

ANALYSIS OF PRIVATE TUTORING DECISIONS IN KOREA: A GAME THEORY APPROACH.

CHOI, Álvaro*

Abstract

The proliferation of private tutoring (PT) is a major issue in a growing number of countries, Korea being an extreme case. This article explores the causes and consequences of PT in Korea. PT is linked to the existence of a dual higher education system -consequence of a dual labour market- through a game theory approach. Families face a situation similar to a prisoner's dilemma. However, the models presented also show that the country's large level of investment in PT raises questions about its aggregate efficiency and its impact on economic equality and intergenerational mobility.

Keywords: Private tutoring, educational finance, educational efficiency.

JEL classification: I21, I22, I28.

1. Introduction

Private tutoring (PT, hereafter), defined as non-free tutoring in academic subjects provided by the private sector in addition to the formal educational system, is a growing industry in many countries, especially in Asia. Although PT can help students to raise their educational outcomes, those countries are generally concerned about the negative effects associated to the proliferation of PT.

The Republic of Korea (Korea, hereafter) provides one of the most extreme cases. PT in Korea is supplied in different forms, ranging from individual classes at the home of the tutor or the student, to large classes at specialised PT companies called *hakwon*. According to Choi et al. (2003), 73% of primary and secondary school pupils hired PT services, the total cost representing 2,3% of 2003 Korean GDP[†] (54,8% of the budget of the Ministry of Education and Human Resources Development (MEHRD)). Bray (2005a) states that, in 2003, the proportion of students attending PT were 83,1%, 75,3% and 56,3%, in primary, lower secondary and upper secondary education, respectively[‡].

Although PT may have a positive effect on educational outcomes (Korean students systematically obtain high performances in international studies such as TIMMS or PISA), this intense use of PT may also have important negative effects on the individual (such as increased levels of stress or high opportunity costs), on the total efficiency of the Korean education system (it remains unclear that PT has a positive impact on labour productivity), and on the equality of educational opportunities. For instance, Kim and Lee (2010) explain that expenditure in PT in Korea is positively related to the household's level of income. This is especially important in a country where a large proportion of GDP is devoted to education (7,3% of its GDP, in 2006 (OECD, 2009)), education which

* Alvaro Choi, University of Barcelona- Interdisciplinary Group of Educational Policies (GIPE), Faculty of Economics and Business. Av. Diagonal, 690. Torre 4, planta 2.08034, Barcelona, Spain.

[†] Kim (2004) exposes that PT activities represented, in 1990, 1,2% of GDP.

[‡] Those figures were 12,9%, 20% and 26,2%, in 1980.

is being financed, to a large extent by households (31,5% of total expenditure, for all levels of education; this number is the largest among OECD countries).

To understand the scale of the PT issue in the Korean society, it is illustrative to note that former president Kim Dae-Jung proclaimed in his 1998 investiture speech his commitment to free Korean families of the PT burden. In fact, all Korean governments since the 1980's have tried to reduce PT. Nevertheless, the introduced measures, which have randomly swung from total prohibition of PT (1980) to public in-school provision of PT for low-scorers (1984), have been far from being successful. Many of these policies have been addressed at alleviating the effects of PT, rather than treating its causes (or making an inaccurate diagnosis of the issue).

The aim of this paper is to put forward a theoretical framework which allows understanding some of the causes and consequences of PT proliferation in Korea. The following section presents a brief literature review on the causes and effects of PT. Section 3 explains the theoretical background underlying the game theory models presented in section 4. Section 5 discusses the main implications of those models. Finally, the last section gathers the article's main conclusions.

2. Literature review

This section is divided into three subsections: subsection 2.1 reviews the structural causes of PT while its individual determinants and consequences are explained in subsections 2.2 and 2.3, respectively.

2.1. Structural causes

The structural causes of PT are multiple[§]. Some authors, like Kim (2005), defend that low quality of schooling is one of the main causes of PT. Although this argument is usually used in studies referred to developing countries, the 2004 reforms started by the Korean government for reducing the use of PT were based on the principle of increasing the quality of schooling. However, analyzing the Korean students' achievement in international tests, it seems difficult to hold that the internal efficiency of Korean schools is low. The proliferation of PT in Korea is probably more closely linked to the poor quality of universities.

Bad labour conditions of mainstream teachers can also cause the proliferation of PT (Bray, 2005a). Bray explains that, in countries such as Cambodia, teachers do not explain all the contents in school, forcing students to enrol into PT classes which are frequently taught by the same lecturers. Thus PT becomes a means to complement low salaries. This can be the case for some developing countries, but not for Korea, whose teachers are among the best paid in the OECD (OECD, 2009).

The cultural background is a third factor which has been pointed out as a cause of PT (Bray and Kwok, 2003). Societies with Confucian roots seem to stress the importance of education as a personal development tool and as the main social mobility mechanism. In

[§] Bray (2005b) provides a good review on the causes and consequences of PT.

these societies, education plays a strong signalization (Spence, 1973) and class legitimization (Bowles and Gintis, 1976) role.

In the fourth place, and closely related to the last factor mentioned, the expected economic rewards to education may have an influence on the demand for PT. The higher the returns to education, the larger the incentive for adopting strategies which maximize the probability of reaching higher levels of education. Relative wages of university graduates in Korea are similar to the OECD average (OECD, 2009).

The structure of the educational system and the nature of its examination system can also have an influence on the decision of hiring PT services. For example, memory-based exams stimulate the use of PT.

Finally, a last structural cause is the existence of a segmented labour market (Piore and Doeringer, 1971). Further explanations on this point will be provided in section 3, as it is a factor of vital importance for explaining the proliferation of PT in the Korean case.

2.2. Determinants of private tutoring in Korea

A number of authors have studied the individual determinants of PT in different countries^{**}. The main results drawn from Kim and Lee (2010), Ryu and Kang (2009), Kim (2007) and Kim (2005) are divided into individual, family and school determinants of PT.

Individual determinants

1. Birth order matters: families spend more money in PT for their first child. 2. Gender has an undetermined effect on demand for PT (some authors find a positive effect of being male, while others find the gender variable statistically insignificant). 3. Families tend to make heavier investments in PT if their children have high school records, or if they have been held back a course. However, in this case, the order of causality is not clear.

Family determinants

4. The larger the number of children in a household, the smaller the expenditure per student in PT. 5. The use of PT is more intense in urban areas, especially in Seoul. 6. Income and wealth levels are positively correlated with expenditure in PT. 7. The parents' level of education is important, as it is positively correlated with expenditure in PT. However, Kim and Lee (2010) found that the father's profession is statistically insignificant. Findings 6 and 7 seem to support the hypothesis that families with higher socioeconomic status (SES) spend more money in PT than families with lower SES.

School determinants

8. The school's characteristics have an undetermined effect on demand for PT. While Kim (2005) defends that students from public schools and from schools with low mean scores hire more PT services, Kim (2007) finds that school characteristics do not seem to have statistically significant effects on the demand of PT. 9. Kim (2007) obtained a very

^{**} For example, Dang (2007) and Tansel and Bircan (2006) study the determinants of PT in Vietnam and Turkey, respectively.

interesting result: the percentage of classmates receiving PT services is positively correlated with a student's PT expenditure. This result supports one of the assumptions on which the models presented in section 4 rely.

2.3. Consequences of private tutoring

The proliferation of PT has positive and negative effects. On the bright side, PT can have a positive effect on academic achievement and may help students to understand and enjoy their regular classes. PT adapts to each student's needs, not having only remedial purposes, but also helping the best students to improve their performance. If PT helps students to increase their educational outcome, it could be seen as a determinant of economic growth, as economies with large stocks of human capital tend to grow faster. Another positive impact of the PT industry is the fact that it employs a large number of workers. At the same time, attending PT prevents students from doing harmful or less profitable activities.

However, different authors have pointed out some negative effects of PT. Firstly, Bray (2005b) argues that mainstream teachers may "relax" in their duties, as they know that PT will finally make up for their mistakes (PT introduces, in a certain way, a moral risk problem). Secondly, Bray (2005b) explains that the proliferation of PT may distort the organization of the academic curriculum, students giving no importance to those subjects that are not included in the final exams. Nevertheless, this point seems to be more related to the values and culture of the society than to PT itself, the proliferation of the latter just being a consequence of the former. Thirdly, PT may increase the absenteeism rates and reduce the interest of students in mainstream classes. While the first does not hold for the Korean case (absenteeism rates are very low (OECD, 2009)), Korean students show low levels of interest in all the competencies evaluated in PISA (OECD, 2007).

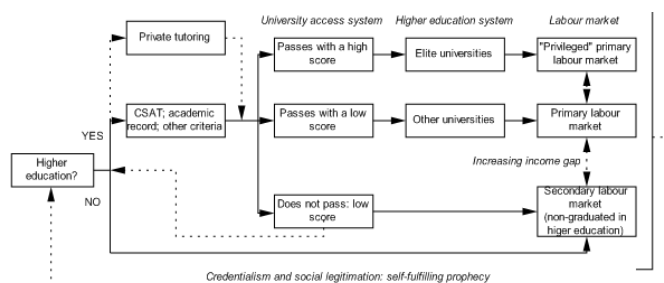
The three most complex negative effects of PT have been left for last. In first place, students are placed under high levels of pressure and fatigue (Huan et al., 2008; Card, 2005). The degree of tolerable pressure depends on the culture and social values where the student lives in. This effect unquestionably affects Korean students, who attend PT even on weekends and, frequently, until late in the night. Second, parents are also placed under pressure to invest in PT: as it will be shown in the models presented in the next section, parents frequently face situations where they have no other alternative than to hire PT services. This raises an economic equality issue, as people from the lowest income quintiles may not be able to hire PT services, or they might hire less or lower quality PT services. This may also maintain or even increase intergenerational inequality as education is one of the main social promotion mechanisms. Finally, the enormous amount of financial and human resources devoted to PT in Korea questions the *social* profitability of this kind of investment.

3. Analytical framework

Game theory is a useful tool for analyzing individual decision-making processes. When taking the decision of hiring PT services, Korean parents face a non-cooperative game

situation, the main causes being credentialism, the social legitimation function of education, and a dual labour market associated to a dual higher education system.

Figure 1. Korean educational system, labour market structure and PT market.



Source: Own elaboration.

Although education is only compulsory until the age of 15, upper secondary education has become tacitly universal. In 2007, 97% of the Korean 25-34 years old population had completed, at least, upper secondary education, this proportion being the highest among all OECD countries^{††} (OECD, 2009). Therefore, the most important educational decision families take is whether their children will access higher education studies^{‡‡}. In 2007, 56% of the 25 to 34 year old Korean people had completed higher education studies (the highest figure in OECD).

However, Korean students are normally not content with just gaining access to university: they want to get admitted in the few prestigious ones, mainly Seoul, Korea and Yonsei universities (the so-called SKY universities). This has generated a growing competition for the few^{§§} places offered by those universities.

Differences in quality between universities not being large (only Seoul National University -SNU- appears among the 200 most prestigious universities, according to the Jiao Tong Universities Ranking^{***}), labour market signalization (Spence, 1973) and credentialism in society are the main reasons why students want to enrol in those prestigious universities. In fact, the dual nature of the Korean higher education system is a consequence of duality in the labour market (Piore and Doeringer, 1971) which, at the same time, is also related to the social legitimation function that education plays in Korea. Not only working conditions differ depending on having a university diploma, but the university graduates' labour market is also dual itself. Benefits from graduating in SKY universities are numerous: better paid jobs (Kim, 2007), greater chances of holding

^{††} The same figure for the population aged between 54 and 65 was 39%; this clearly reflects the fast expansion of the Korean educational system since the 1960's.

^{‡‡} Higher education includes 2-3 years college degrees, 4 years undergraduate degrees, masters and doctoral studies.

^{§§} In 1989, 14.340 out of 400.000 higher education students were enrolled in SKY universities; in 2004, the respective figures were 14.810 and 733.000 (Chae et al. 2004).

^{***} The low number of foreign students in Korea and the large amount of Koreans studying abroad is another index of the low quality of Korean universities. Baek and Jones (2006) also explain that there is a serious mismatch between the skills needed at the labour market and those provided by universities.

important positions (Chae et al., 2004; Kang, 2007), and other non-economic benefits such as social recognition, social networks or, even, greater marriage chances^{†††}.

Therefore, it is no surprise that Korean families are willing to adopt any strategy available for maximizing their children's chances of being admitted in a SKY university^{†††}. Although since 2008 some universities have introduced their own exams, college admission is based on high school records (students are ranked in 15 levels) and, primarily, the College Scholastic Ability Test (CSAT) score. School choice being limited^{§§§} the only way parents have for increasing their children's chances of being admitted in a prestigious university is through PT; however, parents have incomplete information about the effectiveness of their strategy (hiring PT services). Not surprisingly, Chung and Choe (2001) found that those families showing greater levels of implicit credentialism in the answers to the survey they used, were the families whose level of expenditure in PT was the greatest. Self estimations using PISA-2006 data show that 72% of 15-years-old Koreans hired, in 2006, mathematics PT services. This figure is higher than that provided by Bray (2005a) -56,3%, for 2003- and very similar to Choi et al. (2003) -73%, for 2003-. Nevertheless, those figures might be understating the real volume of contracted PT services, as part of the PT activities -especially those provided on a one-to-one basis- take place in the informal market and some students may not wish to confess the total amount of time and resources they spend in PT.

Having described the current situation of PT in Korea and some of its main causes, section 4 provides two models which formalize, using a game theory approach, the above-mentioned analytical framework.

4. Models

The use of game theory in Economics of Education is not frequent but it can be very useful for analyzing strategic individual educational decisions. This section develops and expands the framework provided by Kim (2007) and Chae et al. (2004). Parents' decision making processes on the use of PT are modelled through two different games. The assumptions for both games are the following:

1. All secondary school students (students A and B in the models) who decide to carry on studying at a university level finally do so, either by enrolling in university 1 (prestigious) or in university 2 (non-prestigious). Families have full information about the choices made by other families and know the consequences associated to them. There are only two places for two students.

^{†††} Lee and Brinton (1996) refer to all these non-economic benefits as "institutional social capital".

^{†††} This increase in competition due to the parents' will for making easier their children's social promotion is often called "education fever" (Kim et al, 2005). While Lee (2006) explains that education fever is deeply rooted in Confucian values, Kim et al. (2005) defend that the main cause of education fever are two values: materialism and utilitarianism.

^{§§§} The equalization policy, which is applied in almost all Korean territory, establishes geographic proximity to the centre as the only criterion used for assigning students to high schools (public or private).

2. The total cost of studying in the university (transportation, maintenance, tuition fees, opportunity cost) is assumed to be very similar for both universities ($c_1 = c_2 = c$). According to the Ministry of Education and Human Resources Development (2008), the only cases where the differences in the cost of annual fees could be important were, in year 2007, for students who wanted to enrol in pharmacy, medical studies and physical education studies, where public universities' fees halved those of private institutions.
3. $\omega_1 > \omega_2$: that is, the expected individual monetary and non-monetary benefits from graduating in university 1 are larger than those associated to graduating in university 2. Therefore, the scores obtained in high school and the CSAT strongly condition the labour market outcome of the individual****.
4. The only criteria used for being admitted in universities are the high school academic record and the CSAT score.
5. Let α_A and α_B be the probability of each individual of being admitted in the elite university 1. Therefore, the probabilities of being admitted in university 2 are $(1 - \alpha_A)$ and $(1 - \alpha_B)$, respectively.
6. α_A and α_B depend on individual, family and scholar variables. Let δ be the individual factors; λ the SES of the family; θ , the characteristics of the centres; π , the characteristics of their schoolmates; and ε a number of random circumstances that the student cannot control. Consequently, $\alpha_A = f(\delta_A, \lambda_A, \theta_A, \pi_A, \varepsilon_A)$ and $\alpha_B = f(\delta_B, \lambda_B, \theta_B, \pi_B, \varepsilon_B)$.
7. All individuals who enrol in a higher education institution finally graduate, and their differences in cognitive characteristics (δ) are insignificant.
8. Most schools, public or private, as a consequence of the equalization policy, fix the same tuition fees ($s_A = s_B = s$). Simultaneously, the compulsory rotation policy of teachers guarantees small differences in teacher quality between schools. As a consequence, disparity in the quality of human and material resources among schools should be low ($\theta_A = \theta_B = \theta$).
9. OECD (2009) shows that the variance in the results of Korean students is small. Most of this variance is explained by differences in the socioeconomic and cultural composition between schools, rather than by differences of results within schools. Schools in Korea reproduce the socioeconomic composition of the area in which they are located. If students A and B attend the same school (or both schools are located in zones with similar average SES), then $\pi_A = \pi_B = \pi$.

**** Kim (2007) presents some models where the cost of PT exceeds the benefits linked to being admitted in university. Although interesting, this scenario does not seem to be realistic for describing the Korean case.

10. Families who want to take part in the game must be able to pay, at least, $c + s$.

11. Dang (2007) shows that PT has a positive impact on Vietnamese high school students; Tansel and Bircan (2006) explain that PT increases the students' outcomes in the Turkish CSAT; and Kang (2007) describes that, in Korea, raising expenditure in PT by 10% leads to a 0.61 percentile increase in CSAT score. This small effect might be very important in a hypercompetitive environment where individuals compete for jobs in a similar way to that described by Thurow (1975). In the models, PT has an expected positive effect on outcomes (both on high school records and CSAT score). τ_A and τ_B represent the total expenditure in PT of students A and B, and have a positive effect on α_A and α_B , respectively. The greater τ_A , the larger α_A . Time and physical restrictions necessarily introduce a decreasing marginal effects clause of investment in PT. However, it is important to mention that it is not necessary for α to grow with τ : the key point is the belief of families, their *expectations*, that τ is the only way through which they can influence on α , as $s, c, \delta, \theta, \pi$ and ε are given. The discussion and implications of the following models are provided in section 5.

Model 1. A and B are students whose parents have identical SES ($\lambda_A = \lambda_B$). A and B also attend the same school and have similar cognitive ability. As a consequence, the only way they have for gaining an advantage over the other is through PT. The set of strategies for the families are ($\tau = 0; \tau > 0$).

Figure 2. Payoff matrix associated to model 1.

	$\tau_B = 0$	$\tau_B > 0$
$\tau_A = 0$	$\frac{1}{2}\omega_1, \frac{1}{2}\omega_1$	$\omega_2, \omega_1 - \tau_B$
$\tau_A > 0$	$\omega_1 - \tau_A, \omega_2$	$\frac{1}{2}\omega_1 - \tau_A, \frac{1}{2}\omega_1 - \tau_B$

In this model, similar to those suggested by Kim (2007) and Chae et al. (2004), individuals face a prisoner dilemma situation. Each individual only wants to maximize their payoff, so they consider the other individual's possible strategy before taking their own. This leads to a suboptimal Nash equilibrium where both students hire PT (but α_A and α_B remain the same as if both of them had not hired PT services).

Model 2. A and B are students whose parents have different SES ($\lambda_A > \lambda_B$).

figure 3. Payoff matrix associated to model 2.

	$\tau_B = 0$	$\tau_B > 0$
$\tau_A = 0$	ω_1, ω_2	$\omega_2, \omega_1 - \tau_B$
$\tau_A > 0$	$\omega_1 - \tau_A, \omega_2$	$\omega_1 - \tau_A, \omega_2 - \tau_B$

If $\lambda_A > \lambda_B$, then $\alpha_A > \alpha_B$, as the educational and cultural resources will be better for A than for B. It is also probable that student A's family has better information about the benefits of studying in university 1 but, to keep the analysis simple, we assume that both families share the same information.

If both families decided not to invest in PT, student A would go to university 1. However, the equilibrium in this game is, once again, $\omega_1 - \tau_A, \omega_2 - \tau_B$, that is, both students invest in PT. This requires further explanation: for student A, when $\tau_B = 0$, the optimal strategy is $\tau_A = 0$; and, when $\tau_B > 0$, $\tau_A > 0$. PT works as an “insurance” for individual A which ensures him entrance in university 1 over low-SES student B. As a consequence, family A will choose $\tau_A > 0$.

PT is assumed to have, the rest of variables remaining constant, a sufficient remedial effect on student B to make up for differences in λ . If individual A decides not to hire PT services, individual B will have a strong incentive for hiring PT services. If individual A decides to hire PT services, the optimal strategy for A would be $\tau_B = 0$, as $\omega_2 - \tau_B > \omega_2$. Knowing that individual A will always hire PT, why does individual also B hire PT? The key point here is the fact that student B knows that, although he will probably not be able to beat student A in the race for being admitted in university 1, there are many other “B students” in the market with whom they compete in a game very similar to that explained in model 1. Student B will decide to hire PT services as long as type 1 (prestigious) universities provide a sufficiently large number of places to enrol all “type A” students and part of the “type B” students. Student B will therefore invest in PT ($\tau_B > 0$) as long as $\exists \tau_B > 0 \mid \alpha_B \geq \alpha_A$ and $\alpha_B w_1 > \tau_B$. However, if $\tau_A > 0$ and $\tau_A \geq \tau_B$, α_A will always be larger than α_B . It then comes clear that, when $\lambda_A > \lambda_B$, student B does not really take into account the decisions of individual A, but only those taken by their equals. This last point is especially important, as Korean students share their classes with students that come from families with similar SES. On the other hand, student A does take into account the decisions taken by student B and always hires PT services to protect his “privileged” starting point in the race for entering university 1. In conclusion, model 2 clearly reproduces initial social inequalities. Needless to say, if student B could not afford to pay τ_B , the equilibrium would be ω_1, ω_2 , assuming all parents know the other families' λ .

5. Discussion

The models exposed in section 4 showed that families take PT decisions basically depending on their equals' decisions. However, it has also been described that most families with high SES use PT as insurance for maintaining their comparative advantages. This scheme leads to the reproduction of social inequalities and questions the true role of education as a social mobility mechanism in Korea.

Expenditure in PT by middle and low SES families are subject to (a) the expectation of gaining admittance (in a preferentially prestigious) university, (b) their budgetary restrictions, and (c) the contracting of PT by their equals. Families invest in PT because they have the expectation that it will help their children improve their CSAT results. It is necessary to stress that expectations -families do not have full information about the real impact of PT on final educational achievement- make families invest in PT.

If PT is needed for first, gaining access to university and, second, increasing the chances of being admitted in a prestigious university, budgetary restrictions might be an issue of concern for maintaining equality of opportunities in the access to education. Although gross expenditure in PT in Korea is positively correlated with the income level of the family, low and middle income families are forced to make an important expenditure, relative to their income, which has the similar real regressive effects of a proportional tax on higher education (not to say that, the lower the family's SES, the larger the amount and quality of PT their children should receive for closing the educational outcome gap with the rest of students). The more polarised the distribution of income, the greater the proportion of the population that will have problems for financing PT. According to the imperfect capital markets theory (Stiglitz, 1975), this situation could also have negative consequences on the overall efficiency level of the educational system, as it makes access to higher education of low income -potentially very productive- students difficult. Kim (2004) shows that the importance of the household's level of income is significant and does not decrease across the different educational transitions from high school to doctoral studies.

Once one of their equals decides to invest in PT, the rest of families are "forced" to invest too, fearing that not investing in PT might make their child fall behind. This leads to a suboptimal equilibrium where social welfare is smaller than the potential welfare, as a large part of total resources (according to Choi (2003), 2,3% of GDP, in 2003) was used for financing PT. This expenditure could be seen as an investment (and not as an inefficient expenditure) if PT finally increases the workers' productivity. However, it is doubtful that current PT activities, that focus on putting forward the same contents explained in regular classes and memorizing the answers to past years CSAT exams, have a positive impact on labour productivity, large enough to make up for the total expenditure in PT, its opportunity cost, and the other side effects of PT. The latter include high levels of stress in students (Card, 2005), and the impossibility of spending time in other activities. The impact of PT on labour productivity remains open to future research.

Successive governments have introduced reforms^{††††}, trying to reduce the proliferation and negative consequences of PT. Nevertheless, most of these measures have been unsuccessful, the main reason being that they did not attack the causes underlying PT. Although the achievement of a rational consumption of PT (i.e., arriving to an optimum equilibrium in models 1 and 2) would imply the modification of social values and institutions -changes that are very difficult to introduce in the short and middle term-, there are still measures that the Korean government could introduce for reducing the excessive demand for PT.

On the demand side, a first measure that could help to reduce overheated competition in access to university would be the modification of the structure of CSAT, removing short and multiple choice questions and introducing exercises where reasoning and not only memorising is assessed; in other words: making PT less useful for preparing the CSAT. It must be said, however, that the introduction of exams by each university -a measure introduced during the last years of the 2000 decade- and the use of letters of recommendation could give “A students” even more advantage over “B students” in model 2 in section 4, reducing the level of equality in access to higher education.

Secondly, the introduction of a high quality vocational education system in the higher education level could relax demand for short duration university studies. Thirdly, the introduction of a reliable university quality ranking could help to eliminate old clichés. However, this measure could have the mere effect of changing people’s preferences from one university to another (from university 1 to university 2, in our model). Finally, and although not being a “policy”, demographic trends will reduce the number of university students during the next decades.

PT could also be reduced through supply-side policies. Elite universities could increase the number of places they offer. This would have the risk of increasing the expectations of entrance in SKY universities of students (the expected α , in the models) who would have otherwise not considered the option of applying to the “top” universities. Another measure could consist in increasing the quality of non-elite universities, although the success of this measure would be conditioned to the strength of the abovementioned clichés. Eventually, the Korean government could decide to assume a greater role in the expansion of the education system and start a resolute policy of expanding the quality and quantity of education provided by national universities. This last measure, which would mean a new step in the sequential expansion strategy followed by the Korean education authorities for decades, would have, however, a clear crowding-out effect, as a drop in the number of students is foreseeable during the following years, due to demographic trends.

6. Conclusions

PT expenditure has soared in Korea during the last decades. This increase has been mainly caused by credentialism, which has lead to a dual labour market. Graduating in a university is a must for finding a job in the primary market. However, in such an hypercompetitive environment, holding university studies is not enough: society and the labour market specially reward those students who graduate in one of the few elite

^{††††} Descriptions of those “anti-PT” policies may be found in Kim and Lee (2006), Kim (2005), Chae et al. (2004), and Yang (2001).

institutions. This dual higher education market is a mere reflection of the labour market's duality. Families hire PT as the only strategy for raising the possibilities of their children for being admitted in prestigious universities.

The models presented in this paper show that families find themselves trapped in a prisoner's dilemma situation that take them to maximise their expenditure in PT. From these models it can deduced that low and medium socioeconomic level families fundamentally compete with their equals and use PT for increasing their probabilities of gaining admittance in elite universities. On the other hand, families with high SES also compete with their equals but, at the same time, hire PT services for maintaining their advantage over students with a less favourable socioeconomic background. As a consequence, pursuing individual interests, nearly all Korean families end up hiring PT, this situation being suboptimal. Beyond the personality development problems (which, as pointed out by Card (2005), are acute in the Korean case) and the opportunity cost for students and their families, this situation is suboptimal for two main reasons.

Firstly, the aggregate expenditure in PT will only be efficient in social terms if it increases labour productivity in such a way that it makes up for the sum of the vast amount of resources devoted to PT and its opportunity cost. As far as the author knows, there are still no studies that investigate this issue. However, the type of PT that is usually offered^{****} and the opinions of the employers, who complain about the low employability of graduates in science and technology occupations (Baek and Jones, 2006), make it doubtful that there are gains in efficiency linked to expenditure in PT that offset the total costs.

Secondly, the proliferation of PT raises serious equity questions. While families with a high SES can spend more resources in PT (of best quality too), families with lower SES might not be able to hire PT services or, if they do, have to withstand a proportionally heavier financial burden. If PT is needed for gaining access to, in first place, university and, secondly, the best universities, there is a reduction in the equality of opportunities in education (Roemer, 1998) and the social mobility function of education might be at risk.

The long term solutions to the proliferation of PT are changes in values (replacing credentialism with the workers real productivity) and in institutions (reducing the segmentation between the different labour markets). In the short-medium term, increasing the number of university places that citizens identify as being of high quality, or creating a vocational higher education itinerary could help to moderate demand for PT.

To conclude, this article has set out a theoretical framework under which families decide to hire PT services. Future works should focus on studying some of the assumptions and relationships underlying the models presented in this paper, such as the determinants of PT in Korea, the impact of PT on the students' educational achievement, and the effects of PT on income distribution and the equal opportunities in education principle.

^{****} As Dang and Rogers (2008:184) explain: "the long-term financial returns do not justify the costs of private tutoring. Empirical evidence suggests a bunching of private tutoring investment immediately before school-leaving or university entrance exams, which is consistent with a signaling story".

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