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The separation of lower and higher attaining pupils in the transition from primary to secondary schools: a longitudinal study of London

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The separation of lower and higher attaining pupils in the transition from primary to secondary schools: a longitudinal study of London

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Abstract
This paper uses methods of spatial analysis to show that lower and higher attaining pupils are separating from each other as they make the transition from primary to secondary schools in London. The observation is not simply a function of geography – that some places are more affluent, with a link between wealth and educational advantage – because separations emerge between locally competing secondary schools: those that are drawing their intakes from the same primary schools. Whilst the separations are partly exacerbated by selective and by faith schools, in all but one year during the period 2003-8 they remain statistically significant even when those schools are omitted. However, there is no evidence to suggest the separation of lower and higher attaining pupils is getting worse or better, suggesting the geographical determinants of "choice" are strong and not easily changed.

Keywords : primary school, secondary school, transition, London, spatial analysis

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1. Introduction

This paper discusses innovative methods of spatial analysis to indentify local patterns of competition between secondary schools within London. It shows that higher and lower attaining pupils at primary school separate from each other as they make the transition into secondary schools. This process of separation is found for every year from 2003 to 2008 but without evidence that it is either worsening or improving.

This continuity matches the conclusion of Gibbons & Telhaj (2007) who found, for London as well as for the rest of England, that almost nothing changed during the (preceding) period from 1996 to 2002 in terms of the way pupils of differing age-11 ability are sorted into different secondary schools. They reached this conclusion by using Pupil Level Annual School Census (PLASC) / National Pupil Database (NPD) data that provide information on individual pupils within state schools in England, including their attainment level in compulsory and standardised testing prior to leaving primary school aged 11. Since the data show which primary school the pupil has attended and also which secondary school they are attending or will attend, so it is possible to look at whether each secondary is recruiting higher or lower attaining pupils. Gibbons and Telhaj do this by graphing the cumulative distribution of pupil ability across school intakes and by decomposing pupil variance of ability both between schools and within schools.

Burgess et al. (2008) also use PLASC/NPD data, in their case to show that, in 2004 and in England, high ability pupils are more likely to go to the modal secondary school for their primary school cohort if that secondary school is better than average in terms of its pupil's attainment, with the reverse being true for lower ability pupils. They also show that "poor pupils", as defined by free school meal eligibility, are less likely to go to the modal secondary school when it is better than average but more likely to go when it is worse. In other words, there is a bifurcation of higher and lower attaining pupils and, not uncorrelated, of richer and poorer ones in the transition from primary to secondary school.

This paper differs from these previous studies in two important ways. First, explicit consideration is given to determining which schools compete with which others, then incorporating that information within the modelling process. The importance of linking measures of separation, or of segregation, to the local markets within which schools operate is stressed by Harris & Johnston (2008), after Gibson & Asthana (2000), the latter authors noting: "in trying to establish whether or not the marketization of education has had a polarizing effect, the unit of analysis must […] be the local market within which schools (and parents faced with placement decisions) actually operate" (p. 139).

Put another way, when measuring whether facets of the education system cause some groups of pupils to be found in some schools but not in others, consideration must be given to the spatial properties of markets, choice and of competition. It is not sufficient to assume, tacitly or otherwise, that schools are competing with each other within a local education authority. Though there has been much discussion on the virtues or otherwise of various indices of separation/segregation/polarization (see, for example, Allen & Vignoles 2007; Gibson & Asthana 2003; Goldstein & Noden 2003; Goldstein & 2004; Gorard 2000; Gorard 2004; Gorard 2007; Johnston & Jones 2010; Poulsen et al. 2001;

Peach 2009), less attention has been paid to the areal units of analysis (but see Harris & Johnston 2003; Shuttleworth et al. 2011).

The second difference is to adopt a spatial analytical perspective. Specifically, knowledge of which schools are competing with each other is formalised as a weights matrix in a spatial regression model. In part this has technical advantages: it helps avoid the under-estimation of the standard errors in a regression model that occurs if spatial dependencies exist but are not allowed for. However, the primary motivation is substantive. The approach allows the amount of separation of higher and lower attaining pupils to be quantified as a measure of spatial autocorrelation for which a significance measure can also be determined. Whereas most indices of separation/segregation are aspatial (but see Johnston et al. 2011; Lloyd, in press) the same is not true of the methods used here.

Throughout the paper the term separation is generally preferred over another commonly used word, segregation. Though the two can be synonyms, the latter often acquires a pejorative interpretation when it is taken to imply that two or more groups of people are actively avoiding each other and/or are being kept apart due to some underlying structural properties of, in this case, the education system. In addition, the language of segregation tends to presume that separations – by race, by wealth, by attainment – are necessarily undesirable even though cogent arguments sometimes can be made to the contrary (Merry 2011). From a libertarian and, arguably, a social justice point of view (Brighouse 2002) the key issue is whether the separations are voluntary or not. Though no definitive answer is possible from this type of study, the evident stability in the degree of separation of higher and lower attaining pupils in London over the period from 2003 to 2008 (and 1996 to 2002 in Gibbons' and Telhaj's study) suggests there are strong social and geographical constraints impacting upon school choices that enforce and reinforce the geographies of transition, and which recent educational reforms have done little to change.

2. Geographies of transition

The PLASC/NPD dataset used for this study is comprised of 376 577 records of pupils who made the transition from a primary to secondary school in London during any of the years from 2003 to 2008. After some cleaning of the data, primarily to omit missing records but also pupils with exceptionally low attainment scores (in the lowest 0.5 per cent, that might otherwise skew the analysis), 365 917 records remain (97 per cent). The number of pupils and of schools per year are recorded in Table 1 together with the mean attainment and standard deviation of the pupils in the standardised tests taken during their final year of primary school (Key Stage 2).

Final year of primary school	Number of pupils	Number of schools	Mean attainment score	Standard deviation
2003	59922	383	27.4	4.28
2004	60861	381	27.4	4.34
2005	61816	381	27.5	4.30
2006	62325	382	27.6	4.39
2007	59758	373	27.8	4.29
2008	61235	367	27.8	4.05

Table 1. The numbers of pupils and schools in the data set for each of the years from 2003 to 2008, and the mean attainment and standard deviation of the pupils' standardised test scores.

The geography of transition is shown in Figure 1 for the year 2008. Taking each secondary school in turn, the primary schools are ranked in order of the proportion of the secondary school's intake they send that year. In this way and by considering only the first 80 per cent per secondary school, primary schools sending few pupils to the secondary are discarded. Following Burgess et al. (op. cit.) the map is topological: the connections between the secondary and feeder primary schools are correct but the geographical locations are not. This helps preserve the anonymity of individual schools.

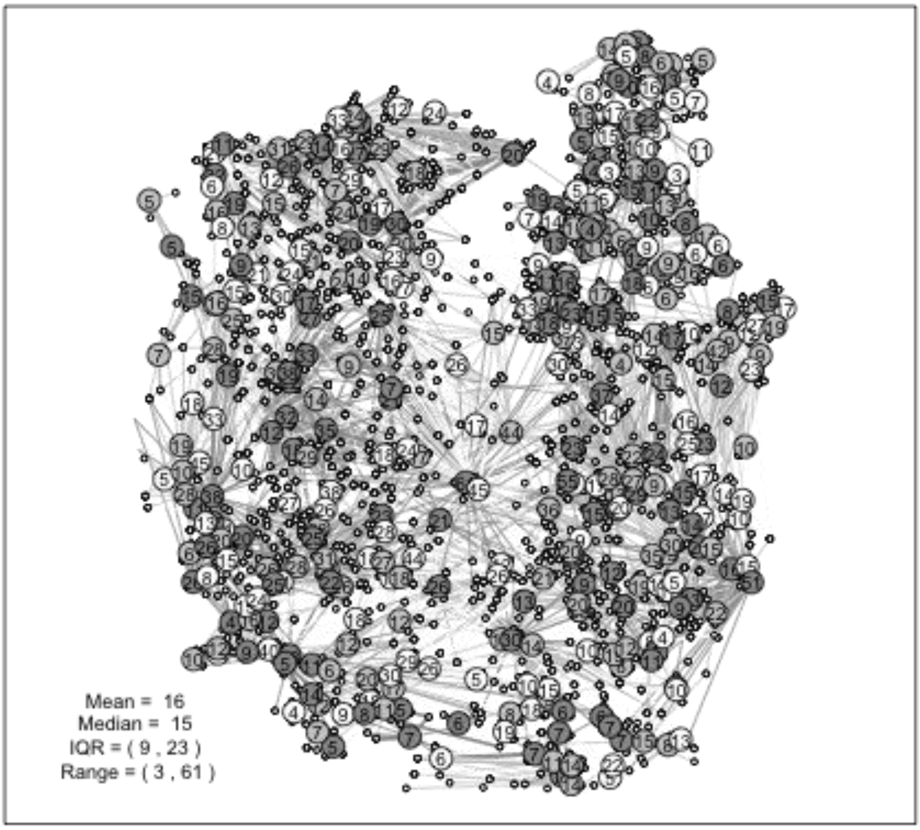

Figure 1. Showing the links between primary and secondary schools for the first 80% of the intake into each secondary school in London in 2008. The average secondary school receives four-fifths of its intake from 15-16 feeder primary schools.

The number associated with each secondary school is the amount of feeder primary schools it links to. Across London, the mean and median average number of primary schools per secondary school is 16 and 15, respectively, with an interquartile range from 9 to 23 and an entire range from 3 to 61 schools. Burgess et al. find that there is an average of 37 primary schools per secondary school and a near identical value is found here, too, if *all* the pupils into every secondary school are considered. However, that is to exaggerate the complexity of the system and includes what might reasonably be regarded as exceptional cases. If, instead, only the first half of the intake into each secondary school is considered, more distinct geographical patterns become apparent (Figure 2). That they do is not surprising. Although only one quarter of pupils in London go to their nearest secondary school it does not follow they are travelling far: on average a secondary school in London has seventeen others within a ten-minute drive from it (Burgess et al. 2006).

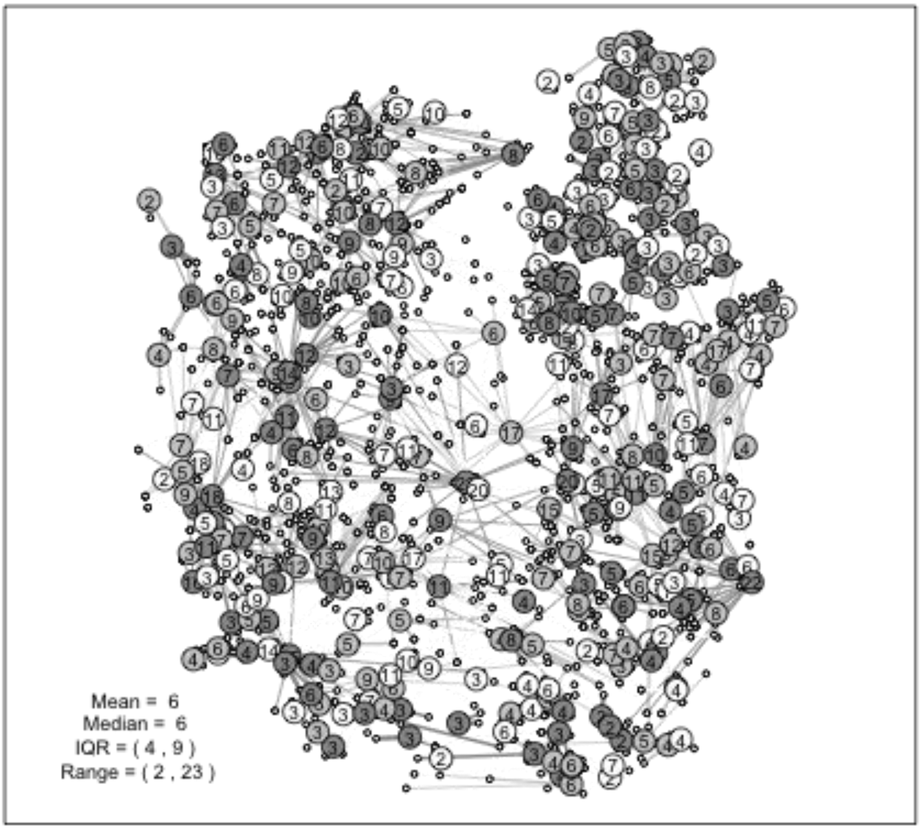

Figure 2. Showing the links between primary and secondary schools for the first 50% of the intake into each secondary school.

Sutherland et al. (2010) indentify the uneasy tension between the promotion of school choice and the priority given to locally based partnership working between schools and other children's services both in the delivery of extended services (for example, after-school clubs) and in aiding the ease of transition from primary to secondary school for more vulnerable and less confident pupils especially (cf. DCSF 2008; DCSF 2009). Recognising the community role of schools, a general preference for ease of access and local schooling, and the impacts of geographically admissions criteria constraining the choice set, it is not surprising if many pupils attend a relatively local school (Harris 2011).

Figure 3 summarises what a comparison of Figures 1 and 2 will show: a typical secondary school recruits the majority of its pupils from a relatively smaller number of primary schools (average, six) but that number rises exponentially as an increasingly greater proportion of the pupils is considered. Not surprisingly, the average transition distance rises too. For 50 per cent of the intake, the median distance between a secondary school and its feeder primary schools is 1.4km, for 80 per cent it is 2.0km, and for the complete intake it is 3.1km. The data are for 2008 but the same trends are observed for other years in the data.

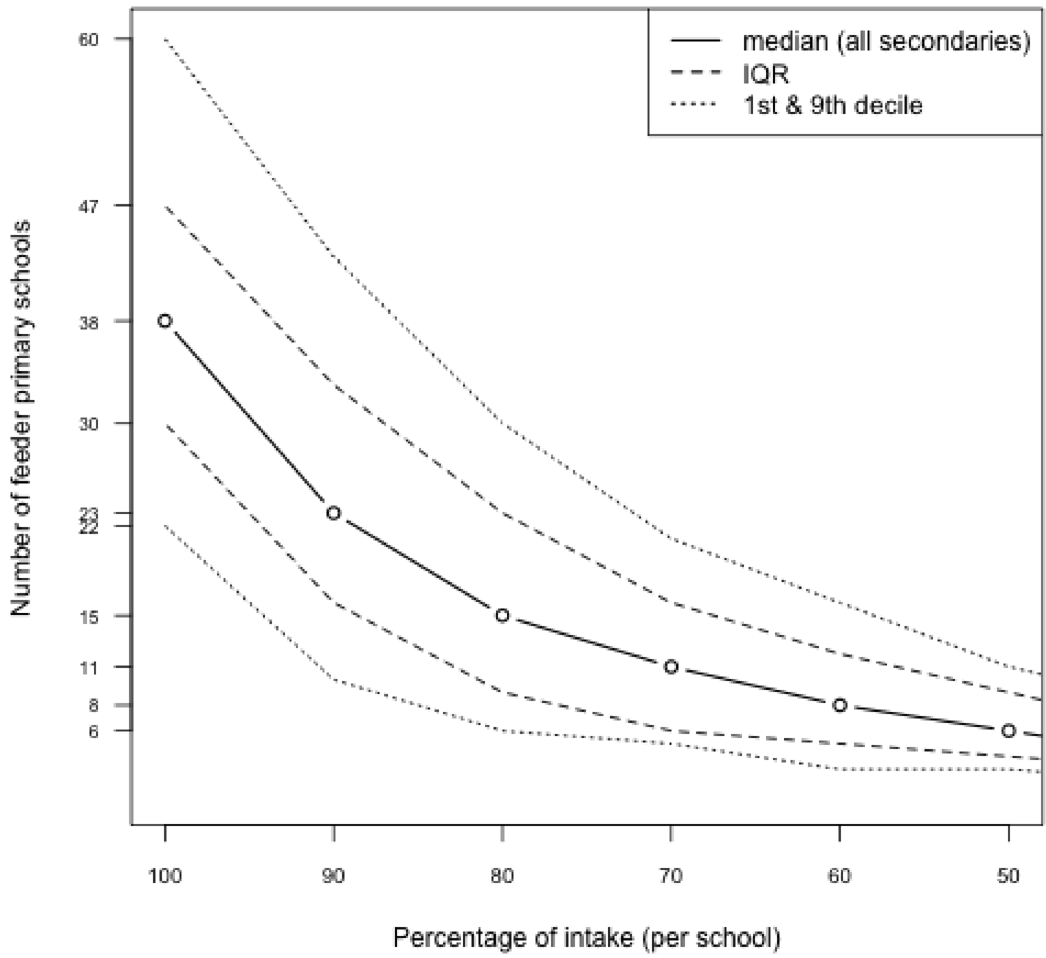

Figure 3. Showing the typical number of feeder primary schools a secondary school in London in 2008 has for a certain percentage of its intake. For example, the median average for the entire intake is 38 but can be higher than 60 or lower than 22 for some schools.

It is instructive to look at the composition of secondary schools that have the most and least numbers of feeder primary schools, most and least being defined by secondary schools in the upper or lower quartile respectively at the 80 per cent threshold of Figure 3.

Table 2 gives indices showing those characteristics of pupils making the transition from primary to secondary school in London in 2008 that disproportionally are found in the schools with most or least feeder schools, relative to all others. An index value of 100 indicates parity. It is notable that schools selecting by academic attainment are disproportionately over-represented by a factor of 25 amongst schools with the highest number of feeder primary schools. Voluntary-aided Church of England (CoE) and Roman Catholic (RC) schools also are over-represented, as are Black Caribbean and Black African pupils. Voluntary-aided (VA) schools have greater latitude to set their own admissions criteria than voluntary-controlled faith schools, and these criteria may include demonstrated commitment to the faith group.

At the other extreme, secondaries with few feeder primaries are disproportionately likely to contain higher proportions of Indian and Pakistani pupils, and to be one of another type of faith school (Jewish, Seventh Day Adventist, Sikh or other Christian).

Indicator	Index value: high*[1]	Index value: low*[2]
Proportion of pupils eligible for free school meals (FSM) (*n* = 16269)	81	79
Proportion of pupils for whom English is second language (*n* = 21250)	84	87
Proportion of pupils with a certified statement of special educational needs (SEN) (*n* = 1286)	73	102
Proportion of pupils White (*n* = 28668)	90	144
Proportion of pupils Black Caribbean (*n* = 3925)	148	45
Proportion of pupils Black African (*n* = 7154)	141	63
Proportion of pupils Indian (*n* = 3249)	59	181
Proportion of pupils Pakistani (*n* = 2393)	52	187
Proportion of pupils Bangladeshi (*n* = 3339)	50	43
Proportion of pupils Chinese (*n* = 388)	250	57
Voluntary aided (CoE) school (*n* = 25)	442	0
Voluntary aided (RC) school (*n* = 63)	158	61
Voluntary controlled school (*n* = 5)	74	0
Other faith school (*n* = 7)	49	556
Selective school (*n* = 19)	2504	0
Smaller school*[3] (*n* = 120)	147	64

*[1] The index shows whether the proportion of, for example, FSM pupils, attending secondary schools with the highest number of feeder schools is the same as it is for all other schools. A value of 100 is parity; 200 indicates the proportion is double (FSM pupils are over-represented); 50 indicates it is half.
*[2] As above but comparing schools with the lowest number of feeder schools with all others.
*[3] The number of pupils enrolled in 2008 is in the lower third for all schools in the study region

Table 2. Indices indicating the characteristics of pupils or of schools that are over- or under-represented in schools with high or low number of feeder schools, relative to all others. An index value of 100 is parity.

3. Comparing each secondary school with its competitors

To understand the logic of the analysis that follows, consider a situation where all pupils achieved exactly the same standardised test result prior to leaving primary school. Averaging those test results by the secondary schools the pupils attend subsequently would produce no differences: each of the secondary schools would yield the same prior attainment average for its group of incoming pupils.

Now imagine that the differences between the pupils were random and the pupils were randomly allocated from a primary school to a secondary school. In this case the differences between the secondary schools would be random also.

Finally, consider the true case: the attainment scores are not all equal; there is, for example, a correlation between eligibility for a free school meal and attainment (FSM eligible pupils are lower attaining on average than those not eligible: 26.4 Vs 28.4: t = -52.5, df = 27040, p < 0.001). There also appears to be at least some geographical patterning to the transition from primary to secondary schools. In such circumstances, non-random differences in the mean prior attainment scores by secondary school are to be expected.

Those differences exhibit a geography that can be summarised by a Moran plot, Figure 4. Here it compares the mean prior attainment scores of pupils entering a secondary school in London in 2008 (horizontal axis) with the spatially lagged and weighted mean of locally competing schools (vertical axis). That the line of best fit, the regression line, is upward sloping reveals positive spatial autocorrelation: secondary schools that receive the highest prior attaining students tend to be competing with other schools that receive the same and, reciprocally, schools that receive the lower attaining pupils are also competing with schools that receive the same.

Again, there are no surprises here. Indicative of neighbourhood inequalities, the positive autocorrelation has little to do with the sorting of high and low attaining pupils from each other in the transition from primary to secondary school but is a function of geography, specifically social geographies, the links between social privilege and educational attainment, and of the geography of where the schools are located in London.

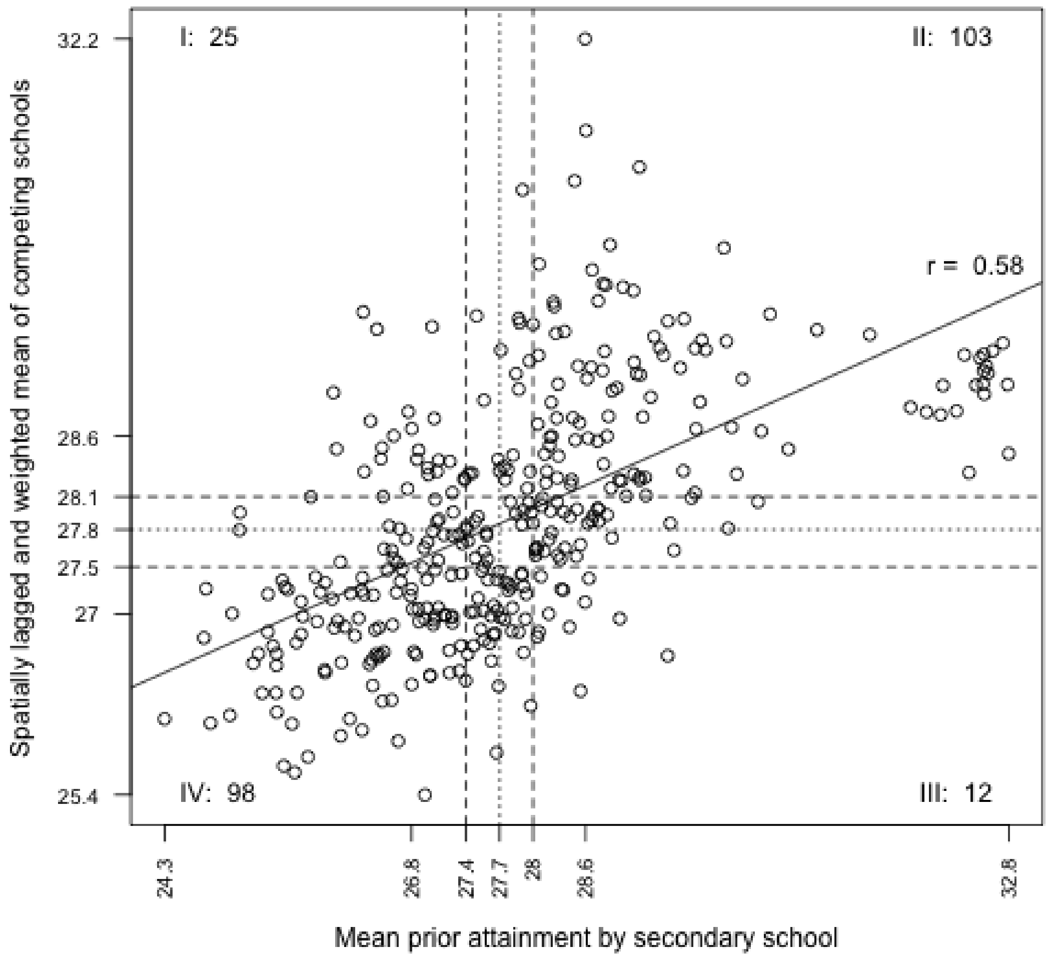

Figure 4. A Moran plot comparing the mean prior attainment of pupils entering a secondary school in London in 2008 with the mean of that school's competitors. The values indicated on the axis are the minimum, first quartile, second quintile, median, third quintile, third quartile and the maximum.

The point that follows but often is missed with simple measures of segregation is that any separation of low and high attaining pupils needs to be disentangled from the socio-economic and residential geographies that provide the canvas on which the effects of school choice and selection are painted. Here it is achieved by changing the focus from the mean prior attainment score per secondary school to considering, instead, *the difference* between the prior attainment school per school and that of its neighbours. This is a simple local measure of dissimilarity, calculated as

$$d = x_i - \sum_{j=1}^{n-1} w_{ij} x_j \qquad \left(j \neq i, 0 < w_{ij} < 1, \sum_{j=1}^{n-1} w_{ij} = 1\right) \qquad [1]$$

where *d* is the measure of local dissimilarity, *i* is a secondary school, *j* is any other secondary school in the study region, *n* is the total number of schools and w_{ij} is a row-standardised weights matrix where any value above 0 indicates *i* and *j* are competing. A negative value of *d* indicates a school is recruiting lower attaining pupils on average and relative to its competitors. A positive value indicates it is recruiting higher attaining pupils.

The definition of competing schools arises from Figure 1. As well as a map, it is a graph where any two secondary schools can be linked by a shared primary school; that is, where they recruit from one or more of the same primary schools. As a definition, that requires the schools to recruit only one pupil each from the shared primary school for the secondary schools to regarded as competing. In practice, the weight of competition considers how important the primary school is to each secondary school in terms of the share of the intake drawn from it.

Specifically, the weight is equal to the proportion of secondary school i's intake that is drawn from the primary school, multiplied by the proportion of secondary school j's intake that is drawn from the same, then scaled (row-standardised) so that the sum of the weights for any schools is equal to one.

If the value of *d* for each secondary school is now compared with that of its competitors, evidence of significant negative spatial autocorrelation is found – Figure 5. A null hypothesis that the downward sloping regression line actually is flat (meaning no spatial autocorrelation) can be rejected at a greater than 99.9 per cent confidence.

Consider the 82 schools in sector 1 of the graph (bounded on two sides by the dashed lines). Put simply, these are schools that are losing out in the local competition for pupils. The pupils they enrol have lower average attainment than would be expected given the schools they compete with, and they are in the lowest fifth for the distribution of *d* scores. Furthermore, competing schools are recruiting higher attaining pupils, on average, placing the spatially lagged value in the highest fifth for those scores.

In contrast, the 85 schools in sector III gain the higher attaining pupils at the expense of their competitors. Sector II contains schools that attract higher attaining pupils on average, as do their competitors, whereas Sector IV has schools and competitors that attract the lower attaining pupils.

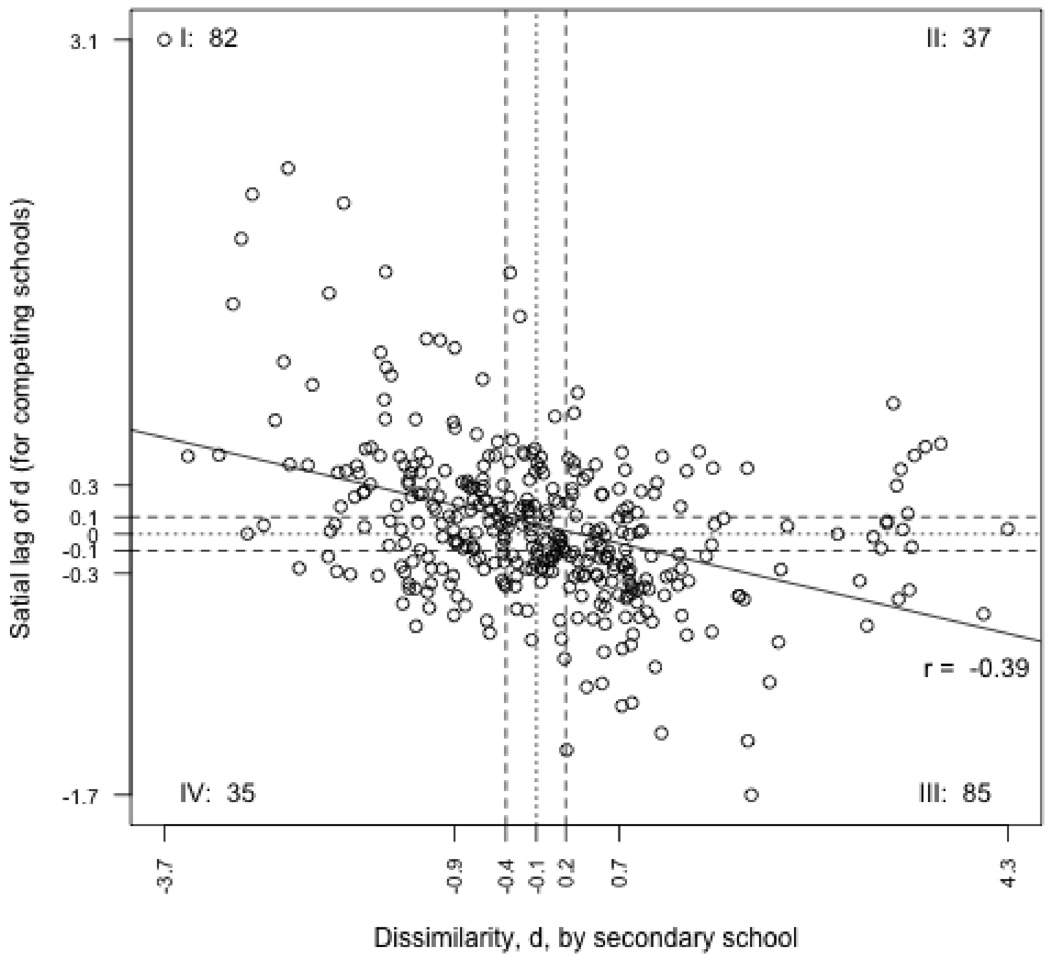

Figure 5. Moran plot comparing the measure of dissimilarity, d, for each secondary school with the average for its competitors. The downward sloping regression line is evidence of negative spatial autocorrelation – of the separation of higher and lower attaining pupils in the transition from primary to secondary school.

Table 3 summarises the characteristics of schools in each of the four sectors using the index method described in Section 2 for Table 2 but this time comparing the schools in one sector with the schools in the remaining three. It is notable that the schools that "lose out" (in sector I of Figure 5, index value I in

Table 3) contain a disproportionate number of pupils with a certified statement of educational needs, and also a high proportion of white pupils, whereas "gainers" (sector III; index value III) tend to contain a higher proportion of non-white pupils. The exceptions are Indian and Chinese pupils that disproportionately are found in sector II schools: schools that recruit higher attaining pupils, on average, and compete with other schools that do the same. Selective schools overwhelmingly are found in this group. Finally, in sector IV – schools that recruit pupils of lower than the locally expected average attainment and compete with schools that do the same – there is a higher proportion of free school meal eligible pupils and also a disproportionate number of Black Caribbean pupils.

Indicator	Index value (I)	Index value (II)	Index value (III)	Index value (IV)
Proportion of pupils eligible for free school meals (FSM)	113	57	97	132
Proportion of pupils for whom English is second language	106	84	107	93
Proportion of pupils with a certified statement of special educational needs (SEN)	127	96	76	107
Proportion of pupils White	105	101	89	111
Proportion of pupils Black Caribbean	93	82	113	111
Proportion of pupils Black African	97	88	103	113
Proportion of pupils Indian	91	100	154	40
Proportion of pupils Pakistani	92	59	157	74
Proportion of pupils Bangladeshi	128	99	121	28
Proportion of pupils Chinese	52	268	97	71
Voluntary aided (CoE) school	59	382	56	78
Voluntary aided (RC) school	91	223	74	62
Voluntary controlled school	0	0	-	0
Other faith school	48	136	121	146
Selective school	0	764	129	0
Smaller school	87	171	52	168

Table 3. Indices indicating the characteristics of pupils and of schools in each of the sectors I to IV, respectively, in Figure 5, relative to the other sectors.

4. Spatial model of separation

To formalise and to assess the significance of the various indicators of lower and higher prior attainment averaged by secondary school, a spatial regression model is used. Specifically, a spatial lagged *y* model (also known as the spatial autoregressive model) is used of the form:

$$y_i = \mathbf{x_i}\boldsymbol{\beta} + \boldsymbol{\rho}\mathbf{w_i}.y_i + \boldsymbol{\varepsilon}_i \qquad [2]$$

where, following the notation of Ward & Gleditsch (2008), **x** is a vector of predictor variables, $\boldsymbol{\beta}$ are the regression coefficients, $\mathbf{w_i}$ is the weights matrix defining competing schools, $\boldsymbol{\varepsilon_i}$ is an error term, and y_i is the measure of local dissimilarity (*d*) measuring whether a school recruits higher or lower attaining pupils, on average, relative to its local competitors. Of particular interest is the measure of spatial autocorrelation, ρ (rho), which quantifies the dependency of the measured y_i at one school on the value of *y* measured at its competitors. It summarises the average dissimilarity between a school and its competitors in regard to the mean prior attainment of their intakes.

The form of the model is drawn from the spatial econometrics literature where it is used to measure spatial spillover effects (LeSage and Pace 2008). It is fitted in the statistical and computing software, R, with the spatial dependency (spdep) library, and using an optimisation and generalised least squares procedure. Whereas the *y* values are calculated from the PLASC/NPD data for pupils making the transition from primary to secondary school in 2008, the *x* values omit that year and are calculated from the pupil data for each of the remaining years 2003–7.

The results are shown in Table 4 where significant indicators of prior attainment averaged by secondary school are identified at a 95% confidence level or above. All the variables have been standardised – converted to z-values – to permit comparison of the magnitude of their effects. Not surprisingly, selective schools admit the highest attaining pupils even given the local competition, and voluntary-aided CoE and RC schools, though not directly selective by attainment, also recruit the more academically able students locally. There is evidence that Chinese students are higher attaining and they are: the difference between their mean standardised test score (29.9) and the mean for other pupils (27.8) is adjudged significant by a two-sample t-test: t = 11.2, df = 392.9, p < 0.001. Smaller schools recruit the lower attaining pupils.

Of particular note is that the rho value is both significant and of sizable effect. This is again evidence of significant separation by attainment as pupils make the transition from primary to secondary school. The Akaike Information Criterion (AIC) is a goodness-of-fit measure where the lower it is, the better. Comparing the AIC value for the spatially lagged model it is found to fit the data better than a standard regression model that omits the effects of spatial dependency.

Standardised Indicator	$\ddot{\beta}$	*s.e.*	*z*	*p*	
(intercept)	-0.077	0.048	-1.599	0.110	
Proportion of pupils eligible for free school meals (FSM)	-0.220	0.059	-3.719	<0.001	*
Proportion of pupils for whom English is second language	-0.023	0.075	-0.311	0.756	
Proportion of pupils with a certified statement	-0.058	0.035	-1.671	0.095	

of special educational needs (SEN)					
Proportion of pupils White	-0.144	0.099	-1.445	0.148	
Proportion of pupils Black Caribbean	0.065	0.053	1.206	0.228	
Proportion of pupils Black African	-0.103	0.057	-1.807	0.071	
Proportion of pupils Indian	0.014	0.055	0.253	0.801	
Proportion of pupils Pakistani	-0.030	0.047	-0.647	0.518	
Proportion of pupils Bangladeshi	0.098	0.056	1.754	0.080	
Proportion of pupils Chinese	0.119	0.042	2.827	0.005	*
Voluntary aided (CoE) school	0.448	0.151	2.959	0.003	*
Voluntary aided (RC) school	0.236	0.117	2.016	0.044	*
Voluntary controlled school	-0.008	0.287	-0.029	0.977	
Other faith school	0.449	0.259	1.730	0.084	
Selective school	2.208	0.218	10.116	<0.001	*
Smaller school	-0.170	0.079	-2.144	0.032	*
Rho	-0.705	0.060	-11.829	<0.001	*
AIC	773	(AIC for linear model: 857)			
LM test for residual autocorrelation	77	*p*-value: <0.001			

Table 4. Summary statistics for the spatially lagged *y* model. An asterisk indicates significance at a 95% confidence interval or above.

Turning to the foot of Table 4, the Langrange Multiplier (LM) test reveals that significant residual autocorrelation remains unexplained in the data. Evidence that this is caused by selective and by voluntary-aided faith schools is presented under the column header 2008 in Table 5. Although the residual autocorrelation remains significant at a 95 per cent confidence interval or above when either the selective or faith schools are omitted, when all are it is no longer so. The same is true for all but two of the years from 2003 to 2008.

	Year	2008	2007	2006	2005	2004	2003
All schools	rho	-0.705	-0.693	-0.578	-0.677	-0.723	-0.677
	p	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
	AIC	773	800	856	809	803	826
	LM	77	41	67	87	53	76
	p	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Omitting selective schools	rho	-0.632	-0.594	-0.556	-0.575	-0.714	-0.638

	p	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
	AIC	831	833	877	853	847	883
	LM	14	4	5	13	5	3
	p	<0.001*	0.049*	0.015*	<0.001*	0.027*	0.072
Omitting voluntary-aided (VA) schools	rho	-0.779	-0.716	-0.688	-0.704	-0.793	-0.673
	p	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
	AIC	568	601	639	616	595	629
	LM	74	41	53	74	41	64
	p	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Omitting selective and VA schools	rho	-0.225	-0.646	-0.699	-0.625	-0.794	-0.653
	p	0.044	<0.001	<0.001	<0.001	<0.001	<0.001
	AIC	729	615	640	641	618	667
	LM	<0.001	4.33	0.482	12	1.69	1.97
	p	0.996	0.037*	0.488	<0.001*	0.193	0.161

Table 5. Summarising the amount of explained and unexplained spatial dependency found in each of the models with *d* as the dependent variable and for each of the years 2003-8.

Returning to the observed rho value, Table 5 shows it to be significant for all but one of the models fitted to the data for each of the years from 2003 to 2008. The exception is the model for 2008 where the selective and voluntary-aided schools are omitted and where the decrease in the magnitude of rho is much greater than for other years. It is not entirely clear why this has occurred, though the decrease in the number of secondary schools falling into these categories should be noted: between 2003 and 2006 there were 274 or 275 in this group; 266 in 2007 and 260 in 2008.

That the rho value otherwise is significant indicates a significant separation of lower and higher attaining pupils in the transition from primary to secondary schools that persists throughout the period from 2003 to 2008 yet also appears neither to be increase nor decreasing. Indeed, such changes as there are appear to be related to a combination of demographic factors and the opening or closure of schools. The Spearman's rank correlation between the rho value (for all schools) and the number of pupils in each year is r_S = 0.464. The correlation between the rho value and the total number of schools is r_S = 0.632. These correlations suggest that as the number of pupils competing for places increases so the separation of lower and higher attaining ones tends to decrease, possibly because it forces a greater spread of pupils across more schools that are not necessarily their first choice. They also suggest that as the number of schools decreases so the amount of separation increases, possibly because the competition of places in popular schools intensifies. However, in both cases the suggestions are largely conjecture.

In fact, looking at the change in the dissimilarity (d) values from the year 2003 to 2008 and comparing that change to the value of *d* in 2003, what appears most evident is regression to the mean: schools that were more dissimilar to their competitors in 2003 tended to become less so by 2008, and schools that were less dissimilar in 2003 tended to become more so.

There are, of course exceptions and it may be observed that amongst those schools that had greater dissimilarity from their competitors in 2008 and for which that dissimilarity increased by 2008 (sector II of Figure 6), selective schools are disproportionately over-represented, as are, but to a much lesser extent, Roman Catholic VA schools – see Table 6 (index II). However, it is too simplistic to suggest that selective and faith schools increasingly attract the higher attaining pupils. In fact, there also is a disproportionate number of such schools amongst the group who were dissimilar to their competitors but are becoming more like them (sector III, Figure 6; Index III, Table 6).

Amongst those schools that "lost out" in 2003 and do but more so in 2008, there is a disproportionate number of white pupils (sector IV; index IV). Encouragingly, perhaps, FSM eligible pupils disproportionately are found in secondary schools where their average prior attainment is becoming more like those of competing schools (sector I; index I).

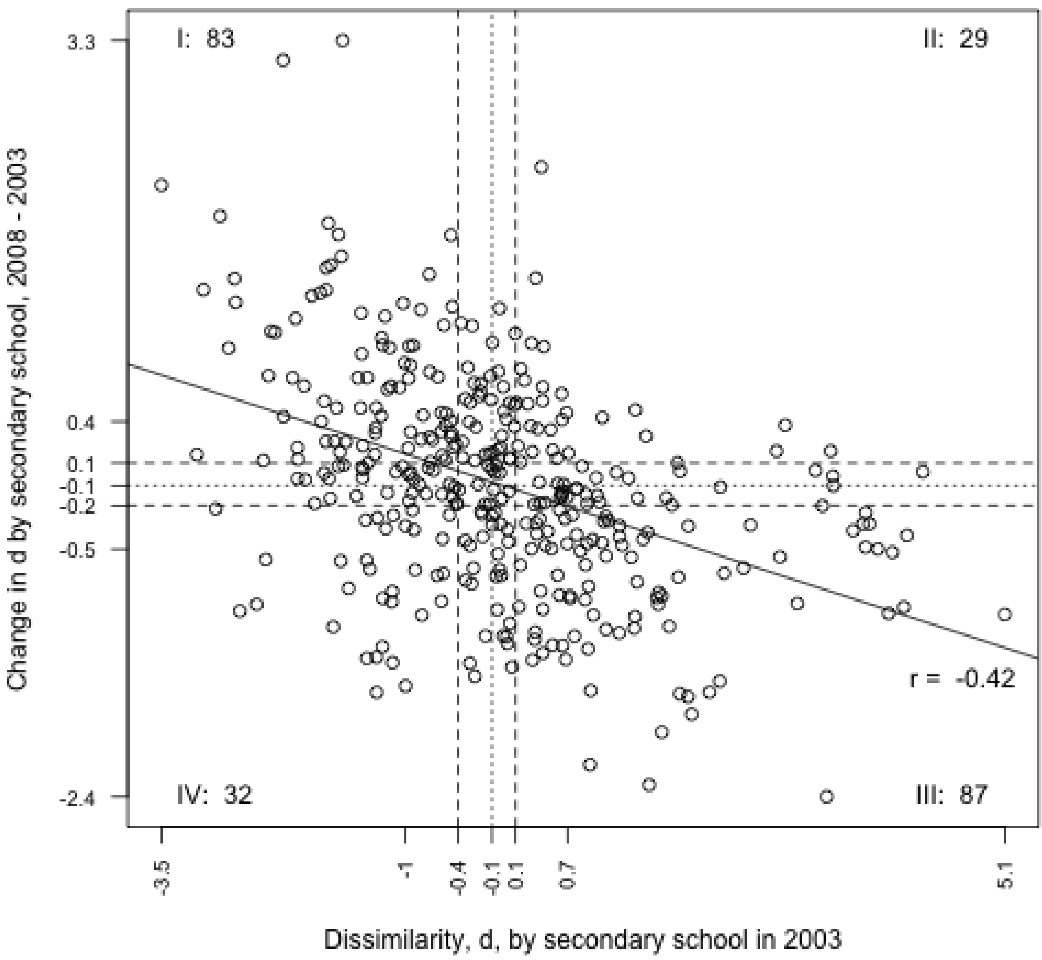

Figure 6. Showing the change in the dissimilarity score (d_{2008} - d_{2003}) for schools against the score in 2003.

Indicator	Index value (I)	Index value (II)	Index value (III)	Index value (IV)
Proportion of pupils eligible for free school meals (FSM)	149	77	76	95
Proportion of pupils for whom English is second language	112	99	96	87
Proportion of pupils with a certified statement of special educational needs (SEN)	128	90	75	115
Proportion of pupils White	93	98	96	124
Proportion of pupils Black Caribbean	120	78	103	79
Proportion of pupils Black African	112	84	104	86
Proportion of pupils Indian	77	172	102	84
Proportion of pupils Pakistani	94	104	112	85
Proportion of pupils Bangladeshi	109	183	87	47
Proportion of pupils Chinese	84	70	195	30
Voluntary aided (CoE) school	30	54	414	48
Voluntary aided (RC) school	85	120	131	60
Voluntary controlled school	0	0	-	0
Other faith school	89	139	166	0
Selective school	0	174	662	0
Smaller school	130	35	121	76

Table 6. Indices indicating the characteristics of pupils and of schools in each of the sectors I to IV, respectively, in Figure 6, relative to the other sectors.

5. Conclusions

This paper has used methods of spatial analysis including a spatially lagged regression model to consider whether higher prior attaining pupils separate from lower attaining ones in schools they choose or are allocated to in the transition from primary to secondary school. The empirical evidence suggests they do, and significantly so, and this is true for every year from 2003 to 2008 with one unusual exception (in 2008, when selective and voluntary-aided faith schools are omitted from the data). What is more, the amount of separation is most likely an under-estimate. Pupils who attend a fee-charging secondary school are omitted from the analysis (about 14 per cent of pupils on average in London but over 40 per cent for the borough of Kensington and Chelsea; MacLeod, 2007), as are pupils who attend a primary school in London but then move outside the region to an adjoining county. Omitted to, are pupils with very low standardised test scores.

Despite this, and despite the evident significance of significant sorting by prior attainment in the local markets within which secondary schools compete, there is not any evidence that the degree of separation is either increasing or worsening. Indeed, there is evidence of regression to the mean: that schools recruiting higher or lower attaining pupils in 2003 become more similar to competing schools by 2008.

As such, this paper lends support to the findings of others authors, especially Gibbons & Telhaj (2007), and also Gorard et al. (2003), and Croxford & Paterson (2006) who also show no evidence that the alleged marketisation of education (Gewirtz, Ball, and Bowe 1995) and the promotion of choice is exacerbating social (or ethnic) “segregation” between schools. Of course, London may not be representative of other parts of England. Nevertheless, combined, the 33 LEAs of Greater London school more pupils than any other conurbation in the country.

Yet, there remain other important questions to consider. Why is it that the significant separations of higher and lower attaining pupils (and of FSM eligible pupils from non-eligible ones in other authors' work) persist at all? Why are they so enduring?

Two suggestions are proffered here. First is the trend of a rising mean test score and a decreasing standard deviation year-by-year from 2003 to 2008. This is evident in Table 1 and means it becomes increasingly difficult for any one secondary school to recruit the best prior attaining students because students are becoming increasingly similar. Yet this does not explain why the differences are being maintained not decreased.

A more compelling reason is the one alluded to when discussing the patterns of transition in London and the markets in which schools compete. They are geographical. What is more, they will remain geographical for so long as admissions criteria for popular schools employ geographical criteria, for so long as ease of access is important for school choice, and for so long as people value the community role of schools. If, in the final analysis, what most parents want is access to a good local school where their children will be valued, respected and well educated, then we ought not to be surprised if recent educational reforms have done little to increase or decrease social segregation. Put simply, the geographical determinants of separation are stronger.

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