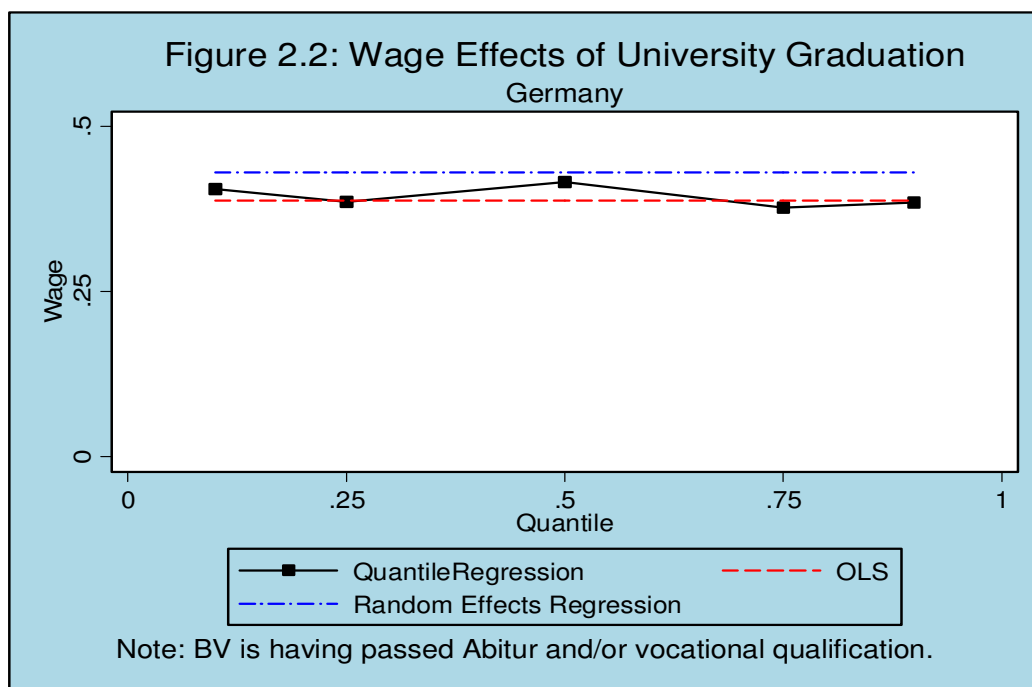
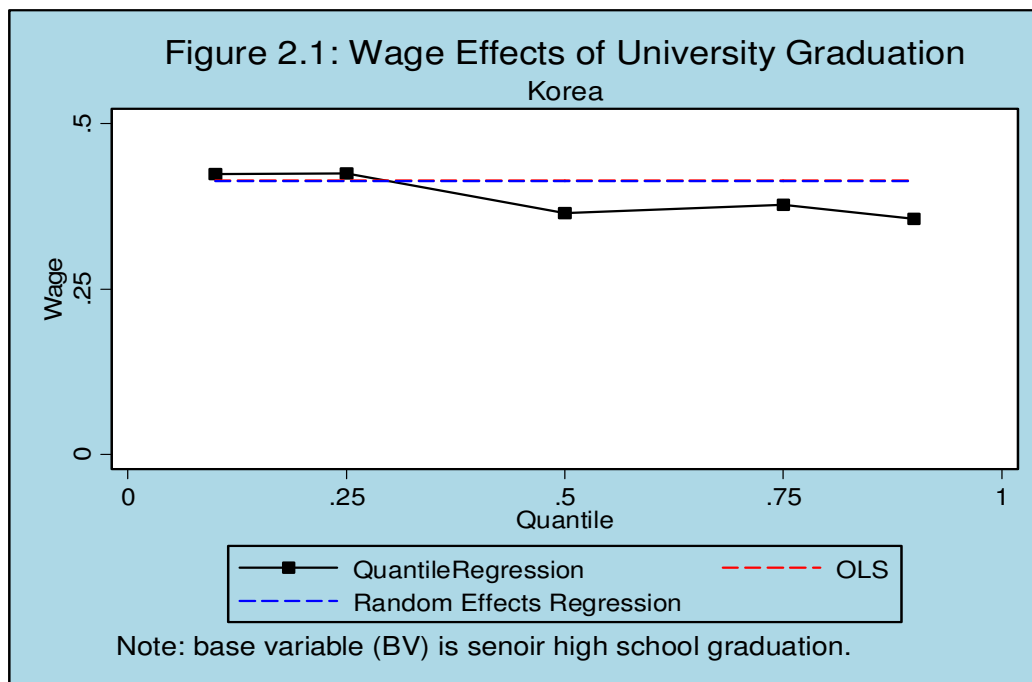
job training for years one to six in Korea were 19.23 percent, 19.64 percent, 17.02 percent, 14.50 percent, 12.34 percent, and 11.57 percent in Korea. The corresponding figures in Germany were 0.92 percent, 1.44 percent, 1.41 percent, 1.50 percent, 1.44 percent, and 1.78 percent. Descriptive statistics of other variables are presented in Tables 1 and 2.

ESTIMATION RESULTS

In the estimation, the base variable of the educational level dummies was senior high school graduation in Korea and a middle vocational qualification and/or a qualification for university admission in Germany. The base variable of job training was no job training. Standard errors were obtained by 200 replications for quantile regression. The OLS and the RE used the heteroskedasticity-robust standard errors for test statistics. In general, the estimation results were statistically significant in both countries up to the five-percent level.

Effects of university education and job training

Are the wage gaps in Korea between people with and without university degrees wider than for those in Germany? By means of OLS and RE, we found that people in Korea with a university degree earned 41 percent more than the base group. This was 37 percent at the median, with all other factors fixed. University graduates in Germany earned 39 percent (OLS), 42 percent (median), and 43 percent (RE) more than the base group. The wage differentials for Korean university graduates were higher at the lower quantiles and lower at the higher quantiles (42 percent at 10th; 35 percent at 90th), while the same trend was not noticeable in Germany. These results suggest that the wage differentials due to university degrees were broadly similar in Korea and Germany, which was contrary to our



Note: Quantile regression presents wage effects of completed university education (in proportion) at the 10th, 25th, 50th, 75th and 90th quantile points.

Figure 2. Wage Effects of University Graduation

expectations (see Figure 2). Observing the overall outline of wage differentials between and within educational levels by means of quantile regression, the wage differentials between the top and bottom educational levels seemed to be higher in Korea than in Germany (see Tables 6 and 7).

The effects of job training on wages in Korea were approximately 8 percent (OLS, median) and 3 percent (RE). The difference between the two estimates signals the importance of individual heterogeneity concerning job training: the so-called career "up-and-comers" may be selected for training in Korea. The job training effects

Table 6. Results using Variables: Educational Levels and Job Training in Korea

Korea	OLS	10th	25th	Median	75th	90th	Random
Hourly Wages							
Under junior high school	-0.278	-0.310	-0.271	-0.282	-0.270	-0.273	-0.287
	-8.82	-6.62	-6.28	-7.44	-6.82	-4.27	-7.39
Junior high school	-0.163	-0.109	-0.136	-0.159	-0.186	-0.200	-0.168
	-7.53	-2.75	-4.28	-6.08	-5.99	-6.66	-5.75
Junior college	0.149	0.194	0.170	0.149	0.127	0.088	0.139
	9.32	7.35	7.63	8.12	6.65	3.62	6.19
University+	0.414	0.424	0.424	0.365	0.377	0.356	0.413
	24.78	14.04	19.41	19.08	17.73	13.44	18.00
Training in the period before last	0.075	0.094	0.103	0.082	0.072	0.049	0.027
	4.86	3.32	5.07	4.96	3.63	2.35	2.06
Observations	6208 (Groups: 2528)						
<i>R-sq/Pse. R2/Wald</i>	0.547	0.3351	0.3496	0.3741	0.3788	0.3617	5482.44

Note Base variable for education level: Senior high school. Base variable of job training: Absence of job training. t-statistics are presented in the 2nd. line of cells in the table. Standard errors are obtained by 200 replications for the quantile regression and the other estimation methods utilize the heteroskedasticity-robust standard error for the test-statistics. Estimates from other control variables are omitted in the table.

Table 7. Estimation Results using Variables: Educational Levels and Job Training in Germany

Germany	OLS	10th	25th	Median	75th	90th	Random
Hourly Wages							
Under Haupt/Realschule	-0.188	-0.534	0.068	0.00028	-0.097	-0.203	-0.215
	-1.03	-0.77	0.16	0.00	-1.65	-2.65	-0.91
Haupt/Realschule	-0.132	-0.042	-0.081	-0.101	-0.116	-0.117	-0.199
	-6.42	-1.12	-0.22	-4.97	-5.77	-3.87	-5.86
Fachschule	0.091	0.105	0.091	0.103	0.098	0.088	0.089
	5.06	2.51	0.10	4.48	4.17	2.96	2.88
Fachhochschule +	0.388	0.405	0.386	0.415	0.377	0.384	0.430
	17.49	9.64	1.99	18.26	15.71	11.89	10.85
Training in the year before last	0.226	0.090	0.215	0.169	0.191	0.135	0.248
	2.93	0.56	1.70	2.37	2.61	1.70	3.48
Observations	3858 (Groups: 1308)						
<i>R-sq/Pse. R2/Wald</i>	0.5264	0.436	0.3532	0.319	0.298	0.2845	1355.56

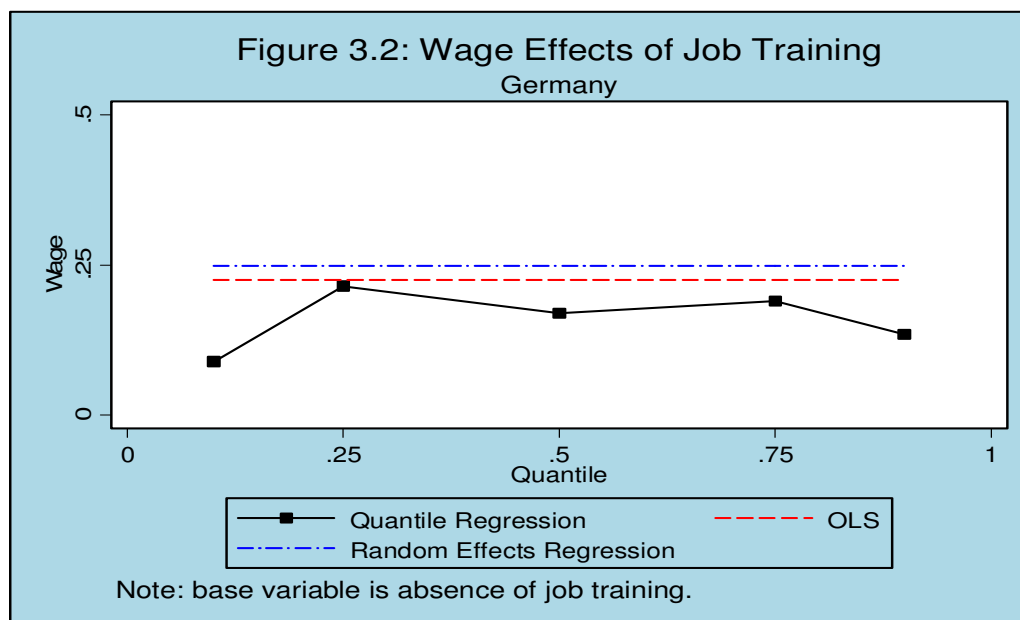
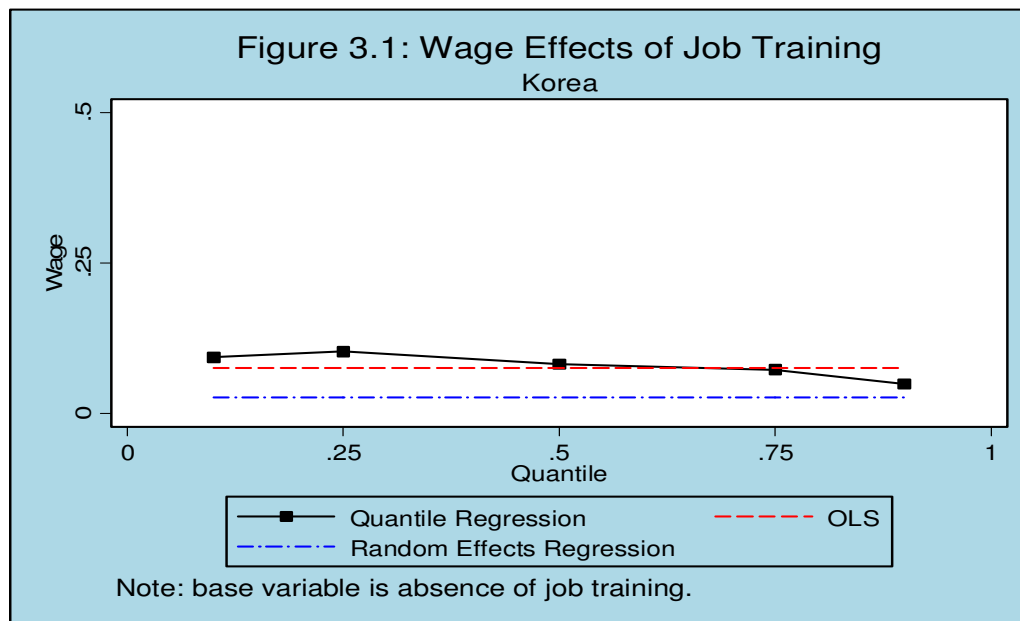
Note Base variable for education level: Occupational qualification (*Berufsabschluss*) and/or aqualification suitable for university admission (*Fach-/Hochschulreife*). Base variable of job training: Absence of job training. t-statistics are presented in the 2nd. line of cells in the table. Standard errors are obtained by 200 replications for the quantile regression and the other estimation methods utilize the heteroskedasticity-robust standard error for the test-statistics. Estimates from other control variables are omitted in the table.

were higher at lower quantiles and lower at higher quantiles (10 percent at the 25th quantile, 5 percent at the 90th). In Germany, the effects of job training were 23 percent (OLS), 17 percent (median), and 25 percent (RE). This lower effect of training at the median revealed some sensitivity due to outliers in the German dataset. The job training effects were higher at lower quantiles and lower at higher quantiles (22 percent at the 25th quantile; 14 percent at the 90th) up to the 10 percent significance level. All estimation results demonstrated stronger effects on

wages of job training in Germany than in Korea (see Figure 3).

Effects of educational years

In the model using the variables of an educational year, we compared the effects of educational duration in Korea and Germany. The estimation results were highly significant in both countries. According to the estimation results, one additional year of education in Korea enhanced wages by about 7.5 percent by means of the

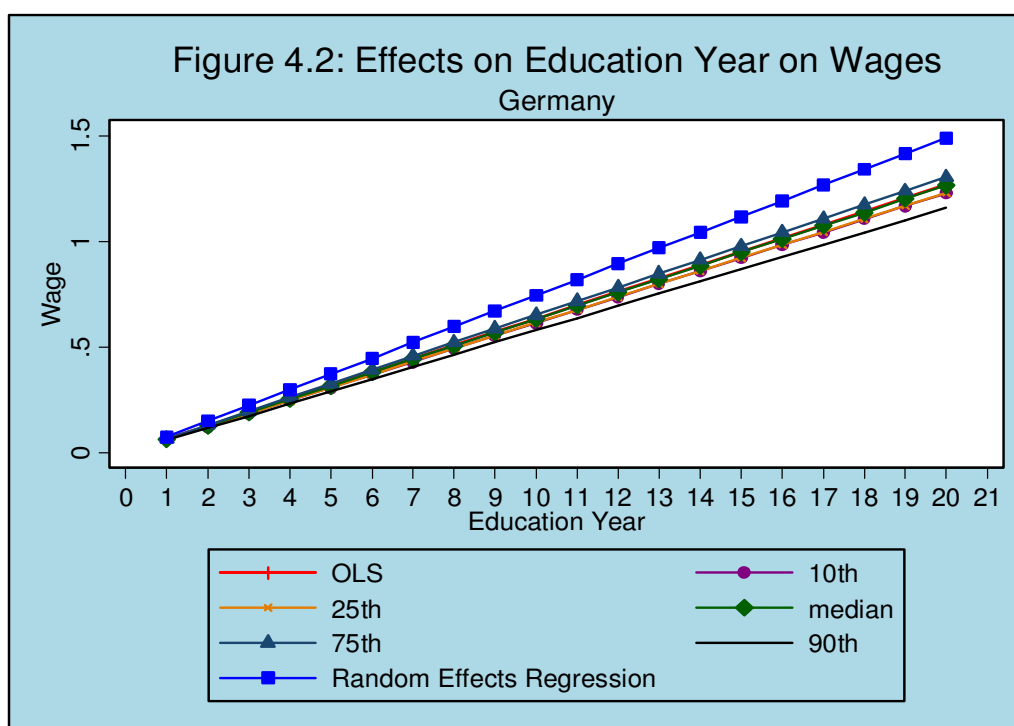
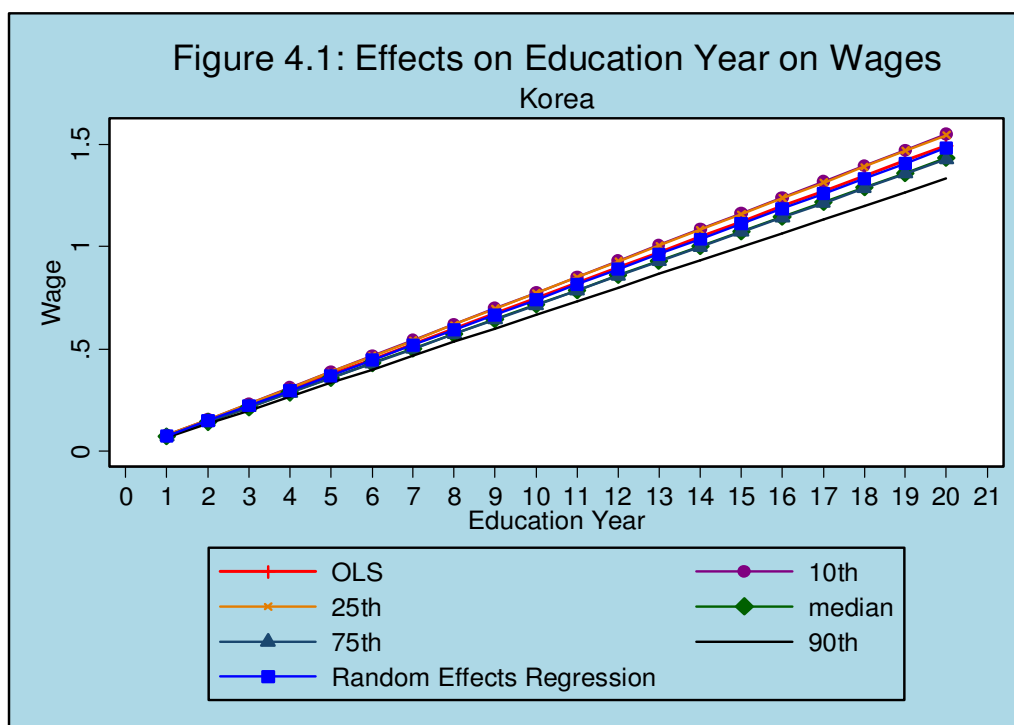


Note: Quantile regression presents wage effects of job training (in proportion) at the 10th, 25th, 50th, 75th and 90th quantile points. These effects of job training are estimated using the main model which controlling for the effects of educational levels.

Figure 3. Wage Effects of Job Training

OLS, by 7.4 percent by means of RE, and by 7.2 percent at the median. The wage effects were higher at the lower quantiles and lower at the higher quantiles (7.8 percent at the 10th quantile; 6.7 percent at the 90th). In Germany, an extra educational year had 6.3 percent of wage effect (OLS), 7.5 percent (RE) and 6.3 percent (median). The difference revealed that the variable for educational duration was more affected by individual heterogeneity in Germany than in Korea. Between the 10th and the 75th

quantiles, the wage effects were lower at the lower quantiles and higher at the higher quantiles (6.1 percent at the 10th; 6.5 percent at 75th). At the highest quantile (90th), however, the effect dropped to 5.8 percent. For 16 and 18 years of education (that is, bachelor's and master's degrees in Korea), the educational wage effects in both countries were approximately the same by RE. These effects were lower in Germany than in Korea using the OLS and quantile regression. The overall results were



Note The lines for 10th, 25th, 50th, 75th and 90th quantiles represent wage effects (in proportion) caused by educational years at each quantile points of log wage distribution.

Figure 4. Wage Effects of Education year

similar to the estimation results gained using the variable educational levels in Section 4.1 (see Figure 4).

Job training led to a 7.7 percent wage increase in Korea and a 25 percent increase in Germany compared

Table 8. Estimation Results using Variables: Job Training in Earlier Years in Korea

Korea	OLS	10th	25th	Median	75th	90th	Random
Hourly Wages							
Training 1 year ago	0.033 1.15	0.059 1.15	0.077 2.16	0.030 1.01	0.007 0.22	-0.013 -0.28	0.042 1.59
Training 2 years ago	0.051 1.69	0.033 0.69	0.053 1.34	0.088 2.75	0.078 2.24	0.053 1.06	0.058 2.13
Training 3 years ago	0.037 1.28	0.093 1.75	0.008 0.20	0.032 0.95	0.005 0.15	0.052 0.80	0.040 1.67
Training 4 years ago	0.042 1.40	0.079 1.55	0.073 1.98	0.054 1.68	0.031 0.82	0.029 0.60	0.044 1.68
Training 5 years ago	0.082 2.49	0.037 0.75	0.047 1.36	0.056 1.62	0.077 1.90	0.044 0.81	0.093 2.89
Training 6 years ago	0.078 2.09	0.073 1.27	0.016 0.41	0.050 1.36	0.091 2.24	0.124 1.96	0.079 2.44
Observations	1945 (Groups: 1201)						
<i>R-sq/Pse. R2/Wald</i>	0.5321	0.3522	0.3513	0.3744	0.3751	0.3535	2198.85

Note Base variable of job training: Absence of job training in each year: one, two, three, four, five and six years ago. t-statistics are presented in the 2nd. line of cells in the table. Standard errors are obtained by 200 replications for the quantile regressions and the other estimation methods utilize the heteroskedasticity-robust standard error for the test-statistics. Estimates from other control variables are omitted in the table.

Table 9. Estimation Result using Variables: Job Training in Earlier Years in Germany

Germany	OLS	10th	25th	Median	75th	90th	Random
Hourly Wages							
Training 1 year ago	-0.291 -2.99	-0.340 -1.78	-0.434 -2.14	-0.296 -2.50	-0.171 -1.25	-0.155 -1.95	-0.180 -1.99
Training 2 years ago	0.154 1.81	0.109 0.61	0.296 1.98	0.157 1.77	0.105 1.13	0.007 0.08	0.218 2.72
Training 3 years ago	0.102 1.29	0.047 0.37	-0.007 -0.06	0.007 0.09	0.030 0.35	0.011 0.11	0.123 2.13
Training 4 years ago	0.108 1.68	0.045 0.34	0.054 0.62	0.003 0.03	0.054 0.76	0.051 0.68	0.119 2.35
Training 5 years ago	0.140 2.50	0.234 1.40	0.188 2.89	0.119 1.94	0.021 0.40	0.003 0.03	0.134 3.29
Training 6 years ago	0.066 1.25	0.034 0.30	0.028 0.31	0.050 0.85	0.040 0.74	-0.027 -0.41	0.064 1.77
Observations	3266 (Groups: 1117)						
<i>R-sq/Pse. R2/Wald</i>	0.4421	0.3335	0.286	0.291	0.2849	0.2763	861.81

Note Base variable of job training: Absence of job training in each year: one, two, three, four, five and six years ago. t-statistics are presented in the 2nd. line of cells in the table. Standard errors are obtained by 200 replications for the quantile regressions and the other estimation methods utilize the heteroskedasticity-robust standard error for the test-statistics. Estimates from other control variables are omitted in the table.

to no job training (OLS). At the median, training led to an 8.6 percent wage increase in Korea. The equivalent figure in Germany was approximately 10 percent, but was insignificant. By means of the RE, these effects were calculated to be 2.7 percent in Korea and 31 percent in Germany. This model also demonstrated the stronger effects of job training in Germany than in Korea, as

shown in the model in Section 4.1.

Training in earlier years, and general and firm-specific human capital

In order to identify the long-term effects of job training, we

Table 8. Estimation Results using Variables: Job Training in Earlier Years in Korea

Korea	OLS	10th	25th	Median	75th	90th	Random
Hourly Wages							
Training 1 year ago	0.033 1.15	0.059 1.15	0.077 2.16	0.030 1.01	0.007 0.22	-0.013 -0.28	0.042 1.59
Training 2 years ago	0.051 1.69	0.033 0.69	0.053 1.34	0.088 2.75	0.078 2.24	0.053 1.06	0.058 2.13
Training 3 years ago	0.037 1.28	0.093 1.75	0.008 0.20	0.032 0.95	0.005 0.15	0.052 0.80	0.040 1.67
Training 4 years ago	0.042 1.40	0.079 1.55	0.073 1.98	0.054 1.68	0.031 0.82	0.029 0.60	0.044 1.68
Training 5 years ago	0.082 2.49	0.037 0.75	0.047 1.36	0.056 1.62	0.077 1.90	0.044 0.81	0.093 2.89
Training 6 years ago	0.078 2.09	0.073 1.27	0.016 0.41	0.050 1.36	0.091 2.24	0.124 1.96	0.079 2.44
Observations	1945 (Groups: 1201)						
<i>R-sq/Pse. R2/Wald</i>	0.5321	0.3522	0.3513	0.3744	0.3751	0.3535	2198.85

Note Base variable of job training: Absence of job training in each year: one, two, three, four, five and six years ago. t-statistics are presented in the 2nd. line of cells in the table. Standard errors are obtained by 200 replications for the quantile regressions and the other estimation methods utilize the heteroskedasticity-robust standard error for the test-statistics. Estimates from other control variables are omitted in the table.

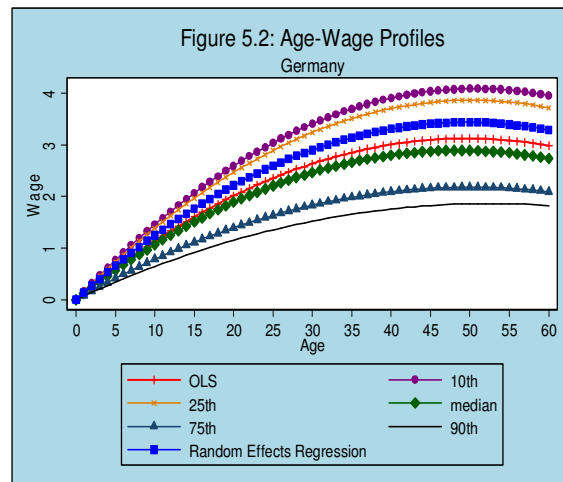
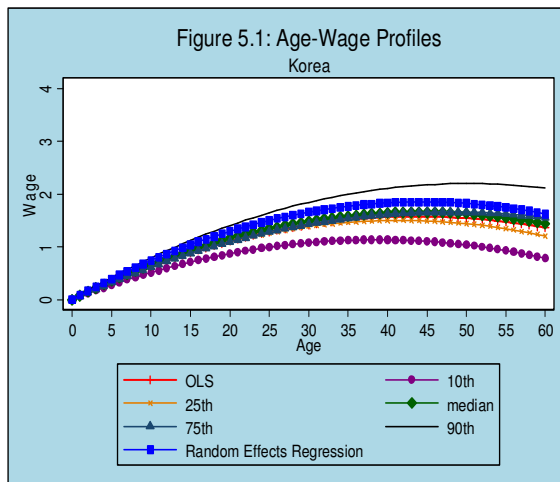
Table 9. Estimation Result using Variables: Job Training in Earlier Years in Germany

Germany	OLS	10th	25th	Median	75th	90th	Random
Hourly Wages							
Training 1 year ago	-0.291 -2.99	-0.340 -1.78	-0.434 -2.14	-0.296 -2.50	-0.171 -1.25	-0.155 -1.95	-0.180 -1.99
Training 2 years ago	0.154 1.81	0.109 0.61	0.296 1.98	0.157 1.77	0.105 1.13	0.007 0.08	0.218 2.72
Training 3 years ago	0.102 1.29	0.047 0.37	-0.007 -0.06	0.007 0.09	0.030 0.35	0.011 0.11	0.123 2.13
Training 4 years ago	0.108 1.68	0.045 0.34	0.054 0.62	0.003 0.03	0.054 0.76	0.051 0.68	0.119 2.35
Training 5 years ago	0.140 2.50	0.234 1.40	0.188 2.89	0.119 1.94	0.021 0.40	0.003 0.03	0.134 3.29
Training 6 years ago	0.066 1.25	0.034 0.30	0.028 0.31	0.050 0.85	0.040 0.74	-0.027 -0.41	0.064 1.77
Observations	3266 (Groups: 1117)						
<i>R-sq/Pse. R2/Wald</i>	0.4421	0.3335	0.286	0.291	0.2849	0.2763	861.81

Note Base variable of job training: Absence of job training in each year: one, two, three, four, five and six years ago. t-statistics are presented in the 2nd. line of cells in the table. Standard errors are obtained by 200 replications for the quantile regressions and the other estimation methods utilize the heteroskedasticity-robust standard error for the test-statistics. Estimates from other control variables are omitted in the table.

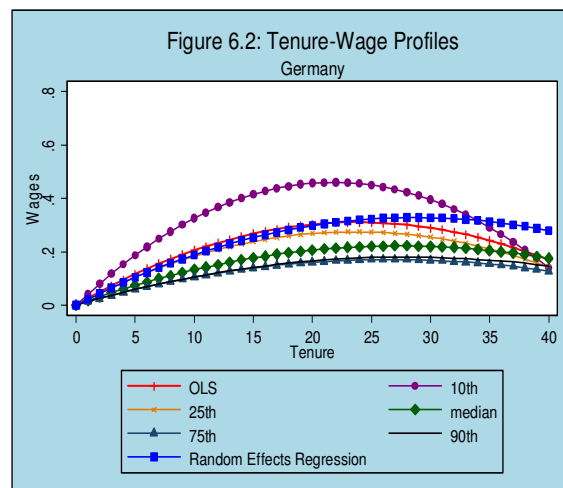
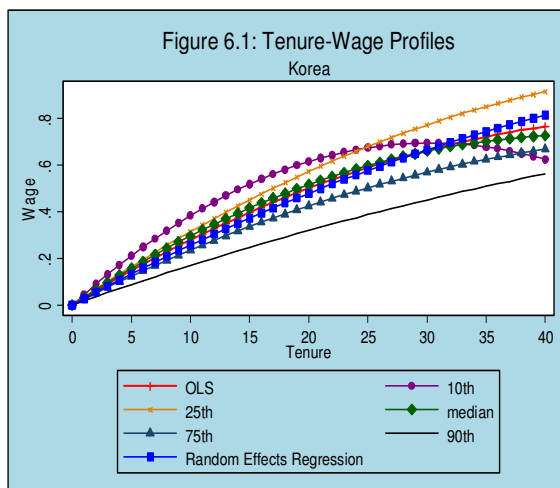
included dummy variables of any job training completed from one to six years ago (see Tables 8 and 9). In Korea, job training completed one year ago had insignificant effects at the 5-percent level using OLS, RE, and at the median. Job training two years ago demonstrated highly significant effects: 6 percent (RE) and 9 percent (median). The corresponding figures for three to four years ago were 4–5 percent (RE, median) at 10 percent significance level. For five to six years earlier, the wage increases

were 8–9 percent using both OLS and RE. In Germany, the effects were significant and negative for training undertaken one year ago: -18 percent (RE) and -29–30 percent (OLS, median). Job training undertaken two years earlier showed the highest effect on wages: 22 percent (RE) and 15–16 percent (OLS, median). For three to five years ago, the effect remained 10 percent to 14 percent using OLS, RE, and median estimation. The level remained at 6.6 percent using RE for job training



Note The curves for 10th, 25th, 50th, 75th and 90th quantiles represent wage effects (in proportion) caused by age at each quantile points of log wage distribution. These profiles are estimated using the main model which controlling for the effects of educational levels.

Figure 5. Age-Wage Profiles



Note The curves for 10th, 25th, 50th, 75th and 90th quantiles represent wage effects (in proportion) caused by tenure (in year) at each quantile points of log wage distribution. These profiles are estimated using the main model which controlling for the effects of educational levels.

Figure 6. Tenure-Wage Profiles

completed six years earlier. The quantile regression confirmed that wage losses due to job training one year ago were much stronger at lower quantiles. However, the gains for training conducted one to five years before were also stronger at lower quantiles in Germany. According to the estimation results, our study confirmed that the effects of job training completed in earlier years were overall stronger in Germany than in Korea.

We also analyzed the effects of general human capital using age and firm-specific human capital using tenure. The study focused on comparing the relative differences of wage profiles by age and tenure between the two

countries. Figures 5 and 6 revealed that general human capital had a stronger effect on wages than firm-specific human capital in both countries. General human capital in Germany had a stronger effect than that in Korea, but firm-specific human capital in Korea had stronger effects than that in Germany. Using quantile regression, our study also revealed an interesting fact: in Korea, general human capital showed the lowest effect at the 10th quantile, then the 25th, followed by the median and the 75th, and showed the highest curve at the 90th quantile. The exact opposite was true in Germany. However, firm-specific human capital had a greater effect

at the lower quantiles and vice versa in both countries.

DISCUSSION

This study planned to examine whether the wage gaps between people with and without university degrees were wider in Korea than in Germany, because of the well-developed vocational training system in Germany, which apparently reduced educational wage gaps.

According to the results obtained by RE, OLS, and median estimation, university graduates in Korea earn 37–41 percent more than senior high school graduates. University graduates in Germany earn 39–43 percent more than their base group. Contrary to our expectations, the estimation itself did not reveal a noticeable wage difference due to university education between the two countries. However, the descriptive analysis used in the study found that 52 percent of university graduates in Korea were younger than 36 years, compared to only 22 percent in Germany. We plausibly assumed that, given the social conditions in Korea, where more than 80 percent of high school graduates have entered university in recent years, the educational wage effects of young people in Korea would suffer less from omitted ability and self-selection biases than their counterparts in Germany. Therefore, the true effects of university degrees in Korea may be higher than estimated, although the actual sizes of the biases were not identified. Analyzing the effects of educational duration, it was found that undertaking one more year of education had a positive wage effect of about 7.5 percent in both countries based on RE. Using the OLS and median estimation, wage effects in Korea were roughly 7–7.5 percent, compared to 6 percent in Germany. Using quantile estimations, wage differentials between the top and bottom educational levels were also higher in Korea than in Germany along different wage distributions. The findings adhere to the hypothesis of this study.

Nevertheless, why is the difference in wage effects of university education between Korea and Germany so moderate? As mentioned in the introduction, the inefficiently high demand for university education in the Korean labour market has led to an increase in the number of unemployed university graduates. This oversupply of university graduates could force a wage decrease. The Korean Statistical Information Service (2008) reported that university graduates were 36.6 percent among those aged 25–29 who were not economically active in 2004. This figure increased to 54.5 percent in 2007. The increase of non-economically-active university graduates may also lower the wage level of university graduates.

Job training completed during the year before last under consideration resulted in a 17–31 percent wage increase in Germany, while the corresponding percentages in Korea were 2.7–10 percent. With regard to the

effects of job training completed one to six years earlier under consideration, job training in Germany also demonstrated stronger long-term effects on wages than that in Korea. Furthermore, descriptive analysis shows that 61 percent of individuals who completed job training in Korea attained a tertiary educational qualification, compared to 11 percent in Germany. According to the theory of human capital, individuals who are more capable and motivated, who usually have higher earnings potential, also tended to achieve a higher level of education. Assuming that this is the case, the effect of job training in Korea, which is already lower than in Germany, might have a stronger upward bias, and the true effect of training in Korea may be even lower. This lower effect of job training in Korea compared to Germany seems to mainly be a reflection of the poor management of training programs in Korea, as observed in Section 2. This results in low productivity of training and its meager wage effects. Tenure-wage profiles show that the firm-specific human capital effect is stronger in Korea than in Germany. This may signal that “learning by doing on-the-job” is more critical for wages than the training offered in Korea; this could be an interesting hypothesis for future research. The estimation results have shown that the well-developed system of job training in Germany had a higher effect on wages than job training in Korea, which offers individuals a better chance of reducing the educational wage gap.

How could Korean job training improve? By comparing both systems of job training, this study first noticed that German job training was established as an integral part of formal school education, while Korean job training was mainly conducted after the completion of formal schooling. Since the 1990s, human capital investment in Korea has turned sharply towards university education after the secondary level of education. The dramatically increased demand for the junior college and university level of education in the 1990s did not noticeably raise the levels of occupational qualifications in Korea, because job training was detached from schooling. This increased the number of employees who were skilled as *Meister* or technicians and occupationally qualified at universities in the German system. In this regard, a focus on more practical training in programs in schooling may help strengthen job training in Korea.

In terms of managing and conducting job training at vocational schools, this study confirmed that social partners in Korea – who should be developing the norms for vocational training and skill standards, providing references, controlling examinations, and awarding certificates – do not play an adequate role. By introducing a vocational training system in schools along German lines (Korea introduced “*Meister* senior high schools” in 2010), Korea seems to be trying to enhance the participation of social partners (that is, employers) in training at vocational schools and by hiring graduates from these schools.

This could make vocational education more attractive in two ways. Firstly, employers could hire employees who are trained during their schooling by the employers themselves according to their own skill demands. Secondly, graduates from vocational schools could easily find a job after the completion of formal schooling, in contrast to university graduates who suffer from high rates of unemployment. In doing so, however, this system seems primarily to support labour market efficiency, rather than addressing the quality of vocational education and training provided in schools. It is still unclear whether the earlier matching between vocational schools and companies helps graduates obtain an established job or, more importantly, compels them to take any job offered by the cooperating company in the job search phase. To enhance the effect of job training, learning from the German experience, we would like to place greater emphasis on chambers of industry and employers taking a more active role in developing and managing the quality of job training in vocational schools in Korea. In addition, Gill et al., (2000: 31) stressed that a critical success factor is a well-organized trade union and its ability to control the vocational education and training system.

With regard to the reduction in the excessive demand for university entrance in Korea, the German dual system has not limited the demand for higher education. In Germany, the educational level of participants in the dual system continues to increase. However, it is hoped that enhancing the quality of training at vocational schools will improve the employment prospects of graduates. It could motivate pupils to be qualified vocationally, which would reduce the oversupply of university graduates in the labour market.

CONCLUSION

In order to determine whether job training reduces educational wage gaps, this study first compared the system of education and job training in Korea with that of Germany, and established common factors and differences in the two systems. Employing the same empirical framework, the estimation identified the wage differentials due to job training and university education between the two countries.

Ultimately, this study was the first to empirically demonstrate that the well-developed management of job training in Germany offers people a better chance to reduce the educational wage gap compared with Korea. The political implications are that this paper suggests a stronger integration of job training into schooling – not only into vocational school, but also into the higher level of education – and greater involvement in training at vocational school by employers and trade unions. With reference to the recent reform policy on vocational education and training, the findings of this study suggest

that the teachers' union and the government in Korea should have greater involvement in the vocational qualification programs provided by employers in the introduction of "*Meister* senior high school."

ACKNOWLEDGEMENTS

This paper is the thoroughly revised version of an essay from my dissertation, "Essays on Labor Market and Human Capital – Korea and Germany" (submitted 2010, published 2011). Unlike the earlier version, this paper excludes individuals with an East German or foreign background, even if they were educated and vocationally trained in Germany (data from the German Socio-Economic Panel). This paper finds noticeable differences in the results: the hypothesis of this study is verified in this paper. For insightful comments, advice, and suggestions concerning this paper, I would like to thank Roland Eisen, Horst Entorf, Bernd Fitzenberger, and Jürgen Schupp as well as participants in the seminars at University of Frankfurt-on-Main and in the workshop at the German Institute for Economic Research (DIW). All remaining errors are my own.

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