# Online Appendix

## A. Online Appendix Tables



## B. Online Appendix Figures

## C. Proofs of Proposition 4 and lemmas, and discussion of model's assumptions

Online Appendix Table A.1: Breastfeeding results including deceased children

| | Tab. 2, col. 3 | | Tab. 3, col. 3 | | Tab. 4, col. 3 | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Birth order | -0.0612*** | -0.0602*** | | | | |
| | [0.00421] | [0.00419] | | | | |
| Male | -0.105*** | -0.103*** | -0.103*** | -0.102*** | 0.0203 | 0.0113 |
| | [0.00866] | [0.00862] | [0.00867] | [0.00863] | [0.0301] | [0.0295] |
| Male x Birth order | | | | | -0.0847*** | -0.0779*** |
| | | | | | [0.0216] | [0.0212] |
| Male x Birth order$^2$ | | | | | 0.00997*** | 0.00920*** |
| | | | | | [0.00316] | [0.00310] |
| Include deceased children? | No | Yes | No | Yes | No | Yes |
| Birth order fixed effects? | No | No | Yes | Yes | Yes | Yes |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 108,616 | 111,462 | 108,616 | 111,462 | 108,616 | 111,462 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. All regressions use breastfeeding duration as their dependent variable. For each pair of regressions, the odd-numbered column presents coefficients from the regression reported in the main tables of the paper, and the even-numbers column presents the identical regression except that children who had died by the time of the survey are included in the sample. See Tables II, III, and IV for more details. All regressions include the standard set of covariates and age-in-month fixed effects in previous tables (see the notes to Table III for a list), in addition to those listed. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.2: Robustness check removing the spline in the linear effect of $\Delta Ideal$

| | Months breastfed | | | | Mortality, 12-36 mos. | | Mortality, 1-6 mos. | |
|---|---|---|---|---|---|---|---|---|
| | Tab 2, c 6 | Tab 2, c 7 | Tab 4, c 4 | Tab 4, c 5 | Tab 7, c 4 | Tab 7, c 8 | Ap tab 3, c 4 | Ap tab 3, c 8 |
| $\Delta Ideal \geq 0$ | 0.407*** | 0.583*** | | | | | | |
| | [0.0618] | [0.0611] | | | | | | |
| $\Delta Ideal$ | 0.299*** | 0.147*** | | | | | | |
| | [0.0219] | [0.0233] | | | | | | |
| Male x ($\Delta Ideal \geq 0$) | | | 0.497*** | 0.494*** | -0.00404 | 0.00428 | -0.000705 | 0.000679 |
| | | | [0.125] | [0.122] | [0.00286] | [0.00298] | [0.00243] | [0.00326] |
| Male x $\Delta Ideal$ | | | -0.0275 | -0.0117 | -0.00178* | -0.00183 | -0.00214** | -0.00121 |
| | | | [0.0436] | [0.0425] | [0.00100] | [0.00140] | [0.000872] | [0.00157] |
| Covariates | No | Yes | No | Yes | Yes | Yes | Yes | Yes |
| Fixed effects | No | No | $\Delta Ideal$ | $\Delta Ideal$ | $\Delta Ideal$ | $\Delta Ideal$ | $\Delta Ideal$ | $\Delta Ideal$ |
| Diff in coeffs, unpiped - piped | | | | | -0.00831 | | -0.00139 | |
| $F$-test, unpiped - piped ($p$-vals) | | | | | 0.0443 | | 0.733 | |
| Observations | 106844 | 106844 | 106844 | 106844 | 116957 | 33850 | 114997 | 33011 |
| R-squared | 0.493 | 0.521 | 0.494 | 0.522 | 0.00912 | 0.00780 | 0.00433 | 0.00433 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. These tables report results from some of the main regressions in the paper, but remove as explanatory variables the regressors $\Delta Ideal \times (\Delta Ideal \geq 0)$ or $Male \times \Delta Ideal \times (\Delta Ideal \geq 0)$, depending on the specification. The main heading lists the dependent variable for each regression, and the sub-headings list the location of the results in the main body of the paper to which the coefficient(s) of interest should be compared. All regressions are estimated by OLS; "covariates" refers to the standard set of covariates in previous tables (see the notes to Table III for a list). Please see the tables listed in the sub-headings for more information on the specifications and variable definitions. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.3: At what age does the gender gap in breastfeeding begin?

| | Dependent variable: Child breastfed for at least... | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 mo. | 2 mos. | 3 mos. | 4 mos. | 5 mos. | 6 mos. | 7 mos. | 8 mos. | 9 mos. |
| Male | -0.00029 | -0.00036 | 0.0000077 | -0.000084 | 0.00090 | 0.0017 | 0.0045*** | 0.0067*** | 0.0089*** |
| | [0.00033] | [0.00061] | [0.00084] | [0.0010] | [0.0012] | [0.0013] | [0.0016] | [0.0017] | [0.0019] |
| Observations | 108947 | 106417 | 103602 | 100805 | 97954 | 95206 | 92425 | 89716 | 87176 |

| | Dependent variable: Child breastfed for at least... | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 mos. | 11 mos. | 12 mos. | 13 mos. | 14 mos. | 15 mos. | 16 mos. | 17 mos. | 18 mos. |
| Male | 0.0097*** | 0.011*** | 0.013*** | 0.024*** | 0.027*** | 0.030*** | 0.031*** | 0.032*** | 0.033*** |
| | [0.0021] | [0.0023] | [0.0024] | [0.0030] | [0.0031] | [0.0032] | [0.0034] | [0.0035] | [0.0036] |
| Observations | 84790 | 82574 | 80560 | 78254 | 75643 | 72984 | 70334 | 67660 | 65050 |

| | Dependent variable: Child breastfed for at least... | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 19 mos. | 20 mos. | 21 mos. | 22 mos. | 23 mos. | 24 mos. | 25 mos. | 26 mos. | 27 mos. |
| Male | 0.041*** | 0.042*** | 0.041*** | 0.041*** | 0.041*** | 0.041*** | 0.041*** | 0.040*** | 0.036*** |
| | [0.0038] | [0.0039] | [0.0039] | [0.0040] | [0.0041] | [0.0042] | [0.0038] | [0.0039] | [0.0039] |
| Observations | 62433 | 60051 | 57785 | 55674 | 53630 | 51691 | 49482 | 46960 | 44506 |

| | Dependent variable: Child breastfed for at least... | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28 mos. | 29 mos. | 30 mos. | 31 mos. | 32mos. | 33 mos. | 34 mos. | 35 mos. | 36 mos. |
| Male | 0.034*** | 0.032*** | 0.029*** | 0.026*** | 0.023*** | 0.023*** | 0.023*** | 0.018*** | 0.014*** |
| | [0.0040] | [0.0040] | [0.0040] | [0.0038] | [0.0038] | [0.0038] | [0.0038] | [0.0037] | [0.0036] |
| Observations | 42105 | 39641 | 37202 | 34758 | 32419 | 30318 | 28225 | 26171 | 24145 |

Notes: The table reports 36 separate regressions that differ in the outcome variable. The outcomes are whether the child is breastfed at least one month (which is only defined if the child is at least age one month), at least two months (which is only defined if the child is at least age two months), and so forth. Each regression includes birth order dummies and our standard covariates (see Table III for a list); the specification is analogous to Table III, column 2. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.4: Effect of gender, birth order, and ideal family size on fertility-stopping

| | Dep. var.: Child has no younger sibling | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | 0.0302*** | 0.0272*** | 0.0154*** | -0.00118 | -0.0177** |
| | [0.00199] | [0.00203] | [0.00253] | [0.00712] | [0.00746] |
| Birth order | 0.0175*** | | | | |
| | [0.000944] | | | | |
| $\Delta Ideal \geq 0$ | | 0.116*** | | | |
| | | [0.00316] | | | |
| Mother has at least one son | | | 0.0283*** | | |
| | | | [0.00331] | | |
| Male x Birth order | | | | 0.0241*** | |
| | | | | [0.00491] | |
| Male x Birth order$^2$ | | | | -0.00340*** | |
| | | | | [0.000698] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | 0.0648*** |
| | | | | | [0.00813] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 110183 | 104456 | 110183 | 110183 | 104456 |
| R-squared | 0.331 | 0.344 | 0.338 | 0.338 | 0.346 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. The regressions reported in this table are identical to those in Table VI, except that an indicator variable for whether the child has no younger siblings is used as the dependent variable. See notes to Table VI for additional details on the specifications. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.5: Fertility-stopping, with and without mother fixed effects

| | Including mother fixed effects | | | | Excluding mother fixed effects | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Male | -0.147*** | -0.142*** | -0.102*** | -0.0927*** | -0.0270*** | -0.0279*** | -0.0161** | -0.00166 |
| | [0.0157] | [0.0148] | [0.0141] | [0.0133] | [0.00754] | [0.00647] | [0.00724] | [0.00600] |
| Male x Birth order | 0.1000*** | 0.0961*** | | | 0.0691*** | 0.0690*** | | |
| | [0.0107] | [0.0101] | | | [0.00539] | [0.00477] | | |
| Male x Birth order$^2$ | -0.0121*** | -0.0114*** | | | -0.00926*** | -0.00922*** | | |
| | [0.00153] | [0.00145] | | | [0.000778] | [0.000704] | | |
| Male x ($\Delta Ideal \geq 0$) | | | 0.154*** | 0.143*** | | | 0.124*** | 0.109*** |
| | | | [0.0158] | [0.0149] | | | [0.00809] | [0.00688] |
| Male x $\Delta Ideal$ x ($\Delta Ideal \geq 0$) | | | 0.0349*** | 0.0323*** | | | 0.0106** | 0.00439 |
| | | | [0.0101] | [0.00943] | | | [0.00508] | [0.00437] |
| Male x $\Delta Ideal$ | | | -0.0353*** | -0.0312*** | | | -0.0146*** | -0.00892** |
| | | | [0.00864] | [0.00801] | | | [0.00424] | [0.00350] |
| Covariates | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 200650 | 200650 | 189273 | 189273 | 200650 | 200650 | 189273 | 189273 |
| R-squared | 0.814 | 0.831 | 0.824 | 0.840 | 0.0432 | 0.284 | 0.114 | 0.318 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. This table estimates specifications from Table IV to test their robustness to including the standard set of covariates (listed in Table III) and mother fixed effects. As the breastfeeding variable generally has too small a sample to estimate a mother fixed-effects regression, whether the child has a younger sibling (i.e., future fertility) is instead used as the dependent variable for all regressions in this table. We exclude children under age nine months because not enough time has passed for them to have a younger sibling. See Table IV for further detail on the specification and variable definitions. $^*p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

Online Appendix Table A.6: Desired future fertility

| | Dep. var.: Mother wants to have another child | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | -0.118*** | -0.0974*** | -0.0308*** | 0.0296*** | -0.0416*** |
| | [0.00297] | [0.00246] | [0.00366] | [0.00910] | [0.00742] |
| Birth order | -0.143*** | | | | |
| | [0.00134] | | | | |
| $\Delta Ideal \geq 0$ | | -0.652*** | | | |
| | | [0.00405] | | | |
| Mother has at least one son | | | -0.180*** | | |
| | | | [0.00495] | | |
| Male x Birth order | | | | -0.108*** | |
| | | | | [0.00653] | |
| Male x Birth order$^2$ | | | | 0.0149*** | |
| | | | | [0.000919] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | -0.116*** |
| | | | | | [0.00867] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 76123 | 72748 | 76123 | 76123 | 72748 |
| R-squared | 0.337 | 0.582 | 0.411 | 0.401 | 0.586 |

Notes: Standard errors are in brackets. The regressions reported in this table are identical to those in Table VI, except that the mother's self-reported preference regarding whether she wants another child is used as the dependent variable. See notes to Table VI for additional details on the specifications. The unit of observation is the mother, and the child-specific variables are based on her youngest child. We code women who are sterilized, for whom the survey question is not asked, as not wanting another child; the results are similar if we omit these women from the sample. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.7: Falsification test: Child received any vaccination

| | Dep. var.: Child received any vaccination | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | 0.0192*** | 0.0193*** | 0.0215*** | 0.00229 | 0.00780 |
| | [0.00209] | [0.00211] | [0.00292] | [0.00712] | [0.00769] |
| Birth order | -0.0149*** | | | | |
| | [0.00113] | | | | |
| $\Delta Ideal \geq 0$ | | -0.00593* | | | |
| | | [0.00320] | | | |
| Mother has at least one son | | | -0.00475 | | |
| | | | [0.00367] | | |
| Male x Birth order | | | | 0.00753 | |
| | | | | [0.00547] | |
| Male x Birth order$^2$ | | | | -0.000276 | |
| | | | | [0.000832] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | 0.00557 |
| | | | | | [0.00842] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 109770 | 104083 | 109770 | 109770 | 104083 |
| R-squared | 0.238 | 0.231 | 0.238 | 0.238 | 0.233 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. The regressions reported in this table are identical to those in Table VI, except that an indicator for whether the child received any of the six vaccines that make up the "Total vaccinations" variable is used as the dependent variable. See notes to Table VI for additional details on the specifications. $^*p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

Online Appendix Table A.8: Falsification test: Child given medical treatment when he/she had a cough or fever

| | Dep. var.: Child given medical treatment when had fever/cough | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | 0.0494*** | 0.0504*** | 0.0488*** | 0.0568*** | 0.0463** |
| | [0.00534] | [0.00549] | [0.00724] | [0.0182] | [0.0188] |
| Birth order | -0.0157*** | | | | |
| | [0.00257] | | | | |
| $\Delta Ideal \geq 0$ | | -0.00886 | | | |
| | | [0.00858] | | | |
| Mother has at least one son | | | 0.00136 | | |
| | | | [0.00933] | | |
| Male x Birth order | | | | -0.00541 | |
| | | | | [0.0133] | |
| Male x Birth order$^2$ | | | | 0.000719 | |
| | | | | [0.00195] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | -0.0000149 |
| | | | | | [0.0210] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 29482 | 27976 | 29482 | 29482 | 27976 |
| R-squared | 0.105 | 0.105 | 0.106 | 0.106 | 0.105 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. The regressions reported in this table are identical to those in Table VI, except that an indicator variable for whether a child received medical treatment conditional on having a cough or fever is used as the dependent variable. See notes to Table VI for additional details on the specifications. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.9: Falsification test: Child given medical treatment when he/she had diarrhea

| | Dep. var.: Child given medical treatment when had diarrhea | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | 0.0337*** | 0.0358*** | 0.0384*** | -0.000903 | 0.0620** |
| | [0.00798] | [0.00820] | [0.0106] | [0.0274] | [0.0276] |
| Birth order | -0.0175*** | | | | |
| | [0.00380] | | | | |
| $\Delta Ideal \geq 0$ | | -0.0173 | | | |
| | | [0.0130] | | | |
| Mother has at least one son | | | -0.00909 | | |
| | | | [0.0138] | | |
| Male x Birth order | | | | 0.0129 | |
| | | | | [0.0196] | |
| Male x Birth order$^2$ | | | | 0.0000867 | |
| | | | | [0.00285] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | -0.0374 |
| | | | | | [0.0309] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 13697 | 12974 | 13697 | 13697 | 12974 |
| R-squared | 0.0972 | 0.0973 | 0.0976 | 0.0981 | 0.0991 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. The regressions reported in this table are identical to those in Table VI, except that an indicator variable for whether a child received medical treatment conditional on having diarrhea is used as the dependent variable. See notes to Table VI for additional details on the specifications. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.10: Main specifications, Wave 1 only

| | Dep. var.: Months of breastfeeding, Wave 1 only | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | 0.315*** | 0.303*** | 0.245*** | -0.178 | -0.116 |
| | [0.0586] | [0.0616] | [0.0743] | [0.209] | [0.200] |
| Birth order | 0.207*** | | | | |
| | [0.0274] | | | | |
| $\Delta Ideal \geq 0$ | | 0.793*** | | | |
| | | [0.101] | | | |
| Mother has at least one son | | | 0.147 | | |
| | | | [0.0966] | | |
| Male x Birth order | | | | 0.303** | |
| | | | | [0.143] | |
| Male x Birth order$^2$ | | | | -0.0324 | |
| | | | | [0.0201] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | 0.675*** |
| | | | | | [0.228] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 40607 | 37098 | 40607 | 40607 | 37098 |
| R-squared | 0.549 | 0.544 | 0.550 | 0.550 | 0.544 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. The regressions reported in this table are identical to those in Table VI, except that duration of breastfeeding is used as the dependent variable and only observations from the first survey wave are included. See notes to Table VI for additional details on the specifications. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.11: Main specifications, Wave 2 only

| | Dep. var.: Months of breastfeeding, Wave 2 only | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | 0.397*** | 0.368*** | 0.333*** | -0.102 | -0.222 |
| | [0.0637] | [0.0653] | [0.0814] | [0.225] | [0.229] |
| Birth order | 0.232*** | | | | |
| | [0.0307] | | | | |
| $\Delta Ideal \geq 0$ | | 0.637*** | | | |
| | | [0.105] | | | |
| Mother has at least one son | | | 0.124 | | |
| | | | [0.105] | | |
| Male x Birth order | | | | 0.377** | |
| | | | | [0.155] | |
| Male x Birth order$^2$ | | | | -0.0522** | |
| | | | | [0.0220] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | 0.784*** |
| | | | | | [0.254] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 27136 | 25987 | 27136 | 27136 | 25987 |
| R-squared | 0.648 | 0.647 | 0.649 | 0.649 | 0.647 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. The regressions reported in this table are identical to those in Table VI, except that duration of breastfeeding is used as the dependent variable and only observations from the second survey wave are included. See notes to Table VI for additional details on the specifications. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.12: Main specifications, Wave 3 only

| | Dep. var.: Months of breastfeeding, Wave 3 only | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | 0.468*** | 0.456*** | 0.198** | 0.0487 | 0.179 |
| | [0.0675] | [0.0684] | [0.0918] | [0.235] | [0.247] |
| Birth order | 0.234*** | | | | |
| | [0.0332] | | | | |
| $\Delta Ideal \geq 0$ | | 0.316*** | | | |
| | | [0.107] | | | |
| Mother has at least one son | | | 0.483*** | | |
| | | | [0.114] | | |
| Male x Birth order | | | | 0.291* | |
| | | | | [0.173] | |
| Male x Birth order$^2$ | | | | -0.0360 | |
| | | | | [0.0256] | |
| Male x ($\Delta Ideal \geq 0$) | | | | | 0.408 |
| | | | | | [0.271] |
| Covariates | Yes | Yes | Yes | Yes | Yes |
| Additional fixed effects | None | None | Birth order | Birth order | $\Delta Ideal$ |
| Observations | 42440 | 41371 | 42440 | 42440 | 41371 |
| R-squared | 0.435 | 0.437 | 0.436 | 0.436 | 0.437 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. The regressions reported in this table are identical to those in Table VI, except that duration of breastfeeding is used as the dependent variable and only observations from the third survey wave are included. See notes to Table VI for additional details on the specifications. $^*p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

Online Appendix Table A.13: Child mortality between zero and six months

| | Household lacks piped water | | | Household has piped water | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Male | 0.00428*** | 0.0200*** | -0.00447 | 0.00581*** | 0.0106 | -0.00186 |
| | [0.00128] | [0.00472] | [0.00451] | [0.00194] | [0.00695] | [0.00825] |
| Male x Birth order | | -0.00879*** | | | -0.00135 | |
| | | [0.00319] | | | [0.00534] | |
| Male x Birth order$^2$ | | 0.000804* | | | -0.000262 | |
| | | [0.000452] | | | [0.000856] | |
| Male x ($\Delta Ideal \geq 0$) | | | 0.00247 | | | 0.00484 |
| | | | [0.00503] | | | [0.00875] |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| $\hat{\beta}_{\text{unpiped}} - \hat{\beta}_{\text{piped}}$, | -0.00150 | -0.00741 | -0.00237 | | | |
| coeff(s) of interest | | 0.00106 | | | | |
| $F$-test of above coeff | | | | | | |
| difference(s) ($p$-value) | 0.517 | 0.487 | 0.814 | | | |
| Observations | 127932 | 127932 | 119573 | 35029 | 35029 | 33866 |
| R-squared | 0.0105 | 0.0106 | 0.0108 | 0.00829 | 0.00842 | 0.00891 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. This table is identical to Table VII except that mortality between zero and six months serves as the dependent variable and only children born between 7 and 66 months of the survey date are included. $^*p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

Online Appendix Table A.14: Child mortality between one and three months

| | Household lacks piped water | | | Household has piped water | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Male | -0.000210 | 0.00222 | -0.00171 | 0.000127 | 0.00221 | -0.00364 |
| | [0.000595] | [0.00216] | [0.00207] | [0.000817] | [0.00306] | [0.00337] |
| Male x Birth order | | -0.000836 | | | -0.00125 | |
| | | [0.00152] | | | [0.00246] | |
| Male x Birth order$^2$ | | -0.0000163 | | | 0.000105 | |
| | | [0.000222] | | | [0.000401] | |
| Male x ($\Delta Ideal \geq 0$) | | | 0.000373 | | | 0.00313 |
| | | | [0.00233] | | | [0.00357] |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| $\hat{\beta}_{\text{unpiped}} - \hat{\beta}_{\text{piped}}$, | -0.000342 | 0.000412 | -0.00276 | | | |
| coeff(s) of interest | | -0.000121 | | | | |
| $F$-test of above coeff | | | | | | |
| difference(s) ($p$-value) | 0.735 | 0.894 | 0.517 | | | |
| Observations | 122818 | 122818 | 114964 | 34048 | 34048 | 32946 |
| R-squared | 0.00244 | 0.00249 | 0.00267 | 0.00395 | 0.00398 | 0.00431 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. This table is identical to Table VII except that mortality between one and three months serves as the dependent variable and only children born between 4 and 63 months of the survey date are included. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.15: Child mortality between 37 and 60 months

| | Household lacks piped water | | | Household has piped water | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Male | -0.0000881 | 0.000673 | -0.00243 | -0.000573 | 0.000749 | -0.00117 |
| | [0.000510] | [0.00167] | [0.00179] | [0.000603] | [0.00203] | [0.00267] |
| Male x Birth order | | -0.000914 | | | -0.000879 | |
| | | [0.00120] | | | [0.00168] | |
| Male x Birth order$^2$ | | 0.000172 | | | 0.0000991 | |
| | | [0.000175] | | | [0.000265] | |
| Male x ($\Delta Ideal \geq 0$) | | | 0.00130 | | | 0.000229 |
| | | | [0.00200] | | | [0.00292] |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| $\hat{\beta}_{\text{unpiped}} - \hat{\beta}_{\text{piped}}$, | 0.000484 | -0.0000357 | 0.00107 | | | |
| coeff(s) of interest | | 0.0000730 | | | | |
| $F$-test of above coeff | | | | | | |
| difference(s) ($p$-value) | 0.540 | 0.723 | 0.763 | | | |
| Observations | 83807 | 83807 | 77525 | 22833 | 22833 | 21940 |
| R-squared | 0.00176 | 0.00178 | 0.00177 | 0.00453 | 0.00455 | 0.00439 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. This table is identical to Table VII except that mortality between 37 and 60 months serves as the dependent variable and only children born between 61 and 96 months of the survey date are included. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.16: Mortality results with rural interactions

| | Mortality between 12 - 36 months | | | Mortality between 1 and 6 months | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Male x Unpiped | -0.00328** | 0.00420 | 0.00415 | -0.00245* | 0.00212 | 0.00481 |
| | [0.00153] | [0.00514] | [0.00609] | [0.00138] | [0.00491] | [0.00507] |
| Male x Birth order x Unpiped | | -0.00450 | | | -0.00163 | |
| | | [0.00409] | | | [0.00384] | |
| Male x Birth order$^2$ x Unpiped | | 0.000495 | | | -0.0000248 | |
| | | [0.000647] | | | [0.000607] | |
| Male x ($\Delta Ideal \geq 0$) x Unpiped | | | -0.0106 | | | -0.00787 |
| | | | [0.00656] | | | [0.00556] |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 161021 | 161021 | 150807 | 157084 | 157084 | 148008 |
| R squared | 0.0115 | 0.0119 | 0.0112 | 0.00496 | 0.00512 | 0.00544 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. *Unpiped* is an indicator variable for a household lacking access to piped water. All regressions are estimated by OLS (so coefficients represent percentage-point changes in the probability of death) and include the standard set of covariates in previous tables (see the notes to Table III for a list). All regressions also include each of our standard covariates interacted with *Unpiped* and interacted with *Rural*. In columns 1, 2, 4, and 5, birth-order dummies and their interactions with each of *Unpiped* and *Rural* are included. In columns 3 and 6, dummies for each value of $\Delta Ideal$ as well as $Male \times \Delta Ideal$ and $Male \times (\Delta Ideal \geq 0) \times \Delta Ideal$ are included, plus each of these variables interacted with *Unpiped* and with *Rural*. Each regression also includes a control variable corresponding to the variables for which we report coefficients, but replacing *Unpiped* with *Rural*. The first panel includes children born between 37 and 96 months before the survey date and the second panel includes children born between 7 and 66 months before the survey date. See notes to Table VII for explanation of these sampling rules and further detail. $^{*}p < 0.10,^{**} p < 0.05,^{***} p < 0.01$

Online Appendix Table A.17: Child mortality between one and six months, using the same sample rather than same recall period as Table VII

| | Household lacks piped water | | | Household has piped water | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Male | -0.000837 | 0.00455* | -0.00689*** | -0.000710 | 0.00663* | 0.00188 |
| | [0.000760] | [0.00272] | [0.00248] | [0.00109] | [0.00378] | [0.00344] |
| Male x Birth order | | -0.00221 | | | -0.00540* | |
| | | [0.00193] | | | [0.00305] | |
| Male x Birth order$^2$ | | 0.0000705 | | | 0.000705 | |
| | | [0.000284] | | | [0.000506] | |
| Male x ($\Delta Ideal \geq 0$) | | | 0.00448 | | | -0.00687* |
| | | | [0.00282] | | | [0.00387] |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| $\hat{\beta}_{\text{unpiped}} - \hat{\beta}_{\text{piped}}$, | -0.000117 | 0.00321 | 0.0113 | | | |
| coeff(s) of interest | | -0.000638 | | | | |
| $F$-test of above coeff | | | | | | |
| difference(s) ($p$-value) | 0.930 | 0.458 | 0.0183 | | | |
| Observations | 129377 | 129377 | 120118 | 35678 | 35678 | 34337 |
| R-squared | 0.00395 | 0.00405 | 0.00397 | 0.00390 | 0.00402 | 0.00455 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. This table is identical to Table VII except that mortality between one and six months serves as the dependent variable. The sample of children used in the estimations differs between this table and Appendix Table 1. In Appendix Table 1, we use children born between 7 and 66 months of the survey date; children who are 7 months old are the youngest cohorts for whom the outcome, 1-to-6-month mortality, is well-defined, and the sample minimizes recall bias by using children who died or would have died recently. Using the same sampling rule, the cohorts in Table VII are those born between 37 and 96 months of the survey date. In this table, as a robustness check we use the sample of children born between 37 and 96 months of the survey date (the same sample as Table VII) and examine 1-to-6-month mortality as the outcome. $^*p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

Online Appendix Table A.18: Effect of gender on breastfeeding duration, households without piped water

| | OLS | | Hazard | OLS | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Male | 0.359*** | 0.370*** | -0.103*** | 0.241*** | 0.262*** | 0.466*** |
| | [0.0426] | [0.0415] | [0.00867] | [0.0530] | [0.0595] | [0.0777] |
| Mother has at least one son | | | | 0.261*** | | |
| | | | | [0.0692] | | |
| Male share of mother's children | | | | | 0.202** | |
| | | | | | [0.0832] | |
| Male x First survey wave | | | | | | -0.208** |
| | | | | | | [0.101] |
| Male x Second survey wave | | | | | | -0.0655 |
| | | | | | | [0.105] |
| Covariates | No | Yes | Yes | Yes | Yes | Yes |
| Observations | 85359 | 85359 | 108616 | 85359 | 85359 | 85359 |
| R-squared | 0.533 | 0.557 | | 0.557 | 0.557 | 0.557 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. This table is identical to Table III, but only children living in households without access to piped water are included. Please see Table III for further detail. $^{*}p < 0.10$,$^{**}$ $p < 0.05$,$^{***}$ $p < 0.01$

Online Appendix Table A.19: Effect of gender and birth-order interactions on breastfeeding, households without piped water

| | OLS | | Hazard | OLS | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Male | -0.205 | -0.162 | 0.0413 | -0.0482 | -0.0566 |
| | [0.151] | [0.148] | [0.0355] | [0.149] | [0.145] |
| Male x Birth order | 0.381*** | 0.368*** | -0.103*** | | |
| | [0.104] | [0.102] | [0.0249] | | |
| Male x Birth order$^2$ | -0.0477*** | -0.0464*** | 0.0127*** | | |
| | [0.0147] | [0.0144] | [0.00357] | | |
| Male x ($\Delta Ideal \geq 0$) | | | | 0.653*** | 0.664*** |
| | | | | [0.167] | [0.163] |
| Male x $\Delta Ideal$ | | | | -0.0779 | -0.104 |
| | | | | [0.0913] | [0.0889] |
| Male x $\Delta Ideal$ x ($\Delta Ideal \geq 0$) | | | | 0.0322 | 0.0796 |
| | | | | [0.107] | [0.105] |
| Covariates | No | Yes | Yes | No | Yes |
| Max effect of male at birth order... | 3.99 | 3.97 | 4.05 | N/A | N/A |
| Observations | 85359 | 85359 | 84152 | 80355 | 80355 |
| R-squared | 0.538 | 0.557 | | 0.534 | 0.554 |

Notes: Standard errors, in brackets, are adjusted for clustering by mother. This table is identical to Table IV, but only children living in households without access to piped water are included. Please see Table IV for further detail. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.20: Additional summary statistics

| | |
|---|---|
| Mother wants to have another child (N=76123) | 0.448 |
| | [0.497] |
| Child received any vaccination (N=109770) | 0.807 |
| | [0.395] |
| Child given medical treatment when had fever/cough (N=29482) | 0.637 |
| | [0.481] |
| Child given medical treatment when had diarrhea (N=13697) | 0.620 |
| | [0.485] |
| Mother's number of children to date (N=110183) | 2.785 |
| | [1.593] |

Notes: Data drawn from 1992, 1998 and 2005 waves of the National Family Health Survey in India. There is one observation per mother for "Mother wants to have another child variable;" the child-specific variables such as birth order are those of her youngest child. "Child given medical treatment..." variables are only defined if the respondent reported that the child had symptoms of the medical problem in the past two weeks. Number of observations for each variable given in parentheses. Please see Table I for further detail and sampling rules.

Online Appendix Table A.21: Means and regression-adjusted differences in breastfeeding, by birth order and gender

| | Mean [st. dev.] of mos. breastfed | | | OLS coefficients [st. err.] | |
|---|---|---|---|---|---|
| | (1) All | (2) Sons | (3) Daughters | (4) Birth order | (5) Male x Bth. ord. |
| Birth order = 1 | 13.913 | 14.022 | 13.800 | | -0.019 |
| | [8.616] | [8.665] | [8.562] | | [0.246] |
| Birth order = 2 | 14.609 | 14.781 | 14.426 | 0.631*** | 0.136 |
| | [8.862] | [8.950] | [8.764] | [0.050] | [0.247] |
| Birth order = 3 | 15.265 | 15.603 | 14.898 | 1.381*** | 0.282 |
| | [9.142] | [9.289] | [8.966] | [0.057] | [0.252] |
| Birth order = 4 | 15.600 | 15.900 | 15.271 | 1.772*** | 0.345 |
| | [9.350] | [9.491] | [9.183] | [0.067] | [0.262] |
| Birth order = 5 | 15.786 | 16.033 | 15.514 | 1.904*** | 0.292 |
| | [9.308] | [9.433] | [9.163] | [0.079] | [0.275] |
| Birth order = 6 | 15.841 | 16.028 | 15.643 | 2.073*** | 0.170 |
| | [9.455] | [9.539] | [9.363] | [0.095] | [0.294] |
| Birth order = 7 | 16.126 | 16.348 | 15.875 | 2.406*** | 0.000 |
| | [9.635] | [9.567] | [9.708] | [0.123] | [.] |
| Covariates | N/A | N/A | N/A | No | No |
| Fixed effects included | N/A | N/A | N/A | Age-in-mos | Age-in-mos, Birth order |
| Observations | 110,183 | 56,896 | 53,287 | 110,183 | 110,183 |

Notes: The first three columns report means [standard deviations] of the breastfeed variable across birth order and gender. Col. (4) reports the $\beta^b$ coefficients from the following regression: $months\ breastfed_i = \sum_{b=2}^{7} \beta^b birth\ order_i^b + \mathbf{M}_i + \epsilon_i$, where $birth\ order^b$ is an indicator variable for $birth\ order = b$ and $\mathbf{M}$ is a vector of age-in-month fixed effects. No other covariates are included. Col. (5) reports the $\gamma^b$ coefficients from the following regression: $months\ breastfed_i = \sum_{b=1}^{7} \gamma^b male \times birth\ order_i^b + \sum_{b=2}^{7} \beta^b birth\ order_i^b + \mathbf{M}_i + \epsilon_i$. Standard errors in cols. (4) and (5), in brackets, are adjusted for clustering by mother. Note that what are shown in cols. (4) and (5) are the coefficients and standard errors corresponding to Figures I and IV. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.22: Means and regression-adjusted differences in breastfeeding, by $\Delta Ideal$ and gender

| | Mean [st. dev.] of mos. breastfed | | | OLS coefficients [st. err.] | |
|---|---|---|---|---|---|
| | (1) All | (2) Sons | (3) Daughters | (4) $\Delta Ideal$ | (5) Male x $\Delta Ideal$ |
| $\Delta Ideal$ = -4 | 14.288 | 14.015 | 14.570 | | -0.789 |
| | [8.142] | [8.334] | [7.942] | | [0.570] |
| $\Delta Ideal$ = -3 | 14.327 | 14.399 | 14.265 | -0.113 | 0.458 |
| | [8.309] | [8.613] | [8.036] | [0.254] | [0.411] |
| $\Delta Ideal$ = -2 | 14.655 | 14.751 | 14.563 | 0.210 | -0.205 |
| | [8.402] | [8.404] | [8.401] | [0.236] | [0.364] |
| $\Delta Ideal$ = -1 | 14.149 | 14.211 | 14.087 | 0.025 | -0.174 |
| | [8.657] | [8.673] | [8.642] | [0.231] | [0.351] |
| $\Delta Ideal$ = 0 | 14.721 | 15.000 | 14.387 | 0.777*** | 0.230 |
| | [9.160] | [9.284] | [8.997] | [0.231] | [0.352] |
| $\Delta Ideal$ = 1 | 15.310 | 15.683 | 14.919 | 1.241*** | 0.431 |
| | [9.313] | [9.506] | [9.091] | [0.234] | [0.360] |
| $\Delta Ideal$ = 2 | 15.926 | 16.261 | 15.557 | 1.736*** | 0.215 |
| | [9.515] | [9.557] | [9.457] | [0.239] | [0.374] |
| $\Delta Ideal$ = 3 | 16.207 | 16.423 | 15.964 | 2.025*** | 0.176 |
| | [9.666] | [9.709] | [9.615] | [0.251] | [0.402] |
| $\Delta Ideal$ = 4 | 16.471 | 16.560 | 16.372 | 2.165*** | 0.000 |
| | [9.629] | [9.662] | [9.598] | [0.285] | [.] |
| Covariates | N/A | N/A | N/A | No | No |
| Fixed effects included | N/A | N/A | N/A | Age-in-mos | Age-in-mos, $\Delta Ideal$ |
| Observations | 110,183 | 56,896 | 53,287 | 104,456 | 104,456 |

Notes: The first three columns report means [standard deviations] of the breastfeed variable across $\Delta Ideal$ and gender. Col. (4) reports the $\beta^b$ coefficients from the following regression: $months\ breastfed_i = \sum_{b=-3}^{4} \beta^b \Delta Ideal_i^b + \mathbf{M}_i + \epsilon_i$, where $\Delta Ideal^b$ is an indicator variable for $\Delta Ideal = b$ and $\mathbf{M}$ is a vector of age-in-month fixed effects. No other covariates are included. Col. (5) reports the $\gamma^b$ coefficients from the following regression: $months\ breastfed_i = \sum_{b=-4}^{4} \gamma^b male \times \Delta Ideal_i^b + \sum_{b=-3}^{4} \beta^b \Delta Ideal_i^b + \mathbf{M}_i + \epsilon_i$. Standard errors in cols. (4) and (5), in brackets, are adjusted for clustering by mother. Note that what are shown in cols. (4) and (5) are the coefficients and standard errors corresponding to Figures II and V. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A23: Means and regression-adjusted differences in mortality, by birth order and gender

| | Mortality, 12-36 months | | | Mortality, 1-6 months | | |
|---|---|---|---|---|---|---|
| | Mean [st. dev.] | | Coeff [st err] | Mean [st dev] | | Coeff [st err] |
| | (1) Sons | (2) Daughters | (3) Male x Birth ord | (4) Sons | (5) Daughters | (6) Male x Birth ord |
| Birth order = 1 | 0.013 | 0.015 | 0.013*** | 0.016 | 0.013 | 0.010*** |
| | [0.114] | [0.122] | [0.004] | [0.124] | [0.113] | [0.004] |
| Birth order = 2 | 0.014 | 0.021 | 0.009** | 0.012 | 0.014 | 0.006 |
| | [0.119] | [0.143] | [0.004] | [0.110] | [0.116] | [0.004] |
| Birth order = 3 | 0.018 | 0.027 | 0.006 | 0.014 | 0.015 | 0.006 |
| | [0.133] | [0.162] | [0.004] | [0.116] | [0.122] | [0.004] |
| Birth order = 4 | 0.021 | 0.034 | 0.002 | 0.018 | 0.019 | 0.006 |
| | [0.142] | [0.182] | [0.005] | [0.131] | [0.136] | [0.004] |
| Birth order = 5 | 0.024 | 0.037 | 0.002 | 0.017 | 0.024 | 0.001 |
| | [0.152] | [0.188] | [0.005] | [0.130] | [0.152] | [0.004] |
| Birth order = 6 | 0.023 | 0.039 | 0.000 | 0.017 | 0.025 | 0.000 |
| | [0.151] | [0.193] | [.] | [0.131] | [0.155] | [.] |
| Birth order = 7 | 0.028 | 0.043 | 0.001 | 0.020 | 0.021 | 0.006 |
| | [0.166] | [0.204] | [0.007] | [0.139] | [0.144] | [0.006] |
| Covariates | N/A | N/A | No | N/A | N/A | No |
| Fixed effects included | N/A | N/A | Age-in-mos, Birth order | N/A | N/A | Age-in-mos, Birth order |
| Observations | 83,472 | 77,625 | 161,097 | 81,537 | 75,629 | 157,166 |

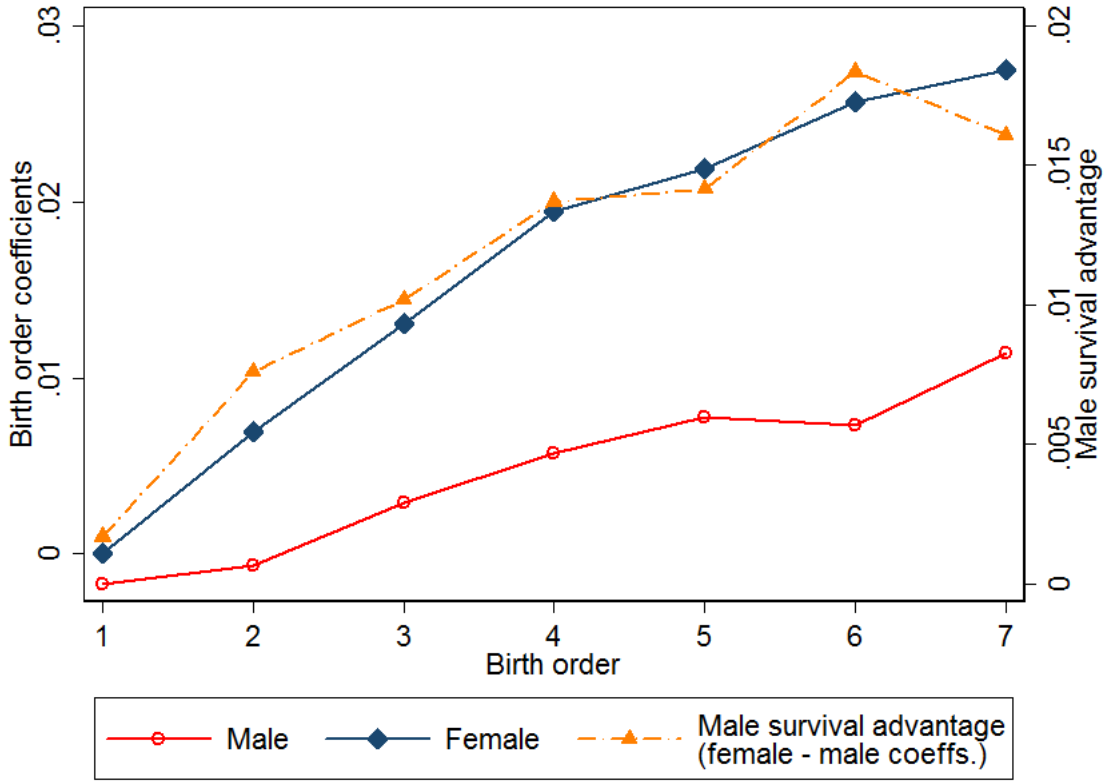
Notes: The first two columns report means [standard deviations] of the 12-to-36-month mortality variable across birth-order and gender. Col. (3) reports the $\gamma^b$ coefficients from the following regression: $mortality_i^{12-36mos} = \sum_{b=1}^{7} \gamma^b male \times birth\,order_i^b + \sum_{b=2}^{7} \beta^b birth\,order_i^b + \mathbf{M}_i + \epsilon_i$, where $birth\,order^b$ is an indicator variable for $birth\,order = b$ and $\mathbf{M}$ is a vector of age-in-month fixed effects. No other covariates are included and only children born between 37 and 96 months before the survey date are included in the sample. Cols. (4) - (6) are analogous except one-to-six-month mortality serves as the dependent variable and the sample includes only children born between 7 and 66 months before the survey date. Standard errors in cols. (3) and (6), in brackets, are adjusted for clustering by mother. Note that col. (3) reports the coefficients and standard errors corresponding to dotted line in Appendix Figure 1. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Table A.24: Means and regression-adjusted differences in mortality, by $\Delta Ideal$ and gender

| | Mortality, 12-36 months | | | Mortality, 1-6 months | | |
|---|---|---|---|---|---|---|
| | Mean [st. dev.] | | Coeff [st err] | Mean [st dev] | | Coeff [st err] |
| | (1) Sons | (2) Daughters | (3) Male x $\Delta Ideal$ | (4) Sons | (5) Daughters | (6) Male x $\Delta Ideal$ |
| $\Delta Ideal$ = -4 | 0.037 | 0.022 | 0.000 | 0.027 | 0.018 | 0.019* |
| | [0.189] | [0.148] | [.] | [0.162] | [0.132] | [0.011] |
| $\Delta Ideal$ = -3 | 0.023 | 0.026 | -0.017* | 0.023 | 0.015 | 0.018** |
| | [0.151] | [0.159] | [0.010] | [0.150] | [0.120] | [0.008] |
| $\Delta Ideal$ = -2 | 0.018 | 0.024 | -0.021** | 0.021 | 0.016 | 0.015** |
| | [0.133] | [0.154] | [0.009] | [0.143] | [0.126] | [0.007] |
| $\Delta Ideal$ = -1 | 0.015 | 0.018 | -0.017* | 0.013 | 0.013 | 0.010 |
| | [0.123] | [0.133] | [0.009] | [0.114] | [0.114] | [0.007] |
| $\Delta Ideal$ = 0 | 0.013 | 0.021 | -0.022** | 0.011 | 0.014 | 0.007 |
| | [0.113] | [0.143] | [0.009] | [0.105] | [0.117] | [0.007] |
| $\Delta Ideal$ = 1 | 0.016 | 0.028 | -0.027*** | 0.016 | 0.017 | 0.009 |
| | [0.124] | [0.164] | [0.009] | [0.125] | [0.129] | [0.007] |
| $\Delta Ideal$ = 2 | 0.021 | 0.031 | -0.025*** | 0.013 | 0.019 | 0.004 |
| | [0.143] | [0.173] | [0.009] | [0.113] | [0.136] | [0.007] |
| $\Delta Ideal$ = 3 | 0.018 | 0.036 | -0.033*** | 0.016 | 0.023 | 0.003 |
| | [0.134] | [0.187] | [0.010] | [0.127] | [0.151] | [0.008] |
| $\Delta Ideal$ = 4 | 0.022 | 0.040 | -0.032*** | 0.021 | 0.031 | 0.000 |
| | [0.148] | [0.195] | [0.012] | [0.142] | [0.172] | [.] |
| Covariates | N/A | N/A | No | N/A | N/A | No |
| Fixed effects included | N/A | N/A | Age-in-mos, $\Delta Ideal$ | N/A | N/A | Age-in-mos, $\Delta Ideal$ |
| Observations | 78,270 | 72,605 | 150,875 | 76,817 | 71,264 | 148,081 |

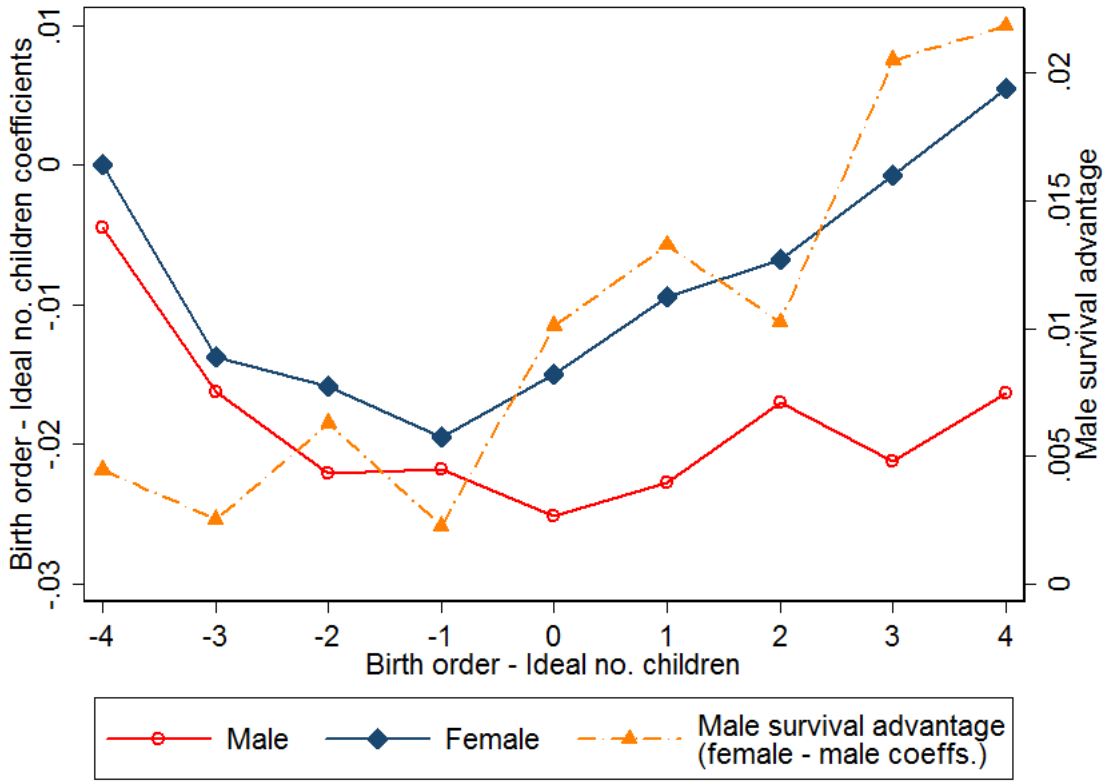
Notes: The first two columns report means [standard deviations] of the 12-to-36-month mortality variable across birth-order and gender. Col. (3) reports the $\gamma^b$ coefficients from the following regression: $mortality_i^{12-36mos} \sum_{b=-4}^{4} \gamma^b male \times \Delta Ideal_i^b + \sum_{b=-3}^{4} \beta^b \Delta Ideal_i^b + \mathbf{M}_i + \epsilon_i$, where $\Delta Ideal^b$ is an indicator variable for $\Delta Ideal = b$ and $\mathbf{M}$ is a vector of age-in-month fixed effects. No other covariates are included and only children born between 37 and 96 months before the survey date are included in the sample. Cols. (4) - (6) are analogous except one-to-six-month mortality serves as the dependent variable and the sample includes only children born between 7 and 66 months before the survey date. Standard errors in cols. (3) and (6), in brackets, are adjusted for clustering by mother. Note that col. (3) reports the coefficients and standard errors corresponding to the dotted line in Appendix Figure 2. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Online Appendix Figure A.1: Gender differences in mortality between age 12 and 36 months, by birth order (excluding households with piped water)



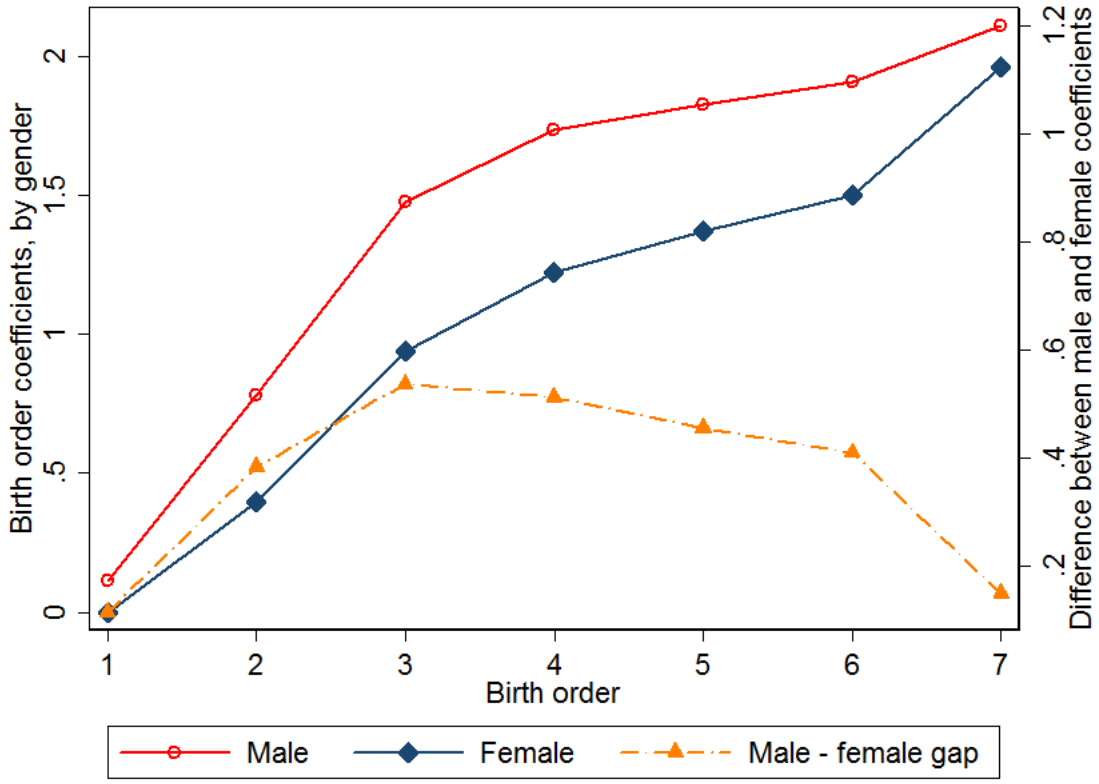

The solid lines plot the gender-specific coefficients for birth-order dummies from a regression with mortality between ages 12 and 36 months as the dependent variable, with the coefficient for birth order 1 for females normalized to 0. The regression includes no other control variables besides the main effects of male and the birth order dummies.

Online Appendix Figure A2: Gender differences in mortality between age 12 and 36 months, by $\Delta Ideal$ (excluding households with piped water)



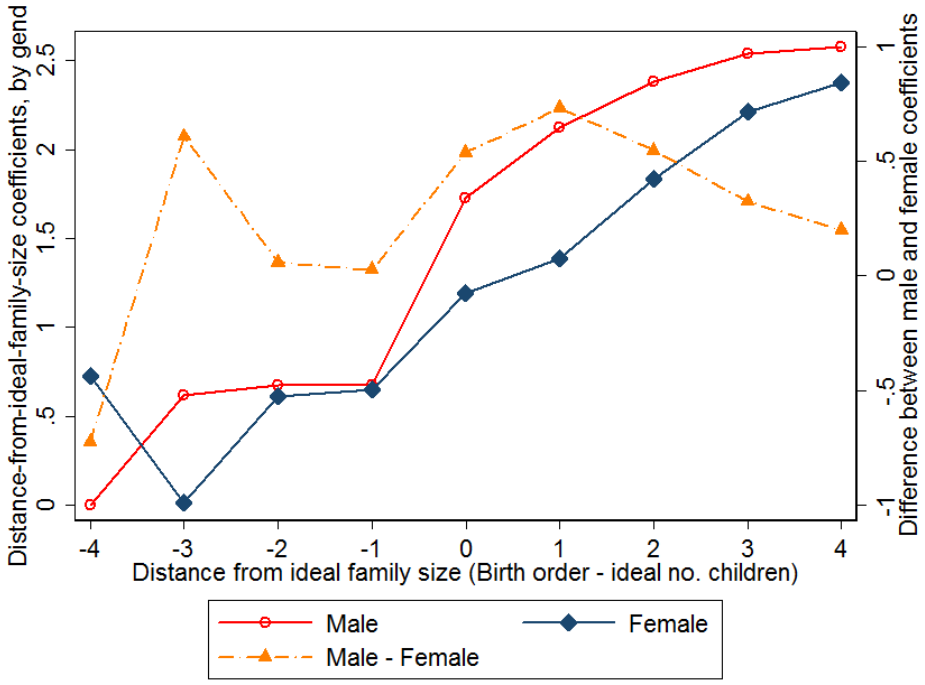

See Appendix Figure 1. In this figure, $\Delta Ideal$ dummy variables replace birth-order dummy variables.

Online Appendix Figure A.3: Gender differences in breastfeeding duration by birth order (excluding households with piped water)




Notes: This figure is a version of Figure IV for only households lacking piped water. The solid lines plot the gender-specific coefficients for birth-order dummies from a regression with breastfeeding duration as the dependent variable, with the coefficient for birth order one for females normalized to zero. The regression includes age-in-month fixed effects and no other control variables. The dashed line is the difference between the male and female coefficients.

Online Appendix Figure A4: Gender difference in breastfeeding duration by $\Delta Ideal$ (excluding households with piped water)




This figure is a version of Figure V for only households lacking piped water. The solid lines plot the gender-specific coefficients for "distance from ideal family size" (birth order minus ideal family size) dummies from a regression with breastfeeding duration in months as the dependent variable. The coefficient for males for distance from ideal family size = -4 is normalized to zero. The regression includes age-in-month fixed effects and no other control variables. The dashed line is the difference between the male and female coefficients.

## Proofs of Proposition 4 and Lemmas

**Proposition 4.**

*(i) Breastfeeding is constant for birth order below the ideal family size and can strictly increase in birth order only after the ideal family size has been reached.*

*(ii) There is no gender gap in breastfeeding for birth order below the ideal family size. The gender gap in breastfeeding only arises after the ideal family size has been reached.*

*Proof.*

(i) A mother will not breastfeed for $n < \widehat{n}$, by Lemma 2. Proposition 1 establishes the remainder of the proof. The mother will begin breastfeeding at some $n \geq \widehat{n}$, the exact value depending on the gender composition of her children and the extent of her son preference.

(ii) The proof to part (i) establishes that neither boys nor girls are breastfed for $n < \widehat{n}$, so there is no gender gap. Proposition 2(i) establishes the possibility of a gender gap at $n \geq \widehat{n}$. ■

**Lemma 1.** *A mother will choose to breastfeed if and only if* $u(n,s) \geq \frac{u(n+1,s)+u(n+1,s+1)}{2}$ *(assuming she breaks indifference in favor of breastfeeding rather than childbearing).*

*Proof.* In words, the lemma states that a mother will not breastfeed her $n^{\text{th}}$ child and instead will have her $(n+1)^{\text{st}}$ child if and only if the expected value of having *exactly* one more child exceeds the value of stopping now.

To show necessity, assume that $u(n,s) < \frac{u(n+1,s)+u(n+1,s+1)}{2}$. The expression for the value function is

$$V(n+1,s) = \max\left\{\frac{u(n+1,s)}{1-\beta}, u(n+1,s) + \beta\left(\frac{V(n+2,s)+V(n+2,s+1)}{2}\right)\right\}.$$

It follows that $V(n+1,s) \geq \frac{u(n+1,s)}{1-\beta}$, and similarly $V(n+1,s+1) \geq \frac{u(n+1,s+1)}{1-\beta}$. Therefore $\frac{u(n,s)}{1-\beta} < \frac{V(n+1,s)+V(n+1,s+1)}{2}$, which implies that $V^{b=0} > V^{b=1}$ or that the mother will choose not to breastfeed.

To show sufficiency, suppose toward contradiction that $u(n,s) \geq \frac{u(n+1,s)+u(n+1,s+1)}{2}$ but the mother has her $(n+1)^{\text{st}}$ child, so $V^{b=0} > V^{b=1}$. This gives $\frac{V(n+1,s)+V(n+1,s+1)}{2} > \frac{u(n,s)}{1-\beta} \geq \frac{u(n+1,s)+u(n+1,s+1)}{2(1-\beta)}$. It follows that either $V(n+1,s+1) > \frac{u(n+1,s+1)}{1-\beta}$ or $V(n+1,s) > \frac{u(n+1,s)}{1-\beta}$; either the mother continues having children at $(n+1,s)$ or at $(n+1,s+1)$ (or both). Since the marginal value of continuing to have children is higher the lower $s$ is, conditional on $n$, the mother continues having children (at least) at $(n+1,s)$.

That the mother continues at $(n+1,s)$ implies that $\frac{V(n+2,s)+V(n+2,s+1)}{2} > \frac{u(n+1,s)}{1-\beta}$. However, if we can show that $u(n+1,s) > \frac{u(n+2,s)+u(n+2,s+1)}{2}$, then we have back our original problem with $n+1$ replacing $n$, implying that the mother will continue to have children if she reaches $(n+2,s)$. By induction, as long as the mother had daughters she would continue

having children indefinitely, contradicting Lemma 3 which states that the number of children is bounded above. Therefore, all that remains to prove sufficiency is to show that

$$u(n,s) > \frac{u(n+1,s)+u(n+1,s+1)}{2} \Rightarrow u(n+1,s) > \frac{u(n+2,s)+u(n+2,s+1)}{2}.$$

Rearranging terms and substituting in the definition of $u$ gives,

$$-\lambda\frac{g(s+1)-g(s)}{2} > q(n+1)-q(n) \Rightarrow -\lambda\frac{g(s+1)-g(s)}{2} > q(n+2)-q(n+1)$$

which holds by the concavity of $q$. ∎

**Lemma 2.** *$\widehat{n}$ exists, and $\widehat{n} > 0$. For all $n < \widehat{n}$, a mother will have the $(n+1)^{st}$ child regardless of sex preference $\lambda$ and regardless of the sex composition of existing children.*

*Proof.* Given strict concavity of $q$, that $\lim_{n\to\infty} q'(n) = -\infty$, and our assumptions that $q(1) > q(0)$, we know $q(n)$ must achieve a maximum at some unique $n_{\max} > 0$. Defining $h(n) \equiv q(n+1) - q(n)$, our assumption that $q(1) > q(0)$ is equivalent to $h(0) > 0$. Strict concavity of $q$ implies that $h$ is a continuous, strictly decreasing function.

Since $q$ has a maximum at $n_{\max}$ and is strictly decreasing to the right of $n_{\max}$, we know that $h(n) < 0$ for all $n \geq n_{\max}$. Thus $h$ crosses zero exactly once, and does so from above somewhere in $(0, n_{\max})$. We have that $\widehat{n} = \max\{n \mid h(n) \geq 0\}$ is equal to the unique $n$ such that $h(n) = 0$.

For any $n < \widehat{n}$, the benefit to having another child is strictly positive regardless of the sex composition of existing children ($q$ is strictly greater than zero in this region and $\lambda g$ is always increasing), so mothers always choose to have the $(n+1)^{\text{st}}$ child. ∎

**Lemma 3.** *The total number of children that a mother gives birth to is bounded above; that is, there exists $\overline{n}$ such that she never has more than $\overline{n}$ children, regardless of sex composition.*

*Proof.* The proof of Lemma 2 established that $h(n) \equiv q(n+1) - q(n)$ is a continuous, strictly decreasing function. Since $\lim_{n\to\infty} q'(n) = -\infty$, we have that $\lim_{n\to\infty} h(n) = -\infty$ by the Fundamental Theorem of Calculus. Let $\bar{n}$ be equal to the unique $n$ such that $h(n) = -\lambda\big[g(1)-g(0)\big]$. Consider a woman who has $n \geq \bar{n}$ children; the marginal net cost of having the $(n+1)^{\text{st}}$ child is sufficiently large that even if doing so conferred the maximal marginal benefit associated with an additional son ($\lambda\big[g(1)-g(0)\big]$, which arises if the child is her first son), it would not exceed the utility loss associated with the extra child, $q(n) - q(n+1) \geq q(\bar{n}) - q(\bar{n}+1)$. Thus having any child beyond the $\bar{n}^{\text{th}}$ will necessarily decrease a mother's period utility, and it is *never* optimal to have more than $\bar{n}$ children, regardless of the sex composition of existing children. ∎

In addition, we add the following technical remark about the model.

**Comment 1.**

In the model, we are interested in the case where a mother wants to have at least one child, or $\widehat{n} > 0$ (equivalently, $q(1) - q(0) > 0$). Lemma 2 shows that under this assumption

there exists a unique $\widehat{n}$, and that it always lies in $(n_{\max} - 1, n_{\max})$ where $n_{\max}$ is the $n$ that maximizes $q$. Also note that even a mother with all sons might continue past $\widehat{n}$ because of the marginal benefit of more sons $\lambda[g(\widehat{n}+1) - g(\widehat{n})]$, but every mother continues up to at least $\widehat{n}$.

**Discussion**

We close by revisiting some of the model's assumptions, beginning with our decision to model breastfeeding as a binary choice. The model can easily be relabeled so that the decision is between short and long periods of nursing, to reflect that fact that almost all children in our sample are breastfed initially, but the binary nature of the model still deserves further attention.

First, modeling the decision as binary makes the predictions hold weakly for an individual mother. For example, a mother with negligible son preference who wants three children will breastfeed her third child but not the first two (or, equivalently, {short, short, long}). In line with Proposition 1, her breastfeeding choice is weakly increasing in birth order for all birth orders; it is constant between birth order one and two, and then strictly increases from birth order two to three. Empirically, we examine a large population of mothers, and given heterogeneity in ideal family size and son preference, aggregating over a population should smooth out the discrete fertility-stopping decisions predicted by the model. In addition, patterns for a particular mother depend on the realized sex composition of her previous children, whereas for a population, the population-average sex composition is known. Thus, we conjecture that the results would hold strictly (e.g., breastfeeding is strictly increasing in birth order) at the population level for most well-behaved joint distributions of $\phi$ (demand for children) and $\lambda$ (son preference).

Second, the binary specification does not take into account mothers' using breastfeeding to space births as opposed to merely prevent them. The essential assumption to incorporate birth-spacing into our framework is that mothers who want to continue having children might space their births to an extent, but they will still breastfeed less than mothers who want to stop having children entirely. This assumption follows naturally from a model (such as ours) where a mother receives flow utility from her children; she will begin receiving the positive flow of utility sooner if she has her children sooner.

It is also worth reviewing the assumption that breastfeeding perfectly prevents conception, even though the studies cited in the previous section indicate it merely decreases fecundity. Allowing mothers to conceive while breastfeeding would only reinforce the model's predictions, because a second, negative feedback loop (*from* subsequent conception *to* weaning of the current child) is activated.

To see that the model's predictions are only reinforced by relaxing the assumption of perfect contraception, consider a modification of the model such that a mother chooses whether to breastfeed her child both in the period the child is born and the next period. Assume a mother is constrained to breastfeed only one child at a time, and she prefers to breastfeed a younger child (which follows directly if she perceives the health benefits as concave in breastfeeding duration). Then a mother will breastfeed her child in the second period of his or her life if and only if the child does not have a younger sibling, or equivalently if and only if the child was breastfed in the first period. Thus, the two channels reinforce each other.