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A Case for “Reverse One-Child” Policies in Japan and South Korea? Examining the Link between Education Costs and Lowest-Low Fertility

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Abstract

Household spending on children’s pre-tertiary education is exceptionally high in Japan and South Korea, and has been cited as a cause of low fertility. Previous research attributes this high spending to a cultural emphasis on education in East Asian countries. In this paper, we argue that institutional factors, namely higher education and labor market systems, play an important role in reinforcing the pressure on parents to invest in their children’s education. We review evidence showing that graduating from a prestigious university has very high economic and social returns in Japan and South Korea, and examine the implications for fertility within the framework of quantity-quality models. Finally, we put forward ‘reverse one-child’ policies that directly address the unintended consequences of these institutional factors on fertility. These policies have the additional virtues of having very low fiscal requirements and reducing social inequality.

Keywords

lowest-low fertility; Japan; South Korea; education; quantity-quality model; policy

Introduction

A substantial body of literature has examined the links between institutional factors and fertility variation among developed countries. McDonald (2006), for example, argues that the lowest-low fertility rates in East Asia and Southern Europe are due to mismatched levels of gender equity in economic and social institutions, where the burden of childrearing falls almost exclusively on women. Other researchers point to the impact of chronically high unemployment rates in Southern Europe, which have depressed marriage rates (Ahn and

Mira 2001) and raised the costs of childbearing (Del Boca 2003), as well as to the role of stronger intergenerational ties in East Asia and Southern Europe in terms of financial support for elderly parents (Lee and Mason 2010) and emotional bonding between parents and adult children (Dalla Zuanna 2007), which encourages parents to invest heavily in a small number of children. More recently, Anderson and Kohler (2012) argue that high household spending on education may be one of the key explanations for why East Asian countries, including Japan, Singapore, South Korea and Taiwan, have the lowest completed cohort fertility rates in the world. The authors attribute the high spending to a mixture of Confucian values and Western egalitarianism which promotes education as the key to social mobility, an argument which is supported to varying degrees by a number of other papers (Chang 2008; Chung 2002; Liu 2012; Sorensen 1994; Suzuki 2008; Tsuya and Choe 2004). This paper adds to the literature on the determinants of low fertility in the East Asian context by emphasizing the institutional factors that may generate unintended negative effects on fertility. Specifically, we claim that a set of institutional factors in the higher education and labor market system – the large economic and social returns to admission to a highly ranked university – partially explains the low fertility rates in Japan and South Korea.

As Anderson and Kohler (2012) note, household spending on children's pre-tertiary education is exceptionally high in East Asia. Household expenditures on school fees and 'shadow' educational activities, such as cram schools (known as *jukus* in Japan and *hagwons* in South Korea), home tutoring and correspondence courses, account for around 2% and 3% of GDP in Japan and South Korea respectively (see Table 1). By contrast, household spending on school fees and other educational institutions accounts for only 0.4% of GDP in Europe (European Commission 2005). The high levels of household spending in the two East Asian countries cannot be fully explained by low public expenditures on education, which are substantially lower in South Korea but higher in Japan than in the EU.¹ Moreover, household spending in Japan and South Korea grew rapidly even during periods when public expenditures were being substantially increased (Bray and Lykins 2012; Kim and Lee 2002; Ogawa et al. 2009).

The burden of high educational costs on parents is even more apparent when these amounts are evaluated as a proportion of household budgets. Since household consumption constitutes only 61% and 54% of GDP in Japan and South Korea (World Bank 2013), and since only 46% and 74% of households in Japan and South Korea have children below the age of 18 (OECD 2012a), Japanese and South Korean parents devote around 6% and 7% of all household spending on their children's pre-tertiary education respectively. These values are somewhat low compared to other estimates, which suggest that Japanese parents spend between 4% and 16% of household income on school fees *per child* (OECD 2011) while South Korean parents spend more than 9% of household income on children's shadow education, or around 8% of household income *per child* (Chung and Choe 2001; Kang 2007; Kim and Lee 2010; OECD 2012b). Still other studies suggest that costs to South Korean

¹Public expenditures on pre-tertiary education in 2004 account for 2.7% and 3.6% of GDP in Japan and South Korea, compared to 3.6% in the EU. However, Japan has a lower proportion of students in the population (OECD 2011) and public expenditures on primary and secondary educational institutions *per student* in 2004 were \$12,934 and \$8,945 in Japan and South Korea respectively, compared to \$12,203 in the EU (OECD 2007). These values are adjusted for purchasing power parity.

parents may be even higher – on the order of 16% of family income in 2001 *per child* in middle school (Hwang 2001) – which may reflect underreporting of informal but expensive shadow educational activities such as home tutoring (Lee 2012). While the estimates vary due to differences in data and estimation methods (see Appendix A3), what is clear is that they are much higher than in the EU and the US, where spending on children's pre-tertiary education constitutes only 1% and 2% of all household spending respectively (European Commission 2005).

At the same time, a few differences between Japan and South Korea are apparent (see Table 1). First, household spending on pre-tertiary education is higher in South Korea than in Japan, and may be twice as high in terms of proportion of household budgets (Tsuya and Choe 2004). Second, while most of the household expenditures in Japan appear to be on school fees – around 78%, compared to 20% on shadow education (European Commission 2005) – expenditures in South Korea mainly go to shadow education. There are a number of potential explanations for these differences: a) educational ambitions are substantially higher in South Korea than in Japan, with a far larger proportion of lower-income students aspiring to attend a university, especially at younger ages (Nakamura 2003), b) cohort sizes are declining more markedly in Japan, reducing not only the number of students but also household expenditures per student by lowering competition for spots at top schools (Nakamura 2003; Anderson and Kohler 2012); and c) unlike South Korea, Japan has no secondary and high school equalization policies, allowing parents to compete by paying high fees for top private schools rather than by paying for shadow education. This competition begins as early as primary school, where the demand for enrollment in 'ladder schools' affiliated with prestigious private high schools is particularly high (European Commission 2005 Annex), and peaks at the end of secondary school (the equivalent of ninth grade in the US), where Japanese students compete for admission to high schools, which are differentiated through a nationally recognized ranking system based on their placement records at top universities (Ono 2001; Takeuchi 1991).² The less successful students, who are disproportionately represented by lower-income families, enroll in lower ranked general high schools or are tracked into vocational high schools, usually the students' "second choices" (Ono 2001:164). Consistent with the first explanation, at least 70% of South Korean primary school students participate in shadow education, with participation rates falling to around 50% at older ages as students headed for vocational high schools lower their educational expectations (see Table 2; Nakamura 2003). The opposite pattern is true for Japanese students, with only around 20% participating in primary school, increasing to 50% in secondary school (the equivalent of the last three years of middle school and the first year of high school in the US) or later. Hence, while not *all* Japanese and South Korean parents experience 'education fever', around half of Japanese families and a considerably higher proportion of South Korean families display symptoms. In both countries, higher-income families are not only much more likely to participate in shadow education (Bray and Lykins 2012; Stevenson and Baker 1992; OECD 2011), but are also more likely to choose more expensive forms of shadow education (Bray and Lykins 2012; OECD 2011).

²Hence, one reason why prestigious private six-year schools, which combine middle and high school curricula, are highly sought after despite their enormous school fees is that they allow their students to avoid this arduous event (Okada 1999).

On the one hand, the high value placed on pre-tertiary education by Japanese and South Korean households may be viewed positively as part of the explanation for these countries' strong performance in international tests such as the Programme for International Student Assessment (PISA); on the other hand, these high household expenditures on education may have unintended consequences for society, including extremely low fertility (Anderson and Kohler 2012; OECD 2011). Anderson and Kohler show that the proportion of household income spent on education is negatively correlated with fertility at the third or higher parities at the province level in South Korea; similarly, Ogawa et al. (2009) show that educational and health expenditures (both public and private) on children are negatively correlated with fertility in Japan, Taiwan and South Korea. These associations do not necessarily imply a straightforward causal interpretation. Instead, households that prefer fewer children in the first place may simply spend more on each child. But the argument that high education costs reduce fertility is consistent with survey data: 68% and 56% of South Korean and Japanese respondents cited educational and child care costs as a reason for having fewer children than desired, compared to only 31% of U.S. parents (Suzuki 2008); similarly, around 80% of Japanese parents aged 25-35 cited educational and child care costs as a reason for having fewer children than desired (OECD 2011).

This paper has three main goals. The first goal is to identify and discuss a set of institutional factors that help to explain the scale of household spending on children's pre-tertiary education in Japan and South Korea. While previous papers, e.g. Anderson and Kohler 2012, have discussed the potential impact of household educational expenditures on East Asian fertility, ours is the first paper which does not mainly focus on cultural explanations. Instead, we highlight the roles played by the higher education and labor market systems that reinforce cultural dispositions. The second goal is to show how these specific institutional factors may lead to lower fertility using economic and sociological theory, including child quantity-quality and co-production models. We argue that these factors affect not only the number of children within households (which may be more relevant in the case of South Korea), but also household formation behavior (which may be more relevant in the case of Japan). Finally, the third goal is to explore one potential policy implication of the paper: we propose a novel set of 'reverse one-child' policies which may have a number of important advantages over alternative policies.

Education Credentialism in Japan and South Korea

When asked why they spend on private after-school education for their children, Japanese and South Korean parents are less likely to cite the importance of ensuring that their children are receiving a quality education, and are very likely to mention the more concrete goal of getting their children into a good university.³ In a 2010 survey, "[t]he name of the university one graduates from is important for future job prospects" is the top reason given by South Korean parents, while "[c]lassroom atmosphere and school equipment are not satisfactory" was rated as least important (OECD 2012b: 133); similarly, Japanese parents cite

³Greenhalgh (1988) makes a similar observation with regard to how education was viewed during the Qing dynasty: it "was universally prized, although not so much for its contents – mostly moral standards and norms of conduct – as for its 'face value'" as a requisite for entry to the coveted imperial bureaucratic class.

preparation for the next round of school entrance exams as one of the main reasons for sending their children to *jukus* (OECD 2011). In this section, we review evidence that educational credentialism, where individuals are judged based on their educational success and particularly the ranking of the tertiary institution they attended, rather than by their actual skills and abilities (Chang 2008; Chung and Choe 2001), is almost certainly the single biggest reason why household spending on children's pre-tertiary education is so high in these two East Asian countries.

Underlying educational credentialism in the two countries is a set of institutional arrangements in the higher education and labor market systems which govern both access to and returns from attending a highly ranked university. First, increases in demand for higher education were met by expanding the private higher education sector – 77% and 86% of Japanese and Korean universities are private (OECD 2011; Korean Ministry of Education 2013) – rather than by increasing enrollment at existing national universities. As a result, a small number of the national universities, which dominate the very top of a well-established educational hierarchy, are able to impose strict regulations on admissions using highly selective merit-based processes.

Second, name recognition of the top few universities is extremely high not only among the general public (European Commission 2005 Annex; Tsuya and Choe 2004), but also among employers. These elite universities are much more likely than other institutions to have connections to major companies and top government departments, who preferentially or exclusively hire their graduates (European Commission 2005; Lee and Brinton 1996; Stevenson and Baker 2002), producing the Japanese “folklore” that “people never obtain a satisfactory occupational position without graduating from a selective senior high school and a selective university” (Takeuchi 1991:101). School-employer networks appear to be particularly important in the East Asian context: comparing the transitions from university to labor market in Japan and the Netherlands, van der Velden, van de Loo and Meng (2007:94) find that Japanese students are far more likely to rely on their school career offices and their connections to employers, which provide students with “a tightly woven safety net”. Students from the top universities can look forward to the best safety nets of all, with near-exclusive access to top entry jobs in prestigious firms and in the government bureaucracy, where they tend to be placed on the elite track and are promoted more quickly than their competitors (Koh 1989).

Third, long after graduation from university and placement in first jobs, individuals continue to rely on alumni networks to gain access to more rapid promotion or to better jobs with other employers. These alumni networks are especially valuable for graduates from elite universities who become a “sponsored elite” (Stevenson and Baker 1992:1641). As a result of these institutional arrangements in the Japanese and South Korean higher education and labor market systems which help to reinforce educational credentialism, the ranking of the tertiary institution that an individual attends is “perhaps the single most important factor in determining his or her life chances” (European Commission 2005 Annex:239).

The above argument is corroborated by empirical studies on wage returns from university ranking. For Japan, Ono (2004) finds that graduates who attended a good university make

over 10% more than graduates who attended a lower ranked university, even after controlling for individual ability using pre-college test scores; similarly, van der Velden, van de Loo and Meng (2007) find a comparable wage premium for graduating from universities with higher average entrance exam test scores. For South Korea, there is not only evidence of a wage premium for university ranking, but also evidence that this premium is driven almost entirely by enormous wage differences between graduates from the very top few schools and all other graduates⁴ (Kim and Lee 2010). The evidence thus suggests steep increasing returns to university rank, especially for the most highly ranked, producing a ‘jackpot’ or ‘winner-take-all’ reward structure where a small difference in academic performance during an entrance exam could produce large differences in post-graduate economic earnings (Frank and Cook 1996).

Moreover, these studies provide some evidence that these large payoffs are at least partly due to educational credentialism, where institutional reputation is weighted far more heavily than individual qualities. Van der Velden, van de Loo and Meng (2007) find that the wages of Japanese university graduates are strongly related to the ranking of the institution they attended, whereas family background and self-reported acquired competencies have no predictive power. (The opposite is true for the Netherlands.) They argue that this is due to the fact that Japanese employers tend to place little value on what new employees have already learned – preferring, instead, to provide any required training after they’ve been hired – and instead rely heavily on university ranking as a signal for future productivity. Similarly, Lee and Brinton (1996) find that making use of school-employer connections was much more effective for getting prestigious jobs at large firms for South Korean graduates from top universities than for other graduates. In contrast, having higher individual ability relative to other students from the same institution did not impact job placement.

The rewards for graduating from a highly ranked university are not limited to economic returns, high as they might already be. Indeed, there is some evidence that the economic returns may not be sufficient to stimulate education fever: wage returns to college prestige are also substantial in the United States (Black and Smith 2004; Dale and Krueger 1999), albeit lower than in South Korea (Kim and Lee 2010), but the proportion of US household budgets spent on children’s education is not especially high (European Commission 2005). Instead, the key drivers of passion may have more to do with the perception that individuals are also “ranked in social prestige for the rest of their life by the ranking of the university they attended” (Sorensen 1994:19), which in Taiwan is considered far more important for determining social status than income or occupation stratum (Liu 2012). The social prestige is enhanced by the fact that this selected minority is part of a highly visible group that dominates the political and economic elite. Alumni from the top six South Korean universities make up more than half of the Who’s Who list and 85% of the candidates for top public sector positions (Kim and Lee 2010); similarly, in Japan, graduates from the top two universities (University of Tokyo and Kyoto University) make up 70% of higher civil servants (Koh 1989), and the names of the universities attended by public figures is a

⁴Kim and Lee (2010) finds that South Korean graduates from the top five universities earn 42% more than graduates who did not go to the top 30 universities, whereas graduates from the next top five earn less than 10% more. For the studies on Japan, no wage data on graduates from the highest ranked universities were available.

“national obsession” (Ono 2004:597). In addition to high social standing – which is shared to a large extent by parents (Sorensen 1994; Brinton and Lee 1996) who are often credited for their children’s success – these graduates also enjoy excellent marriage prospects (Chung and Choe 2001). Hence, educational credentialism, along with education and labor market institutional arrangements that maintain and reinforce it, creates the perception that “getting a diploma from a good college is a ticket to success”, for which households will “forgo almost anything” (Chang 2008:3). Moreover, since graduation rates are generally very high, with universities viewing it as an “obligation” to provide students with degrees (OECD 2011:116), admission to a top university is almost a ‘sure win’. Drawing on his own experiences as a South Korean student, Hwang (2001:617) recalls that he “believed that passing the [Seoul National University] entrance exam would guarantee [his] job, finances, house, family and future”. University students themselves appear to appreciate their secure position in this institutional setup and “traditionally considered their university time to be more social than academic” in a dramatic behavioral shift from their pre-tertiary days; university professors appear to be similarly aware and usually “demand relatively little of their charges” (Ellington 2005:2). On the other hand, the less fortunate candidates who performed more poorly on the entrance exams have relatively few options since “education is virtually the only gateway to success and high status” (Sorensen 1994:34). One potential course of action is to spend another year preparing for the next round of entrance exams, which is a common response among ambitious Japanese students (European Commission 2005). Another alternative is to study abroad –South Koreans in particular make up a disproportionate share of foreign students in all OECD countries (OECD 2007), which may reflect both the strong demand for higher education as well as the need for many candidates to insure against poor performance on local universities’ entrance exams. Beyond that, individuals who do not make the grade and especially those who do not get into any college at all are “often treated as second-class citizens”, with “dramatically reduced prospects for social and economic advancement” (European Commission 2005 Annex:238-239).

Given the high stakes involved, paying high fees for private schooling or shadow education is an extremely attractive investment for households. As previously discussed, while not all parents opt to participate in this ‘winner-take-all’ tournament, around half of Japanese families and a considerably higher proportion of South Korean families do. These high levels of participation are even more extraordinary in light of the fact that a substantial proportion of Japanese parents actually view attending *juku* as potentially harmful for their children, with 34.0% and 24.5% expressing fears that *juku* has a negative impact on character development and future career choices (OECD 2011). Nevertheless, many of these parents continue to invest in such after-school activities, reflecting the extremely high payoffs for gaining admission to a top university in terms of future wages and social status.

The discussion in this section does not simply highlight how educational credentialism in Japan and South Korea affects household incentives to invest in pre-tertiary education, but also provides some reason to be cautious with regard to the implications for policy. The evidence suggests that there are strong links between the higher education and labor market systems, with a pivotal role played by the use of highly selective university admission processes as signals of labor productivity. Any policy solutions that address this education-job institutional nexus must therefore take into account how the labor market may respond to

the potential impacts on the reliability of these signals. We return to this in our discussion on potential policy solutions.

Implications for East Asian Fertility

We now turn to the implications for fertility. We begin with a discussion of standard economic theories of fertility based on the work by Gary S. Becker and colleagues, before moving on to sociological implications. While economic theories provide insights into behavioral motivations from a rational agent viewpoint, predicting actual human behavior is frequently more complex. We stress that an economic analysis may be unusually appropriate in the case of East Asian and in particular Sinic populations (which include Hong Kong, Singapore, Taiwan and South Korea), who “represent a case of extreme economic rationalism” with regard to fertility decisions (Greenhalgh 1988:631). Fertility in these populations appears to be heavily influenced by cost-benefit considerations, with historical evidence of deliberate changes in age at marriage, birth control, abortion and infanticide in response to changes in economic conditions (Greenhalgh 1988). In short, an economic analysis is appropriate because East Asian populations are more prone to framing fertility decisions within a quantity/quality calculus where family security and upward social mobility are the primary goals.

Economic theories of fertility postulate the prominent child ‘quantity-quality’ model, where child ‘quality’ is often defined as the child’s potential future income. A more realistic definition might use the child’s potential *household* income instead, and include other factors such as social status. We argue below that taking these factors into account would strengthen our conclusions, but for now proceed with the simpler definition. Similar to Becker and Tomes (1976), we view child quality as a function of a) ‘endowment’, including gender and ‘innate’ academic talent, and b) household investments in his or her health and education. For now, we focus on parental investments and return to the issue of child investment on his or her own quality later in this section. The child quantity-quality model supposes that parents allocate their income or budget I between quantity of number of children n , quality of each child q_i , and all other consumption goods y such that they maximize their total utility. Suppose for now that all children are equally endowed and that parents are egalitarian and prefer all their children to be equally well-off, so that they invest equally in all children ($q_i = q$). Then

$$I = nq\pi_c + y\pi_y, \quad (1)$$

where π_c and π_y are the prices of children and all other consumption goods respectively (Becker and Lewis 1973). The assumption that parents are egalitarian is useful not only because it simplifies the above equation but also because it introduces a key insight into the child quantity-quality tradeoff, which is that increasing child quality makes it more difficult to increase child quantity (and vice versa). For example, if a family decides to increase all their children’s education by one year, it becomes more expensive to have one more child. Becker and Lewis refer to this as the ‘interaction effect’. Algebraically, the price of child quantity is $q\pi_c$ and hence dependent on q ; graphically, it means that the budget constraint

delineating the possible combinations of quantity and quality is not linear but rather upward concave (Hotz, Klerman, and Willis 1997). The interaction effect offers an explanation for why higher income households tend to have fewer children even if the demand for child quantity rises with income: if the demand for child quality rises faster than the demand for child quantity, the ratio of n to q falls, leading to a higher cost of n relative to q (Hotz, Klerman, and Willis 1997).

We discuss the implications of relaxing the assumption that all children are equally endowed later. For now, we explore the impact of high returns of admission to a highly ranked university on parental investments and fertility. Figure 1 below illustrates the following points. The top graph shows the effect of being admitted to a more prestigious university on the child's future wages under three scenarios with high, moderate and no returns to university ranking, while the bottom graph shows the resulting marginal costs of child quality, i.e. the costs of raising the child's future income by \$1. (For simplicity of illustration, we portray individuals in the 'no-returns' scenario as always earning less; note, however, that the absolute levels of the curves in the top graph have no implications for the bottom graph.) Under the 'no-returns' scenario, the marginal costs of child quality increase with the child's future wages due to diminishing marginal returns to investment. Under the 'moderate-returns' and 'high-returns' scenarios, the marginal costs of child quality also increase but more slowly, since the marginal investment boosts not only future labor productivity but also the probability of attending a highly ranked university, reaping the wage benefits associated with educational credentialism.

For illustrative purposes, consider the following thought experiment: suppose that the average income of university graduates is \$100 and that graduates of higher ranked universities earn more. Under the 'moderate-returns' scenario, graduates from top universities earn 10% more or \$110, while under the 'high-returns' scenario, graduates from top universities earn 30% more or \$130. Now suppose that it costs parents \$10 to get their children into top universities through private schooling, shadow education or forms of investment in children's pre-tertiary education. Under the 'moderate-returns' scenario, it costs parents \$10 to increase child income by \$10, so that the marginal cost of child quality is \$1; under the 'high-returns' scenario, the marginal cost is only \$0.33.

The above thought shows that Japanese and South Korean parents have a strong incentive to invest in their children's pre-tertiary education because it is 'cheaper' in terms of the impact on the child's future income. To see this graphically, note that parents choose to invest in child quality up to where the marginal cost is equal to the marginal benefit, where the marginal benefit curve is downward sloping due to diminishing marginal utility of money. Hence, the higher the returns to university ranking, the higher the levels of child quality that parents choose ($Y_{HR}^* > Y_{MR}^* > Y_{NR}^*$). Returning to the child quantity-quality model, since the cost of child quantity is $q\pi_c$, a higher q implies higher costs of child quantity and hence lower levels of fertility. In addition, the lower marginal costs of q under the 'high-returns' scenario raises real income, reinforcing the downward pressure on n if the income elasticity of demand for q is greater than that for n .

One potential counterargument is that the higher demand for educational resources in the higher-returns scenarios may drive up the prices of private schooling and shadow education, eradicating all or part of the differences in child quality marginal costs. For instance, in the above thought experiment, higher demand may drive up the cost of getting one's children into top universities under the 'high-returns' scenario from \$10 to \$30, so that the marginal cost of child quality goes up from \$0.33 to \$1. Graphically, higher input prices push the 'high-returns' marginal cost curve up until it coincides with the 'moderate-returns' marginal cost curve, so that parents in both scenarios choose the same level of q at Y_{MR}^* . (Note that the 'high-returns' curve would not be pushed past 'moderate-returns' curve, as demand for educational resources would no longer be higher in the former than in the latter scenario). Hence, the impact of high returns of admission to a highly ranked university on child quality and fertility may be moderated to a large extent by input price differences. We argue that the price differences are unlikely to be large enough to fully compensate for the impact of higher returns to university ranking, especially for shadow education, where the wide range of educational activities results in low barriers to entry and reduces capturing of consumer surplus.⁵ We also present some evidence later in this section that Japanese and South Korean parents' demand for educational inputs is insensitive to cost effectiveness (so that higher prices may not necessarily lead to lower quantity demanded), and offer a discussion of the social constraints that may explain this behavior.

Thus far, the analysis assumes that all children are equally endowed and that parents are egalitarian. We now examine the implications of relaxing these assumptions. Following Becker and Tomes (1976), we assume that the marginal costs of child quality are lower for better endowed children, so that parents can maximize total child welfare by investing more in the education of more endowed children until the marginal costs of quality are equal among all siblings, and compensating less endowed children with higher levels of cash transfers later in life. In the case of Japan and South Korea, the 'winner-take-all' structure of returns to university rank means that parents have even more incentive to focus on their most academically gifted children, who have the best chance of entering a top university. This incentive appears to be reflected in actual behavior, where Japanese and South Korean children who are already doing well academically tend to receive more private tutoring (Stevenson and Baker 2002; OECD 2012b), even after controlling for household income and parental education (Kim and Lee 2010).

The implications for fertility are less straightforward. If non-egalitarian parents face no social constraints, one potential strategy is to have a large number of children to increase the chances of having a highly endowed child, and then investing only in the most promising child. As Greenhalgh (1988: 655) points out, Chinese families during the Qing dynasty responded to opportunities for mobility by following precisely this strategy: increasing fertility to maximize the number of sons, and then "selecting one son for educational achievement and use the others to finance his climb". This strategy, however, has become less attractive as the minimum level of education needed for any type of social advancement for all individuals has increased, making it more difficult to socially or morally justify such

⁵Indeed, for certain mass activities such as online courses, high demand may actually drive down prices due to economies of scale.

an approach. Indeed, current East Asian social conventions demand that parents invest heavily in the education of even less endowed children, for whom the marginal costs of child quality are higher – otherwise, they are “considered strange” (Lee 2012:5) and face the risk of being labeled as irresponsible (Anderson and Kohler 2012; Hwang 2001; Lee 2012; Sorensen 1994; Tsuya and Choe 2004). These social conventions also help to explain why such large proportions of parents (around half in Japan and at least 70% in South Korea) participate in this ‘winner-take-all’ tournament, as well as why parents’ demand for educational inputs appears to be insensitive to cost effectiveness: the evidence that shadow education leads to better academic results is surprisingly weak (Bray and Lykins 2012), with causal models suggesting that household expenditures on shadow education have only minimal impacts on test scores in South Korea (Kang 2007). Hence, the marginal costs of child quality may in fact be very high (though they would always be relatively low in the ‘high-returns’ scenario compared to the other scenarios), so that the relentless spending on children’s pre-tertiary education in Japan and South Korea may reflect either parents’ “subjective/cultural belief about the effectiveness of private tutoring, or the concern about their being viewed by the peers as neglectful of children’s education” (Kang 2007:27). With these social expectations in place, parents may find that their best strategy would be to have a small number of children and to invest heavily in them.

While cultural beliefs and stronger intergenerational ties may help to explain why Japanese and South Korean parents face such high social expectations with regard to investment in children’s pre-tertiary education, it is worth noting that some features of the higher education and labor market systems also play a role in reinforcing these pressures. First, university applicants are, to a larger extent than in other countries, assessed based on their performance on tests and entrance examinations rather than by their extracurricular activities or recommendation letters (Ono 2004). This institutional feature encourages parents to be involved since child ability or talent is “conceived as being transitory and subject to change” (Takuchi 1991: 109); instead, it is believed that “effort, perseverance, and self-discipline, and academic ability, determine academic success; and these study and behavioral habits can be taught” (EU 2005 Annex:228).

Second, as argued in the previous section, future labor market outcomes depend heavily on the ranking of the university that an individual is admitted to, rather than his or her acquired competencies by the time of graduation. As a result, achievement at younger ages, i.e. pre-tertiary ages, is weighted more heavily and “seen as critical because educational failures cannot be made up at later ages” (Tsuya and Choe 2004:77).⁶ We argue that this makes a crucial difference to the child raising experiences of Japanese and South Korean parents, since the production of child quality depends more heavily on parental inputs at earlier ages and more heavily on the child’s own inputs at later ages (see Figure 2). By pushing events of lifelong significance to earlier ages, educational credentialism forces Japanese and South Korean parents to be “greater ‘stakeholders’ in their children’s life course decisions” (Chung and Choe 2001:194) and to bear a larger proportion of the financial and psychological

⁶Takeuchi (1991) notes that while students who fail to enter the academic track at the high school have little chance of entering a prestigious university, Japanese high school students who fail their first university entrance examinations may reapply in future years. Hence, academic achievement is arguably even more crucial at younger than at older ages.

burdens. The higher levels of parental contributions and accountability are reflected through social attitudes: “if a child enters a respected school, everyone congratulates the child’s parents. If the child fails, however, the parents behave like repenting sinners.” (Chang 2008:6) Hence, investing in children’s education may be viewed as less of a pure economic decision and more of a socially and morally binding “duty” (Anderson and Kohler 2012:11) or “obligation” (Lee 2012:5; Tsuya and Choe 2004:79). These “strong social and psychological pressures” (Tsuya and Choe 2004:76) help to explain why households with low income (Liu 2012) or less endowed children (Chung and Choe 2001) may also invest in children’s pre-tertiary education, despite the low returns in terms of their probability of getting into a highly ranked university.

The high levels of responsibility and stress placed on parents drives them not only to invest more in their children’s academic success, but also to put more pressure on the children to do the same using parenting practices “characterized by excessive pampering, overprotection and extreme pushiness” (Chang 2008:6). To make sure that children fully appreciate what is at stake, parents employ tactics ranging from gentle reminders that how they do in school affects the whole family (Hwang 2001) to more “fearsome” (Sorensen 1994:26) methods that ensure compliance. These tactics, aided by the social emphasis on the importance of filial piety, appear to be effective – South Korean middle school students, for instance, spend at least twice as much time studying math as their U.S. counterparts (Hwang 2001).

The above analysis shows that educational credentialism encourages parents to choose smaller family sizes, which may help to explain why the desired number of children is fairly low (less than two) in both Japan and South Korea (Tsuya and Choe 2004). Beyond this important proximate determinant of fertility, the high costs of children’s pre-tertiary education may further drive families to have even fewer children than desired (see discussion on parental surveys in Introduction) by driving married women to seek employment, leading to mental and marital stresses due to work-family conflicts (Chung and Choe 2001). In addition to lower marital fertility, which accounts for two-thirds of the recent fertility decline in South Korea (Suzuki 2008), high educational costs may also promote delayed marriage, which accounts for almost all fertility decline in Japan since the 1970s and 40% of fertility decline in South Korea between 1980 and 1990, by encouraging individuals to wait until they can better afford these child expenses (Tsuya and Choe 2004) or to choose partners more selectively. This marital sorting confers additional marriage market benefits to attending a top university, resulting in a self-perpetuating cycle that rewards those at the top of the educational hierarchy.

The discussion in this section begins by building on classic economic models of fertility, which introduce the key insight that there is a child quantity-quality tradeoff, so that increasing child quality makes it more difficult to increase quantity (and vice versa). We note that this framework is unusually appropriate for modelling the fertility decisions of East Asian populations, which have historically been heavily influenced by cost-benefit considerations (Greenhalgh 1988). More crucially, we show how educational credentialism in Japan and South Korea exacerbates this tradeoff in favor of child quality by producing a ‘winner-take-all’ structure which rewards small family sizes and ‘education fever’. Our analysis also departs from standard quantity-quality models by incorporating sociological

insights and identifying institutional features in the Japanese and South Korean contexts which help to explain why the demand for children's pre-tertiary educational inputs appear to be highly insensitive to cost effectiveness, and why households with low income or less endowed children also engage in competitive behavior. Finally, we use a separate set of co-production models to illustrate how the emphasis on admission to a high ranking university causes parents to bear a uniquely large proportion of the burden of this institutional structure.

Ideally, to evaluate the claim that fertility behavior is influenced by high returns of admission to a highly ranked university in the two East Asian countries more directly, we would need to use data from a natural experiment in which these institutional arrangements in the higher education and labor market system are relaxed in randomly selected regions, e.g. due to enactment of local policies which prevent employers from taking job candidates' university background into consideration or force employers to maintain a given level of diversity in terms of representation of institutions of higher education in hiring decisions. Data for this counterfactual do not exist. However, we note that existing empirical evidence supports our hypothesis, with findings showing that fertility at higher parities is negatively associated with household expenditures spent on children's education, both at the provincial level in South Korea (Anderson and Kohler 2012) and at the country level in Japan, Taiwan and South Korea (Ogawa et al. 2009).

Our analysis does not assume or imply that Japanese and South Korean parents care more about their children's future wellbeing than other parents do. As noted earlier, intergenerational ties are extremely strong in both East Asia and Southern Europe (Dalla Zuanna 2007), and even outside these regions, parents generally have strong incentives to make sure that their children have bright futures. Rather, we highlight specific institutional features of the Japanese and South Korean educational and labor market systems which reward and even socially demand a parental mindset where the "[u]ltimate importance is attached to getting into a university as high as possible up the hierarchy" (Tsuya and Choe 2004:77) at the cost of smaller family sizes.

A Case for "Reverse One-Child" Policies in Japan and South Korea

Since fertility decline and the recognition of low fertility as a potential social problem started first in Europe, East Asian policy responses have been strongly influenced by European policies and experiences. In this paper, we argue that institutional factors specific to Japan and South Korea, namely highly selective university admission processes together with hiring practices that exploit signaling from these processes and promote educational credentialism, create incentives for parents to invest heavily in their children's pre-tertiary education, limiting the family sizes that households can afford. These institutional arrangements have powerful impacts because of the cultural/historical importance of mental frames (or schemas) that feature the value and appropriateness of the quantity/quality tradeoff.

To address the unanticipated consequences of these institutional arrangements for fertility, we propose a novel set of 'reverse one-child' policies. The 'reverse one-child' policies are so

named because they have the opposite effect of the Chinese one-child policy: rather than penalizing higher fertility by reducing larger families' income and their children's prospects, 'reverse one-child' policies reward higher fertility by making it easier for children from larger families to succeed in life. These policies can take a number of forms, from more paternalistic versions such as legally requiring public universities to favor applicants from larger families to more market-based versions such as providing funding incentives for universities which do so; alternatively, the policies may aim to increase the competitiveness of applicants from larger families by subsidizing their pre-tertiary (and tertiary) educational costs. In effect, the proposed policy is an affirmative action program for children with siblings, a criterion which is easy to assess/document. The implementation of the affirmative action program could be targeted for a decade or more from policy enactment (so as not to penalize those born under a prior policy regime) but have immediate impacts on the fertility decision making of those at lifecycle stages where having additional children is feasible.

Further, we argue that 'reverse one-child' policies have a number of important advantages over more traditional pro-natalist policies such as per-child subsidies, including child allowances and tuition benefits, which have been introduced in a number of European countries and are increasingly gaining political traction in Asia. First, 'reverse one-child' policies have far lower fiscal requirements. Second, they are distinct in a very important sense from per-child subsidies and other similar previous initiatives in that the marginal benefits of having another child are not constant but rather increase with family size, directly countering the pressures on parents to invest heavily in a small number of children. Hence, their impacts are not undermined by the educational 'arms race', where child pre-tertiary academic ability is not viewed as absolute but rather as relative to that of other children (Kim and Lee 2010), so that a universal increase in educational investment may not change parents' incentives to spend in order to get ahead of the pack. This argument is consistent with the fact that increased public spending on education in South Korea in the 1990s did not prevent household spending on private tutoring from rising during the same period (Kim and Lee 2004), and has been used by Suzuki (2008) to predict that recent South Korean reforms (the 'Saeromaji plan 2010', which includes childcare subsidies and provision of after-school educational programs) are unlikely to lower the demand for private tutoring. Third, 'reverse one-child' policies help to address pertinent social inequality-related issues stemming from the fact that larger and less well-off families cannot afford as much shadow education. This is a potentially important advantage over other policies such as increased tracking by ability levels in public schools, which weakens the educational 'arms race' by making it less feasible for poorer and less academically gifted children to compete, but increases social inequality. The negative impact on social inequality may be pivotal in politically justifying these policies in countries like South Korea, where traditional neo-natalist policies have limited support due to the neo-liberalistic outlook of the government (Suzuki 2008). Fourth, they are more efficient since the benefits from having an additional child are conferred on all children in the household rather than just on the additional child.

Figure 3 helps to illustrate the fourth point. The bottom curve in both graphs represents the budget constraint delineating all the combinations of child quantity and quality that an egalitarian household can afford, and it is nonlinear due to quantity-quality 'interaction' effect (Hotz, Klerman and Willis 1997) discussed in the previous section. The top curve in

the left graph represents the new budget constraint when per-child subsidies are available; likewise, the top curve in the right graph represents the new budget constraint when ‘reverse one-child’ policies are in place. Unlike the former, the top curve in the right graph is not parallel but rather flatter than the bottom curve, since the impact of the policy increases with the number of children in the household. Given the same indifference curve, a flatter budget constraint results in higher levels of child quantity being chosen, increasing household fertility.

Despite these advantages, ‘reverse one-child’ policies are subject to a number of important considerations. Most fundamentally, it is not clear that policies which increase fertility at the cost of lower household spending on children’s pre-tertiary education would benefit East Asian countries. As Lee and Mason (2010) point out, societies with higher levels of human capital and productivity may be more than able to deal with the problem of low support ratios, particularly if these societies also have high elderly labor participation rates and low elderly health care costs. While determining whether the negative externalities associated with low fertility outweigh the positive externalities associated with high spending in children’s pre-tertiary education is well beyond the scope of this paper, there is some evidence that the educational ‘arms race’ in Japan and South Korea may be less of a social boon and more of a source of social inefficiency and serious financial and psychological distress for parents as well as children. As previously mentioned, there is some evidence that household expenditures on shadow education have only marginal impacts on children’s academic performance (Bray and Lykins 2012; Kang 2007), possibly due to student fatigue and duplicative educational resources (Kim and Lee 2010). This reduces gains from formal schooling, known as “classroom collapse” in South Korea (Chung 2002:8), which in turn forces parents to view after-school education as necessary (OECD 2012) in a self-perpetuating cycle of inefficiency. For Japan, educational credentialism has also resulted in wasteful scenarios where 30% of high school students and 40% of university freshmen spend at least one extra year studying for university entrance examinations (European Commission 2005; Ono 2004), which takes away at least one year’s worth of income and valuable work experience. Beyond the implications for efficiency, extremely strong educational pressures are also associated with unintended negative consequences for children, including relatively high rates of psychological distress and depression associated with an adolescence that is at once stressful and boring due to long hours of studying (as much as 14 hours a day in South Korea) (Lee and Larson 2000), as well as a potential loss in curiosity, creativity and self-perceived ability to learn independently (Chang 2008; Lee 2012) due to an unwavering focus on test preparation which avoids any work that is not directly related to examinations (Lee and Larson 2000). Moreover, those who do not successfully meet their parents’ high expectations may struggle with emotional and self-esteem issues (Sorensen 1994), which is sometimes blamed for the relatively high youth suicide rate in South Korea (Lee 2012). These potential harms to their children have not gone unnoticed by parents – 34.0% of Japanese parents worry that attending *juku* has a negative impact on their children’s character development (OECD 2011), and public resentment towards shadow education in South Korea is so high that two former education ministers who made positive remarks about private tutoring were lambasted and eventually forced to resign (Chung 2002).

Second, ‘reverse one-child’ policies would cause university admission decisions to be partly based on family size rather than wholly based on academic merit, and this in turn may cause firms to be less likely to use admission into top universities as a reliable signal of productivity, reducing the policies’ potency as an incentive for families to have more children. Nevertheless, by undermining educational credentialism in the East Asian context, the policies would have served their purpose by removing an existing obstacle to higher fertility.

Third, the policies would likely affect the fertility behavior of only a subset of families in Japan and South Korea who experience education fever. However, this subset includes around half of Japanese and the majority of South Korean families, and is certainly large enough to make a substantial difference to population fertility rates. It is possible that ‘reverse one-child’ policies would *increase* the proportion of parents with education fever, since they increase the payoff to having a large number of children and investing only in the most promising one, similar to the strategy pursued by Chinese families during the Qing dynasty (Greenhalgh 1988). As we discussed in the previous section, this strategy is socially untenable; instead, the most likely scenario is that the policies would simply reduce the payoff from having only a few children and investing heavily in each child. Moreover, that if the policies *did* increase the proportion of parents with education fever, it would actually boost their effectiveness since these marginal participants are likely to pursue a strategy involving larger family sizes. Outside of Japan and South Korea, however, the policies are likely to have much weaker impact in countries where widespread education fever is less of a phenomenon.

Finally, one important disadvantage of ‘reverse one-child’ policies is its relatively long time frame, so that their success depends crucially on whether policymakers can make a credible show of long-term commitment. The high frequency of changes to university admission policies in South Korea has led to public mistrust (Chang 2008; Kim and Lee 2002), most notably in South Korea due to negative historical experiences.⁷ Nevertheless, we argue that there is a need to focus on university admissions (rather than, for example, at the primary school level), in recognition of the primary motivation behind education fever: the economic and social returns associated with admission to a top university. Previous policy attempts to dampen education fever at the pre-tertiary school levels, through reducing ability grouping in public schools in Japan and assigning students to secondary/high schools through a lottery system in South Korea, failed to have any impact beyond shifting the competition to the private sector (in the form of prestigious private high schools in Japan and shadow education in South Korea) (Kariya and Rosenbaum 1999; Kim and Lee 2002) and raising the costs of participation in the ‘winner-take-all’ tournament. Similarly, critics have opposed a more recent proposal to eliminate high school entrance examinations in Japan by merging middle and high schools, arguing that this plan would only shift the competition to primary school ages (Okada 1999). Instead, to reduce the implementation timeframe and increase public credibility, we propose combining ‘reverse one-child’ policies with similar policies which

⁷For instance, the unpopular decision to diversify university admission criteria by considering non-academic achievements simply extended the competition among students to extracurricular activities (Chung 2002), causing even more stress for parents and students (Kim and Lee 2002).

apply at earlier stages of children's educational careers, such as subsidizing the pre-tertiary educational costs or requiring high schools to offer preferential admission for children from larger families.

With national fertility rates stubbornly and dramatically below replacement levels and the specter of population aging increasingly becoming impossible to avoid, the governments of Japan and South Korea have become increasingly open to pro-natalist initiatives, including the provision of child subsidies and allowances and parental leave. In the case of 'reverse one-child' policies, we acknowledge that similar policy suggestions, such as the proposal to instate affirmative action for lower income applicants by the president of Seoul National University, were previously viewed as un-meritocratic and possibly unconstitutional (Chung 2002). However, affirmative action policies in educational or labor market settings, based on either race or gender, have been successfully implemented in China (Sautman 1998), where commitment to meritocratic values is similarly high, and more recently in South Korea (Cho and Kwon 2010). Finally, we note that most policies seeking to confront institutional constraints on fertility, including gender inequity, are also likely to face significant cultural barriers.

Conclusion

This paper has three goals. The first is to identify and discuss a set of key institutional factors which help to explain the scale of household spending on children's pre-tertiary education in Japan and South Korea. Unlike previous papers which have mainly focused on cultural explanations, we highlight the roles played by the higher education and labor market systems that greatly reinforce the cultural/historical focus on the quantity/quality tradeoff. In particular, we identify institutional arrangements which promote educational credentialism, where individuals are judged based on their educational success and particularly the ranking of the tertiary institution they attended, rather than by their actual skills and abilities.

The second goal is to show how these specific institutional factors within the East Asian cultural context lead to lower fertility using economic and sociological theory, including child quantity-quality and co-production models. We show how these factors create incentives to invest in children's pre-tertiary education, limiting the household sizes that families can afford, and discuss the contribution of social constraints which delineate how 'responsible' parents should behave under these institutional arrangements. We also argue that these factors affect not only the number of children within households (which may be more relevant in the case of South Korea), but also household formation behavior (which may be more relevant in the case of Japan).

Finally, the third goal is to explore some possible policy implications of the paper. We propose a novel set of 'reverse one-child' policies that undermine credentialism and the potentially counterproductive educational 'arms race'. Unlike traditional pro-natalist policies such as per-child subsidies, these policies are designed such as the marginal benefits of having another child are not constant but rather increase with family size, directly countering the pressures on parents to invest heavily in a small number of children. We also argue that

‘reverse one-child’ policies have minimal fiscal requirements, reduce social inequality, and are likely to be more effective and more efficient than alternative policies.

Like most previous related research, this paper focuses almost exclusively on the two East Asian countries for which more data are available, Japan and South Korea. It is likely, however, that the issues discussed here apply to a number of other East Asian states, including China, Singapore, Taiwan and Hong Kong (Anderson and Kohler 2012), and may also be relevant to other Asian countries where rapid economic growth is being matched by rapid growth in household expenditure on education, with implications for Asia’s future demographic landscape.

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Appendix: Spread of Estimates in Table 1 for Japan and South Korea

The estimates in Table 1 for Japan and South Korea are based on different data sources and estimation methods. In general, estimates based on survey data tend to be higher than those based on industry revenue data, which do not include informal tutoring or other forms of private educational expenditures. However, there continues to be substantial variation within the former set of estimates, potentially due to differences in survey methodology or included categories of expenditures.

For Japan, the estimates suggest that expenditures on shadow education are comparatively low compared to expenditures on school fees. The estimate from Bray and Lykins (2012) is taken from Dawson (2010) while the estimate from Stevenson and Baker (1992) is taken from Katsuki (1988). Both of these sources use private tutoring industry revenues. The estimate from EC (2005) is based on household expenditure survey data and includes both school fees and shadow education costs. It is unclear from the report whether their estimates include tertiary-level expenditures.

For South Korea, expenditures on shadow education are much larger than private school fees. Most of the estimates are based on expenditure surveys with the exception of the estimate from Chang (2008) for shadow education costs in 2006 and the estimate from EC (2005) for school fees, which are based on private industry taxable revenues and private school revenues respectively. The highest estimate of shadow education costs is from Chang (2008) for 2007, which is taken from a Bloomberg Businessweek Magazine article (which does not cite its source). In the middle range, Kim and Lee (2010)’s 2006 estimates are taken from Nam (2007), who uses household expenditure survey data, while their 1998 estimates are taken from KEDI (1999), who conduct a survey of Korean parents. Similarly, Kang (2007)’s estimate is based on a 2003 media briefing by KEDI in 2003. (This briefing could not be located, and is assumed to be based on a later wave of the survey.) Another middle range estimate is from EC (2005) Annex, which is taken from Yoon et al. (1997) and

based on survey data. Finally, the lower range estimates are from Bray and Lykins (2012), OECD (2012b) and Chung (2002). Their estimates are taken from Jang (2011) and KNSO (2011), who use labor survey data and educational expenditure survey data, the Ministry of Education, Science and Technology, who uses educational expenditure survey data, and the Ministry of Education, who uses survey data, respectively. Hence, estimates based on government reports appear to be somewhat lower. The estimates from Bray and Lykins (2012) and OECD (2012b) may also be lower due to a decline in spending in 2010 compared to previous years (KNSO 2011).

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Fig. 1.
Returns from University Ranking and Marginal Costs of Child Quality

Fig. 2.
Coproduction of Child Quality by Child's Age

Fig. 3.
Impact of policies on household budgets

Table 1

Household Spending on Children's Pre-Tertiary Education in Japan and South Korea, as Percentage of GDP

Country	Year	Household spending on children's education (% of GDP)	Type of spending	Source
Japan	2010	0.19	Shadow education	Bray and Lykins (2012)
	2000	1.81	School fees and shadow education	EC (2005)
	1986	0.31	Shadow education	Stevenson and Baker (1992)
South Korea	2010	1.72	Shadow education	Bray and Lykins (2012)
	2010	1.8	Shadow education	OECD (2012b)
	2007	3.84	Shadow education	Chang (2008)
	2006	1.56	School fees	Kim and Lee (2010)
	2006	2.79	Shadow education	Kim and Lee (2010)
	2006	1.67	Shadow education	Chang (2008)
	2002	0.30	School fees	EC (2005) Annex
	2003	2.3	Shadow education	Kang (2007)
	2000	1.37	Shadow education	Chung (2002)
	1998	0.84	School fees	Kim and Lee (2010)
	1998	2.9	Shadow education	Kim and Lee (2010)
	1995	2.40	Shadow education	EC (2005) Annex

Notes: Currency values were converted to % of GDP using GDP values from the World Bank at <http://databank.worldbank.org>, inflation data from <http://fxtop.com/en/inflation-calculator.php> and exchange rates data from <http://fxtop.com/en/historical-exchange-rates.php> (calculated using rates on 31 January of each year). Currency values per household were converted to currency values using household data from Nishioka et al. (2011) for Japan. GNP values were converted to % of GDP using data from the Federal Reserve Bank of St. Louis from <http://research.stlouisfed.org/fred2/categories/33108>.

Table 2**Participation Rates in Shadow Education in Japan and South Korea**

Country	Year	Participation rates	Type of shadow education	Source
Japan	2007	15.9% and 65.2% of lower primary and secondary school students	<i>Juku</i>	Bray and Lykins (2012)
	2007	25% and 50% of primary and secondary school students	<i>Juku</i>	OECD (2011)
	2007	19.5% and 17.1% of primary and secondary school students	Home tutoring and distance learning	OECD (2011)
	2005	50% of all school-age children	<i>Juku</i>	EC (2005) Annex
South Korea	2010	86.8%, 72.2% and 52.8% of primary, secondary and high school students	All	OECD (2012b)
	2008	87.9%, 72.5% and 60.5% of primary, secondary and high school students	Tutoring	Bray and Lykins (2012)
	2003	83.1%, 92.8% and 87.8% of primary, secondary and high school students	Tutoring	Kim and Lee (2010)
	2000	70.7%, 59.5% and 46.8% of primary, secondary and high school students	Tutoring	Kang (2007)
	1997	Over 70% of primary school students and around 50% of secondary and high school students	Tutoring	Kim and Lee (2002)