

# Female Genital Cutting and Education: Theory and causal evidence from Senegal

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# Motivation

- Female Genital Cutting (FGC) continues to be a social norm in large parts of the world: 200 million women worldwide are affected by it, 3 million every year.
- Widespread among many ethnic groups in West Africa, where most girls are cut during their infancy or early childhood. Yet, clear opposition fails due to tolerance to *multiculturalism*.
- Literature has focused on health and mental consequences, with little effects (Wagner 2015)
  - ▶ As a result pressure to governments to eradicate it.
  - ▶ Proponents: education changes behavior
- We ask:
  - ▶ Unobserved factors? Tradition immune to education
  - ▶ Reverse causality? FGC affects educational choice

# Our contribution

- We study the causal link from FGC to education
- Propose a theoretical framework for this link in the context of marriage market to understand the role of
  - ▶ Cultural norms
  - ▶ Health
  - ▶ Age of marriage
- We also propose an identification strategy (DiD) that allows us to test the main link and the mechanisms

# Preview of our results

- We examine three education variables (mean):
  - 1 Years of education (3.07)
  - 2 Level of education (1.12)
  - 3 The probability of never attending school (0.36)
- Women who are cut during infancy or early childhood are less educated:
  - 1 1.762 less years of education (5.7% of the mean)
  - 2 0.825 less level of education (7.4% of the mean)
  - 3 0.028 p.p. more likely to never attend school (for an overall of 0.63 when compared to the mean)
- Take away: in contexts where FGC is deeply rooted in tradition, (credibly) banning FGC offers huge potential: eradicate it and improve education

# Literature

- Wagner (2015) :
  - ▶ 13 African countries. Nationally representative data.
  - ▶ No evidence of general health impairments or decreased fertility, instead cut women have more children
  - ▶ More likely to contract STI and have genital problems
  - ▶ Marry earlier than uncut women
- Ambrus and Field (2008):
  - ▶ Early marriage reduces years of education

# Conceptual framework 1

- Marriage market. Two periods. Two outcomes in second period.

$$u(c_1, c_2) = u(c_1) + E[u(c_2)] \quad (1)$$

- $u(c_t) = \ln(c_t)$
- $c_1 = w - s$ , for period 2:  $c_S = \beta \hat{r}(\gamma)s$  and  $c_M = \beta \hat{r}(\gamma)s + \phi$ .  $\gamma$  denotes cutting, and has a cost  $\sigma$ , while returns to education:  $\beta \hat{r}(\gamma)$
- Also, schooling, age of marriage and cutting are related:  $s = s(e)$ , where  $s' > 0$ ; and  $e = e(\gamma)$ , where  $e' < 0$
- Cutting increases the chances of marrying,  $\pi(\gamma(\sigma))$ , i.e.  $\frac{\partial \pi}{\partial \gamma} > 0$ .
- Notice we make cutting affect the returns to education (health dimension), potentially  $\frac{\partial \hat{r}}{\partial \gamma} < 0$
- Cutting less likely when the cost increases:  $\frac{\partial \gamma}{\partial \sigma} < 0$
- As in Ambrus and Field (2008), parental decision where parents choose  $s$  and  $\gamma$  to maximize utility:

## Conceptual framework 2

- Maximization problem:

$$U = u(w - s) + \frac{\pi(\gamma(\sigma))u(\beta\hat{r}(\gamma)s + \phi) + [1 - \pi(\gamma(\sigma))]u(\beta\hat{r}(\gamma)s)}{1 + r} \quad (2)$$

- How education and cost of cutting are related

$$\frac{\partial s}{\partial \sigma} = -\frac{d\gamma}{d\sigma} \left[ \Theta_1 \left[ \frac{ds}{de} \frac{de}{d\gamma} \right] + \Theta_2 \frac{d\hat{r}}{d\gamma} + \Theta_3 \frac{d\pi}{d\gamma} \right] \Theta_4 \quad (3)$$

- Since  $\Theta_1 < 0$  and  $\Theta_2, \Theta_3, \Theta_4 > 0$ , and also  $\frac{de}{d\gamma} < 0$ ,  $\frac{ds}{de} > 0$ ,  $\frac{d\hat{r}}{d\gamma} < 0$ ,  $\frac{d\pi}{d\gamma} > 0$ :
- $\frac{\partial s}{\partial \sigma} > 0$ : increasing the cost of FGC increases education

# Context

- Senegal. 28 % of women between 15 and 49 are cut. (3% in Niger and 99% in Guinea).
- Parental decision: mainly conducted during infancy or early childhood. Between 0-6. In our data, less than 3% of the cut girls are cut after the age of 6.
- **Law** banned FGC and sanctions those who provoke sexual mutilations or give instructions for their commission with six months to five years of prison, or hard labor for life if cutting results in death. The law was enacted the 29th of January 1999, following the anti-FGC speech of the US first lady Hillary Clinton in Senegal and 10 months of intense anti-FGC campaign led by different Senegalese civil society organizations.
- Ethnic variability rooted in tradition ▶ Intensity



# Data

- DHS 2016, 2015, 2014, 2012 and 2010. 25,256 households, 32,827 female born from January 1990 that by the time of the survey were at least 7 years old.
  - ▶ Although arbitrary, more accurate
  - ▶ Legal age to start school
  - ▶ After the majority of cut girls are actually cut (90%)
- Summary stats: [▶ Desc. Stats](#) [▶ Desc. Stats old sample](#)
- Trends: [▶ FGC](#) [▶ Years of Educ.](#) [▶ Level of Educ.](#) [▶ No Educ.](#)

# Empirical Strategy: Estimation

Policy effect

$$\begin{aligned} FGC_{ikrt} = & \alpha_0 + \alpha_1 POST_t \times LawIntensity_k + \alpha_2 LawIntensity_k \\ & + \alpha_3 YearBirth_t + \alpha_4 EthnicGroup_k + \alpha_5 Region_r \\ & + \alpha_6 Region_r \times YearBirth_t + \alpha_7 X_i + \mu_{ikrt} \end{aligned} \quad (4)$$

Second stage

$$\begin{aligned} Y_{ikrt} = & \beta_0 + \beta_1 \widehat{FGC}_{ikrt} + \beta_2 LawIntensity_k \\ & + \beta_3 YearBirth_t + \beta_4 EthGroup_k + \beta_5 Region_r \\ & + \beta_6 Region_r \times YearBirth_t + \beta_7 X_i + u_{ikrt} \end{aligned} \quad (5)$$

# Results: Years of Education

	OLS		IV		IV	
	(1)	(2)	(3)	(4)	(5)	(6)
	Years Education	Years Education	Prevalence FGC (0/1)	Years Education	Prevalence FGC (0/1)	Years Education
<i>Panel A: Years of Education</i>						
Intensity $\times$ PostLaw	0.299* ( 0.171)		-0.236*** ( 0.016)		-0.170*** ( 0.018)	
FGC		-0.656*** ( 0.078)		-1.654** ( 0.758)		-1.762* ( 1.026)
Regional Dummies	Yes	Yes	No	No	Yes	Yes
Regional time trends	Yes	No	No	No	Yes	Yes
N	32,668	32,668	32,668	32,668	32,668	32,668

# Results: Level of Education

	OLS		IV		IV	
<i>Panel B: Level of Education (0-5)</i>	(1)	(2)	(3)	(4)	(5)	(6)
	Level of Education	Level of Education	Prevalence FGC (0/1)	Level of Education	Prevalence FGC (0/1)	Level of Education
Intensity $\times$ PostLaw	0.140** ( 0.056)		-0.236*** ( 0.016)		-0.170*** ( 0.018)	
FGC		-0.201*** ( 0.027)		-0.790*** ( 0.242)		-0.825** ( 0.347)
Regional Dummies	Yes	Yes	No	No	Yes	Yes
Regional time trends	Yes	No	No	No	Yes	Yes
N	32,668	32,668	32,668	32,668	32,668	32,668

# Results: No Education

	OLS		IV		IV	
<i>Panel C: Never in school (0/1)</i>	(1)	(2)	(3)	(4)	(5)	(6)
	Never in School	Never in School	Prevalence FGC (0/1)	Never in School	Prevalence FGC (0/1)	Never in School
Intensity × PostLaw	-0.047* ( 0.024)		-0.237*** ( 0.016)		-0.170*** ( 0.018)	
FGC		0.082*** ( 0.013)		0.415*** ( 0.091)		0.275* ( 0.144)
Regional Dummies	Yes	Yes	No	No	Yes	Yes
Regional time trends	Yes	No	No	No	Yes	Yes
N	32,827	32,827	32,827	32,827	32,827	32,827

# Robustness Checks

- Placebo: artificial start of law in 1995, observe girls up to 1998
- Placebo: boys
- Born from 1980

# Placebo and Checks: Years of Education

	Placebo: law in 1995		Placebo: Sample of men	Pre-law period from 1980	
	(1) Prevalence FGC (0/1)	(2) Years Education	(3) Years Education	(4) Prevalence FGC (0/1)	(5) Years Education
Intensity $\times$ PostLaw	-0.004 ( 0.026)		0.277 ( 0.203)	-0.218*** ( 0.016)	
FGC		17.568 ( 132.128)			-1.067* ( 0.647)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Regional time trends	Yes	Yes	Yes	Yes	Yes
N	14,433	14,433	25,939	45,388	45,388

# Placebo and Checks: Level of Education

	Placebo: law in 1995		Placebo: Sample of men	Pre-law period from 1980	
<i>Panel B: Level of Education (0-5)</i>	(1) Prevalence FGC (0/1)	(2) Levels of Education	(3) Levels of Education	(4) Prevalence FGC (0/1)	(5) Levels of Education
Intensity $\times$ PostLaw	-0.004 ( 0.026)		0.100 ( 0.070)	-0.218*** ( 0.016)	
FGC		8.395 ( 58.603)			-0.527** ( 0.216)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Regional time trends	Yes	Yes	Yes	Yes	Yes
N	14,433	14,433	25,939	45,390	45,390



# Placebo and Checks: No Education

Placebo: law  
in 1995

Placebo:  
Sample of men

Pre-law  
period from 1980

*Panel C: Never in school (0/1)*

	(1) Prevalence FGC (0/1)	(2) Never in School	(3) Never in School	(4) Prevalence FGC (0/1)	(5) Never in School
Intensity $\times$ PostLaw	-0.005 ( 0.026)		-0.053* ( 0.031)	-0.218*** ( 0.016)	
FGC		2.008 ( 10.889)			0.262*** ( 0.097)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Regional time trends	Yes	Yes	Yes	Yes	Yes
N	14,538	14,538	26,067	45,674	45,674

# Heterogeneity

Sample splits for

- Poverty
- Rural

# Heterogeneity: poverty, rural

## Focused in poor and rural samples

	Poor sample		Non-poor sample		Urban sample		Rural sample	
<i>Panel A: Years of Education</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Prevalence FGC (0/1)	Years Education	Prevalence FGC (0/1)	Years Education	Prevalence FGC (0/1)	Years Education	Prevalence FGC (0/1)	Years Education
Intensity $\times$ PostLaw	-0.153*** ( 0.022)		-0.262*** ( 0.027)		-0.212*** ( 0.028)		-0.150*** ( 0.024)	
FGC		-2.021 ( 1.442)		1.100 ( 0.975)		-0.356 ( 1.023)		-3.745** ( 1.685)
N	23,943	23,943	8,725	8,725	11,860	11,860	20,808	20,808

# Heterogeneity: poverty, rural

## Focused in poor and rural samples

	Poor sample		Non-poor sample		Urban sample		Rural sample	
<i>Panel B: Level of Education (0-5)</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Prevalence FGC (0/1)	Level of Education	Prevalence FGC (0/1)	Level of Education	Prevalence FGC (0/1)	Level of Education	Prevalence FGC (0/1)	Level of Education
Intensity $\times$ PostLaw	-0.153*** ( 0.022)		-0.262*** ( 0.027)		-0.212*** ( 0.028)		-0.150*** ( 0.024)	
FGC		-1.112** ( 0.499)		0.313 ( 0.320)		-0.198 ( 0.345)		-1.605*** ( 0.605)
N	23,943	23,943	8,725	8,725	11,860	11,860	20,808	20,808

# Heterogeneity: poverty, rural

## Focused in poor and rural samples

	Poor sample		Non-poor sample		Urban sample		Rural sample	
<i>Panel C: Never in school (0/1)</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Prevalence FGC (0/1)	Never in School	Prevalence FGC (0/1)	Never in School	Prevalence FGC (0/1)	Never in School	Prevalence FGC (0/1)	Never in School
Intensity $\times$ PostLaw	-0.153*** ( 0.022)		-0.264*** ( 0.027)		-0.213*** ( 0.028)		-0.150*** ( 0.024)	
FGC		0.345 ( 0.211)		0.029 ( 0.118)		-0.044 ( 0.143)		0.572** ( 0.250)
N	24,040	24,040	8,787	8,787	11,921	11,921	20,906	20,906

Birth year from 1980: [▶ 1980](#)

## Mechanisms: Health Variables

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	(1) BMI	(2) Weight	(3) Height	(4) Anemia	(5) Diarrhea	(6) Health card
Intensity $\times$ PostLaw	-35.668 ( 29.654)	-44.973 ( 63.096)	20.343 ( 68.309)	-0.060 ( 0.063)	-0.014 ( 0.029)	0.057 ( 0.045)
Regional Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Regional time trends	Yes	Yes	Yes	Yes	Yes	Yes
N	12,114	14,735	14,630	15,950	20,561	19,258

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# Conclusions

- We show that the introduction of a FGC ban in Senegal reduced significantly the prevalence of FGC and increased girls education, the study contributes to the thin literature that investigates the use of legal reforms as instruments to tackle harmful practices deeply rooted in tradition.
- Results provide evidence supporting the introduction of anti-FGC legislation in the many countries where the practice is widespread but still not regulated.
- We document for the first time in the literature the causal effect of FGC on education, showing how women that experienced FGC received less educational investments.

# Intensity

## Pre-law shares

Ethnic group	FGC prevalence	Sample size	T-C
Wolof	0.017	0.322	C
Poular	0.642	0.341	T
Serer	0.020	0.119	C
Mandingue	0.812	0.086	T
Diola	0.553	0.039	T
Soninke	0.679	0.019	T
Not a Senegalese	0.744	0.023	T
Other	0.450	0.051	T
Observations		85034	



# Intensity

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Mandingue	0.812	0.086	T
Diola	0.553	0.039	T
Soninke	0.679	0.019	T
Not a Senegalese	0.744	0.023	T
Other	0.450	0.051	T
Observations		85034	

# Sample stats

	N	Full sample				FGC women	Non-FGC women	Diff (FGC - Non-FGC)
		Mean	Standard deviation	Min	Max	(N= 10,546) Mean	(N= 22,281) Mean	
Age	32,827	14.06	5.22	7	26	14.92	13.65	1.28***
Year of birth	32,827	1,998.91	5.02	1,990	2,009	1,998.17	1,999.26	-1.09***
Never in school (0/1)	32,827	0.36	0.48	0	1	0.36	0.35	0.01*
Years of education	32,668	3.07	3.55	0	17	3.12	3.05	0.07
Level of education (0-5)	32,668	1.12	1.14	0	5	1.12	1.12	0.00
Wealth index	32,826	2.60	1.32	1	5	2.12	2.83	-0.70***
Rural	32,827	0.64	0.48	0	1	0.72	0.60	0.12***
Wolof	32,827	0.32	0.47	0	1	0.01	0.47	-0.46***
Poular	32,827	0.34	0.47	0	1	0.59	0.22	0.37***
Serer	32,827	0.12	0.33	0	1	0.01	0.18	-0.17***
Mandingue	32,827	0.09	0.28	0	1	0.19	0.04	0.15***
Diola	32,827	0.04	0.19	0	1	0.06	0.03	0.03***
Soninke	32,827	0.02	0.13	0	1	0.03	0.01	0.02***
Not a Senegalese	32,827	0.02	0.14	0	1	0.04	0.01	0.03***
Other	32,827	0.05	0.22	0	1	0.06	0.05	0.01***

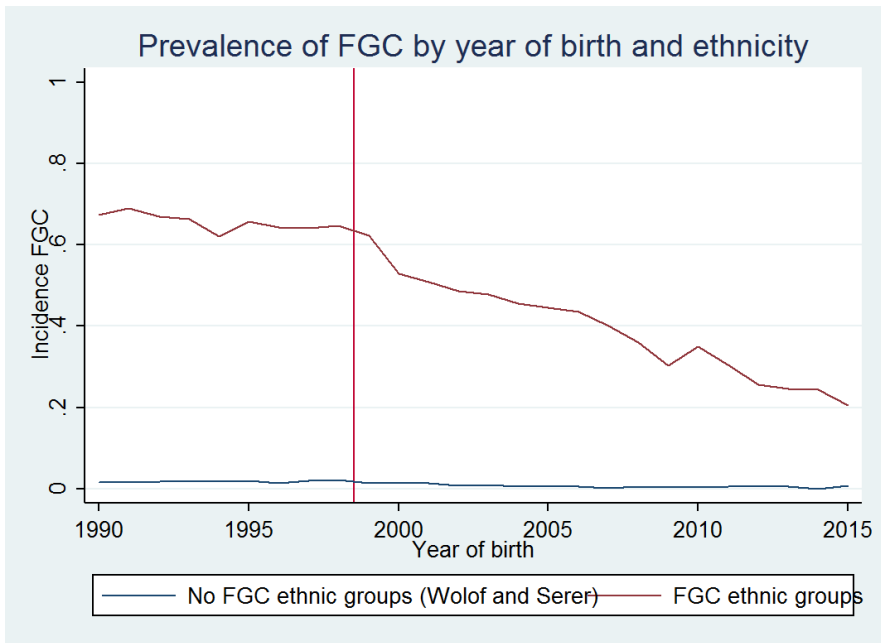
▶ Back

## Sample stats: older women

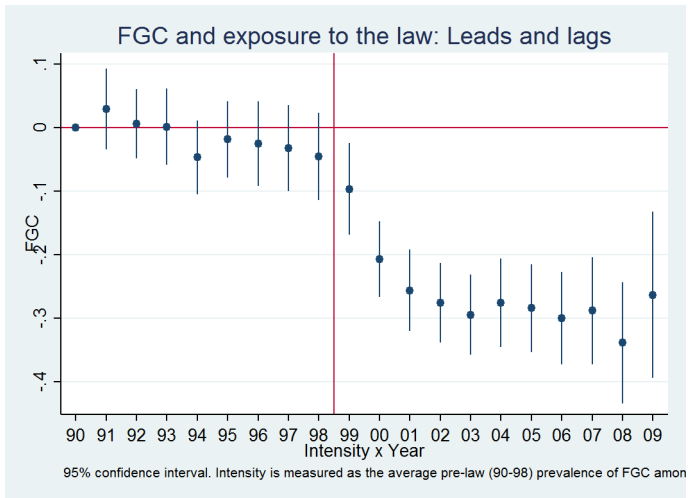
Correlation Y vs FGC:  $y = \beta FGC$  controlling for region, ethnica, birthyear dummies age and its square

	Full sample	15-20	By age 21-30	31-49	Married sample
No Education	0.100***	0.104***	0.098***	0.095***	0.071***
Primary Education	-0.007	0.027*	-0.028**	-0.020	-0.021**
Higher Education	-0.093***	-0.132***	-0.070***	-0.075***	-0.050***
Years of Education	-1.043***	-1.165***	-1.020***	-0.927***	-0.671***
Obs.	38520	11144	13686	13690	26199
Age at marriage	-0.773***	-0.104	-0.724***	-0.925***	
Marriage	0.064***	0.096***	0.078***	0.023**	

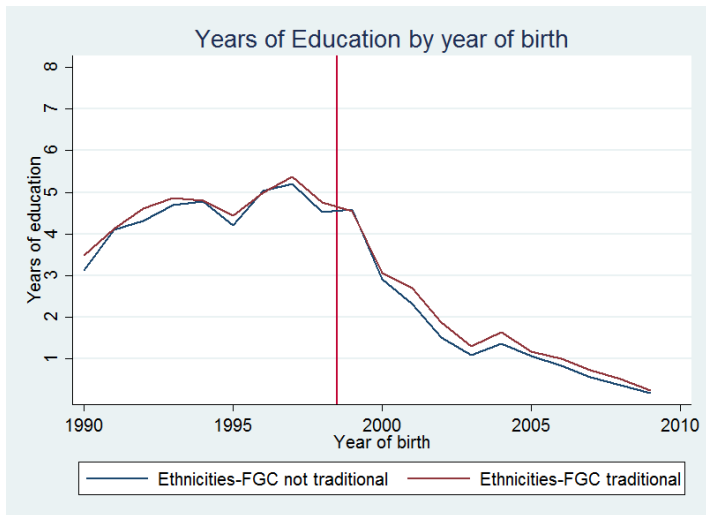
## Trends: Prevalence of FGC by year of birth and ethnicity



# Leads and lags: Prevalence of FGC by year of birth and ethnicity



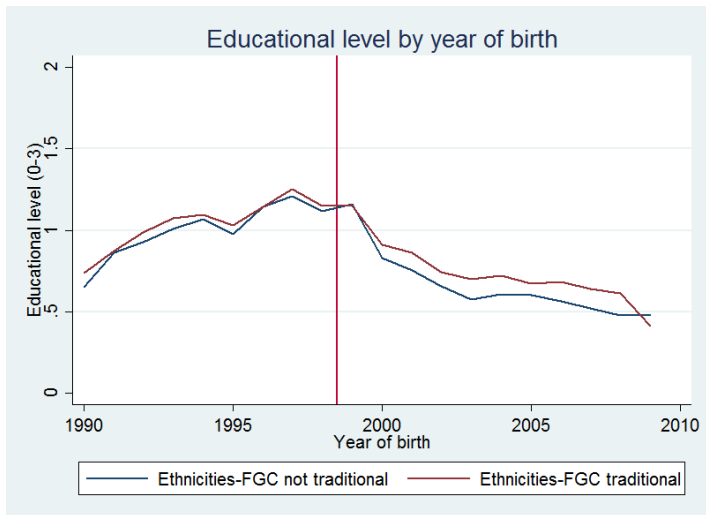
# Trends: Years of Education



▶ Data

▶ Next: Level of Education

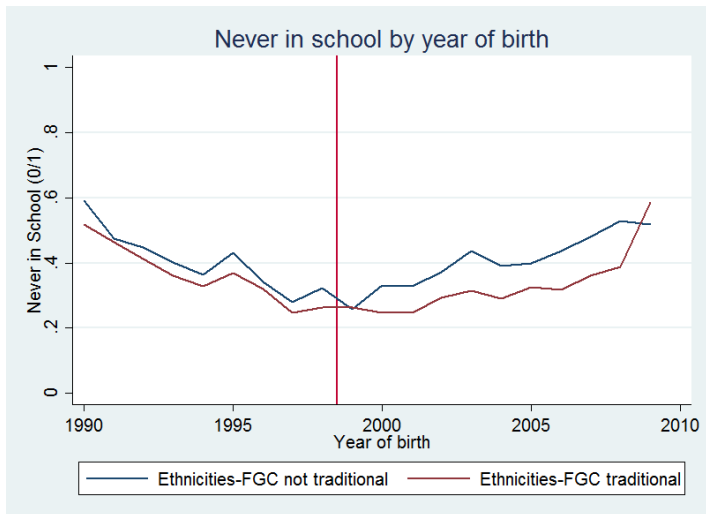
# Trends: Educational Level (0-3)



▶ Data

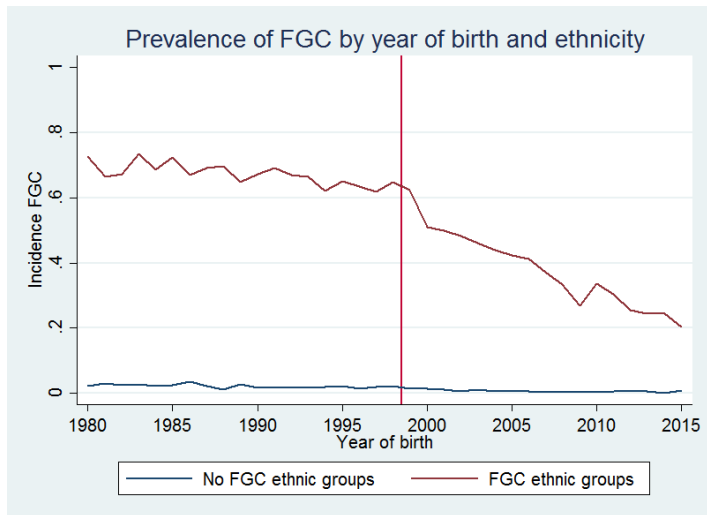
▶ Next: No School

# Trends: No Education

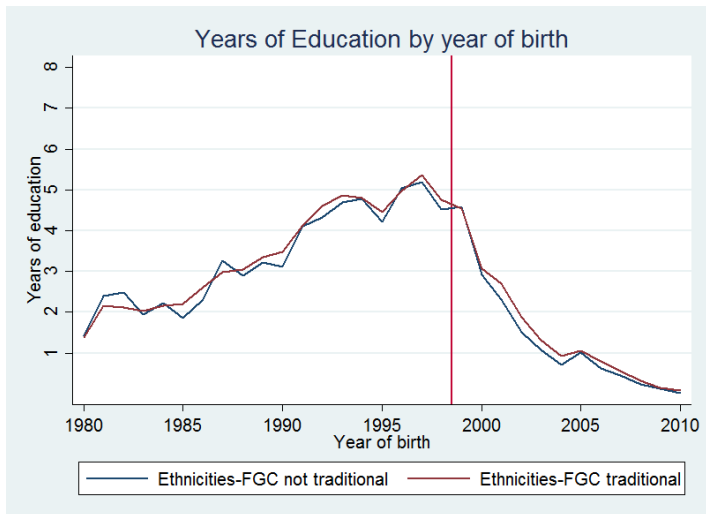




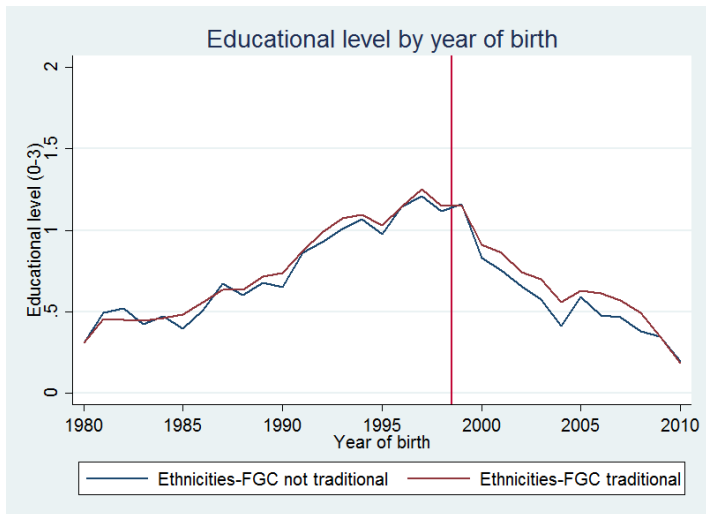
## Longer trends: FGC



## Longer trends: Years of education



## Longer trends: Level of education



## Longer trends: No education

