

# **Maternal Early Marriage and Cognitive Skills Development: An Intergenerational Analysis**

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# Motivation

- 2 problems facing Bangladesh:
  - a global hot spot for early marriage
  - low level of learning across grades completed (i.e. shallow learning-schooling profile) (Asadullah & Chaudhury 2015)
- We argue that these two are connected
- Child marriage a key reason for girls dropping out of upper secondary grades in South Asia & Sub-saharan Africa (Mahmud & Amin 2006; Nguyen & Wodon, 2014; Wodon, Nguyen & Tsimpo, 2016).
- Delayed marriage increases  $\frac{1}{2}$  a year of education in Sub-Saharan Africa & nearly  $\frac{1}{3}$  in South West Asia (Delprato et al. 2015).

# Motivation (cont.)

- Early maternal age is associated with child outcomes
  - (nutritional status and schooling -- Fall et al 2015; behavioural problems -- Chang et al. 2014; low birthweight -- Borja and Adair, 2003; educational and psychosocial outcomes -- Fergusson and Woodward 1999; verbal abilities in early childhood -- Morinis et al 2013).
- But difficult to understand the –ve correlation between maternal age at first marriage and child outcomes as the latter is also affected by factors such as traditional social attitudes and household poverty that affect marriage timing (Gage 2013; Human Rights Watch 2015).

# Study Objective

- Investigate the *causal effect* of early marriage on skill formation
- Identification: use info on the timing of menarche to predict age at first marriage
- Rationale: In patriarchal societies, women face greater pressure for marriage from the onset of menarche (Field and Ambrus 2008; Sekhri & Debnath JDS 2014 ; Hicks and Hicks 2015 ; Sunder 2015; Asadullah and Wahhaj 2016)
  - Field and Ambrus on Bangladesh: each additional year that menarche is delayed postpones marriage by 0.74 year.

# Study Objective (cont.)

- Ours is first to document the *causal* impact of *maternal early marriage* on literacy/numeracy skills of children as well as their mothers in a setting where level of learning is very low
- In doing so, we present maternal early marriage as a new demand side explanation for the low level of human capital in South Asia

# Outline

1. Sample & survey
2. Key descriptive stats
3. Methodology
4. Main results: impact on adult outcomes
5. Main results: impact on child outcomes
6. Main results: pathways
7. Conclusion

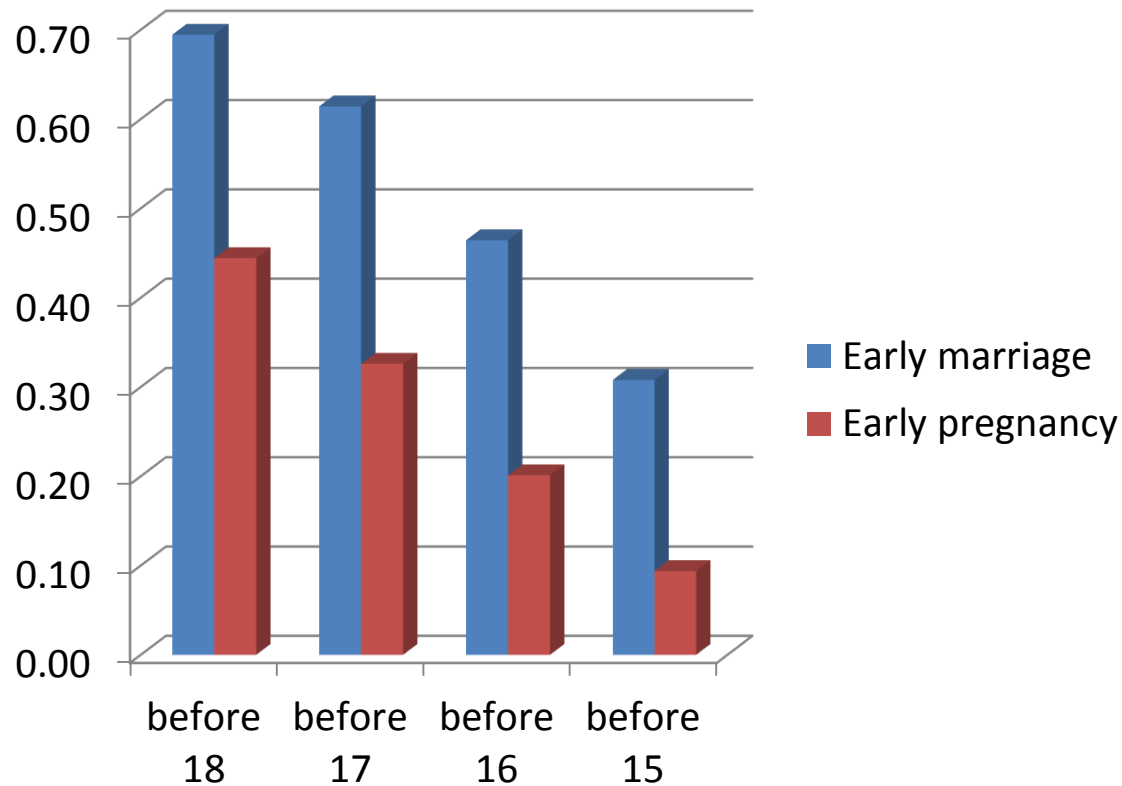
# **1. Sample & survey**

- Context: Baseline data from a Randomized Control Trial evaluation of *Adolescent clubs* in 31 sub-districts from 20 poorest districts of Bangladesh in 2012 in an attempt to shift social norms relating to marriage; implemented by BRAC
- Sample: 4320 adolescents (11-16 years) and their mothers surveyed in 2012
- Mothers and adolescent children participated in literacy and numeracy tests producing *matched cognitive (numeracy) scores* (test adopted from Greaney et al 1998)
- Sample description: Mean age of adolescent child - 13.5 years
- 75% are girls (since the focus is on girls)
- 82% currently in school (no gender gap in schooling)



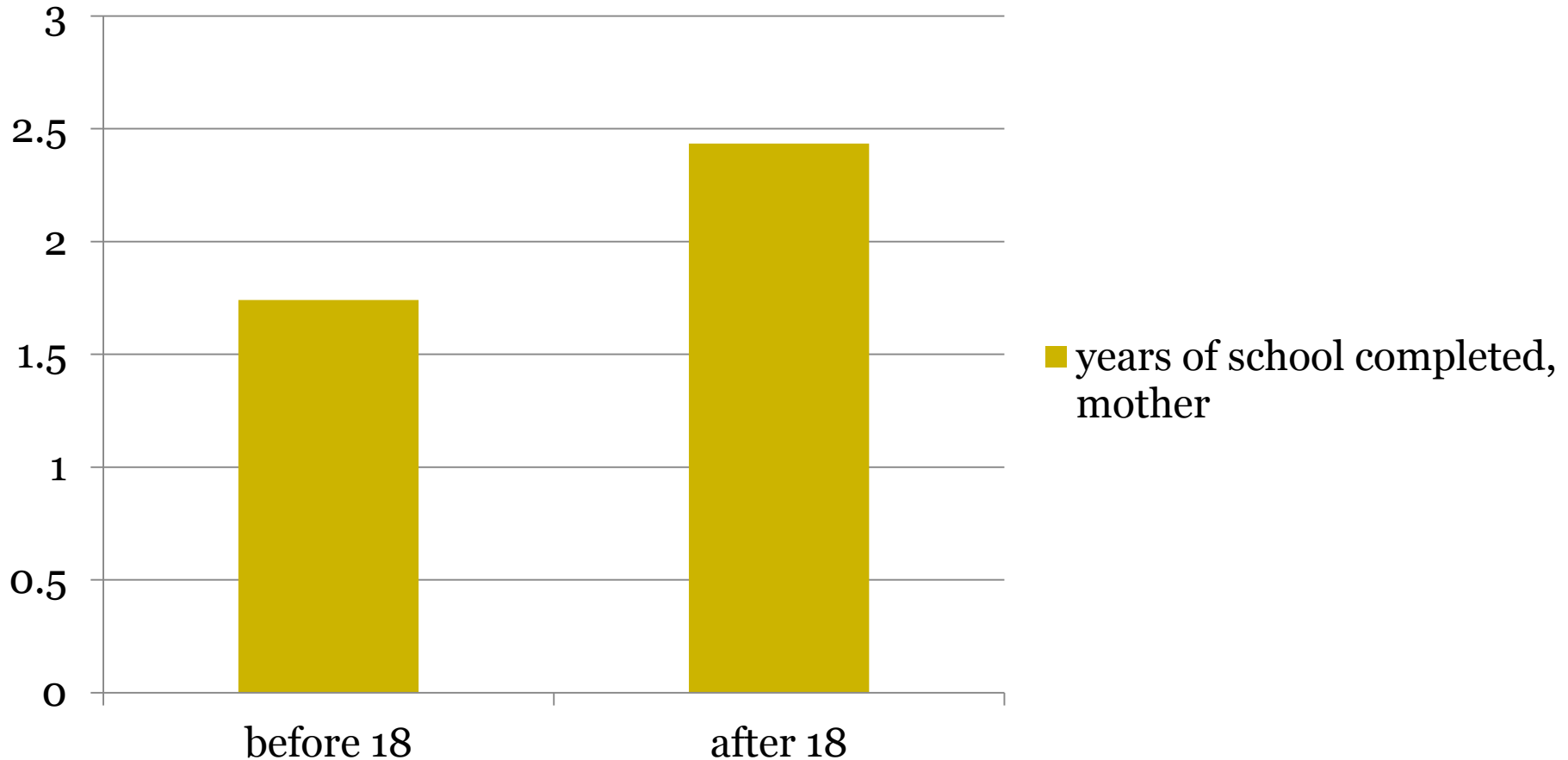
## **2. Key descriptive stats**

# Incidence of early marriage among mothers of adolescents (data in proportion)



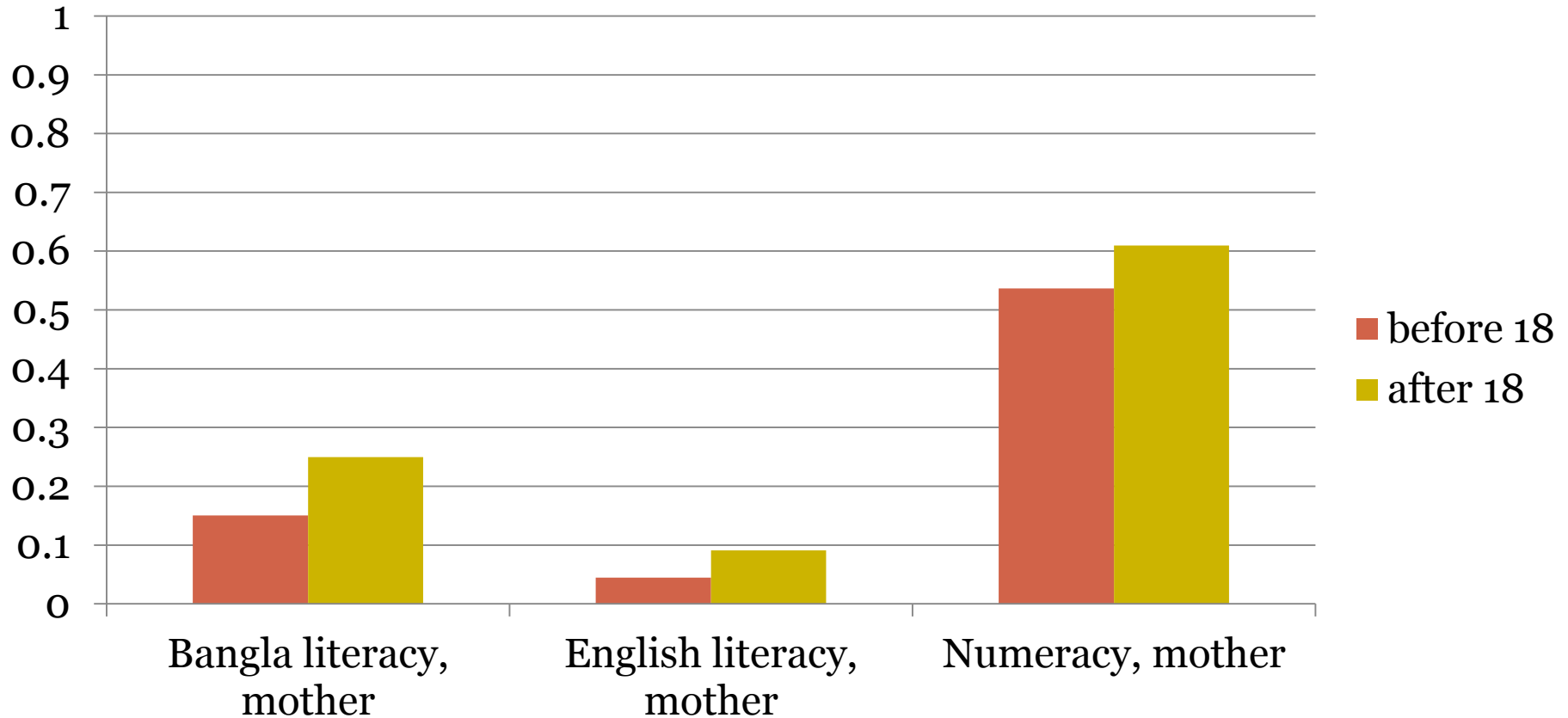
Sample: 4277 mothers of adolescent children surveyed in 2012

# Schooling of **mothers** vs. maternal early marriage (before 18)



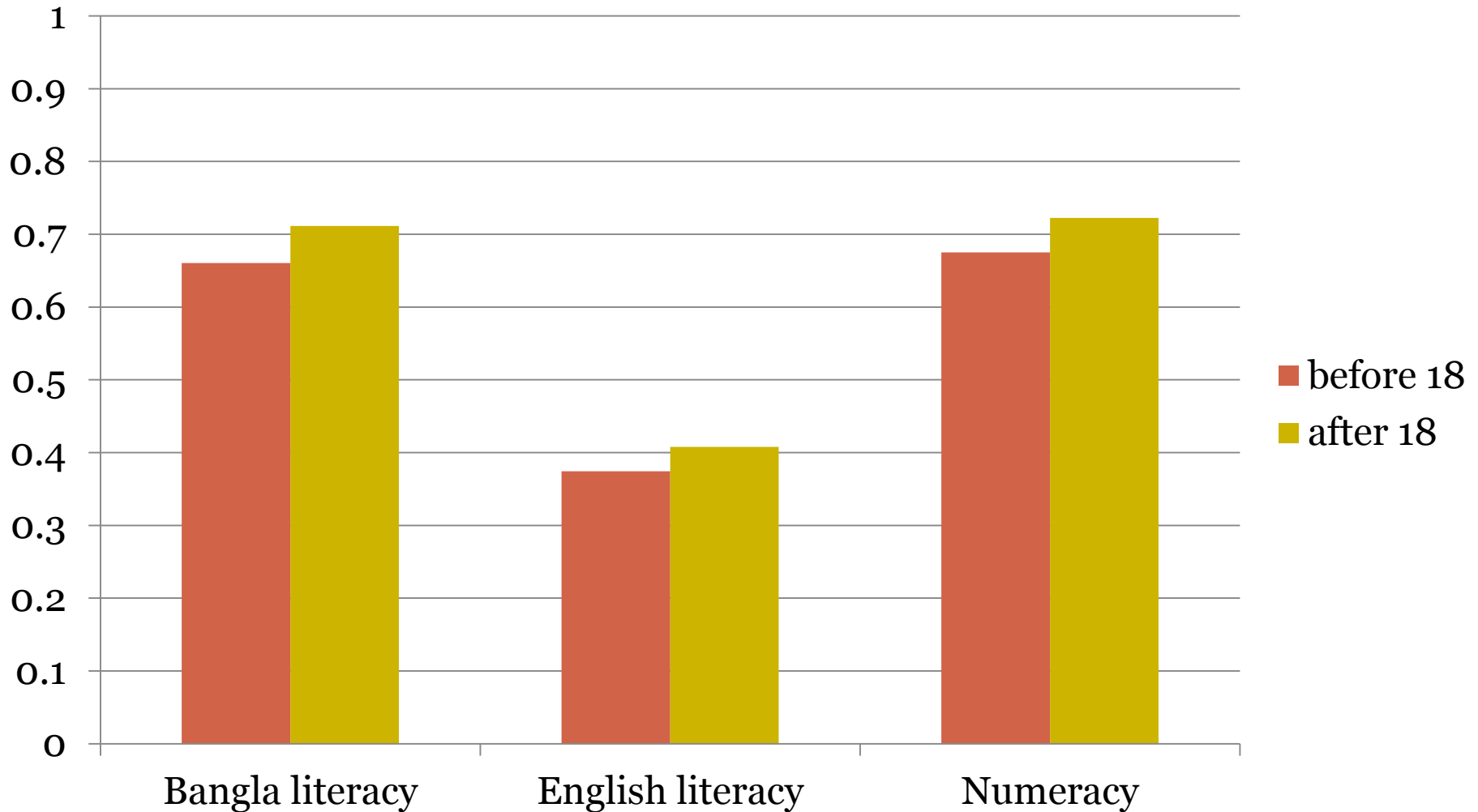
Source: Asadullah, M Niaz, Abdul Alim, Fathema Khatoon and Nazmul Chaudhury (2015) "Maternal Early Marriage and Cognitive Skills Development: An Intergenerational Analysis" (work-in-progress)

# Mother's literacy, numeracy vs. maternal marriage (before 18)



Source: Asadullah, M Niaz, Abdul Alim, Fathema Khatoon and Nazmul Chaudhury (2015) "Maternal Early Marriage and Cognitive Skills Development: An Intergenerational Analysis" (work-in-progress)

# Children's literacy, numeracy vs. maternal marriage (before 18)



Source: Asadullah, M Niaz, Abdul Alim, Fathema Khatoon and Nazmul Chaudhury (2015) "Maternal Early Marriage and Cognitive Skills Development: An Intergenerational Analysis" (work-in-progress)

# Summary of 'early marriage penalty' in raw data

- Mothers who got married *before* 18 have *significantly less* schooling (**1.74**) than those who married later (**2.21**)
- Mothers who married early have *significantly* lower numeracy scores (**54%**) than those who married later (**61%**)
- Learning penalty on mothers the largest in case of (Bangla) literacy (**12** percentage points)
- *Significant* intergenerational learning penalty
  - children belonging to mothers who get married early have lower numeracy skills (**4** percentage points)

# **3. Methodology**

# Identification strategy

Mother's age at first marriage is potentially endogenous

## Origin of the “endogeneity” problem

- Mothers marrying young are from poorer background , less educated parents
- May be from households with conservative social norms

## Estimating the impact of early marriage on mothers and children –

- Use information on *age at menarche* as an exogenous shock to marriage age
- Instrumental variable estimates + birth place FEs
  - Menarche can have low predictive power b/c factors delaying menarche are also correlated with household poverty
  - Strong first stage (coefficient on menarche variable is 0.52)

**Regression models of children's numeracy skills additionally control for usual demand and supply factors**



## **4. Main results: impact on adult outcomes**

**Table 1a: OLS, 2SLS and IV-probit estimates of the effect of age at marriage on **mother's schooling completed, literacy & numeracy****

	OLS	IV	OLS	IV	OLS	IV
<b>Dependent variable: Years of school completed</b>						
<b>Age at marriage</b>	<b>0.174</b>	<b>0.399</b>	0.185	0.387	<b>0.194</b>	<b>0.409</b>
	(10.81)**	(5.23)**	(11.29)**	(4.89)**	(11.74)**	(5.02)**
<b>N</b>	4277	4277	4277	4277	4277	4277
<b>R-squared</b>	0.07	0.02	0.11	0.08	0.11	0.08
<b>Dependent variable: Can read 2 sentences in Bengali (1/0)</b>						
<b>Age at marriage</b>	<b>0.092</b>	<b>0.148</b>	0.097	0.146	<b>0.099</b>	<b>0.035</b>
	(11.03)**	(4.06)**	(10.95)**	(3.58)**	(11.01)**	(3.31)**
<b>N</b>	4277	4277	4247	4247	4227	4277
<b>Pseudo R-squared</b>	0.05		0.08		0.09	
<b>F-test ex instrument</b>	--	182.6	--	192.6	--	180.7
<b>Birth cohort fixed effs</b>	No	No	Yes	Yes	Yes	Yes
<b>Birth place fixed effs</b>	No	No	No	No	Yes	Yes

**Notes: (1)** Models include additional controls: Mother's age, religion **(2)** IV-probit model is used in case of binary dependent variable

**Table 1b: OLS, 2SLS and IV-probit estimates of the effect of age at marriage on **mother's schooling completed and test scores****

	OLS	IV	OLS	IV	OLS	IV
<b>Dependent variable: Can read 2 sentences in English (1/0)</b>						
<b>Age at marriage</b>	0.096	0.117	0.112	0.142	<b>0.117</b>	<b>0.015</b>
	(8.49)**	(2.21)*	(9.25)**	(2.45)*	(9.32)**	(2.28)*
<b>N</b>	4277	4277	4195	4195	3788	4277
<b>Pseudo R-squared</b>	0.06		0.11		0.11	0.07
<b>Dependent variable: Can answer 4 numeracy questions (0-4)</b>						
<b>Age at marriage</b>	<b>0.044</b>	<b>0.03</b>	0.052	0.024	<b>0.052</b>	<b>0.024</b>
	(5.91)**	(0.87)	(6.92)**	(0.69)	(6.88)**	(0.66)
<b>N</b>	4277	4277	4277	4277	4277	4277
<b>R-squared</b>	0.02	0.02	0.09	0.08	0.10	0.09
<b>F-test ex instrument</b>	--	182.6	--	192.6	--	180.7
<b>Birth cohort fixed effs</b>	No	No	Yes	Yes	Yes	Yes
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**Notes: (1)** Models include additional controls: Mother's age, religion **(2)** IV-probit model is used in case of binary dependent variable

## **5. Main results: impact on child outcomes**

**Table 2: OLS & 2SLS estimates of the impact of age at marriage on **children's numeracy scores (0-4)****

	OLS	IV
<b>Age at marriage</b>	<b>0.017</b>	<b>0.062</b>
	<b>(2.68)**</b>	<b>(2.08)*</b>

	OLS		IV	
	Girl	Boy	Girl	Boy
<b>Age at marriage</b>	<b>0.028</b>	-0.014	<b>0.096</b>	-0.072
	<b>(3.52)**</b>	(1.25)	<b>(2.72)**</b>	(1.25)
<b>Observations</b>	3172	1056	3172	1056

**Notes: (1)** Models include additional controls: Mother's age, Non-Muslim household, Household head female, Child currently enrolled in school, grades completed, Child absent from school, Distance to nearest primary school, Distance to nearest secondary school, Household size, Household has electricity, Household asset value (in logs) **(2)** IV-probit model is used in case of binary dependent variable

**6. Main results: What explains  
*maternal early marriage effect* on  
children's learning outcome?**

- **First hypothesis: mothers aspire to marry off daughters young & hence invest less in them**
  - Supportive evidence reported in Table 3 (earlier slide); no effect on boys
- **Second hypothesis: mothers marrying early have less human capital (see Table 1) and constrained to act as “home tutors”.**
  - Some evidence supporting this hypothesis marriage on children (Table 4; see the paper). Control for mother’s human capital wash out some of the effect of maternal early marriage.
- **Third hypothesis: mothers marrying early are less empowered within marriage and hence less able to influence child literacy.**
  - No evidence on this (Table 5; see the paper); mothers’ say (in expenditure & child health) doesn’t explain the estimated effect of maternal age at marriage on child numeracy.

# Conclusion

- IV estimates confirm that the *causal* effect of maternal early marriage on children's cognitive skills
- We also analyzed 3 causal channels through which maternal early marriage impacts children's numeracy outcomes.
- The effect on child numeracy is significant only for daughters – this supports (early) *marriage aspiration* hypothesis
- The effect of mother's early marriage on child numeracy is also partly explained by mother's *diminished cognitive skills* b/c of early marriage
- However no evidence is found to suggest that the effect of maternal age at marriage on children's numeracy is mediated through *limited say* in within household decisions.



# Selected references

- Asadullah, M Niaz & Zaki Wahhaj, 2016. "[Early Marriage, Social Networks and the Transmission of Norms](#)," [Studies in Economics](#) 1602, School of Economics, University of Kent.
- Asadullah, M Niaz and Wahhaj, Zaki (2016) "[Child Marriage Law and Freedom of Choice: The Battle against Early Marriage in Bangladesh](#)," [Economic and Political Weekly](#), Vol. 51, Issue No. 3, 16 Jan.
- Asadullah, M Niaz, Abdul Alim and Fathema Khatoon (2015) Article on BRAC blog "[Delaying Marriage, Educating the Next Generation](#)" 26 July 2015.
- Asadullah, M Niaz and Chaudhury, N (2015) "[The Dissonance between schooling and learning: Evidence from rural Bangladesh](#)," [Comparative Education Review](#), 59(3), 447-472.