

**Excellence in Cities**

**National Evaluation of  
Excellence in Cities  
2002 - 2006**

*NFER*

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*National Evaluation of Excellence in Cities*  
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# Analysis of the Excellence in Cities Data 2002 to 2006

## Introduction

1. The Excellence in Cities (EiC) Programme including Excellence Clusters, provided additional resources and guidance for schools in the most disadvantaged communities between September 1999 and March 2006. Since April 2006 EiC funding has been mainstreamed and now forms part of the School Development Grant. This means schools have the freedom to decide on the best use of their EiC resource and strategies for supporting school improvement and tackling barriers to pupil achievement resulting from disadvantage.

2. A consortium of the National Foundation for Educational Research, the London School of Economics, and the Institute of Fiscal Studies evaluated the impact of the programme from 2000-2003. The study found emerging signs of impact in terms of a partnership dividend and progress in pupils' attitude to learning, and whilst it also found a positive impact on Key Stage 3 maths results, it was probably too early to tell any thing more complete, given that partnerships take time to establish themselves and no pupil had spent their entire secondary education in an EiC school.

3. This report therefore follows up this earlier research by focusing on the period 2002-2006 and, in particular, the following research questions:

- a) What evidence is there of the impact of EiC across the years 1999/00 to 2005/06;
- b) Is EiC narrowing the attainment gap between the pupils from more and less disadvantaged backgrounds;
- c) Whether there is a difference between the performance of deprived pupils at schools with a high proportion of deprived pupils comparing schools in EiC areas and non EiC areas;
- d) Whether the performance of deprived pupils in schools with lots of deprived pupils varies within EiC areas (Phases).

## Approach

4. To tackle these research questions we have modelled the relationship between Key Stage 4 outcomes and pupil and school characteristics using a technique known as Multi-Level Modelling. This allows the analysis to separate out the impact of EiC by comparing progress of pupils in EiC schools with similar pupils in non-EiC schools (see Appendix A for more explanation). The data for the study was taken from the National Pupil Database (NPD), the Pupil Level Annual School Census (PLASC) and the Annual School Census (ASC). Since EiC was targeted on the most deprived areas, we have created a cohort of pupils in non-EiC schools that allows for a more like with like comparison (see Appendix A for more details). The table below gives a summary of the data used in the analysis and highlights how the creation of

the sample of non-EiC pupils has created two cohorts that are more similar in certain characteristics. As the focus of this analysis is on deprivation two measures have been incorporated into the analysis. FSM is the measure of pupil deprivation and the Income Deprivation Affecting Children Index (IDACI) is the school-level measure of deprivation<sup>1</sup>.

Indicator	EiC Pupils	Non-EiC Pupils before selection	Non-EiC pupils after selection
Eligibility for free school meals	25.6%	8.5%	14.9%
KS2 English level 4+	67.8%	74.6%	70.0%
KS2 Maths level 4+	65.0%	71.0%	66.3%
KS2 Science level 4+	77.1%	81.7%	79.1%
KS2 Average points score	25.8	26.7	26.1
IDACI Measure of Deprivation	0.32	0.16	0.22

## Results

5. Descriptive statistics give a foretaste of the results from more detailed analysis. The table below shows that whichever Key Stage 4 outcome measure we examine the average change in EiC schools between 2002 and 2006 is greater than the equivalent for similar schools not in the EiC Programme.

	Best 8 Score	English Score	Maths Score	5+ A* to C GCSE Grades	5+ A* to C Grades with English and Maths
EiC pupils in 2002	32.67	4.38	3.95	43.6%	33.5%
EiC pupils in 2006	35.07	4.55	4.21	53.2%	38.8%
<b>Change</b>	<b>+2.4</b>	<b>+0.17</b>	<b>+0.26</b>	<b>+9.6</b>	<b>+5.3</b>
Non-EiC pupils in 2002	34.35	4.53	4.17	47.9%	37.7%
Non-EiC pupils in 2006	35.45	4.61	4.31	52.6%	40.2%
<b>Change</b>	<b>+1.1</b>	<b>+0.08</b>	<b>+0.14</b>	<b>+4.7</b>	<b>+2.5</b>

6. We now discuss the results from the more detailed Multi-Level Models, to determine the contribution of EiC to these changes. The full models with

<sup>1</sup> An IDACI score of 0 indicates a low level of deprivation and a score of 1 indicates the highest level of deprivation.

significant coefficients can be found in the Appendix B.

### **GCSE Best 8 Score**

7. GCSE Best 8 score (or capped score) is calculated by taking the best 8 GCSE results for an individual pupil and summing the grade points, i.e. A\*=8 points to G=1 point. If a candidate only has results for 5 GCSEs then the score is calculated for those 5.

8. As with most value added models prior attainment has the largest explanatory power of any variable and has a positive relationship with GCSE outcome. As prior attainment increases, so does the best 8 score.

### *Impact of EiC Overall*

9. There is an overall EiC effect where pupils in EiC schools, on average and irrespective of year, progress 1.5 GCSE points more than similar pupils in non-EiC schools. (Due to the inclusion of interactions between EiC and prior attainment and EiC with IDACI, the EiC effect discussed here, and elsewhere, is for a pupil with average prior attainment and in a school with average levels of deprivation). The model also identifies that in the academic years 2003 to 2006 there is an additional benefit of being in an EiC school of approximately 0.2 of a GCSE point, suggesting a total benefit of 1.7 GCSE points by 2006. The average progress in these years is therefore, on average, greater than in 2002, although there is no consistent year on year increase.

### *Additional Impacts of EiC for FSM Pupils*

10. There would appear to be no additional benefit, over and above the EiC effect, for pupils eligible for Free School Meals (FSM), in fact there is a small negative effect for EiC pupils on FSM. By 2006 EiC pupils on FSM were attaining, on average, 1.5 GCSE points more than a similar pupil in a non-EiC school.

### *Additional Impacts of EiC for FSM Pupils in Schools with a High Proportion of Deprived Pupils*

11. We see that there is a significant negative relationship between the average school-level Income Deprivation Affecting Children Index (IDACI), our measure of deprivation, and attainment. As deprivation increased, average progress decreased. A 10 point increase in the deprivation index would see, on average and for all pupils, a best 8 score lower by 2.5 GCSE points. We see that EiC serves to ameliorate the negative relationship between deprivation and attainment. For all EiC pupils the same 10 point change in the deprivation index would see average progress in the best 8 score being lower by only 1.8 GCSE points. Therefore, for similar pupils in schools with the same level of deprivation, the effect of deprivation is less on the EiC pupil than its effect on the pupils from the non-EiC school.

12. In the years 2004, 2005 and 2006 we see a relationship between IDACI and EiC so that the negative impact of deprivation on attainment is again reduced in these years. By 2006 an FSM pupil in an EiC school with a high

proportion of deprived pupils<sup>2</sup> achieved a Best 8, capped points score 2.0 points higher than a similar pupil in a similar non-EiC school.

#### *Differing Impact by Phase of EiC*

13. Pupils in Phase 1 schools made more progress, on average, than similar pupils in Phase 2 or Phase 3 schools. Pupils on FSM in Phase 2 schools made, on average, less progress than similar pupils in Phase 1 schools. Pupils on FSM and in Phase 3 schools made, on average, more progress than expected in 2005 and 2006. Although this positive effect did not cancel out the overall negative effect of being in a Phase 3 school.

#### **English GCSE Score**

##### *Impact of EiC Overall*

14. The relationship between EiC and progress in English is very similar to what we saw for the best 8 GCSE score. On average, pupils in EiC schools make more progress than similar pupils in non-EiC schools. On average they attain approximately 0.2 of a grade more, than similar pupils in non-EiC schools. Therefore for a group of 10 pupils, 2 will make a whole grade more progress than the same group of 10 pupils in a non-EiC school.

15. EiC pupils' progress in 2003, 2004 and 2005 was slightly more than the average progress made in 2002, by approximately 0.02 of a grade more progress. There was no significant difference for EiC pupils in 2006.

##### *Additional Impacts of EiC for FSM Pupils*

16. Pupils eligible for FSM do not receive any additional boost from the EiC Policy, beyond that experienced by their non-FSM peers. Overall, the average progress made by FSM pupils in EiC schools was 0.2 of a grade higher than similar pupils in non-EiC schools.

##### *Additional Impacts of EiC for FSM Pupils in Schools with a High Proportion of Deprived Pupils*

17. The relationship with deprivation is not as clear cut as we saw with the Best 8 outcome. The overall effect of school-level deprivation is negative, although again we see a positive relationship between EiC and deprivation, highlighting the possible effects of EiC in lessening the impact of deprivation. The relationship of deprivation with progress in English is not consistent over the years and so care must be taken when interpreting the results. The consistent effects are that EiC pupils make slightly more progress than expected and they would appear to also make slightly more progress as the deprivation index increases.

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<sup>2</sup> An IDACI score of 0.32.

18. Overall, by 2006 an FSM pupil in an EiC school with a high proportion of deprived pupils<sup>3</sup> achieved an English GCSE score 0.2 points higher than a similar pupil in a similar non-EiC school. This impact does not represent additional progress in comparison to 2002, where the impact was also 0.2 points higher, so the policy has possibly served to narrow the gap for these pupils but not at an increasing rate.

#### *Differing Impact by Phase of EiC*

19. Pupils in Phase 1 schools made, on average, more progress than similar pupils in Phase 2 or Phase 3 schools. Phase 2 pupils in 2005 made less progress than expected when compared to the progress of Phase 2 pupils in the other years. Even though there are some small effects from the relationship of Phase with FSM eligibility and year, they do not compensate for the much larger effect of being a pupil in a Phase 2 or Phase 3 school. Even with some of these effects pupils in Phase 1 schools still made, on average, more progress than similar pupils in Phase 2 or 3 schools

### **Mathematics GCSE Score**

#### *Impact of EiC Overall*

20. The story for maths is again similar to that for previous outcomes. There is an overall positive effect for being in an EiC school where pupils make, on average, more progress than pupils in non-EiC schools, approximately 0.1 of a grade. For our group of 10 pupils this would mean that one pupil would make one grade more progress than the same group of 10 pupils in a non-EiC school. There are fewer examples of year on year progress, over and above the EiC effect.

#### *Additional Impacts of EiC for FSM Pupils*

21. Pupils on FSM, on average, make slightly less progress in EiC schools than they do in non-EiC schools, by 0.03 of a GCSE grade, which makes a negligible impact on the possible benefit they receive overall from the policy, i.e. 0.1 of a GCSE grade. The effect of being on free school meals, on average and for all pupils is negative. The gap between the average performance of pupils on FSM and not on FSM remains relatively stable irrespective of whether the pupil is in an EiC or non-EiC school.

#### *Additional Impacts of EiC for FSM Pupils in Schools with a High Proportion of Deprived Pupils*

22. Like previous results, EiC helps to ameliorate the negative effect of the extent of school-level deprivation on pupil achievement. EiC pupils, on average, make more progress than similar pupils in non-EiC schools, as the level of deprivation increases.

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<sup>3</sup> An IDACI score of 0.32



23. Overall, by 2006 an FSM pupil in an EiC School with a high proportion of deprived pupils<sup>4</sup> achieved a Maths GCSE score 0.1 points higher than a similar pupil in a similar non-EiC school. Like the result for GCSE English, this impact does not represent progress in comparison to 2002, where the impact was also approximately 0.1 points higher, so the policy has possibly served to narrow the gap for these pupils but not at an increasing rate.

#### *Differing Impact by Phase of EiC*

24. Phase 1 pupils, on average, made more progress than similar pupils in Phase 2 or Phase 3 schools. Phase 2 pupils made less progress, on average in 2004, 2005 and 2006 than they did in the other years. Phase 3 pupils made less than expected progress in 2006.

#### ***Five plus A\* to C grades***

##### *Impact of EiC Overall*

25. There was no overall EiC effect in 2002 but we do see significant yearly progress, with this progress peaking in 2005. By 2006, the average EiC pupil was more likely to attain 5+ A\* - C grades than the average pupil in a non-EiC school, by 3.4 percentage points.

##### *Additional Impacts of EiC for FSM Pupils*

26. In 2002 EiC pupils on FSM, on average, were more likely to attain the 5+A\*-C GCSE pass threshold compared to similar pupils not in EiC schools. By 2006 EiC pupils on FSM were, on average, 5.2 percentage points more likely to achieve the threshold than their peers in non-EiC schools<sup>5</sup>. This is due to a year on year boost for all EiC pupils as well as the additional boost specific to FSM pupils.

##### *Additional Impacts of EiC for FSM Pupils in Schools with a High Proportion of Deprived Pupils*

27. There is a relationship between EiC and deprivation in that the impact of deprivation is less for pupils in EiC schools, although the overall impact of deprivation is still negative, i.e. EiC helps to mitigate the effect of being in a deprived school. By 2006, FSM pupils in EiC schools with a high proportion of deprived pupils were more likely to achieve 5+A\*-C GCSE passes than similar pupils in similar non-EiC schools by 6.7 percentage points<sup>6</sup>.

28. Focusing on a particular pupils, the following table identifies the probability of getting 5+ A\* - C grades for the same pupil but in different schools.

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<sup>4</sup> An IDACI score of 0.32.

<sup>5</sup> See footnote 4.

<sup>6</sup> See footnote 4

	<b>2002 prediction</b>	<b>2006 prediction</b>	<b>Change</b>
A boy, average KS2, white UK, no SEN, with FSM in a deprived EiC school	25.9%	38.1%	+12.2
A boy, average KS2, white UK, no SEN, with FSM in a deprived non-EiC school	23.0%	31.4%	+8.4

Note: Deprivation for this table is a score of 0.32 on the IDACI index.

29. The table clearly identifies that for two pupils, with the same characteristics, the increase in probability of attaining the outcome is greater in EiC schools.

#### *Differing Impact by Phase of EiC*

30. Pupils in Phase 1 and Phase 3 schools, on average, are more likely to attain 5+ A\* - C grades than similar pupils in Phase 2 schools. Pupils on FSM in Phase 2 schools are less likely to attain the outcome than similar pupils in other phases whilst the same pupils are also less likely to attain the outcome as deprivation increases. Although there are a number of significant relationships between Phase, FSM eligibility and the deprivation indicator there is no real year on year trend other than that identified for Phase 2 pupils on FSM. Overall there is a negative relationship with deprivation, whilst the impact of deprivation is less on pupils with FSM.

#### **Five plus A\* to C grades with English and Mathematics**

##### *Impact of EiC Overall*

31. The results for this outcome are very similar to those discussed for the 5+A\*-C GCSE pass rate, i.e. EiC pupils in 2002 were more likely to attain this outcome than similar pupils in non-EiC schools, and EiC pupils made more progress than similar pupils from 2003 to a peak in 2005, and continued to close the gap in 2006 - when they were 3.2 percentage points more likely to achieve the threshold<sup>7</sup>.

##### *Additional Impacts of EiC for FSM Pupils*

32. There was no additional EiC effect for pupils on FSM. The gap between pupils on FSM and pupils not on FSM remains relatively stable irrespective of whether the pupil is in an EiC or non-EiC school. FSM pupils in EiC schools are approximately 2 percentage points more likely to achieve 5+A\* - C including English and maths than similar pupils in non-EiC schools.

<sup>7</sup> The figures are for a pupil with average Key Stage 2 results, and who is in a school with average levels of free school meal eligibility, average levels of special educational needs and average levels of pupils with English as an additional language. All other indicators remain the same. When looking at the impact of deprivation the figures are for a 5 point increase in the deprivation index, i.e. more deprivation. IDACI is set equal to 0.32.

### *Additional Impacts of EiC for FSM Pupils in Schools with a High Proportion of Deprived Pupils*

33. Like previous results, EiC possibly helped to ameliorate the negative impact of being in a deprived school. EiC pupils in schools with a high proportion of deprived pupils are more likely, than similar pupils in similar non EIC schools, to attain the outcome in 2006, by 3.0 percentage points<sup>8</sup>.

34. Focusing on a particular pupil, the following table identifies the probability of getting 5+ A\* to C grades including English and maths for the same pupil but in different schools.

	<b>2002 prediction</b>	<b>2006 prediction</b>	<b>Change</b>
A boy, average KS2, white UK, no SEN, with FSM in a deprived <b>EiC</b> school	12.8%	17.4%	+4.6
A boy, average KS2, white UK, no SEN, with FSM in a deprived <b>non-EiC</b> school	11.1%	14.4%	+3.3

Note: Deprivation for this table is a score of 0.32 on the IDACI index.

35. The table clearly identifies that for two pupils, with the same characteristics, the increase in probability of attaining the outcome is greater in EiC schools.

#### *Differing Impact by Phase of EiC*

36. For the EiC only model the results are consistent with the findings from the previous model, except that all Phase 3 pupils were again less likely than pupils in Phase 1 in attaining 5+ A\* to C grades with English and maths.

### **Conclusions**

37. The analyses carried out on this dataset have provided robust and clear findings. An important point to remember is that as we have taken a sub sample of the non-EiC pupils the outcomes of the models may look different from what we would expect from just looking at the national results. In sampling the non-EiC pupils we have deliberately excluded many pupils from schools with a low proportion of deprived pupils, as measured by IDACI, as these are not directly comparable with our EiC pupils. These pupils are also more likely to be the higher attainers at GCSE, hence the problems in trying to directly compare the outcomes from this analysis with what would have been expected given the national results.

38. The results have focussed on the EiC effects and the relationship of EiC with pupil level and school level deprivation indicators. FSM eligibility was used as the pupil level indicator of deprivation and the Income Deprivation Affecting Children Index (IDACI) was used as the school level indicator.

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<sup>8</sup> See footnote 7.

Although there would appear to be some robust findings it must be remembered that the models only explain approximately 50% of the variation in outcomes.

39. The main questions to be answered were:

**a) *Is there evidence of EiC impact in 2006?***

Pupils in EiC schools, on average, made more progress than similar pupils in non EiC schools. This hold across all five GCSE outcomes - Best 8 Score; English Score; Maths Score; 5+ A\* to C GCSE Grades; 5+ A\* to C Grades with English and Maths and for the majority of years. For Best 8 and the two 5+ models the average progress made by EiC pupils in 2006 is significantly greater than the average progress made by similar pupils in 2002.

**b) *Is the impact of EiC serving to narrow the attainment gap between pupils from more or less advantaged backgrounds?***

**c) *Is there a positive effect on deprived pupils going to EiC schools with a high proportion of deprived pupils compared to their non-EiC counterparts?***

Questions b) and c) really need to be answered together as both talk of deprivation, one at pupil level and one at school level. When the school level deprivation indicator was introduced into the model any additional benefits of being on Free School Meals in an EiC school disappeared, or even became slightly negative. To recap, FSM pupils still benefit from the policy, but not by more than their non-FSM peers.

What would have appeared to have made an impact, on all pupils, was the level of school deprivation. As school deprivation increases the difference in average progress between a pupil in an EiC school and a pupil in a non-EiC school, increases. The impact of school level deprivation, as measured by IDACI, would appear to be lessened for pupils in EiC schools, particular in the later years of 2005 and 2006.

**d) *Which EiC phases are the best performers?***

Pupils in Phase 1 schools, on average, made more progress than similar pupils in the other Phases. Pupils in Phase 2 schools appear to make, on average, the least progress.

## Appendix A

### The Data

Analysis of the Excellence in Cities (EiC) datasets was to involve running multi-level models on five GCSE outcomes to primarily identify the relationship between deprivation and attainment. The main indicator of deprivation used was the Income Deprivation Affecting Children Index (IDACI). The IDACI measure was a school level indicator. At the pupil level eligibility for FSM was used as an indicator of deprivation. Outcomes used were best 8 GCSE score, English GCSE score and maths GCSE score. Two threshold measures were analysed and these were 5+ A to C grades and 5+ A to C grades with English and maths. In merging the 2002 to 2006 data a dataset of approximately 2.7 million cases was created. This was split into approximately 0.7 million EiC pupils and 2 million non-EiC pupils. To create a more balanced dataset where the number of EiC pupils and non-EiC pupils were more equal a selection of non-EiC pupils was carried out.

All EiC pupils were selected for the sub-sample. A methodology was then developed to create a subset of non-EiC pupils. One of the main issues with the analysis was to look at deprivation and by the very nature of the EiC program EiC pupils came from urban areas and were generally in the more deprived urban areas, although it is acknowledged that some of the most affluent areas could also be found in these EiC areas. As deprivation was an issue and the EiC cohort had higher levels of deprivation it was felt that the most deprived non-EiC pupils needed to remain in the subset of non-EiC pupils. The IDACI measure of deprivation was therefore split into quintiles and cases in the most deprived quintile were pre-selected into our sub-sample. This resulted in approximately 380,000 pupils. To obtain the correct number of non-EiC pupils a random selection of approximately 320,000 pupils was then carried out on the remaining non-EiC pupils. Table 1 illustrates how this random selection has made the non-EiC cohort more similar, in certain characteristics, to the EiC sample of pupils. The consequence of doing this is to make the analysis more robust in allowing more like-with-like comparisons. In sampling the non-EiC pupils we have deliberately excluded many pupils from schools with a low proportion of deprived pupils, as measured by IDACI, as these are not directly comparable with our EiC pupils. These pupils are also more likely to be the higher attainers at GCSE, hence the problems in trying to directly compare the outcomes from this analysis with what would have been expected given the national results.

**Table 1**

Indicator	EiC Pupils	Non-EiC Pupils before selection	Non-EiC pupils after selection
Eligibility for free school meals	25.6%	8.5%	14.9%
KS2 English level 4+	67.8%	74.6%	70.0%
KS2 Maths level 4+	65.0%	71.0%	66.3%
KS2 Science level 4+	77.1%	81.7%	79.1%
KS2 Average points score	25.8	26.7	26.1
IDACI Measure of Deprivation	0.32	0.16	0.22

Table 2 identifies, for 2002 and 2006, the raw results in the 5 GCSE outcomes for EiC and non-EiC pupils. It must be remembered that we have taken a sub sample of the non-EiC pupils and therefore, the results for this cohort may look different from the overall national results.

**Table 2**

	Best 8 Score	English Score	Maths Score	5+ A* to C GCSE Grades	5+ A* to C Grades with English and Maths
EiC pupils in 2002	32.67	4.38	3.95	43.6%	33.5%
EiC pupils in 2006	35.07	4.55	4.21	53.2%	38.8%
<b>Change</b>	<b>+2.4</b>	<b>+0.17</b>	<b>+0.26</b>	<b>+9.6</b>	<b>+5.3</b>
Non-EiC pupils in 2002	34.35	4.53	4.17	47.9%	37.7%
Non-EiC pupils in 2006	35.45	4.61	4.31	52.6%	40.2%
<b>Change</b>	<b>+1.1</b>	<b>+0.08</b>	<b>+0.14</b>	<b>+4.7</b>	<b>+2.5</b>

To understand the relationship between deprivation and attainment a number of other independent variables at pupil and school level were used in the models. At pupil level these included a measure of Key Stage 2 prior attainment, statement of special educational needs (SEN), eligibility for free school meals, English as an additional language, gender and ethnicity. At school level we used IDACI, the percentage of pupils with free school meals, the percentage of pupils with English as an additional language (EAL) and the percentage of pupils with a statement of special educational needs (SEN). An EiC indicator and year indicators were also included.

The final model includes all the background characteristics previously mentioned but also includes an interaction that looks at the relationship between EiC, a pupils' eligibility for free school meals, the IDACI measure of deprivation and year. This looks at whether EiC pupils on free school meals perform differently depending on the level of deprivation in the school's intake and does this relationship change by year.

A separate model looked at only EiC pupils to identify the relationship between Phase of entry into EiC and attainment. As well as Phase information also included was partnership level self assessments on a variety of EiC related strands.

Table 3 identifies the amount of variation in outcome explained by the final model for each outcome, i.e. the adjusted R-squared. This figure is an estimate of the degree to which the independent variables explain the variation in the dependent variable.

**Table 3**

<i>Model</i>	<i>Best 8 GCSE Score</i>	<i>English Score</i>	<i>Maths Score</i>
Final Model	48%	45%	47%
Final Model - EIC schools only	47%	45%	46%

It can be seen from the table that the final models explain just under 50% of the variation in outcome.

### ***Multilevel Models***

Multilevel modelling is a development of a common statistical technique known as 'regression analysis'. This is a technique for finding a straight-line relationship which allows us to predict the values of some measure of interest ('dependent variable') given the values of one or more related measures. For example, we may wish to predict a pupils' average test performance in GCSE English given some background factors, such as size as eligibility for free school meals (FSM) or their prior attainment at Key Stage 2 (these are sometimes called 'independent variables').

Multilevel modelling is a recent development which takes account of data that is grouped into similar clusters at different levels. For example, individual pupils are grouped within schools. Multilevel modelling allows us to take account of this hierarchical structure of the data and produce more accurate predictions, as well as estimates of the differences between students, and between schools.

## ***Logistic Models***

To analyse the GCSE outcomes of 5+ A\* to C grades and 5+ with English and maths a logistic model was created. Due to the extremely complex nature of the models and the number of interaction terms there were a number of technical issues around the models' ability to converge, to actually compute reliable coefficients. For this reason the dataset was halved to produce a more workable dataset. A check was carried out to ensure we had very similar distributions of the key background variables.

Logistic regression is a form of regression analysis in which the outcome of interest is binary, i.e. just takes two values - for example: passing an exam or not passing an exam. A set of background variables can be used to predict the probabilities of the binary outcome, as in conventional regression analysis, but the coefficients relate to increasing or decreasing the probability that an outcome occurs.

Logistic regression deals with the relative *odds* associated with an event, which are equal to:

$$\frac{\text{Probability of event occurring}}{\text{Probability of event not occurring}}$$

The procedure gives an *odds ratio*, which compares the odds of an event (e.g. attaining 5+ A\* to C grades) associated with one group of students, with the odds for another group. An odds ratio close to one shows that there is little difference between two groups, whereas an odds ratio significantly greater or less than one indicates differences between groups.

All analysis discussed for the logistic models is based on a pupil with average attainment at key stage 2 and in a school with average deprivation, average levels of FSM, average levels of SEN and English as an additional language. As the means for the above indicators change from year to year it was important that this was taken into account when creating the average pupil. To do this a new variable is created that is centred around its mean. For example, K2AV minus the mean for K2AV. A pupil with a score above average will have a positive number and a pupil with a below average score will have a negative number. A pupil with average K2AV will have a score of zero. As the mean changes each year it was important to do this for each year separately. This was done for all the variables mentioned above.



## Appendix B

### Multi Level Model Results - GCSE Best 8 Score

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	5.917	1.004	*	3.949	7.885
School variance	44.045	1.160	*	41.771	46.319
Pupil variance	190.327	0.225	*	189.886	190.768
<b>Final model</b>					
LA variance	23.616	3.202	*	17.340	29.892
LA KS2 covariance	-0.756	0.104	*	-0.960	-0.552
LA KS2 Variance	0.025	0.003	*	0.019	0.031
School variance	45.749	1.548	*	42.715	48.783
School KS2 covar.	-1.454	0.052	*	-1.556	-1.352
School KS variance	0.052	0.002	*	0.048	0.056
Pupil variance	98.620	0.117	*	98.391	98.849
<b>Fixed coefficients</b>					
Cons	-8.012	0.566	*	-9.121	-6.903
K2av	1.878	0.018	*	1.843	1.913
EiC	1.482	0.025	*	1.434	1.530
EiC03	0.169	0.054	*	0.063	0.275
EiC04	0.218	0.063	*	0.095	0.341
EiC05	0.300	0.073	*	0.157	0.443
EiC06	0.212	0.073	*	0.069	0.355
EiCks2av	-0.176	0.029	*	-0.233	-0.119
EiCfsm	-0.198	0.054	*	-0.304	-0.092
EiCidacic	0.073	0.010	*	0.053	0.093
EiCidac04	0.027	0.003	*	0.021	0.033
EiCidac05	0.024	0.003	*	0.018	0.030
EiCidac06	0.033	0.003	*	0.027	0.039
Eal	3.281	0.053	*	3.177	3.385
Sensa	-6.670	0.027	*	-6.723	-6.617

Senstat	-2.497	0.060	*	-2.615	-2.379
Female	2.645	0.018	*	2.610	2.680
year06	-1.799	0.039	*	-1.875	-1.723
year03	0.092	0.038	*	0.018	0.166
year04	-2.051	0.038	*	-2.125	-1.977
year05	-2.882	0.038	*	-2.956	-2.808
Pcfsmx	-0.019	0.004	*	-0.027	-0.011
Pcsenx	-0.039	0.015	*	-0.068	-0.010
Pcealx	-0.010	0.002	*	-0.014	-0.006
Grammar	4.569	0.215	*	4.148	4.990
Faith	0.809	0.074	*	0.664	0.954
Ethmix	0.425	0.063	*	0.302	0.548
Whitoth	1.571	0.063	*	1.448	1.694
gypsy traveller	-4.178	0.458	*	-5.076	-3.280
Asiani	3.954	0.070	*	3.817	4.091
Asianp	2.925	0.072	*	2.784	3.066
Asianb	4.148	0.098	*	3.956	4.340
Asiano	3.888	0.129	*	3.635	4.141
Blackc	0.773	0.063	*	0.650	0.896
Blacka	3.755	0.081	*	3.596	3.914
Blacko	0.192	0.105		-0.014	0.398
Chinese	5.413	0.151	*	5.117	5.709
Ethoth	3.004	0.089	*	2.830	3.178
Boysch	0.959	0.176	*	0.614	1.304
Girlsch	1.899	0.181	*	1.544	2.254
Idaci	-0.258	0.008	*	-0.274	-0.242
Fsm	-4.231	0.039	*	-4.307	-4.155
fsm06	0.328	0.057	*	0.216	0.440
Fsmidacic	0.076	0.002	*	0.072	0.080

## Multi Level Model Results - GCSE English Score

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.079	0.013	*	0.054	0.104
School variance	0.580	0.015	*	0.551	0.609
Pupil variance	2.706	0.003	*	2.700	2.712
<b>Final model</b>					
LA variance	0.298	0.040	*	0.220	0.376
LA KS2 covariance	-0.010	0.001	*	-0.012	-0.008
LA KS2 Variance	0.000	0.000		0.000	0.000
School variance	0.534	0.019	*	0.497	0.571
School KS2 covar.	-0.017	0.001	*	-0.019	-0.015
School KS variance	0.001	0.000	*	0.001	0.001
Pupil variance	1.477	0.002	*	1.473	1.481
<b>Fixed coefficients</b>					
Cons	-0.479	0.064	*	-0.604	-0.354
K2av	0.213	0.002	*	0.209	0.217
EiC	0.161	0.028	*	0.106	0.216
EiC03	0.015	0.007	*	0.001	0.029
EiC04	0.019	0.008	*	0.003	0.035
EiC05	0.024	0.009	*	0.006	0.042
EiC06	-0.015	0.009		-0.033	0.003
EiCks2av	-0.014	0.003	*	-0.020	-0.008
EiCfsm03	0.028	0.014	*	0.001	0.055
EiCidacic	0.008	0.001	*	0.006	0.010
EiCidac05	-0.002	0.000	*	-0.002	-0.002
EiCidac06	0.002	0.000	*	0.002	0.002
EiCfsmidac05	0.003	0.001	*	0.001	0.005
EiCfsmidac06	-0.003	0.001	*	-0.005	-0.001
Eal	0.227	0.006	*	0.215	0.239
Sensa	-0.746	0.003	*	-0.752	-0.740
Senstat	-0.469	0.008	*	-0.485	-0.453

Female	0.518	0.002	*	0.514	0.522
year06	-0.236	0.005	*	-0.246	-0.226
year03	0.173	0.005	*	0.163	0.183
year04	-0.307	0.005	*	-0.317	-0.297
year05	-0.410	0.005	*	-0.420	-0.400
Pcfsmx	-0.002	0.000	*	-0.002	-0.002
Grammar	0.594	0.026	*	0.543	0.645
Faith	0.124	0.009	*	0.106	0.142
Ethmix	0.109	0.008	*	0.093	0.125
Whitoth	0.154	0.008	*	0.138	0.170
gypsy traveller	-0.433	0.057	*	-0.545	-0.321
Asiani	0.383	0.009	*	0.365	0.401
Asianp	0.327	0.009	*	0.309	0.345
Asianb	0.441	0.012	*	0.417	0.465
Asiano	0.359	0.016	*	0.328	0.390
Blackc	0.147	0.008	*	0.131	0.163
Blacka	0.465	0.010	*	0.445	0.485
Blacko	0.085	0.013	*	0.060	0.110
Chinese	0.364	0.018	*	0.329	0.399
Ethoth	0.271	0.011	*	0.249	0.293
Boysch	0.143	0.021	*	0.102	0.184
Girlsch	0.208	0.021	*	0.167	0.249
idaci*100	-0.028	0.001	*	-0.030	-0.026
Fsm	-0.417	0.006	*	-0.429	-0.405
fsm03	-0.078	0.012	*	-0.102	-0.054
fsm04	-0.069	0.009	*	-0.087	-0.051
fsm06	0.065	0.009	*	0.047	0.083
Fsmidacic	0.006	0.000	*	0.006	0.006
fsmidac06	0.003	0.001	*	0.001	0.005
fsmidac04	0.002	0.001	*	0.000	0.004

### Multi Level Model Results - GCSE Mathematics Score

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.107	0.018	*	0.072	0.142
School variance	0.709	0.019	*	0.672	0.746
Pupil variance	3.037	0.004	*	3.029	3.045
<b>Final model</b>					
LA variance	0.348	0.049	*	0.252	0.444
LA KS2 covariance	-0.011	0.002	*	-0.015	-0.007
LA KS2 Variance	0.000	0.000		0.000	0.000
School variance	0.826	0.028	*	0.771	0.881
School KS2 covar.	-0.028	0.001	*	-0.030	-0.026
School KS variance	0.001	0.000	*	0.001	0.001
Pupil variance	1.606	0.002	*	1.602	1.610
<b>Fixed coefficients</b>					
Cons	-1.713	0.070	*	-1.850	-1.576
K2av	0.258	0.002	*	0.254	0.262
EiC	0.116	0.030	*	0.057	0.175
EiC03	0.017	0.007	*	0.003	0.031
EiC04	0.007	0.008		-0.009	0.023
EiC05	-0.008	0.009		-0.026	0.010
EiC06	-0.008	0.009		-0.026	0.010
EiCks2av	-0.020	0.004	*	-0.028	-0.012
EiCfsm	-0.033	0.007	*	-0.047	-0.019
EiCidacic	0.008	0.001	*	0.006	0.010
EiCidac03	-0.003	0.000	*	-0.003	-0.003
EiCidac06	0.003	0.000	*	0.003	0.003
Eal	0.344	0.007	*	0.330	0.358
Sensa	-0.553	0.003	*	-0.559	-0.547
Senstat	0.029	0.008	*	0.013	0.045
Female	-0.066	0.002	*	-0.070	-0.062
year06	-0.248	0.005	*	-0.258	-0.238

year03	-0.092	0.005	*	-0.102	-0.082
year04	-0.304	0.005	*	-0.314	-0.294
year05	-0.391	0.005	*	-0.401	-0.381
Female	-0.066	0.002	*	-0.070	-0.062
Pcfsmx	-0.003	0.001	*	-0.005	-0.001
Pcsenx	-0.009	0.002	*	-0.013	-0.005
Grammar	0.672	0.029	*	0.615	0.729
Faith	0.090	0.010	*	0.070	0.110
Ethmix	-0.020	0.008	*	-0.036	-0.004
Whith	0.091	0.008	*	0.075	0.107
gypsy traveller	-0.391	0.059	*	-0.507	-0.275
Asiani	0.564	0.009	*	0.546	0.582
Asianp	0.317	0.009	*	0.299	0.335
Asianb	0.440	0.013	*	0.415	0.465
Asiano	0.581	0.016	*	0.550	0.612
Blackc	-0.048	0.008	*	-0.064	-0.032
Blacka	0.344	0.010	*	0.324	0.364
Blacko	-0.104	0.013	*	-0.129	-0.079
Chinese	0.913	0.019	*	0.876	0.950
Ethoth	0.340	0.011	*	0.318	0.362
Boysch	0.106	0.024	*	0.059	0.153
Girlsch	0.279	0.024	*	0.232	0.326
idaci*100	-0.027	0.001	*	-0.029	-0.025
Fsm	-0.392	0.005	*	-0.402	-0.382
fsm03	-0.021	0.008	*	-0.037	-0.005
fsm06	0.064	0.008	*	0.048	0.080
Fsmidacic	0.007	0.000	*	0.007	0.007

### Multi Level Model Results - 5+ A\* to C GCSE Grades

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.050	0.009	*	0.03	0.07
School variance	0.496	0.014	*	0.47	0.52
<b>Final model</b>					
LA variance	0.074	0.011	*	0.05	0.10
LA KS2 covariance	-0.015	0.002	*	-0.02	-0.01
LA KS2 Variance	0.004	0.001	*	0.00	0.01
School variance	0.285	0.009	*	0.27	0.30
School KS2 cov.	-0.034	0.002	*	-0.04	-0.03
School KS variance	0.010	0.000	*	0.01	0.01
<b>Fixed coefficients</b>					
Constant	-0.426	0.031	*	-0.487	-0.365
EIC	0.053	0.038		-0.021	0.127
EIC03	0.035	0.020		-0.004	0.074
EIC04	0.105	0.021	*	0.064	0.146
EIC05	0.140	0.022	*	0.097	0.183
EIC06	0.136	0.021	*	0.095	0.177
EICFSM	0.090	0.028	*	0.035	0.145
EICFSM04	-0.053	0.023	*	-0.098	-0.008
EICFSM05	0.084	0.028	*	0.029	0.139
EICIDACI	0.014	0.002	*	0.010	0.018
KS2AVC	0.400	0.006	*	0.388	0.412
FSM	-0.690	0.015	*	-0.719	-0.661
SENSA	-1.062	0.012	*	-1.086	-1.038
SENSTAT	-0.429	0.033	*	-0.494	-0.364
EAL	0.505	0.020	*	0.466	0.544
FEMALE	0.431	0.007	*	0.417	0.445
IDACIC	-0.037	0.002	*	-0.041	-0.033
PCFSMC	-0.007	0.001	*	-0.009	-0.005
PCEALC	-0.002	0.001	*	-0.004	0.000

GRAMMAR	1.797	0.075	*	1.650	1.944
FAITH	0.175	0.021	*	0.134	0.216
YEAR03	0.191	0.014	*	0.164	0.218
YEAR04	0.188	0.014	*	0.161	0.215
YEAR05	0.313	0.015	*	0.284	0.342
YEAR06	0.428	0.015	*	0.399	0.457
ETHMIX	0.070	0.023	*	0.025	0.115
WHITOTH	0.210	0.024	*	0.163	0.257
GYPSY TRAVELLER	-0.662	0.189	*	-1.032	-0.292
ASIANI	0.797	0.027	*	0.744	0.850
ASIANP	0.516	0.027	*	0.463	0.569
ASIANB	0.711	0.037	*	0.638	0.784
ASIANO	0.739	0.050	*	0.641	0.837
BLACKC	0.081	0.023	*	0.036	0.126
BLACKA	0.573	0.030	*	0.514	0.632
CHINESE	1.176	0.066	*	1.047	1.305
ETHOTH	0.500	0.034	*	0.433	0.567
ETHREFU	-0.169	0.028	*	-0.224	-0.114
FSMIDACI	0.016	0.001	*	0.014	0.018
IDACI05	0.003	0.001	*	0.001	0.005
IDACI06	0.002	0.001	*	0.000	0.004



### Multi Level Model Results - 5+ A\* to C GCSE Grades with English and Maths

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.067	0.012	*	0.04	0.09
School variance	0.600	0.016	*	0.57	0.63
<b>Final model</b>					
LA variance	0.058	0.009	*	0.04	0.08
LA KS2 covariance	-0.011	0.002	*	-0.01	-0.01
LA KS2 Variance	0.003	0.000	*	0.00	0.00
School variance	0.185	0.007	*	0.17	0.20
School KS2 covar.	-0.007	0.001	*	-0.01	-0.01
School KS variance	0.003	0.000	*	0.00	0.00
<b>Fixed coefficients</b>					
Constant	-1.252	0.029	*	-1.309	-1.195
EIC	0.105	0.039	*	0.029	0.181
EIC03	0.009	0.022		-0.034	0.052
EIC04	0.036	0.021		-0.005	0.077
EIC05	0.084	0.023	*	0.039	0.129
EIC06	0.047	0.023	*	0.002	0.092
EICIDAC1	0.011	0.002	*	0.007	0.015
EICIDAC105	0.004	0.002	*	0.000	0.008
EICIDAC106	0.004	0.002	*	0.000	0.008
KS2AVC	0.498	0.005	*	0.488	0.508
FEMALE	0.310	0.007	*	0.296	0.324
FSM	-0.714	0.011	*	-0.736	-0.692
SENSA	-1.201	0.015	*	-1.230	-1.172
SENSTAT	-0.704	0.045	*	-0.792	-0.616
EAL	0.418	0.021	*	0.377	0.459
IDACIC	-0.038	0.002	*	-0.042	-0.034
PCFSMC	-0.006	0.001	*	-0.008	-0.004
PCEALC	0.002	0.001	*	0.000	0.004

GRAMMAR	1.816	0.069	*	1.681	1.951
FAITH	0.195	0.021	*	0.154	0.236
YEAR03	0.149	0.015	*	0.120	0.178
YEAR04	0.163	0.015	*	0.134	0.192
YEAR05	0.153	0.017	*	0.120	0.186
YEAR06	0.312	0.017	*	0.279	0.345
WHITOTH	0.154	0.025	*	0.105	0.203
GYPSY	-0.600	0.225	*	-1.041	-0.159
ASIANI	0.877	0.027	*	0.824	0.930
ASIANP	0.557	0.029	*	0.500	0.614
ASIANB	0.741	0.039	*	0.665	0.817
ASIANO	0.795	0.050	*	0.697	0.893
BLACKA	0.644	0.032	*	0.581	0.707
CHINESE	1.200	0.062	*	1.078	1.322
ETHOTH	0.480	0.035	*	0.411	0.549
ETHREFU	-0.136	0.030	*	-0.195	-0.077
BOYSCH	0.131	0.042	*	0.049	0.213
GIRLSCH	0.337	0.039	*	0.261	0.413
FSMIDACI	0.015	0.001	*	0.013	0.017
IDACI05	-0.003	0.001	*	-0.005	-0.001
IDACI06	-0.003	0.001	*	-0.005	-0.001

## EiC Only Analysis

### Multi Level Model Results - GCSE Best 8 Score

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	3.002	1.126			
School variance	42.913	2.100	*	38.797	47.029
Pupil variance	194.798	0.327	*	194.157	195.439
<b>Final model</b>					
LA variance	18.140	4.240	*	9.830	26.450
LA KS2 covariance	-0.550	0.132	*	-0.809	-0.291
LA KS2 Variance	0.017	0.004	*	0.009	0.025
School variance	51.750	2.806	*	46.250	57.250
School KS2 covar.	-1.686	0.096	*	-1.874	-1.498
School KS variance	0.064	0.004	*	0.056	0.072
Pupil variance	102.955	0.173	*	102.616	103.294
<b>Fixed coefficients</b>					
Cons	-6.574	1.066	*	-8.663	-4.485
K2av	1.607	0.030	*	1.548	1.666
phase2	-5.392	1.410	*	-8.156	-2.628
phase3	-6.676	1.784	*	-10.173	-3.179
K2avcph2	0.173	0.044	*	0.087	0.259
K2avcph3	0.186	0.056	*	0.076	0.296
fsmidacph2	-0.053	0.006	*	-0.065	-0.041
fsmph3yr6	0.606	0.168	*	0.277	0.935
fsmph2	-0.785	0.071	*	-0.924	-0.646
Ph2yr4	-0.231	0.065	*	-0.358	-0.104
Ph2yr5	-0.304	0.066	*	-0.433	-0.175
Female	2.679	0.026	*	2.628	2.730
Fsm	-3.751	0.045	*	-3.839	-3.663
Eal	3.544	0.066	*	3.415	3.673
Sensa	-6.433	0.039	*	-6.509	-6.357
Senstat	-2.422	0.088	*	-2.594	-2.250

year03	0.286	0.040	*	0.208	0.364
year04	-1.412	0.046	*	-1.502	-1.322
year05	-2.063	0.047	*	-2.155	-1.971
year06	-1.067	0.041	*	-1.147	-0.987
Ethmix	0.273	0.081	*	0.114	0.432
Whitoth	1.527	0.082	*	1.366	1.688
gypsy traveller	-3.948	0.750	*	-5.418	-2.478
Asiani	3.620	0.090	*	3.444	3.796
Asianp	2.617	0.090	*	2.441	2.793
Asianb	3.780	0.115	*	3.555	4.005
Asiano	3.809	0.160	*	3.495	4.123
Blackc	0.688	0.074	*	0.543	0.833
Blacka	3.525	0.094	*	3.341	3.709
Chinese	5.723	0.197	*	5.337	6.109
Ethoth	3.092	0.107	*	2.882	3.302
Ethref	-0.904	0.123	*	-1.145	-0.663
Pcfsmx	-0.018	0.005	*	-0.028	-0.008
Pcsenx	0.070	0.024	*	0.023	0.117
Grammar	2.299	0.432	*	1.452	3.146
Faith	0.321	0.135	*	0.056	0.586
Boysch	0.773	0.294	*	0.197	1.349
Girlsch	2.519	0.327	*	1.878	3.160
idaci100mean	-0.185	0.010	*	-0.205	-0.165
Integration	-0.327	0.141	*	-0.603	-0.051
fsmidacyr3	-0.012	0.005	*	-0.022	-0.002
Fsmidac	0.089	0.003	*	0.083	0.095
idacyr4	0.024	0.003	*	0.018	0.030
idacyr5	0.021	0.003	*	0.015	0.027
idacyr6	0.034	0.003	*	0.028	0.040

## EiC Only results

### Multi Level Model Results - GCSE English Score

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.041	0.015			
School variance	0.567	0.028	*	0.512	0.622
Pupil variance	2.756	0.005	*	2.746	2.766
<b>Final model</b>					
LA variance	0.273	0.061	*	0.153	0.393
LA KS2 covariance	-0.008	0.002	*	-0.012	-0.004
LA KS2 Variance	0.000	0.000		0.000	0.000
School variance	0.573	0.032	*	0.510	0.636
School KS2 covar.	-0.019	0.001	*	-0.021	-0.017
School KS variance	0.001	0.000	*	0.001	0.001
Pupil variance	1.526	0.003	*	1.520	1.532
<b>Fixed coefficients</b>					
Cons	-0.379	0.128	*	-0.630	-0.128
K2av	0.187	0.004	*	0.179	0.195
phase2	-0.740	0.169	*	-1.071	-0.409
phase3	-0.780	0.214	*	-1.199	-0.361
K2avcph2	0.022	0.005	*	0.012	0.032
K2avcph3	0.019	0.006	*	0.007	0.031
fsmidacph2	-0.006	0.001	*	-0.008	-0.004
fsmph2yr4	-0.080	0.017	*	-0.113	-0.047
fsmph2yr5	-0.075	0.018	*	-0.110	-0.040
fsmph2yr6	0.097	0.019	*	0.060	0.134
fsmph3yr6	0.073	0.021	*	0.032	0.114
idacph2yr6	-0.002	0.001	*	-0.004	0.000
fsmph2	-0.066	0.012	*	-0.090	-0.042
Ph2yr5	-0.052	0.009	*	-0.070	-0.034
Ph2yr6	-0.069	0.009	*	-0.087	-0.051
Ph3yr3	-0.042	0.010	*	-0.062	-0.022
idacph2yr6	-0.002	0.001	*	-0.004	0.000

Female	0.514	0.003	*	0.508	0.520
Fsm	-0.380	0.006	*	-0.392	-0.368
Eal	0.243	0.008	*	0.227	0.259
Sensa	-0.716	0.005	*	-0.726	-0.706
Senstat	-0.450	0.011	*	-0.472	-0.428
year03	0.194	0.006	*	0.182	0.206
year04	-0.279	0.005	*	-0.289	-0.269
year05	-0.355	0.006	*	-0.367	-0.343
year06	-0.189	0.006	*	-0.201	-0.177
Ethmix	0.083	0.010	*	0.063	0.103
Whitoth	0.131	0.010	*	0.111	0.151
gypsy traveller	-0.457	0.094	*	-0.641	-0.273
Asiani	0.342	0.011	*	0.320	0.364
Asianp	0.299	0.011	*	0.277	0.321
Asianb	0.403	0.014	*	0.376	0.430
Asiano	0.345	0.020	*	0.306	0.384
Blackc	0.127	0.009	*	0.109	0.145
Blacka	0.443	0.011	*	0.421	0.465
Ethrefu	-0.057	0.015	*	-0.086	-0.028
Chinese	0.383	0.024	*	0.336	0.430
Ethoth	0.265	0.013	*	0.240	0.290
Pcfsmx	-0.002	0.001	*	-0.004	0.000
Pcsenx	0.007	0.003	*	0.001	0.013
Grammar	0.371	0.051	*	0.271	0.471
Faith	0.097	0.016	*	0.066	0.128
Boysch	0.106	0.033	*	0.041	0.171
Girlsch	0.254	0.035	*	0.185	0.323
idaci100mean	-0.020	0.001	*	-0.022	-0.018
Integration	-0.076	0.020	*	-0.115	-0.037
Beyondclassroom	0.060	0.002	*	0.056	0.064
fsmidacyr3	-0.002	0.001	*	-0.004	0.000
Fsmidac	0.008	0.000	*	0.008	0.008
fsmyr3	-0.028	0.011	*	-0.050	-0.006

## EIC Only results

### Multi Level Model Results - GCSE Maths Score

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.049	0.018			
School variance	0.676	0.033	*	0.611	0.741
Pupil variance	3.143	0.005	*	3.133	3.153
<b>Final model</b>					
LA variance	0.192	0.050	*	0.094	0.290
LA KS2 covariance	-0.006	0.002	*	-0.010	-0.002
LA KS2 Variance	0.000	0.000		0.000	0.000
School variance	0.894	0.048	*	0.800	0.988
School KS2 covar.	-0.032	0.002	*	-0.036	-0.028
School KS variance	0.001	0.000	*	0.001	0.001
Pupil variance	1.684	0.003	*	1.678	1.690
<b>Fixed coefficients</b>					
Cons	-1.455	0.125	*	-1.700	-1.210
K2av	0.225	0.003	*	0.219	0.231
phase2	-0.698	0.154	*	-1.000	-0.396
phase3	-0.872	0.195	*	-1.254	-0.490
K2avcph2	0.022	0.005	*	0.012	0.032
K2avcph3	0.022	0.006	*	0.010	0.034
fsmidacph2	-0.004	0.001	*	-0.006	-0.002
fsmph3yr6	0.072	0.025	*	0.023	0.121
fsmph2	-0.093	0.009	*	-0.111	-0.075
ph2yr4	-0.047	0.009	*	-0.065	-0.029
ph2yr5	-0.086	0.009	*	-0.104	-0.068
ph2yr6	-0.085	0.010	*	-0.105	-0.065
ph3yr6	-0.260	0.012	*	-0.284	-0.236
Female	-0.064	0.003	*	-0.070	-0.058
Fsm	-0.363	0.006	*	-0.375	-0.351
Eal	0.364	0.008	*	0.348	0.380

Sensa	-0.551	0.005	*	-0.561	-0.541
year03	-0.089	0.005	*	-0.099	-0.079
year04	-0.258	0.006	*	-0.270	-0.246
year05	-0.333	0.006	*	-0.345	-0.321
year06	-0.165	0.007	*	-0.179	-0.151
Ethmix	-0.034	0.010	*	-0.054	-0.014
Whitoth	0.091	0.011	*	0.069	0.113
Gypsy	-0.299	0.098	*	-0.491	-0.107
Asiani	0.542	0.012	*	0.518	0.566
Asianp	0.315	0.011	*	0.293	0.337
Asianb	0.431	0.015	*	0.402	0.460
Asiano	0.570	0.021	*	0.529	0.611
Blackc	-0.046	0.010	*	-0.066	-0.026
Blacka	0.337	0.012	*	0.313	0.361
Chinese	0.968	0.025	*	0.919	1.017
Ethoth	0.360	0.014	*	0.333	0.387
Ethrefu	-0.117	0.016	*	-0.148	-0.086
Pcfsmx	-0.003	0.001	*	-0.005	-0.001
Pcsenx	-0.010	0.003	*	-0.016	-0.004
Grammar	0.349	0.056	*	0.239	0.459
Boysch	0.125	0.037	*	0.052	0.198
Girlsch	0.317	0.041	*	0.237	0.397
idaci100mean	-0.018	0.001	*	-0.020	-0.016
Integration	-0.064	0.025	*	-0.113	-0.015
Beyondclassroom	0.055	0.028	*	0.000	0.110
fsmidacyr3	-0.003	0.001	*	-0.005	-0.001
Fsmidac	0.008	0.000	*	0.008	0.008
fsmyr6	0.049	0.010	*	0.029	0.069
idacyr6	0.004	0.000	*	0.004	0.004



## EiC Only results

### Multi Level Model Results - 5+ A\* to C GCSE Grades

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.025	0.011	*	0.00	0.05
School variance	0.491	0.024	*	0.44	0.54
<b>Final model</b>					
LA variance	0.073	0.019	*	0.04	0.11
LA KS2 covariance	-0.120	0.003	*	-0.13	-0.11
LA KS2 Variance	0.002	0.001	*	0.00	0.00
School variance	0.356	0.018	*	0.32	0.39
School KS2 covar.	-0.039	0.003	*	-0.04	-0.03
School KS variance	0.010	0.001	*	0.01	0.01
<b>Fixed coefficients</b>					
Constant	-0.650	0.061	*	-0.770	-0.530
PHASE2	-1.363	0.460	*	-2.265	-0.461
PHASE3	-0.129	0.069		-0.264	0.006
PH2YR4	-0.086	0.024	*	-0.133	-0.039
PH2YR5	-0.108	0.031	*	-0.169	-0.047
PH2YR6	-0.064	0.032	*	-0.127	-0.001
FSMIDACPH2	-0.005	0.002	*	-0.009	-0.001
FSMIDACYR3	-0.002	0.001	*	-0.004	0.000
FSMPH2	-0.136	0.018	*	-0.171	-0.101
FSMPH3YR6	0.109	0.044	*	0.023	0.195
PH2KS2AVC	0.049	0.015	*	0.020	0.078
K2AVC	0.343	0.010	*	0.323	0.363
FEMALE	0.425	0.007	*	0.411	0.439
FSM	-0.627	0.015	*	-0.656	-0.598
SENSA	-1.002	0.011	*	-1.024	-0.980
EAL	0.543	0.017	*	0.510	0.576
ETHMIX	0.062	0.020	*	0.023	0.101
WHITOTH	0.217	0.021	*	0.176	0.258

ASIANI	0.742	0.023	*	0.697	0.787
ASIANP	0.462	0.023	*	0.417	0.507
ASIANB	0.653	0.029	*	0.596	0.710
ASIANO	0.771	0.042	*	0.689	0.853
BLACKC	0.055	0.019	*	0.018	0.092
BLACKA	0.556	0.024	*	0.509	0.603
CHINESE	1.250	0.058	*	1.136	1.364
ETHOTH	0.533	0.027	*	0.480	0.586
ETHREFU	-0.071	0.031	*	-0.132	-0.010
GRAMMAR	1.410	0.125	*	1.165	1.655
PCFSMXC	-0.006	0.001	*	-0.008	-0.004
PCEALXC	-0.004	0.001	*	-0.006	-0.002
BOYSCH	0.160	0.060	*	0.042	0.278
GIRLSCH	0.380	0.057	*	0.268	0.492
IDAC100MEAN	-0.026	0.002	*	-0.030	-0.022
YEAR03	0.255	0.010	*	0.235	0.275
YEAR04	0.329	0.013	*	0.304	0.354
YEAR05	0.505	0.013	*	0.480	0.530
YEAR06	0.604	0.012	*	0.580	0.628
FSMYR4	0.076	0.021	*	0.035	0.117
FSMYR5	0.100	0.021	*	0.059	0.141
FSMYR6	0.047	0.022	*	0.004	0.090
FSMIDAC	0.016	0.001	*	0.014	0.018

## EiC Only results

### Multi Level Model Results - 5+ A\* to C GCSE Grades with English and Maths

Parameter	Estimate	Standard error	Sig.	95% Confidence interval	
				Min.	Max.
<b>Base case</b>					
LA variance	0.026	0.013	*	0.00	0.05
School variance	0.610	0.030	*	0.55	0.67
<b>Final model</b>					
LA variance	0.069	0.016	*	0.04	0.10
LA KS2 covariance	-0.012	0.003	*	-0.02	-0.01
LA KS2 Variance	0.003	0.001	*	0.00	0.00
School variance	0.217	0.012	*	0.19	0.24
School KS2 covar.	-0.007	0.001	*	-0.01	-0.01
School KS variance	0.003	0.000	*	0.00	0.00
<b>Fixed coefficients</b>					
Constant	-1.432	0.057	*	-1.544	-1.320
PHASE2	-1.795	0.452	*	-2.681	-0.909
PHASE3	-0.184	0.070	*	-0.321	-0.047
PH2YR4	-0.144	0.025	*	-0.193	-0.095
PH2YR5	-0.244	0.031	*	-0.305	-0.183
PH2YR6	-0.242	0.032	*	-0.305	-0.179
FSMIDACPH2	-0.007	0.002	*	-0.011	-0.003
FSMPH2	-0.189	0.021	*	-0.230	-0.148
FSMPH3YR6	0.098	0.048	*	0.004	0.192
PH2KS2AVC	0.064	0.015	*	0.035	0.093
KS2AVC	0.044	0.010	*	0.025	0.064
FEMALE	0.302	0.007	*	0.288	0.316
FSM	-0.580	0.012	*	-0.604	-0.556
SENSA	-1.128	0.014	*	-1.155	-1.101
EAL	0.449	0.018	*	0.414	0.484
WHITOTH	0.133	0.022	*	0.090	0.176
GYPSY TRAVELLER	-0.569	0.252	*	-1.063	-0.075

ASIANI	0.804	0.024	*	0.757	0.851
ASIANP	0.522	0.024	*	0.475	0.569
ASIANB	0.702	0.031	*	0.641	0.763
ASIANO	0.790	0.042	*	0.708	0.872
BLACKC	-0.054	0.021	*	-0.095	-0.013
BLACKA	0.578	0.025	*	0.529	0.627
CHINESE	1.200	0.054	*	1.094	1.306
ETHOTH	0.542	0.029	*	0.485	0.599
ETHREFU	-0.110	0.033	*	-0.175	-0.045
GRAMMAR	1.540	0.116	*	1.313	1.767
PCFSMXC	-0.006	0.001	*	-0.008	-0.004
BOYSCH	0.144	0.060	*	0.026	0.262
GIRLSCH	0.378	0.055	*	0.270	0.486
IDAC1100MEAN	-0.027	0.002	*	-0.031	-0.023
YEAR03	0.187	0.011	*	0.165	0.209
YEAR04	0.272	0.012	*	0.248	0.296
YEAR05	0.329	0.012	*	0.305	0.353
YEAR06	0.492	0.012	*	0.468	0.516
FSMIDAC	0.015	0.001	*	0.013	0.017

## Appendix C

### List of variables for main analysis

Variable label	Variable name
K2av	Average Key Stage 2 Point Score
EiC	Excellence in Cites
EiC03	Excellence in Cites 2003
EiC04	Excellence in Cites 2004
EiC05	Excellence in Cites 2005
EiC06	Excellence in Cites 2006
EiCks2av	Interaction of EIC with K2 average point score
EiCfsm	Interaction of EIC with free school meal eligibility
EiCfsm03	Interaction of EIC with free school meal eligibility and year 2003
EiCfsm04	Interaction of EIC with free school meal eligibility and year 2004
EiCfsm05	Interaction of EIC with free school meal eligibility and year 2005
EiCidacic	Interaction of EIC with IDACI Index
EiCidac03	Interaction of EIC with IDACI Index and year 2003
EiCidac04	Interaction of EIC with IDACI Index and year 2004
EiCidac05	Interaction of EIC with IDACI Index and year 2005
EiCidac06	Interaction of EIC with IDACI Index and year 2006
EiCfsmidac05	Interaction of EIC with fsm, IDACI Index and year 2005
EiCfsmidac06	Interaction of EIC with fsm, IDACI Index and year 2006
Eal	English as an additional language
Sensa	Special educational needs - no statement
Senstat	Special educational needs - statement
Female	Female
year06	Year 2006
year03	Year 2003
year04	Year 2004
year05	Year 2005
Pcfsmx	Percentage of pupils eligible for free school meals
Pcsenx	Percentage of pupils with special educational needs
Pcealx	Percentage of pupils with English as an additional language
Grammar	Grammar school
Faith	Religious school
Ethmix	Mixed ethnicity

Whitoth	White Other ethnicity
gypsy traveller	Gypsy traveller
Asiani	Asian – Indian
Asianp	Asian – Pakistani
Asianb	Asian - Bangladeshi
Asiano	Asian – Other
Blackc	Black Caribbean
Blacka	Black African
Blacko	Black Other
Chinese	Chinese
Ethoth	Other ethnicity
Boysch	Boys school
Girlsch	Girls school
Idaci	IDACI
Fsm	Free school meal eligibility
fsm03	Free school meal eligibility 2003
fsm04	Free school meal eligibility 2004
fsm05	Free school meal eligibility 2005
fsm06	Free school meal eligibility 2006
Fsmidacic	Interaction of free school meal eligibility with IDACI
fsmidac06	Interaction of free school meal eligibility with IDACI and year 2006
fsmidac04	Interaction of free school meal eligibility with IDACI and year 2004
idaci05	Interaction of IDACI with year 2005
idaci06	Interaction of IDACI with year 2006

## List of variables for EiC Only analysis

Variable name	Variable label
K2av	Average Key Stage 2 Point Score
phase2	Phase 2 school
phase3	Phase 3 school
K2avcph2	Interaction of Phase 2 with KS2 average points score
K2avcph3	Interaction of Phase 3 with KS2 average points score
fsmidacph2	Interaction of free school meals, Phase 2 and IDACI index
fsmidacph2yr4	Interaction of free school meals, Phase 2, IDACI index and year 2004
fsmph2yr3	Interaction of free school meals, Phase 2 and year 2003
fsmph2yr4	Interaction of free school meals, Phase 2 and year 2004
fsmph2yr5	Interaction of free school meals, Phase 2 and year 2005
fsmph2yr6	Interaction of free school meals, Phase 2 and year 2006
fsmph3yr3	Interaction of free school meals, Phase 3 and year 2003
fsmph3yr4	Interaction of free school meals, Phase 3 and year 2004
fsmph3yr5	Interaction of free school meals, Phase 3 and year 2005
fsmph3yr6	Interaction of free school meals, Phase 3 and year 2006
fsmph2	Interaction of free school meals and Phase 2
ph2yr3	Interaction of Phase 2 and year 2003
ph2yr4	Interaction of Phase 2 and year 2004
ph2yr5	Interaction of Phase 2 and year 2005
ph3yr3	Interaction of Phase 3 and year 2003
ph3yr4	Interaction of Phase 3 and year 2004
ph3yr5	Interaction of Phase 3 and year 2005
idacph2yr6	Interaction of IDACI with Phase 2 and year 2006
idacph2yr3	Interaction of IDACI with Phase 2 and year 2003
idacph3yr3	Interaction of IDACI with Phase 3 and year 2003
female	Female
fsm	Free school meal eligibility
eal	English as an additional language
sensa	Special educational needs - no statement
senstat	Special educational needs - statement
year03	Year 2003
year04	Year 2004
year05	Year 2005
year06	Year 2006

ethmix	Mixed ethnicity
whitoth	White Other ethnicity
gypsy traveller	Gypsy traveller
asiani	Asian – Indian
asianp	Asian – Pakistani
asianb	Asian - Bangladeshi
asiano	Asian – Other
blackc	Black Caribbean
blacka	Black African
blacko	Black Other
chinese	Chinese
ethoth	Other ethnicity
ethref	Ethnicity refused
pcfsmx	Percentage of pupils eligible for free school meals
pcsenx	Percentage of pupils with special educational needs
pcealx	Percentage of pupils with English as an additional language
grammar	Grammar school
faith	Religious school
boysch	Boys school
girlsch	Girls school
idaci	IDACI Index
integration	LA Self assessment - Integration
beyondclassroom	LA Self assessment - Beyond the classroom
fsmidacyr3	Interaction of free school meal eligibility with IDACI and year 2003
fsmidac	Interaction of free school meal eligibility with IDACI
fsmyr3	Free school meal eligibility 2003
fsmyr4	Free school meal eligibility 2004
fsmyr5	Free school meal eligibility 2005
fsmyr6	Free school meal eligibility 2006
idacyr4	Interaction of IDACI with year 2004
idacyr5	Interaction of IDACI with year 2005
idacyr6	Interaction of IDACI with year 2006



## Appendix D

### Excellence in Cities Phases

<b>Phase 1</b>	<b>Phase 2</b>	<b>Phase 3</b>
Camden	Barking & Dagenham	Enfield
Greenwich	Brent	Hounslow
Hackney	Ealing	Sandwell
Hammersmith & Fulham	St Helens	Wolverhampton
Islington	Sefton	Oldham
Kensington & Chelsea	Wirral	Barnsley
Lambeth	Rochdale	Doncaster
Lewisham	Gateshead	Luton
Southwark	Newcastle upon Tyne	Blackburn
Tower Hamlets	North Tyneside	Blackpool
Wandsworth	South Tyneside	
Westminster	Sunderland	
Haringey	Bristol	
Newham	Hartlepool	
Waltham Forest	Middlesbrough	
Birmingham	Redcar & Cleveland	
Knowsley	Stockton on Tees	
Liverpool	Hull	
Manchester	City of Leicester	
Salford	Stoke on Trent	
Rotherham	Halton	
Sheffield	Nottingham City	
Bradford		
Leeds		

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