"Why are Indian Children So Short? " - Replication and Extension

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Outline

Introduction

Motivation and Objective

Possible Explanations of the *"Asian Enigma"* (Ramalingaswami et al., 1996; Headey et al., 2012)

- Women's status, sanitation, and urbanization (Smith et al., 2003)
- Genetic differences or long term consequences of past undernutrition (Klasen, 2008)
- Eldest son preference (Jayachandran & Pande, 2017)

Research Question and Contribution

- Research Question: Considering emerging trends in the past ten years, does parental preference for eldest sons still drive the health outcomes of Indian children?
- Contribution:
  1. External validity test of eldest son preference hypothesis
  2. Examination of influence of macro-trends on child health

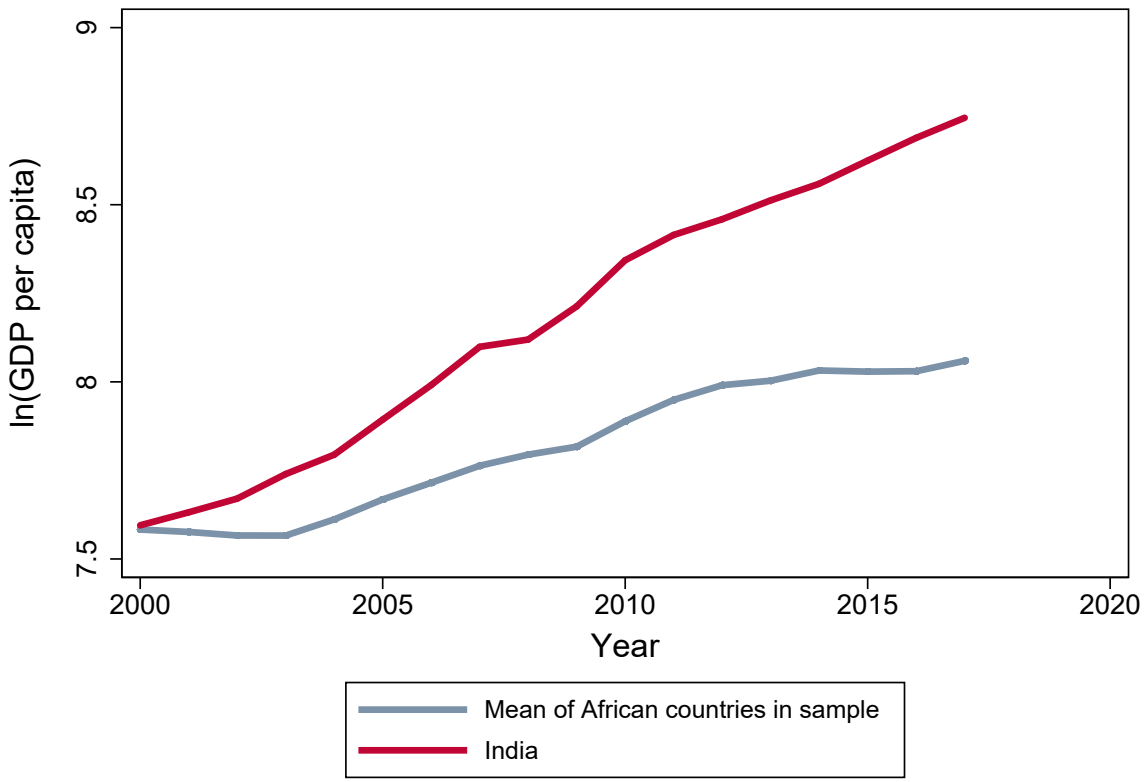
Background and Literature Review

Eldest Son Preference in India

- Social, economic, and cultural reasons (Arnold et al., 1998)
- Effect on fertility behavior (Clark, 2000; Jensen, 2003; Rosenblum, 2013)
- Effect on allocation of resources in education, nutrition, health (for example: Anukriti et al., 2016; Arnold et al., 1998; Bharadwaj & Lakdawala, 2013; V. Gupta et al., 2016; Oster, 2009; Pande, 2003; Rosenzweig & Schultz, 1982; Asfaw et al., 2010)

Emerging Trends

1. Greater female education in India (Klasen, 2016; Sahoo & Klasen, 2018)
2. Large economic growth in India



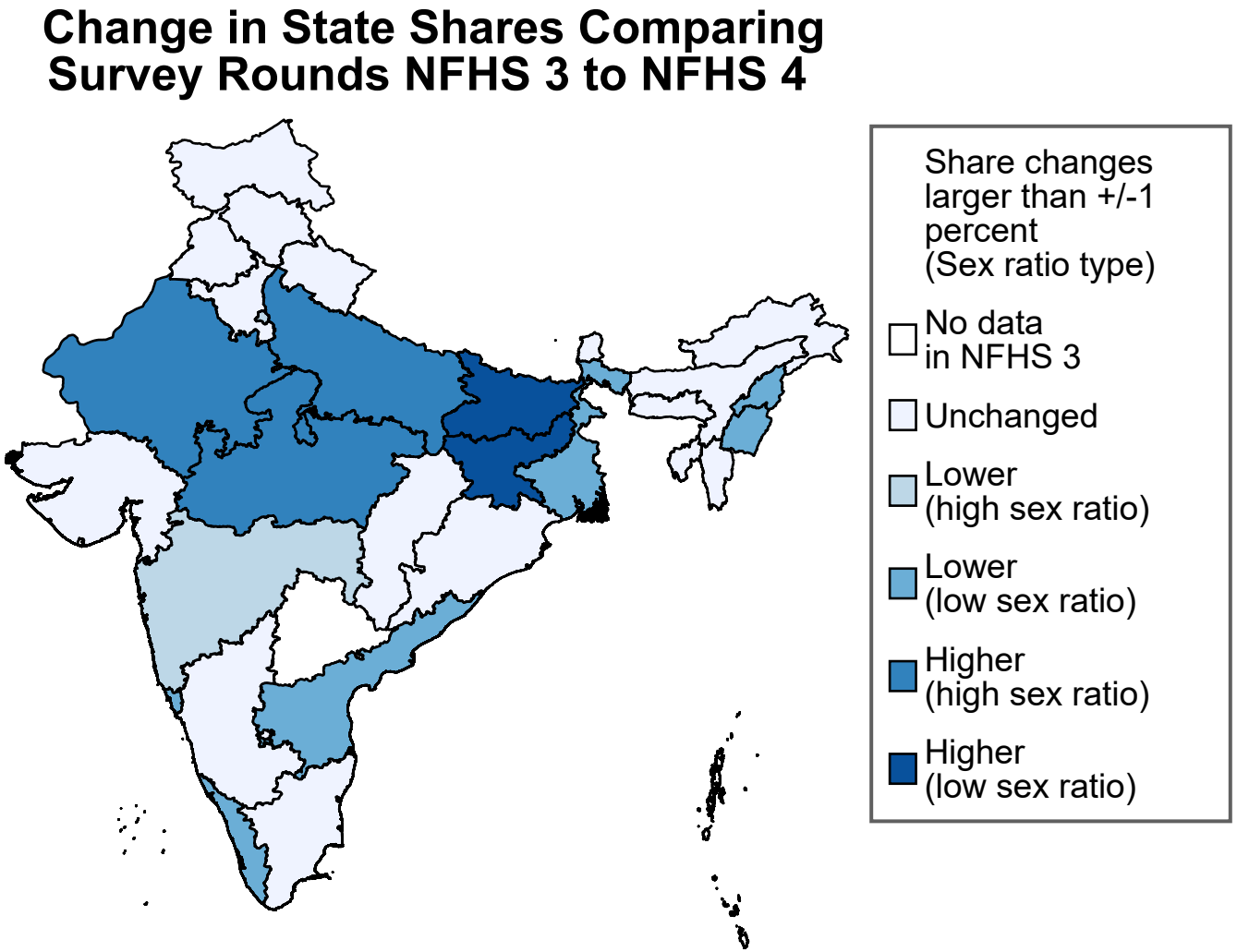
Source: Own calculations using data from Penn World Table 9.1 (Robert C. Fenestra, 2019)

Emerging Trends

1. Greater female education in India (Klasen, 2016; Sahoo & Klasen, 2018)
2. Large economic growth in India
3. Anti-Open Defecation Campaigns in India (Spears et al., 2013)
4. Nutrition transition (Pingali, 2007; Qaim, 2017; de Haen et al., 2011)

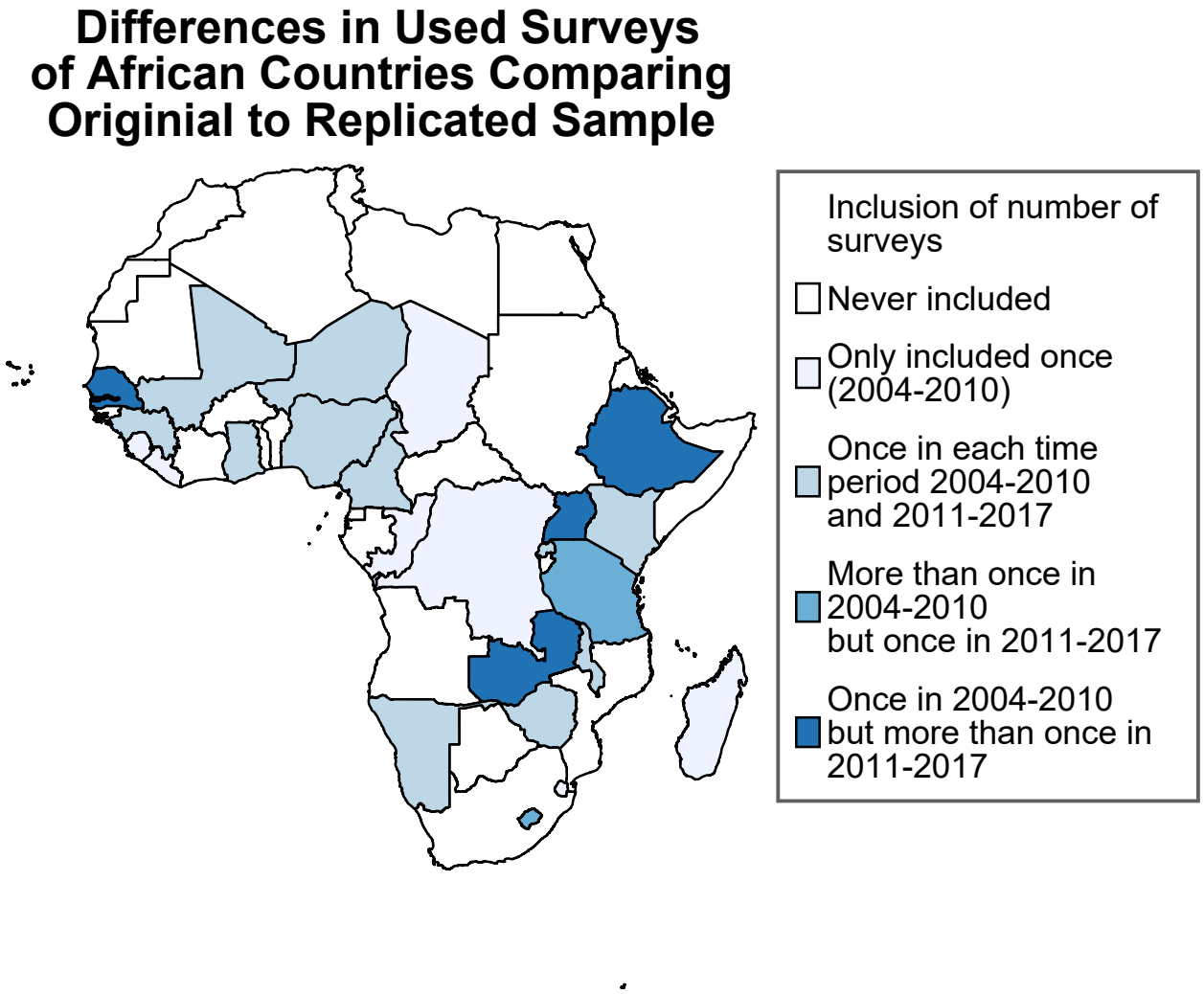
Data and Methodology

Sample Comparison: India



Source: Own calculations based on Jayachandran & Pande (2017) using data from Census 2011, DIVA-GIS (2019), IPUMS DHS (ICF, 2004), DHS (Heger Boyle & Sobek, 2019)

Sample Comparison: SSA



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Estimation Strategy I (Jayachandran & Pande, 2017)

$$HFA_{imc} = \alpha_1 I_c + \alpha_2 I_c \times 2ndChild_{imc} + \alpha_{3c} \times 3rd + Child_{imc} + \beta_1 2ndChild_{imc} + \beta_2 3rd + Child_{imc} + \gamma X_{imc} + \epsilon_{imc} \quad (1)$$

- HFA_{imc} outcome variables
- I_c Indian children
- $2ndChild_{imc}$ second-born children
- $3rd + Child_{imc}$ third-and-higher birth order children
- X child age dummy variables (in months) and control variables on mother or primary sampling unit level with interactions
- Clustered at the mother level

Estimation Strategy II (Jayachandran & Pande, 2017)

$$
\begin{aligned}
Y_{imc} = \alpha_1 I_c + \delta_1 I_c \times Girl + \delta_2 I_c \times Girl \times 2ndChild_{imc} \\
+ \delta_2 I_c \times Girl \times 3rd + Child_{imc} \\
+ \beta_1 2ndChild_{imc} + \beta_2 3rd + Child_{imc} \\
+ \beta_3 Girl \times 2ndChild_{imc} + \beta_4 Girl \times 3rd + Child_{imc} + \beta_5 Girl_{imc} \\
+ \alpha_2 I_c \times 2ndChild_{imc} + \alpha_3 I_c \times 3rd + Child_{imc} + \gamma X_{imc} + \epsilon_{imc}
\end{aligned}
\tag{2}
$$

- Y_{imc} outcome variables
- $Girl$ female children

Modification of Estimation Strategy

- Focus on height-for-age z-scores as outcome
- Replication I: Weights according to DHS mother sample weights
- Replication II & Extension:
  - Weights
  - Time period 2011 to 2017
  - Trend Variables added to X

Replication I: Weights

Selected Summary Statistics

	(Unweighted)		*(Weighted)*	
	India subsample	Africa subsample	India subsample	Africa subsample
Mother's age at birth (years)	24.75 [5.23]	26.96 [6.86]	24.25 [5.19]	26.95 [6.85]
Mother's total children born	2.74 [1.82]	3.88 [2.54]	2.87 [1.91]	3.90 [2.55]
Mother's desired fertility	2.47 [0.96]	4.62 [1.47]	2.45 [0.89]	4.62 [1.46]
Mother wants more children	0.34	0.67	0.34	0.67
Mother completed her fertility	0.67	0.33	0.67	0.33
Child's age (months)	30.20 [16.90]	28.27 [17.06]	30.18 [17.01]	28.26 [17.05]
Child is a girl	0.48	0.50	0.48	0.50
Child's birth order	2.62 [1.80]	3.74 [2.48]	2.74 [1.88]	3.75 [2.48]
Child's HFA z-score	-1.51 [1.81]	-1.35 [1.94]	-1.67 [1.80]	-1.36 [1.96]
Birth spacing (months)	36.16 [20.32]	38.69 [20.63]	37.43 [19.42]	38.43 [20.43]
Number of PSUs	3,822	10,366	3,822	10,366
Main sample of children	42,069	126,066	42,069	126,066

Notes: Standard errors are in brackets.

Source: Adapted from Jayachandran & Pande (2017) & DHS (Heger Boyle & Sobek, 2019)

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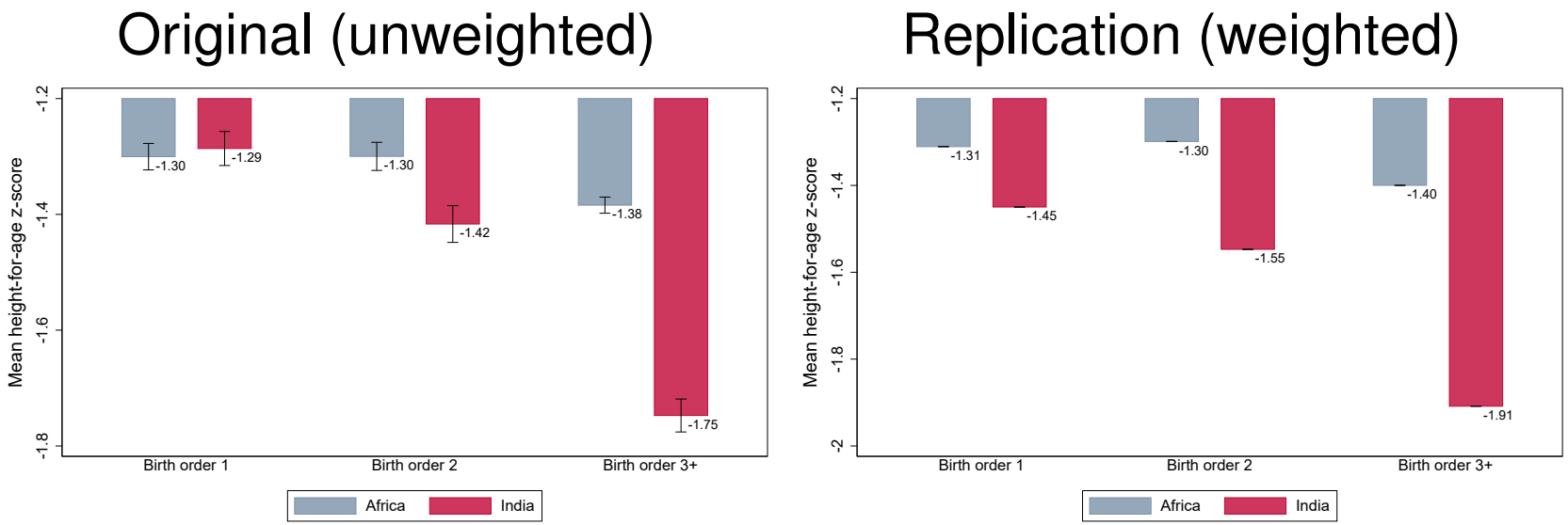
Key Findings: Summary Statistics

- After adjusted weights changes of larger than +/-0.1 in means for India
- Increases in mother's total born children, child's birth order and birth spacing
- Decreases in mother's age at birth and child's HFA z-score

Child Height in India and Africa, by Child's Birth Order



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India's Differential Birth Order Gradient in Child Height

	unweighted			*weighted*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.083	0.092		-0.240	-0.073	
	[0.011]	[0.018]		[0.013]	[0.023]	
India × 2nd child		-0.144	-0.161		-0.119	-0.152
		[0.025]	[0.027]		[0.032]	[0.034]
India × 3rd+ child		-0.377	-0.227		-0.356	-0.199
		[0.024]	[0.032]		[0.030]	[0.041]
2nd child		0.023	-0.011		0.035	0.003
		[0.015]	[0.017]		[0.019]	[0.021]
3rd+ child		-0.066	-0.118		-0.070	-0.121
		[0.013]	[0.019]		[0.016]	[0.024]
Africa mean of outcome	-1.351	-1.351	-1.351	-1.363	-1.363	-1.363
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's literacy × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	168,108	168,108	167,737	168,135	168,135	167,765

Notes: Standard errors are clustered by mother and appear in brackets.

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Key Findings: India's Differential Birth Order Gradient

- Not only high-birth order children but all children in India worse off compared to African children
- Shallower birth-order gradient in India

Child Gender and the Birth Order Gradient in Height I

	unweighted		*weighted*	
	HFA z-score		*HFA z-score*	
	(1)	(2)	(1)	(2)
India	0.148		-0.003	
	[0.026]		[0.033]	
India × Girl	-0.111		-0.140	
	[0.036]		[0.046]	
India × 2nd child	-0.107	-0.152	-0.077	-0.157
	[0.036]	[0.040]	[0.046]	[0.051]
India × 3rd+ child	-0.352	-0.221	-0.342	-0.246
	[0.033]	[0.047]	[0.042]	[0.061]
India × 2nd child × Girl	-0.076	-0.045	-0.089	-0.004
	[0.053]	[0.057]	[0.066]	[0.073]
India × 3rd+ child × Girl	-0.051	-0.048	-0.028	0.075
	[0.047]	[0.067]	[0.059]	[0.086]
2nd child	0.023	-0.005	0.021	0.011
	[0.022]	[0.026]	[0.028]	[0.031]
3rd+ child	-0.057	-0.113	-0.070	-0.113
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Africa mean of outcome	-1.351	-1.351	-1.363	-1.1363
Age & other controls	No	Yes	No	Yes
Observations	168,108	165,596	168,135	165,623

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Child Gender and the Birth Order Gradient in Height II

	unweighted		*weighted*	
	HFA z-score		*HFA z-score*	
	(5)	(6)	(5)	(6)
India	-0.011		-0.157	
	[0.014]		[0.018]	
India × Girl	-0.143	-0.147	-0.167	-0.172
	[0.020]	[0.019]	[0.025]	[0.024]
Africa mean of outcome	-1.351	-1.351	-1.1363	-1.1363
Age & other controls	No	Yes	No	Yes
Observations	168,108	167,737	168,135	165,623

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

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Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

Key Findings: Child Gender and the Birth Order Gradient in Height

- Not only high-birth order children but all children in India worse off compared to African children
- Shallower birth order gradient for boys in India
- Worse results for girls in India

Back-of-the-envelop Calculations

Explained share of India-Africa level gap in height		*Unweighted*	*Weighted*
Calculation 1:	*Birth order gradient*		
	Accounting Exercise 1	65%	25%
	Accounting Exercise 2	84%	40%
Calculation 2:	*Birth order gradient rooted in eldest son preference*		
	Accounting Exercise 1	32%	11%
	Accounting Exercise 2	43%	10%

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017) using data from DHS (Heger Boyle & Sobek, 2019)

Replication II & Extension

Selected Summary Statistics

	(2004-2010)		*(2011-2017)*	
	India subsample	Africa subsample	India subsample	Africa subsample
Mother's age at birth (years)	24.25 [5.19]	26.95 [6.85]	24.72 [4.76]	27.13 [6.68]
Mother's total children born	2.87 [1.91]	3.90 [2.55]	2.30 [1.42]	3.75 [2.46]
Mother's desired fertility	2.45 [0.89]	4.62 [1.46]	2.28 [0.88]	4.62 [1.44]
Mother wants more children	0.34	0.67	0.39	0.69
Mother completed her fertility	0.67	0.33	0.63	0.31
Child's age (months)	30.18 [17.01]	28.26 [17.05]	30.18 [16.88]	28.92 [17.06]
Child is a girl	0.48	0.50	0.48	0.50
Child's birth order	2.74 [1.88]	3.75 [2.48]	2.18 [1.40]	3.64 [2.41]
Child's HFA z-score	-1.67 [1.80]	-1.36 [1.96]	-1.26 [1.82]	-1.16 [1.79]
Birth spacing (months)	37.43 [19.42]	38.43 [20.43]	37.16 [21.61]	39.46 [21.44]
Number of PSUs	3,822	10,366	28,215	12,684
Main sample of children	42,069	126,066	230,220	168,490

Notes: Standard errors are in brackets.

Source: Adapted from Jayachandran & Pande (2017), IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

Selected Summary Statistics

	(2004-2010)		*(2011-2017)*	
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Source: Adapted from Jayachandran & Pande (2017), IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

Trend Summary Statistics

	(2004-2010)		*(2011-2017)*	
	India subsample	Africa subsample	India subsample	Africa subsample
Mother is literate	0.49	0.48	0.68	0.55
Log GDP per capita (in child's birth year)	7.77 [0.10]	7.35 [0.67]	8.50 [0.08]	7.80 [0.68]
Poorest wealth quantile	0.23	0.23	0.12	0.43
2nd poorest wealth quantile	0.09	0.24	0.19	0.23
3rd poorest wealth quantile	0.20	0.20	0.19	0.15
4th poorest wealth quantile	0.21	0.18	0.22	0.14
Richest wealth quantile	0.27	0.16	0.29	0.04
Open defecation	0.63	0.32	0.47	0.23
Meat or eggs consumed	0.12	0.43	0.14	0.30
Dairy products consumed	0.11	0.16	0.13	0.20

Notes: Standard errors are in brackets.

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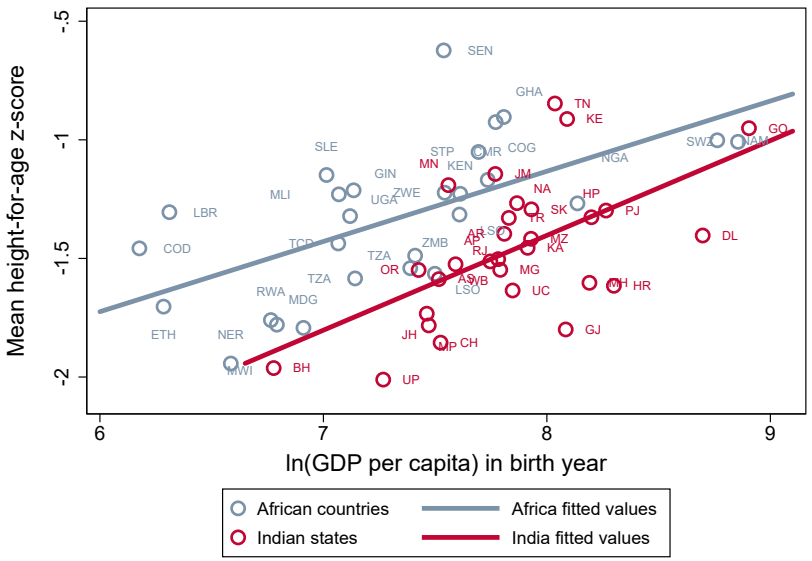
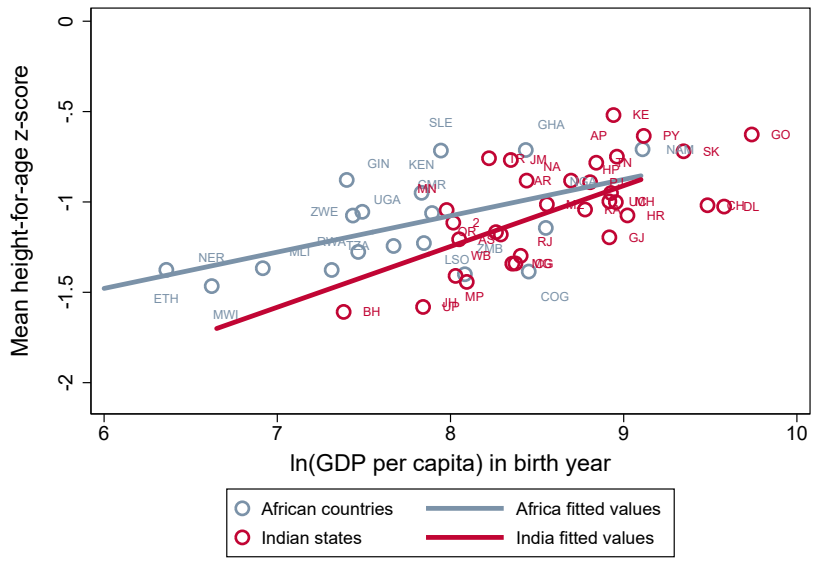
Source: Adapted from Jayachandran & Pande (2017), IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

Child Height versus National GDP

(2004-2010)



(2011-2017)



Source: Own calculations using data from Penn World Table 9.1 (Robert C. Fenestra, 2019)

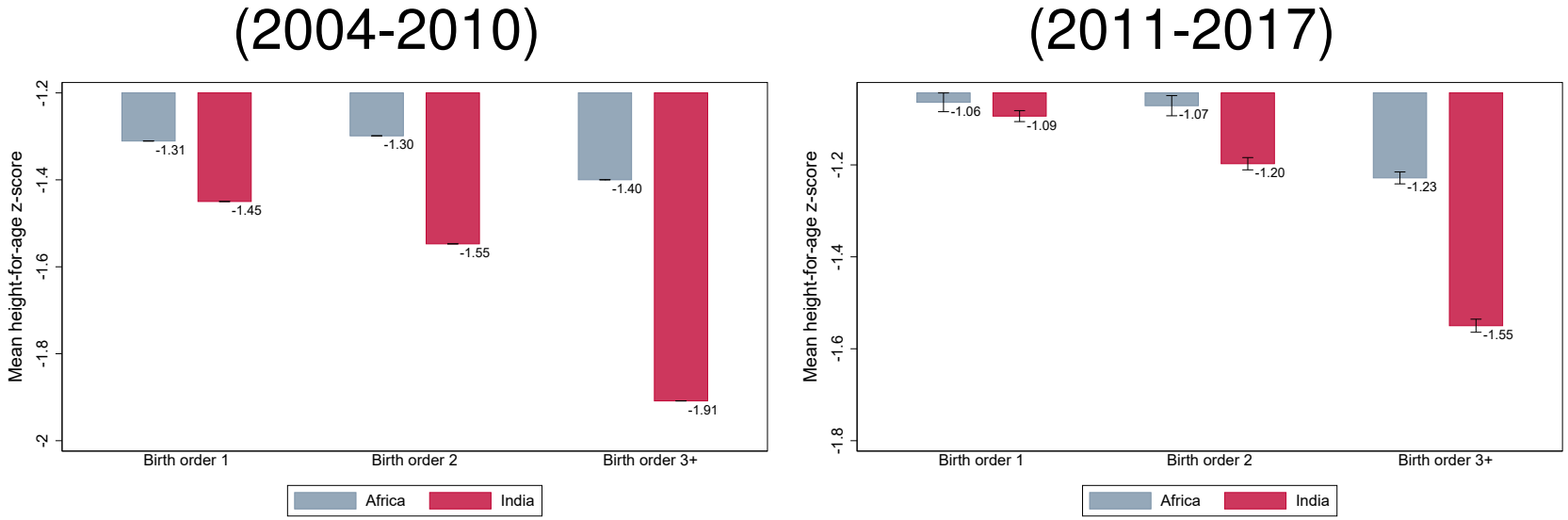
Key Findings: Summary Selected Statistics

- Similar features: mother's age at birth, mother wants more children, child's HFA z-score, mother's total born children, mother completed her fertility, child's birth order
- Diverging features:
  - Child's age: Increase for Africa
  - Mother's desired fertility: Decrease in India
  - Birth spacing: Decrease in India and increase for Africa

Key Findings: Summary Statistics Trends

- Similar trends: Increases in mother's literacy, GDP per capita
- Diverging trends:
  - Poorest wealth quantile: Decrease in India and increase for Africa
  - 2nd poorest wealth quantile: Increase in India
  - Richest wealth quantile: Decrease for Africa
  - Open defecation: Decrease in India
  - Meat or eggs consumed: Decrease for Africa

Child Height in India and Africa, by Child's Birth Order



Source: Adapted from Jayachandran & Pande (2017), IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
3rd+ child		0.056	-0.050		0.076	0.008
		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
India × Meat or eggs consumed	0.070	0.065	0.090	-0.057	-0.058	0.007
	[0.048]	[0.048]	[0.060]	[0.037]	[0.037]	[0.047]
Meat or eggs consumed	0.206	0.206	0.136	0.188	0.188	0.136
	[0.024]	[0.024]	[0.029]	[0.022]	[0.022]	[0.027]
India × Dairy products consumed	-0.019	-0.022	-0.059	-0.054	-0.057	0.036
	[0.056]	[0.056]	[0.067]	[0.038]	[0.038]	[0.045]
Dairy products consumed	0.129	0.131	0.132	0.171	0.174	0.093
	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
3rd+ child		0.056	-0.050		0.076	0.008
		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
India × Meat or eggs consumed	0.070	0.065	0.090	-0.057	-0.058	0.007
	[0.048]	[0.048]	[0.060]	[0.037]	[0.037]	[0.047]
Meat or eggs consumed	0.206	0.206	0.136	0.188	0.188	0.136
	[0.024]	[0.024]	[0.029]	[0.022]	[0.022]	[0.027]
India × Dairy products consumed	-0.019	-0.022	-0.059	-0.054	-0.057	0.036
	[0.056]	[0.056]	[0.067]	[0.038]	[0.038]	[0.045]
Dairy products consumed	0.129	0.131	0.132	0.171	0.174	0.093
	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
3rd+ child		0.056	-0.050		0.076	0.008
		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
India × Meat or eggs consumed	0.070	0.065	0.090	-0.057	-0.058	0.007
	[0.048]	[0.048]	[0.060]	[0.037]	[0.037]	[0.047]
Meat or eggs consumed	0.206	0.206	0.136	0.188	0.188	0.136
	[0.024]	[0.024]	[0.029]	[0.022]	[0.022]	[0.027]
India × Dairy products consumed	-0.019	-0.022	-0.059	-0.054	-0.057	0.036
	[0.056]	[0.056]	[0.067]	[0.038]	[0.038]	[0.045]
Dairy products consumed	0.129	0.131	0.132	0.171	0.174	0.093
	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
3rd+ child		0.056	-0.050		0.076	0.008
		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
India × Meat or eggs consumed	0.070	0.065	0.090	-0.057	-0.058	0.007
	[0.048]	[0.048]	[0.060]	[0.037]	[0.037]	[0.047]
Meat or eggs consumed	0.206	0.206	0.136	0.188	0.188	0.136
	[0.024]	[0.024]	[0.029]	[0.022]	[0.022]	[0.027]
India × Dairy products consumed	-0.019	-0.022	-0.059	-0.054	-0.057	0.036
	[0.056]	[0.056]	[0.067]	[0.038]	[0.038]	[0.045]
Dairy products consumed	0.129	0.131	0.132	0.171	0.174	0.093
	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
3rd+ child		0.056	-0.050		0.076	0.008
		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
India × Meat or eggs consumed	0.070	0.065	0.090	-0.057	-0.058	0.007
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Meat or eggs consumed	0.206	0.206	0.136	0.188	0.188	0.136
	[0.024]	[0.024]	[0.029]	[0.022]	[0.022]	[0.027]
India × Dairy products consumed	-0.019	-0.022	-0.059	-0.054	-0.057	0.036
	[0.056]	[0.056]	[0.067]	[0.038]	[0.038]	[0.045]
Dairy products consumed	0.129	0.131	0.132	0.171	0.174	0.093
	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
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		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
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	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
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Observations	65,273	65,273	64,141	147,049	147,049	140,404

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India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
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India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
3rd+ child		0.056	-0.050		0.076	0.008
		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
India × Meat or eggs consumed	0.070	0.065	0.090	-0.057	-0.058	0.007
	[0.048]	[0.048]	[0.060]	[0.037]	[0.037]	[0.047]
Meat or eggs consumed	0.206	0.206	0.136	0.188	0.188	0.136
	[0.024]	[0.024]	[0.029]	[0.022]	[0.022]	[0.027]
India × Dairy products consumed	-0.019	-0.022	-0.059	-0.054	-0.057	0.036
	[0.056]	[0.056]	[0.067]	[0.038]	[0.038]	[0.045]
Dairy products consumed	0.129	0.131	0.132	0.171	0.174	0.093
	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

India's Differential Birth Order Gradient in Child Height

	(200-2010)			*(2011-2017)*		
	HFA z-score			*HFA z-score*		
	(1)	(2)	(3)	(1)	(2)	(3)
India	-0.255	-0.127		-0.311	-0.203	
	[0.046]	[0.057]		[0.030]	[0.040]	
India × 2nd child		-0.119	-0.179		-0.074	-0.096
		[0.052]	[0.060]		[0.037]	[0.044]
India × 3rd+ child		-0.177	-0.224		-0.159	-0.175
		[0.048]	[0.070]		[0.034]	[0.051]
2nd child		0.090	0.049		0.068	0.032
		[0.033]	[0.039]		[0.029]	[0.035]
3rd+ child		0.056	-0.050		0.076	0.008
		[0.028]	[0.044]		[0.24]	[0.038]
India × Mother's literacy	0.188	0.149	0.073	0.111	0.074	0.089
	[0.041]	[0.043]	[0.052]	[0.028]	[0.029]	[0.038]
Mother's literacy	0.078	0.084	0.087	0.156	0.169	0.104
	[0.023]	[0.023]	[0.031]	[0.020]	[0.020]	[0.028]
2nd poorest wealth quantile	0.014	0.011	0.015	0.083	0.084	0.047
	[0.030]	[0.030]	[0.035]	[0.021]	[0.021]	[0.026]
3rd poorest wealth quantile	0.183	0.180	0.137	0.217	0.216	0.110
	[0.029]	[0.029]	[0.037]	[0.022]	[0.022]	[0.030]
4th poorest wealth quantile	0.312	0.309	0.186	0.400	0.398	0.268
	[0.029]	[0.029]	[0.042]	[0.023]	[0.023]	[0.036]
Richest wealth quantile	0.669	0.664	0.402	0.687	0.683	0.454
	[0.034]	[0.034]	[0.056]	[0.028]	[0.028]	[0.047]
India × Open defecation	-0.088	-0.079	-0.079	-0.157	-0.153	0.004
	[0.044]	[0.044]	[0.068]	[0.032]	[0.032]	[0.048]
Open defecation	0.005	0.004	-0.061	0.120	0.119	-0.032
	[0.025]	[0.025]	[0.038]	[0.023]	[0.023]	[0.035]
India × Meat or eggs consumed	0.070	0.065	0.090	-0.057	-0.058	0.007
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India × Dairy products consumed	-0.019	-0.022	-0.059	-0.054	-0.057	0.036
	[0.056]	[0.056]	[0.067]	[0.038]	[0.038]	[0.045]
Dairy products consumed	0.129	0.131	0.132	0.171	0.174	0.093
	[0.030]	[0.030]	[0.038]	[0.024]	[0.024]	[0.030]
Africa mean of outcome	-1.363	-1.363	-1.363	-1.163	-1.163	-1.163
Child's age dummies × India	No	No	Yes	No	No	Yes
Mother's age at birth × India	No	No	Yes	No	No	Yes
PSU FEs	No	No	Yes	No	No	Yes
Observations	65,273	65,273	64,141	147,049	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

Key Findings: India's Differential Birth Order Gradient

- Overall decrease in stunting gap but largest for third-or higher-birth order children
- Not only high-birth order children but all children in India worse off compared to African children
- Shallower birth-order gradient in India
- Mother's literacy with increasing positive association
- Wealth increases health
- Gap between India and Africa in open defecation increasing
- Small differences in the consumption of animal products for India and Africa

Child Gender and the Birth Order Gradient in Height I

	(2004-2010)		*(2011-2017)*	
	HFA z-score		*HFA z-score*	
	(1)	(2)	(1)	(2)
India	-0.007		-0.203	
	[0.069]		[0.048]	
India × Girl	-0.240		0.004	
	[0.072]		[0.051]	
India × 2nd child	-0.150	-0.306	-0.012	-0.048
	[0.074]	[0.094]	[0.052]	[0.071]
India × 3rd+ child	-0.210	-0.389	-0.123	-0.116
	[0.067]	[0.108]	[0.048]	[0.082]
India × 2nd child × Girl	0.069	0.227	-0.116	-0.172
	[0.103]	[0.132]	[0.073]	[0.100]
India × 3rd+ child × Girl	0.073	0.379	-0.068	-0.172
	[0.092]	[0.153]	[0.065]	[0.115]
2nd child	0.090	0.106	0.039	0.006
	[0.048]	[0.062]	[0.041]	[0.056]
3rd+ child	0.055	0.005	0.079	-0.017
	[0.040]	[0.069]	[0.034]	[0.062]
India × Mother's literacy	0.153	0.094	0.074	0.012
	[0.043]	[0.079]	[0.029]	[0.061]
Mother's literacy	0.081	0.042	0.170	0.155
	[0.023]	[0.048]	[0.020]	[0.045]
2nd poorest wealth quantile	0.015	0.007	0.086	0.045
	[0.030]	[0.038]	[0.021]	[0.029]
3rd poorest wealth quantile	0.180	0.142	0.217	0.093
	[0.029]	[0.041]	[0.022]	[0.035]
4th poorest wealth quantile	0.308	0.168	0.400	0.264
	[0.029]	[0.047]	[0.023]	[0.041]
Richest wealth quantile	0.666	0.394	0.684	0.448
	[0.034]	[0.062]	[0.028]	[0.035]
India × Open defecation	-0.083	-0.137	-0.154	0.001
	[0.044]	[0.073]	[0.032]	[0.053]
Open defecation	0.008	-0.071	0.119	-0.017
	[0.025]	[0.041]	[0.023]	[0.039]
India × Meat or eggs consumed	0.062	0.135	-0.063	0.056
	[0.048]	[0.067]	[0.037]	[0.055]
Meat or eggs consumed	0.208	0.115	0.190	0.116
	[0.024]	[0.032]	[0.022]	[0.031]
India × Dairy products consumed	-0.022	-0.061	-0.058	0.042
	[0.056]	[0.073]	[0.038]	[0.052]
Dairy products consumed	0.131	0.132	0.174	0.084
	[0.030]	[0.042]	[0.024]	[0.034]
Africa mean of outcome	-1.363	-1.363	-1.163	-1.163
Age & other controls	No	Yes	No	Yes
Observations	168,135	165,623	147,049	123,282

Notes: Standard errors are clustered by mother and appear in brackets.

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Age & other controls	No	Yes	No	Yes
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Age & other controls	No	Yes	No	Yes
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	(2004-2010)		*(2011-2017)*	
	HFA z-score		*HFA z-score*	
	(1)	(2)	(1)	(2)
India	-0.007		-0.203	
	[0.069]		[0.048]	
India × Girl	-0.240		0.004	
	[0.072]		[0.051]	
India × 2nd child	-0.150	-0.306	-0.012	-0.048
	[0.074]	[0.094]	[0.052]	[0.071]
India × 3rd+ child	-0.210	-0.389	-0.123	-0.116
	[0.067]	[0.108]	[0.048]	[0.082]
India × 2nd child × Girl	0.069	0.227	-0.116	-0.172
	[0.103]	[0.132]	[0.073]	[0.100]
India × 3rd+ child × Girl	0.073	0.379	-0.068	-0.172
	[0.092]	[0.153]	[0.065]	[0.115]
2nd child	0.090	0.106	0.039	0.006
	[0.048]	[0.062]	[0.041]	[0.056]
3rd+ child	0.055	0.005	0.079	-0.017
	[0.040]	[0.069]	[0.034]	[0.062]
India × Mother's literacy	0.153	0.094	0.074	0.012
	[0.043]	[0.079]	[0.029]	[0.061]
Mother's literacy	0.081	0.042	0.170	0.155
	[0.023]	[0.048]	[0.020]	[0.045]
2nd poorest wealth quantile	0.015	0.007	0.086	0.045
	[0.030]	[0.038]	[0.021]	[0.029]
3rd poorest wealth quantile	0.180	0.142	0.217	0.093
	[0.029]	[0.041]	[0.022]	[0.035]
4th poorest wealth quantile	0.308	0.168	0.400	0.264
	[0.029]	[0.047]	[0.023]	[0.041]
Richest wealth quantile	0.666	0.394	0.684	0.448
	[0.034]	[0.062]	[0.028]	[0.035]
India × Open defecation	-0.083	-0.137	-0.154	0.001
	[0.044]	[0.073]	[0.032]	[0.053]
Open defecation	0.008	-0.071	0.119	-0.017
	[0.025]	[0.041]	[0.023]	[0.039]
India × Meat or eggs consumed	0.062	0.135	-0.063	0.056
	[0.048]	[0.067]	[0.037]	[0.055]
Meat or eggs consumed	0.208	0.115	0.190	0.116
	[0.024]	[0.032]	[0.022]	[0.031]
India × Dairy products consumed	-0.022	-0.061	-0.058	0.042
	[0.056]	[0.073]	[0.038]	[0.052]
Dairy products consumed	0.131	0.132	0.174	0.084
	[0.030]	[0.042]	[0.024]	[0.034]
Africa mean of outcome	-1.363	-1.363	-1.163	-1.163
Age & other controls	No	Yes	No	Yes
Observations	168,135	165,623	147,049	123,282

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

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Child Gender and the Birth Order Gradient in Height II

	(2004-2010)		*(2011-2017)*	
	HFA z-score		*HFA z-score*	
	(5)	(6)	(5)	(6)
India	-0.158		-0.284	
	[0.049]		[0.033]	
India × Girl	-0.188	-0.216	-0.045	-0.028
	[0.038]	[0.041]	[0.026]	[0.029]
India × Mother's literacy	0.191	0.123	0.068	0.110
	[0.041]	[0.051]	[0.028]	[0.037]
Mother's literacy	0.075	0.080	0.157	0.106
	[0.023]	[0.031]	[0.020]	[0.028]
2nd poorest wealth quantile	0.017	0.021	0.085	0.051
	[0.030]	[0.035]	[0.021]	[0.026]
3rd poorest wealth quantile	0.184	0.144	0.218	0.115
	[0.029]	[0.037]	[0.022]	[0.030]
4th poorest wealth quantile	0.311	0.193	0.402	0.277
	[0.029]	[0.042]	[0.023]	[0.036]
Richest wealth quantile	0.671	0.421	0.689	0.471
	[0.034]	[0.056]	[0.027]	[0.047]
India × Open defecation	-0.093	-0.141	-0.158	-0.006
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Meat or eggs consumed	0.207	0.156	0.190	0.114
	[0.024]	[0.028]	[0.022]	[0.026]
India × Dairy products consumed	-0.020	-0.081	-0.055	0.052
	[0.056]	[0.066]	[0.038]	[0.045]
Dairy products consumed	0.129	0.139	0.171	0.080
	[0.030]	[0.038]	[0.024]	[0.030]
Africa mean of outcome	-1.1363	-1.1363	-1.163	-1.163
Age & other controls	No	Yes	No	Yes
Observations	65,273	64,141	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

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	[0.034]	[0.056]	[0.027]	[0.047]
India × Open defecation	-0.093	-0.141	-0.158	-0.006
	[0.044]	[0.068]	[0.032]	[0.048]
Open defecation	0.010	-0.056	0.120	-0.029
	[0.025]	[0.038]	[0.023]	[0.035]
India × Meat or eggs consumed	0.067	0.046	-0.062	0.033
	[0.048]	[0.058]	[0.037]	[0.045]
Meat or eggs consumed	0.207	0.156	0.190	0.114
	[0.024]	[0.028]	[0.022]	[0.026]
India × Dairy products consumed	-0.020	-0.081	-0.055	0.052
	[0.056]	[0.066]	[0.038]	[0.045]
Dairy products consumed	0.129	0.139	0.171	0.080
	[0.030]	[0.038]	[0.024]	[0.030]
Africa mean of outcome	-1.1363	-1.1363	-1.163	-1.163
Age & other controls	No	Yes	No	Yes
Observations	65,273	64,141	147,049	140,404

Notes: Standard errors are clustered by mother and appear in brackets.

Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

Child Gender and the Birth Order Gradient in Height II

	(2004-2010)		*(2011-2017)*	
	HFA z-score		*HFA z-score*	
	(5)	(6)	(5)	(6)
India	-0.158		-0.284	
	[0.049]		[0.033]	
India × Girl	-0.188	-0.216	-0.045	-0.028
	[0.038]	[0.041]	[0.026]	[0.029]
India × Mother's literacy	0.191	0.123	0.068	0.110
	[0.041]	[0.051]	[0.028]	[0.037]
Mother's literacy	0.075	0.080	0.157	0.106
	[0.023]	[0.031]	[0.020]	[0.028]
2nd poorest wealth quantile	0.017	0.021	0.085	0.051
	[0.030]	[0.035]	[0.021]	[0.026]
3rd poorest wealth quantile	0.184	0.144	0.218	0.115
	[0.029]	[0.037]	[0.022]	[0.030]
4th poorest wealth quantile	0.311	0.193	0.402	0.277
	[0.029]	[0.042]	[0.023]	[0.036]
Richest wealth quantile	0.671	0.421	0.689	0.471
	[0.034]	[0.056]	[0.027]	[0.047]
India × Open defecation	-0.093	-0.141	-0.158	-0.006
	[0.044]	[0.068]	[0.032]	[0.048]
Open defecation	0.010	-0.056	0.120	-0.029
	[0.025]	[0.038]	[0.023]	[0.035]
India × Meat or eggs consumed	0.067	0.046	-0.062	0.033
	[0.048]	[0.058]	[0.037]	[0.045]
Meat or eggs consumed	0.207	0.156	0.190	0.114
	[0.024]	[0.028]	[0.022]	[0.026]
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	[0.056]	[0.066]	[0.038]	[0.045]
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Source: Adapted from Jayachandran & Pande (2017); IPUMS DHS (ICF, 2004) & DHS (Heger Boyle & Sobek, 2019)

Key Findings: Child Gender and the Birth Order Gradient in Height

- Not only high-birth order children but all children in India worse off compared to African children
- Shallower birth order gradient for boys in India
- Indian first-birth order girls not additionally worse off
- Mother's literacy with increasing positive association
- Wealth increases health
- Gap between India and Africa in open defecation increasing
- Small differences in the consumption of animal products for India and Africa

Limitations

Limitations

- Only descriptive, not causal evidence
- Sample of DHS with incompleted fertility
- Measurement of indicator variables
- *"Asian Enigma"* persists

Conclusion

Conclusion

- Larger difference between African and Indian children in stunting, also for first-borns
- Decreased disadvantage of later-born Indian children
- Less explanatory power of eldest son preference hypothesis by Jayachandran & Pande (2017)
- Trends are relevant but increase height gap between Africa and India

$\rightarrow$ *"Asian Enigma"* still unexplained

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