Foundations of Econometrics
Assignment 7

Daniel Campos
Èric Gutiérrez
Samuel Fraley

November 25, 2025

Question 1

Replicate Figures 4 and 6 from the paper. Comment on the possible effect of increase of minimum school leaving age on earnings and age of leaving the full-time education.

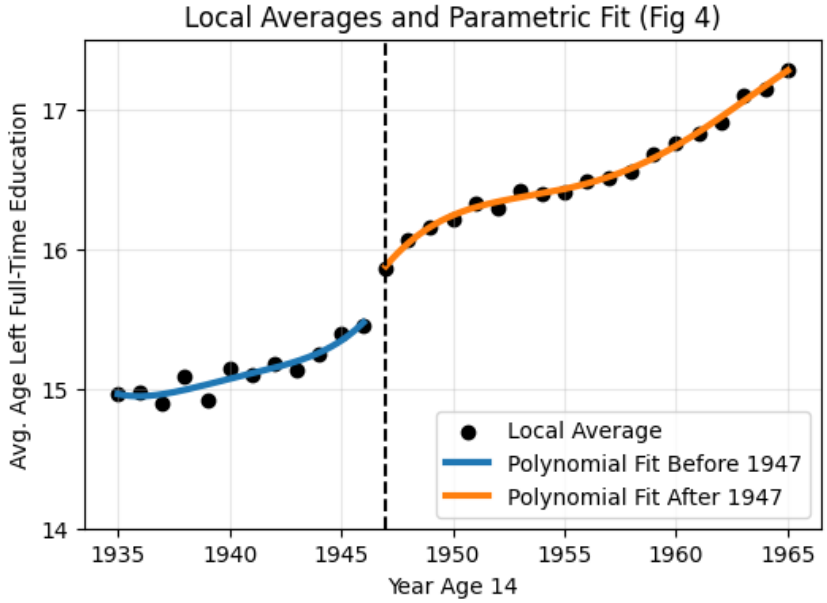

Figure 1: Average age left full-time education by year aged 14 (Great Britain)

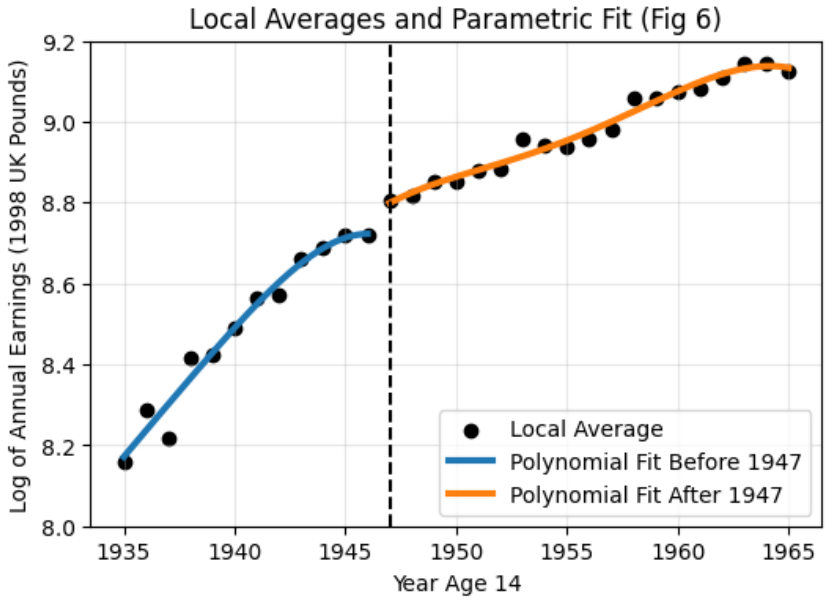

Figure 2: Average annual log earnings by year aged 14 (Great Britain)

Figure 1 (Figure 4 in Oreopoulos (2006)): As can be seen in this figure, there is a sharp jump in the average age at which full-time educatin is left exactly at the cutoff where the cohort turned 14 in 1947 (indicated by the vertical dashed line). The polynomial fit for the pre-1947 cohorts (blue line) shows a gradual increase, but the average leaving age stays near the previous legal minimum of 15 years of schooling. Immediately at the 1947 cutoff, the average age shifts upward to approximately 16.0 (orange line). This indicates high compliance with the new legislation, effectively forcing a large fraction of the population —who would have otherwise dropped out— to acquire one additional year of schooling. The increase of the minimum age at which is legal to leave school affected the average age by approximately 0.5 years.

Figure 2 (Figure 6 in Oreopoulos (2006)): Consistent with the shock to years of education exposed in for the previous figure, there is a visible jump in the log of annual earnings at the 1947 cutoff. The polynomial fit for the post-1947 cohorts (orange line) begins at a noticeably higher intercept than the projection of the pre-1947 trend (blue line). Under the assumption that unobserved characteristics vary smoothly across the 1947 threshold, this jump in earnings can be causally attributed to the exogenous increase in compulsory schooling. In other words, by increasing the minimum age at which is legal to leave school by one year, the log of annual earnings experienced a 0.1 points jump (approximately), which corresponds to a 10.5% increase in annual earnings.

Question 2

Replicate Table 1 for Great Britain. Briefly comment your results

Table 1: Estimated Effect of Minimum School-Leaving Age on Age Finished Full-Time Education and Log Annual Earnings (Great Britain, ages 25–64, 1935–1965)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(First stage) dependent variable:			(Reduced form) dependent variable:			Initial
Sample population	Age finished full-time school			log annual earnings			sample size
Great Britain	0.469	0.469	0.475	0.055	0.052	0.056	115298
	(0.067)***	(0.066)***	(0.065)***	(0.015)***	(0.014)***	(0.017)***	
Birth Cohort Polynomial Controls	Quartic	Quartic	Quartic	Quartic	Quartic	Quartic	
Age Polynomial Controls	None	Quartic	None	None	Quartic	None	
Age Dummies	No	No	Yes	No	No	Yes	

This table looks at how the change in minimum leaving school age impacted two outcomes: age finished full-time education and log annual earnings. The first column shows the results for age finished full-time education, while the second column shows the results for log annual earnings. The regression uses cell means to create age and region cohorts to test the effect. For the first stage regressions (age finished full-time as a dependent variable), we see that the cofficient is around 0.47 for the 3 regressions with different age controls and dummies. For reduced form regressions (log annual earnigns as a dependent variable), the coefficient is around 0.05.

These results suggest raising the minimum school-leaving age from 14 to 15 increased average years of schooling by about 0.47 years for affected cohorts, and the cohorts born just after the change show roughly 5% higher annual earnings in the reduced-form estimates. The results are statistically significant and fairly robust across specifications.

Question 3

Estimate RD-IV as in Table 2 for Great Britain. Comment your results.

	(1)	(2)	(3)	(4)	(5)	(6)
	Returns to schooling: OLS			Returns to compulsory schooling: IV		
Great Britain	0.073	0.074	0.074	0.110	0.115	0.119
	[0.001]***	[0.001]***	[0.001]***	[0.033]***	[0.033]***	[0.039]***
Birth cohort polynomial controls	Quartic	Quartic	Quartic	Quartic	Quartic	Quartic
Age polynomial controls	None	Quartic	None	None	Quartic	None
Age dummies	No	No	Yes	No	No	Yes
Initial sample size	13118					

If we examine columns (1), (2), and (3), referring to the specifications carried out using OLS, we can notice that the coefficient on the age left full-time education (*agelfted*) remains constant at around 0.073, in the case of the first specification, and at 0.074, in the case of the following two. Thus, the inclusion of quartic age polynomial controls and age dummies does not significantly alter the estimate, so any possible variation driving the latter within Great Britain is not related with the controls for age differences. Finally, it can be concluded that, by OLS, an additional year of education is associated with an increase in annual earnings of 7.3-7.4%.

It should also be added that, with regard to these initial three specifications, the results are very similar to those of Oreopoulos (2006), diverging by barely half a percentage point.

Moving on to columns (4), (5), and (6), conducted with the same specifications as columns (1), (2), and (3), respectively, but through the inclusion of an IV on compulsory schooling, we obtain higher estimates of 0.110, 0.115, and 0.119, which are still statistically significant, even at the 1% level, despite an increase in standard errors. This difference with respect to OLS is presumably due to the fact that the latter reflects the average variation in overall schooling, without differentiating between voluntary and compulsory choices. Therefore, the potential presence of confounders does not allow the estimate to represent causality for each individual. The IV, however, identifies the causal returns to schooling for the compliers, that is, the LATE. In this context, the compliers are those individuals who had no choice but to continue for at least one more year of schooling because of the modification of the law in 1947.

Furthermore, we may assume that these individuals, who would have left education at age 14 had the law not been modified, would have done so out of an urgent need to start working, and can therefore be profiled as low-income individuals for whom an extra year of education had a relatively greater effect.

The one thing that the IV estimates do share with the OLS estimates is that the addition of age polynomials and dummies does not affect their value. In this case, however, the estimates do differ more from those of Oreopoulos (2006), by around three percentage points each.