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Having an Older Brother Is Good or Bad for Your Education And Health? Evidence from Vietnam

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Abstract

This study examines the sex of the first-born children on education and health outcome of later born children. We do not find a significant effect of the sex of the first-born children on health utilization of later born children. However, we find some small effects of education. Once controlled for the number of sibling, having a firstborn brother reduces the probability of school enrolment and the probability of having good academic performance. Although the education outcomes of girls are higher than boys, this evidence still indicates gender bias in education investment of parents in their children in Vietnam.

JEL Classification: J13, J11, I2,

Keywords: Gender, birth order, education, household surveys, Vietnam.

INTRODUCTION

Education and health play very important role for human being, especially for children. While education is basically understood as the process of teaching, learning and achieving the knowledge, health is defined as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO, 1946). Attaining good educational basis and health status can benefit not only the children themselves but also for their families.

Education is also considered as a means to empower children to play an active role in the transformation of their societies, and rate of return to education for economic development is high (Giang *et al.* 2014). Additionally, a good health always appears to be the first wish and the central to human happiness and well-being. It also importantly contributes to economic development, as healthy populations live longer, are more productive, and save more.

Among factors, parents' decision in investment for education and health of children then becomes a significant aspect that effects their future development. This allocation decision is also impacted by lot of by criteria, including gender of the children. In many countries, especially in East and South Asia, imbalanced sex-ratio is a "production" of pro-male society which is impacted from Hinduism and Confucianism. Guilmoto (2007) reported that Asia is region which had the highest imbalanced sex-ratio in the world. Because of son preference while restricted number of children in each family and constrained household resources, parents cull child sex prenatally or post-natally. Some parents in those countries might invest less in the girls than in the boys. It is carried out through investing health care for girls less than boys such as less breastfeeding, less immunization coverage, less food allocation on infant girls or bring their male children to health centers earlier in case of illness. Education enrollment ratio of female tend to be lower than male, such as literacy rate among female and male is 0.56 in Nepal, 0.57 in Pakistan, 0.62 in Bangladesh, 0.65 in India according to the global gender gap report published in 2007.

Gender discrimination in parents' investment has considered in the studies about the effect of birth order, gender on educational achievement (Kim, 2009) or the effect of sibling sex composition on education and health of children, such as Michinobu (1995), Hauser (1997), Yu and Su (2003), Dancer and Rammohan (2004), Salem (2004),

Lidbom *et al.* (2008), Chaudhuri (2008), Chien Chen *et al.* (2009), Lin and Zhao (2010), H. Chen *et al.* (2007, 2008, 2010), Husain *et al.* (2011).

Like as other countries in East Asia, son has still been preferred in many parts in Vietnam. Besides that, because of family-planning policy (only one to two child in each family), families often try to have least one son or continue bearing children until they have a son. To have son, parents select foetus's sex by many methods. This sex-selection led to imbalanced sex ratio birth, according to the report “Recent Changes in the sex ratio at birth in Vietnam- A review of the evidence” (UNFPA 2009), from 107 to 108 in 2002-2005 and from 110 to 112 boys per 100 girls in 2006-2008. The imbalanced sex ratio birth is the highest in Northeast, from 120 to 122 in 2006-2008. Parents' investment in children also shows discrimination hence literacy rate and enrollment in primary education of female often is less than male, 0.95 for both of rate according to the global gender gap report published in 2010. It is easy to see from the statistics that son preference of parents in Vietnam led to the clear difference in education attainment and health status between boys and girls.

Although there are a large number of studies on education of children in Vietnam (e.g., Mont and Nguyen, 2013; Nguyen and Nguyen, 2015; Nguyen, 2016), there are no studies on the gender of the first-born children on the education and health of the later-born children. Thus, this study examines how the sex of the firstborn child affects education and health care of later born children. This paper consists of six sections. The second section presents literature review on related issues. The third section presents the data set used in this study. The fourth section presents some descriptive analysis. The fifth section presents the empirical findings. Finally, the sixth section concludes.

LITERATURE REVIEW

Gender inequality is an importance issue because of its effect on socio-economic development. Hence, there were many researches which studied about gender inequality in countries on around the world, especially about gender wage gap.

The question of how the sex composition of siblings affects children's has been considerably researched with effort to analyze in various dimensions by both economists and sociologists. The sex composition of the sibship may affect children

through two main channels. First, the sex composition will impact on parental behavior and in turn it will affect child outcomes. Second, it could be the direct effects between siblings affected by the sibship sex composition, it may be caused by the different interaction between different gender children.

First-born child is known as person who often acts as surrogate parent like an instructor, a caregiver or even a model for his or her younger siblings. He or she tends to achieve a superior status in relationship to their younger ones. This difference turns out to be greater parallel to the increase in age gap. Moreover, the gender of the first-born also affects younger siblings. Older girl often tends to be a good nurturer and teacher while older boy, on the other hand, has a tendency to be better stimulators and models (Cirirelli, 1972). The gender of the first-born, moreover, can affect the way parents behave to the younger. This behavior can be easily identified in the society of pro-male. Family with the first-born boy tends to be smaller size, subsequently, more investment can be allocated to their children for better education and health. In countries with son-preference, parents, on the other hand, may continue give birth until a son is achieved. This situation can lead to limited investment for their children. As a result, the education and health of those children will be negatively affected.

Studies conducted in US suggested that the sex composition of a sibship has viable theoretical utility for educational research. Powell and Steelman (1989) showed how the sex composition of a sibship influences financial strategies of college students and they found that women with brothers are more likely to have difficulty in receiving financial support for education from their parents than those with only sisters. In another study with same vein, by analyzing data from high school students, Powell and Steelman (1990) also concluded that each additional brother suppresses one's grade-point average at twice the rate of each additional sister.

By using data on the educational attainment of people who were born during period from 1920 to 1965, Butcher and Case (1994), in another paper, showed that the gender composition of siblings has impact on women's educational outcomes, but not in the case of men's. They found that females are better off growing up with a brother rather than a sister. In this study, a decrease over time in impact of sibling sex composition on education was also evidenced. Two possible explanations were given to clarify the sibling sex composition's impact on educational attainment, namely, household resource spending; and personal gender role in schooling.

With same study trend as Butcher and Case, Kaestner (1997) used a more recent data set and figured out a different result. No effects were found for white male and female, moreover those Black teenagers who growing up with a sister or more had relatively better educational outcomes than one without or less sisters. He also extended his study by reviewing educational achievement of teenagers and children to see more on effect of sibling gender composition and find the potential reasons of this effect. This extension also approves the finding that educational attainment was not impacted by sibling sex composition, however, little may be found among black people at the age from 15 to 18. He also pointed out that children growing with sisters achieved a better outcome on education than those with brothers.

On the other hand, in other studies such as one carried out by Hauser and Kuo (1998) and Bauer and Gang (1999) in the US and Germany respectively, they find no evidence that educational attainment was affected by sibling gender composition. By using data from three large surveys, namely, the 1973 Occupational Changes in a Generation Survey (OCG), the 1986 to 1988 Surveys of Income and Program Participation (SIPP), and the 1989 National Survey of Families and Households (NSFH), Hauser and Kuo find almost no evidence supporting the idea that women's schooling has been effected by having sisters during the 20th century in the U.S. Additionally, sister quantity effect on educational achievement is found to be not systematically different from one of brother quantity. In the case that birth time and gender are not taken into consideration, one additional child to be appeared will reduce educational attainment modestly.

In England, a study is conducted by David W Lawson and Ruth Mace (2008) utilizing the data from a large cohort study of contemporary British families (ALSPAC) aiming at testing the hypothesis whether siblings could be considered to be a threat to healthy development as rival in the condition of constraint investment by parents in children. The result shows that children who are even born in comparatively prosperous household seem not be better off in parental investment in health, and the later-born children is subjected to be worst affected in family.

In spite of a growing work on this issue from the US or developed countries, this topic is considered to be inadequately researched in developing countries where son preference still exists. Parish, Willis, Grag and Morduch were few ones who have studied the impact of sibling gender composition on educational attainment in

developing countries scenario. In their study conducted using Taiwanese data, Parish and Willis' (1993), and Garg and Morduch (1998), finally reported that the gender composition of siblings have considerable influence on children's educational outcomes and health status. They also found that in the condition of household resource constraint, children, regardless of gender, with older sisters have a better health status and educational attainment. It could be explained by the possibility that older sisters may be a financial provider or they may get married and move to another family which helps to ease the strain on household resources. Other studies conducted in sub-Saharan Africa by Garg and Morduch (1998) using Ghanaian data and Morduch (2000) using South African data also supported those previous findings proposed by Parish and Willis', that is to say, children growing up with only sisters rather than with only brothers have better health outcomes. However, when conducting the study utilizing Tanzanian data, Morduch (2000) hardly found proof of gender disparities in both males and females' educational attainment. Although he could show a positive relation between the number of female siblings and educational outcomes, no variation was figured out in educational attainment with regard to the child's gender, or birth order among sisters.

Some studies directed their goal into the role of birth order on schooling attainment in same context of developing countries such as Birdsall (1980, 1991); Erjnaes and Portner, 2004). Birdsall's (1980) worked with the relation between numbers and resources allocation. The data to be used was extracted from a study on family budget during 1967-1968 with wide-ranged information including income of family members, age, schooling attainment of parents, as well as those from children. The result has shown that there is a negative correlation between resource distribution and number of children. He found in the family with larger number of children, the parents have to deal with extra burden which directly leads to less investment for each child. In other study conducted in 1991, working with the effect of birth order on educational attainment using data on children in urban Colombia, and he concluded that because of maternal time constraints, first-born and last-born children benefit as they belonging to smaller households than the middle born. However, no evidence of birth order effects was found in the case of unconstrained-maternal time.

Erjnaes and Portner (2004) in a study using Philippine data by a model of intra-household allocation in which fertility is taken as endogenous variable, also supported

the idea proposed by Lindert (1977) that lower birth order children have bigger relative benefits in the schooling resource allocation. It may be caused by the fact that lower birth order children are generally has fewer sibling rivals, which likely helps them to have closer contact with maternal time. This is a significant factor influencing children schooling attainment. Up to now, this study is one of the first ones has taken intra-household distribution and decision of fertility into one combined model.

A nationally-scaled data is utilized in M. Dancer and A. Rammohan's study in order to point out that gender, birth order and sibling characteristics strongly affect Egyptian children's schooling attainment. The findings have showed that schooling outcomes of earlier born children is often better off, especially in case of females and rural children. Nevertheless, birth order and sibling characteristics hardly affected male and urban children, with exception of male children born as sixth or higher birth order. They also find that sibship size increase associates with lower schooling attainment for the last born school-age child.

Another study was conducted using Egyptian context by Rania Salem (2003). She applied the Resource Dilution model and the data on Egyptian adolescents collected in 1997. Through collected results, there is evidence to support this model concerning to educational attainment outcomes however, the model does not hold for nutritional outcomes. The author sees a negative relation between sibship size and educational attainment in Egypt. More surprisingly, in contrast to Resource Dilution model's prediction, the later-born children turn out to be more advantaged comparing to their first-born. Remarkably, in family with older sisters, educational attainment seems to be better off. This finding could be explained by the fact that in resource constraint condition, girls may earn money to support family or may be withheld from school to free up resources for younger peers. In conclusion, in Rania Salem's study, gender was pointed out as one of strongest determinants of adolescent benefits whereas sibling configuration stays in a limited influence on educational and health outcomes.

For studies conducted in Asia, especially in pro-male society like China and Taiwan, H. Chen *et al.* (2007, 2008) turn out to be those who have actively paid much interest in reviewing the effect of sibling sex composition on educational attainment for a very long time. They have conducted a series of papers working from the aspect of "twins gender shocks" using the randomness of firstborn twins' sex composition as a natural experiment. In the study carried out in 2007, when looking at the exogenous

gender shocks of first-born twins to estimate the influence of sibling sex composition on college attendance in a highly sex-imbalanced economy, Taiwan, they found that sibling sex composition hardly affected college attendance of both genders, which is conversely different from previous studies. Shortly after this paper, in mid-2008, the authors conducted another study on the causal influence of a change in sibling sex composition on children's educational achievements. The estimation finds no negative effects of having a brother, relative to a sister, on both genders' college attainment.

In Vietnam, so far, quite a few papers have been examining the topic of first-born gender effect or relating topic. Most studies focus on the idea of son preference which was deeply affected by Confucianism. A small survey was conducted by Binh (2013) in two provinces of Hai Duong and Ninh Thuan, revealing that son preference in those localities still exists with some disparity. Located in Red River Delta, Hai Duong presents a strong idea of pro-male, which partly leads this province to be one of the highest imbalance sex ration at birth, 121.3 boys per 100 girls in 2011. Meanwhile, there is inequality in province of Ninh Thuan but the son-preference has been found to be less prominent. This may be affected by the cause of ethnic minority, that is to say, Ninh Thuan is one of the largest concentration province of Cham people with a bilateral kinship system.

Other report seriously concerning this aspect names "Son Preference in Viet Nam: Ancient desires, advancing technologies" by UNFPA (2011). This research shows nowadays, most people have deeply understood the policy of two children, however, they wish at least one must be a son. Sons, as people believe, are crucial for their role of carrying on family lines; executing ancestor worship; and parents caring when they turn old. Another finding of this report is presenting the significant role of pressure from family and community in male dominance preservation. This son-demand has led to the over use of technology for pre-natal selection of child gender which creating the high ration of imbalance sex at birth.

DATA SET

The dataset used in this paper is from Vietnam Household Living Standards Survey (VHLSS) in 2006. This survey is an ongoing longitudinal one examining the Vietnamese population and conducted by General Statistics Office (GSO) with technical

assistance of UNDP and World Bank. Started in 1992, and from 2002, by combining two data sets of MPHS (Multi-purpose Household Survey) and VLSS (Vietnam Living Standards Survey), it has been conducted every 2 years. This survey aims at examining living standards of Vietnamese people and the result can be utilized for evaluating, implementing and amending the Strategy for Comprehensive Poverty Reduction and Growth. The questions concentrate on income, expenditures, economic activity, education, healthcare, and available infrastructure, namely, road, electricity, water and so on. This survey is nationwide and covers about 37,000 participants with various indicators. The questions are designed to ask for the household head's responses, however for each specific content, the most knowledgeable member will be selected to give the answer. Different from VLSS, the household questionnaire in VHLSS is prepared so that it can be completed in one interview, and the sensitive issues such as savings, credit, assets will be conducted at the end. In this study, within the scope of evaluating the effect of child's gender in 2006, only observed characteristics of individuals who are from 7 to 17 years old are used.

EDUCATION AND HEALTH OF CHILDREN

Table 1 shows that the average rate of school enrolment and having good academic performance of children excluding the first-born depends on gender of firstborn or gender or number of siblings. In details, the mean of children enrolling school when firstborn is girl is 0.8690 and the mean of children having academic performance in this case is 0.4985. However, if the firstborn is boy, these figures are lower, 0.8329 and 0.4697, respectively. It means in the families that girl is the firstborn, the rate of children enrolling school and having good academic performance is higher than in the families that boy is the firstborn. This may be explained that in family of first-born boy, investment focuses on the oldest child than the later, leading to lower educational achievements comparing to family of first-born girl.

Table 1: School enrolment and having good academic performance by groups in 2006

Group	School enrolment	Having good academic performance
<i>By gender of firstborn</i>		
Firstborn is girl	0.8690	0.4985
Firstborn is boy	0.8329	0.4697
<i>By gender</i>		
Female	0.8604	0.5497
Male	0.8398	0.4181
<i>By the number of siblings</i>		
2	0.9133	0.5759
3	0.8547	0.4708
4	0.8111	0.4026
5	0.7626	0.3994
Above 5	0.7221	0.3450

Source: Estimation from the 2006 VHLSS

The mean of female children enrolling school is 0.8604 children and higher than male children which is only 0.8398 children. Beside that the average rate of girl children having good academic performance is higher much than one of boy children, 0.5497 and 0.4697, respectively. In reality, in most families, girls often show their workaholic and careful manner which is crucial to achieve a good result in basic schooling grades while boys are more active which lead to less concentration on learning.

Above figures show that educational results of girl children are better than one of boy children, however it does not prove that the education of girl children are gotten better care from family than one of boy children.

Table 1 also shows that if children have more siblings, the rate of enrolling school is lower and the rate having good academic performance even decreases more. In other words, the children having only two siblings have more opportunity to enroll school than the children having more than 5 siblings, thus they have better educational result than one having more than 5 siblings. Table 2 presents the use of health care services of children from 7 to 17 years old in 2006. The first, we compare the use health care services between child groups that determined by gender of firstborn. There is different between child groups in proportions of having health insurance by the difference in gender of firstborn. The children proportion of having health insurance which firstborn is girl is higher little than one which firstborn is boy. Besides that, the children proportion visit health care contacts which firstborn is girl is higher than one which firstborn is boy. However, the payment for health care of both of groups is the

similar. It may be caused by the reason of pro-male in which family will generally pay more attention to the first-born boy's medical check. However, when children are sick, regardless of gender, they will be hospitalized for being treated.

Table 2: Health insurance and health care contacts (from 7 to 17 years old) in 2006

Group	Having health insurance	Number of outpatient health care contacts	Number of inpatient health care contacts	Out-of-pocket payment per outpatient contact	Out-of-pocket payment per inpatient contact
<i>By gender of firstborn</i>					
Firstborn is girl	0.6075	0.6712	0.0468	66.6	1271.9
Firstborn is boy	0.5795	0.5986	0.0389	67.2	1146.6
<i>By gender</i>					
Female	0.5968	0.6447	0.0361	65.6	923.6
Male	0.5888	0.6215	0.0490	68.2	1424.7
<i>By the number of siblings</i>					
2	0.7030	0.7045	0.0471	74.5	1885.0
3	0.5738	0.6659	0.0534	58.6	734.6
4	0.4955	0.6118	0.0240	83.6	558.2
5	0.5498	0.4636	0.0311	54.4	1407.4
Above 5	0.4649	0.3594	0.0291	32.4	1827.0

Source: Estimation from the 2006 VHLSS

The table also compares the use health care services between girls and boys. It's easy to see that the children proportion of having health insurance and visiting health care contacts in both of genders are the same, however spending per health care contact of boys is higher than one of girls, especial for inpatient contact. Table 2 shows that the children who have more siblings have less health insurance, visit health care contact less and pay for outpatient contact less. However, the children who have more siblings pay for inpatient contact more. In family with high number of children, the regular medical checks may not often conducted, however, when the sickness becomes worse, the treatment has to be employed which could be costly.

EMPIRICAL RESULTS

The main variable of interest is the sex of the first-born children. We also control for exogenous variables. Explanatory variables should not be affected by the endogenous variable, i.e., the gender of the first-born (Heckman et al., 1997; Angrist and Pischke, 2008). As a result, endogenous variable such as education of head is not used. Table A.1 in Appendix describes variables used in this study.

Table 3 presents the regression of school enrolment and educational performance. Interestingly, boys have lower school enrolment than girls. It implies that there is bias against girls in education. The sex of the first-born children does not have significant effect on the education enrolment of the later born children. However, when the number of siblings is controlled, the effect of sex of the first-born children is significant and negative. This pattern is also found on the effect of the sex of the first-born children on educational performance of later-born children.

Possibly, the effect of the sex of the first-born children on the later born children happens through two channels. Firstly, have the first-born boys decrease the number of children, and because of the small number of children, education of children is improved. Secondly, children with the first-born brothers might receive less attention than those with the first-born sisters. This still reflects a small bias against girls in investing in education for children.

Table 3: The effect of factors on school enrolment

Explanatory variables	School enrolment		Academic performance	
Firstborn is boy	-0.0134 (0.0105)	-0.0174* (0.0099)	-0.0236 (0.0141)	-0.0303** (0.0143)
Age	-0.0410*** (0.0022)	-0.0402*** (0.0022)	-0.0137*** (0.0040)	-0.0137*** (0.0036)
Sex (male=1; female=0)	-0.0219** (0.0101)	-0.0294*** (0.0102)	-0.1338*** (0.0117)	-0.1457*** (0.0112)
Number of siblings		-0.0395*** (0.0049)		-0.0622*** (0.0097)
Constant	1.3844*** (0.0253)	1.5086*** (0.0236)	0.7301*** (0.0592)	0.9356*** (0.0664)
Observations	5317	5317	4502	4502
R-squared	0.12	0.14	0.02	0.05

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Estimation from the 2006 VHLSS

Table 4 shows the effect of factors on the probability of having health insurance of children. Similarly, a negative effect in “having health insurance” of children has been found and the appearance of “number of siblings” variable has intensified this effect. When the firstborn is boy, “having health insurance” probability drops off 0.0257. One unit increase of “age” and “number of siblings” makes “having health insurance” probability down in 0.0123 and 0.0497 in turn. However, the impact of variable “sex of children” is statically insignificant.

Table 4: The effect of factors on having health insurance

Explanatory variables	Having health insurance	Having health insurance
Firstborn is boy	-0.0207 (0.0157)	-0.0257* (0.0149)
Age	-0.0133*** (0.0032)	-0.0123*** (0.0031)
Sex (male=1; female=0)	-0.0086 (0.0107)	-0.0181 (0.0110)
Number of siblings		-0.0497*** (0.0103)
Constant	0.7758*** (0.0439)	0.9321*** (0.0505)
Observations	5317	5317
R-squared	0.01	0.02

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Estimation from the 2006 VHLSS

Table 5 presents the linear regression result of impact on variables of “number of outpatient health care contacts and the number of inpatient health care contacts”. From the table, it can be seen that only factors of “age” and “number of siblings” are statistically significant on “number of outpatient health care contacts” with negative manner. When children increase one year, the number of outpatient health care contacts probability would go down 0.0257. It may imply that, the older children are, the better health they may achieve. Moreover, one unit increase in number of siblings leads to the decrease in number of outpatient health care contacts probability of 0.0698.

Table 5: The effect of factors on “the number of individual outpatient health care contacts” and “the number of individual inpatient health care contacts

Explanatory variables	Outpatient contacts		Inpatient contacts	
Firstborn is boy	-0.0577 (0.0504)	-0.0648 (0.0507)	-0.0074 (0.0076)	-0.0080 (0.0075)
Age	-0.0271*** (0.0091)	-0.0257*** (0.0090)	-0.0007 (0.0013)	-0.0006 (0.0013)
Sex (male=1; female=0)	-0.0245 (0.0601)	-0.0378 (0.0598)	0.0128* (0.0073)	0.0117 (0.0074)
Number of siblings		-0.0698*** (0.0200)		-0.0061*** (0.0021)
Constant	1.0175*** (0.1389)	1.2370*** (0.1604)	0.0489*** (0.0126)	0.0681*** (0.0159)
Observations	5317	5317	5317	5317
R-squared	0.00	0.00	0.00	0.00

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Estimation from the 2006 VHLSS

Table 5 also reveals that if the effect of number of siblings on the number of inpatient health care contacts is not considered, only impact of children’s sex is statistically significant to the number of inpatient health care contacts. In which, the

number of inpatient health care contacts probability of boys is 0.0128 higher than ones of girls. For the function considering the effect of number of siblings on the number of inpatient health care contacts, only impact of number of siblings is statically significant which negatively affect the number of inpatient health care contacts, namely when number of siblings increase one unit, the number of inpatient health care contacts probability would go down 0.0061.

This below table presents result of linear regression evaluating effect of factors on variables of “out of pocket payment per outpatient contact” and “out of pocket payment per inpatient contact”. Only effect of “age” and “number of siblings” has been found statically significant on “out of pocket payment per outpatient contact”. Specifically, when children get one year older, the payment per outpatient contact would increase 7,170 VND while there is one more in number of siblings, the out of pocket payment per outpatient contact would decrease 6,130 VND.

Table 6: The effect of factors on “out-of-pocket payment per outpatient contact” and “out-of-pocket payment per inpatient contact”

Explanatory variables	Out-of-pocket payment per outpatient contact		Out-of-pocket payment per inpatient contact	
Firstborn is boy	-2.42 (7.88)	-2.84 (7.83)	-76.01 (741.86)	-76.56 (744.62)
Age	6.98*** (2.32)	7.17*** (2.28)	-29.31 (84.26)	-19.16 (76.53)
Sex (male=1; female=0)	3.04 (11.78)	2.12 (11.48)	495.99 (498.19)	470.33 (482.69)
Number of siblings		-6.13* (3.06)		-139.78 (147.46)
Constant	-18.64 (17.24)	-1.15 (23.72)	1,325.33 (1,106.09)	1,641.85 (1,365.91)
Observations	1320	1320	197	197
R-squared	0.01	0.01	0.00	0.01

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: Estimation from the 2006 VHLSS

The regression result shows that gender of firstborn has little effect on education and health of children. Nevertheless, their age is play a big role with rather high negative effect while the gender of children has a negative effect to education but not health. The number of siblings has a comparatively high and negative impact on education and health care of children. To conclude, among factors, the age has largest effect to children’s education and health.

CONCLUSION

This study examines the effect of the sex of firstborn children on education and health of later born children. Interestingly, boys have lower school enrolment than girls. It implies that there is bias against girls in education. The sex of the first-born children does not have significant effect on the education enrolment of the later born children. However, when the number of siblings is controlled, the effect of sex of the first-born children is significant and negative. This pattern is also found on the effect of the sex of the first-born children on educational performance of later-born children.

Possibly, the effect of the sex of the first-born children on the later born children happens through two channels. Firstly, have the first-born boys decrease the number of children, and because of the small number of children, education of children is improved. Secondly, children with the first-born brothers might receive less attention than those with the first-born sisters. This still reflects a small bias against girls in investing in education for children.

Children with a brother also have a lower rate of health insurances than children with a sister, but this difference is small. Regarding the health care utilization, we do not find a significant effect the sex of firstborn children.

APPENDIX

Table A.1: Description variables

Variable	Obs	Mean	Std. Dev.	Min	Max
School enrolment	5317	0.850	0.357	0	1
Having good academic performance	4502	0.484	0.500	0	1
Having health insurance	5317	0.593	0.491	0	1
Number of outpatient health care contacts	5317	0.633	1.810	0	35
Number of inpatient health care contacts	5317	0.043	0.251	0	7
Out-of-pocket payment per outpatient contact	1320	66.90	211.61	0	6000
Out-of-pocket payment per inpatient contact	197	1212.3	3766.8	0	40000
Firstborn is boy	5317	0.527	0.499	0	1
Age	5317	12.591	2.963	7	17
Sex (male=1; female=0)	5317	0.508	0.500	0	1
Number of siblings	5317	3.253	1.299	2	11
Ethnic minority (yes=1, Kinh=0)	5317	0.183	0.386	0	1
Urban (urban=1; rural=0)	5317	0.195	0.396	0	1
Education grade of household head	5317	7.203	3.403	0	12

Source: Estimation from the 2006 VHLSS

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