Effects of Education Policy on Women's Investment in Early Childhood Health Care in Uganda

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Introduction

Investment in early childhood healthcare has long term implications on a child's abilities and success as adults. In many developing countries that lack social securities for the elderly, children are relied upon as financial and social support for retirement. Healthy children are stronger and can be more successful in school, thus creating a path for future success. In households with limited resources, parents tend to invest on children who have higher cognitive abilities. Therefore, sibling rivalry, competition among siblings for limited resources exist, because the parents have to choose which child to invest in based on the information they have.[i] In societies that are biased towards men, the investment in girls has lower returns than investment in boys. Therefore, many parents choose to invest their limited resources on their sons. Although, in their study Arkesh, Bagby and De Walque (2012) looked at factors, such as a child's health and mental capacity, that the parents used to determine weather or not to invest in their education. I believe that the cost of education can also determine the parent's decision to invest in the child's healthcare.

In this paper, I studied factors that determine investments in early childhood healthcare in Uganda. One of the factors I studied was the Universal Primary Education (UPE) policy implemented by the Ugandan government in 1997. Under this policy, the government abolished tuition and Parent and Teacher Association (PTA) fees for four children of school going age per family.[ii] The purpose of the UPE was:

- To promote human resource development.
- Enable every child to complete their primary education and make it accessible.
- Make education affordable and equitable to eliminate disparities and inequalities in Uganda
- Use as a tool to eradicate poverty by equipping every individual with basic skills and knowledge.

Despite the removal of the charges, primary education was not made compulsory, nor was it completely free. Parents were expected to contribute labor, community work and still pay for the school supplies which many were not able to do. Additionally, the conditions that the government imposed about the age bracket of eligibility, the priority to girls and, the four-child restriction per family was problematic because the definition of a family did not reflect the realities of the nation. Households with more than four children that qualified in the age bracket were forced to pay fees on the additional child or children. Therefore, the government eventually removed the restriction and allowed all people that wanted to get a primary education to enroll.[iii]

Even though there were various factors that did not satisfy the public initially, this policy dramatically reduced the cost of primary education for children. I looked at how the changes in the monetary cost of schooling due to this policy impacted the parent's investment in the child's healthcare. I looked at data before 2002, when the government dropped the conditions, to study if children who qualified for the free education had greater investment in their healthcare than their siblings who did not qualify.

Events and investment in fetal origins and early childhood have life-long consequences according to Almond, Currie and Duque (2018). Therefore, investment in healthcare early in a child's life will influence long-term outcomes in their life. These outcomes, other than long-term health, that economists are interested in are personality, IQ and wages.[iv] This would mean that

early childhood investments may be related to the child's ability to financially support themselves and their parents when they are adults and when their parents retire. Additionally, shocks in early life can affect a child's ability to perform well in school as well. So, my hypothesis is that parents who are only able to send the children who qualify for the UPE to school will invest more in the healthcare of those children relative to other children who will not be able to take advantage of the program.

In a male biased society, there is a greater chance of parents providing better care for their son compared to their daughters. In a study done in India by Anukriti, Bhalota and Tam (2016) on abortions, fertility and parental investment with increase in sex detection technology, they determined a bias in favor of boys. They found that the increased availability and access to technologies like ultrasound "increased post-neonatal and neonatal survival of girls" however it is "offset by increased prenatal loss of girls due to feticide".[v] Moreover, they also discovered that girls that did survive end up receiving higher rates of early-life investment and that the decline in fertility has benefited girls as well because they do not have to share resources between a large number of siblings. In this paper I attempted to see if there is a similar male bias in Uganda, especially in families headed by women. Moreover, I wanted to see if the government conditions in UPE that favored girls had any effect on mother's investment in the healthcare of girls relative to boys.

Methodology

I got the data to conduct the analysis from the DHS database that collects demographics data from all countries that accept aid from the United States. In addition to the elements mentioned above, I also looked at other factors such as household traits, the demographic traits of the mother as well as the demographic traits of the child that might affect the investment in early childhood healthcare. I created an outcome/ independent variable called after_cutoff to separate out children who did not qualify for the UPE program. Then I created seven variables that measured different healthcare investment such as completed vaccines, pre-natal care and the height and weight of the child. Lastly, I created several individual control variables and local controls that are listed below. I ran regression analysis on the dependent variables to test my theory.

I created the following independent variable:

- after_cutoff which measures the number of children who fit the age criteria for the policy but are cutoff because of the number of children in the household

I created the following dependent variables:

- m_assistance is a dummy variable the measure whether the mother got medical assistance during pregnancy or birth
- c_dpt is a dummy variable that measures if the child has received dpt vaccines
- c_polio is a dummy variable that measures if the child has received polio vaccines
- c_measles is a dummy variable that measures if the child received measles vaccines
- weight: this measure the weight of the children within a percentile divided by 100

- height: this measure the weight of the children within a percentile divided by 100
- c_breastfeeding: is a dummy variable that measures if the child was breastfed for at least 6 months

In addition, I used the following controls

- bord_8: birth order of the child is greater than 8
- numchildren: which measures the number of eligible children in the household
- v001: village cluster
- hcontrol: local control, used to control for household
    - v136: household size
    - v151: sex of the household head
    - v152: age of household head
    - m_age: mother's age
- wlthindex: the wealth index that the household falls into
- xi: local control, used to control for child's demographic traits
    - age2: children of age of 2 and under
    - b4: sex of the child
- mcontrol: local control, used to control for mother's demographic traits
    - v106: education of the mother
    - m_age: age of the mother

I merged the table UGBR41FL with another table that contained the wealth quintile of households in Uganda to control for it when running the regressions.

I ran five ols regressions for each of the dependent variable. I ran the first regression with the independent variable after_cutoff, numchildren, board_8, and the cluster v001. Next, I added household controls with "hcontrol". In the third regression I added xi to control for the demographic traits of the child. The fourth regression I added a control for the wealth index and finally in the last regression I added "mcontrol" to control for the demographic traits of the mother. Lastly, I used robust standard errors to correct for heteroskedasticity.

Initially, I had created a BMI dependent variable as well, however, since the sample of children I was studying were so young the results I was getting were not reliable. Therefore, I decided to use the height and weight as separate dependent variables instead. The height and the weight variables are linear probability models while the rest of the independent variables are dummy variable. Finally, I ran regressions of all the dependent variables with the interaction variable "after_cutoff and girls" to measure if there was any difference in investment for girls that were cutoff from UPE compared to boys. The hypothesis I was testing was that an increase in my primary variable, after_cutoff, as well as the sex of the child will have a negative effect on the outcome variables.

The regression equation I used with all the controls:

$$\mathrm{Y_i} = \beta_0 + \beta_1 aftercut\_off + \beta_2 \mathrm{numchildren} + \beta_3 bord\_8 + \beta_4 \mathrm{i.wlthindex} + \text{`mcontrol}' + \text{`xi}' + \text{`hcontrol}'$$

Findings:

After running the regression with all the controls, there were several variables that had a positive impact on the dependent variables. There were also some variables that had a negative impact on all the dependent variable. I ran the regressions with the interaction variable to check if the investment in healthcare was different for girls that fell in the after_cutoff group relative to boys in that group **(Appendix 8)**. However, none of the dependent variables has any significant effect with the interaction variable besides the medical assistance variable. Which means that there wasn't any significant difference between investments in girls and boys that were cut off from the UPE policy. The findings about each of the other outcome variables I looked at are listed in detail below:

Weight (Appendix 1)

The after_cutoff variable is not significant when using weight as the dependent variable. Which means that the conditions in the universal primary education policy that restricted the children from not being able to access the free primary education did not have any effect on the weight of the child. The sex of the child did not have any significant effect on the weight percentile they were a part of either.

On the other hand, the education of the mother had a significant effect on the weight of the child. A 1 unit/year increase in the mother's education increases the child's weight percentile by 3.027 units. A woman who is literate has a greater understanding of the nutrients that a child may need as they grow up. Additionally, the education of the mother means that they are likely to work, increasing the income and resources of the household. The age of the child is shown to have a negative effect. However, this could just be because the children I looked at in this study were 2 years old or below and children tend to weigh less when they are young.

Height (Appendix 2)

The after_cutoff variable is not significant. Which means that the inability for the child to take advantage of the free primary education with the conditions did not have any significant effect on their health that might affect their height. The sex of the child did not have a significant effect on height either.

The mother's education had a positive effect on the height of the child. A 1 unit/year increase in the mother's education increases the child's height percentile by 1.814 units. Which could mean that an educated woman is more likely to provide better childcare which would result in better health of the child and the family as a whole. The number of people in the household also had a significant effect on the height of the child. A 1 unit increase in the number of members in the household increase the child's height percentile by .603 units . The larger number of family members could mean that there is more income in the family allowing them to have better resources to care for a child. Lastly, the mothers age also had a positive impact on the child's height. A 1-year increase in the mother's age increase the child's height percentile by .342 units.

The age of the child had a negative impact on the child's height. A 1-year increase in their age decrease the child's height in their percentile by approximately 17 inches. This could be because children grow much faster at a young age and their growth slows down as they grow older. If a child is in a female led household, the child's height percentile has a negative effect of 2.389 units. This is mostly likely because female led households are the most economically

disadvantaged group. This restricts their access to resources that children need to be healthy and grow at the right pace. Thus, the children are shorter in such households.

Breast feeding (Appendix 3)

The after_cutoff variable is not significant in determining weather or not the child will get breast fed for at least 6 months after birth. The child's eligibility to get access to free primary education did not play a significant role in weather or not they received breast feeding. The sex of the child is not significant in determining if the child receives breastfeeding either. The most surprising is that the education of the mother is not a significant contributing factor in weather or not they choose to breast feed the child. This could be because getting formula or other animal milk cost money and breastmilk is the most economical option for many women. Therefore, their choice to do this is rooted more in economic reasons rather than the wellbeing of the child.

Children born in households that fall in the 4^{th} quintile of the wealth index are more likely to get breast fed than children in households of other quintiles. There could be various reasons for this such as the cost of alternatives as well as the likelihood that women who are in this quintile have more education so are aware of the benefits of breastfeeding. Additionally, they are less likely to work outside their homes compared to women in the 5^{th} wealth quintile. Hence, are able to be with their child to breast feed them. Lastly, and increase in the mother's age increase the likelihood of the child getting breastfed for at least 6 months. Older women could use breastfeeding as a contraceptive tool to decrease or stop having children.

A 1 person increase in the people in the household decreased the likelihood of the child getting breastfed for at least 6 months decreased by .00496%. This could be due to the amount of responsibilities of the household that women are performing and therefore, do not have time to breastfeed their child regularly.

DPT completion (Appendix 4)

The after_cutoff variable is not significant for this variable which means that the eligibility of the child in getting free primary education did not affect parents' decision to give the child the complete dosage of the dpt vaccination. The sex of the child did not have any significant effect on weather or not the child got the complete dpt vaccine dosage.

The mother's education on the other had a positive impact on the child receiving the complete dpt vaccine. A 1-year increase in the mother's education increased the likelihood of the child getting the complete dose of the dpt vaccine by .0455 %. An educated woman is more likely to be aware of the advantages of getting and completing the dpt vaccine dosage. Therefore, a higher education in the mother will increase the likelihood that the child gets the vaccine. The dosage of the dpt vaccine is given to infants under 2 years old when they are 2 months, 4months, 6 months, 15 months and 18 months.[vi] Therefore, if the child was under the age of 1 it increased the likelihood of the child getting the complete dose of the dpt vaccine by .0506. Finally, the mother's age had a positive impact on the child getting the complete dosage of the vaccine. A 1-year increase in the mother's age increased the likelihood of the completing the dpt vaccine by .00618 %. Older women have more children, thus, more experience so they are aware of the consequences of not vaccinating their children, hence, are more likely to complete the dosage.

In households headed by women the likelihood of completing the dpt vaccine decreased by .0836%. Again, households led by women are usually the most economically disadvantaged as

well as socially disadvantaged. Therefore, resources are spread thin and the family may not have time to take the child to a doctor to complete the dpt vaccine dosage. A year increase in the age of the head of household decreased the likelihood of completing the dpt vaccine. Older women may not be fully aware of the risks or do not trust new technology to protect children. Therefore, in households headed by older women the children are less likely to get the complete dpt vaccine.

Measles completion (Appendix 5)

The after_cutoff variable is not significant for this dependent variable. A child's eligibility to get free primary education does not affect the likelihood that they complete the measles vaccine. The sex of the child does not have any affect on the completion of getting the measles vaccine either.

The mother's education has a positive effect on the likelihood that the child will get the complete measles vaccine. A 1-year increase in the mother's education increased the likelihood of completing the measles vaccine by .0257%. Again, educated women are more likely to understand the importance of vaccines on the child's health. A child under the age of 2 increases the probability of having completed the vaccine by .237%. Lastly, the age of the mother has a positive effect on the child getting the complete dose of the vaccine. A 1-year increase in the mother's age increases the likelihood of completing the vaccine by .00433%.

A child in a household headed by a woman has a lower chance of getting the complete vaccine dosage. There are economic and social constrains on women who are support their families financially. In household's headed by women the likelihood of completing the vaccine decreases by .0530%. A year increase in the age of the head of the household decrease the likelihood of completing the vaccine by .00181%. Older people may not be aware of the importance and usage of vaccines thus, may not think it is important for their children to get them.

Polio vaccine completion (Appendix 6)

The after_cutoff variable is not significant for this dependent variable either. The fact that the child will not be able to receive free primary education does not affect the parents' decision to give them the polio vaccine. The sex of the child does not have any significant effect on this either.

The education of the mother on the other hand has a positive effect on the chances that the child receives the complete dosage of the polio vaccine. A year increase in the education of the mother increases the likelihood of the completion of the vaccine by .0444%. Polio awareness has been a global health priority for a number of years. Educated women are more likely to be aware of it as well as the importance of the vaccine. Children normally get the all the dosage of the vaccine with in their 1st year.[vii] Therefore, Children under the age of 1 are likely to complete the vaccine by .0528%. A year increase in the mother's age increases the likelihood of completing the vaccine by .00694% as well.

Households led by women are usually the most economically disadvantaged. Therefore, for children is such environments the likelihood of completing the vaccine decreased by .0822% than children in households led by men. Older people are less likely to understand the importance of vaccines or have faith in them. Therefore, a year increase in the age of the household head will decrease the likelihood of completing the vaccine by .00291%. Older people

who are the main breadwinners of the household may not have the time to take the child to get the vaccine either.

Medical assistance during pregnancy (Appendix 7)

The sex of the child is not significant in determining whether or not the mother received medical assistance during pregnancy. This is probably due to the fact that they did know the sex of the child during the pregnancy.

More interestingly medical assistance is the only dependent variable where the after_cutoff variable was significant. Pregnancies that occurred after the cutoff limit of the UPE policy were more likely to get medical assistance by .0492%. One reason could be that the parents might be trying to find out the gender of the child by getting medical assistance. Although, there is no clear evidence of a male bias in Uganda. A 1-year increase in the education of the mother increases the likelihood that they will seek medical assistance by .0509%. Educated women understand the risks of a pregnancy as well as the benefits of getting prenatal care. Therefore, the increase in education results in women seeking out medical assistance during their pregnancies. A year increase in the age of the mother increases the likelihood that they seek medical assistance by .00679%. Women past a certain age have higher chances of having more complications during pregnancies and childbirth so they are more likely to need and seek medical assistance.

If the child has 8 or more siblings that are older than them then it has a negative impact on the mother receiving medical assistance during pregnancy and the child receiving pre-natal care. Increase in the birth order after 8 decreases the likelihood of pre-natal care by .0613%. Women with many children have experience with childbirth, so they believe that they do not need medical attention during the pregnancy. The age of the child is shown to have a negative effect. Children under the age of 2 decrease the likelihood that they receive pre-natal care by .0880%.

Conclusion

The findings show that my initial hypothesis, that a child's eligibility for UPE would have a significant impact on the parent's decision to invest in their healthcare is not found in the data. The after_cutoff variable should have had a negative impact on the dependent variable if this hypothesis had been true. However, that is only true for one dependent variable, which is the likelihood that the mother seeks medical attention during pregnancy. My next hypothesis that the sex of the child will have a negative impact on the parent's investment in their healthcare is also false from the hypothesis. I wanted to see if women invested more in their sons relative to their daughters in terms of healthcare. However, as seen by the findings, there seems to be no significant bias towards boys compared to girls in Uganda. The sex of the child does not determine the investment they receive in their healthcare. However, children born in households headed by women are the least likely to receive proper investment in their healthcare. Lastly, the mother's demographics, such as her age and especially her education was the biggest positive determinant of early childhood healthcare investment.

Appendix 1 (Weight)

VARIABLES	weight	weight	weight	weight	weight
after_cutoff	0.584	0.304	-1.865	-1.849	-1.990
	(1.837)	(1.816)	(1.759)	(1.761)	(1.767)
number of children	0.0550	0.0474	0.415	0.417	0.343
	(0.398)	(0.413)	(0.390)	(0.392)	(0.529)
bord_8	-3.293	-3.472	-3.976	-3.952	-4.122
	(2.691)	(2.711)	(2.683)	(2.700)	(2.721)
quintiles of wealth index = 2, second quintile				-0.525	-0.521
				(2.028)	(2.027)
quintiles of wealth index = 3, middle quintile				0.769	0.800
				(1.802)	(1.805)
quintiles of wealth index = 4, fourth quintile				-2.583	-2.632
				(1.831)	(1.837)
quintiles of wealth index = 5, highest quintile				-2.911	-2.743
				(2.013)	(2.011)
highest educational level					2.977***
					(1.044)
mother's age					0.118
					(0.161)
under age 2 = 1			-20.65***	-20.66***	-20.79***
			(1.318)	(1.323)	(1.325)
under age 2 = 2			-17.28***	-17.27***	-17.44***
			(1.428)	(1.432)	(1.436)
sex of child = 2, female			1.362	1.396	1.344
			(0.935)	(0.931)	(0.925)
number of household members		0.0484	0.0907	0.0767	0.0463
		(0.240)	(0.238)	(0.240)	(0.241)
female led household		-2.543*	-1.690	-1.717	-1.913
		(1.411)	(1.365)	(1.366)	(1.367)
age of household head		0.0400	0.0528	0.0517	0.0451
		(0.0512)	(0.0481)	(0.0481)	(0.0506)
Constant	27.09***	25.95***	35.93***	37.36***	32.29***
	(1.269)	(1.952)	(2.005)	(2.507)	(3.705)
Observations	3,417	3,415	3,415	3,415	3,415
R-squared	0.131	0.133	0.219	0.221	0.224

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 2 (Height)

VARIABLES	height	height	height	height	height
after_cutoff	3.257	2.409	0.245	0.217	0.0822
	(2.063)	(2.061)	(1.965)	(1.967)	(1.963)
number of children	0.00757	-0.180	0.201	0.205	-0.420
	(0.399)	(0.411)	(0.390)	(0.392)	(0.500)
bord_8	-4.161*	-4.347*	-5.020**	-5.061**	-4.845**
	(2.406)	(2.435)	(2.315)	(2.330)	(2.295)
quintiles of wealth index = 2, second quintile				-1.206	-1.153
				(1.751)	(1.746)
quintiles of wealth index = 3, middle quintile				0.137	0.157
				(1.857)	(1.863)
quintiles of wealth index = 4, fourth quintile				-1.152	-1.165
				(1.841)	(1.850)
quintiles of wealth index = 5, highest quintile				-0.852	-0.674
				(2.253)	(2.251)
highest educational level					1.769*
					(1.006)
mother's age					0.344**
					(0.156)
under age 2 = 1			-18.50***	-18.50***	-18.70***
			(1.232)	(1.232)	(1.234)
under age 2 = 2			-16.47***	-16.49***	-16.85***
			(1.286)	(1.289)	(1.286)
sex of child = 2, female			0.445	0.472	0.439
			(0.943)	(0.939)	(0.937)
number of household members		0.529**	0.577**	0.578**	0.603**
		(0.267)	(0.262)	(0.263)	(0.261)
female led household		-2.868**	-2.133*	-2.138*	-2.487**
		(1.273)	(1.203)	(1.208)	(1.204)
age of household head		0.0610	0.0719	0.0712	0.0407
		(0.0474)	(0.0445)	(0.0446)	(0.0473)
Constant	20.79***	16.85***	26.29***	26.96***	19.78***
	(1.191)	(1.940)	(1.995)	(2.481)	(3.773)
Observations	3,417	3,415	3,415	3,415	3,415
R-squared	0.138	0.143	0.223	0.224	0.226

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 3 (Breastfeeding)

VARIABLES	e1	e2	e3	e4	e5
	min 6 months breastfeeding				
after_cutoff	-0.0612**	-0.0542**	0.0187	0.0183	0.0178
	(0.0241)	(0.0239)	(0.0203)	(0.0203)	(0.0202)
number of children	0.0134***	0.0145***	0.00129	0.00138	-0.00775
	(0.00513)	(0.00535)	(0.00444)	(0.00446)	(0.00532)
bord_8	-0.0380	-0.0416	-0.0216	-0.0211	-0.0160
	(0.0378)	(0.0382)	(0.0313)	(0.0314)	(0.0313)
quintiles of wealth index = 2, second quintile				0.0106	0.00911
				(0.0197)	(0.0195)
quintiles of wealth index = 3, middle quintile				0.00164	-0.000401
				(0.0226)	(0.0226)
quintiles of wealth index = 4, fourth quintile				0.0452**	0.0444**
				(0.0203)	(0.0202)
quintiles of wealth index = 5, highest quintile				0.0289	0.0286
				(0.0234)	(0.0234)
highest educational level					-0.00614
					(0.0116)
mother's age					0.00400***
					(0.00150)
under age 2 = 1			0.532***	0.532***	0.530***
			(0.0148)	(0.0147)	(0.0147)
under age 2 = 2			0.526***	0.526***	0.523***
			(0.0156)	(0.0157)	(0.0157)
sex of child = 2, female			-0.0144	-0.0150	-0.0147
			(0.0115)	(0.0114)	(0.0115)
number of household members		-0.00602**	-0.00605**	-0.00600**	-0.00513**
		(0.00296)	(0.00235)	(0.00235)	(0.00240)
female led household		0.0350**	0.00804	0.00871	0.00565
		(0.0168)	(0.0134)	(0.0134)	(0.0133)
age of household head		0.000742	0.000336	0.000347	4.28e-06
		(0.000673)	(0.000529)	(0.000530)	(0.000549)
Constant	0.747***	0.746***	0.462***	0.442***	0.388***
	(0.0159)	(0.0260)	(0.0233)	(0.0290)	(0.0414)
Observations	3,978	3,976	3,976	3,976	3,975
R-squared	0.071	0.074	0.425	0.426	0.428

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 4 (dpt completion)

VARIABLES	a1	a2	a3	a4	a5
			completed dpt		
after_cutoff	0.0240	0.0302	0.0221	0.0214	0.0187
	(0.0245)	(0.0242)	(0.0246)	(0.0248)	(0.0250)
number of children	-0.00366	0.000602	0.00244	0.00255	-0.00759
	(0.00517)	(0.00532)	(0.00544)	(0.00543)	(0.00714)
bord_8	-0.103***	-0.0957**	-0.104***	-0.105***	-0.102***
	(0.0367)	(0.0369)	(0.0373)	(0.0373)	(0.0369)
quintiles of wealth index = 2, second quintile				0.0147	0.0159
				(0.0262)	(0.0262)
quintiles of wealth index = 3, middle quintile				0.0209	0.0224
				(0.0297)	(0.0297)
quintiles of wealth index = 4, fourth quintile				0.0273	0.0275
				(0.0302)	(0.0303)
quintiles of wealth index = 5, highest quintile				0.0484	0.0526
				(0.0336)	(0.0339)
highest educational level					0.0458***
					(0.0150)
mother's age					0.00598***
					(0.00217)
under age 2 = 1			0.0570***	0.0566***	0.0528***
			(0.0193)	(0.0193)	(0.0192)
under age 2 = 2			-0.0206	-0.0211	-0.0267
			(0.0221)	(0.0222)	(0.0223)
sex of child = 2, female			0.00320	0.00342	0.00267
			(0.0159)	(0.0158)	(0.0159)
number of household members		-0.00460	-0.00380	-0.00375	-0.00354
		(0.00378)	(0.00376)	(0.00370)	(0.00374)
female led household		-0.0790***	-0.0803***	-0.0793***	-0.0849***
		(0.0208)	(0.0210)	(0.0210)	(0.0213)
age of household head		-0.00250***	-0.00258***	-0.00257***	-0.00302***
		(0.000755)	(0.000755)	(0.000751)	(0.000763)
Constant	0.423***	0.535***	0.513***	0.486***	0.342***
	(0.0165)	(0.0294)	(0.0311)	(0.0368)	(0.0557)
Observations	3,978	3,976	3,976	3,976	3,975
R-squared	0.168	0.176	0.180	0.181	0.185

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 5 (Measles)

VARIABLES	c1	c2	c3	c4	c5
			completed measles		
after_cutoff	-0.00660	-0.00307	0.0321	0.0324	0.0307
	(0.0210)	(0.0210)	(0.0206)	(0.0208)	(0.0208)
number of children	0.000615	0.00247	-0.00400	-0.00410	-0.0117**
	(0.00468)	(0.00476)	(0.00459)	(0.00459)	(0.00580)
bord_8	-0.111***	-0.107***	-0.0955***	-0.0958***	-0.0930***
	(0.0322)	(0.0322)	(0.0308)	(0.0308)	(0.0305)
quintiles of wealth index = 2, second quintile				0.00673	0.00676
				(0.0228)	(0.0228)
quintiles of wealth index = 3, middle quintile				-0.00837	-0.00825
				(0.0268)	(0.0269)
quintiles of wealth index = 4, fourth quintile				0.00959	0.00921
				(0.0266)	(0.0267)
quintiles of wealth index = 5, highest quintile				0.0248	0.0269
				(0.0293)	(0.0296)
highest educational level					0.0260**
					(0.0128)
mother's age					0.00420**
					(0.00179)
under age 2 = 1			0.233***	0.233***	0.230***
			(0.0168)	(0.0169)	(0.0168)
under age 2 = 2			0.242***	0.242***	0.238***
			(0.0170)	(0.0170)	(0.0170)
sex of child = 2, female			0.0152	0.0153	0.0150
			(0.0131)	(0.0130)	(0.0130)
number of household members		-0.00207	-0.00211	-0.00195	-0.00163
		(0.00288)	(0.00279)	(0.00275)	(0.00280)
female led household		-0.0384**	-0.0496***	-0.0495***	-0.0533***
		(0.0176)	(0.0172)	(0.0173)	(0.0175)
age of household head		-0.00121*	-0.00138**	-0.00138**	-0.00170***
		(0.000623)	(0.000618)	(0.000617)	(0.000631)
Constant	0.225***	0.279***	0.142***	0.133***	0.0385
	(0.0149)	(0.0251)	(0.0256)	(0.0326)	(0.0456)
Observations	3,978	3,976	3,976	3,976	3,975
R-squared	0.133	0.136	0.207	0.207	0.210

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6 (polio)

VARIABLES	b1	b2	b3	b4	b5
			completed polio		
after_cutoff	0.0263	0.0327	0.0249	0.0239	0.0212
	(0.0237)	(0.0236)	(0.0240)	(0.0242)	(0.0243)
number of children	-0.00549	-0.00130	0.000517	0.000677	-0.00935
	(0.00515)	(0.00524)	(0.00538)	(0.00537)	(0.00715)
bord_8	-0.101***	-0.0940**	-0.103***	-0.104***	-0.100***
	(0.0379)	(0.0383)	(0.0386)	(0.0386)	(0.0382)
quintiles of wealth index = 2, second quintile				0.0218	0.0230
				(0.0259)	(0.0258)
quintiles of wealth index = 3, middle quintile				0.0338	0.0353
				(0.0296)	(0.0295)
quintiles of wealth index = 4, fourth quintile				0.0312	0.0314
				(0.0297)	(0.0298)
quintiles of wealth index = 5, highest quintile				0.0627*	0.0669**
				(0.0332)	(0.0334)
highest educational level					0.0450***
					(0.0153)
mother's age					0.00590***
					(0.00220)
under age 2 = 1			0.0596***	0.0589***	0.0552***
			(0.0194)	(0.0194)	(0.0193)
under age 2 = 2			-0.0180	-0.0185	-0.0241
			(0.0222)	(0.0223)	(0.0224)
sex of child = 2, female			-0.00158	-0.00118	-0.00192
			(0.0158)	(0.0158)	(0.0158)
number of household members		-0.00477	-0.00399	-0.00396	-0.00376
		(0.00368)	(0.00366)	(0.00360)	(0.00363)
female led household		-0.0773***	-0.0790***	-0.0776***	-0.0831***
		(0.0208)	(0.0209)	(0.0209)	(0.0212)
age of household head		-0.00240***	-0.00249***	-0.00247***	-0.00291***
		(0.000751)	(0.000752)	(0.000747)	(0.000760)
Constant	0.431***	0.540***	0.519***	0.484***	0.342***
	(0.0165)	(0.0295)	(0.0315)	(0.0369)	(0.0554)
Observations	3,978	3,976	3,976	3,976	3,975
R-squared	0.176	0.183	0.188	0.188	0.193

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 7 (Medical assistance during pregnancy)

VARIABLES	r1	r2	r3	r4	r5
	medical assistance during birth				
after_cutoff	0.0676***	0.0689***	0.0518**	0.0528***	0.0497**
	(0.0193)	(0.0201)	(0.0200)	(0.0200)	(0.0200)
number of children	-0.0200***	-0.0205***	-0.0169***	-0.0172***	-0.0284***
	(0.00414)	(0.00421)	(0.00416)	(0.00417)	(0.00624)
bord_8	0.0738***	0.0701**	0.0581**	0.0579**	0.0613**
	(0.0277)	(0.0276)	(0.0271)	(0.0272)	(0.0275)
quintiles of wealth index = 2, second quintile				0.00153	0.00325
				(0.0216)	(0.0215)
quintiles of wealth index = 3, middle quintile				-0.0220	-0.0199
				(0.0234)	(0.0232)
quintiles of wealth index = 4, fourth quintile				-0.0227	-0.0223
				(0.0232)	(0.0230)
quintiles of wealth index = 5, highest quintile				-0.00835	-0.00333
				(0.0268)	(0.0268)
highest educational level					0.0522***
					(0.0125)
mother's age					0.00667***
					(0.00185)
under age 2 = 1			-0.000475	-0.000323	-0.00455
			(0.0148)	(0.0148)	(0.0147)
under age 2 = 2			-0.0818***	-0.0816***	-0.0880***
			(0.0147)	(0.0147)	(0.0146)
sex of child = 2, female			-0.00357	-0.00343	-0.00434
			(0.0116)	(0.0116)	(0.0115)
number of household members		-0.00202	-0.00122	-0.00109	-0.000912
		(0.00274)	(0.00276)	(0.00276)	(0.00275)
female led household		0.0115	0.0128	0.0121	0.00585
		(0.0166)	(0.0166)	(0.0167)	(0.0167)
age of household head		0.00110*	0.00105*	0.00104*	0.000536
		(0.000586)	(0.000588)	(0.000588)	(0.000612)
Constant	0.230***	0.203***	0.217***	0.227***	0.0652
	(0.0131)	(0.0228)	(0.0258)	(0.0322)	(0.0423)
Observations	3,978	3,976	3,976	3,976	3,975
R-squared	0.194	0.195	0.204	0.205	0.214

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 8 (Interaction Variable)

VARIABLES	f1 weight	f2 height	f3 min 6 months breastfeeding	f4 completed dpt	f5 completed measles	f6 completed polio	f7 medical assistance during birth
after_cutoff==1	-0.304	0.983	0.00948	0.000382	0.0395	0.00964	0.0581**
	(2.227)	(2.187)	(0.0238)	(0.0285)	(0.0252)	(0.0282)	(0.0247)
girl==1	2.094*	0.828	-0.0104	-0.000789	0.00976	-0.00247	-0.00594
	(1.223)	(1.146)	(0.0141)	(0.0190)	(0.0163)	(0.0191)	(0.0151)
after_cutoff==1 & girl==1	-3.065	-1.522	0.0177	0.0380	-0.0184	0.0251	-0.0162
	(2.251)	(2.194)	(0.0260)	(0.0341)	(0.0286)	(0.0345)	(0.0264)

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