Over-Education and Job Mobility among Young Korean Female Graduates

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Abstract

Using data from the 2009 Graduates Occupational Mobility Survey (GOMS) covering Korean female graduates making their transition from college to labor market, this paper examines the incidence and the effects of over-education on job mobility. Contrary to most prior research in the literature, this study considered individual heterogeneity in perceived skills mismatch to measure education-job mismatch. In regard to the prevalence of over-education, the conventional measure based on the assumption of workers' homogeneity in skills clearly overestimates over-education. As for the effects of being over-educated on job mobility, the results provide evidence that favors many previous studies whereby over-education significantly impact job turnover; hence, suggesting that over-educated young female workers are more likely to change jobs in Korea. This positive correlation remains even when we estimate an augmented specification where graduate over-education is disaggregated according to perceived skills mismatch. Most importantly, in this case it is found that the genuinely over-educated workers are more likely to switch their employers than their apparently over-educated counterparts.

Key words

Over-Education, over-skilling, job turnover, female, graduates

Introduction

Since the seminal work by Richard Freeman (1976), there has been a growing literature on qualification-job mismatch, i.e., the difference between a worker's attained or completed level of qualifications and the

level of qualifications required for the job the worker holds. Most researches focused on education-job mismatch, particularly of over-education. This is because in the recent decades, higher education worldwide had witnessed a rapid expansion. In South Korea (hereafter denoted as Korea), there has been a significant increase over the past decades in the number of female students with qualifications. The proportion of women holding a college degree and advanced educational backgrounds has steadily increased from 2.4 percent in 1975 to 13.1 percent in 1995. A decade earlier 65.4 percent of female high school graduates entered college in Korea, while 70.4 percent of male graduates did so. In 2010, however, female high school students surpassed male students in the higher education entry ratio with 80.5 percent to 77.6 percent. In 2013, women made up 42.2 percent of students enrolled in higher educational institutions.

The improvement of higher education among Korean female students has naturally given rise to concerns whether the economy can successfully provide enough positions to accommodate all college graduates. Unfortunately, Korea ranks 117 out of 142 countries in gender gap, according to the World Economic Forum's Global Gender Gap Report 2014. More specifically, this report considers that in Korea maternity leave is unpaid, males occupy most technical job fields, men dominate political positions, and 90 percent of legislators, senior officials and managers are men. Moreover, the employment rate of Korean female graduates ranked at the bottom among a group of the world's advanced nations (OECD). The most recent data from the OECD also shows that Korea has the highest wage disparity among the 33 OECD countries with a 39 percent gap between males and females in median wages. Under such circumstances, female graduates may be more likely to accept employment which does not fully utilize their qualifications.[1] Indeed, numerous news and research institutes reports on labor market mismatch, particularly for the failure of qualified individuals to obtain

[1] This is also due to many female graduates labors resign their job temporarily once they get married, pregnant or have childbirth. A data from Statistics Korea has confirmed that about 20.3 percent out of all housewives in 2013 were from this group. Therefore, it is not possible for female graduates to retain the same position after a long career break. As a result, many are likely to accept low-paid jobs on a temporary or irregular basis.

jobs commensurate with their qualifications (i.e., over-qualification), and its costs in Korea. However, one of the least dealt with approaches is the economic analysis of labor market mismatch among female graduates in Korea. In this paper, we focus on one specific group in a disadvantaged positon in the labor market: female college graduates.

One of the major concerns in the over-education literature is that basic measurement methods to define education-job mismatch. In regard to this issue, most prior researches assumed that workers with a given level of schoolings may be homogeneous in terms of skills (e.g., Alba-Ramirez, 1993; Chevalier & Lindley, 2007; Cho & Lee, 2014; Cohn & Khan, 1995; Cohn & Ying, 2000; Duncan & Hoffman, 1981; Sicherman, 1991; Sloane, 2002; Zulkifli & Hazrul, 2013). According to these studies, there is a close relationship between education-job mismatch and skills-job mismatch. In other words, most previous studies in the literature treat educational mismatch and skill mismatch as equivalent phenomena. This is partly caused by the limited information on skill mismatch that only recently being made available.

Some previous studies, however, supported the view that education-job mismatch and skills-job mismatch are distinct phenomena with a variety of labor market outcomes, suggesting that the link between educational mismatch and skill mismatch is much weaker. For instance, earlier research from sociology perspective has pointed out that educational mismatch is not sufficient to explain skills-job mismatch (Halaby, 1994). Three papers by Chevalier (2003), Green and Zhu (2010) and Mavromaras et al. (2013) attempted to make progress by disaggregating the over-education variable. Chevalier distinguished between genuine and apparent over-education by considering job satisfaction as a possible way of showing the degree of match between workers and jobs. Green and Zhu also distinguished between formal and real mismatch according to whether this is accompanied by under-utilization of skills. Meanwhile, Mavromaras et al. considered three possible categories of over-education: namely over-educated only; over-skilled only; both over-educated and over-skilled. Over-educated workers may have low skill level and over-education therefore does not necessarily equate to skill mismatch. Accordingly, the inability of the education-j measures to account for skills-job mismatch may produce biased estimates of the incidence and the effects of education-job mismatch in the labor market. In this paper,

we address this measurement issue by proposing an alternative method that incorporates both the educational mismatch and skill mismatch into an improved measure of over-education.

Using two periods' panel data from the Graduates Occupational Mobility Survey (hereafter denoted as GOMS), this paper examines the incidence and effects of over-education on job mobility (i.e., turnover, quits) among young female graduates in the Korean labor market. Since the young females have a weaker position in their participation in the labor market, compared to those with average attainment, they tend to be the ones who invest in human capital and change jobs more frequently. For the most skilled female workers, it may suggest that over-qualification in early careers is voluntary; whereby it is purposely done to accumulate work experience until they get the best job offer. Thus, the topic of job mobility is of paramount importance, when analyzing the incidence and effects of over-education among young female graduates. To my knowledge, however, no journal in Korea has ever published an economic analysis of the relationship between over-education and job mobility among young female graduates. As such, this paper and future research will narrow this gap.

This paper also contributes to literature by accounting for individual heterogeneity in perceived skills mismatch when measuring over-education and, therefore, addresses the measurement issue discussed earlier. An alternative method used in this study incorporates information on both educational mismatch and skill mismatch in the workplace into an improved measure of over-education. Besides, the GOMS survey that is used in this study is different with other dataset because it includes two appropriate survey questions on education-job mismatch and skills-job mismatch. Specifically, we make use of questions in a recent dataset, namely the 2009 GOMS survey which ask respondents about the extent to which they are able to use their previously acquired education and skills, respectively, on the job. In this analysis the alternative measure of over-education seems less likely to be biased through failure to control for skill utilization differences. Since this paper focuses on college graduates, under-education is generally not possible, as this group has the highest level of education. Thus, possible categories of education-job matching are limited to:

(i) *Apparently matched*: matched in education, but over-skilled

(ii) *Genuinely matched*: matched in both education and skills
(iii) *Apparently over-educated*: over-educated, but matched in skills
(iv) *Genuinely over-educated* : over-educated and over-skilled

Theoretical Background[2]

Is a graduate who is mismatched in education, especially for over-education, more like to change jobs? Can the phenomenon of over-education at the early stage of a graduate's career be considered as an opportunity of occupational upgrading through job mobility in the future? These questions refer to the hypothesis of career mobility theory suggested by Sicherman and Galor (1990). They provided an additional dimension to the existing analysis of the human capital model in which over-education is viewed as an investment in human capital at the beginning of a graduate's career and thus is expected to increase the likelihood of occupational upgrading through job mobility.

Sicherman and Galor (1990) developed the notion of career mobility that can partially explain over-education. In their model, they assume that a worker with given innate ability may prefer to start in a job below his ability level if this is compensated by a higher probability to be promoted. This implies that "individuals may accept a lower-level firm in which the direct return to schooling is lower if in those firms, for a given level of schooling, the probability of promotion is higher". To test their model, they estimate the effect of education on wages and the effect of education on the probability of upward career mobility for 24 different occupations, finding that the estimated effects are negatively correlated: in occupations where the returns to schooling in terms of wages are lower, the effect of schooling on career mobility is larger.

A central feature of the theory of career mobility is that "part of the returns to education is in the form of higher probabilities of occupational upgrading, within or across firms". As regards the relationship between over-education and subsequent job mobility, they claim that "it will be rational for some individuals to spend a portion of their working careers in occupations that require a lower level of schooling than they

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[2] The primary reference for this section is Leuven and Oosterbeek (2011).

have acquired". This implication is further explored in Sicherman (1991). Sicherman's (1991) own empirical tests indeed confirmed the expectation that overeducated workers have better upward career mobility prospects than correctly allocated ones. Using PSID data for 1976 and 1978, he estimated regression models of both firm and occupational mobility, finding positive and significant relationship between with a measure of over-education. Moreover, occupational mobility was found to predominantly involve movements in an upward direction. If this is the case, the theory of career mobility could provide a powerful tool for research in over-education

Data

Graduates Occupational Mobility Survey (GOMS)

In this paper we use the data from the Graduates Occupational Mobility Survey (GOMS). The GOMS is a nationally representative survey of Korean young graduates of 2-to-3-year colleges or higher education institutions in a given survey year. This survey is the largest short-term panel survey that offers users the advantages of both cross-sectional data and time-series data. Conducted annually by Korean Employment Information Service (KEIS), the GOMS aims to provide basic information to policy makers and researchers so it could be used for employment policy making and in-depth studies of highly educated unemployment problem. The GOMS project was launched in 2006 under the supervision of the National Statistical Office and the support from Ministry of Labor in Korea. The first wave of 2005 GOMS initiated in 2006 was conducted on a sample of 25,000 young persons (approximately 5 percent of the population). In 2009, the survey design was modified to a short-term longitudinal survey. Beginning with the 2007 GOMS, the survey has performed for each subject on the next calendar year of graduation. The sample of the GOMS is composed of 4 percent of all college graduates who graduated from a 2-to-3 year colleges or higher education institutions, which corresponds to 18,000 persons.

For the empirical analysis, we make use of data from the GOMS among the cohort that graduated in the year 2009 (i.e., 2009 GOMS) in the empirical analysis. This cohort was surveyed the first time in 2010

and a second time in 2012. In the first-wave survey, all graduates having successfully completed a degree in a recognized tertiary or higher education institution are asked to complete a questionnaire one year after graduation. Only graduates who participated in the first wave survey are asked to take part in the second wave survey two years later. Since the GOMS contains extensive information concerning youths' labor market behavior and educational experience, one and three years after graduation, it in particular facilitates this study that investigates characteristics of the transition the youths make from school to the labor market.

Several restrictions on the 2009 GOMS data are imposed to define the set of data used for this study. In order to follow female graduates from the time they enter the workforce, males are excluded from the analysis. The sample consists only of salaried graduate employees who graduated in the year 2009 and who provide valid information for the variables of interest, so that self-employed and unpaid family-employed workers at the time of both surveys are excluded. These restrictions resulted in a final sample of 5,760 (resp. 4,966) Korean female graduates in 2010 (resp. 2012).

Measuring Educational Mismatch

For the present study, the 2009 GOMS data provides information on both education-job and skills-job mismatch as the basis. The following two survey questions are used to collect these two sets of information. The first (resp. second) question is related to self-assessed education-job mismatch (resp. skills-job mismatch). Respondents were asked directly whether they are over- and under-educated (resp. over- and under-skilled) for the work they do as follows.

What is the level of education (resp. skills) required by your current job, compared to your education (resp. skill) level?

(1) Very low
(2) Low
(3) Appropriate
(4) High
(5) Very high

As a conventional measure of education-job mismatch, individuals are defined as being over-educated if they claimed that a below level of education is most appropriate for their current job. The responses to the first question are used for identifying those over-educated. Individuals claiming (1) *Very low* or (2) *Low* as the level of required education level in the current job as, compared to their own education level acquired are classified as over-educated and those selecting (3) *appropriate* are classified as matched in education.

As noted earlier, this conventional approach assumes that over-educated graduates are homogeneous in terms of skills, and thus numerous previous studies on labor market mismatch treat education-job mismatch and skills-job mismatch as equivalent phenomena. However, there exists significant variability in skills endowments among workers with the same educational attainment in general. For instance, a worker may have low skill levels for his/her educational attainment, compared to his/her peers and thus unable to obtain a job commensurate with his/her educational level. Such an individual will be over-educated, but not necessarily over-skilled.

In order to account for workers' heterogeneity in terms of perceived skills utilization, this paper attempts to adopt an improved concept of over-education that combines the measure of education-job mismatch from the first question with the measure of skills-job mismatch from the second question. The measure of skills-job mismatch is used for identifying whether skills among over-educated graduates do or do not correspond to the job. In the second question, individuals selecting 1 or 2 (resp. 3) on the scale are classified as over-skilled (resp. matched in skills).

Using the term apparent/genuine duality introduced by Chevalier (2003), this paper considers four types of matching status: (i) apparently matched, (ii) genuinely matched, (iii) apparently over-educated, and (iv) genuinely over-educated. Table 1 summarizes how the measure of education-job mismatch is disaggregated into four possible categories.

Table 1.
Identification of Educational Mismatch

Categories		Education-Job Mismatch	
		(1) or (2) = Over	(3) = Match
Skill-Job Mismatch	(1) or (2) = Over	Genuinely Over-Educated	Apparently Matched
	(3) Match	Apparently Over-Educated	Genuinely Matched

Note: 'Over' denotes the over-skilled/educated and Match denotes the adequately matched respectively.

As noted by Groot and Maassen van den Brink (2000), the following four measures of education-job mismatch are used in the literature: (1) direct self-assessment; (2) indirect self-assessment; (3) job analysis; (4) realized matches. Among these four categories of measures, like most previous studies, this paper employs the direct self-assessment method to define education-job mismatch. The other methods for measuring education-job mismatch are indeed difficult to be implemented on the basis of the GOMS data. Thus, the procedure used in this paper to create over-education variables is open to criticism as it is based on subjective evaluation, which could possibly be unrelated to the actual conditions.

The existing literature, however, provides a conclusion about the reliability of self-reported measures, and the workers' self-assessed qualification-job mismatch has been still used in much of the literature. Jones and Sloane (2010) argued that there is no obvious evidence that employees would consistently overestimate or underestimate their own skills or exaggerate or downplay the extent to which the job requires the level of skills they possess. Di Pietro and Urwin (2006) also claimed that the self-reported 'subjective' measures of education and skill mismatch are reliably compared to the jobholder's judgment concerning the degree of utilization of employees' knowledge and skills. Chevalier (2003) in particular emphasized that the subjective method has the advantage of adjusting the measure of over-education to the specific requirements of the job, while objective and statistical methods assume that all jobs within a given occupation have the same requirements. Thus, the individual's subjective assessment adopted in this analysis is also expected to provide the substance (important information) of the present paper, even though it could also perhaps constitute a weakness of the study.

Incidence of Over-education among Young Korean Female Graduates

In this section we analyze the incidence of over-education in the Korean labor market among young female graduates. Table 2 provides how the incidence of education-job mismatch evolves one and three years after graduation. The upper (resp. lower) part of this table shows proportions derived from the conventional (resp. alternative) measure. According to the conventional measure in panel A, the majority (resp. minority) of workers are adequately educated (over-educated) and their proportion is approximately 71 (resp. 19) percent in 2010. The proportion of over-educated employees has significantly decreased by about 5 percent points two years later (approximately 14 percent). At least one out of ten graduates is over-educated in 2012. This proportion of over-educated workers appears comparable to or smaller than the overall means reported by other existing studies of graduate over-education. For Australian graduates, Mavromaras et al. (2013) provided rates of over-education ranging between 14 percent and 23 percent. Green and Zhu (2010) found that the proportion of over-educated workers is ranging between 23 percent and 33 percent among U.K. graduates. This pattern is also consistent with the findings of Frenette (2004) showed that at least 30 percent of Canadian graduates are over-educated. The findings presented in panel A suggest that the proportion of over-educated workers among young Korean female graduates is non-negligible, although the magnitude is similar to or lower than that reported in the developed countries such as U.S. and U.K.[3]

When over-educated graduates are disaggregated depending on perceived skills mismatch, previous results based on a conventional measure of over-education are clearly overestimated. It turns out that around one third of them are in a situation of genuinely over-educated one year after graduation (approximately 6 percent). The extent of genuinely over-educated has remained almost stable since 2010, indicating that there is no significant change in the prevalence of genuine over-educa-

[3] The Degrees more frequently associated to over-education in Korea are: Fundamental Science related such as Physics, and Chemistry, Agriculture, Arts, Education, Languages, Physical Education, Political Science and Psychology, etc., although the chance of over-education is associated with any other degrees in general.

tion between the first and second interviews, with a proportion remaining around 5 percent. The low proportion of genuinely over-educated workers suggests that there is a shortage of skilled/qualified labor in the Korean youth labor market. Interestingly, these proportions of genuinely over-educated graduates are comparable to those of other developed countries such as the U.K. (e.g., Chevalier, 2003; Green & Zhu, 2010) and Australia (Mavromaras et al., 2013), although these results come from different measurement approaches.

Table 2.
The Incidence of Change of Educational Mismatch

Year Sample	2010	2012
Panel A: Conventional measures:		
Over-Educated	0.186	0.135
Matched (Adequately Educated)	0.713	0.767
Panel B: Alternative measures:		
(1) Genuinely Over-Educated	0.065	0.055
(2) Apparently Over-Educated	0.114	0.072
(3) Genuinely Matched	0.652	0.694
(3) Apparently Matched	0.051	0.046
Sample Size	5,760	4,966

Source: 2009 GOMS, data is unweighted.

Empirical Model and Methodology

This study aims to analyze the relationship between job mobility and education-job mismatch, particularly for over-education. In order to achieve the goal we ran a multinomial probit regression in which job mobility is regressed on a vector of characteristics for individual *i*. The regression model estimated in this study is of the following general form:

$$Prob(MOBILITY_i) = \Phi(\alpha + \beta_1 + X_i + \beta_2 Z_j)$$

where *i* and *j* index individuals and workplace respectively. The dependent variable $MOBILITY_i$ corresponds to the mutually exclusive states of "turnover" and "quit", relative to the base of "staying" in the

same job with the same employer of the individual worker *i*. X_i is a set of individual demographic variables, Z_j is a set of employment characteristics. β_1 and β_2 are vectors of unknown parameters to be estimated. We control for a number of characteristics of individuals (age, marital status, educational attainment, and location) and their jobs (firm size, union membership, public sector employment, full-time employment contract). The definition and summary mean statistics of the variables used in this study are provided in Table 3 and Table 4, respectively.

Table 3.
Definition of Variables

Variables	Definitions
Panel *A*: Dependent Variable:	
TRUNOVER	Dummy variable: 1 if, in 2012, a person worked for an employer different from that in 2010, 0 otherwise.
QUIT	Dummy variable: 1 if, a person worked from in 2010 is outside the labor force in 2012, 0 otherwise.
Panel *B*: Educational Mismatch Variables:	
OE	Dummy variable: 1 if an individual is matched in education, but over-skilled, 0 otherwise.
MATCH	Dummy variable: 1 if an individual is matched both in education and skills, 0 otherwise. <Reference group>
Apparent MATCH	Dummy variable: 1 if an individual is matched in education, but over-skilled, 0 otherwise.
Genuine MATCH	Dummy variable: 1 if an individual is matched both in education and skills, 0 otherwise. <Reference group>
Apparent OE	Dummy variable: 1 if an individual is over-educated, but matched in skills, 0 otherwise.
Genuine OE	Dummy variable; 1, if an individual is over-educated and over-skilled, 0 otherwise
Panel *C*: Individual Demographic Variables:	
AGE	Workers age (years)
AGESQ	The square of AGE/100
COLLEGE	Dummy variables: 1 if 2-to-3-year college degree, 0 otherwise. <Reference group>
UNIVERSITY	Dummy variable: 1if 4-year college degree, 0 otherwise
SINGLE	Dummy variable: 1 if the worker is single, 0 otherwise. <Reference group>

Variables	Definitions
MARRIED1	Dummy variable: 1 if the worker is married with spouse, 0 otherwise.
MARRIED2	Dummy variable: 1 if the worker is married without spouse, 0 otherwise.
CAPITAL	Dummy variable: 1if the worker lives in Seoul and Gyeonggi-do, 0 otherwise.
Panel *D*: Employment Characteristics Variables:	
FULL	Dummy variable: 1 if full-time employment, 0 otherwise..
UNION	Dummy variable: 1 if member of labor unions, 0 otherwise.
PUBLIC	Dummy variable: 1 if employed in the public sector, 0 otherwise.
SMALL	Dummy variable: 1 if firm has less than 30 employees, 0 otherwise. <Reference group>
MIDDLE	Dummy variable: 1 if firm has 30 to 299 employees, 0 otherwise.
LARGE	Dummy variable: 1 if firm has more than 300 employees, 0 otherwise.

Table 4.
Summary Mean Statistics

Variables	2010	2012
Panel *A*: Dependent Variable:		
TURNOVER	-	0.514 (0.007)
QUIT	-	0.334 (0.007)
Panel *B*: Educational Mismatch Variable:		
OE	0.186 (0.005)	0.135 (0.005)
MATCH	0.713 (0.006)	0.767 (0.006)
Apparent MATCH	0.051 (0.006)	0.694 (0.002)
Genuine MATCH	0.652 (0.002)	0.046 (0.002)
Apparent OE	0.114 (0.005)	0.072 (0.005)
Genuine OE	0.065 (0.003)	0.055 (0.005)
Panel *C*: Individual Demographic Variables:		
AGE	25.156 (0.071)	28.181 (0.078)
AGESQ	7.131 (0.094)	8.246 (0.059)
UNIVERSITY	0.612 (0.006)	0.642 (0.007)
MARRIED1	0.094 (0.004)	0.171 (0.005)
MARRIED2	0.005 (0.001)	0.007 (0.001)
CAPITAL	0.512 (0.107)	0.538 (0.007)

Variables	2010	2012
Panel *D*: Employment Characteristics Variables:		
FULL	0.401 (0.007)	0.437 (0.007)
UNION	0.053 (0.003)	0.077 (0.004)
PUBLIC	0.084 (0.004)	0.083 (0.004)
MIDDLE	0.342 (0.006)	0.307 (0.007)
LARGE	0.171 (0.005)	0.351 (0.007)
Sample Size (Observations)	5,760	4,966

Notes: Standard errors in parentheses.

For the empirical analysis, two models are provided to identify the correlation between over-education and job mobility, conditional on employment. Model 1, as a benchmark, incorporates a dummy variable indicating over-education (*OE*) in the basic equation above.

$$Prob(MOBILITY_i) = \Phi(\alpha + \beta_1 X_i + \beta_2 Z_j + \gamma OE_{ij})$$

This specification with a single dummy for over-educated individuals is a special case of the one proposed by Verdugo and Verdugo (1989) which includes both dummies for being over- and under-educated. In Model 1, over-educated graduates are compared to graduates who are matched in education (i.e., adequately educated; the reference category).

Model 2 replaces the indicator representing over-education (*OE*) in Model 1 by a vector of dummies including different type of education-job mismatch. To some extent, this paper relies on a similar equation that incorporates an alternative measure of education-job mismatch discussed earlier.

$$Prob(MOBILITY_i) = \Phi(\alpha + \beta_1 X_i + \beta_2 Z_j + \gamma_1 Apprent\_MATCH_{ij} + \gamma_2 Apprent\_OE_{ij} + \gamma_3 Genuine\_OE_{ij})$$

where *Apparent_MATCH* is a dummy for apparent match, *Apparent_OE* dummy for apparent over-education, and *Genuine_OE* dummy for genuine over-education. Apparently matched, apparently over-educated, and genuinely over-educated graduates are thus compared to graduates who are genuinely matched.

Results and Discussion

The aim of this section is twofold. First, we analyze changes in matching status from 2010 to 2012. Second, we examine the relationship between over-education and job mobility, distinguished between turnovers and quits. For both purposes, this paper relies on the 2009 GOMS data including individuals who graduated in the year 2009. This cohort was first interviewed in 2010, followed by a second interview in 2012. The selected sample consists of salaried workers; and the obtained data revealed valid information on the variables of interest.

Table 5 present results for the transitional process from one matching category to another between 2010 and 2012. As shown in Table 5, there is a large variation within each group of mismatched graduates between 2010 and 2012. According to this table, at least 55percent young Korean female graduates who are initially mismatched in education and/or skills achieve upward mobility three years after graduation; i.e., in the form of a better job matching. For instance, approximately 88 percent of genuinely over-educated graduates in 2010 moved to another matching category in 2012, indicating that genuine over-education is a permanent state for very few graduates. Specifically, genuinely over-educated graduates of the first interview changed their mismatch status to the following: genuine match (55.2 percent), apparent match (5.6 percent), or apparent over-education (27.5 percent).

The majority of changes occurring among other mismatched graduates are similar to the genuine match category. Indeed, at least 58 percent of graduates being apparently over-educated in employment one year after graduation were working in jobs for which they are genuinely matched at the time of the second interview. This figure is even more substantial for those apparently matched at the time of the first interview: 61.5 percent of them were genuinely matched three years after graduation. As expected, most of those who are genuinely matched in 2010 remained genuinely matched two years later.

For all matching status one year after graduation, the most important message is that the state of "genuinely matched" is increasing two years later, suggesting that the other three states of mismatch are temporary in most cases. In principle, the results presented here support the view of career mobility theories, showing that the upward mobility of young

graduates occurs progressively after graduation. One possible reason is that the beginnings of young graduates' careers often involved phases of training and specialization. From the perspective of the career mobility model, over-education can be regarded as a short-term mismatch occurring at the beginning of a working career.

Table 5.
Transitions in Matching Status (column proportions)

Alternative measures	Genuinely Over-Educated	Apparently Over-Educated	Genuinely Matched	Apparently Matched
	2010			
2012				
Genuinely Over-Educated	**0.117**	0.105	0.073	0.074
Apparently Over-Educated	0.275	**0.245**	0.092	0.124
Genuinely Matched	0.552	0.586	**0.702**	0.615
Apparently Matched	0.056	0.064	0.133	**0.187**
Observations	374	657	3,756	294

Source: 2009 GOMS, data is unweighted.

In order to achieve the second goal, i.e., to study the dynamic relationship between over-education and job mobility, we have examined a special longitudinal sample of young Korean female graduates observed between 2010 and 2012. To do so, we combined the 2009 GOMS with its following-up survey in 2011. For each measure of education-job mismatch, we estimate a multinomial Probit model in which the two types of job mobility are distinguished between turnovers and quits.[4] In Table 6, the multinomial Probit regressions results are presented. The first (resp. second) column of Table 6 presents estimates from the conventional (resp. alternative) measure of graduates mismatch.

Begin with the coefficient estimates of education-job mismatch in panel *A*. According to the conventional measure, the estimation results

[4] It should be noted that this study does not able to separate voluntary from involuntary job mobility, because the 2009 GOMS data did not ask about the respondent's reason for leaving his or her job.

indicate that self-assessed over-education only (*OE*) is positively associated with the probability of two primary types of subsequent job mobility. When over-education is combined with perceived skills mismatch (i.e., an alternative measure), the coefficients on each type of mismatch are significantly positive in a multinomial Probit model. It suggests that workers who report as genuinely over-educated in 2012 (*Genuine OE*) are approximately 57 percent points more likely to switch employers. Importantly, the association between genuine over-education and job turnover is the largest, indicating that the probability of job turnover is the highest among graduates who are mismatched in both education and skills at the start of their career. As discussed earlier, the result that genuine over-education increases the likelihood of job turnover is consistent with career mobility theories: over-educated workers have better prospects of upward mobility than those who are correctly matched.

The probability of quitting is significantly increases with over-education status, particularly for genuine over-education. Economic theory suggests that a worker will quit his job if the expected present value of his future earning (should he remained with the firm) is lower than if he leaves the firm. The result, i.e., over-education status increases the likelihood of quitting, is in accordance with the stylized facts from job search theories; whereby most skilled among graduates prefer to wait in the non-employment pool until they get the best job offer they can. High skill individuals have higher reservation wages and are willing to wait longer than the least skilled graduates. This is because the least skilled graduates tend to accept the job offer they get, even if it involves over-education. In addition, the theory of career mobility also suggests that quitting is a device of which workers realize as an optimal path to a chosen career. When the best career cannot be realized in one firm, quitting will be part of the worker's optimal career path.

Turning to the other coefficient estimates, despite the inclusion of a large number of controls, the general results are consistent with stylized facts from conventional job mobility estimations. In terms of individual demographic variables in panel *B*, not surprisingly, age has a statistically significant negative impact on job turnover: older (or more experienced) workers are less likely to change jobs than their younger counterparts. Married female employees have higher rates of job mobility than single

workers, other things being equal[5]. The probability of job mobility is significantly higher for workers who live in urban areas. In regards to employment characteristics in panel *C*, full-time workers have lower job mobility than part-time counterparts. The effect of union membership on the probability of job mobility is negative. The tendency of union workers to change employers is low. The probability of job mobility is also significantly low for female graduates who are working in relatively large firms.

Table 6.
The Effects of Over-Education on Job Mobility

Variables	Conventional Measures		Alternative Measures	
	Turnover	Quit	Turnover	Quit
Panel *A*: Educational Mismatch related Variables:				
OE	0.257*** (0.049)	0.103*** (0.046)	-	-
Apparent MATCH	-	-	0.252** (0.083)	0.111 (0.127)
Apparent OE	-	-	0.287** (0.125)	0.187** (0.081)
Genuine OE	-	-	0.574*** (0.216)	0.231** (0.113)
Panel *B*: Individual Demographic Variables:				
AGE	-0.094*** (0.029)	-0.085*** (0.029)	-0.092*** (0.029)	-0.084*** (0.029)
AGESQ	0.102*** (0.038)	0.098*** (0.028)	0.091*** (0.038)	0.095*** (0.027)
UNIVERSITY	-0.092** (0.042)	-0.064 (0.043)	-0.098** (0.042)	-0.064 (0.043)
MARRIED1	0.213*** (0.060)	0.190*** (0.064)	-0.216*** (0.060)	-0.191*** (0.064)
MARRIED2	0.166 (0.227)	0.185 (0.235)	0.161 (0.227)	0.181 (0.235)
CAPITAL	0.065** (0.037)	0.100*** (0.038)	0.063* (0.037)	0.100** (0.038)

[5] More than 1 in 5 women of working age in Korea are leaving their jobs after getting married or having children, according to the World Economic Forum's Global Gender Gap Report 2014.

Variables	Conventional Measures		Alternative Measures	
	Turnover	Quit	Turnover	Quit
Panel *C*: Employment Characteristics Variables:				
FULL	-0.540*** (0.087)	-0.475 (0.536)	-0.542*** (0.086)	-0.482 (0.536)
UNION	-0.604*** (0.074)	-0.478*** (0.083)	-0.602*** (0.074)	-0.478*** (0.083)
PUBLIC	0.050 (0.068)	0.078 (0.049)	0.052 (0.068)	0.066 (0.215)
MIDDLE	-0.178*** (0.045)	-0.149** (0.075)	-0.179*** (0.045)	-0.104** (0.046)
LARGE	-0.226*** (0.046)	-0.285*** (0.047)	-0.230*** (0.046)	-0.286*** (0.047)
Constant	2.034*** (0.489)	3.104*** (0.623)	2.002*** (0.489)	3.002*** (0.611)
Sample Size	5,760		4,966	
Log-Likelihood	-3,311		-3,309	
Pseudo R-square	0.0373		0.0381	

Note: Standard errors in parentheses: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Data is unweighted.

Conclusion

In this paper, we examine the incidence and the effects of over-education on job mobility among Korean female graduates at the early stage of their career. Using the latest panel data from the 2009 Graduates Occupational Mobility Survey (GOMS), this study has proposed a more detailed definition of over-education than the earlier literature by accounting for graduate heterogeneity in perceived skills mismatch; while conventional measures of over-education in most previous studies merely considered the concept of excess schooling based on the usual assumption that over-educated workers are implicitly over-skilled. This study considers four types of matching status: (1) "apparently matched" (matched in education, but over-skilled); (2) "genuinely matched" (matched in both education and skills); (3) "apparently over-educated" (over-educated, but matched in skills); (4) "genuinely over-educated" (over-educated and over-skilled). Given that genuinely over-educated graduates cannot use most of their skills acquired in the workplace compared to their apparently over-educated counterparts, this distinction is particularly important when estimating the effects of over-education on

job mobility, suggesting that genuinely over-educated workers are more likely to change their current jobs than their apparently over-educated counterparts. With a larger applicant pool, the firm can be pickier in selecting the candidates (Schlicht, 1978; Stiglitz, 1987). Therefore, genuinely over-educated workers have some advantages over apparently over-educated counterparts in finding new employers.

The main findings presented in this paper are the following: The conventional measure based on the assumption of workers' homogeneity in skills clearly overestimates the prevalence of over-education. At least 19 percent are over-educated but only about 7 percent are both over-educated and over-skilled (i.e., genuine over-education). This suggests that the majority of over-educated female college graduates have jobs that commensurate with their skills. The low proportion of genuinely over-educated workers also suggests a shortage of qualified female college-educated workers in the Korean youth labor market. As for the effects of being over-educated on job mobility, regardless the measure of over-education, the results provide evidence that favors many previous studies; whereby over-education is significantly associated with job turnover, suggesting that over-educated female workers are more likely to change jobs. This positive correlation remains even if we estimate an augmented specification where graduate over-education is disaggregated according to perceived skills mismatch: high job mobility is clearly related to over-education jointly either with matched in skills (i.e., apparent over-education) or over-skilling (i.e., genuine over-education). Most importantly, in line with Chevalier (2003), Green and Zhu (2010) and Mavromaras et al. (2013), in this case it is found that the genuinely over-educated workers are more likely to switch their employers than their apparently over-educated counterparts.

The findings presented in this paper may suggest that education-job mismatch between female college graduates' level of education/skills acquired and job requirements has an adverse effect on the labor market efficiency, raising employee turnover. Indeed, a high rate of employee turnover can be a significant problem for employers. When someone leaves a job, for instance, it is costly to replace the employee due to the productivity losses. Since the efficient job-worker matching process will determine how efficiently workers find new jobs, labor market policies that change or improve job-worker matching processes can help at

reducing turnover costs of young female graduates in the workplace. For policy makers, thus, the efficiency with which human resources of women are developed in the education system and used on the labor market must become one of the priority concerns.

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APPENDIX

Number of Female Students in Higher Education Institutes

Classification	Higher Education Graduates	Universities	University of Education	Industrial University	Graduate school	Junior College	Other
2013	1,574,495	835,703	11,828	20,320	158,952	303,169	244,523
2012	1,574,076	821,875	12,751	26,319	159,032	307,350	246,749
2011	1,571,909	802,075	13,765	34,430	158,523	310,247	252,869
2010	1,524,603	778,186	14,712	36,565	152,367	304,846	237,927
2009	1,483,536	749,329	15,335	38,258	146,090	301,395	233,129
2008	1,455,962	727,178	16,244	40,785	141,672	305,701	224,382
2007	1,436,730	712,735	17,658	41,962	137,118	308,453	218,804
2005	1,399,931	684,238	17,856	46,382	124,930	316,326	210,199
2000	1,286,762	596,389	15,032	38,232	80,072	339,233	217,804

Sources: KEDI, Korean MOE, Korean National Statistical Office.

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