

# An explanatory model of the level of segregation in each LEA

Stephen Gorard  
Cardiff University School of Social Sciences

This piece is part of an ESRC-funded project investigating the impact of markets in public policy (R000238031). A fuller account of the methods and data is available in Gorard (2000). The paper contains a summary of one regression model used to identify the likely determinants of socio-economic segregation between schools. Several such models have been run and, as explained below, there are several equivalent solutions due to the strong inter-relationships between some of the available predictor variables. The dependent variable here is the level of segregation in each LEA in England in 2000, as assessed by the Gorard segregation index for free-school-meal eligibility. Equivalent models have been run for the levels of segregation in each year from 1989 to 2000, and for changes in segregation 1989-1995, 1995-2000, and 1989-2000. For further discussion of these models, see Gorard et al. (2001).

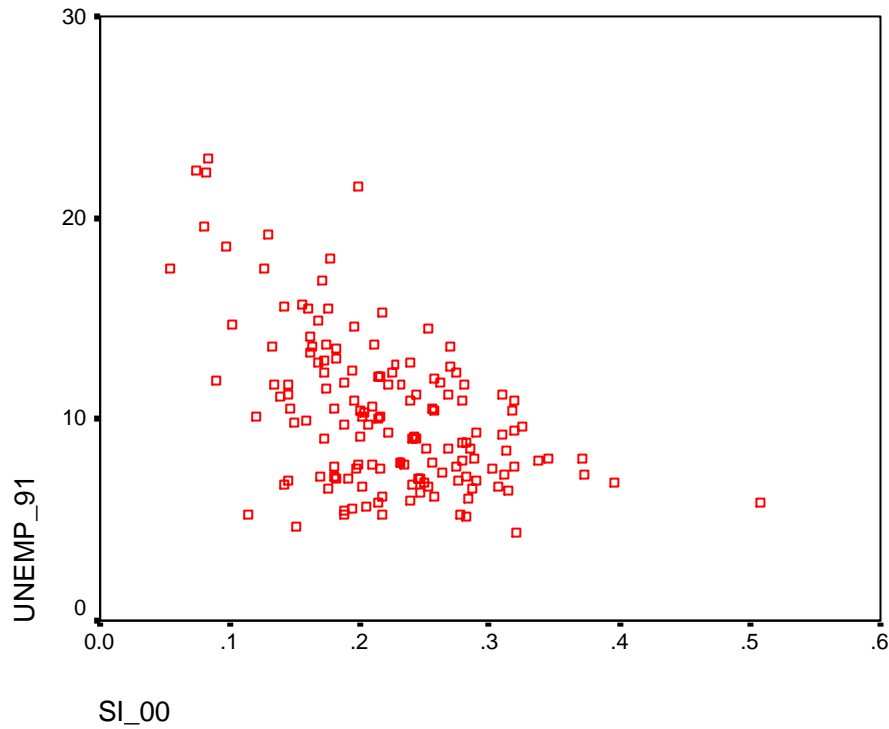
The potential predictor variables were entered into the model in three batches, selected first in terms of theoretical explanations for the causes of segregation, and then in terms of the amount of variance in segregation they 'explained'. Where potential predictors were themselves highly inter-related the one with the strongest relationship to dependent variable was used. The three batches represent variables to do with local geography, the nature of local schools, and appeals heard against placement. The latter are used here as an indicator of market forces. In addition to the variables listed here, there were a number of indicators not found relevant at all to levels of local segregation. Most notable, perhaps, was the local level of per-pupil funding.

## **Stage 1 – Local geography variables**

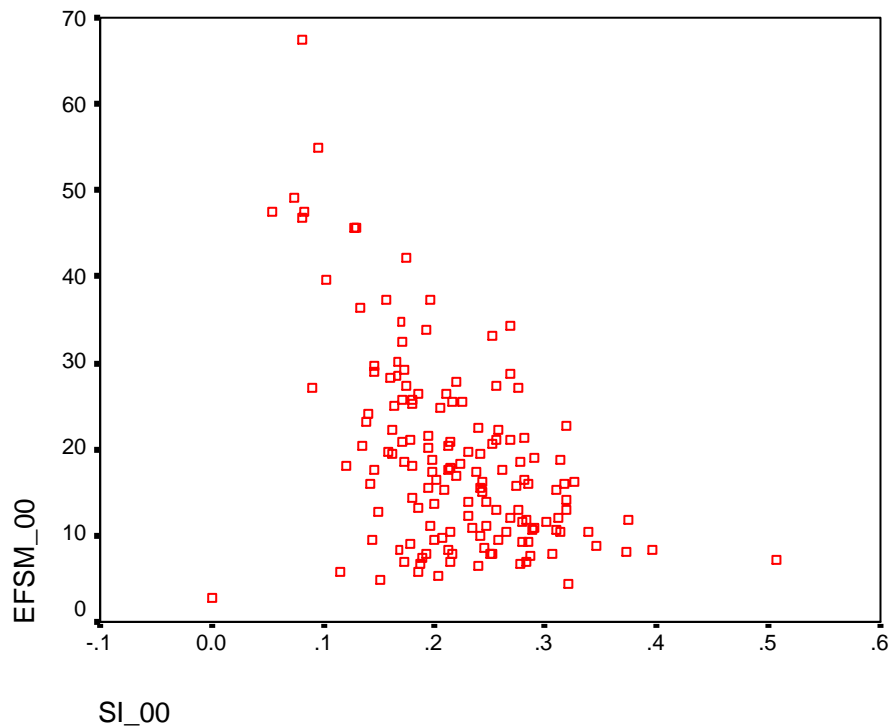
Clearly many of the potential geographical variables are themselves inter-related. There tends to be greater poverty and higher level of ethnic minorities in urban areas, for example. Two of the three highest single correlations are between the dependent variable and the local level of unemployment as assessed by the census 1991 (Figure 1) and the percentage of pupils eligible for free-school-meals (Figure 2). However, the two predictors are themselves even more highly correlated ( $R=0.92$ ) and so only unemployment is used for the multiple regression analysis. Note that the relationship between the local level of free-school-meals and segregation between school occurs despite the strongly composition invariant nature of the segregation index (Gorard and Taylor 2000), and that the direction of the relationship is the opposite of that occurring with compositionally-variant indices such as the dissimilarity index. This relationship is, therefore, an important empirical finding. Areas with higher levels of unemployment and poverty tend to have lower between-school segregation. These two predictors are also highly related to local population density ( $R=0.72$ ), suggesting that all are indicators of the nature of local housing rather than economic status *per se*. Urban areas have greater poverty, larger ethnic minority populations, better public transport, close-set housing, variable-cost housing, and less segregation in schools.

These are also the areas showing the greatest decline in segregation since 1989 (Gorard 2000).

**Figure 1 – LEA-level relationship between segregation and local unemployment (R=-0.52)**



**Figure 2 – LEA-level relationship between segregation and local poverty (R=-0.51)**



The multiple correlation between the segregation index for each LEA and the geographical and population characteristics of that LEA is  $R=0.84$ . Table 1 shows the individual correlations between segregation and each of the potential predictors. In addition to the items discussed above, areas with lower segregation are more likely to have Labour councillors (see below for grammar schools), more unauthorised absence, pupils with English as an additional language, and those with special needs or who are permanently excluded from school. Areas with greater segregation, otherwise, tend to be larger and increasing in terms of the number of pupils, thereby putting pressure on school places (see below for surplus places). The bulk of the variation in segregation can be ‘explained’ by variables such as these.

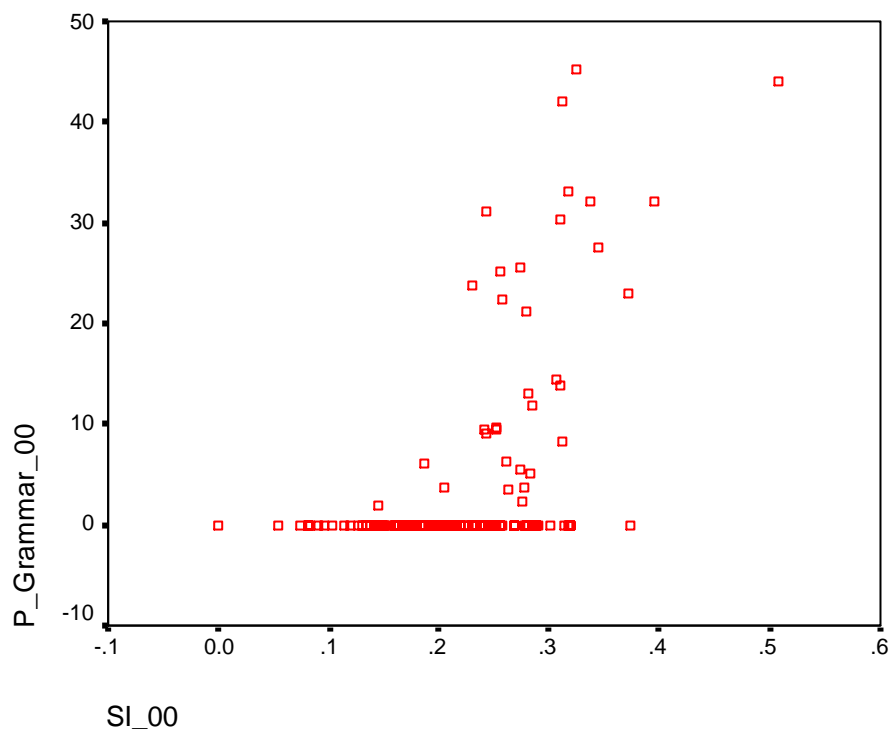
**Table 1 – Relationships between segregation and geographical characteristics**

<i>Predictor</i>	<i>Correlation</i>
Unemployment %	-.52
Population density	-.35
Conservative councillors %	+.42
Labour councillors %	-.29
Number of pupils	+.33
Growth in number of pupils since 1995	+.26
Free-school-meal eligibility	-.51
English as an additional language	-.29
Growth in EAL/ESL since 1995	-.10
Special educational needs statements	-.28
Permanent exclusions %	-.22
Unauthorised absence (half-days)	-.43
Growth in unauthorised absence	+.23
Number of ‘white’ ethnicity pupils	+.24
Number of Black-Caribbean pupils	-.31
Number of Black-African pupils	-.37
Number of Black ‘other’ pupils	-.28
Number of Bangladeshi pupils	-.23

## **Stage 2 – School organisation variables**

The strongest single relationship between segregation and the nature of local schools concerns the proportion of grammar schools. Figure 3 shows that most LEAs have no grammar schools, but for those that do there is a clear growth in segregation with growth in selection.

**Figure 3 – LEA-level relationship between segregation and selection at school (R=0.54)**



The multiple correlation between the segregation index for each LEA and the geographical *and* school organisation characteristics of that LEA is  $R=0.97$ . Table 2 shows the individual correlations between segregation and each of the potential predictors. Segregation tends to be higher in larger LEAs in terms of the number of schools (see above), and those with considerable diversity of schooling in terms of Secondary Moderns, Grammars, Independent, Foundation, and Faith-based schools. Segregation is lower in areas with more comprehensive provision controlled by the LEA, and more surplus places. The latter has been the subject of some erroneous commentary. Surplus places reduce the likelihood of appeals being needed (see below), presumably because more families can obtain their first choice of placement. Rather than increasing segregation, as some commentators would have it, this actually reduces it, presumably by weakening the link between residence and school.

**Table 2 – Relationships between segregation and school organisation**

<i>Predictor</i>	<i>Correlation</i>
Number of schools	+0.33
Secondary Modern %	+0.40
Grammar schools %	+0.54
Comprehensive %	-0.48
Independent schools	+0.20
Voluntary-controlled schools	+0.11
Voluntary-aided schools	+0.07
GM/foundation schools	+0.33
LEA-controlled schools %	-0.19
Surplus places %	-0.35

Almost all of the variation in segregation can be ‘explained’ by the kinds of variables discussed so far. None of these are clearly market-based. Selection *by* schools

predates 1989 and is anyway the antithesis of parental choice. The kinds of diversity in local schools shown here are historical in nature and not market-driven (Gorard 1997).

### Stage 3 – ‘Market’ variables

The multiple correlation between the segregation index for each LEA and the geographical, school organisation *and* ‘market’ variables is  $R=1.00$ . It is possible to calculate precisely the level of segregation in 2000 (and indeed any available year) using the kinds of variables discussed so far. This is a remarkable finding, but it must be remembered that segregation is a property of groups of schools not of individual schools, families, or pupils. The patterns described here are, and can only be, in the aggregate and they are simply correlations (but ones that our more detailed fieldwork can expand and challenge). They do not deny a role for policy, agency, or serendipity in the school allocation process. However, using the local level of appeals as an indicator of the strength of market forces, it is clear from Table 3 that these forces are related to levels of segregation. However, their overall impact is dwarfed by the impact of geography and school organisation – factors which largely predate and are largely independent of the Education Reform Act 1988.

**Table 3 – Relationships between segregation and appeals against placement**

Appeals lodged	+ .28
Appeals heard	+ .26
Appeals upheld	+ .29

### References

- Gorard, S. (1997) *School choice in an established market*, Aldershot: Ashgate
- Gorard, S. (2000) *Education and Social Justice*, Cardiff: University of Wales Press
- Gorard, S. and Taylor, C. (2000) *A comparison of segregation indices used for assessing the socio-economic composition of schools*, Measuring Markets: the case of the ERA 1988 Working Paper 37, Cardiff: Cardiff University School of Social Sciences
- Gorard, S., Taylor, C. and Fitz, J. (2001) Explaining school segregation presentation at BERA Conference, Leeds, 8-10th September, also available on *Education-line*