Do some schools narrow the gap? Differential school effectiveness revisited

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Overview of the paper

• Focus on ethnic and poverty achievement gaps at age 11 in England, ask what factors might drive growth in these gaps age 7-11

• Present empirical data from a study in Inner London of over 6,000 pupils in 57 schools over three years

• Conclude – no evidence of substantial differential school effectiveness by pupil groupings

• Consider implications particularly for policy formulations that position ‘failing’ or ‘low quality’ schools as a main contributor to equity gaps
Ethnic & poverty gaps in progress 7-11

• Most research focuses on secondary schools, but low achievement at age 11 a key risk factor for subsequent low achievement at age 16, for continuing in FTE/university, long term employment and occupational outcomes (e.g. Boudon, 1974; Kingdon & Cassen, 2010)

• England – strong evidence that ethnic and poverty gaps already exist at age 7 and that they widen further age 7-11, e.g. Strand (2010) shows FSM gap grows by -0.13 SD (to -0.63 SD by age 11), and White British-Black Caribbean gap grows by -0.21 SD (to -0.33 SD at age 11).
School quality as an explanation

• Frequently proposed explanation, particularly for the growth in gaps over time, is that ethnic minorities and poor pupils attend lower quality schools (e.g. Fryer & Levitt, 2004; Wilson, Burgess & Briggs, 2011).

• Strongly reflected in government policy which continue to construe ‘failing schools’ as the significant problem, with emphasis on floor targets, new academies/free schools, parental choice etc. (e.g. Wilshaw, 2012)

• Well established that schools have different levels of effectiveness as indexed by CVA (e.g. Mortimore et al 1988). If variation in school quality is the main influence on gaps, would expect gaps to be bigger in some schools than in others.
Differential school effectiveness

- Differential school effectiveness (DSE) specifically used to denote ‘within-school’ variation in the effectiveness of a school:
  - For different subjects or outcomes
  - Over time (for different cohorts)
  - For different pupil groupings (e.g. boys/girls, ethnic majority/minorities, low/high SES etc).

  - Strand (2010) national study of over 530,000 pupils attending 14,200 schools, indicated extremely small DSE for equity gaps, e.g. Correlation between schools CVA for FSM and non-FSM pupils = 0.98. “Good schools good for all”.
RQs for current study

• Strand (2010) strong on breadth, but one limitation is studied a single cohort, with average within-school n=37, imprecise estimates

• Present study addresses by focussing on a large inner London LA and collecting national test data over three successive cohorts, giving an average within-school sample of n=120

• Can therefore address key question of DSE:
  – Over subjects (En, Ma, Sc)
  – Over time (cohorts) (2004-2006)
  – Over pupil groupings (ethnic minorities, pupils on FSM, gender).
The study Local Authority (LA) & Data

• Inner London LA, densely populated, high deprivation, one of the most ethnically and linguistically diverse LAs in England
  – 80% of pupils from ethnic minorities: largest groups are Black Caribbean (23%), Black African (21%) and White British (20%)
  – 40% with EAL, over 150 languages spoken at home
  – 23rd most deprived of 354 LAs districts in England (IMD 2004)
  – 38% entitled to FSM, nearly 2.5 times England average (16%)

• National test scores at age 11 in English, maths and science collected over three successive cohorts (2004-2006) together with prior attainment at age 7, over 6,000 students in all 57 mainstream primary schools

• Outcomes normal score transformed within each year to mean=0 and SD=1
Multi-level multivariate modelling

• MLWin 2.28 used to reflect hierarchical structure in the data:
  – Level 4 - Schools
  – Level 3 - Cohorts
  – Level 2 - Students
  – Level 1 - Test scores (En, Ma, Sc)

• Level 1 exists to model the multivariate outcomes, levels 2-4 represent the nested structure
Explanatory variables

- Age 7 average test score (normalised);
- Age in months (normalised);
- Sex (boy / girl);
- Ethnic group (White British against 10 other groups);
- Poverty (entitled to a FSM);
- Special Educational Needs: (SA, SAP or statemented);
- Mobility (pupil joined school in Y3, Y4, Y5 or Y6);
- Stage of Fluency in English (beginner to fully fluent);
- Interaction terms (e.g. Ethnicity * FSM);
- Cohort composition (e.g., school mean age 7 score; %FSM, %SEN, %White British etc.)
### Descriptives: Age 7 & 11 test scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable</th>
<th>N</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
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<tbody>
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<td>Age 7 score (normalised)</td>
<td>Age 11 scores (normalised)</td>
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<tr>
<td>Ethnic</td>
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<td>English</td>
<td>maths</td>
<td>science</td>
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<td>White-British</td>
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<td>1199</td>
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<td>1.03</td>
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<td></td>
<td></td>
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<tr>
<td>Not entitled FSM</td>
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<td>3723</td>
<td>61.6%</td>
<td>.17</td>
<td>.95</td>
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<td>.95</td>
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<td>.95</td>
<td>.26</td>
<td>.96</td>
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<td>-.29</td>
<td>.94</td>
<td>-.20</td>
<td>.88</td>
<td>-.19</td>
<td>.92</td>
<td>-.20</td>
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<td>-.45</td>
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<td>-.46</td>
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<td>Boy</td>
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<td>2955</td>
<td>48.9%</td>
<td>-.13</td>
<td>.99</td>
<td>-.10</td>
<td>.92</td>
<td>.08</td>
<td>1.00</td>
<td>.04</td>
<td>.98</td>
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<td>Girl</td>
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<td>51.1%</td>
<td>.11</td>
<td>.94</td>
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</table>

**Note:** Based on 6,045 students with both age 7 and age 11 test scores.
Fixed Effects – Progress age 7-11

• Have to interpret in context of strong interactions between ethnic group & FSM in terms of progress, as noted in previous research (Strand 1999, 2010, 2014a, 2014b). Compared to the average (score=0), poor progress 7-11 is evidenced by two groups:
  – **White British pupils on FSM** falling further behind
  – **Black Caribbean pupils** (regardless of FSM status)
  – Black African students make average progress, though still a relative gap compared to White British for those not on FSM

• Could be limited SES controls (FSM, SEN, mobility, school %FSM) fail to capture the full extent of Black Caribbean social disadvantage among those not entitled to FSM, but other research suggests same result even with better SES measures (e.g., Philips et al, 1998; Strand 2011, 2014)
Progress age 7-11 by subject

**English**

- White British
- Black African
- Black Caribbean

**Maths**

- White British
- Black African
- Black Caribbean

**Science**

- White British
- Black African
- Black Caribbean

**Average age 11 score**

- White British
- Black African
- Black Caribbean

*Note: For clarity only the results for the three largest ethnic groups are shown. Zero indicates average progress age 7-11. Adjusted for prior attainment at age 7, chronological age, gender, SEN, mobility, stage of fluency in English, school %FSM & school mean age 7 score.*
School Effects

- Null models: variance at school level 12% for English & Maths, 17% for Science.
- Prior attainment and pupil background (CVA models) explain over half (53% science, 57% maths, 77% English) of the school variation in the null (raw score) models.
- But substantial differences between schools in student progress age 7-11 remain:
  - e.g. in the CVA model for average age 11 score, there is a **0.52 SD** difference in student progress between schools 1SD above/below the LA average.
  - Around **one-quarter of schools** are reliably different from the LA average (see figure on next page).
School CVA estimates - average age 11 score
School CVA estimates - average age 11 score

Less effective schools (n=8)

Average effectiveness (n=42)

More effective schools (n=7)
Differential school effectiveness by pupil groupings

Reasons for the school differences in CVA outcomes not revealed by the data. But whatever the reasons the crucial finding is that the size of the equity gaps does not vary substantially across schools.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Fixed coeff.</th>
<th>School level var.</th>
<th>5th centile school</th>
<th>95th centile school</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSM</td>
<td>-.25</td>
<td>.002</td>
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<td>Black Carib.</td>
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<td>.001</td>
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<td>Girls</td>
<td>-.06</td>
<td>.001</td>
<td>-.13</td>
<td>.00</td>
</tr>
<tr>
<td>Age 7 (Slope)</td>
<td>.63</td>
<td>.007*</td>
<td>.46</td>
<td>.80</td>
</tr>
</tbody>
</table>

Note: Ethnicity reduced to four groups (White British, Black Caribbean, Black African and Any Other). * indicates $p<.05$. 
Differential effectiveness by FSM

![Graph showing School CVA residual for FSM students vs. School CVA residual for students not entitled to FSM, with a correlation coefficient R=0.98.](image)
DSE for Black Caribbean & White British

\[ R = 0.91 \]
Differential effects by prior attainment

Correlation between progress of students with low (-1 SD) and high (+1SD) prior attainment at age 7 = 0.79.
DSE across subjects

- CVA scores are moderately stable across subjects (En. vs. Ma. = 0.65; En. vs. Sc. = 0.67; Ma. vs. Sc = 0.83)

\[ R = 0.66 \]
DSE over time

• CVA scores moderately stable **over time** for maths (r= 0.68) & science (r= 0.64), but unstable for English (r= 0.29)
DSE by model

• **Raw and CVA scores** correlate highly, but are not identical (En=0.78; Ma=0.82; Sc=0.86). **VA and CVA scores** all correlate >0.94.

![English 2005](image)
Concn - DSE by subject, time & model

• Sufficient variability to warrant subject level reporting (likely to be even bigger in secondary schools where different teachers for different subjects);

• Stability is an issue, particularly for English, use of three year rolling averages sensible (DFE introduced in 2013);

• CVA scores do not totally reorder the raw score rankings, but high \( r \) does not mean measuring the same thing. If want to measure school effects need CVA models.
Conclusions - DSE by pupil groupings

• No schools reliably reversed the usual ‘within school’ pattern of FSM students making less progress than non-FSM students, or Black Caribbean students making less progress than White British students. Difficult to sustain an argument that gaps are due to individual ‘school quality’.

• **Good schools are good for all**: schools that added the most value for White British students, girls or those not on FSM also added the most value for Black Caribbean, boys or FSM.

• **While the more effective schools raise the bar they do not close the gap**: non-disadvantaged pupils benefit just as much. The *relative* performance of the disadvantaged remains similar even when the absolute performance of such groups has improved (Strand, 2010; Mortimore & Whitty, 1997).
FSM gap by OFSTED rating

FSM gap by OFSTED rating

Reasons for within-school gaps

- **School processes**
  - **Setting or streaming**: over one-third of children in Y2 set in literacy & maths, and low SES children disproportionally represented in bottom sets (Hallam & Ireson, 2013). Setting can increase within-school gaps for disadvantaged & ethnic minority students (Braddock & Slavin, 1993; Oakes, 2005).
  - **Distribution of teachers across classrooms within schools**: Black & disadvantaged students more likely to be matched to novice teachers, while White & more advantaged students matched to more highly qualified teachers (Clotfelter, Ladd & Vigor, 2005; 2006). Pressure from more affluent parents to secure better resources for their children, and the greater power of more experienced teachers to lobby for easier-to-educate students.
  - **Widespread low expectations on the part of teachers** for low SES and Black Caribbean pupils? May be a factor (e.g. Strand, 2012) but needs to account for relative success of most ethnic minority groups despite disadvantage, and Black African students in particular.

- **Beyond the school gates**
  - Root causes in early years (age 0-5), Home Learning Environment (HLE), parental aspirations/involvement, access to social and economic capital, peer groups, street culture or neighbourhood factors, all leading to ‘Matthews effects’
Policy Implications

• **Focus on school structures is a distraction** (GM schools, Foundation schools, Beacon schools, Specialist schools, Academies, UTCs, Studio schools, Free schools, Grammar schools etc.)

• **Focus on heroic schools that ‘succeed against the odds’ misplaced** (e.g. National Commission on Education, 1996; DCSF Extra Mile project, 2008), such schools are by definition exceptions & over-estimates what typical schools can achieve.
  
  – “**whilst some schools can succeed against the odds, the possibility of them all doing so, year in and year out, still appears remote given that the long-term patterning of educational inequality has been strikingly consistent throughout the history of public education in most countries**” (Mortimore & Whitty, 1997, p9).
  
  – **Exemplary though such schools might be, they do not represent scalable models for America’s poor and minority children** (Rothstein, 2004) [for an England perspective see Barker, 2010].

• **Pupil premium (April 2011):** may have positive influence by focussing all schools attention on the FSM gap within their schools. But purely school based interventions may have limited success. Results indicates the need for positive discrimination in resourcing on a massive scale.
Related papers


