

Child Gender and Parental Inputs: No More Son Preference in Korea?

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Son preference has persisted across many generations, particularly in patriarchal Asian societies. This is well represented by the grossly skewed sex ratio at birth: 111 in China, 112 in India and Vietnam, and 113 in Hong Kong.¹ Advanced technologies that allow prenatal sex selection and the increasing desire for smaller families have induced more parents to opt for their preferred – male – child.

However, South Korea (hereafter, Korea), which shares many of the traditional norms with nearby countries, seems to be heading towards gender neutrality. Sex ratio at birth which surpassed 116 in 1990, is now 105, the natural ratio (see Figure 1 Panel A).

Does the recovery of a natural sex ratio imply that son preference has disappeared in Korea? This paper studies differences in parents' time and monetary inputs by the sex of their child. Although the decline in sex ratio at birth may reflect changes in underlying preferences regarding child gender overall, it is also possible that discrimination still exists in how boys and girls are treated *after* birth. In the latter case, gender differences in parental treatment could result in non-trivial differences in human capital accumulation and career choices. Korea is a particularly interesting case to study in this context because it is the only Asian country escaping the imbalanced sex ratio at birth but still lagging behind other developed countries in female labor mar-

ket outcomes.²

To study parental time and monetary investments on various dimensions, we use data from several sources, including Korean Labor and Income Panel Survey, Korean Time Use Survey, Korean Education Longitudinal Study, and Private Education Expenditures Survey. Our empirical strategy exploits randomness of the first child's sex to overcome potential bias from endogenous fertility decisions, following Dahl and Moretti (2008).

Our findings reveal that parental inputs and expectations differ by child gender. More specifically, we find that first, mothers of girls are more likely to be working compared to mothers of boys, as women are more likely to return to work when their first-born child is female. Second, girls spend twice as much time as boys in housework activities. That is, even at young ages, stereotypical gender roles seem to arise in the household. Third, monthly expenditures on private out-of-school education are on average 23 dollars higher for first-born boys than for first-born girls. Fourth, parents expect their children to receive slightly more education and to work in higher-income professions when their first-born child is male.

Our article contributes to the literature on child gender effects by providing evidence on how boy-girl differences may not arise in terms of sex ratio at birth, but may appear after birth in forms of parental inputs. In developing countries, there are serious sex imbalance in abortions and infant health outcomes (Jayachandran and Kuziemko, 2011; Barcellos, Carvalho and Lleras-Muney, 2014). In developed countries, child gender is shown to affect marital stability and time use of parents, but the effect is usually small in magnitude (Lundberg and Rose, 2002; Dahl and Moretti, 2008). The Korean

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¹2014 estimates from the CIA World Factbook.

²According to OECD Employment Outlook 2013, employment to population ratio among women aged 15–64 in Korea ranks 25th out of 34 OECD countries (at 53.5 percent), and the gender earnings gap remains the largest (at 37 percent).

case helps bridge the gap in existing research between developing and developed countries and also has important implications for other Asian countries where son preference remains strong till this day.

I. Empirical Strategy

Boy-girl differences in parental inputs can be measured using a regression model as follows:

$$(1) \quad y_i = \alpha + \beta Boy_i + \mathbf{X}'_i \boldsymbol{\gamma} + \varepsilon_i,$$

where y_i is the parental input of interest for child i , Boy_i is an indicator that equals one if the child is male and zero otherwise, \mathbf{X}_i is a vector of family characteristics, and ε_i is an error term. The OLS estimate of β captures the average effect of child gender on parental investments if child gender is randomly assigned or exogenous conditional on covariates.

Although child gender can be considered being randomly determined at conception, the boy-girl difference parameter in (1) may not be consistently estimated using observational data for two reasons. First, in societies where sex-selective abortions are prevalent, girls are less likely to be born into families with strong son preference. Second, even in the absence of sex-selective abortions, child gender would not be exogenous if parents make fertility decisions based on gender of previous children. In many countries including the US and India, parents are less likely to have additional children following a son than a daughter (i.e., son-biased fertility stopping rules).

In Korea, there has been no evidence of prenatal sex selection among first-born children since 1991 and thus it is reasonable to assume that first child gender is exogenous during our sample period (see Figure 1 Panel B).³ However, there are signs of son-biased fertility stopping rules for higher-order births (see Appendix Table 1). Under son-biased fertility stopping rules, a representative sample of children in all birth orders would result in a sample of parents in which son-biased parents are underrepresented and gender-neutral parents are overrepresented (Bharadwaj, Dahl and Sheth, Forthcoming). With the selec-

tive sample of parents, boy-girl difference estimates would be biased downwards.

To address this concern, we exploit randomness of the first child's gender following Dahl and Moretti (2008). Then, Boy_i in regression model (1) indicates whether the first child is male and the estimation sample would only consist of first-borns. Note that girls end up having more siblings than boys under son-biased fertility stopping rules. Thus, the identification strategy relying on the first child's gender consistently estimates the *total* effect of child gender on parental inputs, including any indirect effects through subsequent fertility choices that may depend on the gender of the first-born child.

II. Data and Results

The results of estimating regression model (1) are reported in Table 1. Each entry represents the effect of child gender when the dependent variable is mother's employment, child's housework hours, expenditures on child's private out-of-school education, and parent's expectations regarding child's educational attainment, respectively. All regressions are run conditional on baseline parental characteristics and regional dummies.

First, we look at parental time inputs, as measured by maternal employment. We focus on mother's labor supply because women still bear the bulk of responsibility for child rearing in Korea. We use data from the Korean Labor and Income Panel Survey (KLIPS), a longitudinal study of a representative sample of Korean households and individuals living in urban areas. We use all 13 waves spanning 1998–2010 and construct a sample of women who were observed some time before as well as after first childbirth.

We find that the probability a woman works after first childbirth is 9 percentage points lower when the first-born is male than when it is female, even after controlling for her work status prior to childbirth. That is, boys are more likely to live with stay-at-home mothers than girls. We obtain nearly identical results when we shorten the time span to ever worked five years pre- and post- first childbirth. This result is more surprising given that Korean families are less likely to have additional children following a son, as aforementioned.

³Sex-ratio at birth in Korea has been remaining within the normal range of 104–107 for first births since 1991, for second births since 2003, and for all birth orders since 2007.

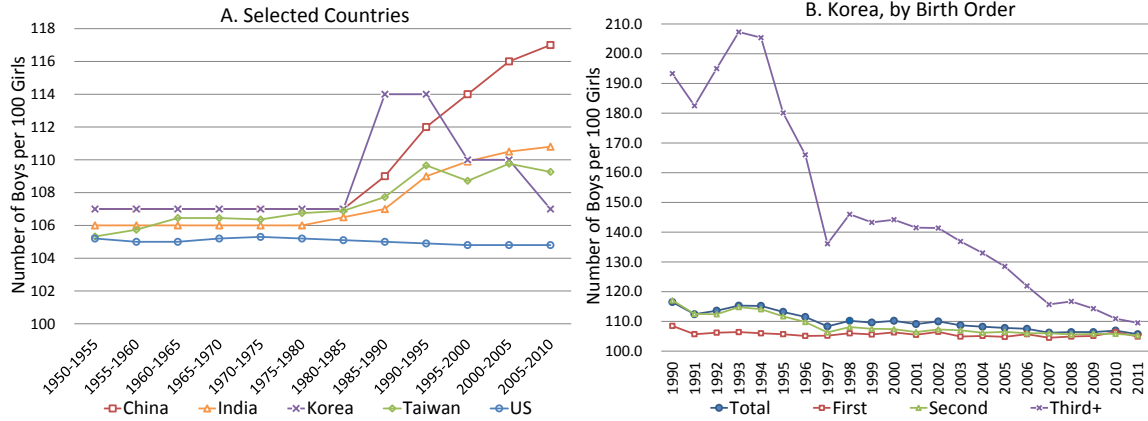


FIGURE 1. SEX RATIO AT BIRTH

Source: Panel A: Data for China, India, Korea, and US are from United Nations, World Population Prospects: The 2012 Revision. Data for Taiwan are from the Department of Household Registration (statistics for 1950–1979 are not available for two counties in Taiwan—Kinmen and Lienchiang). Panel B: Data from Korean Vital Statistics.

TABLE 1—TIME INPUTS, MONETARY INPUTS, AND EXPECTATIONS, BY CHILD'S GENDER

Dependent variable	Coefficient on <i>Boy</i>	Mean [SD]	Observations	Data source
Mother's employment after first childbirth ^a	-0.09* (0.044)	0.51 [0.50]	493	KLIPS 1998–2010
Child's housework time ^b (hours per week)	-0.91*** (0.036)	0.98 [2.53]	29,455	KTUS 1999, 2004, 2009
Private education spending on academic subjects ^{c, d}	23.34*** (6.480)	262.25 [322.72]	8,820	KELS 2005–2007
Private education spending on academic subjects ^{c, e}	2.52*** (0.711)	196.41 [226.13]	481,114	PEES 2007–2012
Private education spending on non-academic subjects ^{c, e}	-5.04*** (0.320)	45.10 [94.67]	481,114	PEES 2007–2012
Expected years of education ^d	0.24*** (0.044)	17.32 [2.22]	8,986	KELS 2005–2007

Note: Robust standard errors in parentheses. Standard deviations in brackets. The estimation sample includes single and two-parent families. Missing values in covariates are imputed with mean values and dummies for missing observations are also controlled. *, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent level, respectively.

^a One observation per mother. Mother's employment after first childbirth is a dummy equal to 1 if a woman worked anytime until the first-born reached age 18. Control variables include whether mother was ever employed before childbirth, parents' age at time of first childbirth, age squared, and dummies for parents' education (less than high school, high school, college or more), and region. Ever employed before childbirth may be anytime between 1–11 years prior to childbirth.

^b Estimation uses survey weights. Control variables include child's age, age squared, parents' age, age squared, and dummies for parents' education (less than high school, high school, college or more), year, and region.

^c Expenditures on private out-of-school education are in thousands of 2010 South Korean wons (KRWs). 1000 KRW is worth approximately 1 USD.

^d Control variables include parents' age, age squared, and dummies for parents' education (less than high school, high school, college or more), year, and urban rural classification (Seoul, large cities, small cities, rural).

^e Estimation uses survey weights. Control variables include dummies for parents' age (20–39, 40–49, 50+), parents' education (less than high school, high school, college or more), urban rural classification (Seoul, large cities, small cities, rural), child's school level (elementary, middle, high), and year.

Another way to analyze parental time inputs is to observe the kind of activities parents share with their children at home. We use the Korean Time Use Survey (KTUS), which reports how much time per day individuals spend on various activities. The study was conducted in 1999, 2004, and 2009 and each wave covers household members older than age 10. Unfortunately, KTUS does not contain information on which child an activity was carried out with nor the birth order of the child. Thus we examine time diaries reported directly by the children in the study and focus on the amount of time they spend doing household chores. The idea is that although we cannot directly assess the time parents spend with their first-born son versus daughter, the time boys and girls spend on housework would provide suggestive evidence of the expectations parents have of their sons versus daughters, at least in terms of gender roles.⁴

The second row of Table 1 reports the effect of child gender on hours spent on housework among respondents between age 10 and 18. The coefficient on *Boy* is negative and statistically significant, and indicates that on average, boys spend about 0.9 hours (per week) less on housework than girls. The magnitude is non-trivial when considering that the mean housework time of all children is only one hour per week. Although not reported here, when we run the regression separately by year, the gender gap in housework time is shown to decline over time.

Next, we investigate whether there are boy-girl differences in parents' monetary inputs. We analyze expenditures on children's private out-of-school education as this type of private education spending is a major component of child rearing expenses in Korea.⁵ The analysis uses a nationally representative sample of middle school students covered by the Korean Education Longitudinal Study (KELS) 2005–2007. The survey asks parents about monthly expenditures on private out-of-school education of Korean, Math, and English, key subjects of the college entrance exam.

⁴Housework time encompasses hours spent on activities such as food preparation, washing dishes, doing the laundry, and cleaning the house.

⁵Private out-of-school education indicates private tutoring, cramming schools, and online courses, but does not include private school fees.

The third row of Table 1 presents that parents whose first child is male spend about 23 dollars more per month for their eldest child's private education on the three key subjects compared to those whose first child is female. The difference is about 9 percent at the mean.

The fourth and fifth rows of Table 1 use the 2007–2012 Private Education Expenditures Survey (PEES) sample of students attending primary and secondary schools to analyze private education spending on academic and non-academic subjects, separately. Non-academic subjects include art, music, sports, and hobby activities.⁶ The results show that the effect of *Boy* on private education spending is positive for academic subjects as in the KELS sample, whereas it is negative for non-academic subjects. That is, parent's private education spending pattern differs by the gender of the child. The size of the boy-girl difference for academic subjects is smaller compared with the one found from the KELS sample because the boy effect is nearly zero for primary schoolers and the effect for secondary schoolers has substantially decreased over time.⁷

Higher expenditures on private out-of-school education for boys may reflect higher expectations on their academic achievement and labor market outcomes. Our study using the KELS data finds that parents' expectations on their children's educational attainment are on average 0.24 years longer for first-born sons than for first-born daughters (see the last row of Table 1). The difference is small but statistically significant at all conventional levels and exist despite the recent reversal of the gender gap in college entrance rates.

We also find that there is a substantial boy-girl difference in parent's aspirations for their children's career choices. The KELS asks parents to select two occupations that they would like their children to have in the future. Appendix Figure 1 plots the fraction of parents who select each occupation by first child's gender. Parents of sons are more likely to select high-wage pro-

⁶Academic subjects in the PEES cover not only Korean, Math, and English, but also Science, Social Science, other foreign languages, computer programming, and critical writing.

⁷When we restrict the analysis to middle school students in the PEES 2007, the boy effect estimate becomes similar to the one obtained from the KELS 2005–2007 although we cannot distinguish the birth order of children in the PEES data.

fessions or those that require advanced degrees, such as doctor, professor, lawyer, and CEO, than parents of daughters.

In sum, whether we look at parental time or monetary inputs, or parents' expectations regarding child's education or occupation, boys and girls in Korea are not treated equally at home. Compared to girls, boys are more likely to live with full-time housewife mothers (rather than working mothers), spend much less time on household chores, receive more financial support for private education on academic subjects, and are expected to obtain higher education and have higher-profile careers.

III. Discussion

One natural interpretation of our findings above is that there is still son preference in Korea. Although the preference is no longer strong enough to distort sex ratios at birth, it may remain in the form of gender-biased childcare. Both cultural and economic factors may lead to the persistence of son preference. For example, parents traditionally relied on their eldest son for old-age support and men continue to earn more than women in the labor market.

Alternatively, it is possible that child gender effects exist not because parents prefer boys over girls but because there are gender-specific constraints: boys may have different needs from girls. For example, if boys tend to have more health and behavioral problems, parents may engage in compensatory behavior and provide more resources to them.

It is difficult to sort out these alternative explanations with observational data, and multiple factors are probably at work for different families. Taken together, however, our empirical evidence suggests in several ways that son preference remains an important component. First, gender-specific constraints would not be vastly different across developed countries and over time. Even if it is true that boys have more health and behavioral problems than girls, it is difficult to argue that these problems are much larger for boys in Korea than in the US, or in the past than nowadays. Second, parents expect longer educational years for their sons than their daughters and focus on different subjects when spending on private education. If parents allocated monetary inputs unequally because boys fared worse

than girls in school, it is difficult to explain why parents then expect higher educational attainment for the former. Third, data from the Korean Value Survey that asks adults "Suppose you could only have one child. Would you prefer that it be a boy or a girl?" shows that 23.5 percent say "boy" and 16.1 percent say "girl" in 2008.

Korea is in a transitional phase where son preference is no longer salient before and at time of birth but where child gender effects appear in more subtle ways afterwards via parental inputs and expectations. The significant boy-girl difference in parental treatments on various dimensions points towards the conclusion that child gender still matters and that stereotypical gender roles continue. Thus, on top of economic development, policies promoting gender equality could be particularly important in Korea and other Asian countries where son preference is entrenched. By directly influencing economic incentives as well as by accelerating the change in cultural norms, such policies would not only improve the overall status of women but also diminish reasons for differential treatment during childhood.

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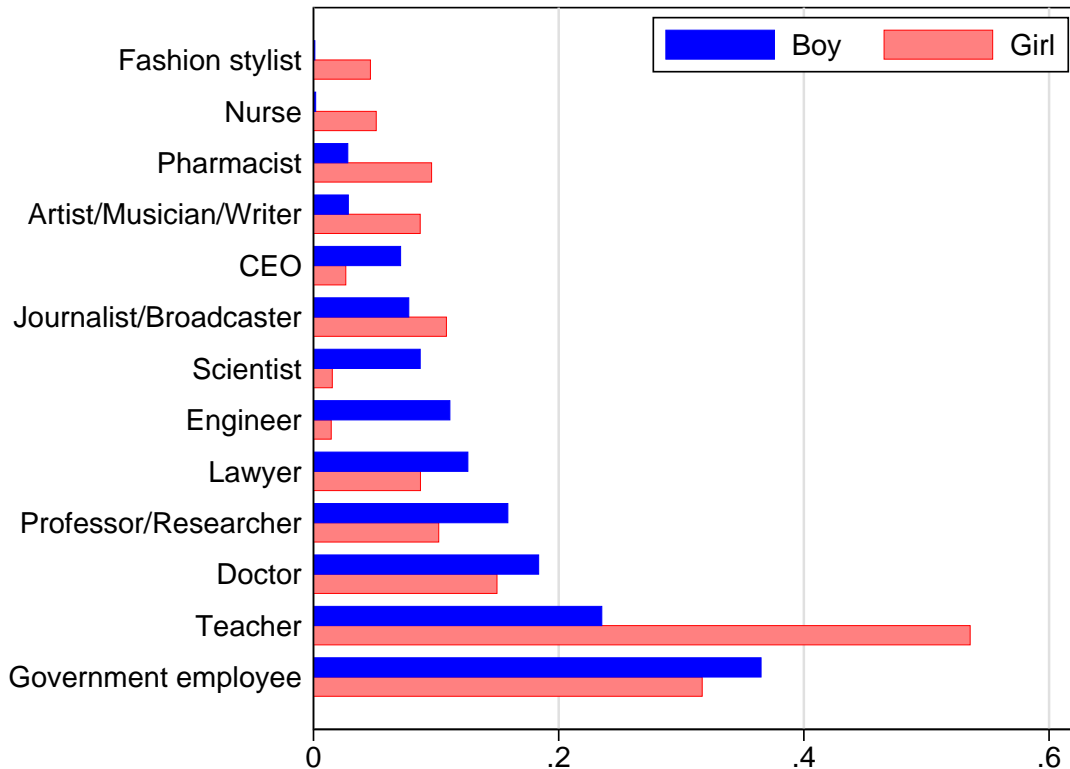
Online Appendix (Not for publication)

Appendix Table1: Number of Children, by First Child's Gender

Dependent variable:	Number of children	2+ children	3+ children
First child: boy	-0.17*** (0.019)	-0.04*** (0.012)	-0.13*** (0.013)
Second child: boy			-0.16*** (0.013)
Controls	Yes	Yes	Yes
N	4,488	4,488	3,446
Dependent variable mean	1.93	0.77	0.19

Notes. OLS estimation using KLIPS 1998–2010. Robust standard errors in parentheses. Control variables include parent's age of the last wave, age squared, dummies for parent's education (less than high school, high school, college or more) and region. Missing values in covariates are imputed with mean values and dummies for missing observations are also controlled. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix Figure 1: Parents' Expectations for Their Children's Future Occupations, by First Child's Gender



Notes. Calculations using KELS 2005–2007. Each bar represents the fraction of parents who want their eldest children to have the given occupation. The Professor/Researcher category excludes scientists. The boy-girl difference in the fraction of parents selecting each occupation is statistically significant at the 1% level for all the listed occupations. The estimated differences are robust to adding control variables listed under Table 1.