

# Assessing the Effects of an Education Policy on Women's Wellbeing in Western Africa: Evidence from Benin

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## Motivation

- ▶ Growing focus on women's empowerment (World bank report *Engendering development* (2001), Duflo (2012))
- ▶ Both a goal and a tool of women's empowerment: improving girls' access to primary schooling (goal of the MDG's)
- ▶ One of the many expected outcomes of improving schooling: change in women's welfare within the household.
  - ▶ When and how she enters marital life: child marriage (before 15 years old).
  - ▶ Tolerance of domestic violence.

## Motivation: Literature

- ▶ Child marriage. Scarce literature
  - ▶ Impact of primary and secondary education resp. on delaying marriage: Breierova and Duflo(2004) in Indonesia; Grépin and Bharadwaj (2014) in Zimbabwe).
- ▶ Literature on education and fertility.
  - ▶ Causal literature - on fertility (Osili et Long, 2008, Nigeria), (Samarakoon and Parinduri in Indonesia, 2015), (Ozier, 2016, Kenya)→ Make the case for a decrease in fertility due to education.
- ▶ Literature on Education and Acceptance of Domestic Violence
  - ▶ Mixed evidence: from positive impact on empowerment in Sierra Leone (Mocan and Cannonier, 2012), (Friedman et al, 2005) to more mixed evidence in Turkey: No impact on tolerance of domestic violence, nor on physical violence but increase in emotional violence (Ersten and Keskin, 2018)

## Research Questions

- ▶ What are the effects of an education policy on the probability to go to school and to enter an early marriage for women in Benin?
- ▶ What is the impact of education on acceptance of domestic violence?

## Preview of Results

Exposure to the schooling program:

- ▶ increases the probability to have attended primary schooling;
- ▶ and decreases the probability to have been married before 15.
- ▶ has no statistically significant effect on tolerance of IPV.

# Outline

Context

Data

Empirical Method

- Two different Approaches

- Preliminary Checks

Results

- Education and Child Marriage

- Acceptance of Domestic Violence

Robustness

Generalization

Channels

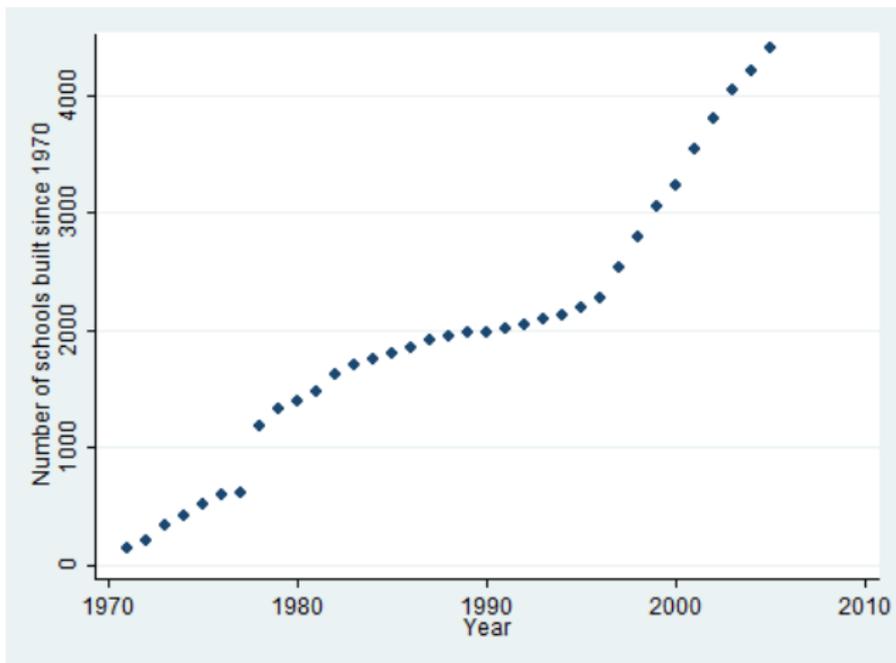
Conclusion

## Context

- ▶ World Conference for Education for All in Jomtien in 1990: Large investments in education in Developing Countries.
- ▶ Reform of education in 1992-1993 in Benin. Public policy implemented:
  - ▶ Increase of infrastructure: number of schools. Between 1992 and 2005, more than 1500 schools built by the State or by NGOs (supply effect). In every departments.
  - ▶ In rural area, accompanied by awareness campaign for girls' education (demand effect).

## Context

Figure: Number of schools built since 1970 by year in Benin

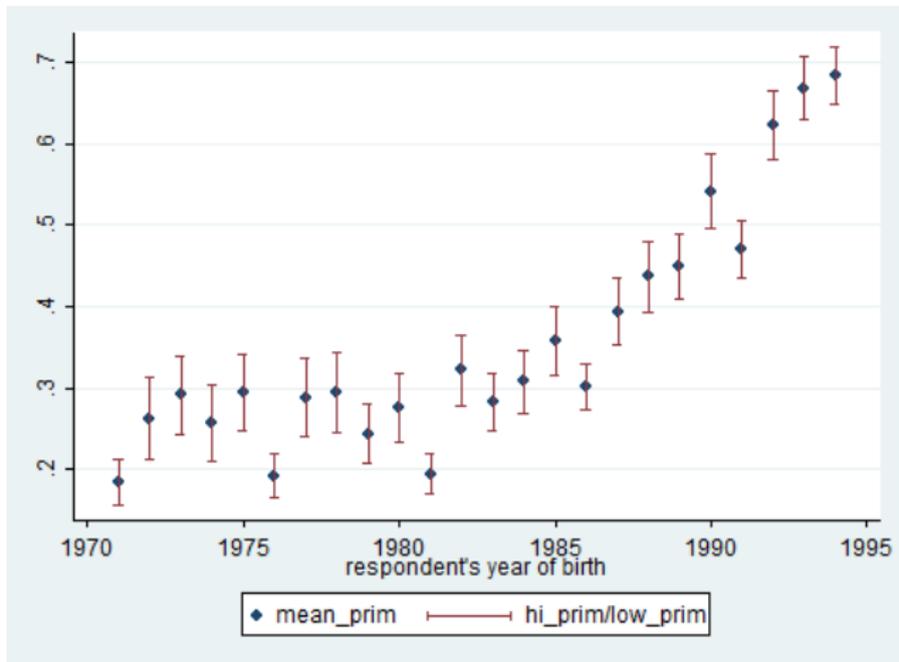


**Note:** The figure presents the number of schools built by year in Benin, since 1970.

## Context

▶ region

Figure: Share of women going to primary school by cohort in Benin



**Note:** The figure presents the share of women who have been to primary school, by birth cohort in Benin.

## Our approach

We will use a method used often in public economics: a Fuzzy Regression Kink Design (Simonsen et al. (2010), Landais (2015), Card et al. (2012), Card et al. (2015)).

- ▶ Instead of exploiting a discontinuity in the likelihood to be treated at some threshold point like in a RDD, we exploit a change in slope of the likelihood of being treated at the kink point.
- ▶ We exploit the change in the trend of the number of schools built when a respondent was 10 years old - to which the individual is exposed according to his birth cohort and to his department of residence - due to a public policy in Benin in the nineties.

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## Data

- ▶ DHS Dataset
  - ▶ Eligible women aged 15-49 years old.
  - ▶ Age at first marriage. Child marriage: marriage before 15 years old.
  - ▶ Tolerance of IPV: measured by the answer to 5 questions.
  
- ▶ School Construction Dataset from PASEC for Benin.

## Data

**Table:** Descriptive statistics women born between 1974 and 1994

	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Median</b>
<i>Respondent's age</i>	26.69	5.83	17	38	26
<i>Age at first cohabitation</i>	18.39	4.12	10	37	18
<i>Married before 15</i>	0.13	0.34	0	1	
<i>Age at first birth</i>	19.31	3.84	11	37	19
<i>Attended primary school</i>	0.37	0.48	0	1	
<i>Observations</i>	11453				

**Source:** PASEC.

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Channels

Conclusion

## Methodology: Two different approaches according to the outcome

- ▶ Education and child marriage: theoretical background:
  - ▶ Literature based on the impact of education on age at marriage.
  - ▶ Not a sequential but a simultaneous decision - consistent with union formation pattern in the region.
  - ▶ Default of the instrumentation in this context (Rosenzweig and Wolpin, 2000).  
→ We will look at two reduced form: assess the impact of the policy on education and early marriages separately.
- ▶ For the impact on Acceptance of Domestic Violence → sequence "women's own education leads to less tolerance of violence" is more credible so we will instrument education by the exposure to the treatment.

## Methodology: For education and age at marriage

We will look at two reduced forms.

$$\begin{aligned} SchoolAttendance_i = & \alpha + \beta(BirthCohort_i - k) + \delta(BirthCohort_i - k) * Post \\ & + \gamma X_i + \varepsilon_i \end{aligned}$$

$$\begin{aligned} EarlyMarriage_i = & \alpha + \beta(BirthCohort_i - k) + \delta(BirthCohort_i - k) * Post \\ & + \gamma X_i + \varepsilon_i \end{aligned}$$

where:

- ▶  $(BirthCohort_i - k)$  is the year of birth of individual  $i$  centered at the kink.
- ▶  $X_i$  is a vector of individual specific control.

First stage

$$\begin{aligned} NumberofSchools_i = & \alpha + \beta(BirthCohort_i - k) + \delta(BirthCohort_i - k) * Post \\ & + \gamma X_i + \varepsilon_i \end{aligned}$$

## Methodology: For the links between education and acceptance of domestic violence

### ► Reduced form

$$ToleranceIPV_i = \alpha + \beta(BirthCohort_i - k) + \delta(BirthCohort_i - k) * Post + \gamma X_i + \varepsilon_i$$

### ► Two stages

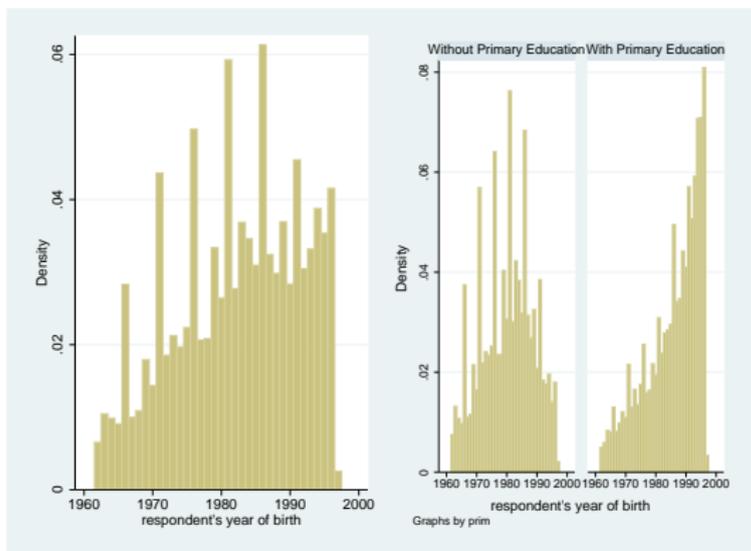
$$SchoolAttendance_i = \alpha + \beta(BirthCohort_i - k) + \delta(BirthCohort_i - k) * Post + \gamma X_i + \varepsilon_i$$

$$ToleranceIPV_i = \alpha + \beta(BirthCohort_i - k) + \delta(\widehat{SchoolAttendance}_i) + \gamma X_i + \varepsilon_i$$

## Preliminary checks - Key identifying assumptions

- Density of the running variable at the kink must be sufficiently smooth, ruling out situations where the variable is precisely manipulated at the kink.

Figure: Birth Year Histogram for Women



The figure presents the histogram of declared birth year for the sample of women in Benin. Source: DHS Benin, 2011.

- ▶ Density of the running variable at the kink
  - ▶ McCrary Test. [▶ McCrary Test](#)
  - ▶ Specific for Regression Kink Design. [▶ McCrary Test - for RKD](#)
- ▶ Take it into account by adding dummies for abnormal years.
- ▶ Smoothness of Covariates.
  - ▶ Urbanization? [▶ Type of residence at Childhood](#)
  - ▶ Other covariates. [▶ Table](#)

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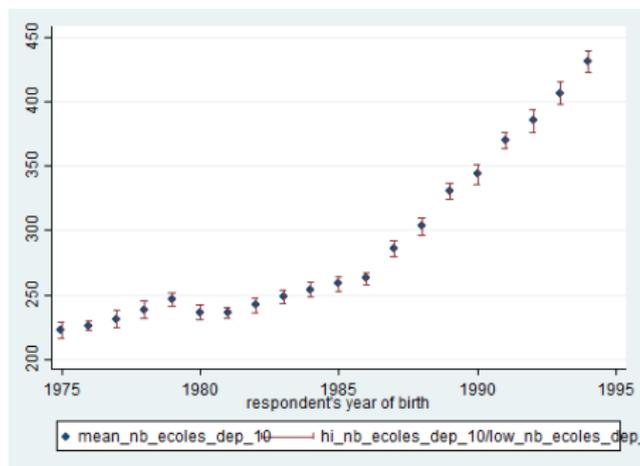
Channels

Conclusion

## First stage - Graphical Evidence

### ▶ Regression

**Figure:** Number of schools available at 10 years old by birth cohort in Benin in the department of residence



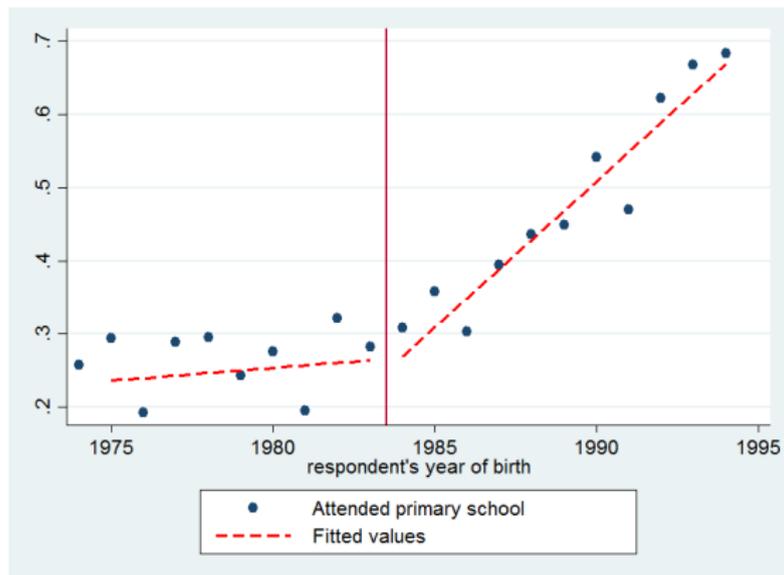
**Note:** The figure presents the number of schools built since 1900 when the woman is 10 years old, by department and year of birth in Benin.

**Source:** DHS Benin, 2011.

## Increase in Education - Graphical Evidence

▶ complete primary

Figure: Share of women going to primary school by cohort in Benin



**Note:** The figure presents the share of women who have been to primary school, by year of birth in Benin.

**Source:** DHS Benin, 2011.

## Impact on education

▶ complete primary

Table: Determinants of the probability to have attended primary school

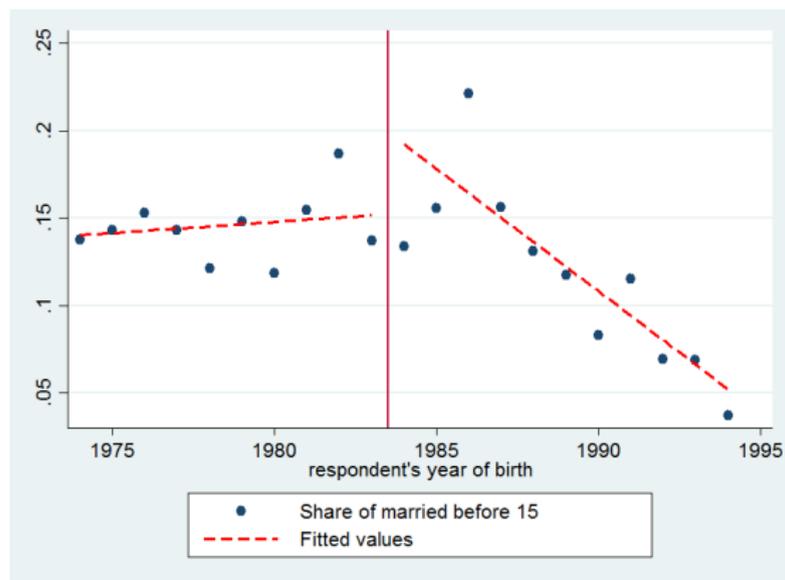
	Reduced form		2nd stage	
	(1)	(2)	(1)	(2)
Normalized birth year	0.001 (0.00)	0.001 (0.00)	-0.003 (0.00)	-0.003 (0.00)
Normalized birth year*post kink	0.034*** (0.00)	0.034*** (0.00)		
Number of schools			0.227*** (0.02)	0.224*** (0.02)
Dummy for round year controls	No Yes	Yes Yes	No Yes	Yes Yes
Mean	0.25	0.25	0.25	0.25
Number of women	11,453	11,453	11,453	11,453
r <sup>2</sup>	0.33	0.33	0.33	0.33
F	154.03	154.35	155.99	155.42

**Note:** The dependent variable is having attended primary school. Models (1) and (2) present the reduced form. We control in every regression by whether the woman lives in a rural or an urban milieu, ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Decrease in Child Marriage - Graphical Evidence

Figure: Impact on Child Marriage



**Note:** The figure presents the share of women who have been married before 15 years old, by cohort year in Benin.

**Source:** DHS Benin, 2011.

## Decrease in Child Marriage

Table: Determinants of the probability to be married before 15 years old - Benin

	Reduced form		2nd stage	
	(1)	(2)	(1)	(2)
Normalized birth year	0.005*** (0.00)	0.005*** (0.00)	0.007*** (0.00)	0.007*** (0.00)
Normalized birth year*post kink	-0.015*** (0.00)	-0.015*** (0.00)		
Number of schools			-0.102*** (0.01)	-0.100*** (0.01)
Dummy for round year controls	No Yes	Yes Yes	No Yes	Yes Yes
Mean	0.14	0.14	0.14	0.14
Number of women	11,453	11,453	11,453	11,453
r2	0.05	0.05	0.05	0.05
F	17.76	17.89	16.99	17.19

**Note:** The dependent variable is the fact to have been married or not before 15 years old.

Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Results: For the links between education and acceptance of domestic violence

- ▶ In this case, the first stage would be the probability to enroll according to the birth cohort.
- ▶ No result on any item for Benin.
- ▶ Initial level of acceptance already rather low in Benin.

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Robustness

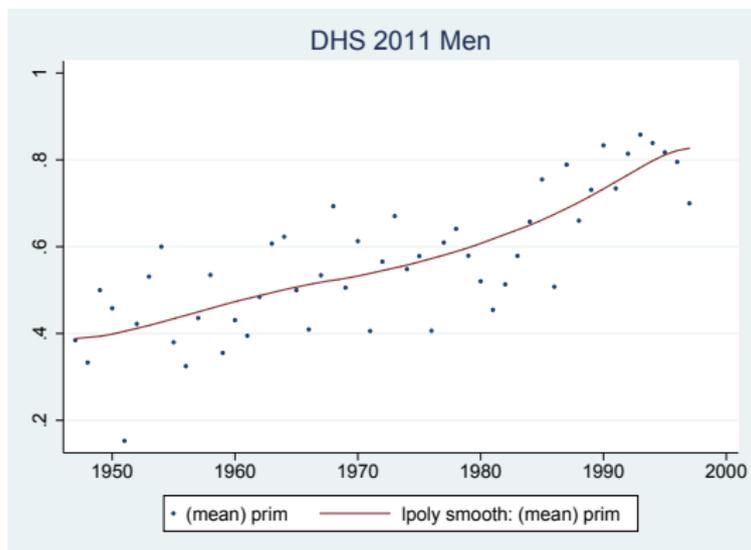
Generalization

Channels

Conclusion

## Alternative Story: Change in men's education?

Figure: Share of men having been to primary school in Benin



**Note:** The figure presents the share of men who have been to primary school, by cohort year in Benin.

**Source:**DHS Benin, 2011.

## Robustness

- ▶ Main concern: age effect that could explain part of our effect.
  - ▶ Solution: Pool DHS 2006 and 2011 together and control for age and  $age^2$ .
  - ▶ Not possible for IPV because of a change in protocol between the two surveys.
- ▶ Results: Effect of the policy remains significant:
  - ▶ on education, the magnitude is rather stable;
  - ▶ on child marriage, the change in magnitude is stronger (effect divided by 2)

▶ Tables

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Data

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Robustness

**Generalization**

Channels

Conclusion

## Generalization

- ▶ Extension of the analysis to countries that exhibit kink in education according to the birth cohort (Benin, Senegal, Guinea, Sierra Leone, Mali, Côte d'Ivoire, Niger, Liberia).
- ▶ Public policy in education decreases the probability to be married before 15 years old for almost every countries in our sample.
- ▶ Except Côte d'Ivoire, Liberia and Senegal (not significant).
  - ▶ Côte d'Ivoire=Ivorian Crisis?
  - ▶ Liberia=Civil War?
- ▶ Concerning the impact of education on Acceptance of Domestic Violence:
  - ▶ Impact in Sierra Leone and Senegal on the tolerance of violence in case of sex refusal. Consistent with Mocan and Cannonier, 2016 (with a Diff in Diff).
  - ▶ No significant for Niger and Mali.

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Robustness

Generalization

**Channels**

Conclusion

## Channels

- ▶ Attending school keeps girls out of the marriage market at least until 15?
  - ▶ The effect is stronger for women who attended school less than 2 years (for Benin). [▶ Table](#)
  - ▶ → Very unlikely to be the main channel.
- ▶ Higher bargaining power: study the heterogeneity of the effect according to women's literacy.
  - ▶ For tolerance of IPV in Senegal, coefficient of interest no more significant. Potential mechanism at play. [▶ Tolerance to IPV according to literacy](#)
  - ▶ Not the case for child marriage (in Benin). Coefficient of interest still significant.
  - ▶ → Impact through a broader channel ? The parents and not the girl considered (compatible with the importance of parents' involvement in the decision to marry their daughter in this context). [▶ Child Marriage according to literacy](#)

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Context

Data

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Robustness

Generalization

Channels

Conclusion

## Conclusion and Way Forward

### ▶ Conclusion

- ▶ The studied public policy increased the probability of enrolment.
- ▶ And decreased the probability to enter a marriage before 15 years old.
- ▶ Similar results for other countries in West Africa with similar policies.
- ▶ But mixed evidence for acceptance of domestic violence.

### ▶ Way Forward

- ▶ Document the first stage for other countries than Benin.
- ▶ Provide more robust choice for the kink.
- ▶ Keep working on our understanding of the mechanisms at play.

Thank you very much for your attention!

## First stage

▶ Back

**Table:** Determinants of the exposure to the treatment

	(1)	(2)
Normalized birth year	1.918*** (0.08)	1.901*** (0.08)
Normalized birth year*post kink	14.659*** (0.23)	14.662*** (0.23)
Dummy for round year controls	No Yes	Yes Yes
Mean	234.00	234.00
Number of married wife	11,297	11,297
r2	0.90	0.90
F	5408.10	5389.90

**Note:** The dependant variable is the intensity of the treatment, measured by the number of schools available in the department at 10 years old for the individual. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

# Double difference

▶ Back

Table: Determinants of the education

	School enrollment	
Number of school built between 1995 and 2000 * Treat	0.3369*** (0.08)	0.3088*** (0.09)
Department and cohort of birth FE	Yes	Yes
Mean		
N	5,623.00	5,623.00
r2	0.19	0.19

**Note:** Model (1) reports estimates of the effects of the number of schools at 7 years old on the probability to have been to school. Model (2) reports estimates of the effects of the number of schools at 7 years old on the number of years of education. All models are estimated with cohorts of birth and department fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

▶ Placebo

# Placebo Double Difference

▶ Back

Table: Determinants of the education

	School enrollment	
Number of school built between 1995 and 2000 * Placebo	0.0631 (0.08)	0.0601 (0.09)
Department and cohort of birth FE	Yes	Yes
Mean		
N	4,735.00	4,735.00
r2	0.19	0.19

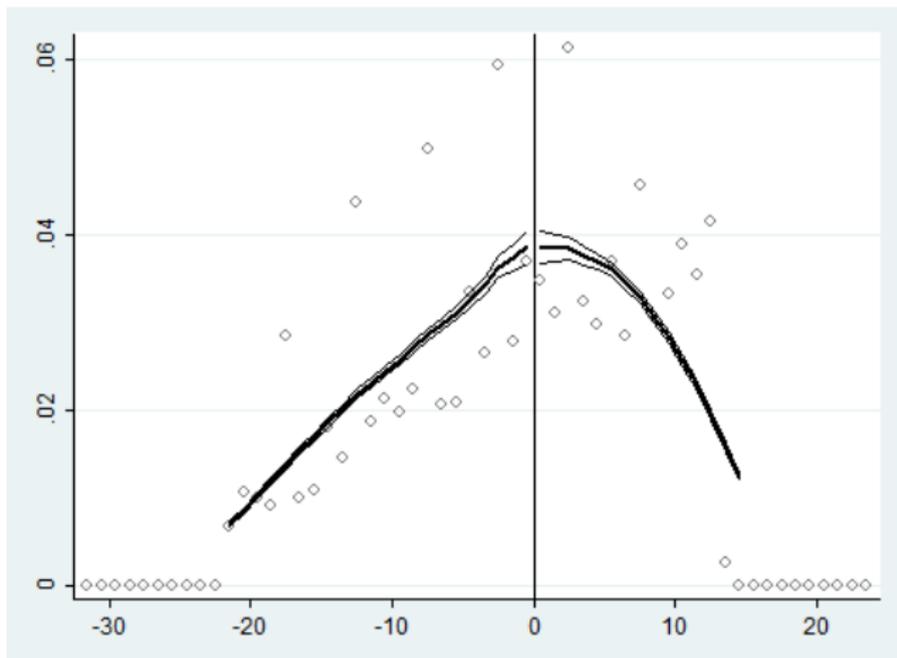
**Note:** Model (1) reports estimates of the effects of the number of schools at 7 years old on the probability to have been to school. Model (2) reports estimates of the effects of the number of schools at 7 years old on the number of years of education. All models are estimated with cohorts of birth and department fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Preliminary checks: McCrary Test

▶ Back

Figure: McCrary Test



**Note:** The figure presents the results of the McCrary Test. There is no discontinuity at the kink. The graph assesses the validity of this assumption for the RKD design. Sample: Women aged 15-49 years old.

## Preliminary checks: McCrary Test - for RKD

▸ Back

Table: McCrary Test for RKD Design - Benin

	Density	
	(1)	(2)
x	0.06 (0.03)	0.05* (0.02)
Treat=1 × x	-0.06 (0.04)	-0.06 (0.04)
Treat	-0.09 (0.26)	
Constant	6.50*** (0.21)	6.45*** (0.12)
Number of cohorts	21.00	21.00
r2	0.22	0.22
F	1.42	2.14

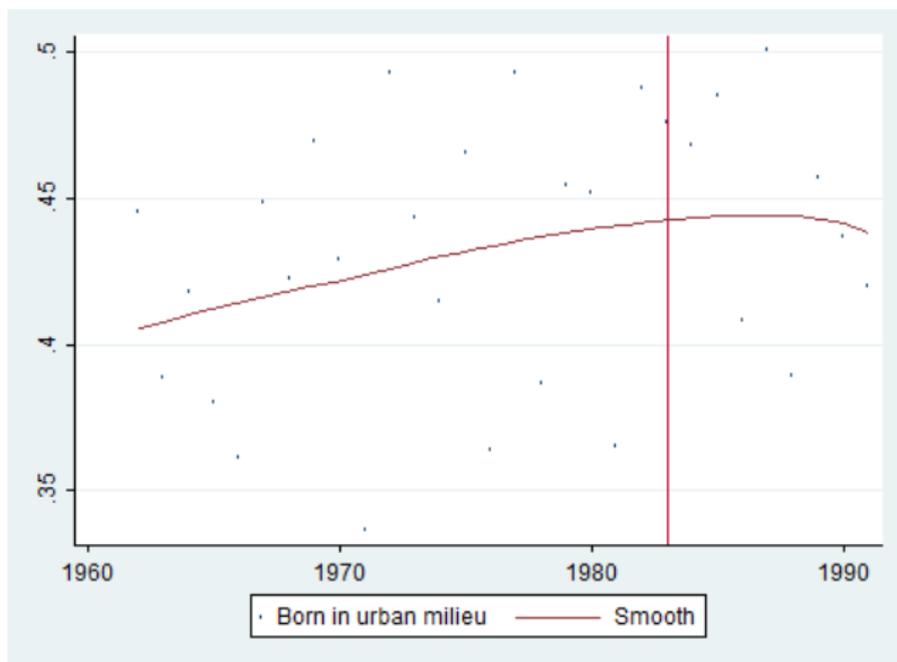
**Note:** The dependent variable is the number of observations by cohorts. Models (1) represents the simple regression kink design. Models (2) includes also a dummy indicating whether the cohort is younger than the kink. The bandwidth is 10 years (on both sides of the kink). Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Preliminary checks: Smoothness of Covariates - Type of Residence of Childhood

▶ Back

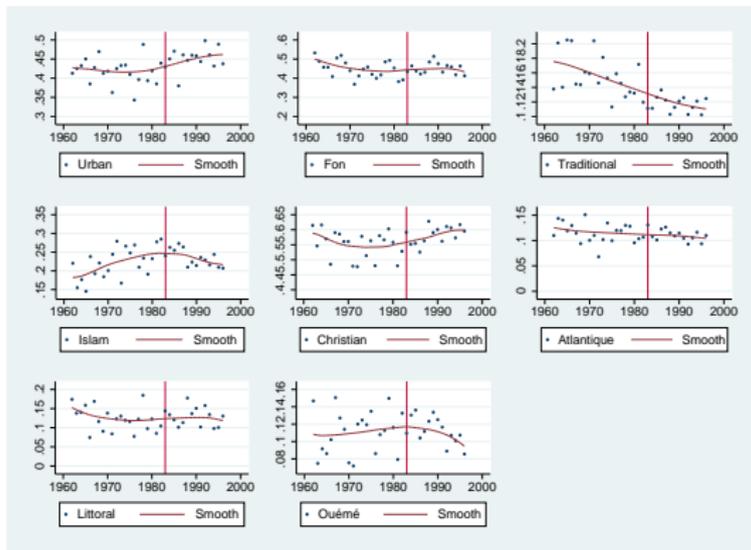
Figure: Share of women living in urban area during their childhood by cohort in Benin



# Preliminary checks: Smoothness of Covariates

▶ Back

Figure: Distribution of Birth Year Declared and Covariates, Benin



**Note:** The graphs test the smoothness assumptions of the covariates. For all 7 panels, year of birth, the assignment variable in our design for the estimation of the effect of education, is normalized at the kink point, 1984. The binsize is 1.

**Source:** DHS, Benin 2011.

## Redistribution of observations

▶ Back

Table: Results - Redistribution Method - BENIN

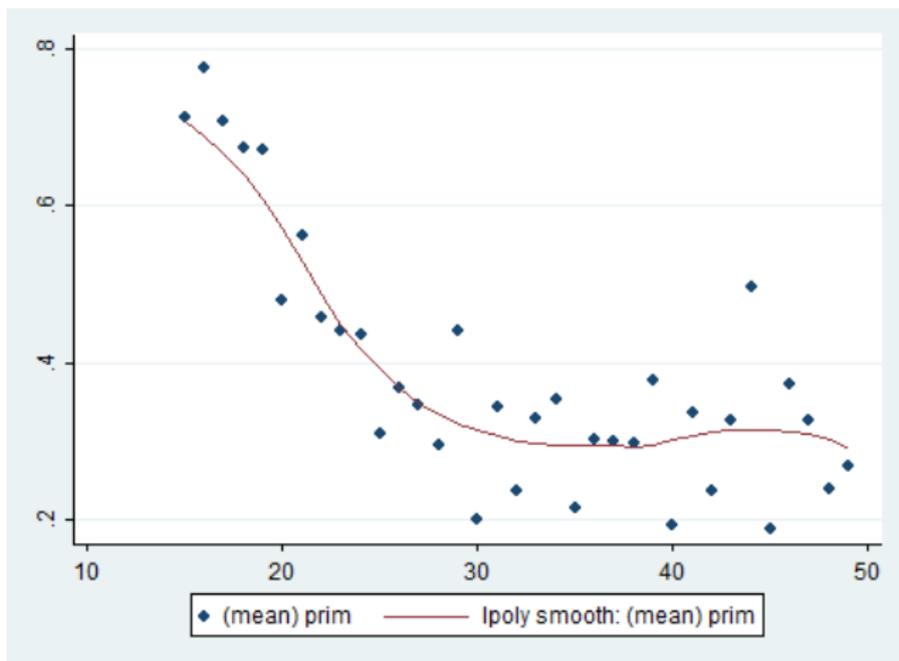
	Share of significant estimation	Mean of the coefficient	Mean of standard deviation
First rule of redistribution	1	-0.0178919	0.0026238
Second rule of redistribution	1	-0.0181535	0.0026104

**Note:** In the first column is presented the share of estimation whose coefficient of interest was significant. It was the case in 100% of the cases. The second column presents the mean of the coefficient of interest computed on all the estimations, and the third column represents the mean of the standard deviation on all the estimations. Sample: Eligible women aged 15-49 years old.

**Source:**DHS Benin, 2011.

## No Age Effect

▶ Back Figure: Effect of age on the probability to have attended school - Benin 2011

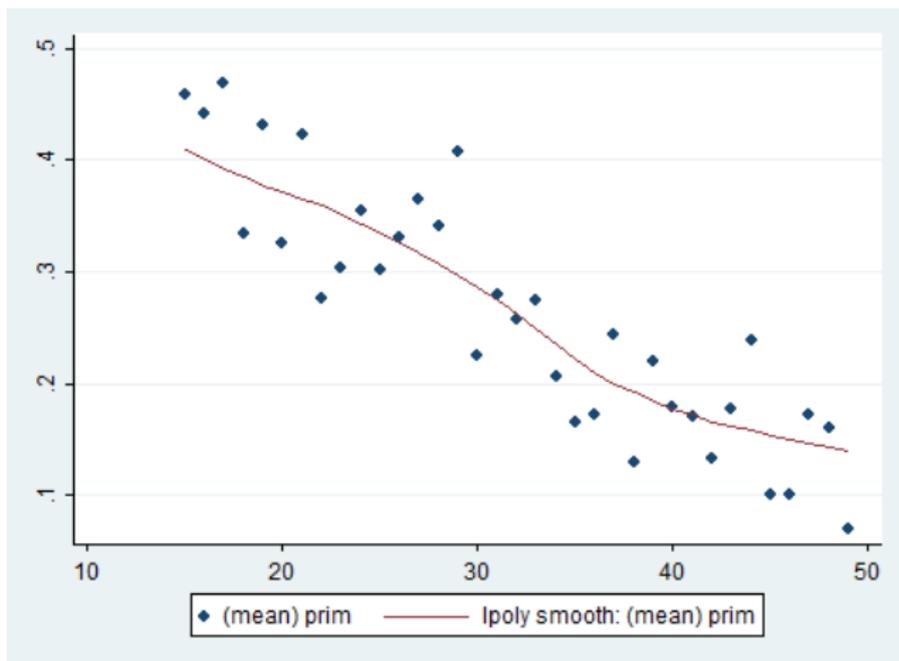


**Note:** The figure presents the share of women who have been to school by age in Benin.

## No Age Effect

▶ Back

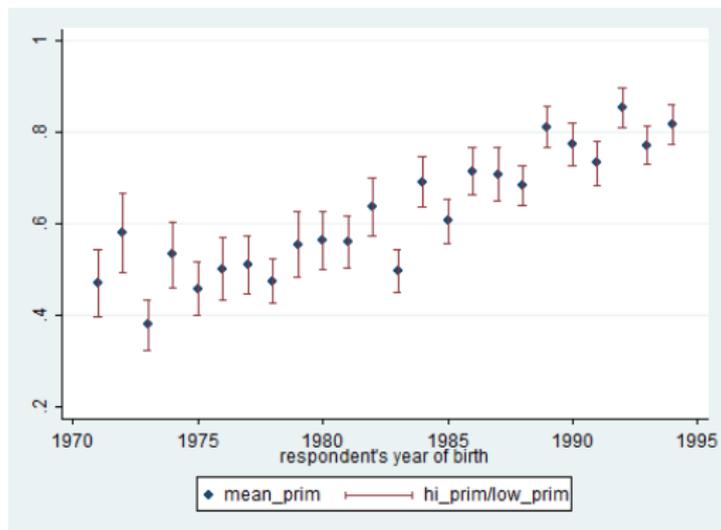
Figure: Effect of age on the probability to have attended school - Benin 1996



**Note:** The figure presents the share of women who have been to school by age in Benin.

## Togo - Placebo

Figure: Share of women with some primary schooling

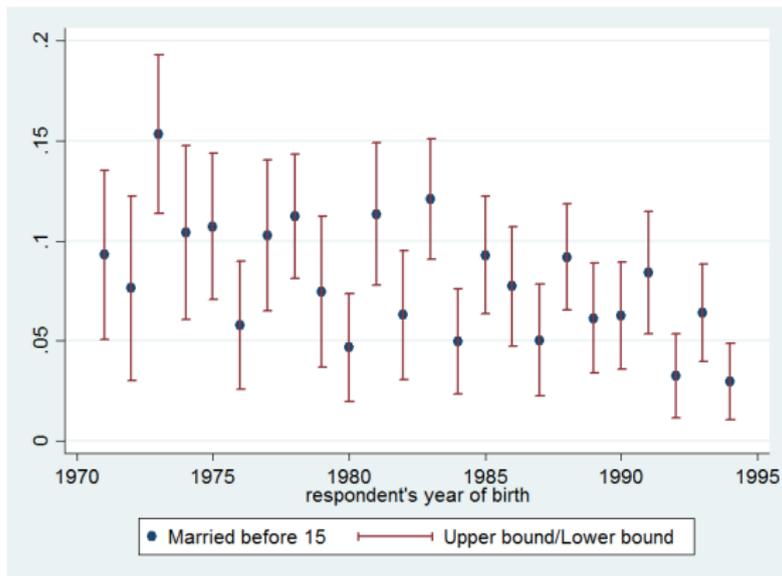


**Note:** The figure presents the share of women who have been to school by age in Togo.

**Source:** DHS Togo, 2014.

## Togo - Placebo

Figure: Share of women married before 15 in Togo



**Note:** The figure presents the share of women who have been to primary school by birth cohort in Togo.

**Source:** DHS Togo, 2014.

# Determinants of Enrollment and Child Marriage - Togo

**Table:** Determinants of enrollment and child marriage

	Enrollment		Child Marriage	
	(1)	(2)	(1)	(2)
Normalized birth year	0.012*** (0.00)	0.012*** (0.00)	-0.001 (0.00)	-0.002 (0.00)
Normalized birth year*post kink	0.005 (0.00)	0.005 (0.00)	-0.001 (0.00)	-0.001 (0.00)
Dummy for round year controls	No Yes	Yes Yes	No Yes	Yes Yes
Mean	0.52	0.52	0.09	0.09
Number of women	5,969	5,969	5,969	5,969
r2	0.31	0.31	0.03	0.03
F	77.85	77.11	7.07	6.88

**Note:** Model (1) and Model (2) reports estimates of enrollment. Model (3) and Model (4) report estimates of child marriage. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Togo, 2014.

## Impact on education

**Table:** Determinants of the NUMBER OF YEARS OF EDUCATION - Benin

	(1)	(2)
Normalized birth year	0.037*** (0.01)	0.037*** (0.01)
Normalized birth year*post kink	0.294*** (0.02)	0.290*** (0.02)
Dummy for round year controls	No Yes	Yes Yes
Mean	1.64	1.64
Number of women	11,453	11,453
r <sup>2</sup>	0.37	0.37
F	116.66	115.94

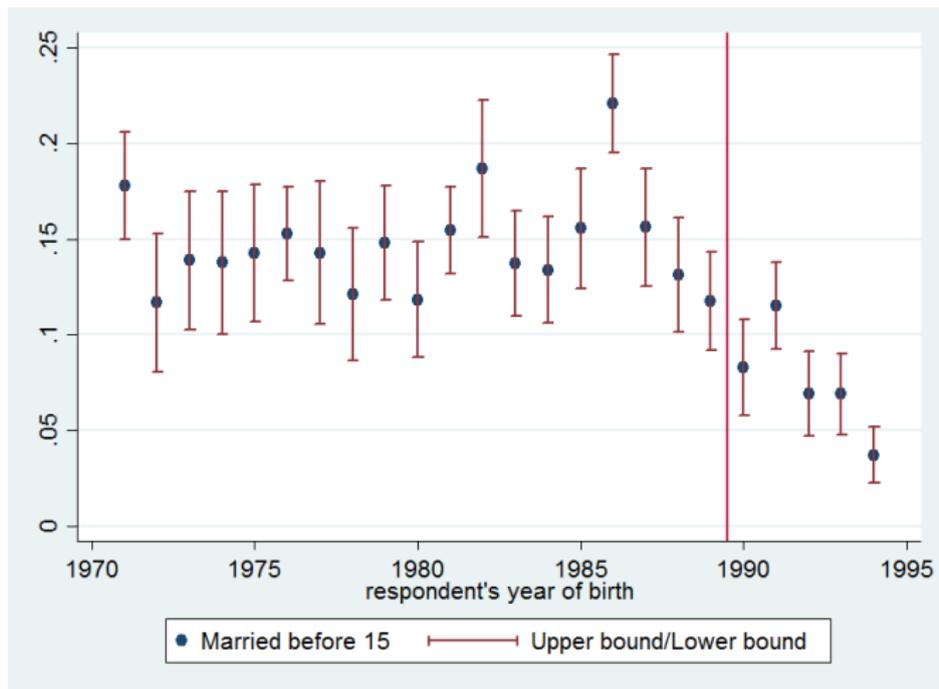
**Note:** The dependent variable is the fact to have been to school. Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Law on legal age at marriage

▶ Back

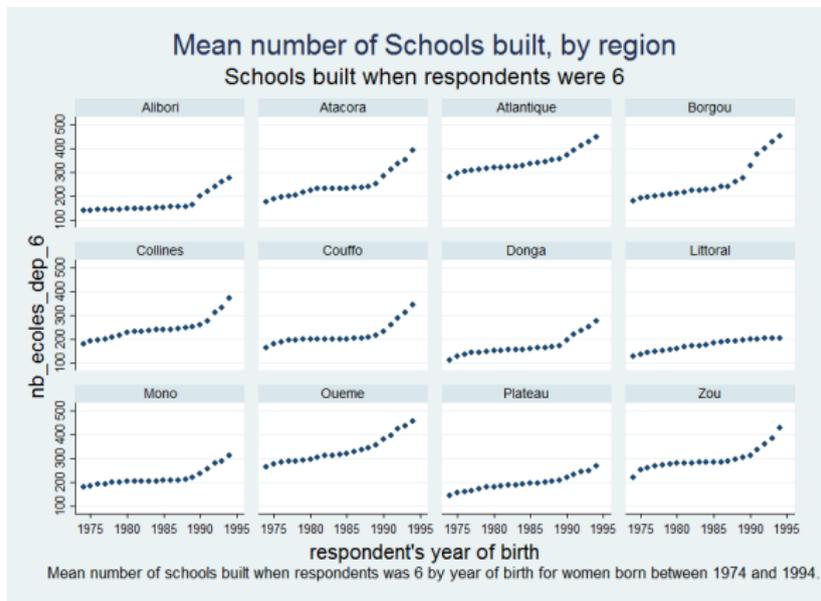
Figure: Probability to be married before 15



Source: DHS Benin, 2011.

## Context

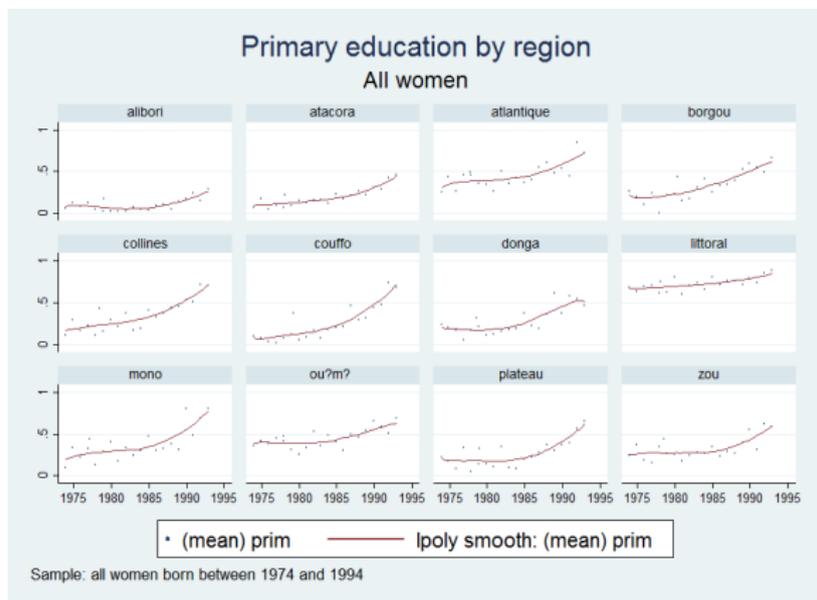
**Figure:** Exposure to primary schooling of respondents when aged 6 by birth cohort and region in Benin



**Note:** The figure presents respondents' exposure to primary schooling by birth cohort and region of Benin, since 1970. **Source:** PASEC.

## Context

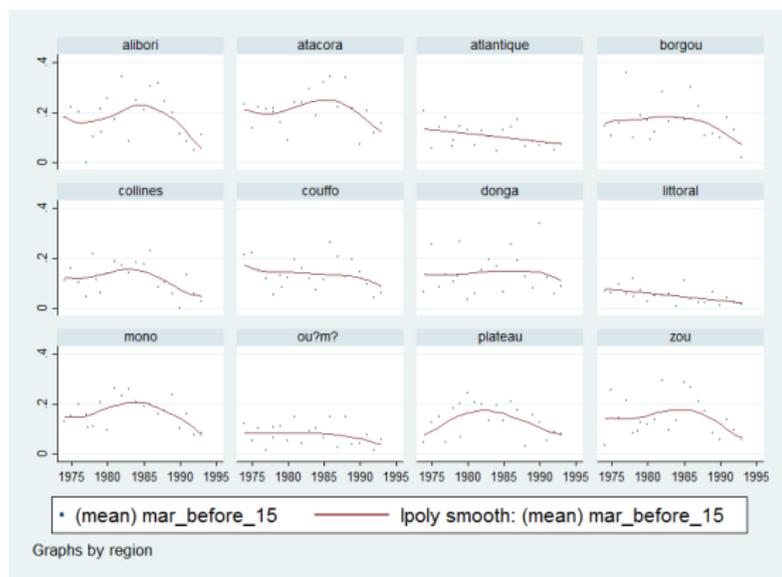
Figure: Primary schooling by birth cohort and region in Benin



**Note:** The figure presents the share of women having attended primary school by birth cohort and region of Benin.

## Context

Figure: Child Marriage by birth cohort and region in Benin



**Note:** The figure presents the share of women married before 15 by birth cohort and region of Benin.

## Impact on child marriage

Table: Determinants of the Married before 15 - Benin - Quadratic

	(1)	(2)
Normalized birth year	0.008 (0.01)	0.010** (0.01)
Normalized birth year <sup>2</sup>	0.001 (0.00)	0.001 (0.00)
Normalized birth year*post kink	-0.006 (0.01)	-0.011 (0.01)
(Norm. birth year*post) <sup>2</sup>	-0.002*** (0.00)	-0.002*** (0.00)
Dummy for round year controls	No Yes	Yes Yes
Mean	0.14	0.14
Number of women	11,453	11,453
r <sup>2</sup>	0.05	0.05
F	15.25	15.33

**Note:** The dependent variable is having been married before 15. Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Impact on education

**Table:** Determinants of Primary education - Benin - Quadratic

	(1)	(2)
Normalized birth year	0.020*** (0.01)	0.015** (0.01)
Normalized birth year <sup>2</sup>	0.002** (0.00)	0.001* (0.00)
Normalized birth year*post kink	-0.010 (0.01)	0.000 (0.01)
(Norm. birth year*post) <sup>2</sup>	0.001 (0.00)	0.001 (0.00)
Dummy for round year controls	No Yes	Yes Yes
Mean	0.25	0.25
Number of women	11,453	11,453
r <sup>2</sup>	0.28	0.28
F	113.04	114.76

**Note:** The dependent variable is having attended primary school. Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Impact on education

**Table:** Determinants of years of education - Benin - Quadratic

	(1)	(2)
Normalized birth year	0.140** (0.05)	0.102* (0.06)
Normalized birth year <sup>2</sup>	0.009 (0.01)	0.005 (0.01)
Normalized birth year*post kink	0.057 (0.10)	0.138 (0.10)
(Norm. birth year*post) <sup>2</sup>	0.005 (0.01)	0.004 (0.01)
Dummy for round year controls	No Yes	Yes Yes
Mean	1.64	1.64
Number of women	11,453	11,453
r <sup>2</sup>	0.29	0.30
F	86.76	87.38

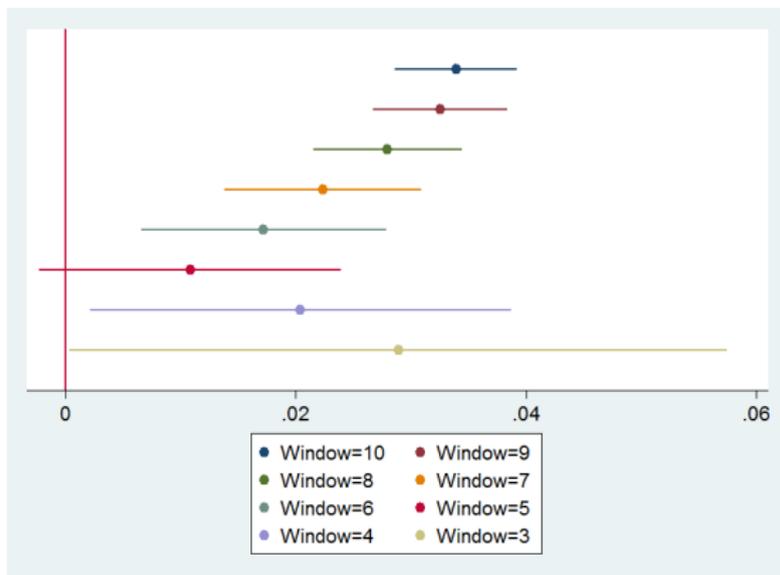
**Note:** The dependent variable is years of education. Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Bandwidth size

-3mm

Figure: Coeff of primary and CI according to bandwidth size

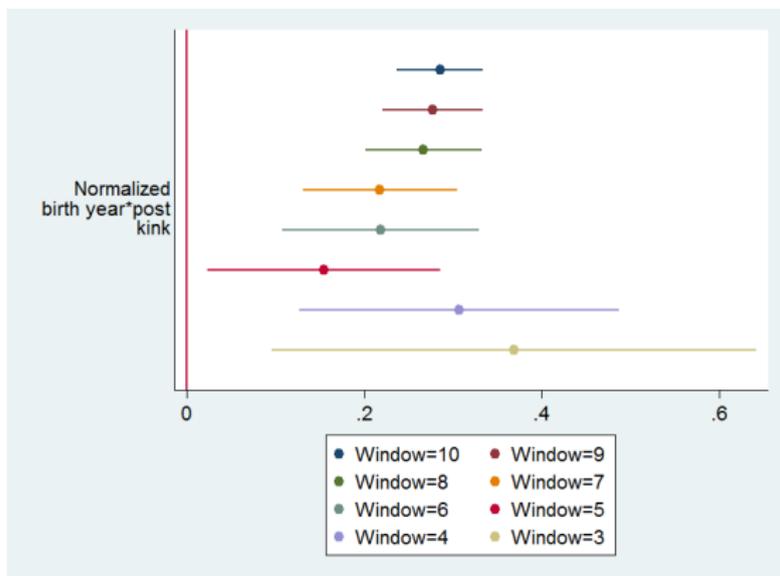


**Note:** on the x-axis is the value of the coefficient of the regression presented in the results section.  
Dependent variable: having attended primary school.

**Source:** DHS Benin, 2011.

## Bandwidth size

Figure: Coeff of years of education and CI according to bandwidth size



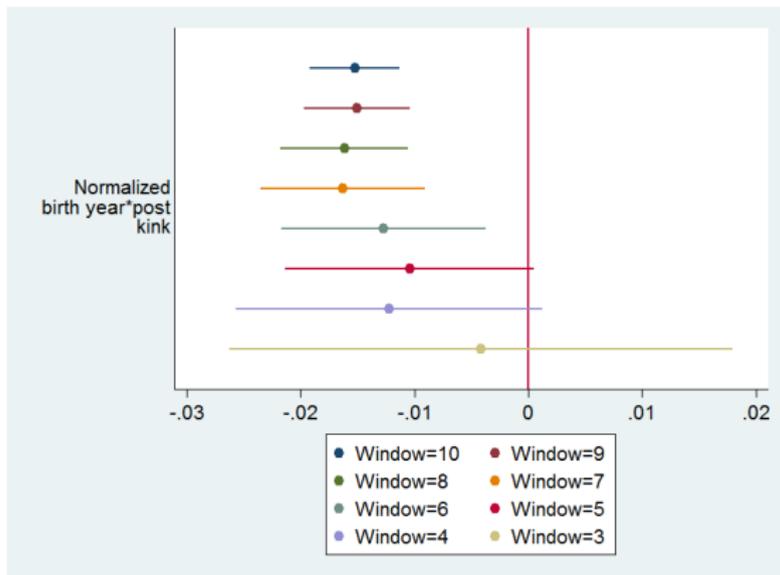
**Note:** on the x-axis is the value of the coefficient of the regression presented in the results section.  
Dependent variable: years of education.

**Source:** DHS Benin, 2011.

## Bandwidth size

▶ Back

Figure: Coeff of married before 15 and CI according to bandwidth size

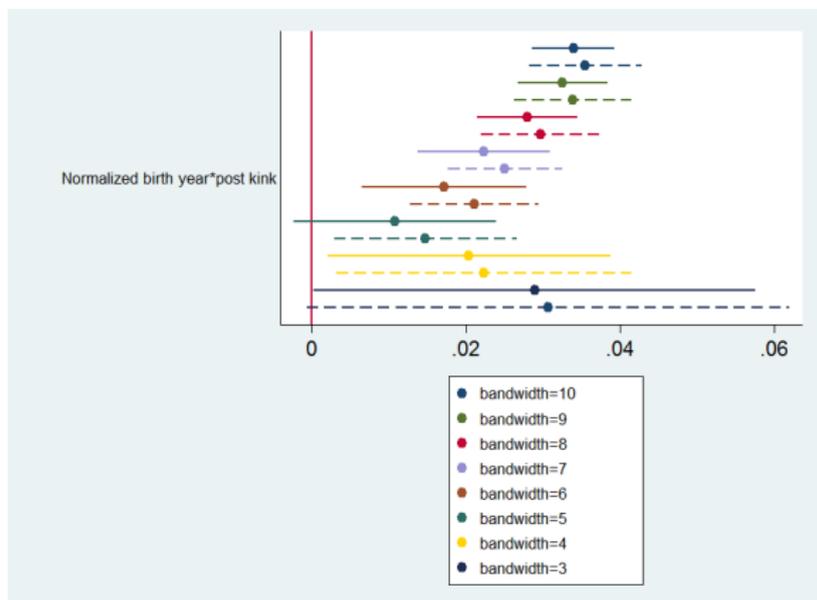


**Note:** on the x-axis is the value of the coefficient of the regression presented in the results section.  
Dependent variable: married before 15.

**Source:** DHS Benin, 2011.

## Bandwidth size

**Figure:** Coeff and CI of primary schooling according to bandwidth size and treatment of SE



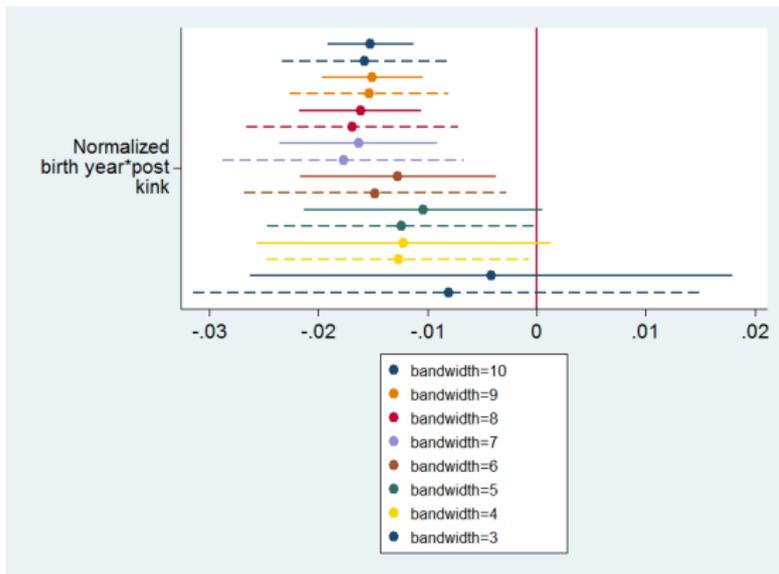
**Note:** on the x-axis is the value of the coefficient of the regression presented in the results section.  
Dependent variable: having attended primary school.

**Source:** DHS Benin, 2011.

## Bandwidth size

▶ Back

**Figure:** Coeff and CI of married before 15 according to bandwidth size and treatment of SE



**Note:** on the x-axis is the value of the coefficient of the regression presented in the results section.  
Dependent variable: married before 15.

**Source:** DHS Benin, 2011.

## Stat. Desc. Married before 15

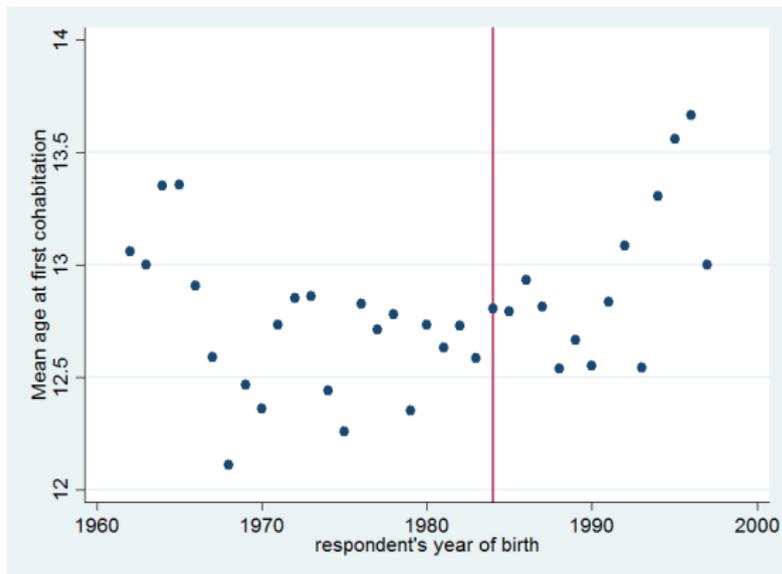
▶ Back

Table: Stat. Desc. Women married as a child

	Married before 15	Before kink	After kink
<i>Age first cohabitation</i>	12.74	12.68	12.84
<i>Age at first child</i>	15.53	15.77	15.1
<i>Years of education</i>	0.74	0.66	0.89
<i>Share of Primary education</i>	0.15	0.12	0.18
<i>Share of Completed primary</i>	0.05	0.05	0.06
<i>Share of Secondary</i>	0.03	0.03	0.04
<i>Age of partner</i>	40.62	45.64	32.46
<i>In a polygamous union</i>	0.41	0.45	0.33
<i>Observations</i>	1982	1251	731

Source: DHS Benin, 2011.

Figure: Age at first marriage for women married before 15



Source: DHS Benin, 2011.

Figure: Education of women married before 15

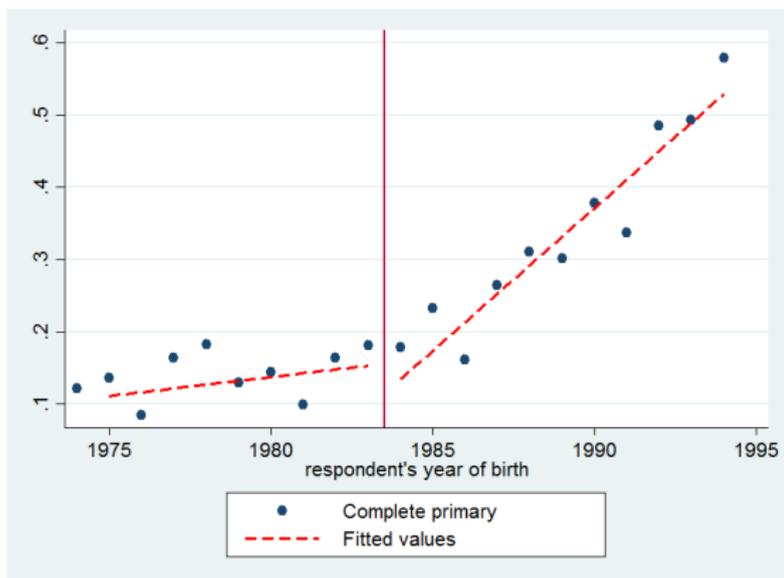


Source: DHS Benin, 2011.

## Increase in Education - Graphical Evidence

▶ Back

Figure: Complete primary schooling by birth cohort in Benin



**Note:** The figure presents the share of women who have completed primary schooling, by year of birth in Benin.

**Source:** DHS Benin, 2011.

## Impact on education

▶ Back

**Table:** Determinants of the probability to have completed primary school

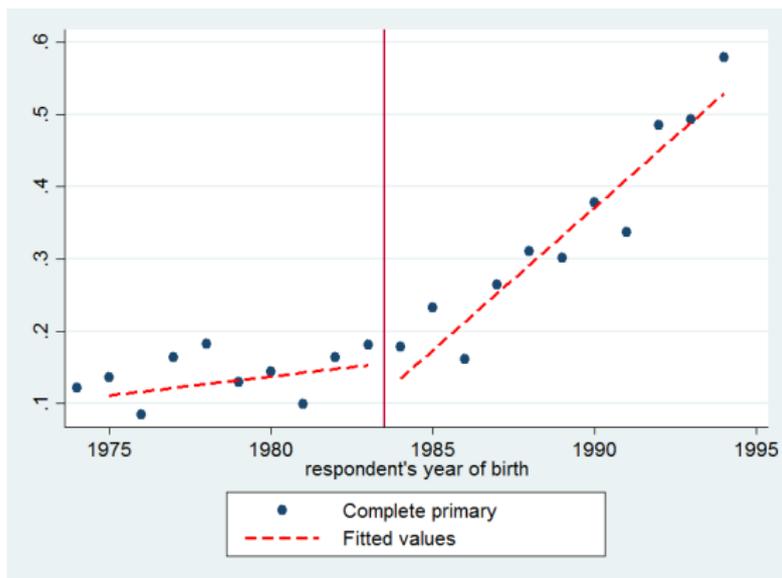
	Reduced form		2nd stage	
	(1)	(2)	(1)	(2)
Normalized birth year	0.001 (0.00)	0.001 (0.00)	-0.002 (0.00)	-0.002 (0.00)
Normalized birth year*post kink	0.035*** (0.00)	0.034*** (0.00)		
Number of schools			0.228*** (0.02)	0.225*** (0.02)
Dummy for round year controls	No Yes	Yes Yes	No Yes	Yes Yes
Mean	0.13	0.13	0.13	0.13
Number of women	11,453	11,453	11,453	11,453
r2	0.24	0.24	0.23	0.23
F	75.47	77.53	77.38	78.39

**Note:** The dependent variable is having completed primary school. Models (1) and (2) present the reduced form. We control in every regression by whether the woman lives in a rural or an urban milieu, ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

**Source:** DHS Benin, 2011.

## Increase in Education - Graphical Evidence

Figure: Secondary schooling by birth cohort in Benin



**Note:** The figure presents the share of women who have completed primary schooling, by year of birth in Benin.

**Source:** DHS Benin, 2011.

## Mechanical effect ?

▶ Back  
Table: Determinants of the probability to be married before 15 years old - Benin

	Less or more than two years of School	
	(1)	(2)
Normalized birth year	-0.002 (0.00)	-0.002 (0.00)
Normalized birth year*post kink	-0.003 (0.00)	-0.003 (0.00)
Normalized birth year*Less than two years	0.011 (0.01)	0.011 (0.01)
Normalized birth year*post kink*Less than two years	-0.023* (0.01)	-0.024* (0.01)
Less than two years	0.130*** (0.04)	0.130*** (0.04)
Dummy for round year controls	No Yes	Yes Yes
Mean	0.07	0.07
Number of women	4,286	4,286
r <sup>2</sup>	0.05	0.05
F	3.57	3.51

**Note:** The dependent variable is the fact to have been married or not before 15 years old. Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

## Literacy ?

▶ Back

Table: Acceptance of Domestic Violence in case of sex refusal - Senegal

	Without the interaction		Controlling for literacy	
	(1)	(2)	(1)	(2)
Normalized birth year	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)
Normalized birth year*post kink	-0.004+ (0.00)	-0.004+ (0.00)	-0.003 (0.00)	-0.003 (0.00)
Normalized birth year*Literacy			-0.000 (0.00)	-0.000 (0.00)
Normalized birth year*post kink*Literacy			0.008 (0.01)	0.007 (0.01)
Literacy			-0.198*** (0.02)	-0.198*** (0.02)
Constant	0.474*** (0.02)	0.474*** (0.02)	0.512*** (0.02)	0.512*** (0.02)
Dummy for round year controls	No Yes	Yes Yes	No Yes	Yes Yes
Mean	0.53	0.53	0.53	0.53
Number of women	29,433	29,433	29,399	29,399
r2	0.12	0.12	0.14	0.14
F	60.93	58.89	76.90	74.76

**Note:** The dependent variable is the fact to have been married or not before 15 years old. 25 / 28

## Literacy ?

▶ Back

Table: Determinants of the probability to be married before 15 years old - Benin

	Literacy	
	(1)	(2)
Normalized birth year	0.007*** (0.00)	0.008*** (0.00)
Normalized birth year*post kink	-0.016*** (0.00)	-0.016*** (0.00)
Normalized birth year*Literacy	-0.013*** (0.00)	-0.013*** (0.00)
Normalized birth year*post kink*Literacy	0.017*** (0.00)	0.018*** (0.00)
Literacy	-0.103*** (0.01)	-0.103*** (0.01)
Dummy for round year controls	No Yes	Yes Yes
Mean	0.14	0.14
Number of women	11,432	11,432
r <sup>2</sup>	0.06	0.06
F	24.45	24.19

**Note:** The dependent variable is the fact to have been married or not before 15 years old. Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion and wealth index. We add also region fixed effects. Sample: Eligible women aged 15-49 years old.

## Robustness

**Table:** Determinants of the probability to have attended primary school

	Reduced form		2nd stage	
	(1)	(2)	(1)	(2)
Normalized birth year	-0.004** (0.00)	-0.004** (0.00)	-0.007*** (0.00)	-0.007*** (0.00)
Normalized birth year*post kink	0.019*** (0.00)	0.019*** (0.00)		
Age in year at time of survey	-0.056*** (0.01)	-0.055*** (0.01)	-0.057*** (0.01)	-0.057*** (0.01)
Age squared	0.001*** (0.00)	0.001*** (0.00)	0.001*** (0.00)	0.001*** (0.00)
Number of schools			0.131*** (0.02)	0.131*** (0.02)
Dummy for round year controls	No Yes	Yes Yes	No Yes	Yes Yes
Mean	0.28	0.28	0.28	0.28
Number of women	23,346	23,346	23,346	23,346
r2	0.33	0.33	0.33	0.33
F	277.01	276.47	.	.

**Note:** The dependent variable is having attended primary school. Models (1) and (2) present the reduced form. We control in every regression by whether the woman lives in a rural or an urban milieu, the ethnicity, the religion and a wealth index. We add also a dummy for special birth years (corresponding to declared age finishing by the digit 0 or 5), to control for age

## Robustness

▶ Back

**Table:** Determinants of the probability to be married before 15 years old - Benin

	Reduced form		2nd stage	
	(1)	(2)	(1)	(2)
Normalized birth year	0.009*** (0.00)	0.009*** (0.00)	0.010*** (0.00)	0.010*** (0.00)
Normalized birth year*post kink	-0.006*** (0.00)	-0.006*** (0.00)		
Age in year at time of survey	0.023*** (0.00)	0.022*** (0.00)	0.023*** (0.00)	0.023*** (0.00)
Age squared	-0.000*** (0.00)	-0.000*** (0.00)	-0.000*** (0.00)	-0.000*** (0.00)
Number of schools			-0.039*** (0.01)	-0.040*** (0.01)
Dummy for round year controls	No Yes	Yes Yes	No Yes	Yes Yes
Mean	0.12	0.12	0.12	0.12
Number of women	23,346	23,346	23,346	23,346
r <sup>2</sup>	0.05	0.05	0.05	0.05
F	26.32	26.39	.	.

**Note:** The dependent variable is the fact to have been married or not before 15 years old. Models (1) and (2) represent the reduced form. We control in every regression with a dummy indicating whether the woman lives in a rural or an urban milieu, dummies for ethnicity, religion