

The Precocious Period:

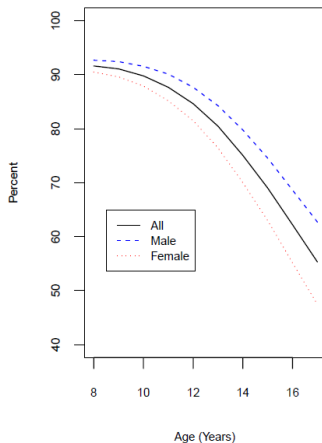
Impact of Early Menarche on Schooling in India

Madhulika Khanna

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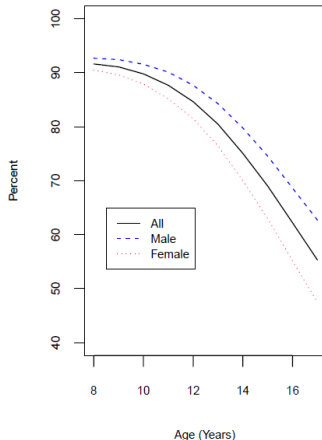
#DIYCSAE

Gender Gap in Enrollment Rate in India



Source: Muralidharan & Prakash (2017), DLHS-IV.

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This paper is the first one to identify a *biological* driver of the higher dropout rate among adolescent girls: **Early Menarche**

Menarche in India

Evidence from recent qualitative reports:

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Though a biological change, menarche completely alters the norms of a girl's engagement with her family and community.

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Exploits the variation in the timing of menarche within a cohort in a differences-in-difference framework

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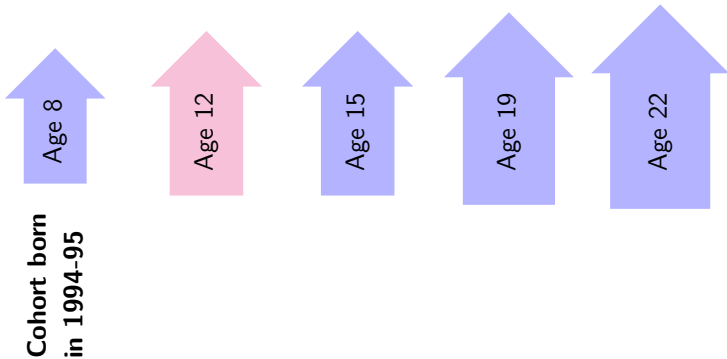
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Challenge to identification: adolescence is a period of many other transitions

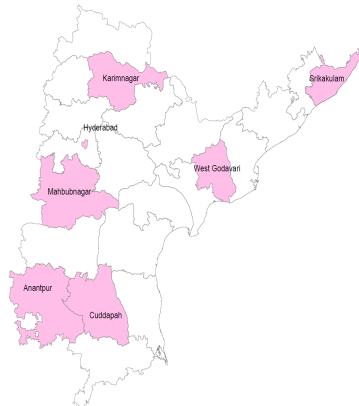
Exploits the variation in the timing of menarche within a cohort in a differences-in-difference framework

Key Result: Reaching menarche before age twelve leads to a 13% decline in school enrollment, an effect size comparable to the *positive* effect of many other government policy and interventions

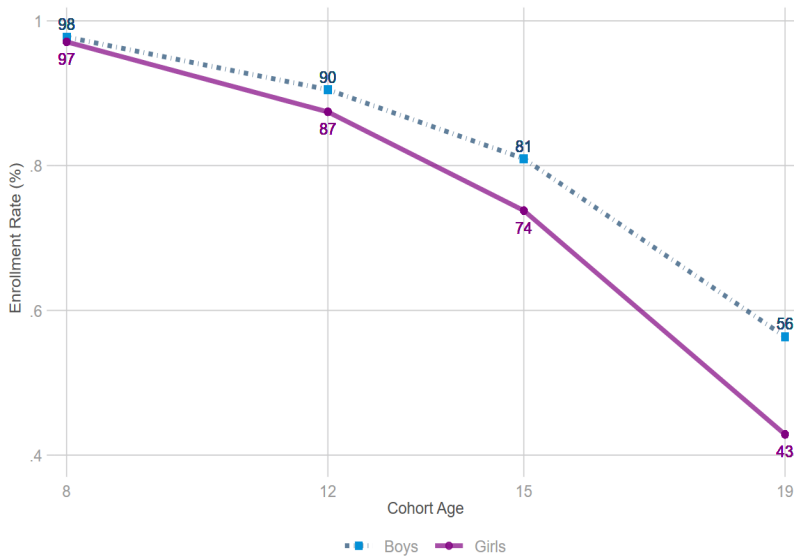
Young Lives Longitudinal Study



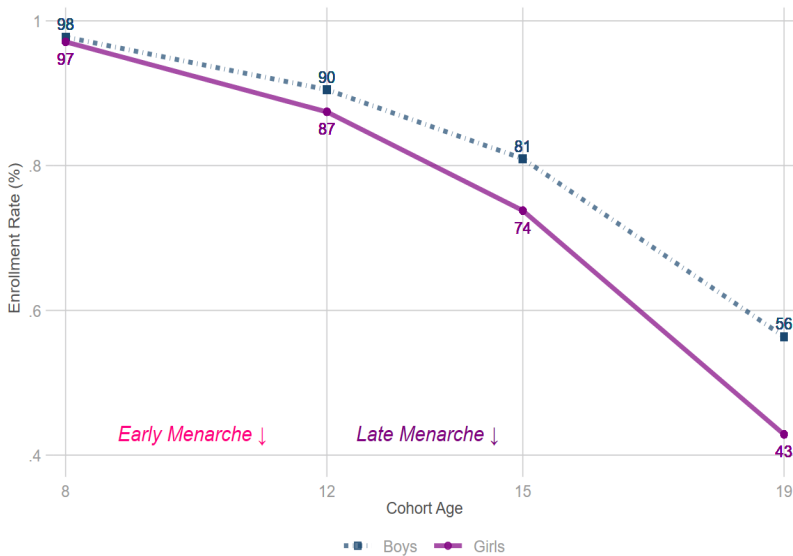
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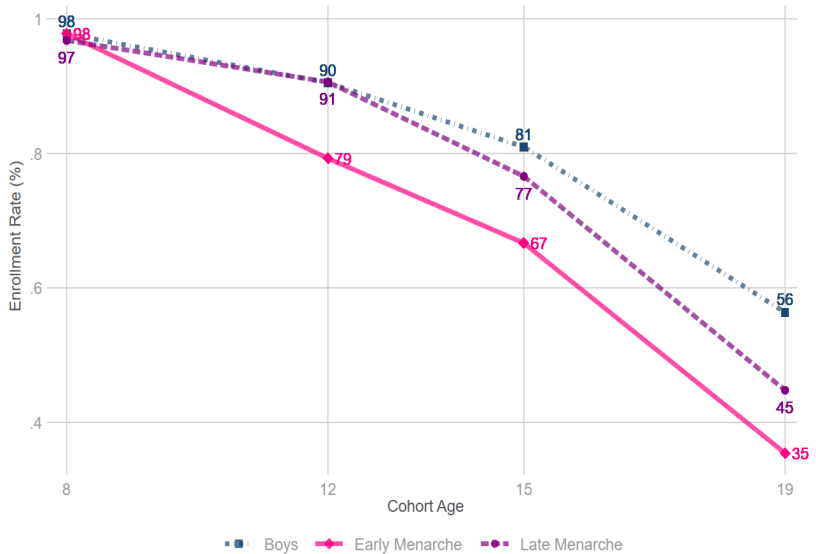
Enrollment Patterns: By Gender



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Enrollment Patterns: By Gender, and Menarche Status



Balance

	Early - Late	Early - Boys
Household size	0.30	-0.24
Wealth index	0.03	0.02
Access to drinking water	-0.02	-0.04
Electricity connection	0.02	0.03
Area of land owned (in ha.)	0.56	0.35
Literate mother (proportion)	0.06	0.06*
Age of the household head (years)	-0.67	-0.15
Schedule Caste	-0.67	0.00
Experience of health shocks	-0.03	-0.07
Experience of drought	-0.05	-0.07*
Speaks Telugu (proportion)	0.01	0.03
No. of older siblings	-0.16	-0.25**
No. of younger siblings	-0.11	0.02
No. of older brothers	0.05	-0.06
No. of older sisters	-0.24**	-0.30**
No. correct answers in Raven's test at 8	0.54	0.40
BMI at age 8 (kg/m^2)	0.48***	0.22
Height at age 8 (cm)	5.05***	2.65***
Weight at age 8 (kg)	2.39***	1.26***
Age in first year at school (in years)	-0.07	-0.06

Results Across Rounds 1 and 2

	vs Late Menarche Girls			
	Outcome: Enrollment Dummy			
	(1)	(2)	(3)	(4)
Early menarche	0.010 (0.011)	0.018 (0.019)	0.026 (0.022)	
Round 2	-0.062** (0.022)	-0.035 (0.031)	-0.034 (0.030)	-0.009 (0.037)
Early menarche X Round 2	-0.123** (0.032)	-0.121*** (0.031)	-0.122*** (0.031)	-0.130** (0.045)
Observations	1017	1013	1013	1013
R^2	0.0494	0.106	0.162	0.599
Control average	0.906	0.906	0.906	0.906
Sampling site FE	No	No	Yes	X
Individual FE	No	No	No	Yes
Controls	No	Yes	Yes	X

Honor and Safety

SCs in Andhra Pradesh have less restrictive gender norms

Gender

	(1)	(2)
Dimension of heterogeneity →	Scheduled Castes	Average Perception of Safety
Early menarche X Round 2	-0.014 (0.063)	-0.065 (0.051)
Early menarche X Round 2 X Non-SC	-0.136 [†] (0.085)	
Early menarche X Round 2 X Lower Perceived Safety		-0.124 [‡] (0.090)
Observations	1013	1013
R ²	0.167	0.168
Control average	0.906	0.906
Sampling site FE	Yes	Yes
Controls	Yes	Yes

† p-value: 0.12; ‡ p-value: 0.18.

Local Wages for Female Dominated Professions

	(1)	(2)
Dimension of heterogeneity →	Teachers' Wages	Nurses' Wages
Early menarche X Round 2	-0.079*** (0.020)	-0.054* (0.026)
Early menarche X Round 2 X Lower Teachers' Wages	-0.089 [†] (0.062)	
Early menarche X Round 2 X Lower Nurses' Wages		-0.107** (0.055)
Observations	1013	1013
R^2	0.168	0.177
Control average	0.906	0.906
Sampling site FE	Yes	Yes
Controls	Yes	Yes

† p-value: 0.16.

Policy Directions

Menstrual hygiene management:

- No effect of provision of menstrual cups in Nepal (Oster & Thornton, 2011)
- No additional effect of providing sanitary napkins over puberty education (Montgomery et al., 2012)

Other interventions that worked:

- **Safety and Privacy:**

Separate-sex toilets (Adukia, 2016)

Bicycles to school going girls (Muralidharan & Prakash, 2017)

Cost of unsafe neighborhoods substantial for young women in urban India (Borker, 2018)

- **Gender attitudes:**

Correcting jointly held beliefs (Bursztyn, Gonzalez & Yanagizawa-Drott, 2018)

Social campaign (Dhar, Jain & Jayachandran, 2018)

- **CCTs:**

CCTs (Mexico: (Schultz, 2004), Brazil: (Glewwe Kassouf, 2012), and Nicaragua: (Millán et al., 2020)

Looking Forward to Your Comments and Feedback! 😊

Madhulika Khanna

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Markers of Gender Performance, by Caste

	(1) Practice purdah	(2) Can go to: Health center	(3) Can go to: Grocery shop	(4) Can go to: Friend's house
Scheduled caste	-0.046* (0.025)	0.039 (0.035)	0.051** (0.022)	0.038 (0.036)
Observations	1774	1774	1774	1774
R^2	0.288	0.216	0.209	0.229
Control average	0.145	0.588	0.802	0.651
PSU FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes