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Understanding the success of London's schools

Simon Burgess

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Centre for Market and Public Organisation
University of Bristol
2 Priory Road
Bristol BS8 1TX
http://www.bristol.ac.uk/cmpo/

Tel: (0117) 33 10952
Fax: (0117) 33 10705
E-mail: cmpo-admin@bristol.ac.uk

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JEL codes: I20, I24
Key words: pupil attainment; ethnicity; immigrants; London schools.

Thanks to Ellen Greaves, Rich Harris, George Leckie, Ruth Lupton, Lindsey Macmillan, Matthew Burgess, Jonathan Portes, and Dave Thomson. Thanks to DfE for providing access to the NPD data and to the ESRC for funding via CMPO.

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Address for correspondence
CMPO
2 Priory Road, Bristol
BS8 1TX
www.bristol.ac.uk/cmpo/
cmpo-admin@bris.ac.uk
Tel +44(0) 117 33 10799

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Abstract

This paper contributes to understanding the 'London Effect', focussing on the role of the ethnic composition. The aim is to understand the statistical contribution to the London premium of ethnic composition. I also analyse data on the performance of recent immigrants. The results confirm that pupil progress on standard measures is significantly higher than the rest of England, 9.8% of a standard deviation. This is entirely accounted for by ethnic composition. The last decade of results shows the same result. I show that for other measures of attainment, the London premium is halved but remains significant.

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1. Introduction

Urban areas are often associated with poor educational attainment. But London is different. Recent analysis suggests that the attainment and progress of pupils in London is the highest in the country. Furthermore, it is claimed that the 'London Effect' is strongest for poor pupils, pupils living in disadvantaged neighbourhoods. A leading education policy commentator argues that: "Perhaps the biggest question in education policy over the past few years is why the outcomes for London schools have been improving so much faster than in the rest of the country". (Freedman, 2014, p. 1).

The advantage for London pupils is sizeable, so unsurprisingly there has been speculation as to what lies behind it. A number of commentators argue that this is the result of policies and practices adopted by London schools. If so, identifying the key policies is a great prize, with the hope that they can be implemented more broadly.

The 'London effect' was first highlighted by Cook (2013, for example) in a series of articles in the FT. He showed that pupils in London scored more highly, and that the difference was greatest for more disadvantaged schools and neighbourhoods. These basic points have been confirmed and reiterated in two recent reports on London, CfBT (2014) and Greaves et al (2014); see also a useful overview in Freedman (2014). The CfBT report (2014) relies chiefly on interviews with an expert panel and focus groups with school leaders and others. It highlights the role of a number of major policy interventions: London Challenge (see DfES, 2003), TeachFirst, and the rise of sponsored academies. It also notes the importance of school leadership and the increasingly sophisticated use of data by schools. Greaves et al (2014) take a different approach, providing a thorough analysis of pupil attainment data, and is much closer in spirit to this paper[1]. Their focus is on making precise the timing of the origin of the London effect as a way of isolating its causes. They also emphasise the role of primary schools rather than secondary schools as the source of the effect.

This paper contributes to understanding the 'London Effect'. My focus here is different, on the role of the ethnic composition of London pupils relative to the rest of the country. The aim is to quantify the 'London Effect' and to understand the statistical contribution to that of the ethnic composition of the student body in London compared to elsewhere. There is a *prima facie* case for this because high performing ethnic groups make up a larger fraction of students in London than elsewhere, and low performing ethnic groups are less numerous in London. London also has a lot more recent

[1] A brief note on chronology: the Greaves et al report and this paper were started independently and in ignorance of each other in 2013. Once we became aware of this, I shared an earlier version of this paper, and they shared a set of slides. Since then the papers have developed separately. While there is a good deal of overlap, the focus of interest in each is sufficiently different to make space for both in the debate.

migrants into the country. We showed some time ago that ethnic minority pupils make better progress through school than white British pupils (see Wilson et al (2005, 2011) and Burgess et al (2009)). Given that these pupils typically live in more disadvantaged neighbourhoods and come from poorer families, their advantages must be less material than books, educational visits and computers. It is argued that ethnic minority pupils have greater ambition, aspiration[2], and work harder in school. This is the main argument here – London has more of these pupils and so has a higher average GCSE score than the rest of the country.

The analysis in this paper focusses on pupils' progress through secondary school as the best measure of what schools (and school systems) do for their pupils. First, confirming previous results, there is a London premium in pupil progress[3] of 9.8% of a standard deviation. I show that ethnic composition matters a great deal: in fact, differences in composition account for all of the gap. If London had the same ethnic composition as the rest of England, there would be no 'London Effect'. Furthermore, there is no significant difference between the progress of white British pupils in London and in the rest of the country. Looking at conditional pupil progress, a London premium of 11% is also entirely eliminated by controls for ethnicity; this is also robust to conditioning on pupil and neighbourhood characteristics. Nor is this a new phenomenon: the London progress premium has existed for the last decade and is entirely accounted for by ethnic composition in each year.

More broadly, my interpretation of this leads to a focus on pupil aspiration, ambition and engagement. There is nothing inherently different in the educational performance of pupils from different ethnic backgrounds, but the children of relatively recent immigrants typically have greater hopes and expectations of education, and are, on average, consequently likely to be more engaged with their school work. These results help to explain the 'London Effect'; they do not explain it away. My argument is that the London effect is a very positive thing, but much of the praise for this should be allocated to the pupils and parents of London for creating a successful multi-ethnic school system. By the same token, there is less evidence that education policies and practices had a large part to play in terms of innovative policies.

There are two important cases in which this is less true, in which accounting for ethnicity reduces (halves) the London premium but does not entirely eliminate it. If we consider GCSE points excluding vocational qualifications, then there remains a small but significant London effect. This in turn arises because pupils in London were entered for significantly fewer of these 'equivalent' qualifications. The implications of this are unclear. It is certainly not appropriate to simply remove some subject

[2] See Burgess (2011) for an analysis of the Next Steps (LSYPE) data on educational aspirations.
[3] These terms are defined below; this is straightforward pupil progress: GCSE score relative to prior attainment.

scores from the total and claim that the remainder represents 'true' progress. Nevertheless, the fact that London schools systematically entered pupils for less of these qualifications may represent the outcome of a particular policy. Second, a measure of very high exam performance also yields a small but significant London effect once ethnicity is included. While this may also be the result of policy, it is also plausible that it derives from the very high concentration of professional families in London and their high input into their children's education (which is not captured by a socio-economic control variable that just measures eligibility for free school meals).

The next section briefly describes the data used in this study. Following that, I confirm the existence of the 'London Effect', and then broaden the scope to look at other cities in England. I quantify the role of ethnic composition and also consider data on recent immigrants. I also show that these results are not unique to the year of data used, 2013, and focus specifically on the case of White British pupils. The final section offers some broader conclusions.

2. Data

This analysis is based on pupil level data for all pupils in state secondary schools in England, taken from the National Pupil Database (NPD). There are over half a million pupils per cohort, of whom over 77,000 learn in London. I have used data from 2012/13[4], and also looked back at the previous decade. The attainment data relates to GCSE exams, taken at the end of compulsory schooling at age 16. The main measure I use is the standard one used for analysis: a pupil's total GCSE points score in her best 8 subjects (counting an A* as worth 8, an A as 7 and so on to 1 point for a G grade). This has a number of advantages. First, it captures variation in achievement from 1 to 8, not just pass/fail. Second, it counts 8 subjects (traditionally the typical number of entries), but no more than 8 so it does not over-reward sheer volume of exams. Third it counts all subjects. Fourth, it is available consistently for the past ten years. Fifth, while all the exams are individually high stakes for the pupils, this particular measure is not highlighted in the school performance tables making it less obviously a subject for gaming directly. This variable is normalised to standard deviation units for easier international comparison. I also examine other attainment measures in the robustness section.

The best way to isolate the contribution of schools, and by extension a city-wide school system, is to analyse pupil progress: to see how well pupils do at GCSE taking account of their prior test scores

[4] The most recent year available at the time of writing.

before entering secondary schools. This necessarily focusses attention on secondary schools (see Greaves et al 2014 for a discussion of primary schools). The prior test scores are each pupil's performance in the Key Stage 2 tests at age 11, in English, Maths and Science. I define pupil progress as the residual of a regression of GCSE capped 8 points score conditional on these KS2 test scores.

Other variables used from the NPD include ethnicity (disaggregated into 20 groups in recent years), eligibility for Free School Meals (FSM) as a measure of family poverty, and basic demographics including gender and month of birth. FSM is a binary indicator tagging the poorest 15% or so of families; it clearly has no power to differentiate income and status in the middle or higher ranges of the income distribution. I define conditional pupil progress as the residual of a regression of GCSE capped 8 points score conditional on KS2 test scores and these variables[5]. Neighbourhood disadvantage is measured in the standard way using the IDACI index (Income Deprivation Affecting Children Indices) derived from the pupil's postcode.

Finally, I have included data from the 2011 Census on the number of immigrants (people born abroad)[6]. This can be matched in at postcode sector level (eg "BS8 1") so is very local, but covers people of all ages so is only an approximation to the number of pupils born abroad or whose parents were born abroad. Data is available broken down by year of arrival in the UK.

3. The 'London Effect'

The 'London effect' is most simply seen as a difference in GCSE points between London and the rest of England (RoE). Table 1 shows this in four ways: the mean GCSE points score converted to standard deviation units or effect sizes; second, pupil progress conditioning GCSE scores on prior test scores; third conditional progress, additionally accounting for a pupil's circumstances; and fourth the progress version of achieving at least 5 A*-C grades.

In terms of the normalised scores, pupils in London schools score on average 5.6 percentage points of a standard deviation higher than the rest of England. This is far from trivial. In terms of progress, a gap of 9.7 percentage points of a standard deviation is very impressive. Statistical significance is

[5] This is: gender, month of birth, FSM eligibility. I have excluded statement of Special Educational Need as this is often considered to be ethnically graded, though the results are effectively unchanged if I include it. I have also obviously excluded ethnicity as the whole point is to see the impact that adding that makes. Whether English is an additional language is also excluded as it is so collinear with ethnicity.

[6] See https://www.nomisweb.co.uk/census/2011/lc2804ew, Table number LC2804EW. Information on postcodes can be found at http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/postal/index.html.

addressed more thoroughly below, but these differences are significantly different from the rest of England. The conditional progress gap is larger still. The table also reports the progress version of the fraction of pupils gaining at least 5 A*-C grades; this is not normalised so the gap represents 2.5 percentage points.

The 'London Effect' has also been shown vividly in graphs like Figure 1, following the format used by Chris Cook, who originated the story of London's success and did much to popularise it[7]. Figure 1 uses the IDACI measure of neighbourhood poverty and divides the population of London pupils into twentieths of increasing disadvantage. It also does the same for the rest of England. For each twentieth in London/not-London I plot the mean pupil progress. Throughout the range, London pupils make much better progress through secondary schools, across rich and poor neighbourhoods. It also shows that the 'London Effect' is higher in poorer neighbourhoods, which has been interpreted to mean that a pupil's starting point in life is less important in London. This is the appeal of the London story – surprisingly higher GCSE performance than the rest of England, an effect measured across all neighbourhoods, but particularly so for poorer neighbourhoods.

One starting point is to investigate other cities. In any distribution there will obviously be places above the mean, and places below. The noteworthy point about London being above the average is partly that it is unexpected, and partly that it is so substantially above the average.

In fact, the same argument can be made about England's second city, Birmingham. Table 2 reports the same statistics comparing Birmingham to the rest of England (ie not Birmingham[8]), as well as two other prominent cities. Not only do Birmingham pupils also out-perform the rest of England, they do so to a greater extent than London pupils do. The GCSE score gap is 5.6 percentage points in London and 8.8 in Birmingham, and the normalised progress gap is 9.7 in London and 13.4 in Birmingham. The results for Birmingham pupils are also shown in the 'Cook' graph in Figure 1, which shows exactly the same pattern as the equivalent figure for London: higher throughout and particularly high for poorer neighbourhoods.

However, these results do not show some general and unsuspected urban renaissance in schools. The pattern is not the same for two other major urban centres, Manchester and Newcastle, also shown in Table 2.

[7] See Cook (2013); he originally used an idiosyncratic measure of pupil attainment, including a subset of GCSE subjects (possibly to be called the Cook-Bacc).

[8] There is a slight messiness here as the 'rest of England' for London includes Birmingham, and the 'rest of England' for Birmingham includes London. If we compare them both to a rest of England excluding both, Birmingham again out-performs London out-performs the rest.

So in terms of GCSE performance, London is indeed special as claimed; but so is Birmingham, and in fact even more so. Table 2 by itself is enough to generate doubts about any explanations of the 'London Effect' that only focus on London, and in particular on arguments that are based on policies adopted in London schools. It suggests at the least, that any explanation based solely on the experience of London is likely to be missing something. This is of course does not imply that policies such as London Challenge had no effect, but rather that we are going to have to work harder to uncover any such effects.

Rather than go through each city and shire individually, I adopt a systematic approach and explore which factors are associated with pupil progress being significantly above the national average. My argument here is about the role of ethnicity so that is the focus of the empirical work; this is not to say that there may be other factors too.

In Figure 2 I plot LA mean pupil progress against the fraction of pupils in each LA who have ethnicity other than White British (the LAs in London are combined). There is a clear and strong relationship in the data. This suggests that ethnic mix matters a lot. This is not surprising as we know that GCSE performance and progress differs by ethnic group, but has been down-played in the discussions so far. Figures in Appendix 1 repeat this for conditional progress, and conditional progress plus neighbourhood disadvantage.

4. The contribution of ethnic composition to the 'London effect'

I show this in two complementary ways.

a. Decomposition

First, Table 3 presents a simple decomposition to determine how much of the aggregate London pupil progress differential is accounted for by the ethnic composition of its pupil population. I use the ten Census ethnic groups: Bangladeshi, Indian, Pakistani, Black African, Black Caribbean, Chinese, Mixed, White British, Other White, and Other. Using these, I compute the mean progress for each ethnic group in London and the mean progress for each ethnic group in the Rest of England (RoE). Alongside these are the composition of London's pupil population and that of the RoE.

There are a few striking facts. White British pupils have the lowest progress measure both in London and RoE. Chinese students and Black African students have the highest progress in the RoE, as well

as Bangladeshi, Indian and Pakistani students. Since the table also shows that White British students account for 84% of all pupils in the RoE compared to 36% in London, it is clear that ethnic composition has a potentially important role to play.

The actual London performance bonus in the table is 9.77 percentage points. I compute two counter-factuals, labelling progress as *v*, and demographic shares as *f*, with subscripts *1* for London and *0* for the RoE. First, the progress for each ethnic group in each region is kept the same, but I compute London's score as if it has the same ethnic composition as the RoE. This counter-factual gap is computed as (*v1*f0*) – (*v0*f0*): (-0.0161) – (-0.0114) = -0.47 percentage points, the wrong sign. Second is the reverse case where I keep the ethnic composition as it is in each place, but assume that each group of London pupils had the same progress as their counterparts in RoE. The gap in this case is (*v0*f1*) – (*v0*f0*): 11.14 percentage points, more than 100% of the gap.

In Table 3, ethnic composition explains all of the 'London Effect' in pupil progress. Pupils in London make no faster progress than outside London in most, but not all, ethnic groups. London simply has a lot higher fraction of high-performing groups and a lot lower fraction of low-performing groups, principally White British pupils.

b. Regression

The second approach uses a regression, which also allows us to consider statistical significance[9]. Table 4 reports the results of a regression of pupil progress on a London dummy, without and then with indicators for the ethnicity of the pupil. The addition of the latter eliminates the 'London effect', falling from 9.77 percentage points to -1.4 percentage points. The table also reports regressions for just Asian students (pupils of Bangladeshi, Chinese, Indian, Pakistani ethnicity, plus other Asian ethnicity and pupils of mixed Asian ethnicity), and for just White British students. The 'London effect' is zero for both.

I also show the results for conditional progress – that is, taking account of personal characteristics such as FSM eligibility, month of birth and gender as well as prior attainment. The story is the same: the London effect is 0.114 without ethnicity controls and -0.006 with. Controlling additionally for neighbourhood disadvantage, and also for statements of special educational need, yield the same picture (not shown).

[9] To deal with correlation of performance within places, I cluster standard errors at location (LA) level.

c. Ethnicity or immigration?

It may not be ethnicity *per se* that is important; it may be that it is the distribution of the children of recent immigrants that is important. Of course, ethnicity does not define immigration status, nor *vice versa*, but is quite highly correlated with it for some groups. There is no large-scale data on the immigration status of pupils, so I take two different approximations, immigrants of all ages, and the language spoken by pupils at home.

Geographically disaggregated recent immigration[10] data is available[11], but covers all people not just school age people, so this is obviously an approximation. Table 5 displays the fraction of the population of all ages born abroad. Unsurprisingly, this is much higher in London, 35%, than in the RoE, 9%. Revisiting the cities from Table 2, this group is also numerically important in Birmingham and Manchester, much less so in Newcastle. Focussing on the likely parents of 16 year-old pupils in 2013, the table also shows the distribution of people born abroad and arriving before the year 2000. Here, London is even more different to the RoE, and the relative positions of Birmingham and Manchester change, and this group are almost negligible in Newcastle.

The table also shows the fraction of pupils of Asian and all non-White British ethnicity in each city, and that these line up well with the recent immigration data[12]. Looking over the whole of England, there is a very strong correlation between the population fraction born abroad and arriving before 2000 and the fraction of Asian pupils taking GCSEs in 2013: see Figure 4 which plots the 7146 postcode sector level data-points and a smoothed fit.

Because the immigrant data is whole population rather than pupil level, test score data are obviously not available. But I can aggregate the test score data to postcode sector level (7146 observations) and run a regression, shown in Table 6a. The first three columns use pupil progress and show a very strong relationship with the born-abroad fraction. Moving from a born-abroad fraction of 0.118 (Newcastle) to 0.347 (London) adds 0.192 of a standard deviation to progress which is a very substantial effect. Adding a control for the fraction of pupils non-White British dilutes the born-abroad impact but it remains extremely strong. The London effect is very small and insignificant: there is no further effect on top of the born-abroad fraction. Looking instead at conditional progress, taking account of poverty and other characteristics yields the same outcome (as does the inclusion of neighbourhood disadvantage, not shown).

[10] An immigrant here is defined as someone born abroad.
[11] Many thanks to Jonathan Portes of NIESR for showing me where to find it.
[12] The columns with the exposure measure are discussed below.

The NPD contains other data that might also approximate immigrant status, namely the language spoken at home. The variable is typically coded as whether English is an additional language. This is strongly correlated with ethnicity, so it is essentially a substitute variable, and so has not been included in the analysis to date. In table 6b I include it in regressions to explain pupil progress and conditional progress. It is strongly positive with an impact of 0.34 SDs and its inclusion eliminates the London effect. See also Appendix 2 which provides further specifications of this result.

In conclusion, it is very difficult to disentangle an ethnicity effect from an immigrant effect at this level of generality. For the purposes of this paper the main point to take is that whichever route is taken, being a recent immigrant or being of non-White British ethnicity has a very substantial positive effect on progress through school.

d. Robustness

Poverty, ethnicity and progress

One of the points that has been stressed in the discussion of the London effect is the dramatically higher performance of disadvantaged pupils in London (see for example the initial findings of Cook, 201#, confirmed in Greaves et al, 2014). It is also obvious in Figure 1a here – the gap in pupil progress between London and the rest of England is actually much higher in the poorest neighbourhoods.

While this has been generated a lot of interest, this facet of the story also derives from differences in the ethnic composition of the disadvantaged population inside and outside London. In the rest of England, 77% of those receiving free school meals are White British; in London, only 24% are. This matters because the association between poverty and school performance is very different in the two communities. This is shown in Figure 4. The relationship between performance and disadvantage for White British pupils is as expected – those living in poorer neighbourhoods do a lot worse. But the picture is completely different for other groups, including pupils of Asian ethnicity shown here: as well as simply showing higher performance, there are as many high performers living in the poorest neighbourhoods as the richest.

Other measures of attainment

Pupils take GCSEs in many subjects, graded from A* down to U. So there are very many potential measures of overall attainment available. The one I have used here is the standard choice for analysis, the capped GCSE points score. In Table 7 I report the basic analysis of the regressions from

Table 4 for other outcome variables; the core results are repeated in the first panel of the table. The table shows results for progress (top half) and conditional progress (below). The alternatives considered are the standard (and highlighted performance measure) fraction of pupils gaining at least 5 C grade; a measure excluding GCSE equivalents from the total, and a measure of high performance.

The results for the fraction achieving at least 5 A* to C grades mirror the main results. There is a clear and strong London effect in both progress and conditional progress, which is entirely accounted for by ethnic composition. Once that is taken into account, the London effect disappears.

This is not true for the capped points score excluding GCSE equivalents. Here, adding in the ethnic controls halves the London effect but does not eliminate it. That is, if we restrict attention to a subset of GCSEs, there is evidence of a London premium. This difference is accounted for by differences in adoption of the equivalents between London and the rest of England, and across ethnic groups; I return to this below.

The measure of high performance shown is the fraction of pupils achieving at least 8 B grades or better. Other measures such as the fraction achieving at least 5 A/A*s, or the number of A/A* grades show the same pattern. The estimated London effect is reduced but not eliminated by the inclusion of ethnic controls. To be clear, ethnic minority groups score more highly on these measures too than White British pupils, but having taken account of this, there remains a premium in London. The same is true looking at conditional progress. There may be a number of reasons for this, including the discussion of equivalences below. But one plausible suggestion is that London contains the highest concentration of highly qualified families in England, which is very poorly captured by a simple binary indicator of not being eligible for free school meals.

The pattern of adoption of equivalent GCSEs across London and ethnic groups is shown in Appendix 3[13]. There is in fact not a great deal of difference between ethnic groups (lower for Indian and Chinese ethnicity pupils, higher for Pakistani and Black Caribbean ethnicity pupils). But there is a big difference between London and the Rest of England: for every ethnic group, the ratio of equivalents entries to 'core' GCSEs is about 30% lower in London. A regression on this ratio at pupil level shows that, as expected, there were relatively fewer equivalent entries for more able pupils (KS2), female pupils and non-FSM-eligible pupils; controlling for these and for neighbourhood disadvantage, a London dummy is significantly negative.

[13] Cook (2014) also makes the point that pupils in London entered fewer equivalent qualifications.

How to interpret this? Equivalent qualifications were promoted as being more suitable for less academic pupils, offering more vocational topics. Their use grew substantially over time, partly because they do offer some useful options for less able pupils, and partly because they were highly weighted in school performance tables; more recently some equivalents have been criticised as having weak content (Wolf, 2011). It is clear that the appropriate outcome variable is the one used here; if equivalents had not been available then schools and pupils would have made other decisions on subjects and effort levels, so simply not counting one set of qualifications is inappropriate. Nonetheless, the difference in equivalents entries between London and the rest of England is interesting and may reflect a common policy response by London schools.

Differential missing-ness

One of the statistical problems in analysing populations with recent migrants is the lack of data from their earlier lives. In this study that means pupils who have taken GCSEs (age 16) but have no KS2 scores (age 11) and hence no progress measure. Those pupils are omitted from the analysis and this may cause bias[14]. This issue is explored in Appendix 4. The first columns show that overall about 5% of pupils who have GCSE scores lack KS2 scores. This is lower for White British pupils (2.6%) than non-White British (13.8%), and consequently higher in London (8.8%) than outside (4.6%). Among non-White British however, there is little overall difference between London (12.4%) and outside (14.6%), slightly lower in London. This missing-ness is higher in London for Indian and Pakistani pupils but substantially lower for Black African and Chinese ethnicity pupils in London. These differences are statistically significant.

Turning to the performance of these pupils, it is clear from the second panel of Appendix 4 that pupils with missing KS2 scores have lower (raw) GCSEs, both overall and in each ethnic group. The gap is similar in each ethnic group. This remains true if the GCSE scores are conditioned on gender, FSM eligibility and month of birth (not shown).

To understand the likely impact on the analysis here, the key fact is the differential missing-ness inside and outside London. This is displayed in the final column which shows for each ethnic group the mean missing-ness outside London minus mean missing-ness inside London, divided by the latter. In fact, by happy coincidence, the effects largely balance out. There are negative values (more missing-ness in London) for Indian and Pakistani pupils (together accounting for about 29k pupils) and positive for Black African and other White pupils (about 32k pupils). It seems very unlikely

[14] There are techniques to impute missing data, but in this paper I simply analyse the pattern of missing-ness.

therefore that differential missing-ness is having a first order impact on the results and so I do not pursue multiple imputation options.

5. The attainment of White British pupils in London

White British pupils have been a focus of interest in the discussion of the London effect. It has been argued that the London effect cannot be all about ethnicity as White British pupils perform better too. In fact, in terms of pupil progress or conditional progress or conditional progress taking account of neighbourhood disadvantage, this is not true, as Tables 3 and 4 demonstrate. In raw GCSE points, there is a gap in favour of London of 3.3% of an SD, relative to a gap of 5.5% for London as a whole[15]. Because of this, and because this group are of particular interest, I focus on their attainment here.

White British pupils living in London differ in many ways from those living outside. One potentially salient difference is the scope for interaction with other higher-scoring ethnic groups in school, and peer effect spill-overs in learning. Any such interactions are likely to be complex, involving attitudes to school, engagement with learning and effort put into school work. Investigating these thoroughly seems to me to be very important, but is far more ambitious an undertaking than is being attempted in this paper[16].

The degree of potential spill-over depends on the potential for interaction among pupils of different ethnicities in school; in other words, whether schools are integrated or segregated. This is best measured here by the exposure index. This is a form of segregation index, measuring the average school fraction of pupils of the other ethnicity experienced by White British pupils (see Massey and Denton, 1988).

This index varies from zero (white British pupils and non-White British pupils are in completely different schools so there are no possibilities for interaction in school) to a maximum of the area fraction of Asian pupils (schools are perfectly integrated and all schools perfectly reflect the neighbourhood). So neighbourhoods with zero non-White British pupils cannot have any such interaction at all, and areas with many non-White British pupils pupils but a segregated school system also will have no interactions.

[15] Part of the difference between a raw GCSE gap and a progress gap arises from differences in KS2 scores, i.e. due to what happens in primary schools, the focus of Greaves et al (2014).
[16] See Burgess et al (2008) for a study of peer effects in learning between ethnic groups in England, plus the references in the text below.

Table 5 reports the values of the exposure index for White British pupils to all non-White British pupils and to Asian ethnicity pupils. There are a number of particularly interesting points. First, the fraction of Asian students is the same in London and Manchester, but the exposure index is 50% higher in London than Manchester, as schools are much more integrated in the capital. In pragmatic terms, this means that far more white British pupils in London have the possibility of school interactions with Asian pupils. Second, although Birmingham has a much higher fraction of Asian students than London, the exposure index is the same. The final columns relating to all non-White British pupils show the same outcome: London schools are much more integrated and so the scope for interactions in learning is much higher.

The causal impact of peer group on attainment is notoriously difficult to pin down[17]. Very rarely are peer groups randomly assigned so any correlation of attainment and school composition comprises both a causal effect and selection. This is a topic for future exploration in the context of London schools.

6. Changes over the last decade

The detailed timing of the emergence of the London effect is not the focus of this paper; see instead Greaves et al (2014). But it is interesting to see whether the role of ethnic composition in accounting for the London effect is only a recent phenomenon.

Tracking changes through time is made more challenging by changes in the available data, changes in the available qualifications, and changes in the implicit incentive structure facing schools and pupils from the accountability system. Because of changes in the degree of disaggregation of ethnic groups and because of a major change in the school incentive structure, I consider changes from 2004[18]. I simply run regressions of the outcome variable (in progress form and conditional progress form) on a London dummy with and without ethnicity controls for each year 2004 – 2013 inclusive. The coefficients and standard error bands are displayed in Figures 5a-d.

Panel A shows the main focus variable of this paper – capped GCSE points score. Without ethnicity controls, it is clear that there has been a substantial and significant London premium for all of this

[17] See Geay et al (2012) who consider the impact of non-native speakers of English on the attainment of native pupils, and Ohinata and van Ours (2013a and 2013b) who analyse the impact if immigrant children on attainment of native Dutch children. These studies use different research designs to try to isolate a causal effect, and find no adverse effect on native pupils, which was their null hypothesis.

[18] I am particularly indebted to Dave Thomson of FFT for advice on the continuity of different NPD variables over time.

decade, increasing slightly. However, once we take account of ethnicity this disappears, and disappears for each year. The pattern is the same for conditional progress (not shown). Panel B reports for the headline figure of the fraction getting 5A*-C grades. The same pattern applies – a clear London premium in progress, entirely accounted for by ethnic composition. Re-running the decomposition in Table 3 for each year over the last decade shows that ethnic composition completely accounts for the London premium in the last five years, and for most of it but not all in the five years before that.

The previous section showed that other attainment measures do show a reduced but still significant London premium after controlling for ethnicity. Panel C shows the evolution of this premium for the fraction gaining 5A*-C including English and Maths, which captures the same idea as excluding equivalent qualifications. The measure not taking account of ethnicity rises impressively throughout the period; including ethnicity controls, the premium is less than half the size but is significant at the end of the period. Panel D takes the other case, a measure of very high performance, the fraction of pupils gaining at least 8 A*-B grades. Taking account of ethnicity reduces the London premium, but it still rises over this period and from around 2008 is significantly different from zero.

This longer term perspective fits well with the findings above. The London premium in our core measure is accounted for by ethnic composition and has been for the past decade; this is not just a recent phenomenon. This is also illustrated well in Figure 6 which shows the changing composition of London's pupil population relative to their relative performance. The alternative measures, excluding certain qualifications or focussing on the upper tail, do show a London premium having controlled for ethnicity.

7. Conclusions

In UK education policy circles, much has been made of the fact that average GCSE scores in London are significantly higher than in the rest of the country. I have confirmed that fact here; pupil progress is the best measure of what schools add to their pupils and this is 9.77% of a standard deviation higher in London.

This achievement is not diminished by the fact that pupils in Birmingham also outscore England, and indeed outscore London, but it does change the interpretation of the 'London Effect'. The case I have made here is that the basis for the London performance is the ethnic composition of its school population. There is a straightforward effect: the lowest progress group, White British pupils, make

up 36% of pupils in London and 84% in the rest of England. London simply has a higher fraction of high-scoring pupils. This is not by chance of course; a key part of the London effect is its attraction to migrants and those aspiring to a better life. More speculatively, because of a more integrated school system and because of a larger population of non-White British pupils, more white British pupils have the opportunity for interactions in school with higher-scoring ethnic minority pupils than those outside the capital do. This potential for peer effect spill-overs may cause higher pupil progress.

Many policy makers, school leaders and commentators enthuse about the major policy of the time, London Challenge, and view it as unambiguously improving schools in London. This unanimity carries weight, and no doubt London schools were improved in a number of ways. But so far at least, catching a reflection of this improvement in the attainment data is proving to be difficult. It sounds somehow uninspiring and disappointing that the London attainment premium is largely accounted for by demographic composition" rather than wholly caused by some innovative policy. I disagree. It can be seen as a story of aspiration and ambition. There is nothing inherently different about the ability and performance of pupils from different ethnic backgrounds. But the children of immigrants typically have high aspirations and ambitions, and place greater hopes in the education system than the locals do.

There are two important policy lessons here, albeit less straightforward ones than perhaps policy-makers might have hoped. First, integrated multi-ethnic school systems can be very productive, allowing the ethnic minority pupils to achieve the grades they seek, and (potentially) raising the scores of white British pupils as well. Here is a role for school leadership, in managing multi-ethnic school system – it could have gone less well. Second, in parts of England where there simply isn't a large community of recent immigrants, a focus on how to encourage pupils' engagement with school, hard work and aspiration may pay strong dividends.

London has a right to be pleased with itself in terms of the excellent GCSE performance of its pupils. The argument here is that the basis for that success lies more with pupils and parents than it does with policy-makers.

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T1: London Effect

Location of school	Normalised GCSE points	Normalised Progress	Conditional Progress	5A*-C (progress)	N
London	0.0491	0.0863	0.1006	0.0220	60820
Rest of England other than London	-0.0068	-0.0114	-0.0133	-0.0029	459796
All	0	0			520616

1. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
2. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
3. Conditional progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science, plus gender, month of birth, and FSM eligibility.
4. Fraction achieving at least 5 A*-C grades, not normalised so is interpreted as percentage points. Residuals from a regression of the variable on KS2 fine scores in English, maths and science.
5. Data are 2012/2013. A very few sample selections to deal with missings. The N relates to the numbers in the progress columns.

T2: London, Birmingham, Manchester and Newcastle

Location	Normalised GCSE points	Normalised Progress	Conditional Progress	5A*-C (progress)	N
London	0.0491	0.0863	0.1006	0.0220	60820
Rest of England other than London	-0.0068	-0.0114	-0.0133	-0.0029	459796
Birmingham	0.0867	0.1318	0.1614	0.0551	10346
Rest of England other than Birmingham	-0.0018	-0.0027	-0.0033	-0.0011	510270
Manchester	-0.2098	-0.0179	0.0121	0.0425	3388
Rest of England other than Manchester	0.0014	0.0001	-0.0001	-0.0003	517228
Newcastle	-0.0295	0.0516	0.0728	0.0853	2449
Rest of England other than Newcastle	0.0001	-0.0002	-0.0003	-0.0004	518167
All					

1. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
2. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
3. Conditional progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science, plus gender, month of birth, and FSM eligibility.
4. Fraction achieving at least 5 A*-C grades, not normalised so is interpreted as percentage points. Residuals from a regression of the variable on KS2 fine scores in English, maths and science.
5. Data are 2012/2013. A very few sample selections to deal with missings. The N relates to the numbers in the progress columns.

T3: Decomposing the contribution of Ethnic composition to the 'London Effect'

Pupil progress

	Pupil Progress (v)				% of pupil population (f)				Counter-factuals	
	RoE	London	All		RoE	London	All			
	0	1			0	1			v1*f0	v0*f1
Bangladeshi	0.2824	0.1895	0.2462		0.73	3.53	1.06		0.138	0.997
Indian	0.3043	0.2631	0.2923		1.87	5.85	2.34		0.492	1.780
Pakistani	0.2143	0.2199	0.2152		2.72	3.86	2.85		0.598	0.827
Black African	0.3317	0.1923	0.2429		0.93	12.36	2.27		0.179	4.100
Black Carib'n	0.0891	-0.0390	0.0108		0.57	6.8	1.3		-0.022	0.606
Chinese	0.4368	0.4115	0.4303		0.27	0.69	0.31		0.111	0.301
Mixed	-0.0228	0.0182	-0.0122		3.06	8.06	3.64		0.056	-0.184
White British	-0.0417	-0.0486	-0.0420		85.61	38.25	80.08		-4.163	-1.593
Other White	0.1702	0.2293	0.1912		2.04	8.44	2.78		0.468	1.437
Other	0.1422	0.2433	0.1849		2.2	12.15	3.36		0.535	1.728
Sum	-0.0114	0.0863	0.0000		459,796	60,820	520,616		-0.0161	0.1000
Gap			0.0977						-0.0047	0.1114

1. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
2. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
3. RoE is Rest of England. Pupil population is for those with non-missing progress measure.

T4: London Effect, with and without ethnic markers

Dependent variable: pupil progress

	1	2	3	4	5	6
	Progress				Conditional progress	
	All	All	Asian pupils	White British pupils	All	All
London	0.098***	-0.014	-0.007	-0.007	0.114***	-0.006
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
Ethnic markers	No	Yes	-	-	No	Yes
R-squared	0.002	0.021	0.000	0.000	0.003	0.023
N	520616	520616	39796	416918	520616	520616

* p<0.10, ** p<0.05, *** p<0.01

Standard errors in parentheses; robust standard errors clustered at LA level

source: tables and figures 20141015

1. Asian pupils have Bangladeshi, Chinese, Indian, Pakistani, Other Asian or Mixed Asian ethnicity.
2. Units are pupil level standard deviations
3. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
4. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
5. Conditional progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science, plus gender, month of birth, and FSM eligibility.
6. Data are 2012/2013.

T5: Distribution of born abroad population, and ethnicity of pupils

	Population (all ages)		Year 11 Pupils			
	% Born abroad	% Born abroad, arrived before 2000	% Asian pupils	Exposure index of White B. pupils to Asian pupils	% Non-White B. pupils	Exposure index of White B. pupils to non-White B. pupils
London	34.7	18.2	18.6	13.9	64.3	56.5
Birmingham	21.0	12.1	30.3	13.4	55.5	34.6
Manchester	24.2	9.6	19.4	9.8	51.9	35.5
Newcastle	11.8	4.1	9.5	8.3	17.2	15.3
Rest of England	8.8	4.3	5.7	4.4	18.2	12.7

1. Population data refers to 2011 (Census), year 11 pupil data to 2013 (NPD)
2. The 'Rest of England' refers to England other than the sum of the named cities.

T6a: Effect of born-abroad population and London on pupil progress

Dependent variable: pupil progress

	1	2	3	4	5	6
	Progress			Conditional Progress		
Fraction born abroad, arrived before 2000	0.838*** (0.09)	0.867*** (0.12)	0.581*** (0.21)	0.974*** (0.09)	0.867*** (0.12)	0.407** (0.20)
London		-0.008 (0.02)	-0.006 (0.02)		-0.008 (0.02)	0.001 (0.02)
% Non-white British			0.074 (0.05)			0.150*** (0.04)
R^2	0.046	0.046	0.048	0.064	0.046	0.069
Observations	7175	7175	7175	7175	7175	7175

* p<0.10, ** p<0.05, *** p<0.01

Standard errors in parentheses; robust standard errors clustered at LA level

source: tables and figures 20141015

1. Born-abroad data from 2011 Census, aggregated to postcode sector
2. An observation is a postcode sector
3. Units are pupil level standard deviations
4. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
5. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
6. Conditional progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science, plus gender, month of birth, and FSM eligibility.
7. Data are 2012/2013.

T6b: English as an additional language and London

Dependent variable: pupil progress

	1	2	3	4
	Progress		Conditional progress	
London	0.098***	0.008	0.114***	0.021
	(0.02)	(0.02)	(0.02)	(0.02)
English is an additional language		0.337***		0.346***
		(0.01)		(0.01)
R^2	0.002	0.019	0.003	0.021
Observations	520616	520616	520616	520616

* p<0.10, ** p<0.05, *** p<0.01

Standard errors in parentheses; robust standard errors clustered at LA level

source: tables and figures 20141015

1. Units are pupil level standard deviations
2. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
3. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
4. Conditional progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science, plus gender, month of birth, and FSM eligibility.
5. Data are 2012/2013.

T7: Other measures of attainment

Dependent variable: pupil progress

	Normalised GCSE points		Achieved at least 5 A*-C grades?		Normalised GCSE points, excluding GCSE equivalents		Achieved at least 8 A*-B grades?	
Progress								
London	0.098***	-0.014	0.025***	-0.007	0.237***	0.119***	0.069***	0.045***
	(5.10)	(0.68)	(2.99)	(0.74)	(9.51)	(5.91)	(5.71)	(3.81)
Ethnic groups	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.002	0.021	0.001	0.007	0.015	0.043	0.004	0.013
Observations	520616	520616	520616	520616	520615	520615	520616	520616
Conditional progress								
London	0.114***	-0.006	0.029***	-0.005	0.259***	0.131***	0.072***	0.047***
	(5.78)	(0.28)	(3.42)	(0.51)	(9.97)	(6.76)	(6.00)	(3.99)
Ethnic groups	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.003	0.023	0.001	0.008	0.018	0.050	0.004	0.013
Observations	520616	520616	520616	520616	520615	520615	520616	520616

* p<0.10, ** p<0.05, *** p<0.01

Standard errors in parentheses; robust standard errors clustered at LA level

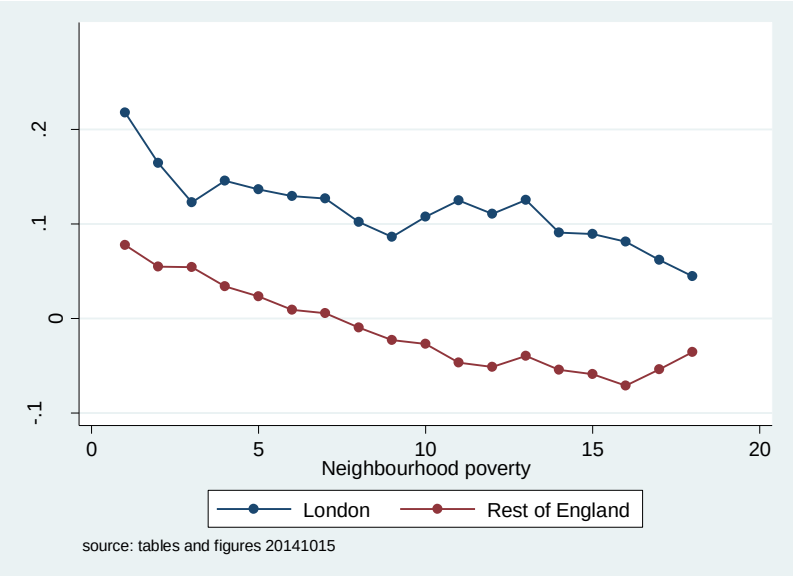
source: tables and figures 20141015

1. Units are pupil level standard deviations
2. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
3. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
4. Conditional progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science, plus gender, month of birth, and FSM eligibility.
5. Data are 2012/2013.

F1: The London and Birmingham Effects

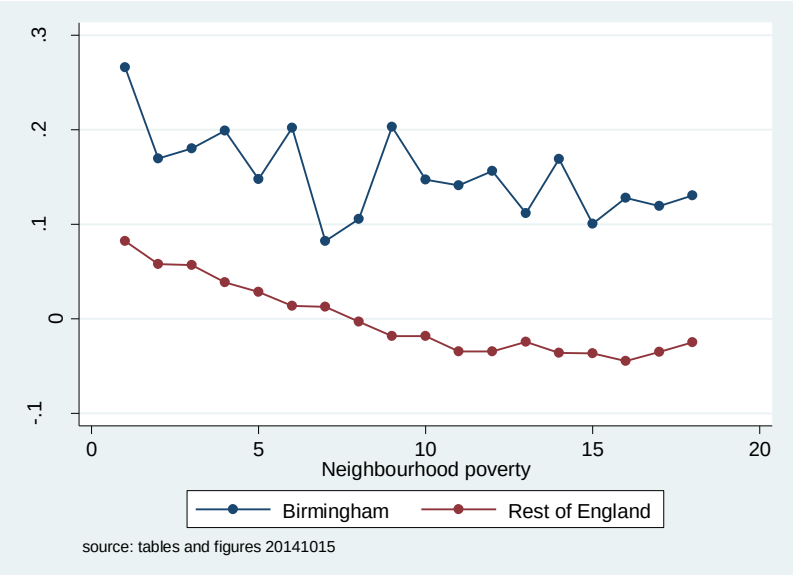
London

Pupil Progress



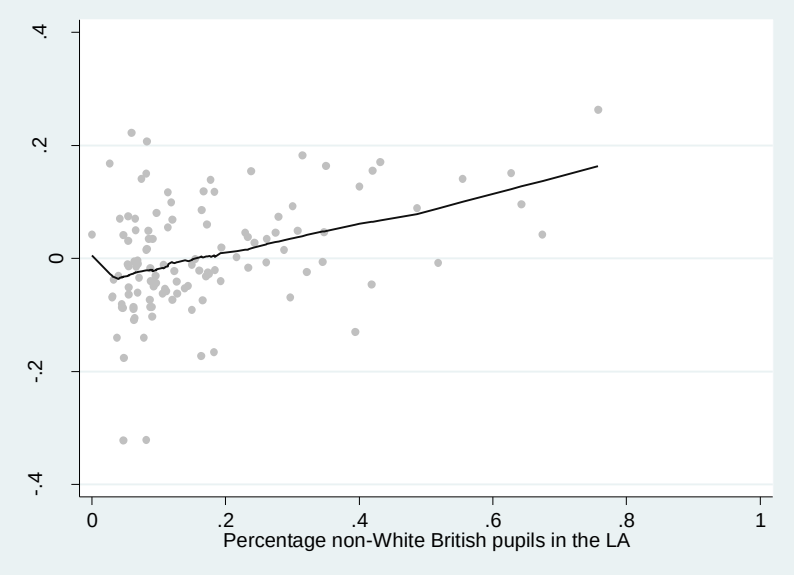
Birmingham

Pupil Progress



F2: Normalised pupil progress and ethnic composition

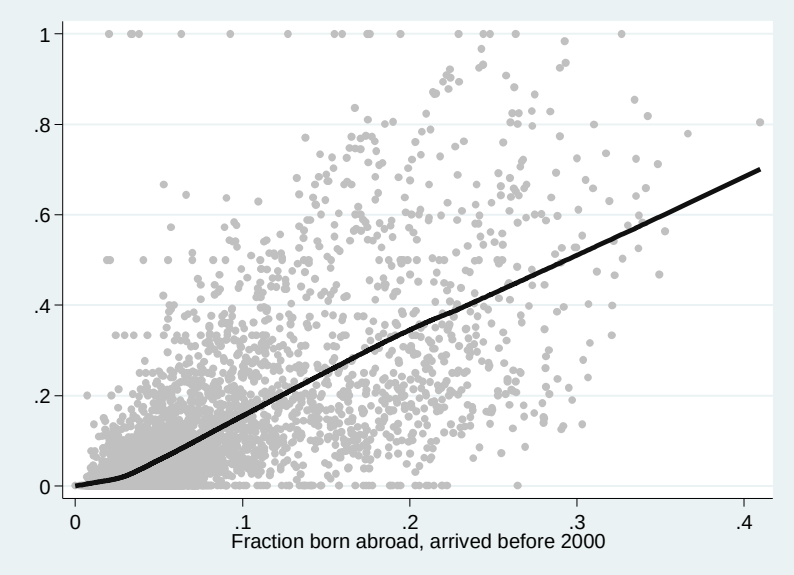
LA average pupil progress



Note: London LAs combined into London
Unweighted lowess smoothed line

F3: Distribution of Asian pupils and population born abroad

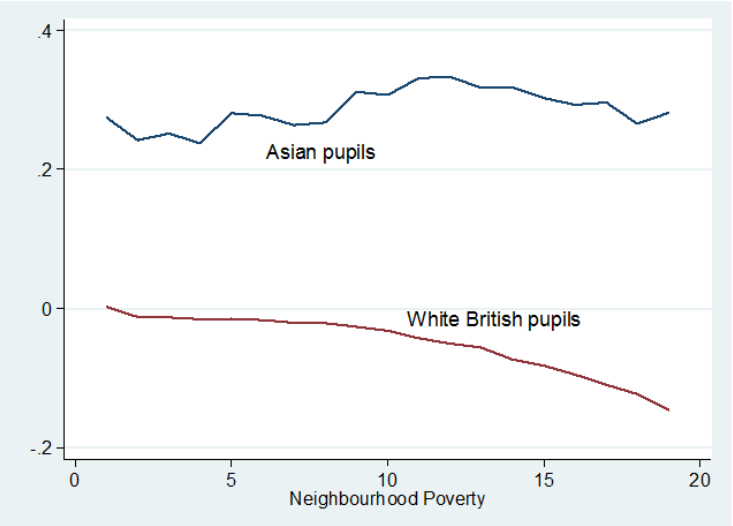
Percentage Asian pupils



Unit is postcode sector
Lowess smoothed line

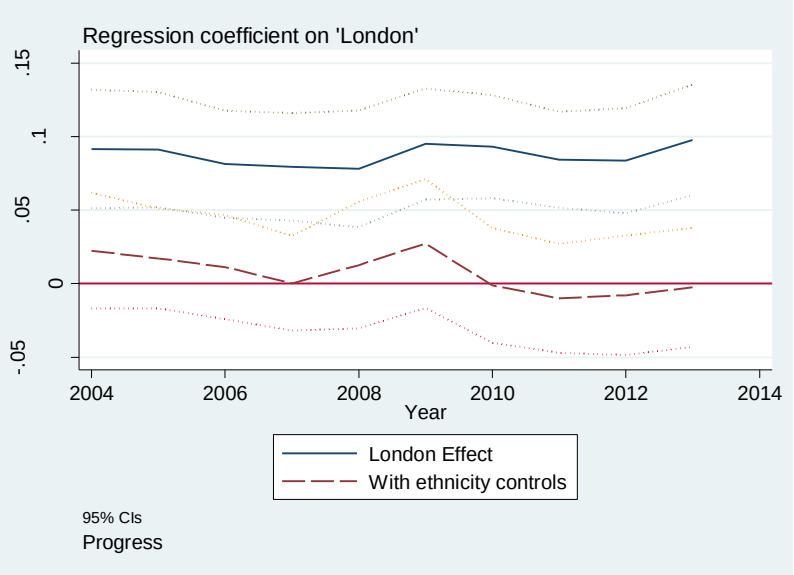
F4: Progress, poverty and ethnicity

Normalised pupil progress

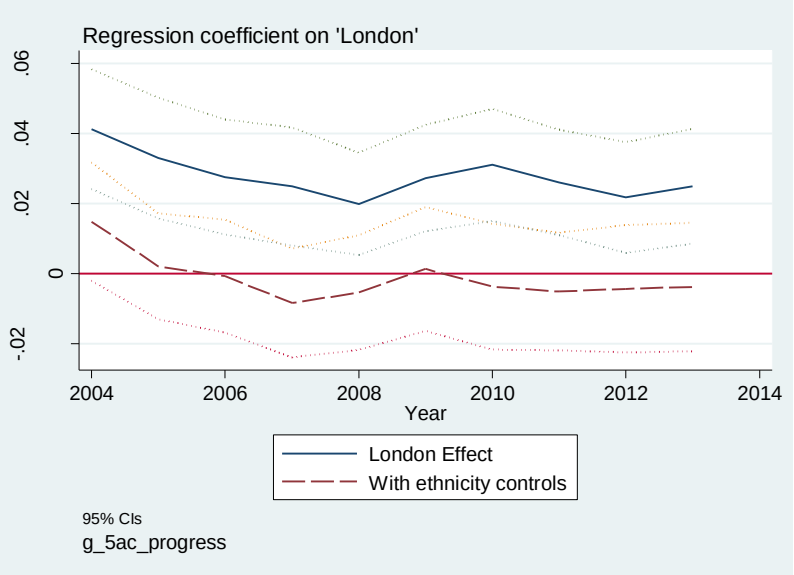


F5: Change over the last decade

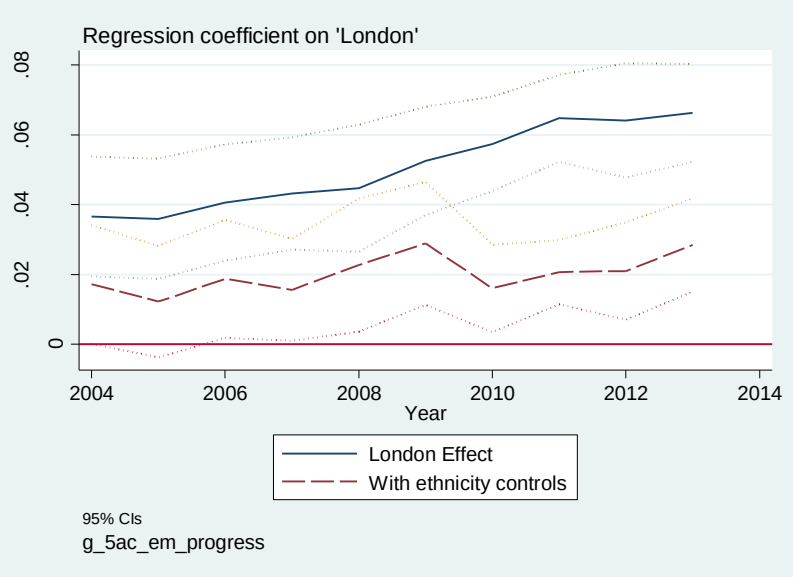
A: Pupil progress



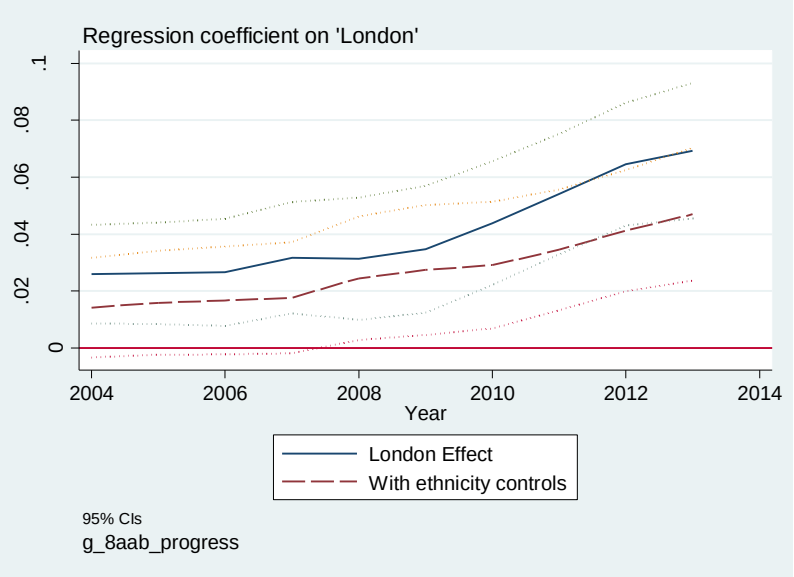
B: Percentage achieving 5A*C (progress form)



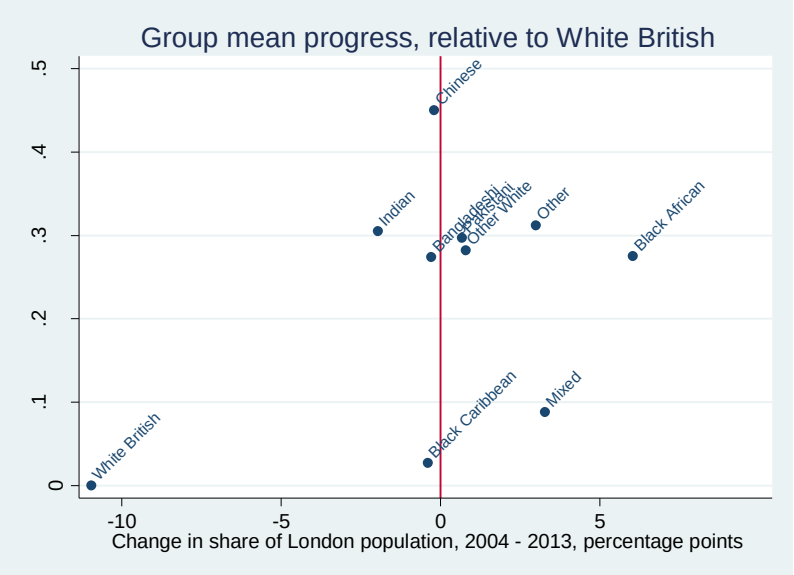
C: Percentage achieving 5A*C including English and Maths (progress form)



D: Percentage achieving at least 8 A*, A, B grades (progress form)

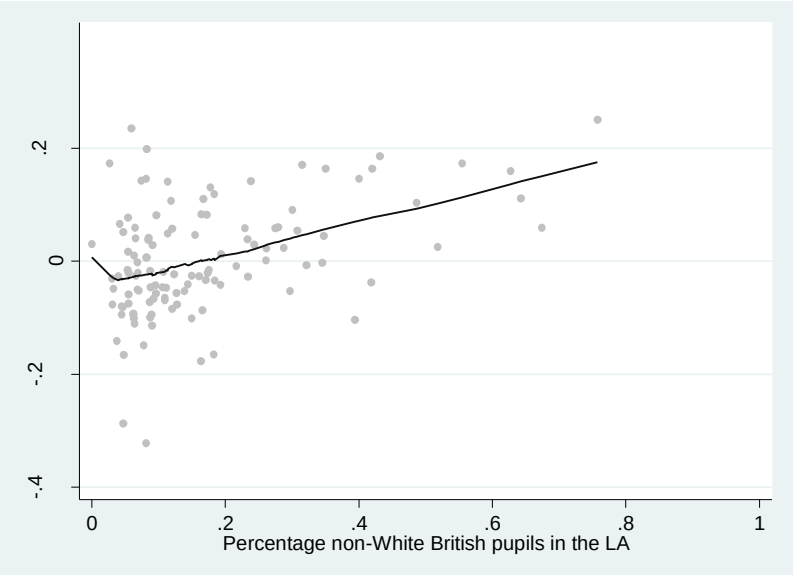


F6: Changing composition of London's pupils over the last decade

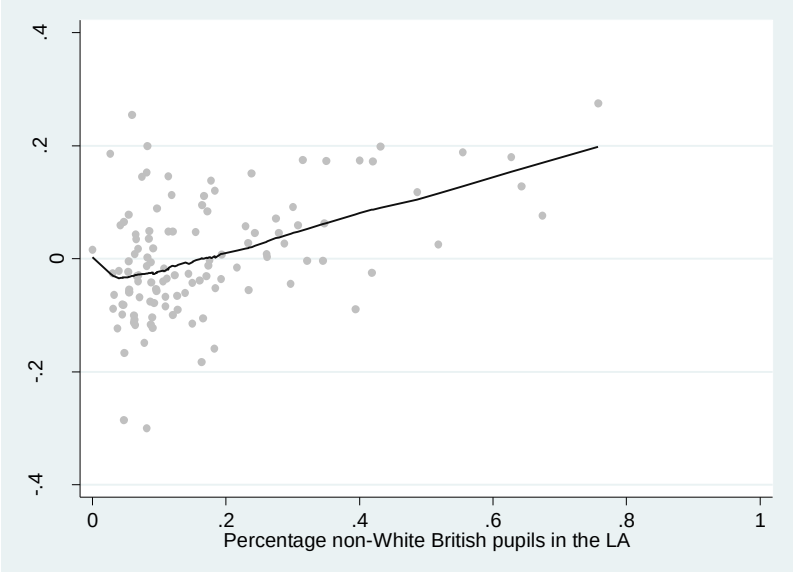


Appendix 1: LA ethnic composition and Pupil Progress – alternative definitions

Conditional progress:



Conditional progress including IDACI



Appendix 2: Pupil Progress and English as an Additional Language

Pupil Progress

	1	2	3	4	5	6
English as an additional language	0.339*** (100.07)	0.366*** (109.15)	0.384*** (112.20)	0.365*** (99.17)	0.359*** (97.25)	0.359*** (37.91)
Pupil characteristics		Y	Y	Y	Y	Y
Neighbourhood Poverty			Y	Y	Y	Y
LA or School Fixed Effects				LA	School	School
SE's clustered at LA level						Y
Observations	520616	520616	519998	519998	519998	519998

t-statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

source: tables and figures 20141015

1. Units are pupil level standard deviations
2. Best 8 GCSE point scores; normalised to be mean 0, SD 1 over England.
3. Progress is measured as the residuals from regressing the normalised GCSE points scores on KS2 fine scores in English, maths and science.
5. Data are 2012/2013.

Appendix 3: GCSE only and Equivalents

	Rest of England	London	All
Bangladeshi	0.735	0.408	0.608
Indian	0.513	0.303	0.451
Pakistani	0.844	0.403	0.770
Chinese	0.374	0.305	0.357
Black African	0.714	0.486	0.577
Black Caribbean	0.881	0.566	0.688
White British	0.669	0.511	0.660
All	0.672	0.470	0.647

For each individual pupil, we take the ratio of GCSE equivalent entries to GCSE only entries.
(in NPD variables this is: (*ks4_entry_e - ks4_entry_g)/ ks4_entry_g*)
This is averaged by ethnic group and location
2012/13 data

Appendix 4: Differential missing-ness of KS2 scores

	Percentage missing KS2 and non-missing GCSE			Normalised GCSE Points		Ratio
	Rest of England	London	All	Missing marker = 0	Missing marker = 1	
Bangladeshi	5.8	5.2	5.6	0.119	-0.691	0.127
Indian	6.3	8	6.8	0.399	0.101	-0.216
Pakistani	6.2	12	7.1	0.021	-0.303	-0.486
Chinese	24.2	17	22.5	0.685	0.295	0.422
Black African	24	12.2	16.9	0.079	-0.349	0.974
Black Caribbean	5.5	5.4	5.4	-0.144	-0.335	0.019
Mixed ethnicity	6.3	5.3	6	0.035	-0.160	0.132
White British	2.6	2.3	2.6	-0.003	-0.314	0.145
Total	4.6	8.8	5.1	0.019	-0.355	0.160

The ratio shows for each ethnic group the mean missing-ness outside London minus mean missing-ness inside London, divided by the latter.