ISA RC28 Spring Meeting 2019 Frankfurt

EDUCATION FOR ALL, GRADUATION FOR SOME?

TRENDS IN INTERGENERATIONAL EDUCATIONAL INEQUALITY IN SUB-SAHARAN AFRICA FOR BIRTH COHORTS 1974-2003

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MOTIVATION

1990-2016:

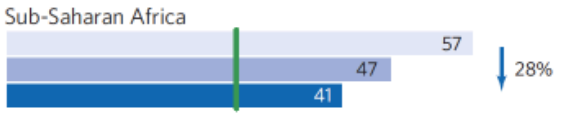
-Economic development
Industrialization, urbanization

-Living conditions
Health, nutrition, family planning

-International commitment
"Education for All", MDGs

-Educational reforms
School fee abolition

Proportion of people living on less than $1.25 a day, 1990, 2011 and 2015 (percentage)



Proportion of undernourished people, 1990–1992 and 2014–2016 (percentage)

Under-five mortality rate, 1990 and 2015 (deaths per 1,000 live births)

Adjusted net enrolment rate* in primary education, 1990, 2000 and 2015 (percentage)

Source: UN (2015). The Millennium Development Goals Report.

RESEARCH QUESTIONS

1: Trends in intergenerational educational inequality in SSA, cohorts 1974-2003:
Have the last decades brought equalization of educational opportunities across socioeconomic strata?

2: Role of contextual factors:
To what extent do contextual factors explain cross-country differences in intergenerational inequality?

THEORIES AND HYPOTHESES

Modernization & Industrialization theory:
Greater education and skill requirements, changing aspirations, more meritocratic selection
(Treiman 1970; Collins 1971; Sieben & de Graaf 2001; Yaish and Andersen 2012)

Risk Aversion Theory, MMI hypothesis:
Upper class able to benefit more from expansion *(Raftery & Hout 1993)*
Persistence of IEI due to differences in motivation (loss aversion), resources (cost-benefit evaluations), success probabilities
(Goldthorpe 1996; Breen and Goldthorpe 1997)

In SSA between 1990 and 2016:
- Reducing relative costs of education for low-SES families
- Improving family income and living conditions

→ **H1:** Equalization by SES to access school

- Deteriorating teaching quality
- Reliance on family resources (language of instruction, school segregation)

→ **H2:** Persistence in inequality by SES to progress in school

DATA & VARIABLES

Data: DHS and MICS, cross-sectional household surveys carried out every 3-5 years;

Countries: 40 countries in SSA, 153 surveys (1-7 per country) survey years 1990 – 2017

Sample: Children aged 14-16

Variables:

	N	Mean	Std.Dev.	Min	Max
INDIVIDUAL LEVEL					
Child's education					
Ever attended primary school	541,856	0.83	0.37	0	1
Completed six or more grades	541,856	0.46	0.50	0	1
Family's SES					
Parent/caretaker completed six or more grades	541,856	0.40	0.49	0	1
Household wealth: wealthier 2 quintiles	532,053	0.41	0.49	0	1
Other characteristics					
Gender: male	541,856	0.52	0.50	0	1
Area of residence: rural	541,856	0.67	0.47	0	1

DATA & VARIABLES

Contextual variables:

COUNTRY-COHORT LEVEL (40 countries):	N	Mean	Std.Dev.	Min	Max
Economic development					
GDP per capita, PPP (current international $)	150	1920	1982	270	14922
Classification by country income: 0=Low, 1=Lower Middle, 2=Upper Middle	152	0.25	0.49	0	2
Living conditions					
Underweight (% of children, age under 5)	135	22.4	8.1	8.0	45.3
Family planning					
Fertility rate (births per woman)	153	5.7	1.0	3.3	7.8
Educational system					
Government expenditure on education (% of GDP)	128	3.9	1.8	1.4	11.3
Fees abolished at or prior to school starting age	149	0.18	0.39	0	1
Political and institutional circumstances					
Colonial past: 0=British, 1=French, 2=Other	153	0.80	0.74	0	2

MODEL

RQ 1: OLS regression model, measuring absolute inequality as difference in probabilities to attend and complete school by SES

$$E_{ijk} = \alpha + \beta_1 SES_{ijk} + \beta_2 C_i + \beta_3 SES_{ijk} \times C_i + \gamma X'_{ijk} + \mu_k + \varepsilon_{ijk} \qquad (1)$$

where

- E_{ijk} - education status of child i in family j in country k
- SES_{ijk} - socioeconomic status of origin;
- C_i - birth cohort
- X'_{ijk} - a vector of control variables (gender, area of residence, age);
- β_1 - regression coefficient: association between SES and child's education status;
- β_2 - regression coefficient: association between cohort and child's education status;
- β_3 - regression coefficient of interest: difference in association between SES and child's education status by cohort;
- μ_k - country-specific fixed effects
- ε - error term.

Standard errors clustered by country and survey (153 clusters)

MODEL

RQ 2: Two-step approach:

1st step: OLS regressions at an individual level (153 surveys),

$$E_{ijk} = \alpha + \beta_1 SES_{ijk} + \gamma X'_{ijk} + \varepsilon_{ijk} \quad (2)$$

2nd step: OLS regressions at an aggregate level (153 coefficients)

$$b_{ky} = \omega + \lambda_{ky} M_{ky} + \varepsilon_{cy} \quad (3)$$

Where

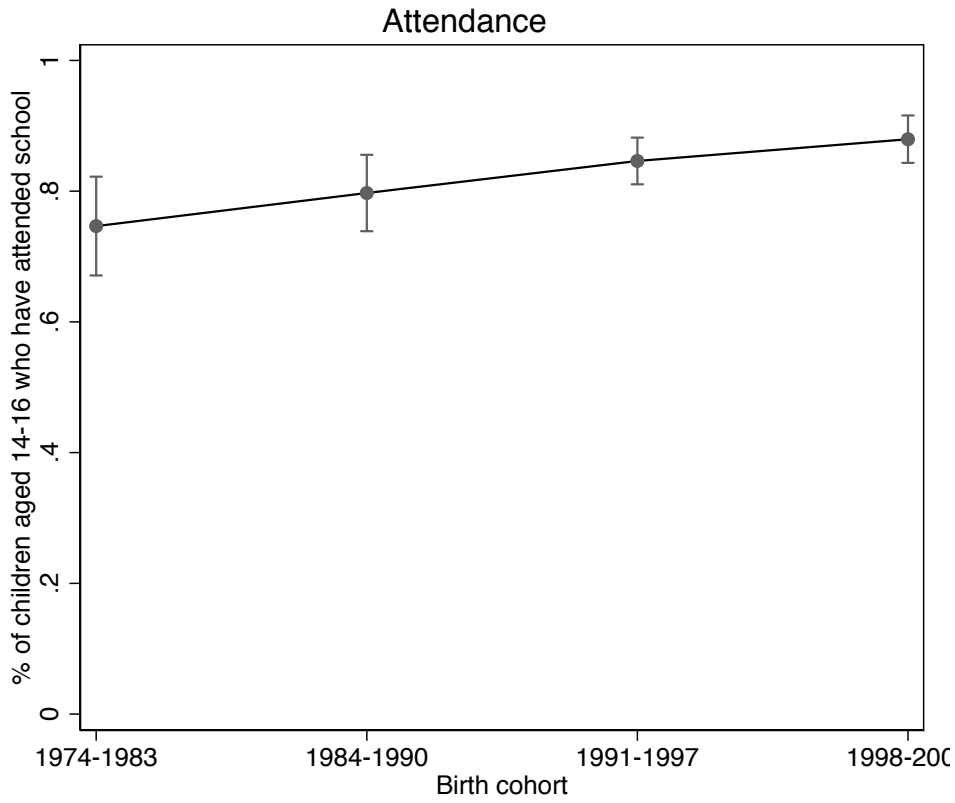
- b_{ky} - the estimated educational inequality coefficient (β_1) extracted from Equation 2
- M_{ky} - the macro-level indicator
- λ_{ky} - the coefficient of interest: expected variation in the inequality coefficient b_{ky}

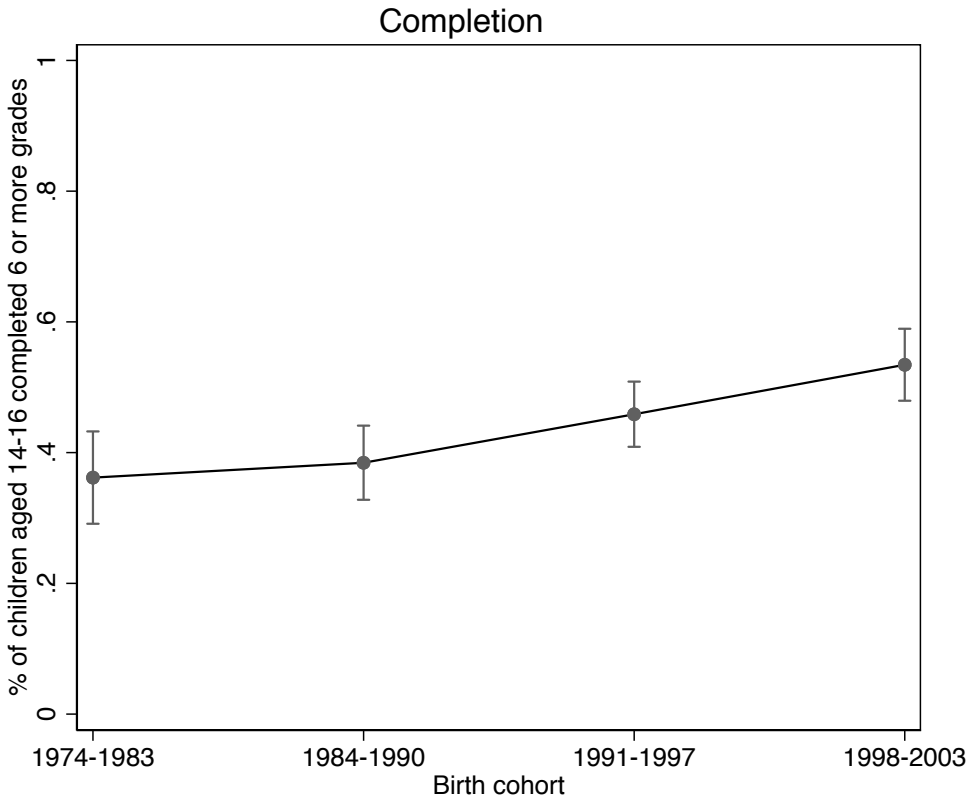
Standard errors clustered by country

Weighted proportional to the squared standard errors for coefficients β_1

FINDINGS

Trends in school attendance and completion, birth cohorts 1974-2003

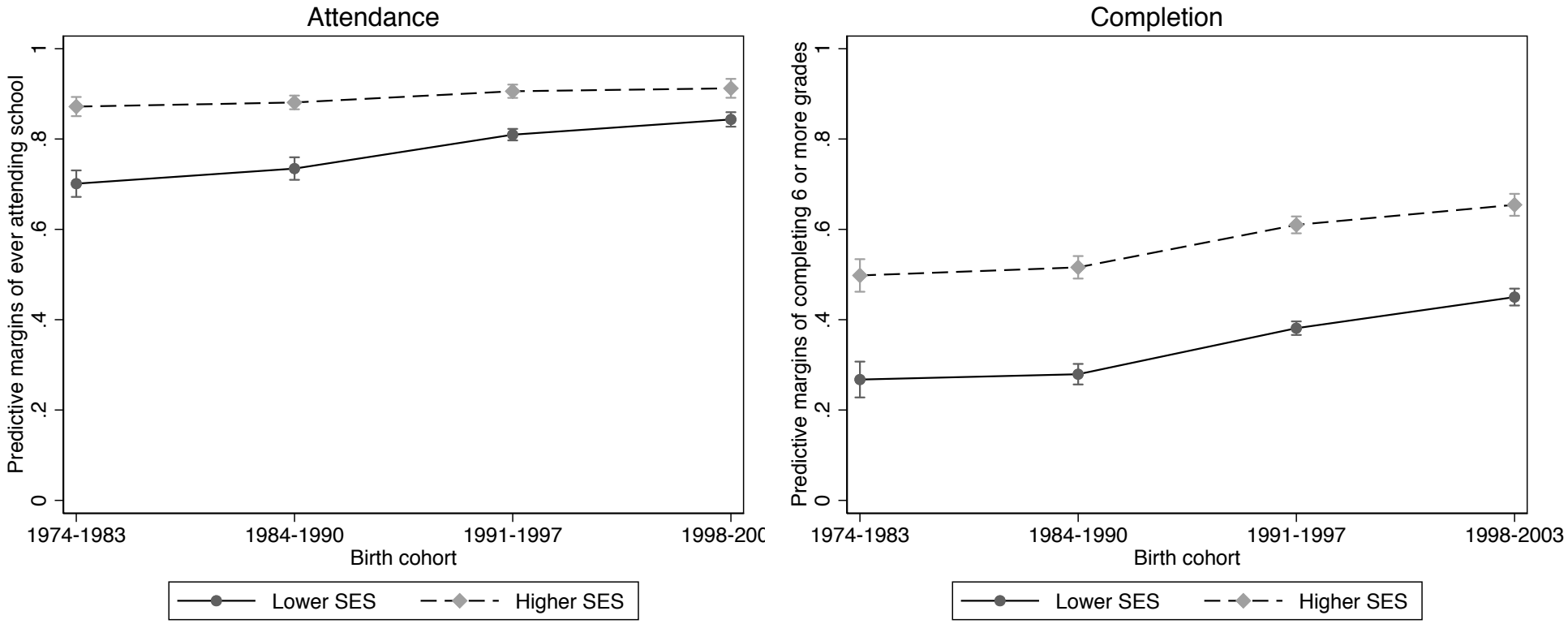




Source: Author's calculations using pooled data from 153 DHS and MICS surveys in 40 countries in SSA

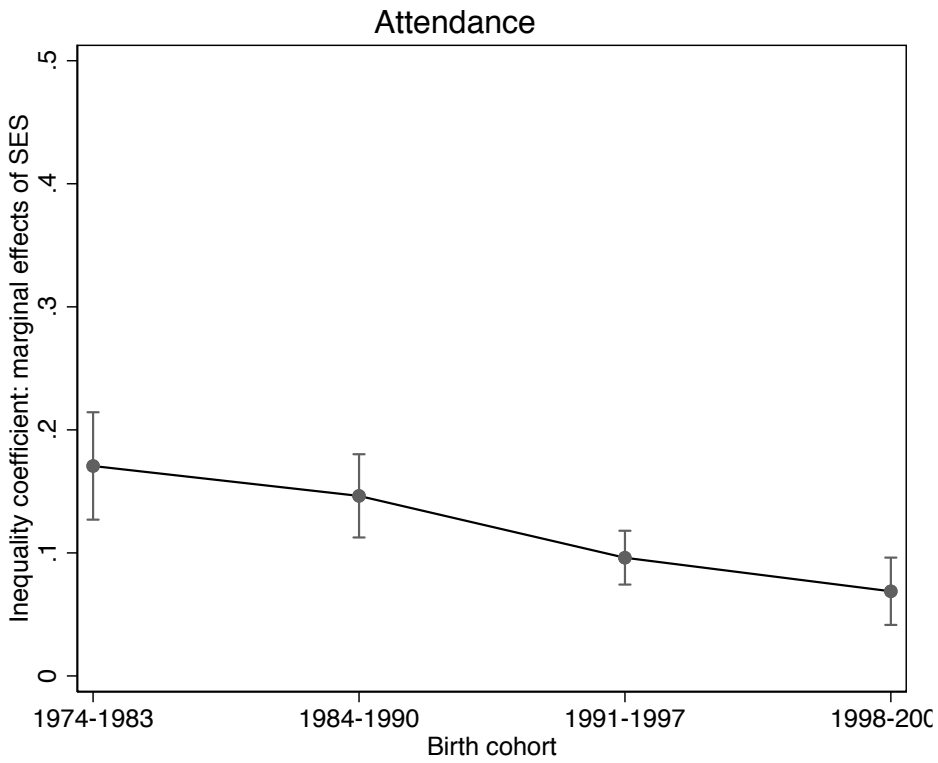
FINDINGS

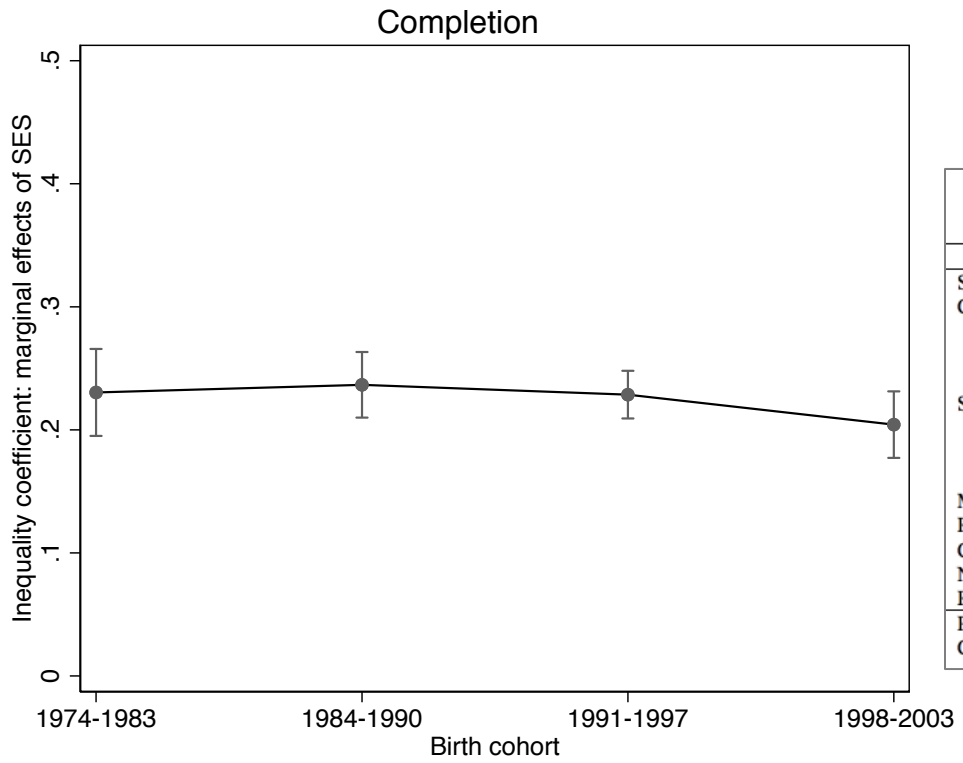
By SES



Predicted school attendance and completion probabilities by SES (parents'/caretakers' educational attainment) from OLS regression models with controls for child's gender, age, area of residence, and country fixed effects.
Standard errors are clustered by country and survey year.
Data: pooled data from 153 DHS and MICS surveys from 1990 to 2017 in 40 countries in sub-Saharan Africa

RQ1: TRENDS IN INTERGENERATIONAL EDUCATIONAL INEQUALITY





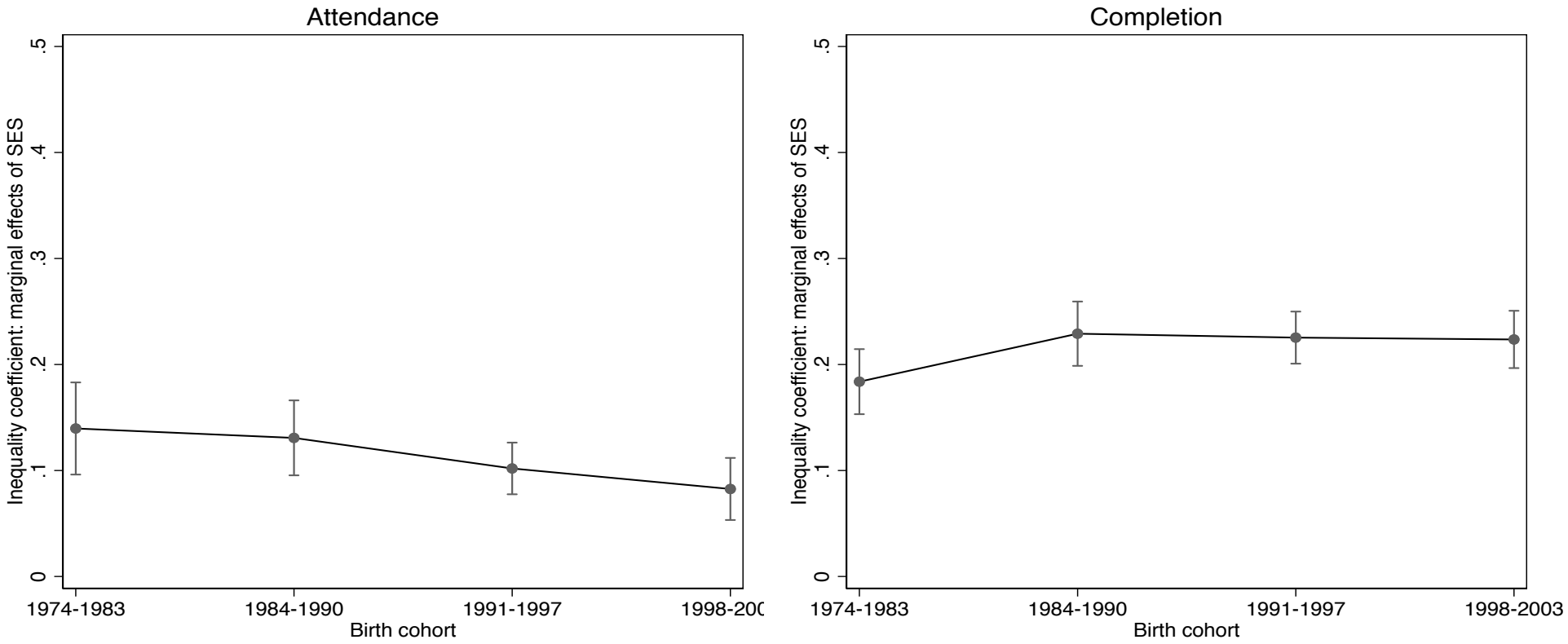
SES = education

	Ever attended school	Completed 6+ grades
	Coef.	Coef.
SES	0.17***	0.23***
Cohort (ref. 1974-83)		
1984-1990	0.03*	0.01
1991-1997	0.11***	0.11***
1998-2003	0.14***	0.18***
SES X Cohort (ref. 1974-83)		
SES X 1984-1990	-0.02	0.01
SES X 1991-1997	-0.07***	0
SES X 1998-2003	-0.10***	-0.03
Male (ref. female)	0.05***	-0.01
Rural (ref. urban)	-0.11***	-0.21***
Constant	0.76***	0.20***
N	541,856	541,856
R-squared	0.25	0.27

P-test: *** p<0.01, ** p<0.05, * p<0.1
Controls not presented here: country and age dummies.

Effect of parents'/caretakers' SES from OLS regression models, with controls for child's gender, age, area of residence, and country fixed effects.
Standard errors are clustered by country and survey year.
Sample: children born between 1974 and 2003, surveyed at age 14-16.
Data: pooled data from 153 DHS and MICS surveys from 1990 to 2017 in 40 countries in sub-Saharan Africa

RQ1: TRENDS IN INTERGENERATIONAL EDUCATIONAL INEQUALITY

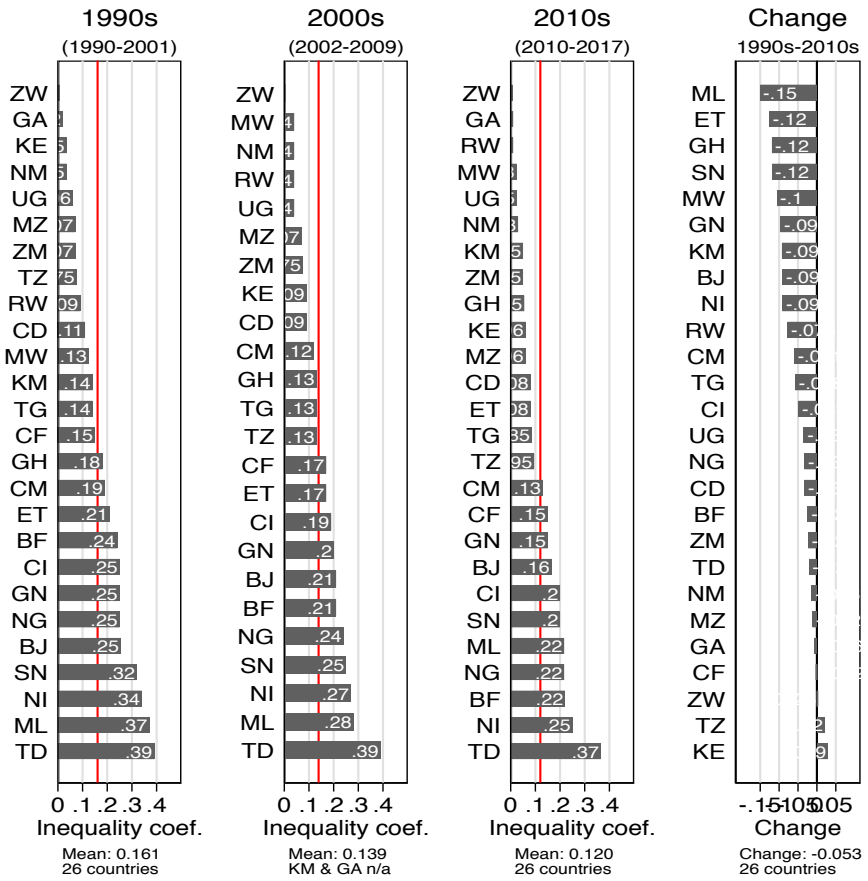


SES = wealth

Inequality estimated using household wealth to define SES. Higher SES families are defined as those belonging to the highest two wealth quintiles

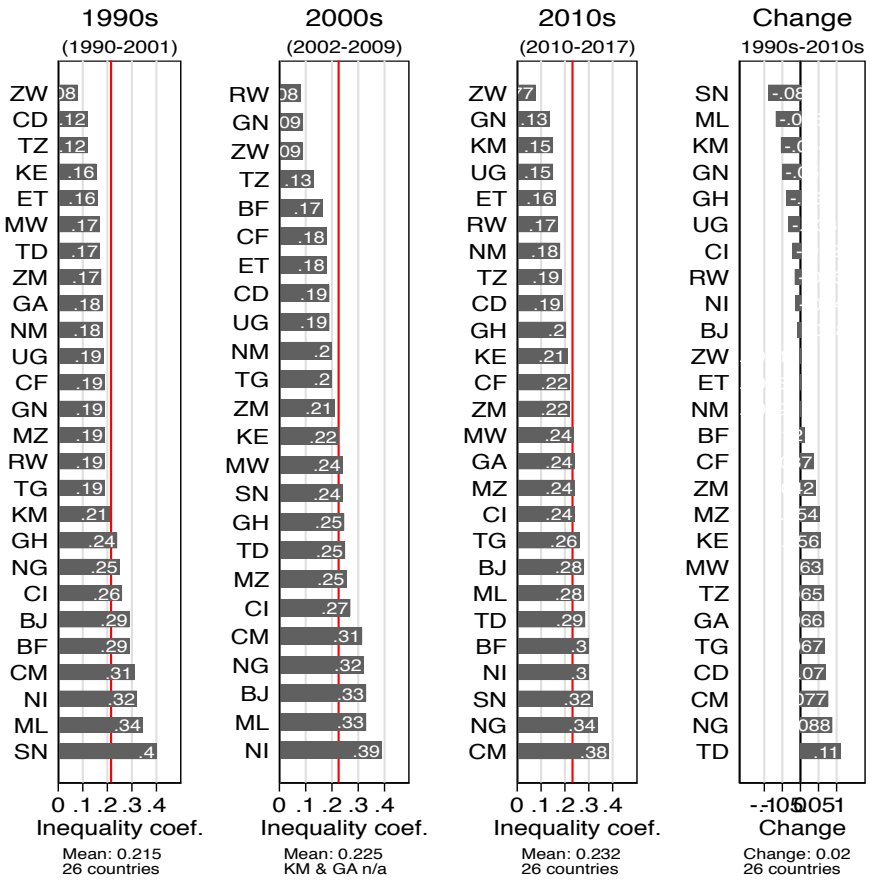
RQ1: TRENDS IN INTERGENERATIONAL EDUCATIONAL INEQUALITY

Attendance



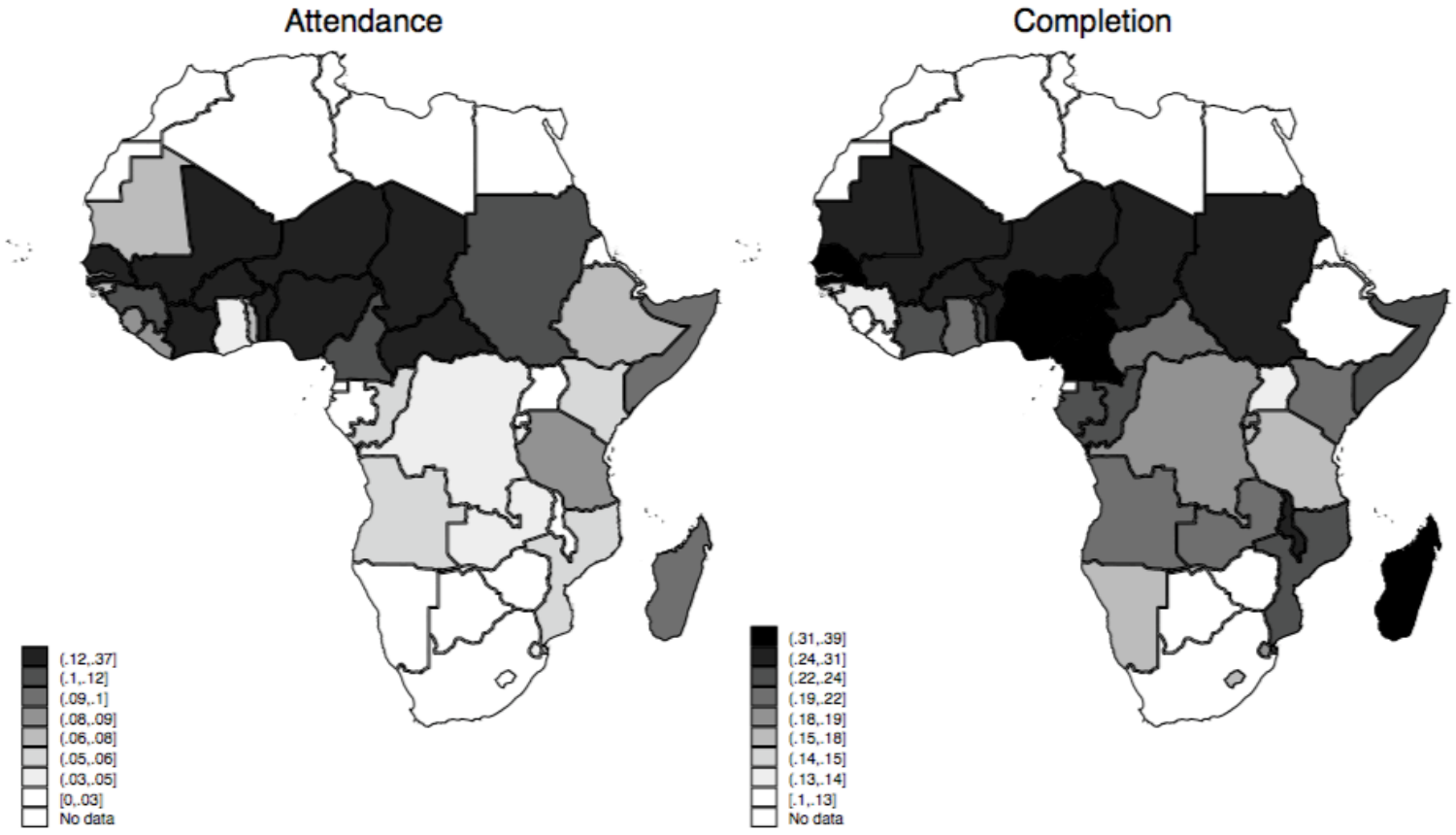
Source: Authors' calculation using DHS and MICS surveys
All coefficients significant at 95% level
Inequality coefficients: association between SES and children's education

Completion



Source: Authors' calculation using DHS and MICS surveys
All coefficients significant at 95% level
Inequality coefficients: association between SES and children's education

RQ2: CROSS-COUNTRY VARIATION



Inequality coefficients: association between families' SES and children's educational outcomes
Source: Authors' calculation based on latest available DHS/MICS surveys, 40 countries

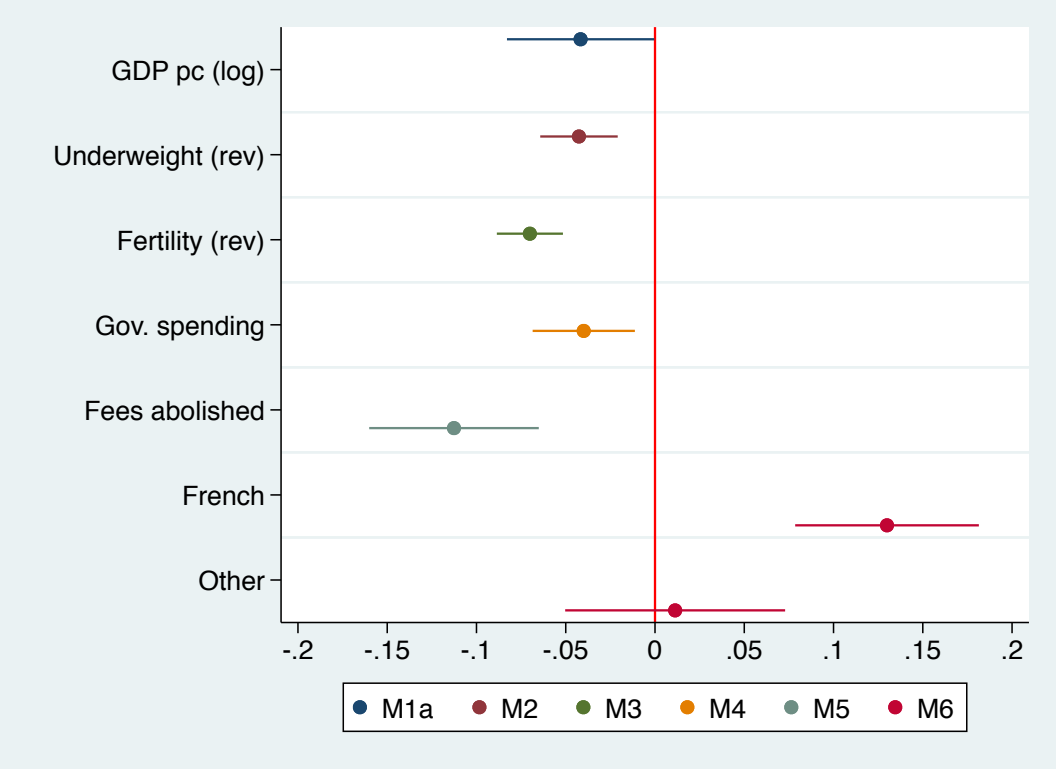
RQ2: ROLE OF CONTEXTUAL FACTORS: ATTENDANCE

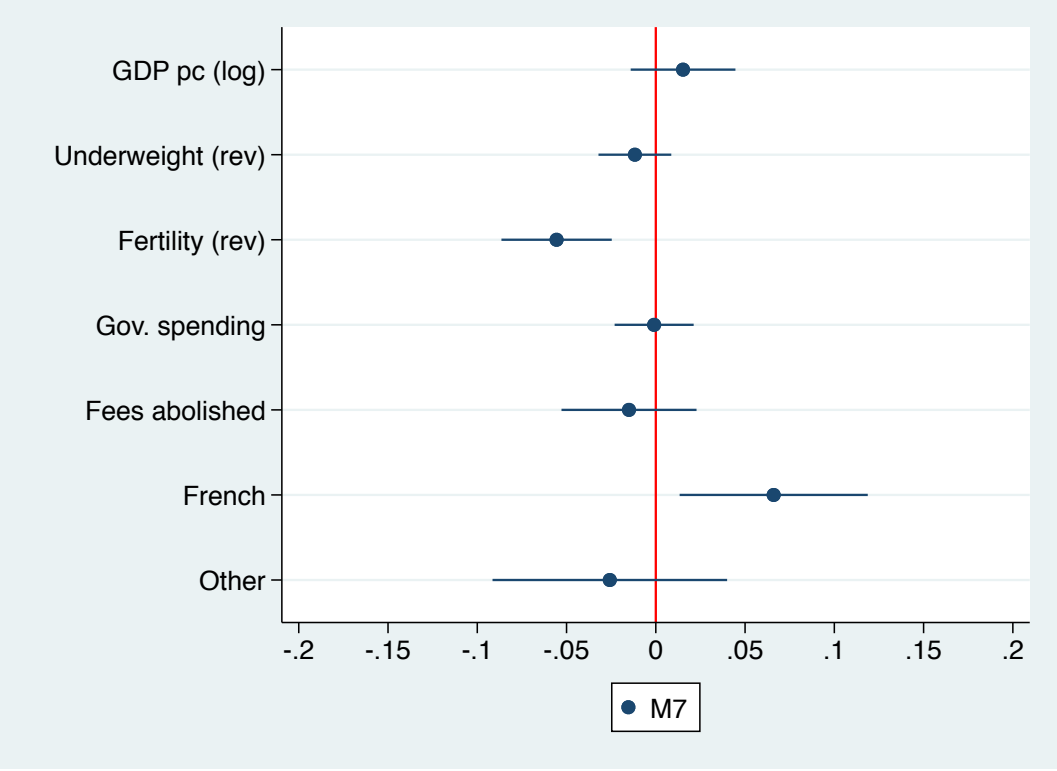
Association between macro-level contextual factors and intergenerational inequality in school attendance

	M1a	M1b	M2	M3	M4	M5	M6	M7
Economic development								
GDP pc int. $ PPP	-0.04**							0.02
Income group (ref. Low)								
Lower middle income		-0.07**						
Upper middle income		-0.16***						
Living conditions								
Underweight (rev.)			-0.04***					-0.01
Family planning								
Fertility rate (rev.)				-0.07***				-0.06***
Educational system								
Government spending					-0.04***			
on education (% of GDP)								-0.00
No primary school fees						-0.11***		-0.02
Colonial past (ref. British)								
French							0.13***	0.07**
Other							0.01	-0.03
Constant	0.18***	0.21***	0.17***	0.16***	0.19***	0.21***	0.11***	0.12***
N (surveys)	116	116	116	116	116	116	116	116
R-squared	0.13	0.07	0.31	0.53	0.10	0.12	0.37	0.71

Inequality coefficient regressed here is the association between SES (parents/caretakers' education) and school attendance.
Sample: 35 countries (116 surveys). Significance test: *** p<0.01, ** p<0.05, * p<0.1.
GDP, underweight, fertility rate, and spending on education are standardized to have a mean of 0 and standard deviation of 1.
All time-varying macro-level indicators are measured with a lag, as an average of 8 years before survey data was collected to reflect the time when children were of school age.
Estimates are based on weighted least squares, weighted by squared standard errors of inequality coefficients to account for precision generated from first stage estimation.
Standard errors are clustered by country.

RQ2: ROLE OF CONTEXTUAL FACTORS: ATTENDANCE





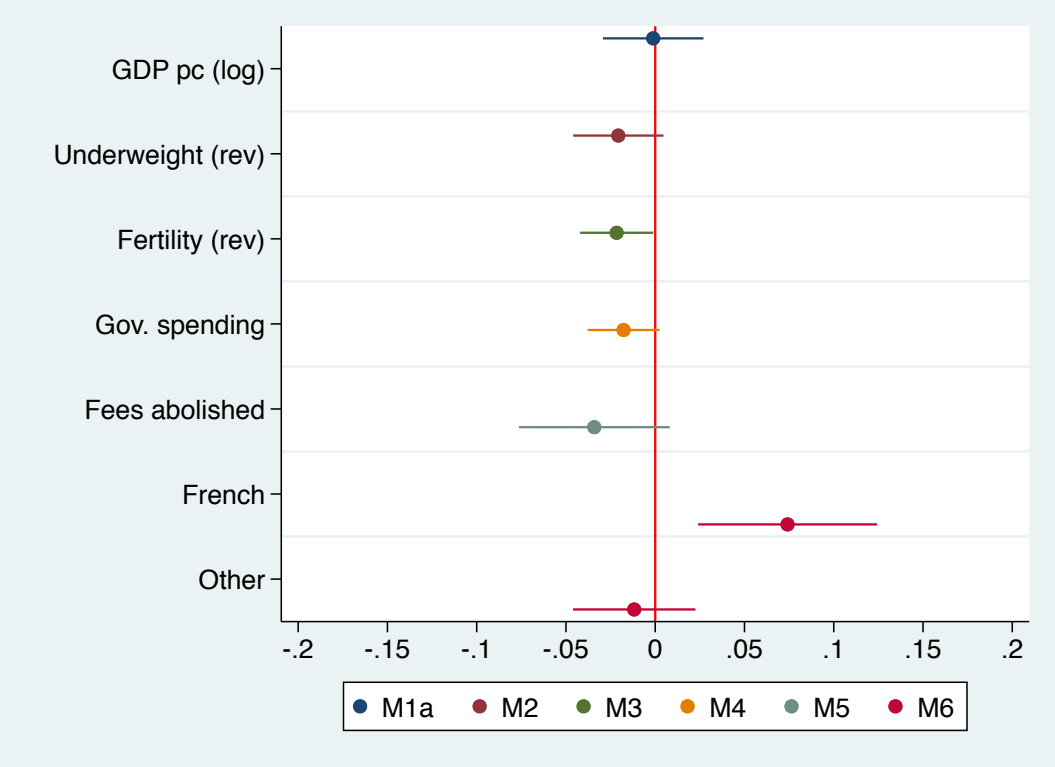
RQ2: ROLE OF CONTEXTUAL FACTORS: COMPLETION

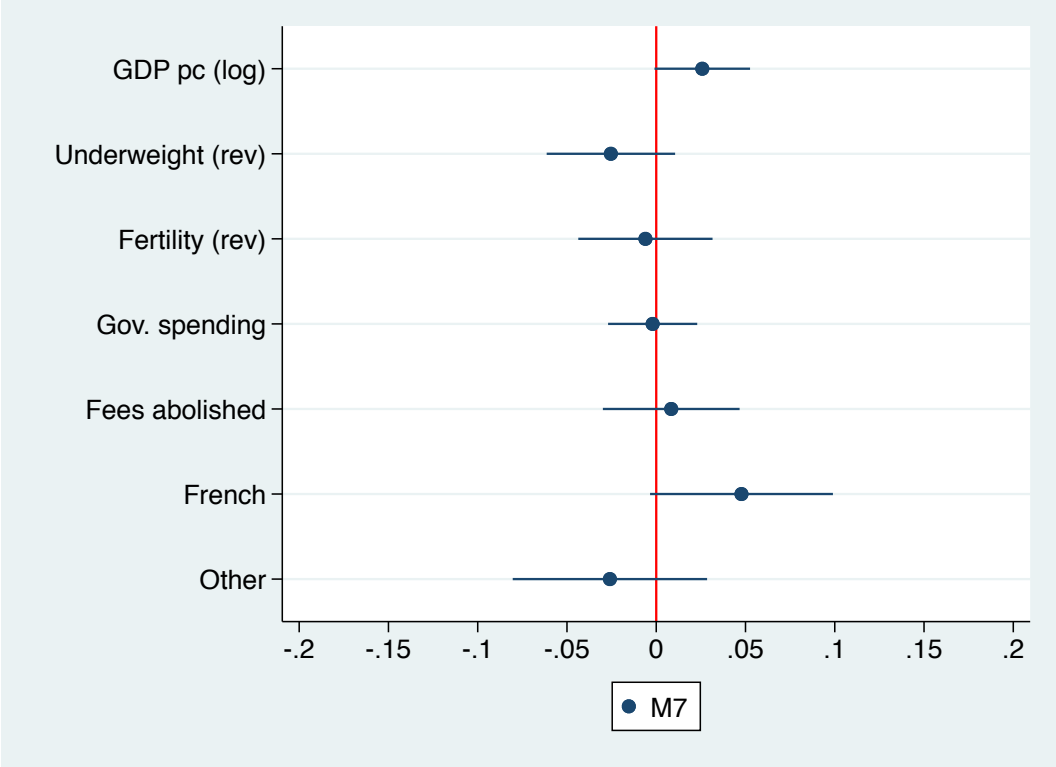
Association between macro-level contextual factors and intergenerational inequality in school completion

	M1a	M1b	M2	M3	M4	M5	M6	M7
Economic development								
GDP pc int. $ PPP	-0.00							0.03*
Income group (ref. Low)								
Lower middle income		0.01						
Upper middle income		-0.03						
Living conditions								
Underweight (rev.)			-0.02					-0.03
Family planning								
Fertility rate (rev.)				-0.02**				-0.01
Educational system								
Government spending					-0.02*			
on education (% of GDP)								-0.00
No primary school fees						-0.03		0.01
Colonial past (ref. British)								
French							0.07***	0.05*
Other							-0.01	-0.03
Constant	0.24***	0.24***	0.23***	0.23***	0.24***	0.24***	0.20***	0.21***
N (surveys)	116	116	116	116	116	116	116	116
R-squared	0.00	0.00	0.10	0.10	0.04	0.02	0.25	0.33

Inequality coefficient regressed here is the association between SES (parents/caretakers' education) and school completion.
Sample: 35 countries (116 surveys). Significance test: *** p<0.01, ** p<0.05, * p<0.1.
GDP, underweight, fertility rate, and spending on education are standardized to have a mean of 0 and standard deviation of 1.
All time-varying macro-level indicators are measured with a lag, as an average of 8 years before survey data was collected to reflect the time when children were of school age.
Estimates are based on weighted least squares, weighted by squared standard errors of inequality coefficients to account for precision generated from first stage estimation.
Standard errors are clustered by country.

RQ2: ROLE OF CONTEXTUAL FACTORS: COMPLETION





SUMMARY

1. Trends in IEI over the last three decades in SSA:
   - ➢ Equalisation in school attendance
     Less dependent on SES
   - ➢ Persistence in inequality to complete school
     Equally dependent on SES
   - → Importance of primary effects of social origin
   - → Possibly reduction of positive self-selection effect of children from poorer backgrounds
   - → Indication towards MMI hypothesis
2. Role of contextual factors:
   - ➢ Yes for level of IEI in school attendance
     Fertility rates, school fees, colonial past
   - ➢ No for level of IEI in school completion

THANK YOU

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ANNEX: MULTILEVEL

Attendance: Two-level models predicting children's probability to have attended school using individual and contextual variables

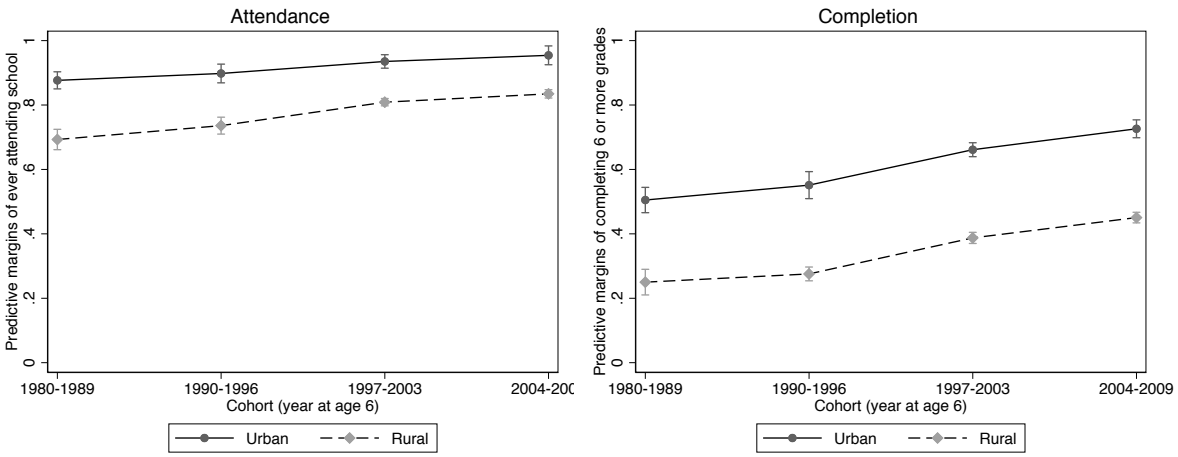
	Model 00	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
SES: caretaker with 6+ grades	0.17***	0.14***	0.14***	0.14***	0.15***	0.14***	0.16***	0.07***	0.11***
Gender: male		0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***
Area: rural		-0.11***	-0.11***	-0.11***	-0.11***	-0.11***	-0.11***	-0.11***	-0.11***
Age		-0.00*	-0.00*	-0.00*	-0.00*	-0.00*	-0.00*	-0.00*	-0.00*
Contextual factors									
GDP pc int. $ PPP, log			0.05***						-0.02
Underweight (rev.)				0.10***					0.05***
Fertility rate (rev.)					0.11***				0.07***
Gov. spending on ed. (% of GDP)						0.06***			-0.02*
School fees abolished							0.16***		0.05*
Colonial past (ref: British)									
French								-0.25***	-0.16***
Other								-0.03	0.03
Interaction with SES									
GDP pc int. $ PPP, log			-0.04***						0.01
Underweight (rev.)				-0.07***					-0.04***
Fertility rate (rev.)					-0.08***				-0.05***
Gov. spending on ed. (% of GDP)						-0.04***			0.02**
School fees abolished							-0.10***		-0.03
Former colony: French								0.16***	0.10***
Former colony: Other								0.01	-0.04*
Constant	0.78***	0.86***	0.86***	0.86***	0.85***	0.85***	0.82***	0.97***	0.90***
Variance components									
ICC	.23	.24	.23	.18	.17	.22	.22	.16	.10
No. of individuals (level 1)	427,242	427,242	427,242	427,242	427,242	427,242	427,242	427,242	427,242
No. of countries (level 2)	35	35	35	35	35	35	35	35	35

Sample: 35 countries, 116 DHS/MICS surveys. Significance test: *** p<0.01, ** p<0.05, * p<0.1

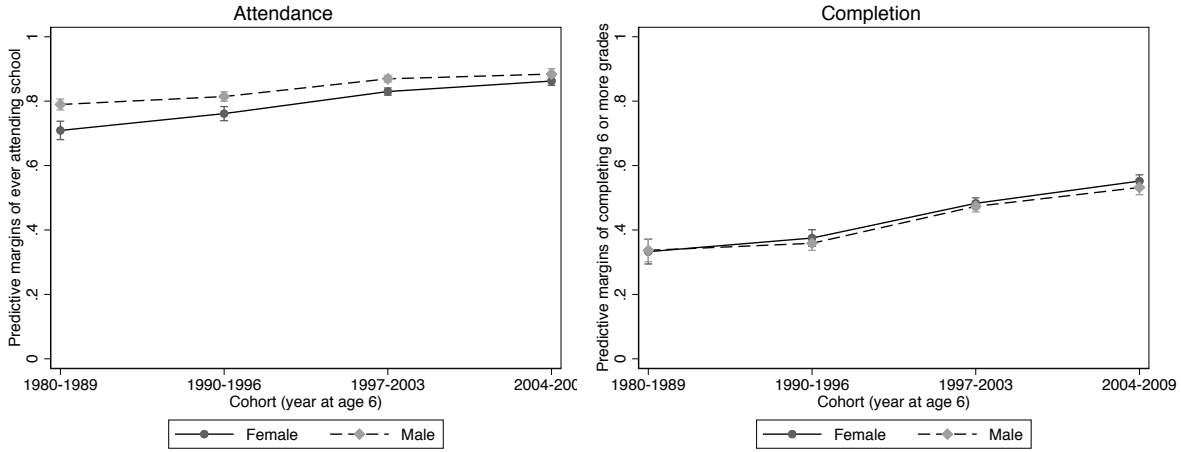
All continuous contextual variables (GDP pc., non-underweight, gov. spending on primary education) are standardized to have a mean of 0 and sd of 1.

ANNEX: INDIVIDUAL CHARACTERISTICS

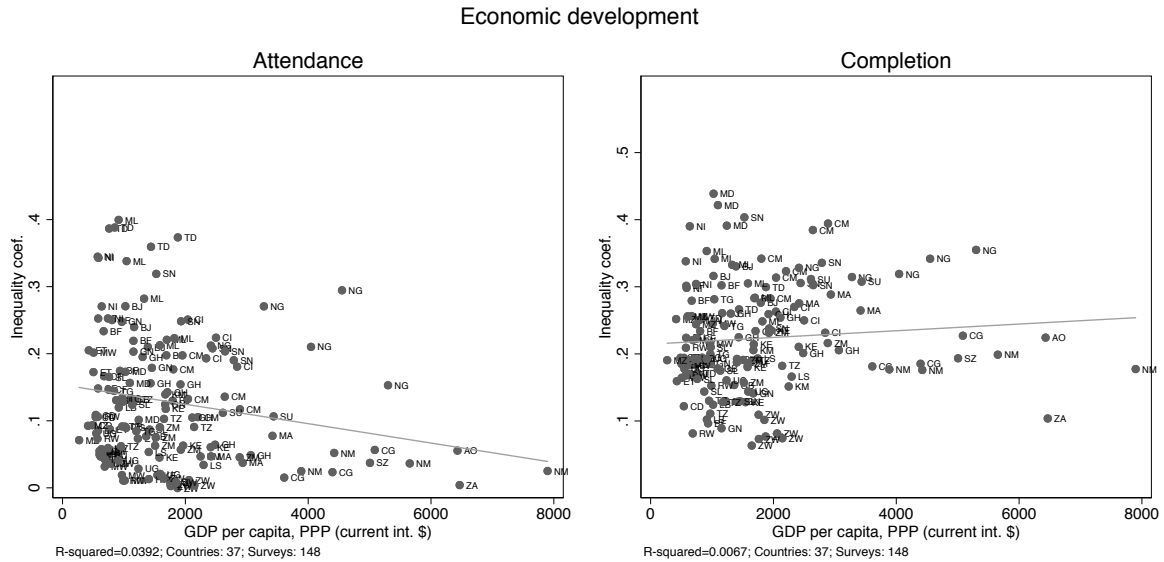
By area of residence

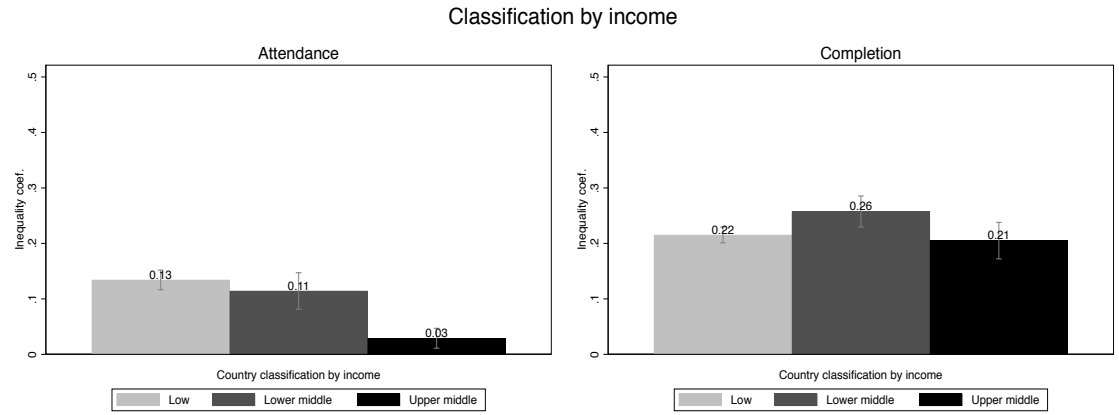


By gender



ANNEX: CONTEXTUAL FACTORS



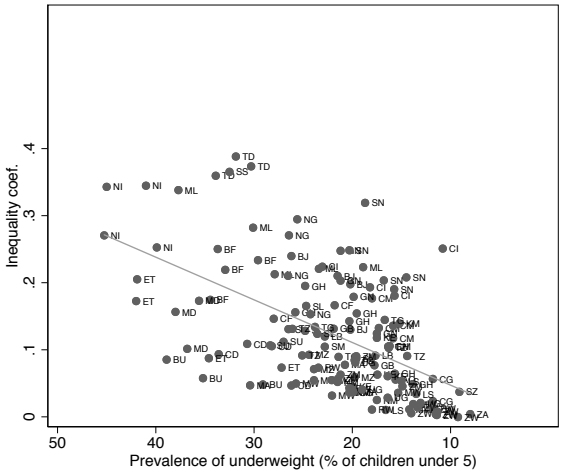


Countries: 39; Surveys: 152

ANNEX: CONTEXTUAL FACTORS

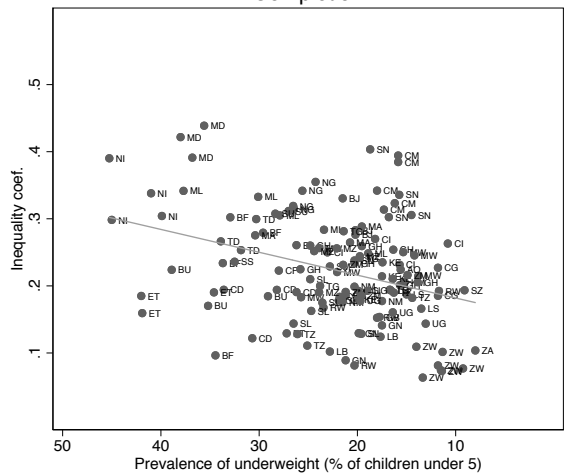
Living conditions

Attendance



R-squared=0.3015; Countries: 39; Surveys: 135

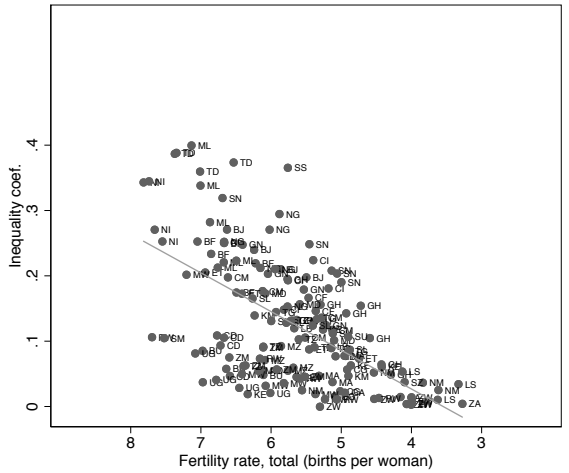
Completion



R-squared=0.1178; Countries: 39; Surveys: 135

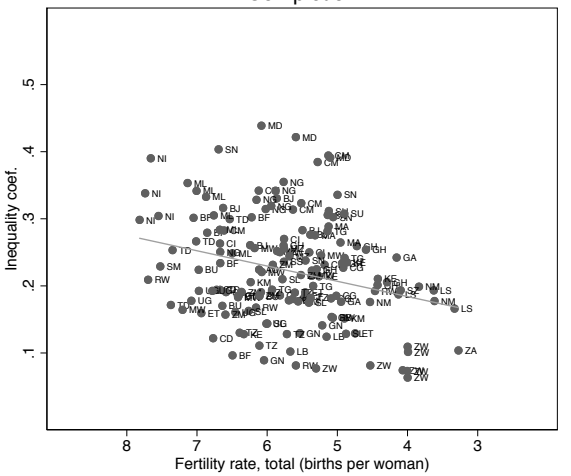
Family planning

Attendance



R-squared=0.3430; Countries: 40; Surveys: 153

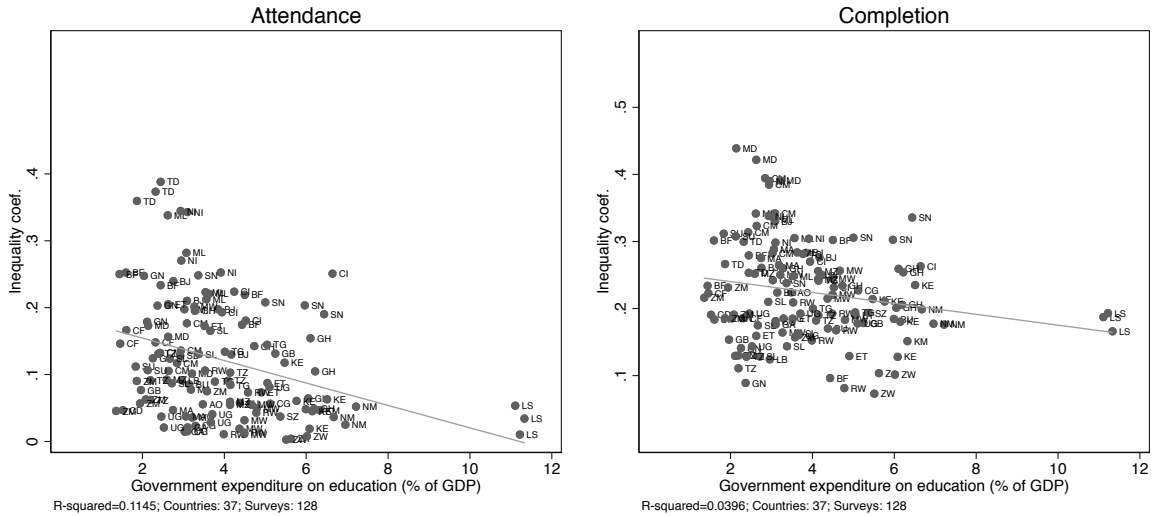
Completion



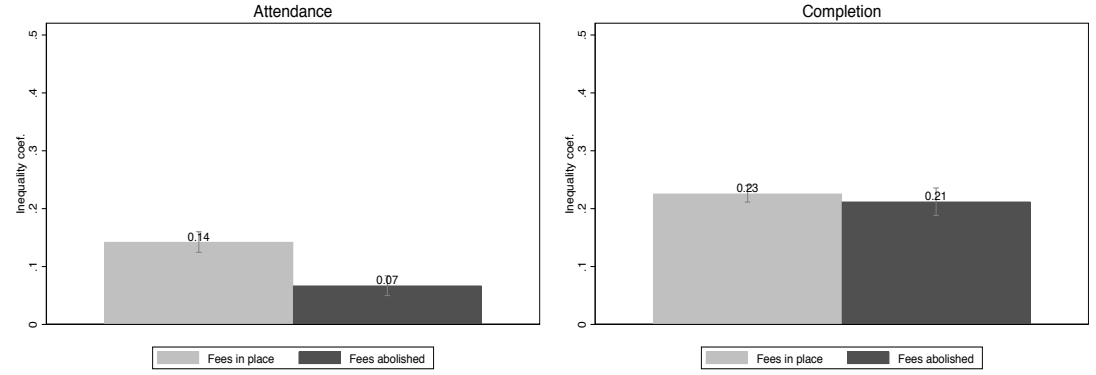
R-squared=0.0776; Countries: 40; Surveys: 153

ANNEX: CONTEXTUAL FACTORS

Government spending on education



Primary school fees at school starting age



Countries: 40; Surveys: 153

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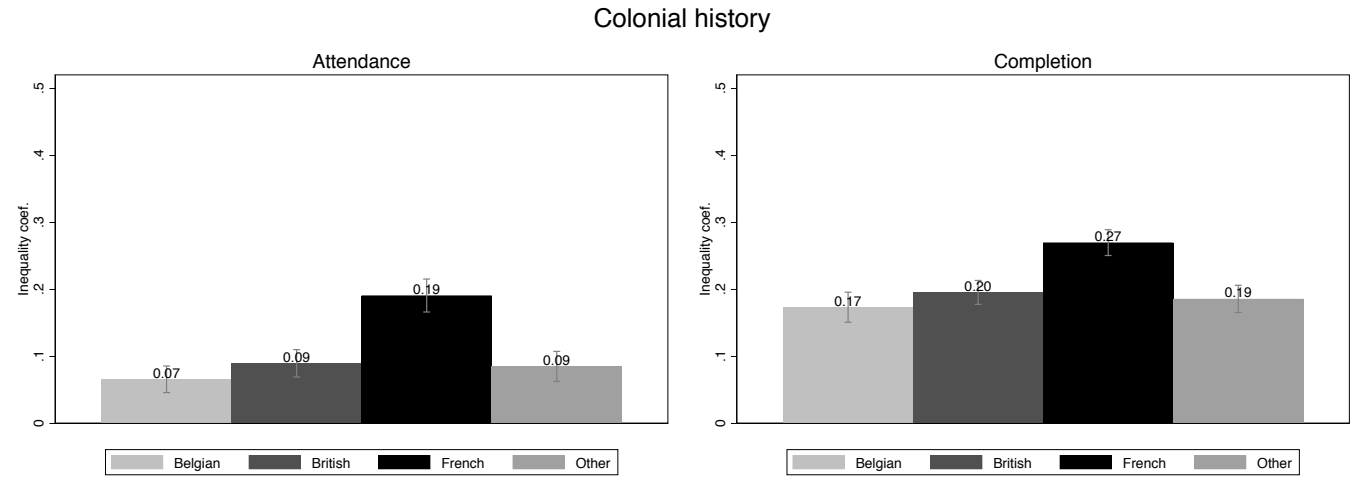

Countries: 40; Surveys: 153