Extended Education in Korea from the Perspective of the Economics of Education

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Introduction

Extended education was introduced as a measure to supplement school education, reduce private tutoring, realize education welfare, and socialize school education (The Ministry of Education and Human Resources, 2006). The effects of extended education are expected to improve academic performance, reduce private tutoring by decreasing the education gap among students from different socioeconomic backgrounds, develop social and affective skills, and enhance students' school satisfaction and community in Korea (Bae, Kim, Yang, 2010 Shin, Kim, Min, and Oh, 2015; Woo and Lee, 2010). Extended education increased programs focusing on math, English, and the Korean language as a substitute for private tutoring. The effects of extended education on reducing private tutoring and enhancing academic achievement have been analyzed, with some positive and negative results. Extended education programs are divided into subjects to enhance academic performance and talent and aptitude programs.

The perspective of the economics of education helps researchers to understand the behaviors of students, parents, and schools, which allocate scarce financial resources to different areas in order to maximize their benefits. This perspective has focused on three concepts and research areas: human capital, market and market failure, and education production. As regards extended education, human capital and education production are applied to explain reasoning for participation in and the effects of extended education. First, the concept of human capital is concerned with the association between education and individual outcomes such as earnings in the labor market. Human capital is measured by knowledge and skills that have been accumulated through education and training. Individuals invest time and money into education and receive benefits such as lifetime earnings in the labor market (Paik, 2009). Human capital theory is applied to explain why students and parents decide to participate in extended education programs. Second, the education production function is used to assess the efficiency and effectiveness of extended education when humans and institutions produce education. Economists use the education production function with an input-output framework in analyzing education (Brewer et al., 2010). The education production function estimates the relationship between inputs (e.g., educational resources) and output or outcomes (e.g., academic achievement) (Harris, 2010). It is common to use statistical models to analyze the relationship between inputs and outputs or outcomes.

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However, causal effects of education inputs on outcomes such as academic achievement have been estimated with available data over time (Hanuskek, 2010; Harris, 2010).

In this chapter, first, statistical methods and research findings on the effects of extended education are reviewed. Second, theories and results on extended education from the perspective of the economics of education are discussed.

Economics of Education Theories

Human Capital Theory

Human capital is defined as "productive capabilities" (Eide and Showalter, 2010). Human capital theory can be traced back to Adam Smith. Smith did not use the term "human capital directly, but considered human abilities as a foundation of wealth in *The Wealth of Nations* in 1776. The study of human capital explored the residual error or unexplained part of the total sums of inputs, concluding that an unexplained factor led to an increase in labor productivity, which had not been measured properly. In the 1950s and 1960s, Jacob Mincer, Theodore Shultz, and Gary Becker focused on education as an investment in human capital. They considered an investment in education as an increase in human capital and labor productivities (Eide and Showalter, 2010).

Human capital theory assumes that education and training increase knowledge, skills, and productivities, and that individuals receive rewards of enhanced earnings for productivity in the labor market. Direct and indirect costs such as tuition and forgone earnings are incurred when individuals invest in education (Baik, 2009; Brewer, Hentschke, and Eide, 2010).

A question arises as to how much individuals should invest in education. Individuals make rational decisions to invest in education if the rate of returns on investment exceeds market interest. One of the policy targets of extended education in Korea is to create substitutes for and reduce private tutoring. Ihm, Woo, and Chae (2008) found that students who were higher achieving and received more private tutoring participated in extended education. They explained that extended education may be assumed as "a future-oriented investment strategy" or "a learning supplement" according to the human capital theory.

Education Production Function

The education production function is the educational version of the production function in microeconomics. Education output is a function of education input through the education process as if production is a function of labor, capital, and land or raw materials. The education production function expresses how outputs of the education process are related to inputs. The education production function is specified as follows:

$$A_{it} = f(S_{it}, S_{it-1}, ..., F_{it}, F_{it-1}, ..., I_i, \varepsilon_{it}) \quad [1]$$

A_{it} is the education output of individual student i at time t. It is a function $f(\cdot)$ of school inputs S and family inputs F at the current time and previous times, a fixed student contribution I_i, and an error term ε_{it}. Education inputs include funding for schools, class size, teacher education and experience, and a variety of education programs and policies. Education outputs are represented by academic achievement and emotional development. Many research findings such as the Coleman Report suggested that family inputs represented by parents' education and family income explained the variations of education outcomes more than did school inputs. A fixed student contribution is innate ability, such as intelligence quotient, which may have considerable impact on achievement but cannot be collected as data. Therefore, family inputs and a fixed student contribution need to be controlled for when the effects of school inputs are isolated. Family inputs and a fixed student contribution are hard to measure or collect as data and are also difficult to control for. However, if data are collected over time, it is possible to estimate the effects of school inputs by controlling for family inputs and student contribution (Harry, 2010). Controversy over school resources and educational outputs has continued. Hanushek argued that there were no systematic relationships between school inputs and academic performance and that incentives for teachers might be a possible way to use school resources (Hanushek, 1989; Hanushek, 1994). However, Grenwald, Hedges, and Laine reanalyzed Hanushek's studies and found that school inputs had a "systematic positive relation between resource inputs and school outcomes" (Hedges, Laine, and Greenwald, 1994).

Extended education has been an important policy that is assumed to act as a substitute for private tutoring and improve student achievement, especially for students from low-income families and rural areas and small towns. Governments have funded extended education vouchers for needy students. While students from families with a low socioeconomic status received extended education vouchers for free, about $600 during one semester, students who are not subsidized participated in extended education with a relatively low price when compared to private tutoring.

Even though extended education and private tutoring have similar aims, namely to supplement and prepare lessons, the price and the quality may differ. Researchers have assessed the effects of value-added academic performance of extended education per unit of price compared to private tutoring (Kim, 2012; Kim, 2014). Other studies have studied the relationship between inputs like extended education programs and outputs such as academic performance and the substitution effect of private tutoring (Bae, Kim, and Yang, 2010; Byun, Hwang, and Kim, 2011; Kim, Byun, and Jo, 2010; Kim, Kwon, and Park, 2014; Lee, 2013).

Empirical strategies

When the impact of education inputs on outputs or outcomes is estimated, it is common to use statistical models such as regression and analyze the relationships between education inputs and outputs. However, the commonly used regression model has some limitations, such as endogeneity problems of explanatory variables like school inputs to infer the causal effect of education inputs on outputs or outcomes. In the regression model, the explanatory variables and error term are supposed to affect dependent variables and have no correlation

with each other. The causal relationship between inputs of interest and outputs or outcomes is key. Research findings on the cause and effect may provide a foundation for a discussion of the effects and future direction of policies or programs.

Research strategies have been sought to isolate the causal effect of education inputs on outputs while controlling for confounding factors. To infer the causal effects, research methods include experimenting with random assignment and quasi-experiments. When random experiments are hard to design and conduct, a quasi-experiment, such as a fixed effects model, a rand effects model, and differences-in-differences, is used to evaluate education inputs such as an extended education policy. For example, fixed effects for schools, students, and time can infer a causal relationship, controlling for constant differences among schools with panel data collected over time on the same individuals or schools (Angrist and Pischke, 2009). Fixed effects models observe students' achievement over time with constant unobserved variables and estimate the causal effects of education policies.

In that fixed effects and differences-in-differences need panel data, a large amount of data collected from students, classes, and schools over time make it possible to assess a causal relationship between education inputs or policies and educational outcomes. Research methods of extended education have evolved with a variety of panel data inputs, starting with regression models and now focusing on quasi-experiments in Korea. Empirical research methods from the perspective of the economics of education attempt to identify causal relationships between inputs or policies and educational outputs or outcomes (McEwan, 2010), which can be interpreted as causal effects of inputs or policies. The educational input of interest is extended education. Extended education has a variety of outputs or outcomes, including academic achievement and non-academic development. Confounding variables are controlled for in empirical studies.

Empirical literature review on extended education

Research on extended education from the perspective of the economics of education has been used mainly in the education productivity function in order to evaluate the effects of extended education. From the human capital theory, very little research has been conducted, but some research can be explained by focusing on who participates in the program, as well as how long and how much students invest in time and money on extended education. Researchers have used a variety of statistical models, from regression to fixed models. Research findings are not consistent regarding the effects of extended education, examining whether extended education has an impact on improving academic achievement and acting as a substitute for private tutoring. Research findings on the impacts of extended education have been reviewed using the human capital theory and the education production function.

Extended education from human capital theory

The human capital theory can be applied to explain research on students' participation and investment in extended education. Kim and Hwang (2009) used data from the Korea Education Longitudinal Survey (KELS) and analyzed participants in the extended education programs at the middle school level, using hierarchical generalized linear models (HGLM).

They found that a majority of middle school students attended extended education programs as supplementary lessons and for talent and aptitude education. Students who had previously participated were more likely to attend. The quality of extended education was one influential determinant. In particular, students from low-income families and rural areas and small towns participated more actively in and benefited from extended education (Kim and Hwang, 2009). Extended education has some merits. The cost of extended education is low compared to expensive private tutoring fees. Students from low-income families are subsidized by the government. In rural areas and small towns, since there are very few private academies, schools offer extended education, and students participate in extended education. For these reasons, students (especially those from low-income families and rural areas and small towns) invest their time and money into extended education. Shin and Kim (2012) also showed that students from lower socio-economic status families tended to supplemented classes of extended education at the elementary schools, using data from the National Assessment of Educational Achievement for all sixth graders in Korea. Extended education vouchers offered from the government amounting to about $600 during a semester allow low socio-economic status students to participate more easily for free.

By contrast, Chae et al. (2009) found that students who have already spent high expenditures on private tutoring and are high achievers are more likely to attend extended education, using survey data from 24 high schools under five Offices of Education and hierarchical linear models (HLM). They explained that higher achieving students with higher expenditures on private tutoring participated more actively in extended education than did lower achieving students. The result is the same as when students with higher academic scores receive more private tutoring. Extended education as well as private tutoring can be an investment in education as "supplementary learning" or "investment in the future" (Ihm et al., 2008). It is likely that students from wealthier families have more options for investing in education and are less sensitive to price. Thus, they invest time and money in extended education just as they do for private tutoring. Lee and Park (2012) found that government grants for extended education might allow students from low-income families to make use of extended education. Since objects of analysis differ at the school level, the participants from the former study in middle school and those from the latter study in high school, the findings may not be comparable. Even though there are few research findings, extended education cannot completely take the place of private tutoring. Regardless of socio-economic status, school levels, and location, students consider extended education as one option for "supplementary learning" or "future investment" activities.

Extended education from the education production function

Extended education and achievement

Empirical research on extended education since 2009 is reviewed here. Nine out of 11 studies reported that extended education had significant positive impacts on achievements. Only two studies showed negative impacts of extended education on students' achievement. Most studies (Chae et al., 2009.; Kim et al., 2010.; Bae et al., 2010; Woo and Lee, 2010; Kim, 2012; Lee and Park, 2012; Shin and Min, 2014; Kim 2014; Park et al., 2014) reported that students who participated in extended education received higher scores on academic tests.

The programs and the quality of extended education at the school level may be important. The participation rate of extended education was higher at schools where fewer students took part in private tutoring and which were located in rural areas and small towns (Shin and Min, 2014). As the quality of extended education measured by a satisfaction survey on such programs was rated as higher, the effects were higher on achievement (Woo and Lee, 2010). Extended education vouchers, which are offered to students from low-income families, had a positive impact on their achievement (Lee and Park, 2012). At the local level, where the participation rates of extended education are higher, students participated less in private tutoring (Kim et al., 2010).

Negative effects were reported in two studies (Byun et al., 2011; Shin and Min, 2012). Byun et al. (2011) also found that the effects of extended education were positive in Korean language and in English in rural areas and small towns.

Since the price of expended education was much lower than that of private tutoring, the impacts of extended education on achievement were more efficient (Kim 2012; Kim 2014). Kim (2012) found that students who participated in extended education at the high school and were in mid-upper grader received higher scores. Kim (2014) also reported that the achievement effect of extended education at the high school level surpassed that of private tutoring. They concluded that extended education programs were more cost-effective. Kim (2014) found that the achievement of students attending extended education improved more per time spent compared to private tutoring.

These empirical studies used a variety of statistical models such as regression, hierarchical linear model, and fixed effect. Some studies inferred a causal relationship between extended education and student achievement (Kim, 2012; Lee and Park, 2012; Byun et al., 2011; Kim 2014; Park et al., 2014). Studies exploring the causal relationship used fixed effect and propensity scoring matching method and found positive effects on achievement, with the exception of one study (Byun et al., 2011). Byun et al. (2011) and Byun and Kim (2010) used the Korean Education Longitudinal Study and evaluated the causal effects of extended education on achievement. Kim (2012) and Kim (2014) used the Private Tutoring Survey and fixed effects models. The propensity score matching method was used as a quasi-experiment to infer a causal effect (Part et al., 2014; Byun et al., 2011; Byun and Kim, 2010; Lee, 2013). Lee (2013) and Byun and Kim (2010) used the Heckman model to control for sample selection bias. As longitudinal data become available, the studies are increasing with a variety of quasi-experiment methods.

Extended education and private tutoring

One of the main targets of extended education has been to act as a substitute for private tutoring. Most empirical studies reported that extended education reduced the expenditure on private tutoring (Bae et al., 2010; Woo and Lee, 2010; Kim, 2012; Kim, 2014; Lee, 2013; Kim et al., 2014). Kim (2012) and Kim (2014) found the effects of substituting private tutoring to be small. The effects of extended education were not enough to crowd out private tutoring (Kim, 2014).

Park et al. (2014) found that extended education decreased private tutoring at the middle school, but increased it at the high school. Byun and Kim (2010) found no impact of extended education on the participation and expenditure levels of private tutoring.

The crowding-out effect of extended education differed according to school levels and residential areas. Kim (2012) and Kim (2014) reported that extended education decreased private tutoring in most areas, with the exception of Gangnam where wealthy families live and many students participate in private tutoring. Extended education was reported to crowd out private tutoring at the middle school in some studies (Kim, 2012; Park et al., 2014), but at the high school in other studies (Kim 2014; Park et al., 2014).

The above studies evaluated the causal effects of extended education on decreasing private tutoring, which reported crowding-out effects (Kim, 2012; Kim, 2014; Lee, 2013) with one exception (Byun and Kim, 2010). Park et al. (2014) found a positive effect at the middle school, but a negative effect at the high school.

Extended education and non-academic development

While many studies focused on the effects of academic achievement, few studies have been conducted to evaluate the impacts of extended education on non-academic development. Students attending extended education built up positive relationships with teachers and classmates (Kim, Byun, and Jo, 2010). However, researchers have found no significant effects of extended education on students' problem behaviors such as unexcused absence, drinking alcohol, and smoking. Park, Ha, and Kim (2014) found that extended education had a positive impact, though it is not large, on academic self-efficacy. However, they found that students attending extended education programs are more likely to attend classes than those who do not, which is somewhat significant. In particular, the effect of extended education on school attendance was more significant for high school students. Researchers have reported that students attending extended education were more positive about the school climate than those who do not. Students who attended extended education were more satisfied with going to school than those who did not. Kim, Byun, and Jo (2010) also found that attending extended education contributed a significant effect on the positive relationship between students, teachers, and peers. Baek (2012), however, found no significant effect of extended education at school sites on school adjustment and the value awareness of school, while private tutoring and academies did have a significant effect. He also discussed the negative stigma effect, in that students from low-income families are more likely to attend extended education programs while those from middle-class and upper middle-class families attend private tutoring and academies.

Non-academic extended education, namely talent and aptitude education, had a positive impact on school life and students' sense of community (Shin, Kim, Min, and Oh, 2015). Attendance at extended education program means that students spend a greater amount of time with teachers and peers, which may result in positive feelings toward schools and learning.

Conclusions

Empirical studies of extended education in Korea have been reviewed from the perspective of the economics of education. Two concepts and research areas from the economics of education perspective include human capital and education production. Students from low-

income families and rural areas and small towns were more likely to participate in extended education programs. However, high-achieving students who received more private tutoring also participated in extended education programs. Based on the human capital theory, we can explain that students, regardless of achievement level and family backgrounds, invest time and money into extended education for "a learning supplement" or "a future-oriented" investment (Ihm, Woo, and Chae, 2008). Students make use of extended education to increase their knowledge and skills. The education production function is used to evaluate the effects of extended education on academic achievement and non-academic development. Empirical studies in particular include a causal relationship between the education input (here, extended education) and outputs or outcomes; such a relationship was inferred with hierarchical models and quasi-experiments such as fixed effects models and propensity score matching methods. By and large, the effects of extended education were positive on achievement, with some exceptions. In particular, students from low-income families received vouchers and made use of extended education programs. This could contribute to lessening the education gap among students from different SES statuses. Extended education was more cost-effective, considering the low prices of extended education, than private tutoring (Kim, 2014). However, few studies have explored the relationship between extended education and non-academic development. In addition, the effects of talent and aptitude extended education have also not been evaluated. As longitudinal data, such as the Korean Education Longitudinal Study and the Seoul Education Longitudinal Study, are becoming available, the causal relation between educational policies and outcomes may be further explored. Based on the causal effects of extended education, policy makers could discuss problems and results and suggest better alternatives.

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