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FINANCIAL ECONOMICS | RESEARCH ARTICLE

Education policy in South Korea: A contemporary model of human capital accumulation?

Patrik Hultberg^{1*}, David Santandreu Calonge² and Seong-Hee Kim³

Abstract: We argue that South Korean families with children are today overinvesting in the level of education due to their high levels of expenditures on private after-school tutoring programs. This situation has evolved due to a combination of factors: a changing labor market, increasing housing and debt payments, as well as an educational “arms race” among Korean families with children. These changes are exacerbating both economic and social issues in Korean society, but are increasingly difficult to address due to issues of complementarity and coordination failures related to educational expenditures. Korea might be inexorably falling into a surprising “education trap.”

Subjects: Economics; Higher Education; Education Policy & Politics

Keywords: education policy; South Korea; human capital; educational expenditures; private tutoring

1. Introduction

South Korea has experienced rapid and unprecedented economic and social achievements since the 1960s. From being one of the world’s poorest nations, it has grown to become the ninth largest economy in the world with a GDP of US\$1.75 trillion and per capita income of US\$34,569 (OECD,

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PUBLIC INTEREST STATEMENT

South Korea today is the ninth largest economy in the world, with an economy known for high levels of technology and education. Much of the nation’s rapid development has been attributed to far-sighted, deliberate, and government-regulated long-term education plans and policies. The economic success of South Korea has recently led to significant social problems, including high rates of suicide, high levels of household debt, and low levels of fertility. One of the main causes of these outcomes is a dramatic increase in education expenditures, especially spending on private after-school tutoring programs. Despite changing labor markets and a reduction in expected benefits from private tutoring and higher education, many households continue to pursue a degree at one of the top three elite tertiary institutions. Excess demand for these select higher education institutions have led to an education arms-race and resulted in overinvestment in private education programs. There is a need for government policies, but issues of complementarity and coordination failures make it a difficult policy problem.

current PPP, 2015). Once labeled as one of the four emerging Asian “Dragons,” South Korea has repeatedly demonstrated that it has an identity of its own, as it strategically transformed itself into one of the world’s high-technology and education superpowers. Much of this rapid development has been attributed to far-sighted, deliberate and government-regulated long-term education plans and policies, which have helped reshape the country and transform its occupational structures and prestige. However, South Korea’s economic success has recently led to significant social problems; South Korea today has the highest suicide rate among the OECD nations, its divorce rate has soared, and the rate of fertility has declined to the lowest among OECD nations (OECD, 2017a; Statistics Korea, 2016). In addition, more than half of middle-income households are cash flow-constrained, resulting in a doubling of household debt and a drastic drop in household savings rate (The Bank of Korea, 2017). According to the McKinsey Global Institute, the cause of these outcomes is largely slowing wage growth combined with an dramatic increase in spending on housing and education (April 2013).

Surprisingly, the wider social effects of overinvestment (i.e. investment in excess of the socially optimal amount) in private after-school tutoring programs have not been closely examined through the lens of a human capital approach, as research to date has tended to focus on curriculum reforms and its impacts on students (So & Kang, 2014). Moreover, up to now, far too little attention has been paid to understanding the root cause of the private education issue, which we argue is due to coordination failure. Finally, this study carries important implications for policy as it provides concrete government alternatives that would contribute to resolving complex social issues.

1.1. Background

Although South Korea’s GDP growth has continued to dominate the international headlines with an average growth rate of 3.55% (2010–2016) compared to 2.0% for OECD, this national success has begun to “decouple from the lives of its middle-income citizens” (McKinsey 2013, Paragraph 3). The second promised “Miracle on the Han River” (한강의 기적) has unfortunately not materialized under Park Geun-hye’s government and according to Lee Geun, Professor at Seoul National University, “the current crisis is a system failure, our failure to use bold, long-term investment to produce new companies, industries and jobs without government help” (Kim, 2017; Paragraph 6). Despite a significant increase in the household saving rate in the past four years (4% in 2012, 8.6% in 2016), Korea is facing a number of critical structural challenges which inevitably have profound social consequences, including high youth unemployment (one of the highest in the OECD) and underemployment, high numbers of young people neither in education nor training (602,000 university graduates were unemployed in February 2017; Statistics Korea, 2017) and approximately 3.34 million degree holders were delaying their entry into the labor force in 2016 to seek regular permanent jobs.

In addition, labor market dualism with significant wage disparities between regular and non-regular (temporary) workers, exploding household debt which, according to the Bank of Korea, reached 1,344.3 trillion won (US\$1.17 trillion) by the end of the last quarter of 2016 (Bank of Korea, 2017, p. 1) are aggravating the situation. The result is declining consumption and growth, and even lower birth rates. The fertility rate has today fallen to the lowest among OECD nations (1.24 births per woman of childbearing age). Perhaps more alarming, South Korea has the highest rate of suicide in the world, according to the World Health Organization, 28.3 per 100,000 people in 2015 (World Health Organization, 2017), which amazingly is about 2.5 times the rate of South Korea in 1995. Suicide is now the most common cause of death for people under 40 (OECD, 2015), including students who cave under the pressure to attend a top college (McKinsey, 2013). The overriding conclusion is that the current changes occurring in South Korea are to a large degree due to households facing increasing financial pressure from the combination of reduced wage growth and diminishing job opportunities (with unemployment figures reaching a seven-year high in February 2017) and the common practice of overspending on housing and education. The Bank of Korea (2017) stated that each Korean individual was now 26 million won (US\$22,741) in debt.

Although South Korea today faces financial constraints at both the household and national level, the nation has produced one of the most highly educated labor forces in the world by investing heavily in education. The proportion of those aged between 25 and 34 years old who had attained tertiary education in 2015 was 69%, the highest score among 36 OECD countries (OECD, 2017b). South Korea's educational system is also producing 15-year olds that rank highly in world PISA scores: 7th in reading, 7th in math, and 11th in science (2015) (OECD, 2016d). In 2011, South Korea led the OECD nations in the number of engineering graduates per capita, with 3,555 per 100,000. Clearly South Korea, and its government, has been very successful in educating its population and workforce. The question is whether this historical success is contributing to some of South Korea's challenges today and, if so, whether a change in education policy is warranted.

In South Korea, social hierarchy and status are paramount and a degree from one of the top three elite tertiary institutions, namely Seoul National University, Korea University, and Yonsei University (SKY institutions), provides an invaluable lifetime network and almost guarantees employment in government or in one of the 63 *Chaebols* (재벌, family-owned conglomerates) such as Samsung, Hyundai, Lotte, or LG. These companies grew under the support of Park Chung-hee's government industrialization programs that began in the 1960s, and today the sales revenue of the five largest chaebols constitutes almost 58% of South Korea's gross domestic product (Chiang, 2016).

These large corporations are still, mainly, growing strongly despite a recent series of corruption, collusion, tax evasion, and embezzlement scandals (e.g. Samsung Group, Lotte Group and SK Group). Today, the success of large corporations stems mostly from productivity growth and globalization. Between 1995 and 2010, South Korea's largest manufacturers raised productivity by 9.3% annually mainly through labor-saving technology investments, as well as shifting 17% of their production to overseas plants (Bank of Korea, 2012). However, output growth in the last five years slowed to a 2¾% annual rate over 2011–15 (OECD, 2016b) and is forecast to grow at 2.3% in 2017, according to the Korea Employer's Federation (KEF, 2016). Industrial production and exports have in recent years stalled (due to the outbreak of the Middle East Respiratory Syndrome and a slowdown of the Chinese economy) and export performance has slowly leveled off. As a result, large companies have hired fewer workers domestically and total employment has fallen by 2% annually and thus the share of domestic employment has declined from 18 to 12%, according to Yoon S. Park, professor of international finance at George Washington University (Y. S. Park, 2016). As business performance worsened in 2016 and in the first quarter of 2017, recruitment of new graduates decreased as employers tend to prefer seasoned ready-to-work employees and/or non-regular workers (temporary workers with one year or less contracts with no retirement grant or bonus when completing their contract). In fact, in January 2017, youth unemployment had reached 8.5 percent, more than double the national average (Statistics Korea, 2017) as these non-regular contracts are not financially attractive. In 2014, non-regular workers were paid 38% less than regular workers on an hourly basis (OECD, 2016b, p. 42).

The share of Korean workers employed by large companies, which generally pay higher wages and offer more benefits, has in fact fallen by approximately one-third in the past two decades and the trend continues in 2017 as political relations with China (the largest economic partner) and North Korea have worsened with the deployment of the Terminal High Altitude Area Defense (THAAD) system, prompting companies with more than 300 employees to "scale-down" regular workers recruitment plans (KEF, 2016). Tensions between China and South Korea escalated when 77 (out of 99) Lotte Mart were shut down by Chinese authorities in March 2017, with an expected economic loss for the conglomerate estimated at US\$80 million. As a result, the vast majority of new jobs in South Korea are today tied to small- and medium-sized enterprises (SMEs), including the service sector. This is a concern because SMEs only have 40% of the productivity of large companies and do not offer the high-paying, long-term employment opportunities that South Korea's major corporations have provided for decades, which drove the economic miracle. As an example, according to the Korea Employer's Federation, companies with over 300 workers paid university-graduated regular workers 43.5 million won (US\$30,986) in 2016. In comparison, university-graduated regular workers

in SMEs with less than five employees were only paid 46.7% of regular workers in large corporations in 2016 (KEF, 2017). The financial industry paid entry-level jobs an average of 3.28 million won (US\$ 2,908) a month in 2016, the retail industry paid 2.75 million won (US\$2,438) and the manufacturing sector 2.8 million won (US\$2,482).

These changes in the structure of the Korean economy are important because all evidence points to middle-income families still adhering to the lifestyle that was made possible under South Korea's old growth formula of a single-earner household with a male breadwinner whose lifetime employment in one of the largest corporations provided steadily increasing pay. In this lifestyle, women stayed out of the labor force from the time their children were born until they left for university. In fact, today about 62% of households still depend on a single wage earner. A number of recent studies (Asian Development Bank, 2015; OECD, 2016b) have highlighted that the unavailability and unaffordability of high-quality childcare as well as household responsibilities and long working hours often prevented women in Asian countries from participating in the labor force. In Korea, the legal maximum working hours per week is currently 68 h and according to the 2016 OECD Employment Outlook report, South Korean employees worked 2,113 h on average in 2015, third-longest among all OECD members (OECD, 2016a, p. 233). The Korea Statistical Information Service (KOSIS) indicated that 51.6% of working-aged Korean women (aged 15 and older) participated in the workforce, compared to 73.2% of men, as of 15 of March 2017 (KOSIS, 2017). In 2014, South Korea had also one of the largest pay gaps between women and men's remuneration in the OECD. Yoonhee Park argued in an analysis of gender pay gap in South Korea that in 2015, the gender pay gap was 34.9% (Y. Park, 2016). In fact, women account for the largest share of non-regular jobs (short term, part-time, seasonal) and lower salaries discourage them from joining the labor force (OECD, 2016b).

In a situation of high debt, lower wages, few high-paying jobs and financial deficits (a financial situation that has deteriorated substantially over the past two decades for middle-income households), middle-income families have responded to their changed circumstances *not* by moving to a two-earner household model for the reasons indicated above, but rather by limiting family size to one child, which helps them manage costs but which has resulted in a very low fertility rate. That is, in response to families spending excessive amounts of money on private schools and private tutoring, which contributes to household deficits, households have chosen to limit family size, rather than increasing income by, mainly, women returning to the labor force, or choosing to spend less on educational investments. These household choices may threaten economic growth according to standard economic models (Kremer, 1993; Solow, 1956), although some endogenous growth models note that results depend on the number of workers in the research sector (Romer, 1990).¹

South Korea's households are still convinced that the path to a successful career, and life, is a good education; that is, a university degree at a prestigious university. As the national college-entrance exam (*Suneung* 수능) is very competitive and university places are limited, Koreans spend a large share of their income on for-profit private tutoring academies called *hagwon* (학원). In 2016, according to a survey conducted nationwide by the Korea Institute of Child Care and Education, 83.6% of five-year olds and 35.5% of two-year olds attended private academies in 2016 (Chung, 2017). It is estimated that the total private education expenditures of elementary, middle, and high school students amounted to 17.8 trillion won in 2015 and that the average monthly spending per student at elementary, middle, and high schools amounted to 244,000 won (US\$217, Statistics Korea). These expenditures are the direct result of South Korean culture and families placing an extremely high value on higher education. This culturally ingrained value, combined with a history of admittance into the top three most prestigious tertiary (SKY) institutions leading to high-paying, and secure, employment in Korea's large corporations (and government), mean that families are willing to pay high fees for private after-school classes and hire private tutors to give children a chance to enter an elite university (some families can afford individual private tutors, while others pool their resources to hire private tutors for small groups of children (돼지엄마 "pig mum phenomenon").

In addition, participation in private supplementary tutoring is often highly correlated to socio-economic backgrounds (Bray & Lykins, 2012). A Statistics Korea Private Education Expenditures in 2015 Survey indicated that the participation rate of households earning 7 million won (US\$6,189) and over showed the highest figure at 82.8%. The participation rate of households earning less than 1 million won (US\$883) showed the lowest figure at 32.1%. Households earning 7 million won spent 420,000 won (US\$371) on private tutoring each month, while those with a 1 million won or less income spent 66,000 won (US\$58) monthly (Statistics Korea, 2016, p. 3).

The rising cost of these hagwons is, as mentioned, increasingly becoming a considerable financial burden for low-income, as well as middle-income, households. Kim and Park (2010) indicated that 84% of parents considered these expenses a significant economic burden. Nevertheless, Korean parents are often willing to bear the prohibitive hagwon costs to maximize their kids' chances of attending one of the top three universities, which they believe will ensure future social mobility. As Lee and Brinton (1996, p. 189) put it: "There is no doubt that university prestige and human capital are highly correlated in South Korea."

This, again, begs the question of why families choose to spend so much on education. Why are families with children engaged in an education "arms-race," a race for a limited number of spots at the highly regarded universities in Korea? Is the arms race actually *bankrupting* Korea, as suggested by Shin (2013)? Why do families continue to lay out large sums of money for years of private schooling and tutoring in order to prepare children for college entrance exams?

This paper explores the continued high spending on education by South Korean households, despite a reduction in expected benefits from private schools, private tutoring, and indeed higher education. Below we offer a theoretical model of human capital accumulation that sheds light on how South Korea finds itself in this problematic position and why it might be very difficult to reverse the situation.

2. A surprising problem

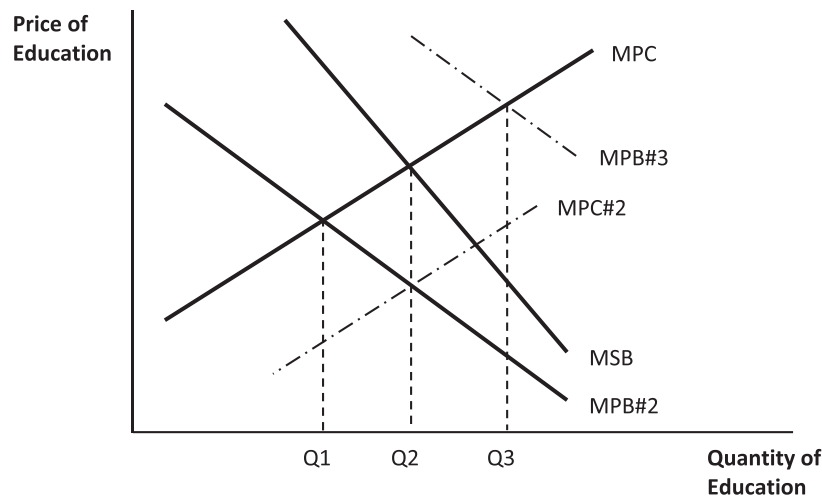
Our model is in many ways straightforward as we assume an economy in which rational actors attempt to maximize their well-being. Due to the presence of markets failures, there is a need for government intervention and hence there will be a mixed economy. Some market failures are familiar, such as the positive externality associated with education expenditures. Some, however, are less familiar and may cause rational people to do inefficient things; in fact, people keep making inefficient decisions *because* it is the rational thing to do.

In many respects, the current situation in Korea is very surprising. Investments in human capital, and education in particular, have strong external benefits to society; that is, spending on education generates benefits to society beyond those to the individuals (Weisbrod, 1962). It is often argued, for instance, that expenditures on education are an investment that produces future economic and social benefits. Education in general is also associated with greater productivity, higher wages, and increased Gross Domestic Product (GDP) (Lucas, 1988; Mankiw, Romer, & Weil, 1992; McMahon, 2010).

Given education's positive externalities, we would expect that the market for education would tend to undersupply this "good"; that is, families with children would tend to underinvest in both private and public education for their children (see Q#1 in Figure 1). That is, the market will provide less education than is socially optimal. This is, of course, why there is a need for the Korean Government to create incentives for families and students to choose a greater amount of education. A government can do this through various channels, either by reducing the (marginal) private costs of engaging in educational activities (shift MPC curve downwards, as shown by MPC#2) or by raising the (marginal) private benefit of engaging in such activities (shifting the MPB curve upwards, as illustrated by MPB#2). If the government is able to correctly value the social benefits from education then an economy can be moved from a position of undersupply to the socially optimal amount of education (Q#2). Naturally, it is possible that a government intervenes too much in the market for

Figure 1. The market for education.

Notes: The diagram shows the quantity of education provided under different scenarios: Q#1 depicts the market outcome assuming no government intervention; Q#2 depicts the socially optimal outcome, assuming appropriate government intervention; Q#3 depicts a situation of overinvestment in education.



education, thus going beyond the socially optimal point to reach an equilibrium of overinvestment (Q#3). Alternatively, circumstances may change to reduce either the private or social benefits from education, or both, which temporarily create a situation of overinvestment by families. In a well-functioning market, families will recognize the inefficiency and reduce their educational expenditures. However, this might not happen if the nation finds itself in an “educational trap,” as may be the case in South Korea.

To better understand the choices that Korean families with children make, we explore the human capital approach.

3. Human capital approach

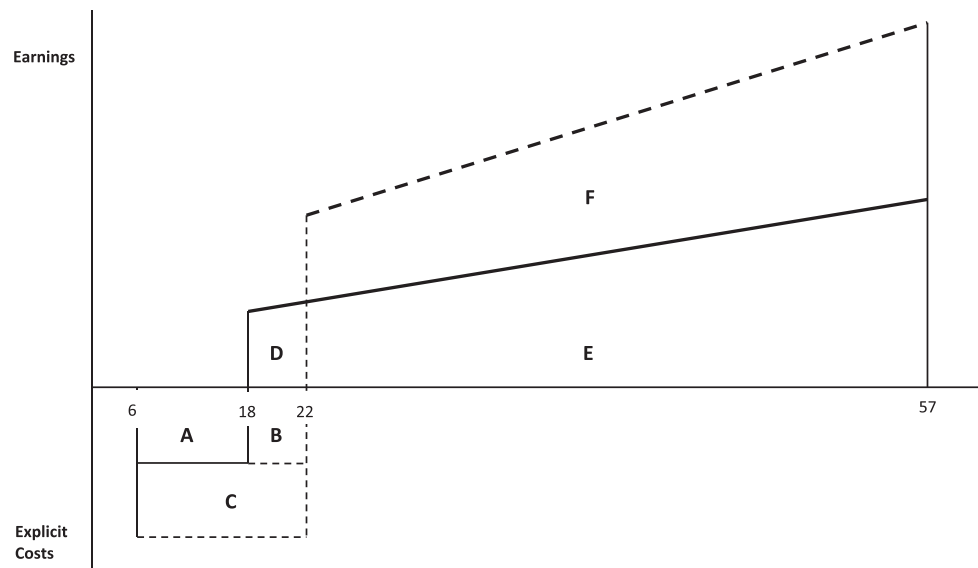
The human capital approach allows us to frame our discussion of the societal effects of education policy implementation in South Korea. In economics, the human capital approach has proven an influential model for understanding private and public decision-making regarding education (as well as health care) (Becker, 1975). The theoretical framework consists of strong assumptions regarding individuals’ levels of rationality and foresight; nevertheless, it provides an initial way to think about the educational investments of Korean households with children.²

We assume that students, or parents on their behalf, invest money on education in order to raise the individual’s own future success, as measured by a lifetime income stream. The added income that results in future years is viewed as a return on the student’s investment into human capital. The question facing households with children is whether the added benefits from educational investments outweigh the costs of additional educational activities. In general, if the discounted benefits are greater, then rational actors should make such investments. If they are not, it would be unwise (for purely economic reasons) to make the educational investment. Figure 2 depicts this choice in simple terms by assuming a representative household/student, thus ignoring the many differences that exist between students (Woodhall et al., 2004). Figure 2 shows that in order to reach the greater benefits represented by area F, a student must incur the explicit costs of B and C, as well as the indirect costs D (opportunity cost of not working). A household with a child should thus compare the discounted values of F to BCD.

The human capital approach can be applied to any level or type of education, as long as educational decisions are made by rational actors. Depending on a nation’s level of development, this choice might involve sending a child to elementary school, or middle school, or secondary school, or tertiary education. Korea has been through all these decision stages, and today almost all students graduate from high school (98% of 25–34-year-old adults have an upper secondary education, OECD, 2016c) and therefore the relevant choice is whether or not to attend university. However, this

Figure 2. Cost-benefit analysis for human capital investment.

Notes: The diagram shows the human capital approach for a representative household/student. The representative student incurs both explicit and implicit costs during education, while additional benefits, in the form of higher earnings, results from such education.



choice can go well beyond a decision at age 18 of whether or not to enroll and thus incurring the cost of tuition and fees (as well as the indirect costs). Today in Korea this choice must be made much earlier (and by the parents), and this fact is represented by the area C in Figure 2.

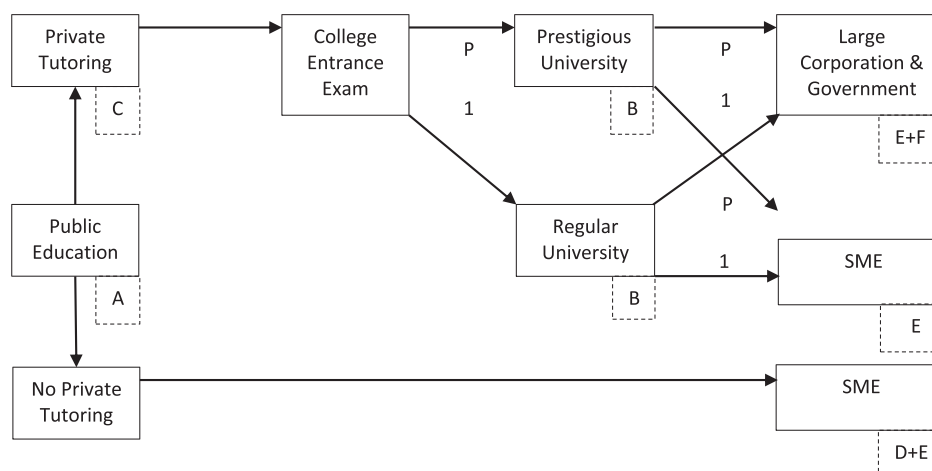
In South Korea, families are currently investing heavily in private tutors and hagwons at primary level, with the hope of the child being able to enroll in a better tertiary institution in the future and, therefore, securing a higher lifetime income. When making this decision, families have an approximate idea of what the lifetime earnings curves look like and regard these as a prediction of what their child could earn if he or she pursued different levels of educational attainment. However, all decisions are made under significant uncertainty. Parents, consciously or not, are also assumed to be able to calculate the discounted present value of the future earnings stream attached to each level of education investment, as well as being able to compare this stream of earnings to the direct and indirect costs of the investment. In effect, parents conduct a cost-benefit analysis with regard to their human capital investment for their child.

The present value of prospective earnings in any given future year, t , can be defined as $V_0^t = \frac{F_t}{(1+i)^t}$, where V_0^t represents the present value of earnings in year t , F_t represents earnings in year t , and i represents the rate of interest (the opportunity cost of the monetary investment made by parents). Future earnings are thus discounted to the present using the rate of interest. The present discounted value of the entire stream of earnings until year N is therefore given by $V_0^t = \sum_{t=1}^N \frac{F_t}{(1+i)^t}$. This equation represents the benefits in the cost-benefit analysis.

In order to achieve these benefits, individuals will incur often heavy private costs of education. These costs are both direct, or explicit, and indirect, or implicit in the form of opportunity costs. The explicit costs involve actual expenditures of money, such as tuition, fees, and books. The implicit costs take the form of foregone earnings if the child is in school. Since the costs and benefits occur at different times, costs before benefits, we require the use of discounting in order to make values comparable. In general, whether a certain level of education or private tutoring program is worth pursuing is determined by discounted benefits exceeding discounted costs. That is, pursue educational investments as long as $V_0^t = \sum_{t=1}^N \frac{F_t - C_t}{(1+i)^t} > 0$, where C_t represents both explicit and implicit private costs of education.

Figure 3. Expected outcomes from educational investment.

Note: The diagram shows the decision tree facing a representative household/student.



This choice is made with uncertainty produced at several possible decision points. Figure 3 attempts to describe the choices, and their uncertainty, that Korean families face in their educational investment decisions. From Figure 3, we can derive the expected pay-offs from the various decisions. Clearly, if a household decides to not send its child to a private after-school tutoring program, the child (based on our assumptions) will not be able to pass the College Scholastic Ability Test (CSAT or *Suneung*) and therefore will not be admitted to any university. Without a university degree, the student will not be able to obtain a high-paying job in either a large chaebol or in government. The outcome is therefore lifetime earnings represented by $D + E$. That is, lifetime earnings of high school graduates will, with a probability of one, be

$$D + E \quad (1)$$

If a household instead decides to invest in private after-school tutoring programs for its child, the household will then incur the explicit cost of C for the chance of passing the College Entrance Exam (CSAT). We assume that the probability of passing the CSAT at a high enough level to get accepted into a SKY institution is P_1 . This means that many students $(1-P_1)$ will not be able to be admitted into a SKY institution, they will instead enroll in a less prestigious tertiary institution.

A student that graduates from a SKY institution has a probability of P_2 of obtaining employment at a large corporation or in the government. Of course only a small fraction of graduates will in fact find such employment (12% of the total workforce are employed at large corporations) so $(1-P_2)$ of SKY graduates will end up working in small and medium sized enterprises (SMEs). Similarly, some percentage (P_3) of graduates from less prestigious universities will find employment in large corporations or the government, but the probability is less than for graduates of SKY institutions ($P_2 > P_3$). Finally, $(1-P_3)$ of graduates from regular universities will end up working at SMEs. This implies that the expected payoff of investing in private after-school tutoring is as follows:

$$(P_1 P_2)(E + F) + ((1 - P_1) P_3)(E + F) + (P_1 (1 - P_2))(E) + ((1 - P_1)(1 - P_3))(E) - C$$

Rearranging slightly gives us,

$$(P_1 P_2 + (1 - P_1) P_3)(E + F) + (P_1 (1 - P_2) + (1 - P_1)(1 - P_3))(E) - C \quad (2)$$

The choice of whether to invest in private after-school tutoring programs for a family with a child, according to the human capital approach, is thus a comparison between Equations (1) and (2). If the expected value represented by Equation (2) is greater than the certain outcome of Equation (3), then

a risk-neutral family should make the investment. If not, then a family would be better off not investing in after-school programs.

As an example, suppose that $P_1 = 1$, so that all students that invest and attend private after-school tutoring programs will be admitted into prestigious university programs. Further assume that $P_2 = 1$ so that all university graduates will find employment in large corporations or the government (assume that there are enough jobs). In this case, the expected benefit of private tutoring is:

$$(E + F) - C,$$

And investment into private education should be seriously considered if

$$(E + F) - C > D + E \xrightarrow{\text{yields}} F - C - D > 0 \quad (3)$$

That is, the family should invest in private after-school tutoring if the benefit is greater than the direct (explicit) and indirect costs of such education (compare Equation (3) to Figure 2).

Of course, the above certainty does not exist in the actual decisions facing Korean households so they have to somehow estimate what the probabilities are prior to making their educational investment decisions. This is of course difficult in the best of circumstances, but it will be especially challenging when there are both structural changes in the economy and changing labor markets. In addition, the probabilities and costs are endogenous to the choices that Korean families make. As more households send their children to private after-school tutoring programs, the demand for such programs increases, leading to increasing costs and inevitable burden. These cost increases are exacerbated by families' location and housing choices (zoning). In addition, as more families send their children to private programs, the probability of passing the entrance exam at a sufficiently high level to ensure admission into the SKY institutions, as well as a few other prestigious universities, declines. This then reduces their probability of obtaining employment at large high-paying corporations and the government.

An earlier paragraph highlighted the fact that the Korean economy has been evolving from a focus on manufacturing by chaebols to a more service-oriented economy (Park & Shin, 2012; Phan & Jeong, 2013) with a share of GDP for the services at 53.5% in 2014 (29% for manufacturing, H. S. Park, 2016), a shift that affects the type of jobs available for university graduates. In addition, as mentioned earlier, large corporations are investing heavily in automation and technology, as well as shifting a greater share of their production overseas, also reducing their share of the domestic workforce. These changes have naturally affected the probability of obtaining employment in the large corporations, no matter from which university a student graduates. These changes have been illustrated in Table 1.

Table 1. Changing costs and probabilities

As more households choose to send their children to private after-school tutoring programs ...	
Costs of private after-school programs increase	$C \uparrow$
Probability of acceptance into prestigious university falls	$P_1 \downarrow$
Probability of employment at large corporation falls	$P_2 \downarrow$
As the economy and labor market change ...	
Probability of employment at large corporation falls	$P_2 \downarrow P_3 \downarrow$

Note: The table indicates how household choices and labor markets influence the cost and probability of educational and employment success.

By examining Equation (2), we see that these changes in costs and probabilities all show a decrease in the expected benefit from education investments. As the expected benefits fall, it becomes less likely that the net present value of lifetime earnings from such investments will be greater than net present value of beginning to work straight after high school. Thus, at the margin, at least some families should decide to not invest in private after-school tutoring programs. That is, over the last decade and a half, we would have expected to see a decline in both the number of students attending private tutoring programs and spending per student for such programs. This has in fact started to occur: participation rate was 68.8% in 2015 down from 71.7% in 2011. What has also occurred in the past six years is a gradual decrease in expenditures: While the total private education expenditures of elementary, middle, and high school students amounted to 17.8 trillion won in 2015, they were 20.1 trillion won in 2011 (Statistics Korea, 2016). However, these small changes do not seem to accommodate the observed changes in labor markets as illustrated by the fact that since the mid-1990s the bottom 20% of 4-year college graduates has been earning less than high school graduates (Lee, Jeong, & Hong, 2014).

4. Complementarity and coordination failure

According to the human capital approach, a household will choose to invest in private after-school tutoring programs if the expected benefits from such investments outweigh the direct and indirect costs. As this decision crucially depends on earnings differentials, costs, and probabilities, we would expect households to change their behavior in response to changes in any or all of these parameters. We have argued that the expected benefits have been falling and costs rising, leading to a fall in the net present value of lifetime earnings for university graduates, which should lead to a reduction in Korea's private educational investments.

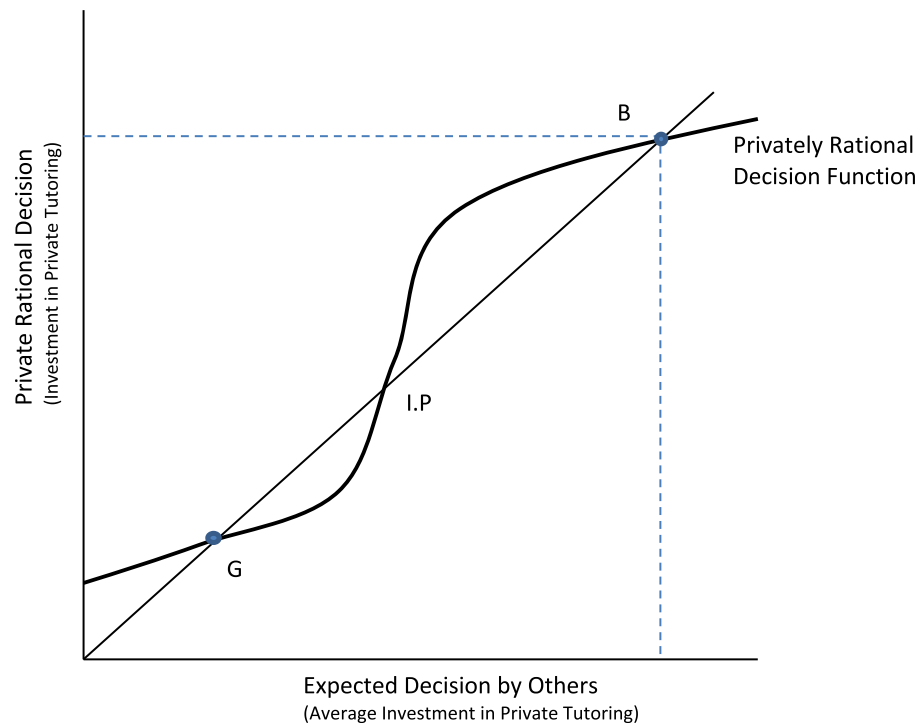
Since expenditures have been steady (average monthly private education expenditures per student were 244,000 won (US\$217) in 2015, which increased slightly from 240,000 won (US\$214) in 2011 (Statistics Korea, 2016), the human capital approach needs to be adjusted to account for this fact. We will argue that a contemporary approach to human capital accumulation will need to take into account issues of complementarity and coordination failures associated with the market for private education in Korea.

Complementarity of education investment refers to the fact that the return of a household's investments in private education for its child depends on similar investments made by other households. That is, one household's decision to invest in private tutoring for its child increases the incentives for other households to make similar investment. The reason is that the probability of a family's child being able to enroll in a prestigious university and obtain a high-paying job at a large corporation decreases as another family sends its child to a private after-school program. The incentive is thus to send one's child to a similar program, or perhaps a better, more expensive one. The flip side of these decisions is that no family will have an incentive to stop investing in private tutoring programs as long as other families continue to make such investments. The first-mover family will bring the probability of employment at a large corporation for its child to "zero." Since this is true for all families, no family is likely to reduce their educational expenditures, unless all families were able to coordinate their investment decisions.

Thus our representative student model shows that if all Korean families with children could agree to stop (or reduce) their investments into private after-school tutoring programs simultaneously, then "all" of them would be better off (this is unlikely to be true, however, with student heterogeneity). The reduced demand for private tutoring would decrease the cost, while the probabilities of achieving admittance into a prestigious university and employment at a large corporation would basically remain unchanged. This would increase the net present value of lifetime earnings for university graduates. It is, however, very unlikely that families will be able to coordinate their educational investment decisions, which is why Korea today finds itself in an "education trap." This situation is depicted as point B in Figure 4. The implication of the issues of complementarity and coordination failure is thus that despite the fall in expected benefits and increase in costs associated

Figure 4. Coordination failures in educational markets (multiple equilibria).

Notes: The diagram shows that a representative household's investment in private tutoring depends on the choices made by other households. The rational decision function depicts that households have an incentive to overinvest (equilibrium B) in private tutoring expenditures, if other households invest heavily in private tutoring.



with investments into private after-school tutoring programs, families will *not* reduce their educational expenses sufficiently. Households are, in effect, trapped in an inferior equilibrium of overinvestment into education; educational expenditures greater than the socially optimal amount.

However, Figure 4 also shows that if enough parents could be convinced to reduce investment in private tutoring for their children (move the system below the inflection point (I.P.)), then private rational behavior would convince others to reduce investments as well. Due to the coordination failure, the only actor that would be able to achieve this outcome would be the government. The question is what exactly the government could do to promote a movement away from equilibrium B to equilibrium G; move the private educational market from a situation of overinvestment to a socially optimal outcome. That is, what policies could the Korean Government enact to reduce the burden on families with children, and therefore improve social issues such as low rates of fertility, rates of suicide (especially among young people), and very low levels of happiness among Korean students. These policies may also reduce the burden of high debt payments, as well as a mismatch between demand and supply in the Korean labor market.

At the same time, we must recognize that education is a good with important and significant external benefits. Thus drastic approaches, such as banning private after-school programs (which was tried and deemed unconstitutional in 1980), will not necessarily be advisable. That is, Figure 1 still applies and the government needs to carefully match marginal private costs to the marginal social benefit of education, while simultaneously coordinating education expenditures of all Korean families in the country. It is a task of gigantic proportions.

5. Government policy alternatives

We have argued that Korea in the past promoted rapid development by implementing far-sighted and deliberate long-term education plans and policies that increased public and private education investment and led to one of the world's most educated workforces. The result is that Koreans spend a lot of money on private education as they believe it is the path to the best universities and a sure conduit to social and material success for the entire family. Today, however, the amount of household expenditures on private tutoring programs appears to be excessive. In addition, households are

increasingly cash flow-constrained leading to higher debt and low savings rate (The Bank of Korea, 2017). The sections above have argued that this is taking a significant toll on parents and children. A JobKorea survey of 1,202 parents in 2016 indicated for instance that 44.6% of them considered themselves to be 에두푸어 “edupoor” (Y. C. Kim, 2016). In addition, Y. C. Kim (2016, p. 165) stated that “800,000 families, 13% of all Korean families or about 3,050,000 people” would spend an average of “28.5% of their gross income” on education. As for children, a comparative study by Save the Children and Seoul National University of 42,567 children happiness levels in 12 countries indicated that South Korean children accounted for the lowest levels in third and fifth year at elementary level, with a sharp decrease in happiness when they entered middle school.

We have also highlighted the problems of complementarity and coordination failures that have both contributed to the educational arms-race and indicate the difficulty of significantly reducing household expenditures on education. The question is; what alternative policies might South Korea implement to reduce education investments to socially optimal levels?

5.1. Less private benefits from education

Figure 1 indicated that one approach is for the government to adopt policies that reduce the (marginal) private benefits from education (shift MPB#2 to the left). There are several possibilities, such as reducing public funding of educational institutions or changing the way students are admitted into universities. Alternatively, the government could opt to raise the (marginal) private costs of education (shift MPC#2 up) by, for example, reducing or removing subsidies currently given to families in need, such as low-income families, families located in certain areas, or multi-cultural families. Policies such as these would raise the private cost of education and, in a well-functioning market, lead to fewer students pursuing a university education. However, these indirect policies are unfair and inequitable, and, we would argue, not a good way to address the problem of excessive expenditures on private after-school tutoring programs, especially in the presence of an educational arms-race.

5.2. Less reliance on the college scholastic ability test

A more direct approach would be to reduce the reliance on the College Scholastic Ability Test (CSAT or *Suneung*). This is perhaps an attractive option since it appears that preparing for the college entrance exam is an important factor in families’ decision to send their child to private after-school tutoring programs (this policy could also be interpreted as shifting MPB#2 to the left in Figure 1). In an attempt to tackle the problem of universities only considering the CSAT for admission (and thereby reducing expenditures on private education) the University Entrance Liberalization Policy was implemented in 2008, which allowed universities to accept students in accordance with their own admissions criteria, such as a student’s school record or practical skills test, in addition to CSAT results. This system backfired as households increased expenditures instead on extracurricular activities. This system was simplified in 2013 and focused more on universities own admission pathways based on school records, essays, CSAT, or practical skills. In 2015, out of school activities were removed as an admission criterion, and self-introduction and recommendation letters were introduced. As of 2016, a number of universities have adopted this approach and student school records have indeed become the most influential factor in the university admission process (OECD, 2016c). This approach does not however significantly and directly contribute in solving high youth unemployment and underemployment issues.

5.3. Less reliance on public sector and chaebol jobs

An earlier section mentioned that there were too many university graduates, not enough high-paying jobs (even in the chaebols or in the public service) and a very large number of graduates that preferred delaying their entry into the labor market to prepare for chaebol admission tests and civil service jobs. In 2016, for instance, 400,000 South Koreans prepared for the civil service exam. Working at Samsung or Hyundai is often considered to be “successful” in Korea and brings pride to the entire household. In 2014, 200,000 took the Samsung admission test for about 14,000 job openings (Lee, 2015), 100,000 applicants took the Hyundai entrance exam for 4,000 new positions

according to Lee (2015), and approximately 300,000 South Koreans degree holders enter the job market every year. But only 200,000 permanent positions are available. The number of those unemployed with a bachelor's degree reached 315,000 as of end-September 2016, accounting for a record 32% of the entire jobless population of 985,000 (Statistics Korea, 2016).

A more effective approach to tackle unemployment and underemployment issues would potentially be to reduce the excessive reliance on public sector and chaebol jobs and further develop (re-branded) workplace-oriented vocational training and apprenticeship programs that would lead to full-time and long-term employment. There seems to be a shift in that direction: employment rate of vocational school graduates rose from 16.7% in 2009 to 47.2% in 2016, according to the Ministry of Employment and Labor. In March 2017, the government announced that 100 billion won (US\$87 million) would be allocated to help local high schools open more vocational training programs, as demand is rising. Additionally, promoting labor mobility across sectors and careers and drastically supporting SMEs and start-ups (which are very keen to recruit talent) to help them offer attractive high-paying jobs could bear very positive fruits. A survey by Saramin, a recruitment firm, in 2016 found that 8 in 10 SMEs had not been able to hire enough people. Of them, 34.6% said that they could not even fill 10% of their job vacancies.

5.4. More SMEs, social enterprises and start-up funding and better tax incentives

Seventeen Centers for Creative Economy and Innovation (CCEI) were created across the country in 2014 as a governmental project under former President Park to match up local startups with fifteen major conglomerates such as Samsung, Hyundai Motor and SK to help provide resources to smaller companies (Jung, 2017), support SME innovation, and local industries. As of November 2016, there were 32,961 venture firms registered in South Korea. However, venture capital investment and limited tax incentives have had limited effectiveness in encouraging innovative startup companies (OECD, 2016b) and recruitment. In 2015, a total of 2.626 trillion won (US\$2.36 billion) was raised in venture funds (Cho, 2016) and the amount decreased to 2.1 trillion won in 2016, according to the Korean Venture Capital Association (KVCA, 2017). In 2017, only three South Korean startups were worth US\$ 1 billion: Coupang [쿠팡] (e-commerce), Yello Mobile Inc. and CJ Games [넷마블게임즈] (on-line entertainment company).

A step in the right direction is the recent announcement (March 2017) by the Science ministry to establish a 113.5 billion won (\$101.8 million) fund the main focus of which is to help young jobseekers launch new startups and develop new biotechnology. To attract international entrepreneurs, the K-startup challenge [<http://www.k-startupgc.org/>] was also launched in 2016, and the attractiveness of working for a foreign startup in Korea might change young graduates and parents' mindset as well as increase their chances in their future job search.

6. Conclusion

This article examined South Korean families' high levels of expenditures on private tutoring programs and whether this would be considered as a contemporary model of human capital accumulation. The most obvious finding to emerge from this study is that Korea is today caught in an inferior equilibrium of overinvestment into education: Our theoretical model shows that although Korean families with children would be better off if they reduced their investments into private after-school tutoring programs; a coordination of their educational investment decisions is unlikely to occur.

Given the complexity of this issue and the failure of most policy reforms in the past, we argue that a multi-faceted contextualized approach is required, which would involve reducing (1) reliance on the *suneung* by changing university entrance criteria, (2) reliance on public and conglomerate jobs by opening more vocational education and training (TAFE) pathways and promoting for instance edutech, biotech startups and a local/international social enterprise ecosystem, and (3) increasing funding and tax incentives for Small and Medium Enterprises and startups while reducing government interventions.

The article did not address the connection between private education expenditures and the delivery of public education in Korea. An education structured around private tutoring that aims to prepare students for the College entrance exam creates excessive competition, emphasis on memorization, and overreliance on academic credentials. It may also reduce student creativity and ability to think independently (Kim, 2000). Private after-school tutoring is also changing incentives of both students and teachers during public school hours; tutored students are often uninterested, very tired (as classes often finish before midnight) and teachers must often choose whether to assist slower learners or accept tutoring as the norm (and increase education inequality). Teachers may also have an incentive to teach less in order to provide tutoring service for a fee after school (Bray, 2007). These and other factors are unintended consequences from private education, and their existence may further reduce the likelihood of families choosing to curtail their educational expenditures.

B. R. Kim (2016) argued that an “epistemological change in the mindset of Korean people” was needed “to reduce private education market” (p. 8). We agree. The fact that Korean culture strongly believes in the importance of education and views education as the vehicle to achieve high income and social status is a well-known statement. But overinvestments in private education carry significant individual and social/economic consequences, which in the long term will be very detrimental to Korean society as a whole. Education and skills foster social progress and many people invest in education with the aim of finding a good job and improving their chances for a better life. A university degree still promises a better career and better financial prospects for many students in twenty-first century South Korea. However, recent research and data suggest that the unemployment rate and the salaries of graduates have either stagnated or deteriorated, with negative impact on their borrowings and consequently on their mental health (Yoo et al., 2016). Families who cannot afford the high price tags of hagwons and college have had to borrow more. Long-term loan debt can further impact career choices and willingness to pursue continuing professional development, as additional degrees mean additional private debt. Lastly, according to Gale, Harris, Renaud, and Rodihan (2014), heavy student loans can often influence personal decisions later in life such as the “quality and timing of marriage” (Gale et al., 2014, p. 4), a significant issue in many countries and in the Korean context, highlighted in the introduction of this article. In short, being a student in Korea, as in many other parts of the world, is expensive and private return on investment in some cases is minimal or equivalent to zero.

This is a serious issue for low-income families in South Korea as it increases inequality in society. Moreover, the *brain waste* (Spring, 2014) where high-skilled graduates fail to find (limited) highly paid jobs requiring high levels of education (youth unemployment is still at an all-time high, 9.4% in August 2017) has extensive repercussions such as depressing wages and lower household consumption, which in turn affects the country’s consumption growth. Despite the recent announcement by the Moon Jae-in’s government to (a) create an additional 810,000 jobs, approximately 20% of which would be in civil service and (b) increase the minimum wage in 2018 (7,530 won/hour or US\$6.63, a 16.5% increase), public sentiment on the economy has remained low. A slight increase in exports in the second quarter of 2017 (mainly memory chips and petrochemical products) has brought positive news but geopolitical tensions in the region have kept tourists away, with the inevitable economic impacts. Escaping this insurmountable trap might require robust, systemic, sustainable and structural reforms (such as decreasing the gender pay gap to incite women to stay in the workforce), an entire economic overhaul and failure to tackle these economic challenges will likely result in worsening social issues in South Korea.

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Notes

1. More recent research suggests that new technologies and artificial intelligence may decouple the connection between population and output growth (Halal, Kolber, & Davies, 2017; Saner & Wallach, 2015).
2. We recognize the many objections to cost-benefit analysis of education, including the fact that earnings differentials reflect many factors unrelated to education, such as natural ability, gender, race, and motivation (see e.g. Woodhall, Hernes, & Beeby, 2004). More fundamental criticism has been offered by Bowles and Gintis (1975).

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