Supplemental Information

DATA AND VARIABLE DEFINITIONS

The following procedures were followed to obtain the analytic data set from the DHS. The DHS data needed for this analysis came from merging household members' data with child health data. The household member surveys document basic demographic information (including age and gender) and schooling attainment of every member of sampled households. This information was used to identify the following 2 key features used in this analysis: 1) The household composition for inclusion in the study and 2) current school attendance.

The household composition for inclusion in the study was identified as follows. The gender and age of each household member was used to identify households with at least 1 child <5 years old (either boy or girl), 1 adolescent boy between the ages of 11 and 17, and 1 adolescent girl between the ages of 11 and 17. In the great majority of households (95.5%), all children were relatives, although not always siblings. We restricted the sample thus to be able to identify the difference in the probability of being in school within households and to see how this difference changes with the number of illnesses among young children.

School attendance was defined by using a survey question that is asked about each household member: "Is (NAME) currently attending school?" Some surveys did not ask this particular question, and instead asked about school attendance at any point in the current school year. We defined our sample by using current attendance because the question about the current school year would bias our estimates in situations in which an adolescent boy or girl was in school at some point during the school year but currently stayed home to care for an ill child. Our focus on short-term (2-week) recall of illness episodes could make this a serious source of bias.

We then merged the households with the identifiable data with detailed information from the individual surveys about child health and maternal employment. In that survey, women from the study households are asked the following 3 questions about each of their living children:

1. Has (NAME) been ill with a fever at any time in the last 2 weeks?

2. Has (NAME) had an illness with a cough at any time in the last 2 weeks?

3. Has (NAME) had diarrhea in the last 2 weeks?

An illness episode was defined as 1 child with 1 or more of these signs.

Finally, we used several additional variables in the subset analysis or as control variables. Maternal work outside the home was identified by asking the following 2 questions: "Aside from your own housework, are you currently working?" and "Do you usually work at home or away from home?" Women were identified as working away from home if they indicated that they work and that they usually work away from home. The household location in a rural or urban location was determined by using the DHS definitions. Mothers were defined as literate if, after being asked to read a short sentence in any of several local languages, they could read any part of a sentence. No survey was excluded from the analysis on the basis of the aforementioned questions.

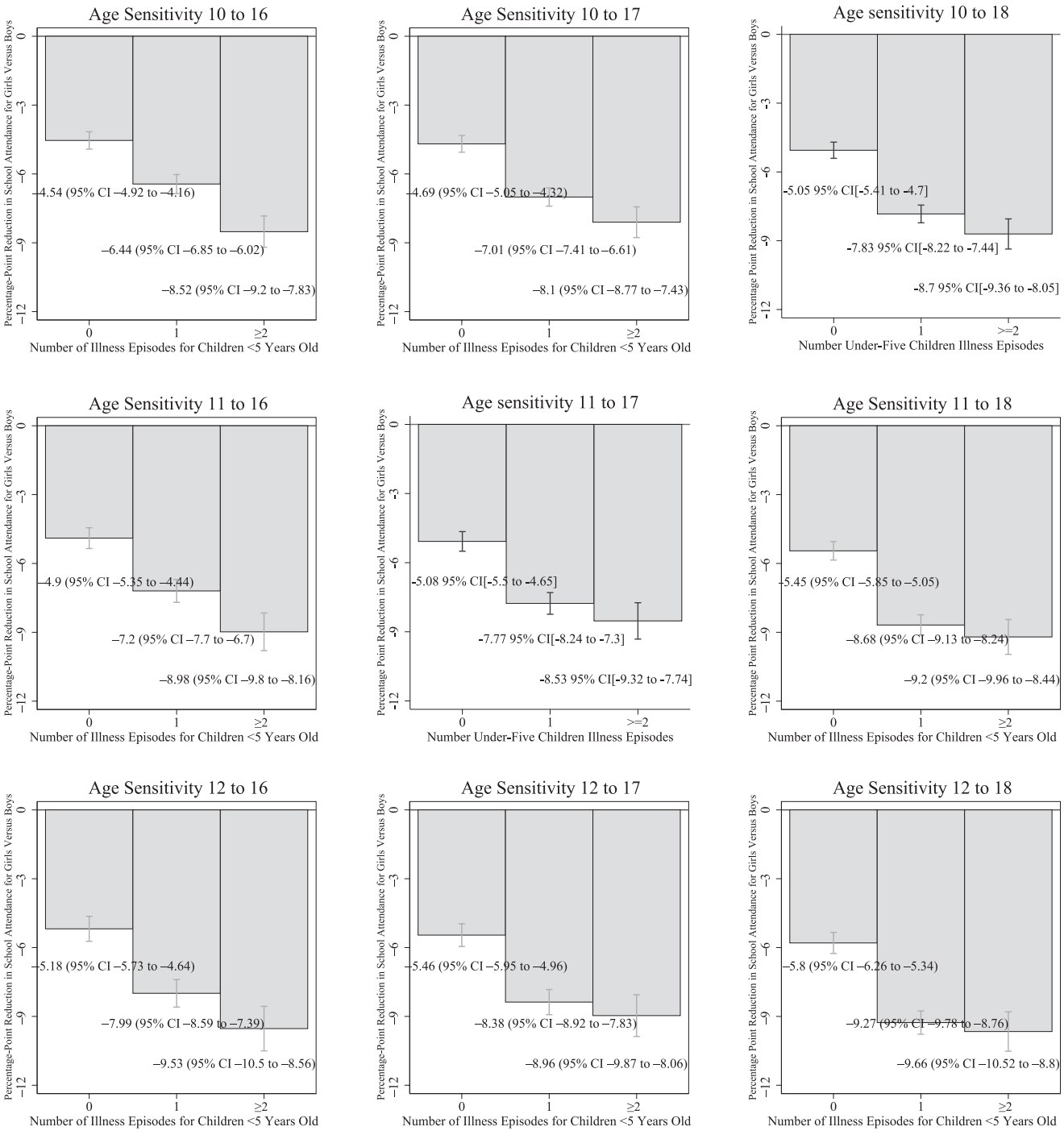
ECONOMETRIC SPECIFICATION

The particular specification we used to test our model is as follows:

$$S_{ih} = \delta(F_i) + \pi(F_i * E_h) + \sum_{j=1}^{J} \gamma_h^j + \varepsilon_{ih}$$

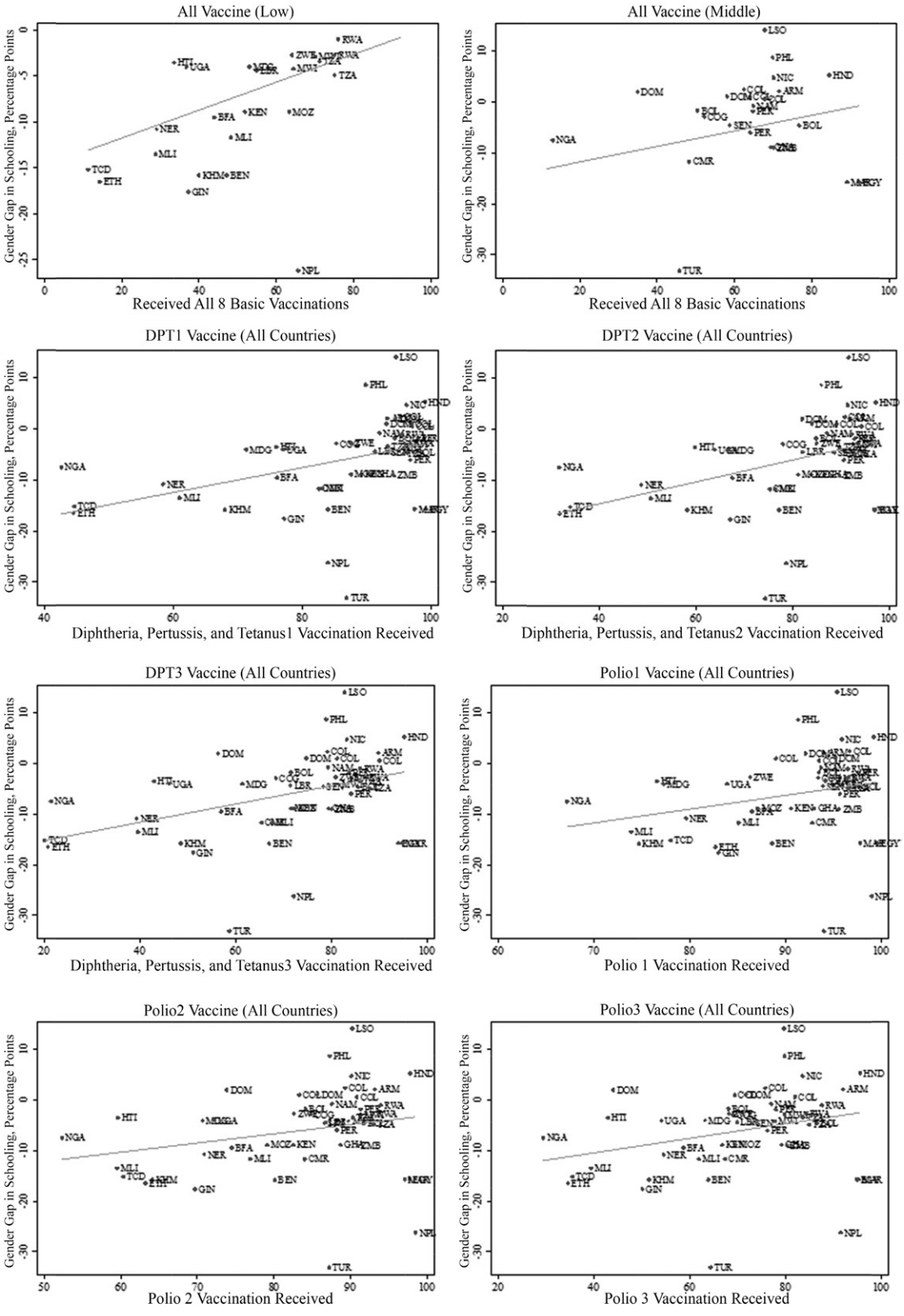
for individual i in household h. The outcome of interest is S, an indicator variable for whether the adolescent child is still in school. We used ordinary least squares regression to regress the schooling outcome on F, an indicator variable for girl. The coefficient on the main effect of F is an estimate of the within-household gender gap in education in the absence of any recent childhood illness for children <5 years old, E. To assess how this gap varies with increased illness episodes, we interacted F with E. γ represents a series of household indicators, or fixed effects, for each household h.

The coefficient on the interaction term then measures the gendered educational response to child illness episodes, netting out confounding variables that vary at the household level, such as maternal education, household wealth, and family size. Of note, although illness episodes in the children <5 years old population are collinear with household fixed effects, the differential effect (eg, slope) of such episodes on girls versus boys can be identified.



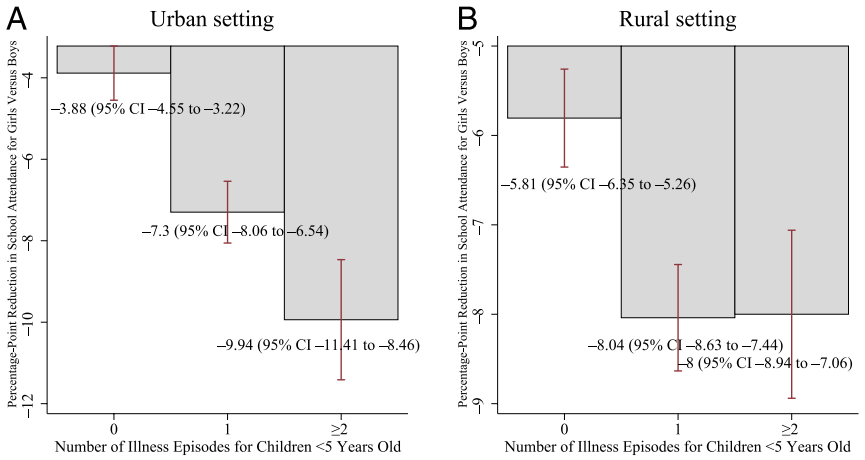
SUPPLEMENTAL FIGURE 5

Sensitivity analyses. Age sensitivity: the figure depicts the gender gap in education as a function of children <5 years old with illness. The average marginal effect (eg, percentage point reduction in school attendance for girls versus boys) and 95% CI are shown on the graph. In the primary analysis, we restricted the choice of adolescent boys and girls as between the ages of 11 and 17, a typical age range for grades 7 to 12. However, the typical age range for secondary school changes, as does the age range when boys or girls may be asked to help with domestic responsibilities. In this sensitivity analysis, we varied the youngest age range from 10 to 12 and the oldest from 16 to 18. The figures below illustrate that the findings are stable within this range of ages.



SUPPLEMENTAL FIGURE 6

Additional gender gap and vaccination rates. The figures depict the correlation between the gender gap in adolescent schooling in response to household with children <5 years old with illness at the country level and the receipt of vaccinations. The adolescent education gender gap is derived by using a fixed-effects estimator as described in the article and Supplemental Information. In the first 2 panels, the sample is divided by World Bank income group classification into low-income countries (Low) and middle-income countries (Middle), and the relationship is shown for all 8 basic vaccinations. These



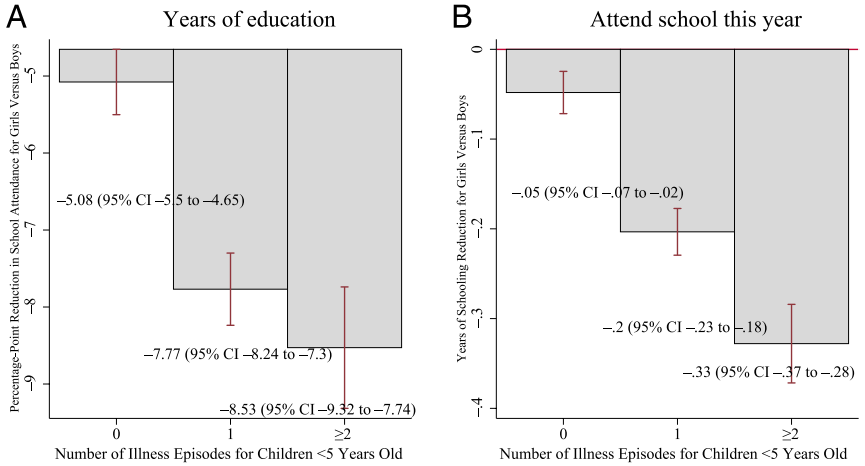
SUPPLEMENTAL FIGURE 7

Analyses by urban-rural stratification. The figure depicts the gender gap in education as a function of children <5 years old with illness splitting the sample into urban and rural settings. The average marginal effect (eg, percentage point reduction in school attendance for girls versus boys) and 95% CI are shown on the graph. Panel A limits the sample to urban settings. Panel B limits the sample to rural settings.

SUPPLEMENTAL TABLE 3 Regressions exploring the effect of birth order and gender

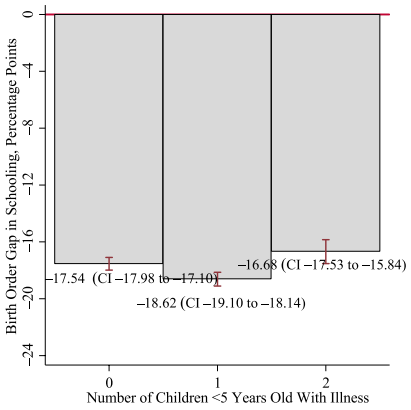
Variable	Coefficient (SE)
Oldest child	−0.159 (0.005)
Oldest child × 1 illness episode	−0.010 (0.008)
Oldest child × ≥2 illness episodes	−0.012 (0.012)
Girl	−0.036 (0.005)
Oldest child × girl	−0.033 (0.009)
Girl × 1 illness episode	−0.027 (0.007)
Girl × ≥2 illness episodes	−0.054 (0.010)
Oldest child × girl × 1 illness episode	−0.005 (0.014)
Oldest child × girl × ≥2 illness episodes	0.044 (0.020)
No. of observations	120 708
Adjusted R2	0.453

Outcome = in school.



SUPPLEMENTAL FIGURE 8

Analyses with different outcomes. The figure depicts the gender gap in education as a function of children <5 years old with illness. The average marginal effect (eg, percentage point reduction in school attendance for girls versus boys) and 95% CI are shown on the graph by using various schooling outcomes. Panel A uses the attendance in school this year as the outcome variable, whereas Panel B uses the number of years of education. The pattern is similar if limiting only to those with at least 1 year of completed education.



SUPPLEMENTAL FIGURE 9

Analyses exploring birth order alone for boys. The figure depicts the oldest age gap in education as a function of children <5 years old with illness. The average marginal effect (eg, percentage point reduction in school attendance for oldest versus others) and 95% CI are shown on the graph. This sample is restricted to all boys, and the interaction is with child illness episodes and an oldest (instead of girl) indicator.

FIGURE 6 Continued

figures illustrate that the gender gap is more responsive to child illness in low-income countries. In the next panels, we show the relationship between vaccination rates and the gender gap by the type of vaccination to examine whether some types of vaccinations appear to have a stronger relationship with the gender gap than others, and the extent to which there is a graded relationship with additional doses of a vaccination (eg, change in the slope between polio 1 and polio 3). DPT, diphtheria, pertussis, and tetanus.

SUPPLEMENTAL TABLE 4 Sample Exclusions and Comparisons

Criteria	No. of Observations	No. of Countries
Households with at least 1 child <5 yr old, 1 older girl and boy	116 260	63
Information about school attendance available	41 821	38
Information about gender and child <5 yr old illness available	41 821	38
Variable	In Final Sample	Excluded From Final Sample
Portion in wealth quintile		
1 (poorest)	23.94	24.35
2	21.72	21.07
3	20.12	19.86
4	17.36	18.43
5	16.86	16.3
No. children <5 yr old in household (median)	2	2