

Neighbourhood change and Educational Achievements:
Evidence from England

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Join with

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Introduction (1)

- The estimation of 'peer effects' in the neighbourhood has received intense attention in recent years
 - Growing number of papers looking at a range of outcomes
 - Different identification strategies often leading to conflicting findings

- The presence of significant, sizeable and possibly non-linear neighbourhood effects has important policy implications
 - E.g. school/classroom peer-effects as opposed to n'hood effects
 - Urban 'mixing' policies vs. school/classroom interventions
 - In the English-context: the long-lasting debate about 'mixing communities' (costs? benefits? stability?)

Introduction (2): In this paper...

- Research question: any evidence of significant/sizeable n'hood effects on pupil educational achievements or attitudes towards education?
- Investigate students' progress during the early years of secondary education
 - Study value-added between age-11/KS2 tests (end of primary) and age-14/KS3 (middle of secondary)
 - Important, 'high-stakes', standardised, centrally-managed exams
- Are pupils affected by changes in n'hood composition between age 11 and age 14?
 - Look at the 'quality' of *young peers* in the n'hood
 - Look at changes-in-changes: flow analysis
 - Look for non-linearities and heterogenous effects

Empirical strategy (1): Measurement – Challenges and solutions

- Challenge (1): size of n'hood?
 - Use Output Areas to aggregate characteristics of young peers in n'hood
 - Approximately 125 households; comparable with Goux/Maurin
 - Also construct larger n'hoods (OA plus all adjacent OAs)

- Challenge (2): which peers?
 - Young peers: same-cohort +1/-1; but also same-cohort only and 'constant-cohort' set-up (more details to follow)

- Challenge (3): which characteristics?
 - Young people: average age-7 grades, FSME, SEN (explain...)

Empirical strategy (2): Identification – Challenges and solutions

- Challenge (1): endogeneity of location?
 - Focus on residential 'stayers'
 - Study relation between test-score value-added/n'hood change
 - Partial out ability, family background/preferences and n'hood fixed FX

- Challenge (2): a sort of 'reflection'?
 - Need changes in n'hood quality to find effect on value-added
 - No change → no effect: fully captured in age-11 test scores
 - What drives changes? Pupils/families moving between locations
 - Is this mobility exogenous? Potentially not...
 - Use several cohorts to further control for n'hood unobservable trends

- Challenge (3): school quality?
 - Can control for school-by-year fixed FX; absorb school quality

Identification details (1): Estimating equation

- Use four cohorts of pupils transiting from end of primary education through to middle of secondary education
 - Sitting for two exams: age 11 (KS2) and age 14 (KS3)

- Estimating equation:

$$Y_{insct} = \mathbf{a}_i + \mathbf{z}'_{nct} \beta + \mathbf{x}'_i \gamma + \mathbf{x}'_i \delta_t + \varphi_n + \xi_n t + U_{sct} + \varepsilon_{insct}$$

where i is 'individual', n is 'n'hood', s is 'school' attended at 'time' t (age 11 or 14) and c is 'cohort'

- The equation includes:
 - Individual and n'hood fixed FX, and n'hood trends
 - 'Trending' effects of individual characteristics
 - Schools-by-cohort (potentially by time) fixed FX

Identification details (2): Estimating equation in differences

- We look at stayers' value-added between age 11 and age 14 and changes in n'hood composition
 - Stayers do not change n'hood: mitigate issues with spatial sorting

- Estimating equation becomes:
$$(Y_{\text{insc}1} - Y_{\text{insc}0}) = (\mathbf{z}'_{\text{nc}1} - \mathbf{z}'_{\text{nc}0}) \beta + \mathbf{x}'_i \delta + \xi_n + (U_{\text{sc}1} - U_{\text{sc}0}) + (\varepsilon_{\text{insc}1} - \varepsilon_{\text{insc}0})$$

- The equation still includes (potentially):
 - N'hood trends: exploit several cohorts, include n'hood FX
 - Unobservables due to cohort-specific changes in school quality when moving from primary to secondary
 - Include secondary-by-year or primary-by-secondary-by-year fixed FX
 - Some specifications simultaneously include n'hood fixed FX and school-by-year fixed FX (very demanding)

Data sources and institutions (very briefly)

- Use NPD/PLASC Pupil Level Dataset and LSYPE
- Pupil Level Annual Census (PLASC): information on pupil's gender, ethnicity, SEN, FSME and crucially n'hood of residence
- National Pupil Database (NPD): information about exams taken at ages 7 (KS1), 11 (KS2) and 14 (KS3) for all pupils in state sector
- Pupils normally change school between primary and secondary
 - Can track schools attended and their characteristics over time
- For outcomes we also use: Longitudinal Survey of Young People in England (LSYPE)
 - 15,500 pupils (year 9, age 14) in 600 schools in England in 2004. Questions on attitudes towards school, playing truant, substance use and anti-social behavior.
- How do we aggregate and use this information?

Data ‘aggregation’ details: Central-cohort +1/-1

Figure 1a: Main dataset construction; four ‘central cohorts’ and +1/-1 adjacent cohorts

	PLASC 2002	PLASC 2003	PLASC 2004	PLASC 2005	PLASC 2006	PLASC 2007	PLASC 2008
Cohort 1	Y5			Y8			
	Y6/KS2			Y9/KS3			
	Y7			Y10			
Cohort 2		Y5			Y8		
		Y6/KS2			Y9/KS3		
		Y7			Y10		
Cohort 3			Y5			Y8	
			Y6/KS2			Y9/KS3	
			Y7			Y10	
Cohort 4				Y5			Y8
				Y6/KS2			Y9/KS3
				Y7			Y10

Note 1: After aggregation of young peers’ characteristics, focus on ‘central cohort’ of pupils staying in same n’hood

Table 1a:
Some descriptive statistics – The stayers

Variable	Mean	Standard Deviation
<i>Panel A: Pupils' characteristics, 'stayers' only</i>		
KS2 percentiles, average English, Maths and Science	50.125	25.236
KS3 percentiles, average English, Maths and Science	51.253	25.819
KS2 to KS3 value-added	1.127	13.598
KS1 score, average English and Maths	15.122	3.611
Pupil is FSM eligible	0.155	0.362
Pupil is SEN	0.213	0.409
Pupil is Male	0.508	0.499
Average rate of outward mobility in n'hood over four years	0.081	0.057
Average rate inward mobility in n'hood over four years	0.083	0.062
Secondary school size (in year 7)	1083.9	384.9
Number of pupils in Output Area, 'central cohort' +1/-1, Year 9	13.865	6.186
Number of pupils in Output Area, 'central cohort' only, Year 6	5.169	2.639
Number of 'stayers': approximately 1,310,000, almost evenly distributed over four cohorts. Number of Output Areas: approximately 134,000; number of Super Output Areas: approximately 32,000.		

Table 1b:
More descriptive statistics – Neighbours’ ‘quality’

Variable	Mean	Standard Deviation
<i>Panel B: Characteristics of pupils in the neighbourhood – Output Area</i>		
KS1 score, average English and Maths – At year 9	14.981	1.760
KS1 score, average English and Maths – Change year 6 to 9	-0.036	0.863
Share FSM eligible – At year 9	0.170	0.199
Share FSM eligible – Change year 6 to 9	0.005	0.081
Share SEN – At year 9	0.217	0.153
Share SEN – Change year 6 to 9	0.002	0.087

Figure 1a – How much variation in n'hood composition? One example: Key Stage 1 of young neighbours

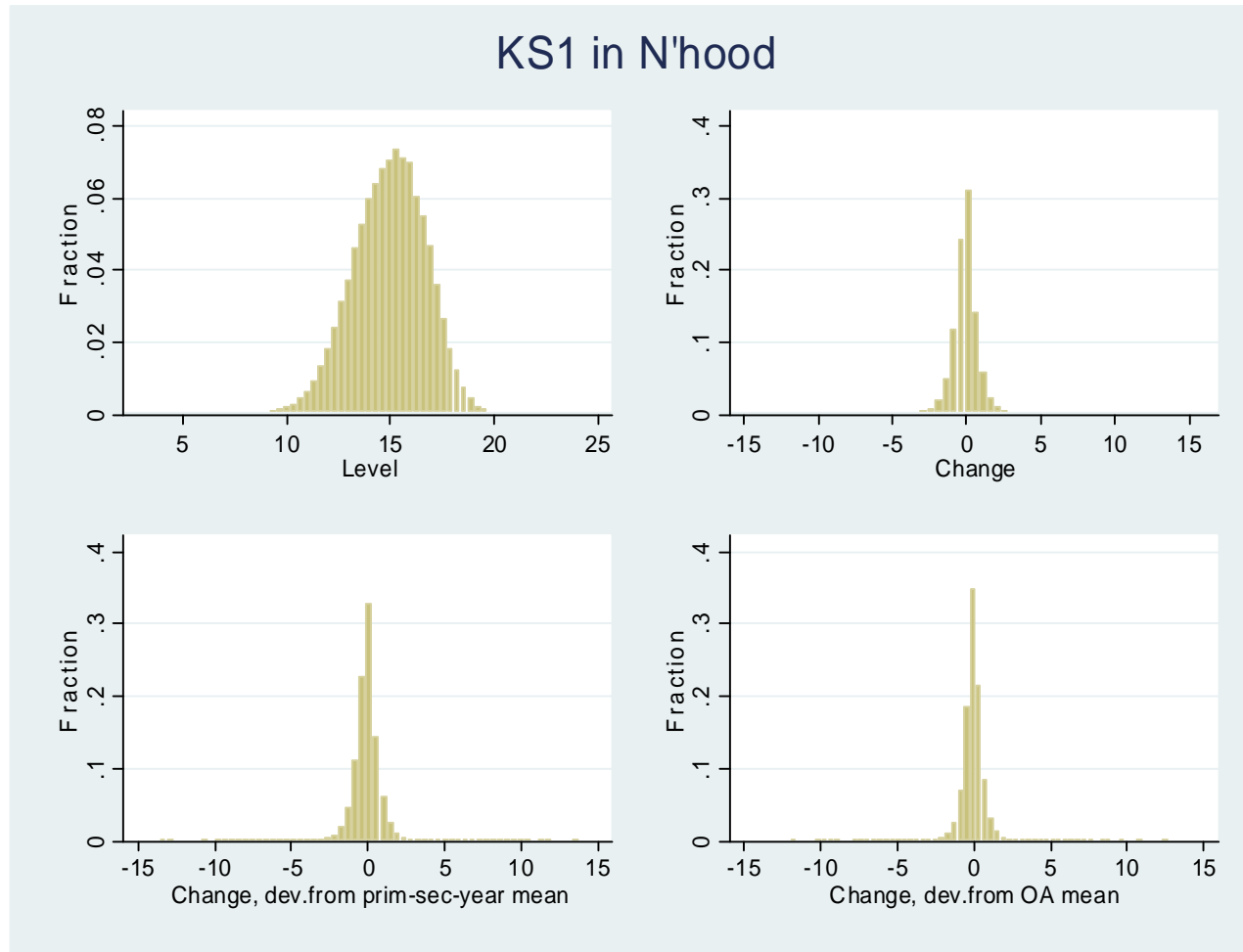


Figure 1b – How much variation in n'hood composition? Another example: FSME of young peers

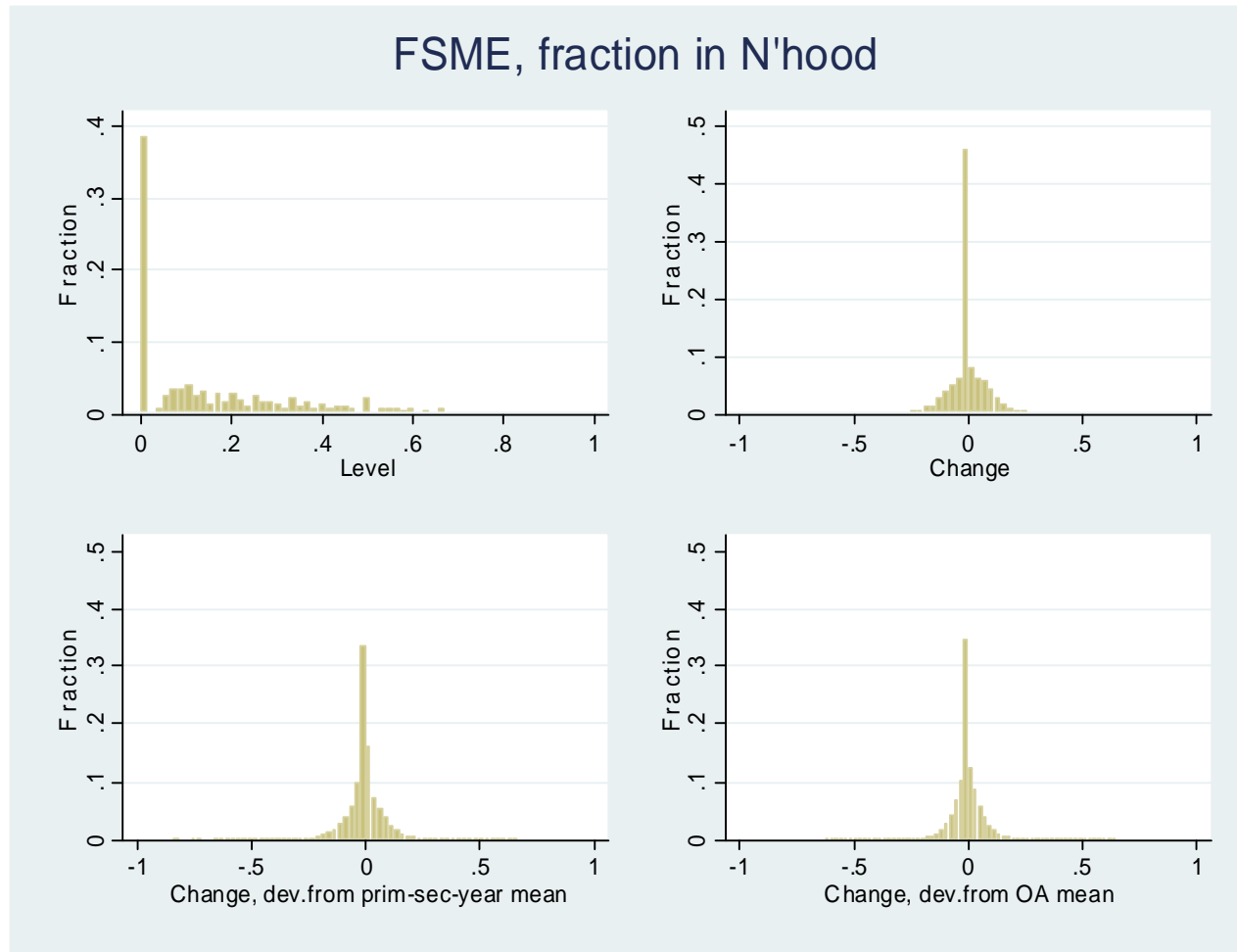


Table 2a:
‘Naive’ cross-sectional regressions – Young peers’ quality

	Dependent Variable/Timing is:			
	KS2/ Year 6	KS2/ Year 6	KS3/ Year 9	KS3/ Year 9
<i>Panel A: N'hood Average KS1</i>				
KS1 score – Level, Year 6 or 9	3.511 (0.015)**	0.588 (0.011)**	4.090 (0.016)**	1.161 (0.012)**
<i>Panel B: N'hood Share of FSME</i>				
Share FSM – Level, Year 6 or 9	-30.597 (0.150)**	-6.592 (0.108)**	-37.441 (0.151)**	-13.153 (0.115)**
<i>Panel C: N'hood Share of SEN</i>				
Share SEN – Level, Year 6 or 9	-27.508 (0.186)**	-5.242 (0.117)**	-32.261 (0.198)	-9.208 (0.129)**
Controls	No	Yes	No	Yes

Table 2b:
Value-added and fixed FX results – Young peers' quality

	Dependent Variable/Timing is:					
	Value-add/ Year 6 to 9	Value-add/ Year 6 to 9	Value-add/ Year 6 to 9	Value-add/ Year 6 to 9	Value-add/ Year 6 to 9	Value-add/ Year 6 to 9
<i>Panel A: N'hood Average KS1</i>						
KS1 score –	0.043	0.041	-0.001	-0.008	0.004	-0.007
Change, Year 6 to 9	(0.0163)**	(0.016)**	(0.014)	(0.014)	(0.020)	(0.019)
<i>Panel B: N'hood Share of FSME</i>						
Share FSM –	-0.923	-0.868	-0.330	-0.263	0.012	0.081
Change, Year 6 to 9	(0.176)**	(0.173)**	(0.153)*	(0.149)	(0.211)	(0.201)
<i>Panel C: N'hood Share of SEN</i>						
Share SEN –	-0.306	-0.365	-0.143	-0.084	-0.019	-0.082
Change, Year 6 to 9	(0.162)	(0.159)**	(0.140)	(0.137)	(0.193)	(0.183)
Controls	No	Yes	Yes	Yes	Yes	Yes
Secondary by Year fixed FX	No	No	Yes	No	No	Yes
Second. by Primary by Year fixed FX	No	No	No	Yes	No	No
OA fixed FX	No	No	No	No	Yes	Yes

An important robustness check: which cohort(s) to aggregate young peers' data?

- Are we using the 'right' peers in the n'hood?
 - Tricky question: answer depends on how n'hood effects work
 - Through interactions: possibly pupils of similar age
 - Through role-models: everyone in n'hood → simply capturing general 'feeling' (looking out of the window)

- Our solutions: experiment with definition of young peers
 - First: only peers of same age (drop +1/-1), as in Goux/Maurin (2007)
 - Second: 'constant-cohort' set-up (more details time permitting...)
 - Get very similar results

- Important finding: results not driven by 'too big' n'hoods or irrelevant peers' definition

Table 3a (bonus slide): Central-cohort only (same age) young peers' definition

	Dependent Variable/Timing is:		
	Value-add/Year 6 to 9	Value-add/Year 6 to 9	Value-add/Year 6 to 9
<i>Panel A: N'hood Average KS1</i>			
KS1 score –	0.014	-0.005	-0.008
Change, Year 6 to 9	(0.012)	(0.011)	(0.014)
<i>Panel B: N'hood Share of FSME</i>			
Share FSM –	-0.340	-0.179	-0.028
Change, Year 6 to 9	(0.120)**	(0.107)	(0.142)
<i>Panel C: N'hood Share of SEN</i>			
Share SEN –	-0.110	-0.013	0.044
Change, Year 6 to 9	(0.105)	(0.095)	(0.125)
Controls	Yes	Yes	Yes
Second. by Year fixed FX	No	No	No
Sec. by Primary by Year fixed FX	No	Yes	No
OA fixed FX	No	No	Yes

Alternative peers' definition (bonus slide): The 'constant-cohort' set-up

		PLASC 2003	PLASC 2004	PLASC 2005	PLASC 2006	PLASC 2007	PLASC 2008
Cohort 2		Y4	Y5	Y6	Y7		
		Y5	Y6	Y7	Y8		
		Y6/KS2	Y7	Y8	Y9/KS3		
Cohort 3			Y5	Y6	Y7	Y8	
			Y6/KS2	Y7	Y8	Y9/KS3	
			Y7	Y8	Y9	Y10	
Cohort 4				Y6/KS2	Y7	Y8	Y9/KS3
				Y7	Y8	Y9	Y10
				Y8	Y9	Y10	Y11

Note 1: We lose one cohort due to length of available pupil census data

Note 2: Trade-off between asymmetry (bad) and using always the same youths 'flowing' around (good)

Table 3b (bonus slide): 'Constant-cohort' (same pupils) young peers' definition

	Dependent Variable/Timing is:		
	Value-add/Year 6 to 9	Value-add/Year 6 to 9	Value-add/Year 6 to 9
<i>Panel A: N'hood Average KS1</i>			
KS1 score –	0.034	-0.020	-0.029
Change, Year 6 to 9	(0.021)	(0.017)	(0.031)
<i>Panel B: N'hood Share of FSME</i>			
Share FSM –	-0.842	-0.354	0.345
Change, Year 6 to 9	(0.203)**	(0.172)*	(0.287)
<i>Panel C: N'hood Share of SEN</i>			
Share SEN –	-0.260	0.106	-0.048
Change, Year 6 to 9	(0.188)	(0.160)	(0.269)
Controls	Yes	Yes	Yes
Second. by Year fixed FX	No	No	No
Second. by Primary by Year fixed FX	No	Yes	No
OA fixed FX	No	No	Yes

Table 4: Neighbourhood change and attitudes

Characteristics of young peers in the neighbourhood and students' behavioural outcomes;
pupils sampled by the LSYPE (aged 14 in 2004)

	Attitudes towards schooling	
	(1) Male Pupil	(2) Female Pupil
<i><u>Panel A: N'hood Average KS2</u></i>		
KS2 score –	0.022	0.012
Change, Year 6 to 9	(0.011)*	(0.009)
<i><u>Panel B: N'hood Share of FSME</u></i>		
Share FSM –	-0.100	-0.015
Change, Year 6 to 9	(0.141)	(0.133)
<i><u>Panel C: N'hood Share of SEN</u></i>		
Share SEN –	-0.200	-0.486
Change, Year 6 to 9	(0.130)	(0.124)**
<i><u>Panel D: N'hood Share of Males</u></i>		
Share Males –	-0.021	-0.016
Change, Year 6 to 9	(0.104)	(0.095)

Additional results: non-linear and heterogeneous effects

- Any evidence that effects are non-linear?
 - Looked at quadratic and cubic terms: no evidence of non-linearities
 - Looked at splines: positive vs. negative effects → not much going on

- Break down by pupils' own background
 - High/Low Key Stage 1; boys and girls; non-FSME vs. FSME; FSME in 'social housing' (pseudo-random allocation)
 - No evidence of significant n'hood effects

- Heterogeneity along dimension of n'hood characteristics
 - Quartiles of pupil population distribution (small/large n'hoods), population density (urban/rural), housing over-crowding, share of social tenants, London vs. the rest, etc.
 - Did not detect any interesting/significant pattern

Conclusions – Summing up...

- Our main methodological contributions:
 - Use 'flow' analysis: changes in n'hood → changes in performance
 - Use stayers and look at value-added for several cohorts: can control for unobserved ability/preferences, n'hood fixed FX and trends
 - Additionally, can completely 'absorb' cohort-specific school quality
 - Note: stayers and their n'hoods fully representative → external validity

- Our findings in a nutshell: little evidence of effects from n'hood change as soon as we control for school quality
 - Similar to Gould et al. (2004)
 - Not different from Katz and others on MTO; and Oreopoulos (2003)
 - Different from Goux/Maurin. Why? Not size of n'hood: small enough
 - Most likely because they do not control for school quality