
The effect of education participation on youth custody: causal evidence from England

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Background

- Negative correlation between education and crime well documented around the world (Lochner & Moretti, 2004; Machin et al., 2011; Hjalmarsson et al., 2015).
- Non-random selection of individuals into education ⇒ cross-sectional estimates of the relationship will likely include substantial bias.
- Requires quasi-experimental variation (RPA).
- Policy implications of relationship – potential further positive externalities of education.

Hjalmarsson, R., Holmlund, H., & Lindquist, M. J. 2015. The effect of education on criminal convictions and incarceration: Causal evidence from micro-data. *Economic Journal*, 125(587), 1290-1326.

Lochner L. & Moretti E. 2004. The effect of education on crime: Evidence from prison inmates, arrests and self-reports. *American Economic Review*, 94, 155-189

Machin, S., Marie, O., & Vujic, S. 2011. The crime reducing effect of education. *Economic Journal*, 121(552), 463-484.

Policy Context – the ‘Raising of the Participation Age’ (RPA)

- ‘Raising of the School Leaving Age’ (RoSLA) 1972 increased minimum school leaving age in UK to 16.
- RPA 2012 increased minimum education/training leaving age in England to 17 (18) for those starting final year in Sept. 2012 (2013).
- Key differences with previous RoSLAs:
 - Education setting and requirements (+ve for participation)
 - Funding and planning (-ve)
 - Enforcement (flip side of broader settings) (-ve)

- Linked administrative data from the National Pupil Database:
 - the Schools Census (SC)
 - Pupil Referral Unit Census
 - Key Stage 2 and Key Stage 4 results
 - the ‘Looked after Children’ dataset
 - the ‘Children in Need’ dataset
 - the National Client Caseload Information System (NCCIS)

This work was produced using statistical data from the Office for National Statistics (ONS). The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates. These outputs must not be used without this disclaimer and warning note.

Data definitions and sample

- NCCIS and SC: those appearing in education/training or on a school register for at least 6 months of the academic year = continuing participation.
- NCCIS: outcome = experience custody age 17/18.
- Dataset contains all individuals in state-funded schools in England in the four cohorts born:
 - Sept. 1994-August 1995, Sept. 1995-August 1996, Sept. 1996-August 1997, and Sept. 1997 to August 1998.
- Total sample:
 - Men: 1,282,709; IV estimation sample **816,089**
 - Women: 1,231,647; IV estimation sample **792,159**

Empirical Approach

1. Regression Discontinuity: exploit discontinuity in education/training participation induced by RPA:
 - Local linear regression, 24-month bandwidth, rectangular kernel.
2. Instrumental Variables: RPA is the instrument for education/training participation:
 - Custody rare outcome \Rightarrow control for rich background/prior attainment differences which may be imbalanced between cohorts despite sample size.

Empirical Approach

- OLS:

$$\text{custody}_i = \alpha_1 + \beta_1 p_i + X_i' \gamma_1 + \varepsilon_{1i}$$

- IV first stage:

$$p_i = \alpha_2 + \beta_2 RPA_i + X_i' \gamma_2 + \varepsilon_{2i}$$

- IV second stage:

$$\text{custody}_i = \alpha_3 + \beta_3 \hat{p}_i + X_i' \gamma_3 + \varepsilon_{3i}$$

custody_i = experiences
custody at age 17 or 18

p_i = participating in
education/training (or
school) at age 17

X_i = vector of controls
including school year,
socio-demographic,
behaviour and prior
attainment
characteristics

RPA_i = indicator for born
in cohort affected by
RPA

Data descriptives

	All: N =1,282,709		Pre-RPA: N =638,644		Post-RPA: N=644,065	
Male	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
ever in custody age 17 or 18	0.00403	0.06336	0.00478	0.06896	0.00329	0.05726
participating in education/training age 17	0.82341	0.38132	0.80998	0.39232	0.83674	0.36960
participating in school 17	0.34364	0.47492	0.33809	0.47306	0.34914	0.47670
	All: N =1,231,647		Pre-RPA: N =613,480		Post-RPA: N=618,167	
Female	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
ever in custody age 17 or 18	0.00027	0.01639	0.00033	0.01823	0.00021	0.01433
participating in education/training age 17	0.85233	0.35478	0.83938	0.36718	0.86518	0.34153
participating in school 17	0.38219	0.48592	0.37475	0.48406	0.38958	0.48765

Visual evidence

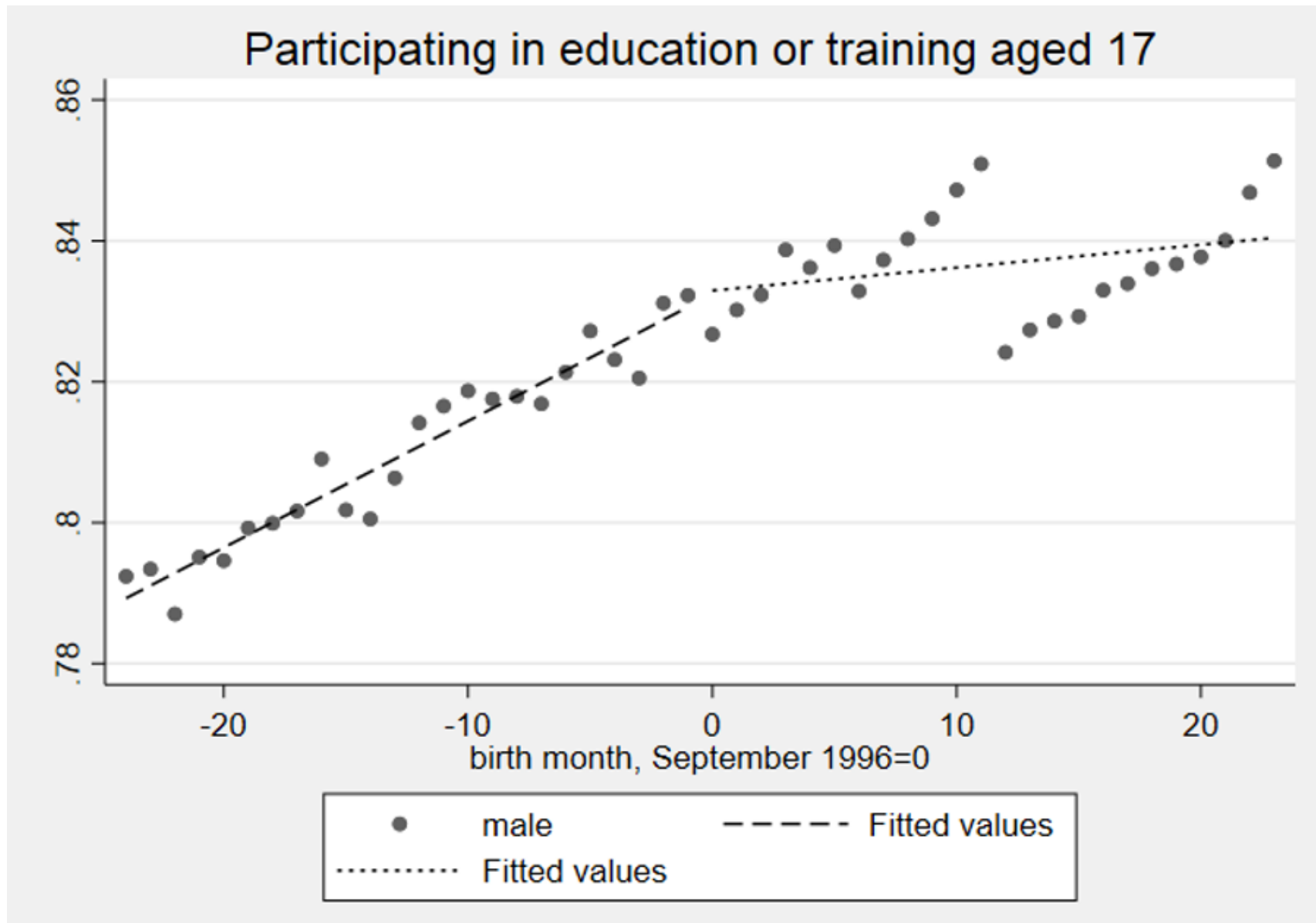


Fig.1: first stage relationship between RPA and participation in education or training aged 17.

Visual evidence

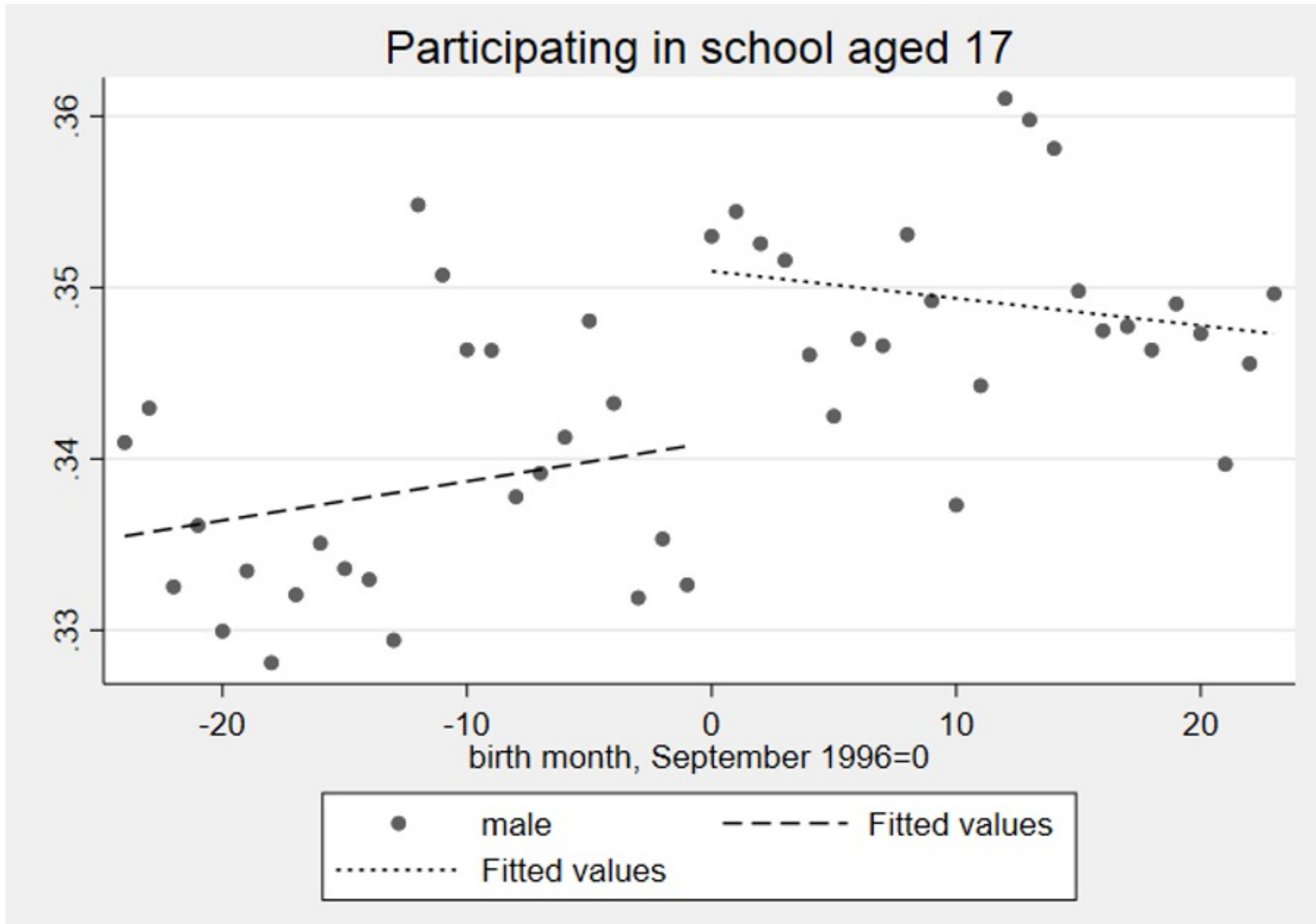


Fig.2: first stage relationship between RPA and participation in school aged 17.

Visual evidence

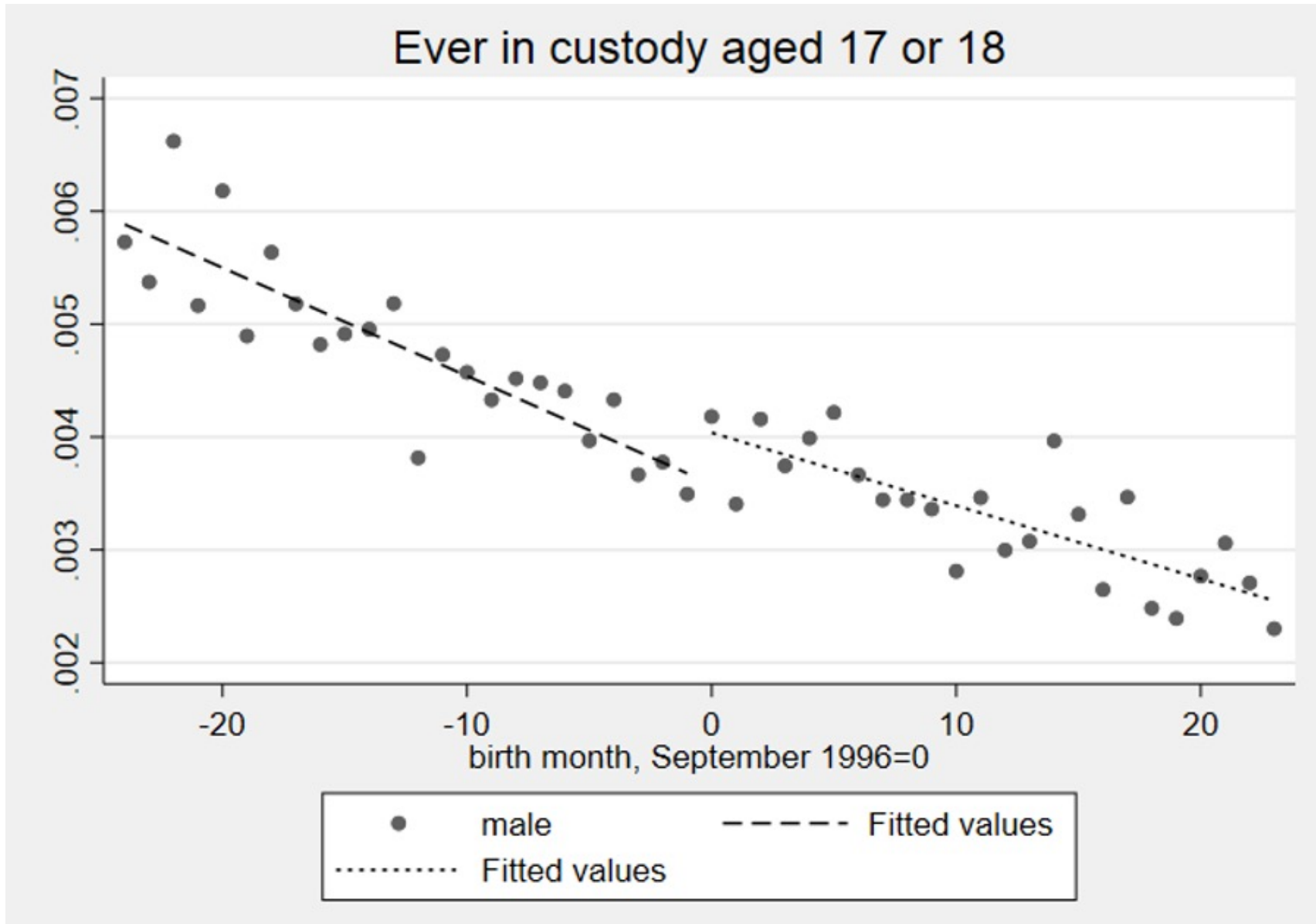


Fig.3: Reduced form relationship between RPA and experience of custody aged 17/18

Results – RD estimates

Participation in education/training

	Coeff.	Std. Err.	p-value
Reduced form	0.0004	0.0002	0.042
First stage	0.0005	0.0013	0.713
Local Wald	0.9192	2.5772	0.721

Local linear regression, 24-month bandwidth, rectangular kernel

N = 1,282,709

Results – IV estimates

Participation in education/training

	Reduced form			IV: first stage		
Dep. variable:	Ever in custody aged 17 or 18			Participating in education/training aged 17		
	coefficient	std. error	p	coefficient	std. error	p
RPA (born Sept 1996 or later)	0.0001	0.0002	0.759	0.0169	0.0014	0.000
				F-stat on excluded IV:	146.9	
	OLS: participating in education/training age 17			IV: second stage		
Dep. variable:	Ever in custody aged 17 or 18			Ever in custody aged 17 or 18		
	coefficient	std. error	p	coefficient	std. error	p
participating in educ/training aged 17	-0.0064	0.0003	0.000	0.0039	0.0128	0.760
N = 816,089						

Controls: year, age-within-cohort, ethnicity, IDACI decile age 11, IDACI decile age 16, % of primary school time FSM, % secondary school time FSM, ever looked after up to age 16, ever child in need up to age 16, ever subject to a child protection plan, SEN at primary school, SEN at secondary school, KS4 av. points at GCSE, KS4 English points score, KS4 Maths points score, attainment at 16 (dummies for sub-level1, level 1, level 3), KS2 English score, KS2 Maths score, KS2 Science score, KS2 av. points score, KS4 school type (dummies for independent, alternative provision, other), attended pupil referral unit (secondary), permanently excluded (primary), permanently excluded (secondary), any temp. exclusions (secondary), prop. sessions unauthorised absence at age 11, 12, 13, 14, 15, 16.

Results – RD estimates

Participation in school

	Coeff.	Std. Err.	p-value
Reduced form	0.0004	0.0002	0.042
First stage	0.0103	0.0017	0.000
Local Wald	0.0437	0.0229	0.057

Local linear regression, 24-month bandwidth, rectangular kernel

N = 1,282,709

Results – IV estimates

Participation in school

Reduced form				IV: first stage		
Dep. variable:	Ever in custody aged 17 or 18			Participating in school aged 17		
	coefficient	std. error	p	coefficient	std. error	p
RPA (born Sept 1996 or later)	0.0001	0.0002	0.759	0.0113	0.0020	0.000
				F-stat on excluded IV:	30.7	
OLS: participating in school age 17				IV: second stage		
Dep. variable:	Ever in custody aged 17 or 18			Ever in custody aged 17 or 18		
	coefficient	std. error	p	coefficient	std. error	p
participating in school aged 17	-0.0008	0.0001	0.000	0.0059	0.0193	0.760
N = 816,089						

Controls: year, age-within-cohort, ethnicity, IDACI decile age 11, IDACI decile age 16, % of primary school time FSM, % secondary school time FSM, ever looked after up to age 16, ever child in need up to age 16, ever subject to a child protection plan, SEN at primary school, SEN at secondary school, KS4 av. points at GCSE, KS4 English points score, KS4 Maths points score, attainment at 16 (dummies for sub-level1, level 1, level 3), KS2 English score, KS2 Maths score, KS2 Science score, KS2 av. points score, KS4 school type (dummies for independent, alternative provision, other), attended pupil referral unit (secondary), permanently excluded (primary), permanently excluded (secondary), any temp. exclusions (secondary), prop. sessions unauthorised absence at age 11, 12, 13, 14, 15, 16.

Robustness

- Results sensitive:
 - to controls <next slide...>;
 - to RD specification.
- Results not sensitive:
 - to participation measure (years of post-16 education, years of post-16 schooling).
- (Limited) heterogeneity by gender, ethnicity<next slide+1...>

Results – IV estimates; controls

Participation in education/training

Reduced form: ever in custody 17/18			IV first stage: participating in education/training age 17				
RPA coefficient	std. error	p		RPA coefficient	std. error	p	Control variables included
-0.0015	0.0001	0.0000		0.0268	0.0007	0.0000	Zero
0.0005	0.0002	0.0662		0.0062	0.0015	0.0000	plus Year
0.0004	0.0003	0.0870		0.0057	0.0014	0.0000	plus Demographic
0.0001	0.0003	0.7890		0.0068	0.0014	0.0000	plus SES
0.0000	0.0003	0.9963		0.0069	0.0014	0.0000	plus Care status
0.0000	0.0003	0.9791		0.0069	0.0014	0.0000	plus SEN
-0.0002	0.0002	0.3825		0.0095	0.0013	0.0000	plus Prior attainment KS4/KS2
-0.0001	0.0002	0.6218		0.0084	0.0013	0.0000	plus School characteristics
0.0001	0.0002	0.7593		0.0169	0.0014	0.0000	plus Behaviour and absences

Results – IV estimates by ethnicity

Participation in education/training

Reduced form				IV: first stage		
Dep. variable:	Ever in custody aged 17 or 18			Participating in education/training aged 17		
	coefficient	std. error	p	coefficient	std. error	p
RPA – white males	-0.0001	0.0002	0.528	0.0185	0.0016	0.000
				F-stat on excluded IV:	133.9	
RPA – black males	0.0013	0.0020	0.511	0.0111	0.0056	0.046
				F-stat on excluded IV:	4.0	
OLS: participating in education/training age 17				IV: second stage		
Dep. variable:	Ever in custody aged 17 or 18			Ever in custody aged 17 or 18		
	coefficient	std. error	p	coefficient	std. error	p
participating in educ/training aged 17 – white males	-0.0049	0.0003	0.000	-0.0073	0.0128	0.528
... – black males	-0.0340	0.0040	0.000	0.1160	0.0128	0.544
N = 816,089 white males; N = 34,630 black males						

Controls: see corresponding main table.

Summary

- Continued participation in education post-16 strongly related to prob. custody at 17/18 (in OLS) – esp. at extensive margin.
- Estimated impacts of RPA on participation in education/training or school specifically are small:
 - 1.5 pp increase in participation compared to around 81.0% participation pre-RPA;
 - 1.1 pp increase in school participation compared to around 33.8% participation pre-RPA.
- Estimated impacts of RPA on custody are v. small and v. imprecise:
 - 0.0001 on pre-RPA base 0.0048 (i.e. 0.01 pp on base risk of 0.48 pp).

Implications

- RPA policy had little impact on continued participation at 17 for young men and for those impacted did not affect likelihood of experiencing custody.
- NEET group were approx. 10% pre-RPA so possible complier group 10% of cohort \Rightarrow 1.5 pp not negligible effect on participation.
- Lack of enforcement of policy suggests compliers were voluntary \Rightarrow selected \Rightarrow less likely to be at risk of custody.
- Implementation of policy likely led to small impacts (timing, funding, enforcement issues).

Policy recommendations

- Provide a coherent and consistent post-16 education/training offer to (voluntarily) retain dis-engaged young people in education beyond compulsory age.
- Provide sufficient funding for local authorities to provide these training options.
- Tentative evidence here suggests those most at risk of later teenage custody more unlikely to engage in current education options post-16 voluntarily.
- Focus on retention initiatives pre-16 and re-engagement programmes amongst the NEET population.

Thank you

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