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A cautionary note on measuring the pupil premium attainment gap in England

Abstract

This exploratory paper uses figures from the National Pupil Database for England to assess the known characteristics of three categories of pupils – those never eligible for free school meals, those who have been eligible but are not now, and those eligible now. It shows that these groups display a clear gradient in terms of special education needs, English as an additional language, and formal qualifications at age 16. The group currently eligible for free schools meals is geographically stratified, faces on average more educational challenges, and gains worse results than the group that had once been eligible but is not now. This shows that we cannot expect the same results from schools with more permanently poor pupils as from schools with many pupils on the threshold of poverty or who move in and out of poverty during their school careers. These findings could be crucial for the rules on how the pupil premium is allocated to schools, and to current policies based on assessing the pupil premium gap in schools, including the work of OFSTED, RAISE, the National pupil premium Champion, and various school awards. Many of the calculations underlying such policies will be unintentionally misleading, and unfair to certain regions and individual pupils.

Keywords

Pupil premium, attainment gap, free school meals, poverty gradient, social justice

The pupil premium gap

According to the Department for Education (DfE), the pupil premium (PP) is additional funding given to publicly funded schools in England to raise the attainment of disadvantaged pupils and close the gap between them and their peers (Gov.UK 2014a). The pupil premium policy was announced by the Coalition government in 2010, and the amount of extra funding per school rose to £1,300 per annum for specified primary school pupils, and

35 £935 for secondary pupils. The funding is received by schools for every pupil who has been
36 entitled to receive free school meals (FSM) over the previous six years. FSM, or its
37 equivalent in other countries, is a widely used and convenient administrative proxy for a
38 pupil from a disadvantaged background, who is more likely than average to struggle at school
39 (Harwell and LeBeau 2010). Additional PP funding is available for children who are or have
40 been living in care. The money must be spent on activities primarily intended to raise the
41 attainment of these potentially disadvantaged pupils (Gov.UK 2015). The idea of PP is well-
42 meaning and, once schools are clear on suitable evidence-informed approaches to raising
43 attainment for this group, the policy is likely to have considerable and beneficial impact
44 (Gorard and See 2013).

45

46 Since 2010, PP has become embedded in schools policy in England. Its use is assessed by the
47 school inspection regime OFSTED when inspecting schools, and a pupil premium
48 achievement gap has been formalised on their tracking system ‘Reporting and Analysis for
49 Improvement through school Self-Evaluation’ (OFSTED 2015). This gap is the simple
50 difference in percentage points in each school between the percentage of PP and non-PP
51 pupils attaining five GCSEs at grade A*-C or their equivalent, including English and maths
52 (Gov.UK 2014b). The GCSE is the most common traditional public examination at age 16.
53 This gap is used routinely by schools themselves, their local authorities and sponsor chains,
54 and by the government-appointed National pupil premium Champion (john dunford
55 consulting 2015), to monitor progress in improving attainment for PP pupils. It is even used
56 to justify giving annual awards to schools with small or narrowing PP gaps (Pupil Premium
57 Awards 2015).

58

59 There are several, perhaps relatively minor, problems with calculating and using attainment
60 gaps in this way. There are objections that such an approach disguises and so diverts attention
61 from the issues of disadvantage that help generate it, and that it emphasises standardised
62 attainment over other educational outcomes (Goodman and Burton 2012). Nevertheless, such
63 gaps are calculated and used in practice, despite having considerable relevant data missing.
64 Around 4% of pupils in state-funded schools have unknown FSM-eligibility status, for
65 example (Gorard 2012). It is also not clear that a simple percentage point difference
66 adequately expresses the gap, because it takes no account of the figures from which the
67 difference emerges (Gorard 2000). This means that a school with none of its FSM-eligible
68 pupils, but 15% of its other pupils, attaining the level 2 GCSE indicator of five or more

69 GCSEs graded A*-C would be said by OFSTED and others to have the same gap as one
70 where 85% of FSM-eligible pupils and 100% of the rest attained five such 'good' GCSEs. It
71 is not clear that this is correct. And some small schools or schools with low levels of
72 disadvantage would naturally have gaps subject to considerable volatility, because of the way
73 small numbers behave in practice. There are also concerns that, once other benefits are taken
74 into account, FSM-eligible pupils are no longer from the very lowest income families in
75 England (Hobbs and Vignoles 2010).

76

77 However, there is a more fundamental problem which this paper explores. FSM-eligibility is
78 not a constant characteristic of an individual pupil, in the same way that sex or ethnicity
79 usually are. Levels of FSM-eligibility are linked to the economy (Gorard 2014). They are also
80 linked to family circumstances, meaning that pupils might move in and out of FSM-eligibility
81 over their school careers. Those pupils previously eligible for FSM but not subsequently are
82 termed a 'hidden poor' by Noden and West (2009, p.4), no longer entitled to some benefits
83 but potentially still suffering the impacts of earlier disadvantage. Partly for this kind of
84 reason, the DfE now produces a measure 'EverFSM6' which includes pupils both currently
85 and previously eligible for FSM (over the previous six years of schooling). Treadaway (2014)
86 considers that even this may not be enough. EverFSM6 still ignores pupils in secondary
87 school who had been eligible more than six years previously, during their formative primary
88 school years.

89

90 Since FSM-eligibility is a threshold characteristic, this means that there will be variation
91 *within* FSM-eligibility. Put simply, some FSM-eligible pupils will be poorer than others and
92 eligible for assistance every year, and some may be at or near the threshold and so moving in
93 and out of FSM-eligibility over time. All will trigger receipt of the pupil premium by their
94 schools, but their absolute level of deprivation may vary considerably in a way that is
95 subsequently linked to their attainment. If so, this would make the PP gap calculation
96 intrinsically unfair, by favouring those schools or regions with more pupils near the threshold
97 and fewer who are FSM-eligible year after year.

98

99 Based on existing data for all maintained mainstream secondary schools in England for one
100 year, this brief exploratory paper addresses the following issues:

101

- 102 • What proportion of pupils are in the three possible groups – never eligible for FSM,
103 previously eligible, or currently eligible?
- 104 • Are there discernible differences between these three groups in terms of their known
105 characteristics and attainment at age 16, and their distribution between areas of
106 England?
- 107 • What are the potential implications of these patterns for policy-makers and
108 practitioners?

109

110

111 **Methods**

112

113 The analysis used to test and illustrate the issues outlined above is based on the National
114 Pupil Database (NPD) for England, Key Stage 4, 2013. This contains a record for every
115 young person in the 15-year-old cohort attending a state-maintained educational
116 establishment – a total of 643,139 cases.

117

118 The two key ‘independent’ variables used here are both flags – zero or one – representing
119 whether a pupil is currently eligible for free school meals (FSM) and whether they have ever
120 been eligible in the past six years (Ever FSM, which is a variable appearing in NPD only
121 recently, and so making this analysis possible). These two flags were used to generate a new
122 variable with the following three values:

123

124 ‘Never FSM’ – if FSM and Ever FSM are both zero;

125 ‘Previously FSM’ – if FSM is zero and Ever FSM is one;

126 ‘FSM now’ – if FSM is one (and Ever FSM is one).

127

128 There is a category unavailable here – where pupils had previously been not eligible for FSM
129 but are currently – and which it is not possible to code from one year of data alone (but which
130 will be assessed as part of a larger study funded by the ESRC - ES/N012046/1). This means
131 that the category ‘Previously FSM’ underestimates the number of pupils at the threshold of
132 being FSM-eligible or going in and out of FSM eligibility over their secondary school
133 careers. Nevertheless, this newly created variable offers the opportunity for a finer graded
134 consideration of the link between FSM and attainment at school.

135

136 The frequencies of the three FSM groups are calculated and converted to percentages of the
137 total cohort (after missing cases are accounted for), for England as a whole and for four local
138 authorities chosen to be illustrative of variation in geography, local prosperity, and the
139 proportions of these three FSM groups.

140

141 The ‘dependent’ outcome variable is the DfE points score for each pupil’s best eight GCSE
142 results or equivalent. The points score is used by DfE and others to assist comparability
143 between GCSE results and less common qualifications such as NVQs and BTECs, and it
144 assigns 16 points to a grade G GCSE, increasing in steps of 6, to 58 for a grade A*. The
145 average KS4 points score per pupil is calculated for each of the three FSM groups, and
146 compared in terms of a simple effect size (the difference between two averages divided by
147 their overall standard deviation).

148

149 The pupil background variables used are whether a pupil is currently listed as having any
150 form of special educational need, whether they have a statement of special educational need,
151 and whether English is their first language. These variables are all categorical and are cross-
152 tabulated in terms of the three FSM groups, and the results are converted to percentages
153 within each category.

154

155

156 **Results**

157

158 *National figures*

159

160 Around 11.1% of the relevant pupils in England do not have a value in the NPD for whether
161 they are eligible for FSM or not, or for whether they have ever been eligible. Of these, the
162 majority (7%) are in private fee-paying schools which are not required to provide this
163 information, and which anyway would have relatively few FSM-eligible pupils. The
164 remaining 4% of pupils in state-funded provision who do not have a value for FSM-eligibility
165 have been shown previously to be a kind of super-deprived group, including those in special
166 schools or recently moving between schools, with higher levels of special needs and lower
167 attainment even than those known to be eligible for FSM (Gorard 2012). This is also true for
168 the 2013 cohort used here. These ‘missing FSM’ pupils are not used for the most of the

169 remainder of the analysis because so many of them are also missing other key information
170 such as their first language.

171

172 For those with valid figures, the clear majority of secondary pupils have never been eligible
173 for FSM in the last six years (Table 1). A high proportion of pupils have previously been
174 eligible, but are not now (11.7%). This group is used for the rest of this paper as indicative of
175 at least some of those pupils from families on the threshold of poverty. However, as noted
176 above, this will be an underestimate of the families moving in and out of poverty over time,
177 because there will also be pupils in the ‘FSM now’ group who had not previously been
178 eligible. Nevertheless, if there are families with permanently very low incomes they will, by
179 definition, be in the last group only (15%). Are they similar in all other respects to the ‘FSM
180 previously’ group?

181

182 Table 1 - Distribution of FSM groups, England, KS4, 2013

FSM group	Percentage of cohort
Never FSM	73.3
FSM previously	11.7
FSM now	15.0

183

184 As already known, pupils eligible for FSM differ, on average, from those not eligible in other
185 ways. What this new analysis shows is that pupils who had been eligible but are not now
186 form a group between these two, on all other available indicators as well (Table 2). ‘FSM
187 now’ pupils are more likely than the ‘FSM previously’ group to be listed as having a special
188 educational need, to have a statement of need, and to speak a language other than English at
189 home, for example. This means that we might expect this new analytical group to have lower
190 attainment at school, on average, than the other two groups.

191

192 Table 2 - Percentage of FSM groups with specified characteristics, England, KS4, 2013

FSM group	Any SEN	SEN statement	EAL
Never FSM	14.5	1.5	10
FSM previously	25.5	2.4	17
FSM now	32	3.9	20.2

193

194 The three groups do indeed have different levels of attainment at age 16, and in the order
 195 envisaged. This fine ‘poverty gradient’ appears in all measures of assessment, and is
 196 illustrated here in terms of the best 8 mean GCSE (and equivalent) point scores (Table 3).
 197 The gap between the two new analytical groups themselves is smaller than that between the
 198 two groups combined and NeverFSM, but it is still considerable (as also noted by Crawford
 199 et al. 2014).

200

201 Table 3 – Attainment of FSM groups, England, KS4, 2013

FSM group	Mean GCSE points score (best 8)	Standard deviation of mean	‘Effect’ size compared to Never FSM
Never FSM	303	108	
FSM previously	230	118	-0.61
FSM now	205	122	-0.82

202

203 Pupils never eligible for FSM do best, followed by those who had been but are no longer
 204 eligible, and finally by those currently eligible. As an ‘effect’ size, the gap between the last
 205 two groups is -0.21. This is smaller than the difference between FSM and not FSM-eligible,
 206 but it is a solid figure, based on all relevant pupils in an entire national cohort. It is large
 207 enough to make a difference to a pupil examination grade, and easily large enough to make a
 208 difference to the overall results for a school or region with a higher proportion of one FSM
 209 group than another. The group that contains all of the pupils who are permanently FSM-
 210 eligible does considerably worse at school, on average, than the group that contains all of the
 211 pupils who move in and out of FSM-eligibility over time. This difference matters.

212

213 *Local examples*

214

215 The difference that this could make to the pupil premium attainment gap is illustrated using
 216 three local authorities. Birmingham, Kensington and Chelsea, and Middlesbrough are all
 217 urban areas, in the midlands, south east and north of England respectively. These three all
 218 have around the same proportion of pupils who have never been eligible for FSM, which
 219 means that they all receive comparable pupil premium payments (Table 4). However, all of

220 these areas are different in terms of the proportions of the kind of FSM-eligible pupils they
221 contain.

222

223 Table 4 – Percentage of each FSM group in Middlesbrough, and Kensington and Chelsea

FSM group	Middlesbrough	Kensington and Chelsea	Birmingham
Never FSM	52.3	55.1	51.9
FSM previously	10.4	27.9	15.9
FSM now	37.4	17.0	32.2

224

225 In the London Borough of Kensington and Chelsea, the clear majority of pupils who have
226 even been FSM-eligible are not now. They probably include, therefore, a proportion who are
227 near the threshold of FSM rather than among the poorest in the country. This could affect the
228 level of qualifications obtained. In fact, over 36% of pupils Kensington and Chelsea are
229 missing any data on FSM-eligibility, confirming that a large number of residents use private
230 fee-paying schools. This might remove some of the highest-attaining or richest pupils from
231 attendance at local state-maintained schools. Because of the well-established correlation
232 between socio-economic status and attainment, this would then tend to reduce the overall
233 level of attainment in local state-funded schools. But it would also reduce the likely gap
234 between the poorest and the majority of those pupils remaining in state-funded schools. This
235 is the kind of factor never considered by those promoting the apparent success of the London
236 Challenge (Hutchings et al. 2012).

237

238 Any assessment of the pupil premium attainment gap must take these two factors into
239 account. In Kensington and Chelsea most pupils receiving the pupil premium are not
240 currently FSM-eligible, and a large proportion of pupils go to school outside the state system
241 and are not included in the figures here. On average the pupil premium attainment gap is
242 lower in Kensington and Chelsea than in England overall (Table 5). This is to be expected
243 because some of the highest attaining pupils are missing (not in maintained schools), and
244 more importantly because it has fewer permanently deprived pupils than the other areas.
245 Curiously, and in opposition to the national picture, the ‘FSM now’ pupils do somewhat
246 better than the ‘FSM previously’ ones.

247

248 Table 5 – Attainment of FSM groups, Kensington and Chelsea, KS4, 2013

FSM group	Mean GCSE points score (best 8)	Standard deviation of mean	'Effect' size compared to Never FSM
Never FSM	356	91	
FSM previously	280	130	-0.71
FSM now	297	125	-0.55

249

250 The situation in the deprived authority of Middlesbrough is very different. Here only 4.7% of
 251 pupils are missing data on FSM eligibility, which is around the same as the national average
 252 of those genuinely missing data. This confirms that few pupils attend private fee-paying
 253 schools. Almost all pupils are in the state-funded system and so contributing to the pupil
 254 premium attainment gap there. Unlike in Kensington and Chelsea the clear majority of pupils
 255 who have ever been FSM-eligible still are (Table 4). They are likely to include many of those
 256 from families permanently receiving other benefits or on low incomes. And it should be
 257 expected that these two factors would both tend to increase the pupil premium attainment gap
 258 (irrespective of what actually goes on in schools or how the PP is used).

259

260 This is what the figures show (Table 6). The pupil premium gap in Middlesbrough is larger
 261 than that for England overall. As with the national figures, there is a clear gradient of
 262 attainment from 'never FSM' through 'FSM previously' to 'FSM now' pupils. The 'FSM
 263 now' pupils are the most disadvantaged, in the majority, and have the lowest KS4 attainment.
 264 It seems that the level of missing data and the precise kind of local FSM pupils partly
 265 determine the supposed pupil premium achievement gap.

266

267 Table 6 – Attainment of FSM groups, Middlesbrough, KS4, 2013

FSM group	Mean GCSE points score (best 8)	Standard deviation of mean	'Effect' size compared to Never FSM
Never FSM	274	114	
FSM previously	192	122	-0.70
FSM now	170	114	-0.89

268

269 The picture in Birmingham is slightly different again. Like Middlesbrough, Birmingham has
 270 a majority of pupils who have ever been FSM-eligible who are currently eligible (Table 4).
 271 Around 11.6% of pupils are missing FSM data, which is about the same as the national
 272 average, suggesting that attendance at private fee-paying schools is also around average (and
 273 so higher than Middlesbrough, but much less than in Kensington and Chelsea). All other
 274 things being equal this suggests that the pupil premium attainment gap should be lower than
 275 Middlesbrough, but higher than Kensington and Chelsea. And again this is what the figures
 276 show (Table 7). The finer-graded poverty gradient in results, between the local FSM groups
 277 proposed by this paper, is there again. And it would be expected to be there, regardless of
 278 how well local schools are using their PP funding.

279

280 Table 7 – Attainment of FSM groups, Birmingham, KS4, 2013

FSM group	Mean GCSE points score (best 8)	Standard deviation of mean	'Effect' size compared to Never FSM
Never FSM	305	112	
FSM previously	245	118	-0.53
FSM now	226	118	-0.69

281

282

283 **Conclusion: Implications for policy**

284

285 The results in this paper raise the possibility that the threshold nature of eligibility for FSM is
 286 disguising an important distinction between those who move in and out of eligibility and
 287 might be close to the threshold for benefits, and those from even poorer families living in
 288 relative poverty during the child's whole school career. And it must be recalled that while it
 289 is not possible with these one-year figures to say anything about pupils who have only
 290 recently moved into FSM-eligibility, the figures presented here are likely to be an under-
 291 estimate of the pool of pupils who are volatile in terms of FSM-eligibility.

292

293 The potential implications for policies and practices based on calculating a pupil premium
 294 attainment gap are substantial. The findings mean that when policy-makers, advocates of the
 295 success of the London Challenge, OFSTED, RAISE, the pupil premium Champion, awards

296 committees and others use the pupil premium gap as a measure of success they are probably
297 and unwittingly being very unfair. It has already been suggested that there is a problem for all
298 such calculations caused by missing data, and because they take no account of the proportion
299 of local residents using private schools, both currently ignored in the calculation of any pupil
300 premium attainment gap (and, as shown above, both influencing the calculation by their
301 absence). What this paper shows more importantly is that they are unfair because they do not
302 take account of the threshold nature of FSM-eligibility. They are ignoring the variation *within*
303 that category.

304

305 As the analysis reveals, this variation within FSM-eligibility is stratified by prior educational
306 challenges like SEN and EAL, and then again by the qualification outcomes used to calculate
307 the gap. Almost as importantly, the analysis shows that different areas have different
308 proportions of the three FSM pupil groups. Heavily disadvantaged areas are likely to have
309 more of the always FSM-eligible pupils, and this makes any comparison with other areas
310 based on the pupil premium gap intrinsically invalid. This is in no way an argument against
311 the pupil premium policy itself, but it does suggest that the impact of the policy needs a rather
312 more robust evaluation than simply measuring changes in the pupil premium attainment gap.
313 It also means that the PP attainment gap should not be used by OFSTED to pre-determine any
314 aspect of the outcomes of school inspections.

315

316 Perhaps just as importantly, the paper has implications for the delivery of the pupil premium
317 itself. Currently these extra resources are given to schools on the basis of the number of
318 pupils in that school who have ever been eligible for free school meals (for the previous six
319 year). This means that schools not only miss out the extra money when data is missing, but
320 that those schools taking the most disadvantaged pupils (likely to attain the lowest at KS4)
321 get the same *per capita* as those who take the pupils moving in and out of eligibility.
322 Currently, until all else is resolved it would make more sense to allocate the pupil premium
323 primarily on the basis of pupils eligible for FSM at the time of allocation, and then to update
324 this every year throughout their school career. This would mean money going to the schools
325 of those most in need, while they are most in need.

326

327

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