

Is it all about school? Intergenerational income mobility in England and the importance of education

Pedro Carneiro, Sarah Cattan, Lorraine Dearden, Laura van der Erve, Sonya Krutikova,
and **Lindsey Macmillan**

UCL and Institute for Fiscal Studies

ISER, University of Essex
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Motivation

- Intergenerational mobility – relationship between socio-economic status of parents and children – widely studied across countries and over time
- Recent advancements in data linkages have made the study of intergenerational mobility *within countries* feasible for the first time (Chetty et al., 2014, Acciari et al. 2019, Corak, 2019)
- Little is known about causal mechanisms, but high mobility areas associated with better schools, less inequality, stronger labour markets, and more stable families (Chetty et al. 2014)
- Some evidence suggests that differences between areas are causal, rather than selection into areas (Chetty and Hendren, 2018)

Motivation

- Theoretical models of intergenerational transmissions emphasise the role of human capital in transmitting incomes across generation (Becker and Tomes, 1979, 1986)
- Evidence shows that education is a key driver of income persistence at the national level – individuals from disadvantaged families on average have lower skills and education, which attract lower returns in the labour market (Blanden et al., 2007)
- This doesn't necessarily mean that education can account for differences across place though (Rothstein, 2019)

Motivation

- Many studies of mobility focus on the relative mobility rates on average
- These studies offer insight into how well individuals from more disadvantaged backgrounds are doing *relative* to individuals from more affluent backgrounds
- Policy focus on relative gaps, but can be improved without much improvement in outcomes of those at the bottom of distribution
- Recently with the 'levelling up' agenda, there has been more interest the life chances of individuals growing up in the most disadvantaged families across places

Contributions

1. First paper to estimate intergenerational mobility at detailed geographical level in England, for all individuals born 1985-1988 in 152 local authorities
2. Explore the role of education in explaining variation across place, using unique administrative data linkage
3. Estimate absolute upward mobility of low-income individuals across different places
4. Consider area-level correlates of mobility, before and after holding educational achievement constant

Outline

- Related literature
- Data
- Measures / Methods
- Results
 - National picture
 - Geographical differences
 - Role of education
 - Area-level characteristics
- Conclusions

Related literature

- Previous work for the UK has relied on longitudinal birth cohort studies to show that intergenerational income mobility declined over time (Blanden et al., 2004, Blanden et al., 2013, Gregg et al., 2017)
- The UK also performs poorly relative to other countries (Corak, 2013, Jerrim and Macmillan, 2015)
- A more recent paper by Bell et al. (2018) used 1% sample from linked census to estimate mobility across aggregated areas of England in terms of occupation, education, and home ownership – can vary from income trends (Breen et al., 2016, Blanden et al., 2013).

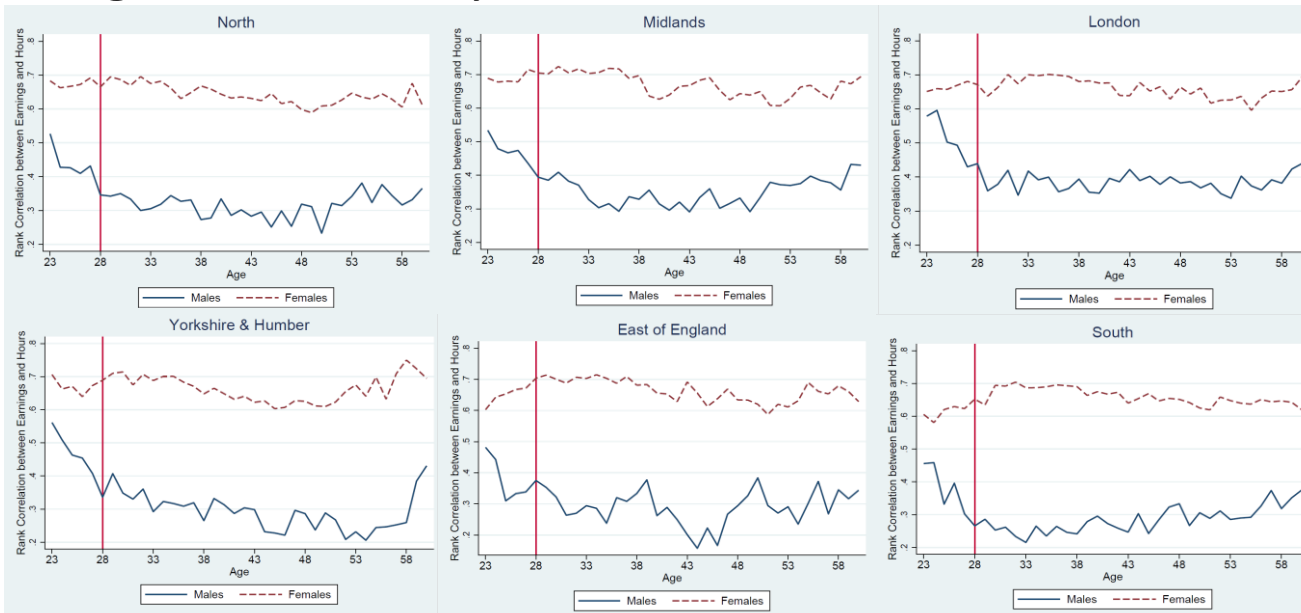
Data

- Longitudinal Education Outcomes (LEO) data for England - all state-educated individuals born 1985-1988 – links school records to university records and earnings records
- Childhood family circumstances – receipt of free school meals (FSM)
- Adult earnings – annual earned income at age 28 (employed + self-employed)

Data

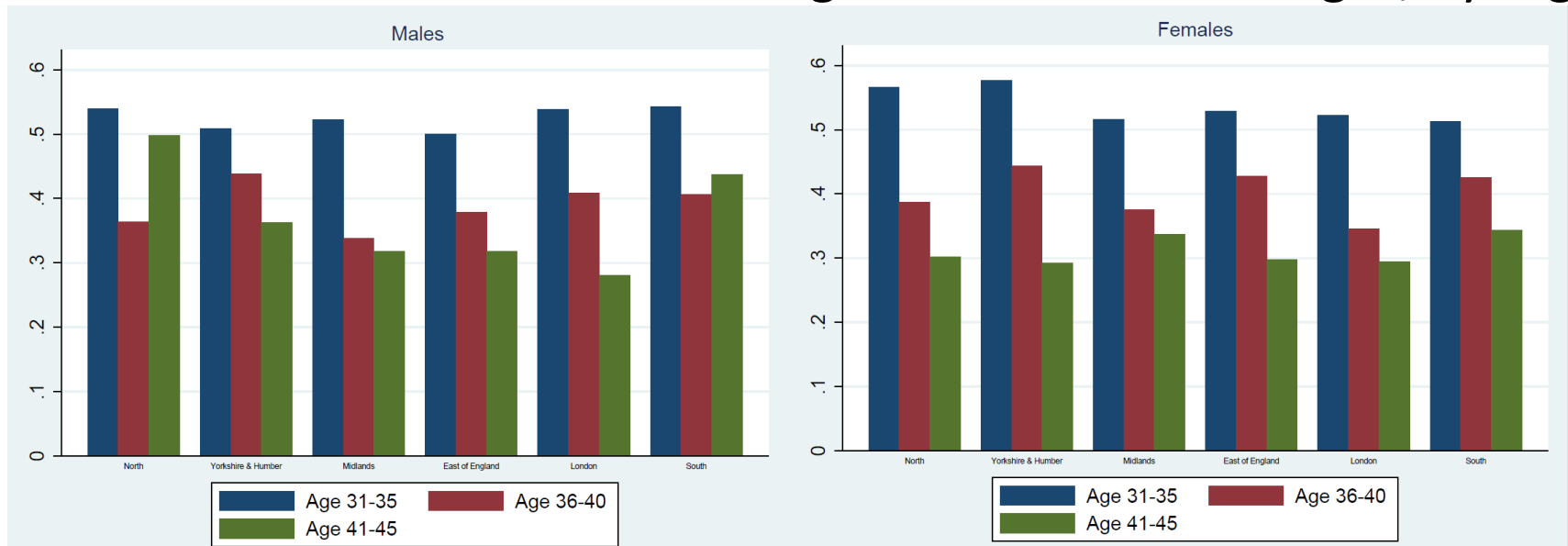
- While we can observe non-participation, we are limited by
 1. Annual earnings – no hourly information available
 2. Earning at age 28 – life cycle bias (Grawe, 2006, Haider and Solon, 2006, Nybom and Stuhler, 2017)
- Crucially, do these vary across regions?

Data - Does the relationship between hours and earnings vary across region over lifecycle?



Data – Do earnings vary across region over lifecycle?

Rank correlation between earnings at 28 and at later ages, by region



Data

- English data is unique in that we have access to all standardised and externally marked tests:
 - age 11 (end of primary school),
 - age 16 (GCSEs or equiv),
 - age 18 (A levels or equiv), and
 - university course (institution*subject) attended
- HC Index: $H_i = \hat{Y}_i = \hat{\alpha} + S'_i \hat{\gamma}$ where S'_i is a vector of human capital measures up to age 11, 16, 18, and 21

Data

- Local authority **of origin** (home address age 16) of individuals – 152 upper-tier local authorities in England
- Note we do not have destination region – any geographical mobility is therefore implicit in our area-level earnings estimates
- Area-level characteristics – we consider a range of local authority-level characteristics, motivated by economics and sociology literature, matched in from various sources including the census (2001), NPD, and ASHE

Table 1: Sample descriptives

	Women		Men	
	non-FSM	FSM	non-FSM	FSM
<i>Cohort</i>				
2001/02 GCSE cohort	0.31	0.31	0.32	0.31
2002/03 GCSE cohort	0.33	0.34	0.34	0.34
2003/04 GCSE cohort	0.35	0.35	0.35	0.35
<i>Background characteristics</i>				
English as additional language	0.07	0.20	0.06	0.20
White	0.79	0.70	0.80	0.71
Black	0.02	0.07	0.02	0.06
Asian	0.05	0.14	0.05	0.14
Missing/Other ethnicity	0.14	0.10	0.14	0.10
<i>Educational attainment</i>				
Age 11 test score pctlile	52.89	37.57	51.00	37.86
Age 16 test score pctlile	56.85	33.50	48.62	26.44
Stay in school past 16	0.56	0.28	0.46	0.20
Start UG	0.48	0.25	0.38	0.19
Graduate from UG	0.41	0.18	0.31	0.12
<i>Age 28 outcomes</i>				
Mean earnings	17700	9900	22300	14700
Median earnings	16000	6600	21200	13500
Self-employment income	0.06	0.03	0.11	0.09
No earned income	0.15	0.31	0.13	0.22
N	710,036	100,709	764,556	108,181

Measures

Absolute upward mobility

- \bar{R}_a^{FSM} - average earned income rank at age 28 of those eligible for FSM at 16
- $P(Q5|FSM)$ – proportion of FSM-eligible that end up in top 20% of income distribution

Measures

Education Decomposition

Estimate: $R_{ia}^{FSM} = \bar{R}_a^{FSM} + u_{ia}$

Human capital: $H_{ia}^{FSM} = \bar{H}_a^{FSM} + v_{ia}$

Wage function: $R_{ia}^{FSM} = \eta_a + \beta_a H_{ia}^{FSM} + w_{ia}$

Subbing HC into WF $\bar{R}_a^{FSM} = \beta_a \bar{H}_a^{FSM} + \eta_a$

Measures

Education Decomposition

Total variance of earnings FEs:

$$\bar{R}_a^{FSM} = \beta_a \bar{H}_a^{FSM} + \eta_a = \theta_a$$

Vary HC levels across areas, holding wage function constant across areas:

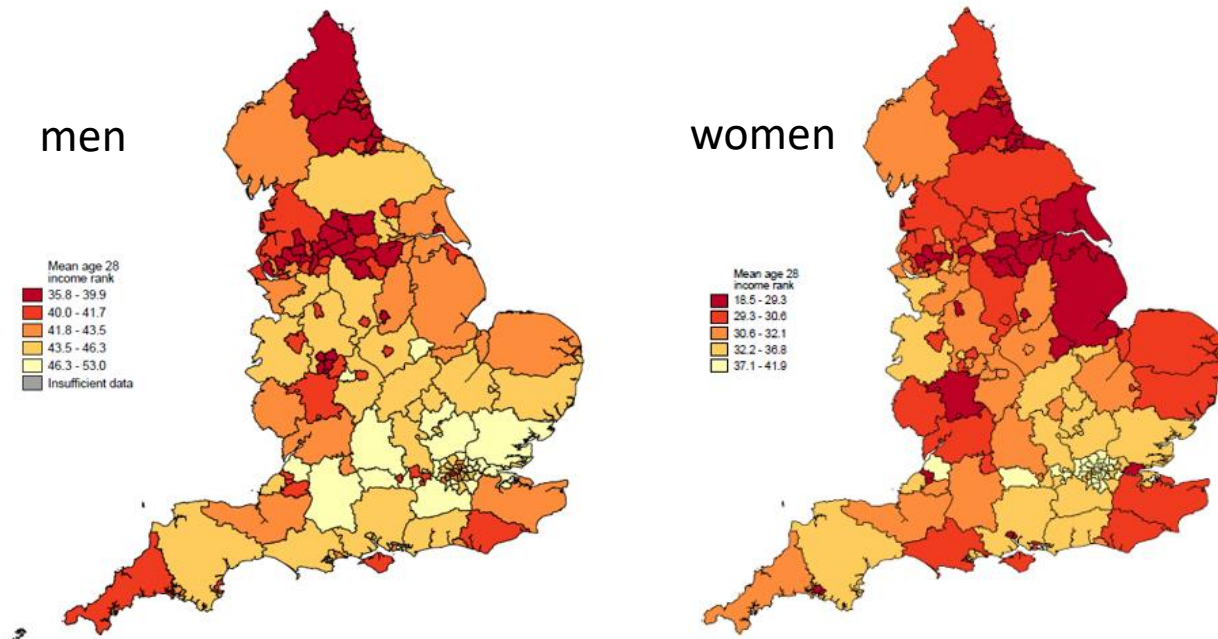
$$\phi_1 = \beta \bar{H}_a^{FSM} + \eta$$

Results – national picture

Table 2: National estimates of absolute mobility

	Overall	Women	Men
\overline{R}^{FSM}	37.5	32.3	42.3
Median earnings rank	37.5	32.3	42.3
$Y_i = \text{£}0$	0.26	0.31	0.22
Relative poverty	0.60	0.70	0.51
$P(Q5 FSM)$	0.084	0.055	0.111
N	208,915	100,716	108,199

Results – mean earnings rank at 28



Results – mean earnings rank at 28

Table 5: Absolute mobility measures for 10 lowest mobility areas (men)

	Region	R_c^{FSM}	Median rank	Y=£0	Y<60% avg national	Y<60% avg local	$P(Q5 FSM)$
Calderdale	Yorkshire	38.3	35.0	0.27	0.56	0.57	0.05
Newcastle upon Tyne	North East	38.2	36.0	0.26	0.57	0.57	0.07
County Durham	North East	38.2	35.0	0.25	0.57	0.57	0.07
Bolton	North West	38.0	35.0	0.25	0.56	0.56	0.07
Manchester	North West	37.5	35.0	0.26	0.58	0.56	0.06
Bradford	Yorkshire	37.1	33.0	0.25	0.60	0.59	0.06
Gateshead	North East	36.8	33.0	0.27	0.58	0.57	0.05
Blackpool	North West	36.8	34.0	0.23	0.58	0.50	0.05
Sheffield	Yorkshire	35.9	33.0	0.26	0.60	0.60	0.05
Nottingham	East Mid	35.8	31.0	0.27	0.61	0.59	0.06

Results – mean earnings rank at 28

Table 3: Absolute mobility measures for 10 highest mobility areas (men)

	Region	R_c^{FSM}	Median rank	$Y=\pounds 0$	$Y<60\%$ avg national	$Y<60\%$ avg local	$P(Q5 FSM)$
Havering	London	53.0	57.0	0.21	0.38	0.45	0.25
Wokingham	South East	50.9	55.0	0.14	0.38	0.61	0.17
Bracknell Forest	South East	50.3	51.0	0.13	0.38	0.53	0.12
Kingston upon Thames	London	50.0	52.0	0.20	0.43	0.62	0.22
Hillingdon	London	49.9	50.5	0.19	0.43	0.53	0.20
Tower Hamlets	London	49.8	51.0	0.16	0.43	0.69	0.19
Surrey	South East	49.3	51.0	0.18	0.40	0.68	0.17
Sutton	London	49.3	50.0	0.20	0.40	0.55	0.20
Barking and Dagenham	London	49.3	51.0	0.18	0.43	0.45	0.19
Hertfordshire	East	49.2	50.0	0.18	0.42	0.56	0.19

Results – mean earnings rank at 28

Table 6: Absolute mobility measures for 10 lowest mobility areas (women)

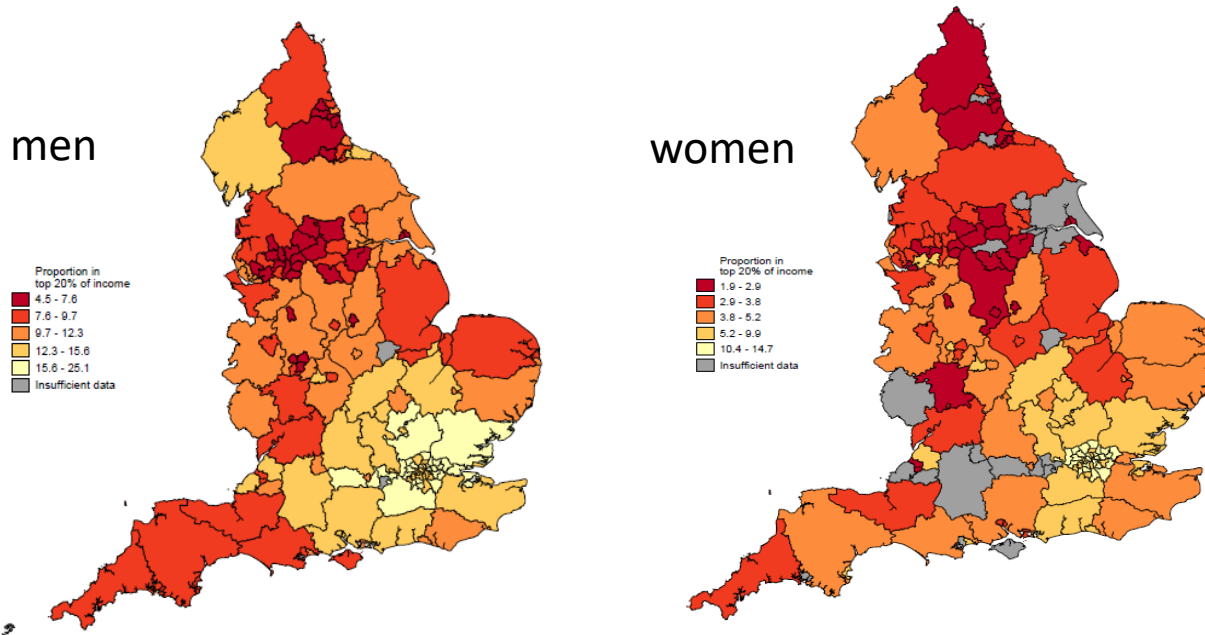
	Region	R_c^{FSM}	Median rank	Y=£0	Y<60% avg national	Y<60% avg local	$P(Q5 FSM)$
Lincolnshire	East Mid	27.8	24.0	0.35	0.78	0.78	0.03
County Durham	North East	27.8	24.0	0.36	0.76	0.77	0.02
Stoke-on-Trent	West Mid	27.6	24.0	0.37	0.77	0.74	0.02
Wakefield	Yorkshire	27.5	24.0	0.37	0.77	0.74	0.02
Middlesbrough	North East	27.1	23.0	0.38	0.77	0.73	0.03
Nottingham	East Mid	27.1	22.0	0.38	0.77	0.76	0.03
Stockton-on-Tees	North East	26.5	22.0	0.38	0.80	0.81	0.02
North East Lincolnshire	Yorkshire	26.0	21.0	0.36	0.81	0.81	0.03
Barnsley	Yorkshire	25.3	21.0	0.41	0.82	0.81	0.01
Kingston upon Hull, City of	Yorkshire	25.1	22.0	0.39	0.82	0.77	0.02

Results – mean earnings rank at 28

Table 4: Absolute mobility measures for 10 highest mobility areas (women)

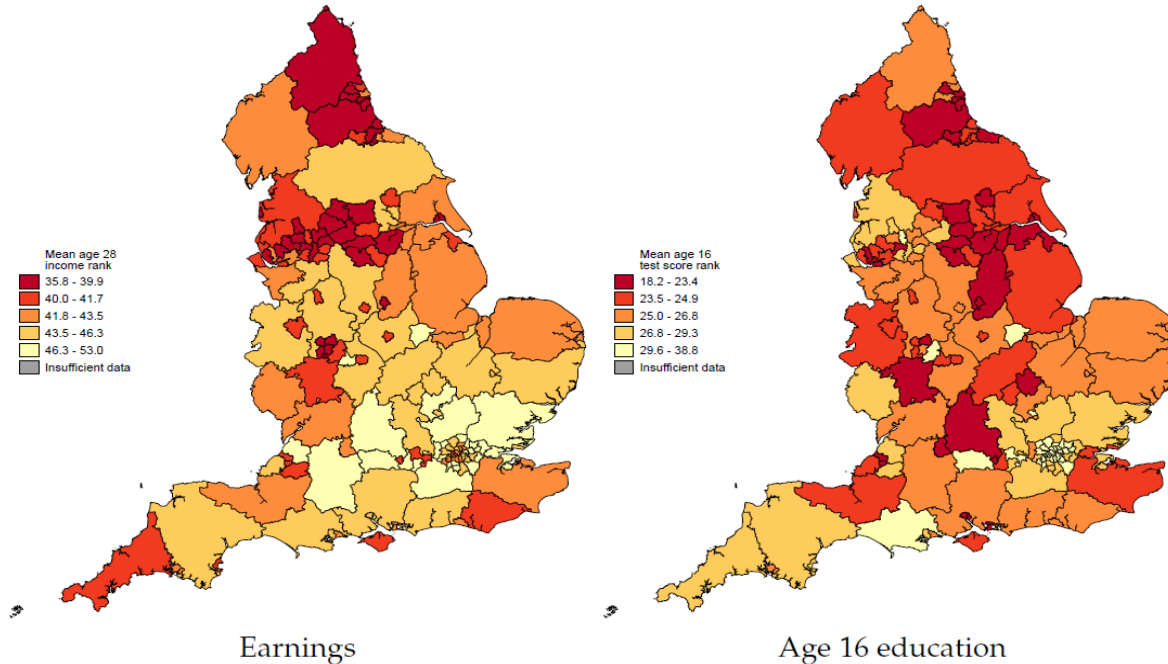
	Region	R_c^{FSM}	Median rank	Y=£0	Y<60% avg national	Y<60% avg local	$P(Q5 FSM)$
Redbridge	London	41.9	37.0	0.23	0.55	0.67	0.14
Kensington and Chelsea	London	41.2	34.5	0.24	0.58	1.00	0.14
Tower Hamlets	London	40.7	35.0	0.27	0.55	0.77	0.13
Ealing	London	40.5	34.0	0.27	0.57	0.65	0.13
Harrow	London	40.5	33.0	0.29	0.57	0.64	0.15
West Berkshire	South East	40.4	35.0	0.20	0.58	0.69	0.11
Hackney	London	40.2	33.0	0.25	0.59	0.68	0.12
Wandsworth	London	40.2	34.5	0.26	0.57	0.82	0.12
Newham	London	40.1	34.0	0.26	0.57	0.58	0.12
Bexley	London	39.9	32.5	0.26	0.60	0.67	0.15

Results – probability of reaching top 20% of income



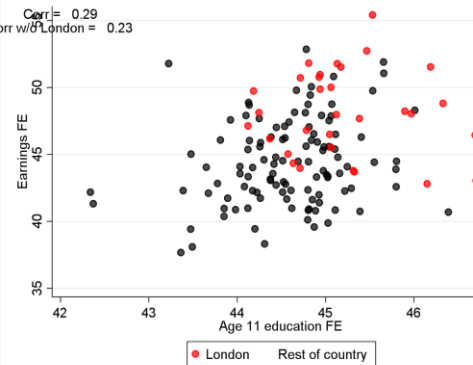
Results – what role does education play in this?

men

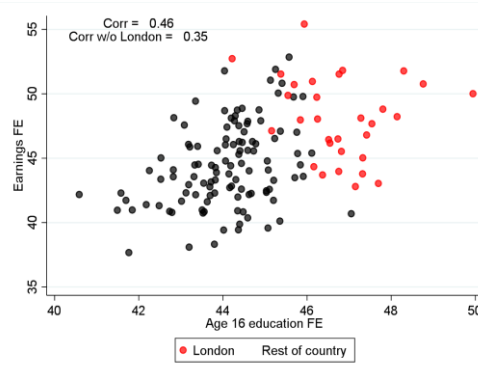


Results – what role does education play in this?

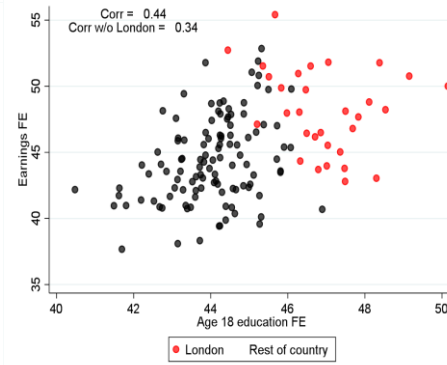
Age 11



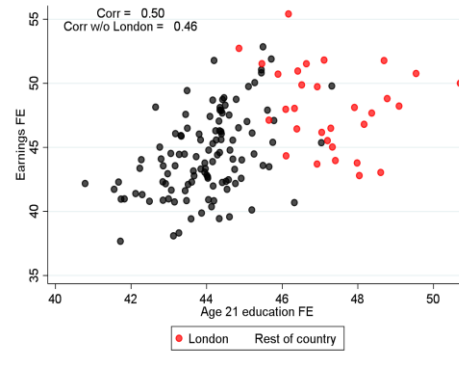
Age 16



Age 18

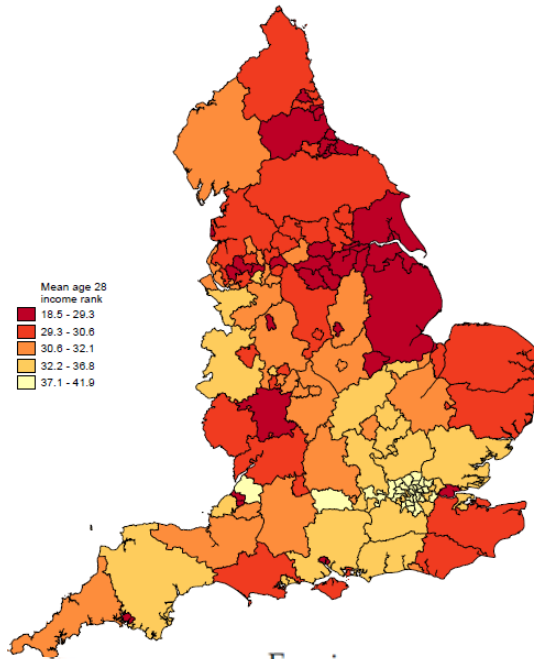


Age 21

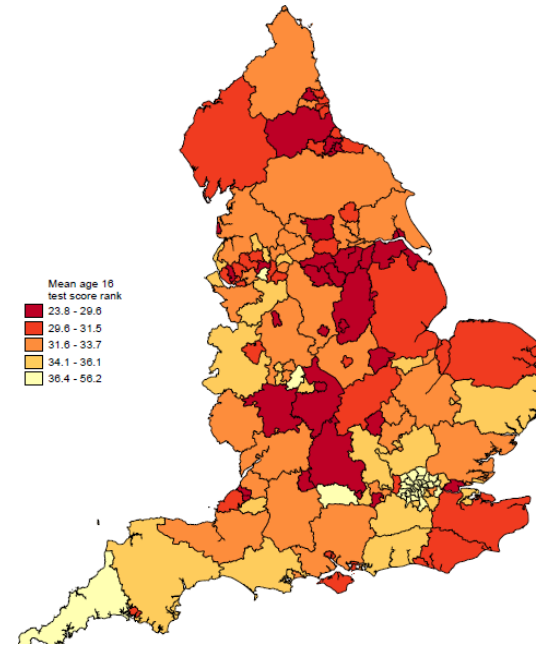


Results – what role does education play in this?

women



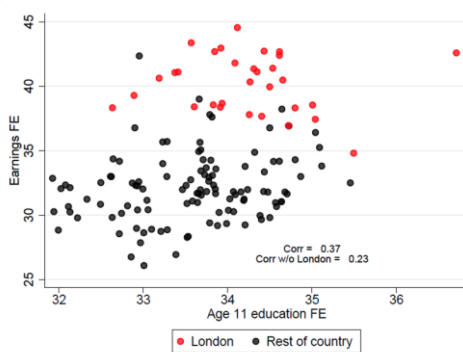
Earnings



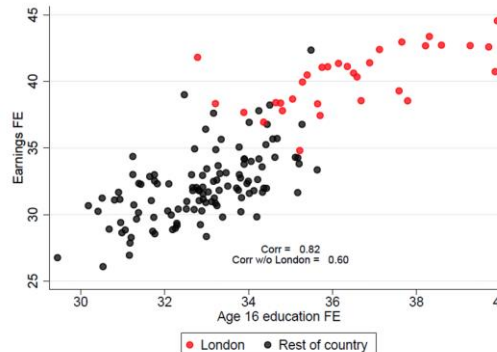
Age 16 education

Results – what role does education play in this?

Age 11



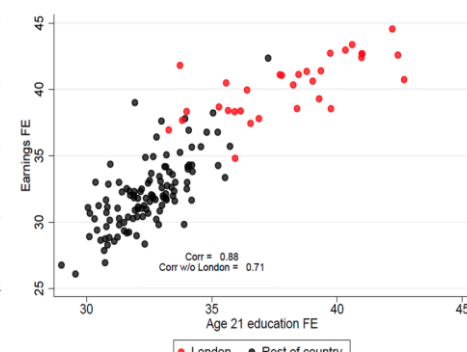
Age 16



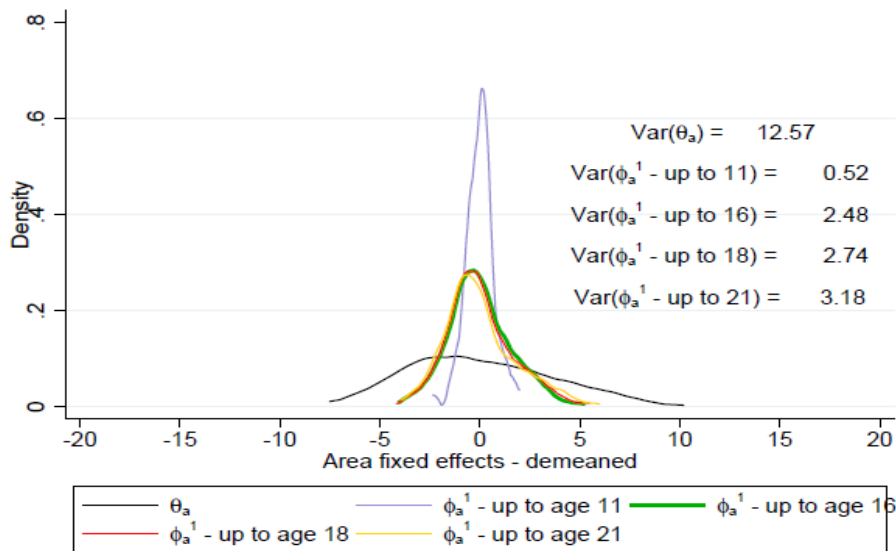
Age 18



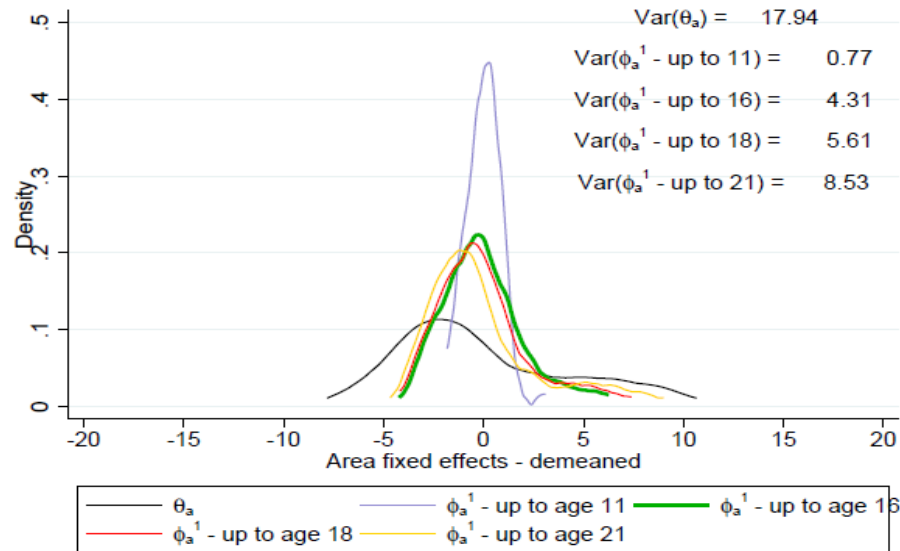
Age 21



Results – what role does education play in this?



Men



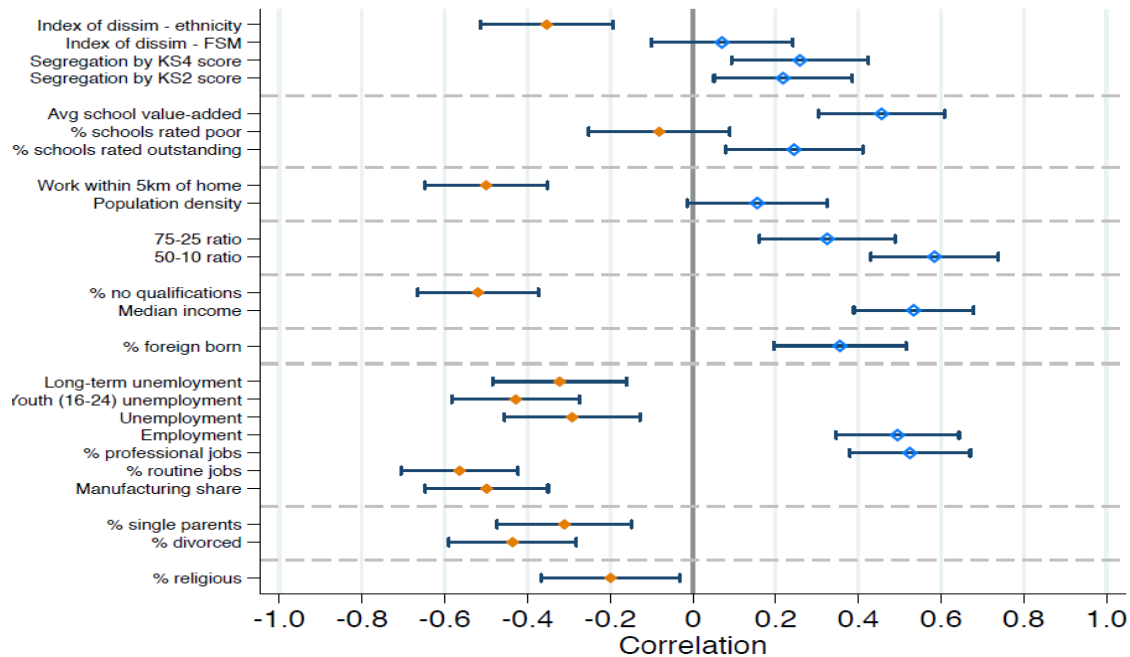
Women

Results – what role does education play in this?

	Share through education	
	Men	Women
HC up to age 11	4.1%	4.3%
HC up to age 16	19.7%	24.0%
HC up to age 18	21.8%	31.3%
HC up to age 21	25.3%	47.5%

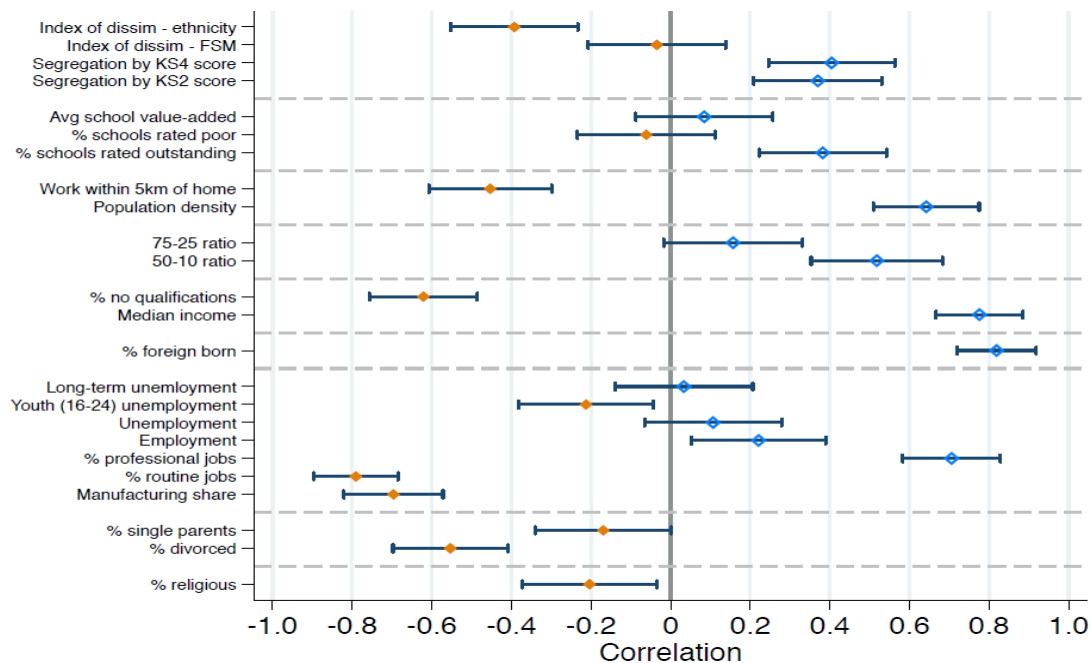
Results – raw area-level correlates

men



Results – raw area-level correlates

women



Results – conditional area-level correlates

men

	Absolute upward mobility		Absolute upward mobility - controlling for education		Reaching the top 20%	
	(1)	(2)	(3)	(4)	(5)	(6)
School quality	-0.058 (0.049)	0.002 (0.047)	0.061 (0.070)	0.125* (0.067)	-0.026 (0.059)	0.057 (0.056)
Population density	0.285** (0.116)	0.113 (0.137)	0.171 (0.164)	0.189 (0.194)	0.235* (0.137)	0.205 (0.162)
Work within 5km of home	-0.243*** (0.060)	-0.229*** (0.081)	-0.245*** (0.085)	-0.224* (0.114)	-0.335*** (0.071)	-0.312*** (0.095)
Inequality	0.236*** (0.058)	0.270*** (0.057)	0.271*** (0.083)	0.318*** (0.081)	0.263*** (0.069)	0.340*** (0.067)
Area deprivation	-0.104 (0.172)	-0.170 (0.195)	-0.237 (0.244)	-0.550* (0.277)	-0.466** (0.203)	-0.596** (0.231)
Share foreign born	0.238** (0.115)	0.491*** (0.174)	-0.272* (0.163)	-0.045 (0.248)	0.044 (0.136)	-0.020 (0.207)
Manufacturing share	-0.236** (0.092)	0.061 (0.089)	-0.342** (0.131)	0.070 (0.126)	-0.383*** (0.109)	0.008 (0.105)
High skilled jobs	-0.194 (0.185)	0.142 (0.177)	-0.378 (0.262)	-0.022 (0.252)	-0.645*** (0.219)	-0.227 (0.210)
Strong labour market	0.318*** (0.094)	0.198** (0.085)	0.269** (0.134)	0.061 (0.120)	0.089 (0.111)	-0.124 (0.100)
Family stability	-0.136* (0.073)	0.047 (0.076)	-0.286*** (0.103)	-0.082 (0.107)	-0.217** (0.086)	-0.048 (0.089)
Religiousness	0.042 (0.062)	0.035 (0.063)	-0.131 (0.088)	-0.114 (0.089)	-0.003 (0.073)	-0.071 (0.074)
Incl London	Yes	No	Yes	No	Yes	No
R-squared	0.756	0.696	0.508	0.598	0.658	0.552
N	133	104	133	104	133	104

Results – conditional area-level correlates

women

	Absolute upward mobility		Absolute upward mobility - controlling for education		Reaching the top 20%	
	(1)	(2)	(3)	(4)	(5)	(6)
School quality	-0.029 (0.049)	0.014 (0.049)	0.077 (0.073)	0.114 (0.072)	-0.012 (0.042)	0.014 (0.036)
Population density	0.228* (0.120)	0.143 (0.147)	0.086 (0.176)	0.196 (0.218)	0.252** (0.102)	0.093 (0.110)
Work within 5km of home	-0.252*** (0.066)	-0.201** (0.092)	-0.278*** (0.097)	-0.209 (0.137)	-0.173*** (0.056)	-0.004 (0.069)
Inequality	0.243*** (0.058)	0.247*** (0.059)	0.293*** (0.086)	0.307*** (0.087)	0.142*** (0.050)	0.139*** (0.044)
Area deprivation	-0.058 (0.175)	-0.235 (0.205)	-0.191 (0.257)	-0.605* (0.305)	-0.170 (0.149)	-0.070 (0.153)
Share foreign born	0.256** (0.120)	0.461** (0.181)	-0.240 (0.177)	-0.062 (0.270)	0.315*** (0.102)	0.325** (0.136)
Manufacturing share	-0.254*** (0.095)	0.036 (0.092)	-0.346** (0.140)	0.070 (0.136)	-0.298*** (0.081)	-0.024 (0.069)
High skilled jobs	-0.165 (0.186)	0.122 (0.180)	-0.352 (0.274)	-0.020 (0.268)	-0.169 (0.159)	0.258* (0.135)
Strong labour market	0.280*** (0.094)	0.192** (0.085)	0.228 (0.138)	0.057 (0.126)	0.102 (0.080)	-0.029 (0.064)
Family stability	-0.162** (0.078)	0.016 (0.082)	-0.304*** (0.115)	-0.095 (0.121)	-0.175*** (0.066)	-0.088 (0.061)
Religiousness	0.011 (0.060)	0.043 (0.062)	-0.162* (0.088)	-0.107 (0.092)	0.071 (0.051)	0.045 (0.047)
Incl London	Yes	No	Yes	No	Yes	No
R-squared	0.756	0.699	0.493	0.580	0.830	0.619
N	130	101	130	101	130	101

Conclusions

- Our findings suggest large differences in life chances across England
- Those in highest mobility areas earn around 30% more than average, while those in lowest mobility areas earn around 20% less than average
- Education is a key driver of differences across place – can account for around 25% of differences for men and almost half for women
- There are differences in the role of education by gender – education more closely tied to labour market outcomes across place for women compared to men, particularly post-16 education.

Conclusions

- But focusing on education alone is not enough to ‘level up’ – strong local labour market conditions associated with higher mobility
- Working within 5k of home is associated with lower mobility, conditional on education and this is not driven by London
- Area deprivation strongly correlated with low mobility, conditional on education – policy makers should also consider wider levels of deprivation and poverty in society