The Causal Effect of Educational Policies on Assortative Mating

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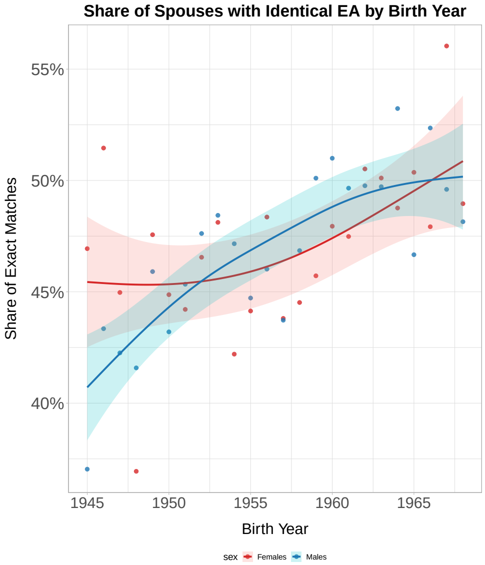
Outline

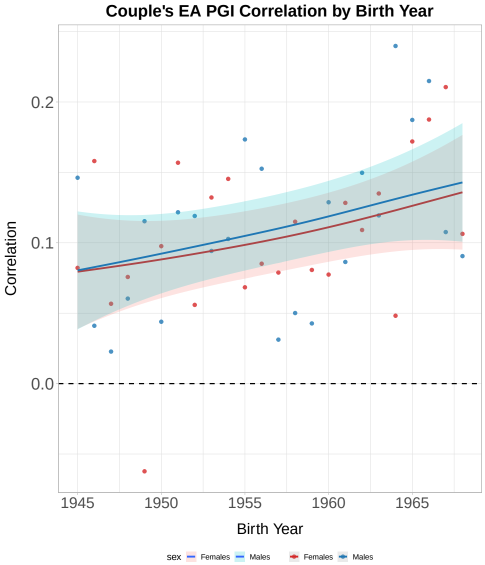
Why Assortative Mating (AM)?

- AM **amplifies** household income and education **inequality** (Breen and Salazar, 2011; Greenwood et al., 2014; Eika, Mogstad, and Zafar, 2019)
- Inequality is **highly persistent across generations** (Clark et al., 2015; Clark, 2023)
- AM **has risen** significantly in the 20th century (Chiappori, Salanié, and Weiss, 2017; Conley et al., 2016; Eeckhaut and Stanfors, 2021)

Trend in Educational Assortative Mating (UK)



Trend in Genetic Assortative Mating in the UK



Educational Policies and AM

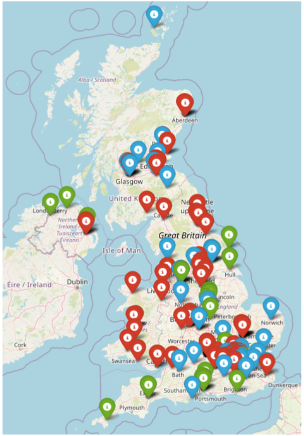
- Educational reforms act as **SES shocks** that can:
  - affect the **marriage market** (Chiappori, Iyigun, and Weiss, 2009)
  - have **intergenerational effects** on education (Oreopoulos, Page, and Stevens, 2006)
  - leave **genetic imprints** in subsequent generations (Abdellaoui et al., 2023)
- Yet, **evidence** on their **causal impact on AM is scarce**

The UK University Expansion

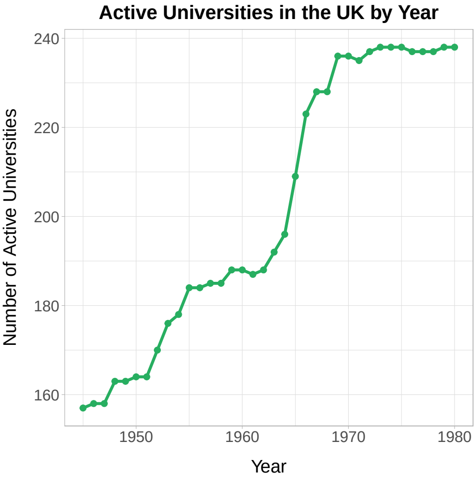
1945

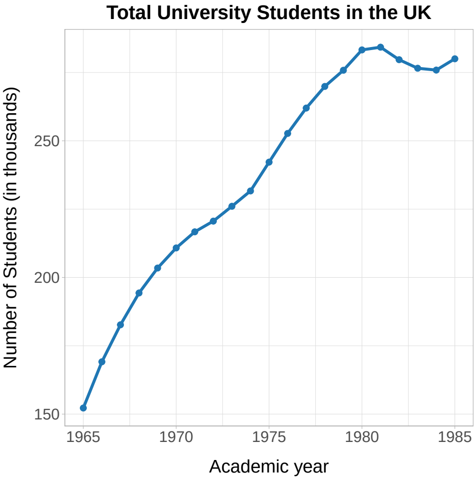
1960

1970



Access to University





Research Question

- What is the **causal impact** of the UK higher education expansion on **Assortative Mating**?

Outline

Data (I)

(1) **Genetic and Individual Socio-Economic Data** (UK Biobank):

- Very **large sample** born between 1945 and 1970
- **Genetic data**
- **Educational attainment**
- **Occupational data**
- **Birth and current place coordinates** (1km precision)

(2) **Higher Education Institutions Data** (source: Gov.uk):

- **Own digitisation**
- **Location coordinates** for each campus
- **Type of institution**: vocational, university...
- **Dates of opening, closure and granted university status**

Data (II)

(3) **Local Socioeconomic Context Data**:

(a) **Unemployment:**

- Historical Unemployment (source: Labour Gazette, **own digitisation**)
- Current Unemployment (source: NOMIS)

(b) **Educational Level in the District of Birth** (source: 1951 Census)

(c) **Population** (source: GBHD)

Caveat: Imputed Spouses

- We impute spousal pairs following Abdellaoui et al. (2023)
    - Had the same home postcode on at least one occasion
    - Reported same homeownership/renting status, length of time at the address, and number of children
    - Attended the same UKB assessment centre on the same day
    - Both reported living with their spouse
    - Consisted of one male and one female

Caveat: Parental Education

- Following Barcellos, Carvalho, and Turley (2021) we approximate parental education by using **measures of early-life socioeconomic (dis)advantages**:
  - **Educational level in the district of birth**: share of adults in the district of birth that completed at least 15 years of education
  - **Number of siblings**, as it is negatively associated to educational attainment
  - **Educational Attainment PGI**

Outline

Outline

Reduction in Distance to University

Our approach:

(1) Measure the **reduction in distance** to the nearest university, $\Delta Dist$, which we define as:

$$\Delta Dist = Dist\_prebirth - Dist\_postbirth$$

Summary Statistics

- *Dist_prebirth*: distance to nearest university, active at year of birth
- *Dist_postbirth*: distance to nearest university, active by age 15

(2) Since the university expansion in the UK targeted disadvantaged areas (Robbins, 1963), we control for

- **Number of active universities at birth year within 50km of birth-location**
- **Population Density and relative Growth** in the district of birth
- **Average Unemployment Rate** in the region of birth (1945-1960)
- **Urban/Rural Area Classification** of the birth postcode

Outline

2SLS

- First Stage:

$$E_i = \pi D_i + X_i' \pi_X + \alpha_c + \mu_r + v_i \tag{1}$$

- Second Stage:

$$Y_i = \gamma \widehat{E}_i + X_i' \beta + \alpha_c + \mu_r + \varepsilon_i \tag{2}$$

- Where:
    - Y_i: spouse's outcome of interest
    - E_i: college education attainment dummy
    - D_i: reduction in distance
    - X_i: vector of controls (reduction in distance controls and proxies for parental education)
    - α_c: cohort fixed effects
    - μ_r: region fixed effects
    - v_i, ε_i: idiosyncratic error terms

Outline

Reduced Form Results

	Spousal Outcomes			
	(1)	(2)	(3)	(4)
	College	EA PGI	Wage	BMI
Panel A: Whole Sample				
Reduction in Distance	0.013*** (0.004)	0.015** (0.007)	0.003 (0.002)	-0.039 (0.031)
Num. Obs.	19147	19147	19147	19147
Panel B: Males				
Reduction in Distance	0.012** (0.005)	0.010 (0.009)	0.002 (0.003)	-0.036 (0.045)
Num. Obs.	9603	9603	9603	9603
Panel C: Females				
Reduction in Distance	0.015*** (0.005)	0.024** (0.010)	0.005 (0.004)	-0.034 (0.039)
Num. Obs.	9544	9544	9544	9544

The reduction in distance is measured per 10 km. Standard errors clustered by spouse pairs in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All models include controls, region and cohort fixed effects, and the first 20 genetic PCs. UKB IP weights have been employed (van Alten et al., 2024)

Second Stage Results

	Spousal Outcomes			
	(1)	(2)	(3)	(4)
	College	EA PGI	Wage	BMI
Panel A: Whole Sample				
College (Instrumented)	1.055*** (0.329)	1.186** (0.591)	0.262 (0.192)	-3.174 (2.709)
Num. Obs.	19147	19147	19147	19147
First Stage F-Stat	14.93			
Panel B: Males				
College (Instrumented)	1.236* (0.677)	0.984 (0.955)	0.217 (0.280)	-3.582 (4.870)
Num. Obs.	9603	9603	9603	9603
First Stage F-Stat	5.24			
Panel C: Females				
College (Instrumented)	0.967*** (0.320)	1.523** (0.745)	0.297 (0.241)	-2.117 (2.611)
Num. Obs.	9544	9544	9544	9544
First Stage F-Stat	10.95			

The reduction in distance is measured per 10 km. Standard errors clustered by spouse pairs in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All models include controls, region and cohort fixed effects, and the first 20 genetic PCs. UKB IP weights have been employed (van Alten et al., 2024)

Outline

Discussion

- The expansion increased spouse's college attainment and mildly spouse's EA PGI
    - Effects were **particularly pronounced for females**
- These results indicate an increase in educational assortative mating
- The ROSLA had no impact on AM See in Appendix

Next Steps

- **Staggered DiD** approach
- **Heterogeneity** by SES
- Impact on **spousal similarity** beyond education
- Explore **Impact in Sweden:**
    - Rich datasets (Population Sample and the Twin Registry)
    - Educational reform that increased educational attainment beyond compulsory education (Meghir and Palme, 2005)

Thank you for listening!

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Outline

- More on the Reduction in Distance
- ROSLA

Reduction in Distance: Summary Statistics

Back	(1) Overall	(2) Positive Reduction	(3) Negative Reduction	(4) No Reduction
Mean Reduction	4.388	18.949	-0.294	0
Std. Deviation	13.122	21.400	0.385	0
Min	-3.858	0.002	-3.860	0
Q1	0.000	2.640	-0.340	0
Q2 (Median)	0.000	10.400	-0.149	0
Q3	0.000	26.800	-0.135	0
Max	180.293	180.293	-0.005	0
Num. Obs.	19147	4741	200	14206
Frequency	100%	24.76%	1.04%	74.2%

Summary statistics for the reduction in distance to university (measured in kilometers). The reduction is calculated as the difference between the distance to the nearest university active at birth and the distance to the nearest university active by age 15.

Reduction in Distance: Test for Quadratic Impact

Back

	(1)	(2)
	College	College
Reduction in Distance to University (10km)	0.016***	0.012***
	(0.005)	(0.003)
Reduction in Distance Squared	-0.000	
	(0.000)	
Num.Obs.	19147	19147
R2	0.011	0.11
AIC	29264.69	29263.68
BIC	32102.11	32093.24
Controls	Yes	Yes
Region FE	Yes	Yes
Cohort FE	Yes	Yes
Genetic PCs	20	20

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors clustered by spouse pairs. UKB IP weights have been employed (van Alten et al., 2024)

First Stage Results

Placebo Tests

	(1) College: All	(2) College: Males	(3) College: Females
Reduction in Distance to University (10km)	0.012***	0.010**	0.016***
	(0.004)	(0.005)	(0.005)
EA PGI	0.106***	0.099***	0.116***
	(0.004)	(0.006)	(0.006)
Num.Obs.	19147	9603	9544
R2	0.105	0.126	0.142
F-Statistic	14.93	5.24	10.95
Controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Genetic PCs	20	20	20

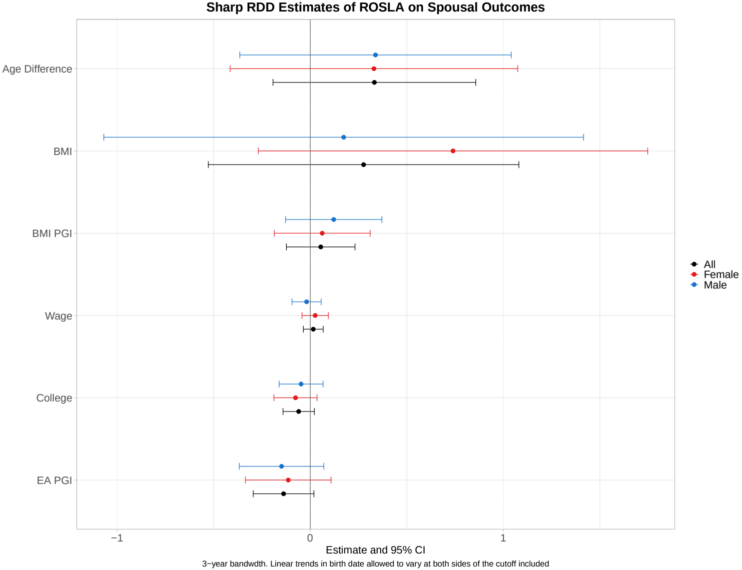
The reduction in distance is measured per 10 km. Standard errors clustered by spouse pairs in parenthesis. * p $<$0.1, ** p $<$0.05, *** p $<$0.01. All models include controls, region and cohort fixed effects, and the first 20 genetic PCs. UKB IP weights have been employed (van Alten et al., 2024)

Outline

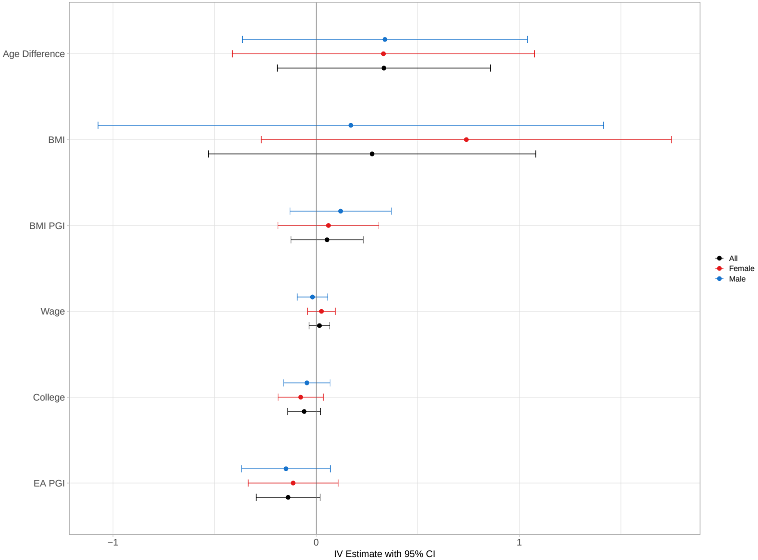
- More on the Reduction in Distance
- ROSLA

The 1972 Raising of the School Leaving Age (ROSLA)

- **ROSLA increased the minimum school-leaving age** in England and Wales **from 15 to 16**
- It did not impact college attainment (Barcellos, Carvalho, and Turley, 2021)
- We study its impact on AM by employing both:
  - Sharp RDD
  - Fuzzy RDD
- It had **no impact on AM** (robust for different bandwidths)


Sharp RDD Estimates of ROSLA on Spousal Outcomes
Age Difference
BMI
BMI PGI
Wage
College
EA PGI
−1
0
1
Estimate and 95% CI
3−year bandwdth. Linear trends in birth date allowed to vary at both sides of the cutoff included
All
Female
Male

Fuzzy RDD Estimates of ROSLA on Spousal Outcomes



1−year bandwidth. Linear trends in birth date allowed to vary at both sides of the cutoff included. Instrumenting school leaving age 16.