Impact of Family Background and Individual Characteristics on Vocational High School Choice in South Korea: A Gender Analysis

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Abstract: At the end of compulsory school, adolescents in many industrialised countries must make an important and far-reaching decision that strongly influences their future working life. Few of the many studies of school choice in South Korea have empirically analysed the choice of type of upper secondary school and almost none have paid attention family background and individual characteristics. This paper does so for both boys and girls completing compulsory lower secondary education, using 11 years' data from the Korea Education and Employment Panel (KEEP) of the Korea Research Institute for Vocational Education and Training from a period before recent Korean vocational educational policy changes. We use a Probit model to deal with binary variables. Key variables considered include teacher assessments of students, father's income, father's education, spending on private tutoring at the lower secondary level, and the number of siblings, these last two never previously analyzed. In addition, to gender analysis this paper confirms previous results that parental social status is a major determinant of high school choice between general and vocational education. The key gender result is that fathers' educational attainment negatively and significantly affects females more than males, and that fathers' high income more negatively and significantly affects males than females in nonattendance at vocational high school. This paper also confirms previous findings that females were more motivated than males to enroll in vocational high school. Vocational education better meets females' needs than males', especially those not well supported by their parents. These findings imply that future research on both Korea and other countries needs to pay much more attention to family and individual characteristics and to differences between genders.

Keywords: Vocational high school, school choice, family background, gender, probit model

1.   Introduction

Before entering the labour market, school choice positively affects career paths as a critical factor determining an individuals' achievement in the labour market and the social hierarchy. Many empirical studies exist worldwide that examine the differences between vocational and general education and choices between the two. For OECD countries as a whole, vocational school students do better than general education students when entering the labour market. Still, this advantage disappears over time (Choi, Jeong & Kim, 2019) a result confirmed in detailed studies of The Netherlands and of Turkey (Middledorp, Edzes & van Dijk, 2018; Torun and Tumen, 2017). Moreover, countries with work-based vocational systems produce better employment results than countries with school-based systems (Choi, Jeong & Kim, 2019; Brunetti & Corsini, 2019). A few studies have also examined the effects of social background on the choice between vocational and general education, for example, in Switzerland (Becker & Glauser, 2018). However, all of this work has lumped together boys and girls without any analysis of gender differences. Indeed, very few studies of vocational education look at gender differences and those that do are now quite dated – for example, Finland, Taiwan and USA (Lasonen & Stenstrom, 1995; van der Meulen Rogers, Zveglich & Wherry, 2006; Van der Meulen Rodgers and Boyer,

2006). The last broad global survey of the TVET gender differences literature covered 1998-2003 (UNESCO-UNEVOC, 2004). Similarly, the choice between general and vocational schools at the upper secondary level in South Korea is a crucial determinant of labour market outcomes. Lower secondary school is compulsory and because over 90 percent of students go on to upper secondary school. For this reason, there have been many studies of school choice in South Korea, especially at the secondary education level (Ahn and Lee, 2009; Kim, 2011; Oh and Lim; 2012; Im, 2013). However, relatively few studies have empirically analysed either the factors of school choice in lower secondary education to transition into different types of upper secondary education or the differences between genders, despite this initial decision having an enormous impact on future career possibilities (Kim and Byun, 2006; Im, 2013).

In South Korea, upper secondary education is primarily divided into general high schools and vocational high schools. General high schools prepare students to enter prestigious universities for academic education, while vocational high schools provide skill- or experience-oriented education to enter the labour market directly after high school graduation (Ministry of Education, 2019). There has long been a strong perception that vocational high school students had weak academic performance, little interest in school, and high rates of becoming juvenile delinquents. This perception also caused vocational high school graduates to enter higher education, contrary to the purpose of vocational education (Paik and Shim, 2017; Choi, 2020). Furthermore, once at university, they have difficulty with their studies because of their weaker academic knowledge compared to general high school graduates. They also have difficulty working after entering the labour market due to their higher expectations of the working environment because they took more education. Overall, the perception is that vocational high schools in South Korea generally have negative consequences (Lee and Kim, 2015). The overriding purpose of vocational high schools is to maximise individuals' potential skills by developing students' aptitude and ability to obtain a decent job in a specific field after graduation (Ahn and Lee, 2009). However, as the labour market in South Korea was in practice focused mainly on encouraging college graduates, the number of students going on to college even after vocational high school increased very rapidly, from 7.8% in 1991 to a peak of 73.5% in 2009, but then falling to a still very high 36.0% by 2018 (KEDI, 2018).

Concerning the link between educational attainment and the labor market, the study of school choice at the upper secondary level is important to identify which factors determine the future careers of South Korean youth, to predict future youth labor market performance, and to help develop appropriate education policies for the different types of school. Government policies regarding vocational education in upper secondary education have been in place for the last two decades, driven by young peoples' difficulty securing employment, especially those who did not graduate from university (MOE, 2019). This has led the government to advocate for vocational education, encouraging positive expectations for vocational high school graduates to obtain decent jobs, in order to help resolve youth unemployment and to expand high school graduates' employment as the South Korean economy recovered from the 2008 economic downturn. Indeed, after the governments' various policies and efforts, the perception of vocational high school changed and enrollment rates gradually increased from 19.2% in 2010 to 25.9% in 2011 (Cho et al., 2011; Oh, et al., 2012).

Despite this critical change, few quantitative studies analyse the factors of high school attendance, especially at vocational high schools, with accurate data considering the determinants of female attendance (Kang, 2014; Moon and Choi, 2017). Most studies of vocational education just look at the post-secondary career decision between enrolling in a university and entering the labor market, without using reliable data to permit generalizing their results and so having limited use for education policy. These studies have a further major limitation in that they focus especially on males and do not compare females and males (Ahn and Lee, 2009; Oh, 2012).

The main aim of this study is to examine the determinants of vocational high school attendance with family background and individual characteristics in South Korea right after completing the last year of compulsory lower secondary education, for females and for males. Males have a duty of military service for two years, so females enter the labor market relatively earlier than males. As mentioned before, despite this earlier entry and the increasing share of females in the workforce, the long-lasting gender wage gap in favor of males still persists (Kim and Noh, 2018). The identification of Korean females' initial career paths is very important to determine their further career paths and to suggest better working environments for females. The second aim of the study is to investigate the gender difference in determinants of vocational high school attendance, especially focusing on female students. Understanding this difference has the potential to make it easier to introduce policies for women to re-enter the labor market after marriage and childbirth, thereby helping offset the low birthrates and aging populations that undermine economic growth in South Korea and other advanced countries.

2. Vocational Education, Family Background and Individual Characteristics in South Korea

The Korean government has continuously proposed new policies to reduce the youth unemployment rate, particularly focused on high school graduates' employment. More aggressively, since 2008, the Korean government declared a "High School Diversification Policy" and "High School Selection System" to develop diversity and specialisation in secondary education. In particular, secondary vocational education has been encouraged. The 400 former traditional vocational high schools have now been replaced with 21 Meister high schools and 676 Specialised high schools, alongside the 1,493 general high schools. Among vocational schools, Meister high school students are privileged compared to Specialised

high school ones, receiving free tuition, dormitory accommodation and special support to get jobs at large firms. Specialised high schools have also tried to improve their education, though they are not generally of the same quality as Meister high schools. Furthermore, in 2010 the government introduced a "Work First-then to College System" policy to promote employment among secondary vocational high school graduates. This policy gives preferential treatment to those who enter the labor market immediately after high school graduation, with the idea of deferring university entry until later. As a result of these government efforts, the number of specialised high school graduates entering university had decreased from over 80% in 2002 to 37.6% by 2014, while those entering the labor market had risen to 47.5% by 2014 from the previous level below 30% in 2002 (Lee and Kim, 2015). Given the intensified current youth unemployment problem, the positive effects on employment of attendance at specialised vocational high schools may show the way forward. This study is focused on females' specialised vocational high school attendance because there is a lack of studies about female vocational education, despite the government is trying to foster gender equality in youth employment.

Several studies have shown that students who have low performance and parents with less education and lower income levels in middle-school are more likely to go to vocational high school than to general high school – see especially Kang and Kim (2002), Yim (2011) and Ok et al., (2013). There have also been some more detailed studies. However, these have had significant methodological flaws, especially concerning the full inclusion of all types of vocational school and the consideration of females as well as males, e.g. Kim (2011) conducted a comparative study on the motives and personal backgrounds of Meister High School and Foreign Language High School students under the same education legislation but selected only one male school in a specific area, thereby limiting any generalisation from the studys' results; Lee and Kim (2015) analysed the effect of student characteristics in junior high school on the choice of vocational high school, using a logistic regression model. However, this study did not examine the differences between specialised high schools and Meister schools within vocational education and also relied only on the junior high school students' choice of vocational high school using 2nd-year vocational high school student data from the Seoul Educational Longitudinal Study (SELS), without comparing males and females, and so did not explain either real effects after graduation from junior high school or gender effects; Jeon et al., (2015) used data from the Korea Educational Development Institutes in 2012 analysis of school education status and level, together with high school sophomore and parents' data, to analyse the effects of second-year students' characteristics and family backgrounds on admission to different types of high school, employing a multinomial logit model. However, the study excluded vocational high schools from its analysis; OH and Lim (2012) investigated the career paths of 1,945 junior high school students at 33 middle schools in Seoul, through chi square test and one-way ANOVA analysis. Still, T their sample was not gender-balanced, and their study suffered also from the same limitation as that of Lee and Kim (2015) of using junior high school survey findings rather than actual post junior high school graduation results.

The only study that has covered both vocational education and gender reasonably correctly is that of Moon and Choi (2017) who analysed female specialised high school graduates using the Korean Education and Employment Panel (KEEP) data from the Korea Research Institute for Vocational Education (KRIVET) under the new policy, "Work first-then to College System", the survival analysis used the Cox proportional hazard model. Female graduates in vocational high school tended to go to college after entering the labor market when they were good at academic performance but employed in temporary jobs without welfare benefits. Even when they had job status and welfare benefits, they were more likely to go on to higher education when hiring companys' wage gaps were more significant for those with different educational backgrounds. However, while more comprehensive than previous studies, Moon and Choi could not identify the determinants of female graduates' choice of vocational high school choice, not to mention that they did not include males, and so did not permit any exploration of the linkage between government policy and career patterns in the labor market.

Previous studies have also confirmed the negative function of vocational high schools and their factors of enrollment. For instance, vocational high school in South Korea loses its original purpose and function as a vocational education institute when it is not able to send students onto the labour market immediately after graduation, and when the students are academically underachieving and not motivated to learn through vocational education and training for their future job. This is why the vocational high school enrollment rate was decreasing. In addition, students with parents of high income and high educational attainment are more likely to enter general high schools than vocational high schools, and they are more likely to go to 4-year universities instead of entering the labour market after high school graduation. Moreover, those students who entered the 2-year university due to their low academic achievement are more likely to enter the 4-year university after 2-year university graduation than the students who decided to build the career first for employment (Byun and Kim, 2011; Oh, 2012; Kim, 2013)

3.   Data and Methods

3.1   The Data Sample

This study is, therefore the first to look at both females and males in a vocational school. It considers the school choice of vocational education by gender before the Korean policy of vocational education was restructured into two types of vocational high school, Meister schools and Specialised high school. It is helpful to understand the precise determinants of school choice before the government changed the perception of vocational education and restructured it, in order to determine how appropriate were the changes. Hence we use data for 2004 and 2007. The data were obtained from the Korean Education and Employment Panel (KEEP) of the Korea Research Institute for Vocational Education (KRIVET), which surveyed two groups (3rd-year middle and high school students) including information about their household, teacher and school, as tracing data every year from 2004 to 2016. This study selected and pooled the 3rd year middle school students' data for the specific years 2004 and 2007. The data in 2004 shows information about the students before they entered high school and the data in 2007 describes the students' information in their 3rd year of high school. Student characteristics and family background in the data of 2004 before choosing a high school are necessary to identify the determinants of vocational high school attendance; the data of 2007 is very important to obtain the variable of each individuals' high school type.
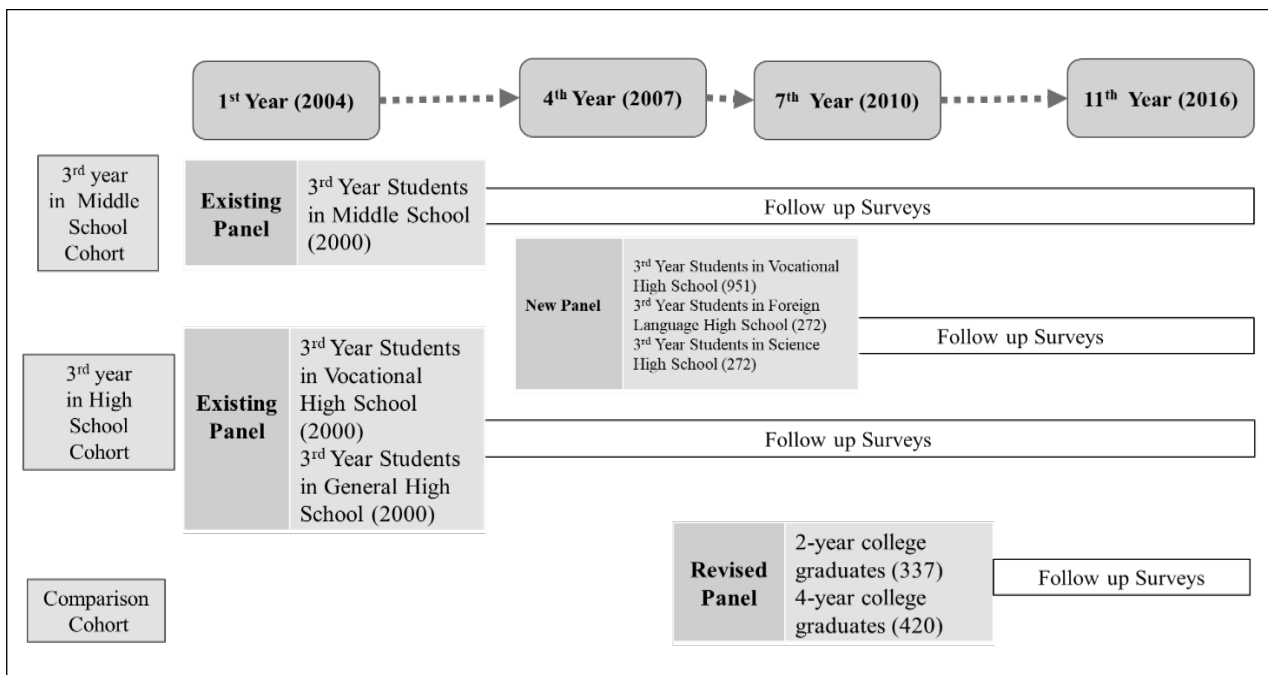

Fig. 1 - Structure of respondents of KEEP (Existing, New, Revised panel).

Table 1 shows variable definitions as well as the descriptive statistics in the analyses of this study. It reports the definition of independent variables and its descriptive statistics for high school choice of analysis using probit model with 1,319 observations, including both 595 male and 650 female students, and also missing values of 74 students. For the dependent variable, the data were merged from both 2004 and 2007 and then this study used a binary variable for "high school": if a student in vocational high school gets a value of one, then by definition a student in general high school get a value of zero. The Table also explains the independent variables that are used to identify the determinants of school choice. "Teacher assessment" indicates student achievement on a scale from 1 to 5 in the third year of middle school, with 5 being the highest score is 5. Ideally, an examination score index like the GPA would have been best for student achievement, but data limitations preclude this (more than 50% of students did not respond), so we use teacher assessments which are available for all students for all school years. The variable of "father income" is the monthly income in Korean won (KR ₩) of the student's father in 2004, and it is regenerated as log wage as a "Father lnW" in the model estimation. The variable of "father's educational attainment" is divided into three categories as a dummy variable: "1" denotes the father's final education level is less than high school, "2" indicates the father's final education level is high school, and "3" reports the father's final education level is more than high school. In analysing father's education, the benchmark is the father's education level "2" (high school). The "private tutoring" variable means the monthly spending in Korean won (KR ₩) on private tutoring, also using a log value as a "Ln PT" in the estimation model. The "siblings" variable identifies the number of siblings in the household.

Table 1 - Summary variables for high school choice.

Variable	Definition of variables	Obs.	Mean	Min	Max
High	Dependent variable: if = 1/0, Vocational / General upper secondary education	1,319	0.4	0.0	1.0
Gender	Gender	1,319	1.5	1	2
Teacher's assessment 1	Teacher's assessment at lower secondary education (lowest)	1,319	0.3	0.0	1.0
Teacher's assessment 2	Teacher's assessment at lower secondary education	1,319	0.4	0.0	1.0
Teacher's assessment 3	Teacher's assessment at lower secondary education	1,319	0.5	0.0	1.0
Teacher's assessment 4	Teacher's assessment at lower secondary education	1,319	0.4	0.0	1.0
Teacher's assessment 5	Teacher's assessment at lower secondary education (highest)	1,319	0.3	0.0	1.0
Father income	Father's monthly income (KR ₩)	1,319	262.2	10.0	3,000.0
Father lnW	Log of father's monthly income	1,319	5.4	2.3	8.0
Private tutoring	Private tutoring cost at lower secondary education in 2004 (KR ₩)	1,319	27.2	1.0	200.0
Ln PT	Log of private tutoring cost at lower secondary level	1,319	0.7	0.0	5.3
Father's educational attainment 1	The father's educational attainment is less than upper secondary	1,319	0.5	0.0	1.0
Father's educational attainment 2	The father's educational attainment is upper secondary	1,319	0.4	0.0	1.0
Father's educational attainment 3	The father's educational attainment is more than upper secondary	1,319	0.4	0.0	1.0
Siblings	The number of siblings	1,319	0.2	1.0	2.0

3.2 Model Specification

This studys' primary goal is to understand the education pathway approach to vocational high school choice, differentiated by gender. Most of the previous literature about Korean high school choice uses a logistic regression or probit regression (Nam, 2005; Oh, 2012) with a treated limited dependent variable (LDV). Wooldridge (2013) defined an LDV broadly as a dependent variable whose range of values is substantively restricted. A binary variable takes on only two values, zero and one, such as male or female, married or unmarried, employed or unemployed, or in the labor force or not in the labor force.

The linear probability model (LPM) assumes that the response probability of parameters, β_j is linear. The equation (1) below is considered the form of binary response models. It can also avoid some LPMs' drawbacks that the fitted probabilities can be less than zero or greater than one. The marginal effect, which is the partial effect of any independent variable, is constant.

$$P(y = 1|x) = G(\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k) = G(\beta_0 + x\beta) \qquad (1)$$

Where G has a value between zero and one for all real numbers z: $0 < G(z) < 1$. This equation can guarantee strict probabilities between zero and one for the estimated respond probability.

To make sure the probabilities fall between zero and one by various nonlinear functions in the probit model, G for the standard normal cumulative distribution function (cdf) is expressed by (2):

$$G(z) = \emptyset(z) \equiv \int_{-\infty}^{z} \emptyset(v)dv \tag{2}$$

where $\Phi(z)$ can be explained as the standard normal density by (3):

$$\emptyset(z) = (2\pi)^{-1/2} exp(\frac{-z^2}{2}) \tag{3}$$

The choice of G, again, ensures that all values of the parameters and the x_j from the strict dependent variable are between zero and one. The equation (2) and (3) are make the G functions stronger at z=0, G (z)→0 as z → -∞, and G (z)→0 as z → ∞.

Furthermore, the probit model can be distinct by equation (4):

$$y^* = \beta_0 + x\beta + e, \ y = 1\,[\,y^* > 0\,] \tag{4}$$

The y=1 [y^*>0] defines the binary outcome and it calls the indicator function which has a value between zero and one, they is one if y^*>0 and y is zero if y^*≤0. *e* has to be independent from x and it has the standard normal distribution which means e is symmetrically districted about zero, and it has the normality assumption making the probit model more attractive more to use probit model in binary response models than logit model.

$$P(y = 1\,|\,x) = P(y^* > 0\,|\,x) = P[e > -(\beta_0 + x\beta)|x]$$
$$= 1 - G[-(\beta_0 + x\beta)] = G(\beta_0 + x\beta) \tag{5}$$

Equation (5) is the same as (1), however, it can derive the response probability for y and the most crucial purpose to explain the effects of the x_j on the response probability P (y=1 | x). For the OLS model, we normally interpret the value of the parameter of change in the response probability when z_3 increases / decreases by 1%. It means that it computes the elasticity of the response probability with respect to an independent variable. For the probit model, we need to be careful to interpret the value of parameters, β_j because of the two-potential problem in binary response models. First, the y in the probit model denote only between zero and one, meaning the average of the explanatory variables represent no one in the sample. Second, if the explanatory variables use the continuous variables, the magnitude of effect on coefficient is not clear into non-linear function. For these reason, two models below are helpful to compute certain value of each i:

$$G\left[\widehat{\beta_0} + \widehat{\beta_1}\bar{x}_1 + \cdots + \hat{\beta}_{k-1}\bar{x}_{k-1} + \hat{\beta}_k(c_k + 1)\right]$$
$$-G(\widehat{\beta_0} + \widehat{\beta_1}\bar{x}_1 + \cdots + \hat{\beta}_{k-1}\bar{x}_{k-1} + \hat{\beta}_k c_k) \tag{6}$$

$$n^{-1}\sum_{i=1}^{n}\{G\left[\widehat{\beta_0} + \widehat{\beta_1}\bar{x}_{i1} + \cdots + \hat{\beta}_{k-1}\bar{x}_{ik-1} + \hat{\beta}_k(c_k + 1)\right]$$
$$-G(\widehat{\beta_0} + \widehat{\beta_1}\bar{x}_{i1} + \cdots + \hat{\beta}_{k-1}\bar{x}_{ik-1} + \hat{\beta}_k c_k)\} \tag{7}$$

The expression in (6) and (7) has a particularly useful interpretation when x_k is a binary variable; it is called the partial effect at the average (PEA) or the average marginal effect (AME). For each unit i, these estimate the predicted difference in the probability that y_i=1 when x_k=1 and x_k=0. The estimated effect of x_k on y_i is the average of the estimated differences in probabilities. When we use the probit model such as binary or dichotomous dependent variable regression models in applications, we need to compute the scale factors described above for the probit model in making comparisons of partial effects.

This study attempts to understand the impact of family background and individual characteristics on vocational high school choice estimating model by gender in South Korea. A previous study (Yoo, 2018) employed the probit model to examine the determinants of the current school's prestige level on school choice. This study also exploits the logit model in vocational high school choice as: 1, if a student is going to vocational high school, and 0 if otherwise.

The probit model represented the vocational high school choice is established as follows:

$$P(y_i = 1\,|\,x) = \beta_0 + \beta_1 ability_1 + \beta_2 fa\_edu_2 + \beta_3 fa\_inc_3 + \beta_4 PT_4 + \beta_5 siblings_5 + \varepsilon_i \tag{8}$$

In equation (8), the dependent variable $y\_i=1$ if student i is attending vocational high school, $y\_i=0$ if student i is attending general high school, and the explanatory variable of ability is a teacher assessment at middle school from 1 to 5 for each individual (the lowest grade of 1 means poor academic performance), fa_edu is a fathers' education levels between less than high school and more than high school, PT is a log of private tutoring cost before entering high school, siblings is several siblings of the individual and ε is the error term. These variables are the most typical and influential variables used for school choice based on previous research using the probit model (Hastings et al., 2005: 2008).

4.   Results

High school choice strongly affects students' career paths and whether they enter university or the labor market after graduating high school in the higher education-dominated society of South Korea. Table 2 reports the results that determine vocational high school attendance, comparing gender differences. It also displays the Average Margin Effect (AME) of the probit model using 1,319 observations from the full sample. The most important results are that the students' better education performance in middle school, the higher education level of the parents, higher parent income and spending on private tutoring show a negative correlation with entering vocational high school, for both males and females. With respect to the main results, we explored gender differences of vocational high school enrollment on the effect of the other factors.

First, among the variables on school characteristics, coefficients of teachers' assessment dummies show that the probability of attending vocational high school is less likely, at a statistically strong significant level, if a student's school achievement is higher than if it is lower, based on teachers' assessments of student achievement. This is more pronounced for males and those with the highest achievement level in middle school; indeed, 74 observations are eliminated from the full sample for this reason. Second, with regard to household characteristics, fathers' education greater than high school and fathers' income have a statistically negative effect on the probability of sending children to vocational high school. Fathers' better education level affects females (6.9%) more than males (5.7%); fathers' higher income affects males (11%) more than females (2.1%) in nonattendance at vocational high school. The result from the full sample, applying the probit model of the marginal effect, shows that holding all other variables constant, the marginal effect on going to vocational high school in terms of the fathers' education is greater than on high school; for every extra year of father education, the probability of vocational high school attendance decreases by 6.1 percentage points. Fathers' education less than high school has a positive effect on vocational high school attendance; however, it is not statistically significant. Moreover, the fathers' high income has a negative effect on the probability of attending vocational high school, and it is strongly statistically significant. If the fathers' income increases one unit then the probability of attending vocational high school decreases by 6 percent, holding all other variables constant. Private tutoring has a strongly statistically negative effect on the probability of entering vocational high school; and for every extra unit of private tutoring, there is a 5% probability of avoiding entering vocational high school, holding all other variables constant. The effect of private tutoring is greater for males than for females. There is a positive correlation of attending vocational high school with the number of siblings for the whole sample; it is negative for males and positive for females, but these gender differences are not statistically significant.

Table 2 - School choice from middle school to high school.

Variables	**Probit Model**					
	Vocational High School Choice					
	ALL	**AME (dy/dx)**	**MALE**	**AME (dy/dx)**	**FEMALE**	**AME (dy/dx)**
teacher assessment_2	0.608***	-0.220***	0.594***	-0.210***	-0.591**	-0.217***
	(0.158)	(0.0545)	(0.214)	(0.0718)	(0.238)	(0.0840)
teacher assessment_3	-1.653***	-0.535***	-1.683***	-0.540***	-1.589***	-0.517***
	(0.157)	(0.0495)	(0.214)	(0.0647)	(0.237)	(0.0774)
teacher assessment_4	-2.355***	-0.631***	-2.303***	-0.632***	-2.365***	-0.619***
	(0.199)	(0.0482)	(0.271)	(0.0640)	(0.296)	(0.0748)
teacher assessment_5	-2.944***	-0.660***			-2.629***	-0.634***
	(0.408)	(0.0480)			(0.454)	(0.0762)
faedu_lesshigh	0.163	0.0348	0.169	0.0409	0.199	0.0418
	(0.113)	(0.0246)	(0.167)	(0.0408)	(0.157)	(0.0338)

Table 2 - (Continue)

Variables	Probit Model					
	Vocational High School Choice					
	ALL	AME (dy/dx)	MALE	AME (dy/dx)	FEMALE	AME (dy/dx)
faedu_morehigh	-0.329**	-0.0616***	-0.264	-0.0578	-0.398**	-0.0694**
	(0.128)	(0.0229)	(0.172)	(0.0368)	(0.198)	(0.0319)
father's lnW	-0.305***	-0.0600***	-0.512***	-0.116***	-0.111	-0.0211
	(0.101)	(0.0199)	(0.151)	(0.0332)	(0.152)	(0.0288)
Ln PT (private tutoring)	-0.251***	-0.0493***	-0.270***	-0.0609***	-0.252***	-0.0478***
	(0.0671)	(0.0130)	(0.0973)	(0.0218)	(0.0978)	(0.0181)
sibling	0.0165	0.00324	-0.189	-0.0427	0.278	0.0526
	(0.192)	(0.0378)	(0.263)	(0.0595)	(0.286)	(0.0538)
Constant	2.951***		4.379***		1.556*	
	(0.586)		(0.874)		(0.873)	
Observations	1,319	1,319	595	595	650	650

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
***, **, * are statistically significant at the 1, 5, and 10% levels, respectively

5. Discussion

This study asks what the determinants of choice between General high school vs. Vocational high school in terms of the students' performance and the students' family background in South Korea differentiated by gender are? What the study finds in regard to the relationship between students' background factors and their probabilities of enrollment in different types of high school is in line with previous studies in South Korea, reviewed in Section 2 above. Most of studies have focused on the factor of high school choice with parental social status as father or mothers' income and education level, their firm size including financial stability or properties and so on, which they believe those are most significant factors (Oh, 2012; Moon and Choi, 2017). Including that factors from previous studies, this study includes more variables with the number of siblings and the private tutoring cost at lower secondary education that is able to cross-check information about the parental social status.

The gender results of this study are very important. According to the estimation results, higher achievement (according to teacher assessments) has a negative effect on attending vocational high school. The previous studies (Ok et al., 2013; Kim et al., 2016) also revealed that parental social status including high school-performance significantly affected attendance at general high school. But there is no appropriate comparison for high school choice in gender. These previous results are consistent with this study that if the teacher assessment is greater than 4, the negative association with attending vocational high school for females is stronger than for males. The 74 male students who had the highest scores did not enter vocational high school (disappeared in the sample), meaning that there is no probability to go to vocational high school among the students with the highest scores in middle school. The family background variables of high fathers' education and fathers' income are also found to have a statistically negative effect on the probability of sending their children to vocational high school. Interestingly, another result here goes beyond previous reports, showing that fathers' better education level affects females more than males, and fathers' better income affects males more than females in terms of nonattendance at vocational high school.

In short, the study results are mostly consistent with previous studies in South Korea. However, a new result in this study is that not only does great school achievement make it unlikely to go to vocational high school, but also that even more than 50 percent of students with middle teacher assessment scores are unlikely to enter vocational high school. The results might be due to vocational high school having an unfavorable social image, such as students being academically underachieving and having low family social status. And when we also consider that the 74 students with the highest teacher assessment scores disappearing from the results, the choice of vocational education is ignored by the group of academically excellent students who focus on entering prestigious universities. It seems that the academically excellent students in South Korea do not think about vocational high school as a learning institution to learn cognitive skills as well as non-cognitive skills which could make for lifelong social harmony. Furthermore, father education and income differently affect males and females.

Regarding the influence of father income on male students, it might be considered that boys are more unconditionally and socially supported by their parents, spending more on private tutoring than they do for girls, long a traditional social

perception in South Korea. However, when the fathers' education is higher than average, he also focuses on the girls' education, including not pursuing vocational high school. It seems educated fathers do not follow the traditional social perception of providing educational support to boys rather than girls.

6. Conclusion and Policy Implications

Policy about vocational high school education has focused on improving its quality and repairing internal systems. As this studys' results show, the policy needs to enroll more students as key to reducing the labor shortages in small and medium-sized enterprises that persistently be drawn on job mismatch. For instance, it is still urgent to focus on changing vocational high schools' perception and how to deal with vocational high school students who are most disadvantaged, usually academically underachieving students from socially low stratum families with low incomes and poor education. Moreover, this study confirms a previous study that showed female students had more motivation to enroll in vocational high school than male ones and a higher labor market participation rate. Vocational education seems to meet females' needs more than those of males, especially those who are not adequately supported by their parents.

While this study did not focus much on the relationship between private tutoring and vocational high school enrollment, its results do show that tutoring is very strongly and negatively correlated with vocational high school enrollment. Therefore, this study also implies that increasing vocational enrollment by eradicating the unfavorable perception of vocational high schools could also help resolve the persistent problem of private tutoring and its cost in South Korea.

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