



Department
for Education

Factors associated with achievement: key stage 4

Research brief

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Introduction

RAND Europe and the Faculty of Education at the University of Cambridge were commissioned by the Department for Education (DfE) to assess the quality of the current measure of socio-economic deprivation used by DfE, namely free school meals (FSM) eligibility, and to identify potential alternative proxy indicators. This summary reports the results from this modelling exercise.

Key Findings

Deprivation indicators and attainment gaps

- A measure of whether the pupil was **ever eligible for FSM in the last five years** (Ever5FSM)¹ explains 23.3% of the variation in pupil achievement at GCSE when entered in a model alongside a set of basic controls². In practical terms, there was a 56 GCSE point³ difference between pupils who have ever been FSM eligible in the last five years and those who have not. This equates to the difference between a pupil gaining one grade better across seven GCSEs (e.g. moving from a C to a B) and two grades better on an eighth GCSE (nine 'letter grades' in total), a substantial difference.
- The Ever5FSM variable performs better, in terms of predictive power, than simply using **current (2006)⁴ FSM eligibility** (explaining 23.3% of the variance compared to 20.7%, respectively). For current (2006) FSM eligibility, there was a 44 GCSE point difference between pupils being eligible for FSM in the final GCSE year and those who were not, equating to gaining one grade better across seven GCSEs.
- The individual **neighbourhood based** proxy measure examined in the modelling, Income Deprivation Affecting Children Index (IDACI), did not perform as well as FSM eligibility in terms of predictive power, explaining 20.8% of the variance, with each additional point on the IDACI scale (i.e. as deprivation worsens) associated with one less GCSE point. Some combinations of neighbourhood based measures can provide more predictive power than FSM eligibility, but they are difficult to interpret and do not provide data on the individual child.

¹ The research team were unable to use Ever6FSM, the measure commonly used, due to the age and stage of the pupils involved in the LSYPE1 survey.

² The basic controls consist of individual demographic measures such as age, gender and ethnicity; area measures relating to region of residence and urban/rural; and school level characteristics such as school size, proportion of pupils with special educational needs statements.

³ A difference of six GCSE points equates to one grade better on a single GCSE. A difference of 12 points would mean either one grade better on two GCSEs or two grades better on one GCSE and so on.

⁴ Current (2006) FSM eligibility refers to FSM eligibility in the school year GCSE exams were taken, which in the LSYPE1 sample was 2006.

- Parental **occupation**, parental **education**, and **other household characteristics** are slightly better predictors of pupil achievement than FSM eligibility (current or Ever5FSM), accounting for 25.6%, 25.8% and 24.4% of the variance, respectively. For example, for household occupational status, there was between a 70 and 95 point difference between the bottom and top groups, with a similar picture observed at the extremes of parental education. Pupils from households with a qualification at level 1 or no qualifications achieved, on average, 80-91 fewer points at key stage 4 than children from households where at least one parent holds a degree level or equivalent qualification. For these measures, the above differences are approximately equivalent to a pupil attaining two letter grades better in seven of the eight GCSEs counted for the 'Best 8' measure. However, these proxies have the problem that at-scale collection of this information is likely to be impractical and difficult.
- Parental **income** accounted for 20.6% of the variance, the lowest of all the considered proxies: after controlling for basic pupil and school characteristics, an increase of £10,000 in household income was associated with a five point increase in key stage 4 attainment, i.e. less than the difference between a B and an A on a single GCSE. This is likely to be because income was measured via self-report, which is likely to include a degree of error, and is likely to reduce the strength of relationship between income and attainment. This finding highlights the difficulties of collecting high quality income data on parents 'at scale' through survey means. Exploring the use of higher quality administrative measures of parental income is one option, though it would require data linkage with data from other government departments.
- Overall, **FSM history** is the preferred measure of deprivation, measured either as cumulative years of eligibility over the pupil's school life, or as FSM eligibility ever in the years preceding the outcome of interest.

Prior attainment

- Setting aside data that describe the socio-economic circumstances of children, **prior attainment** at the end of primary school is found to be the most powerful available predictor of secondary school attainment. However, while prior attainment could be used to identify children at risk of low attainment, it would not address the main policy aim of ensuring better representation of socio-economically disadvantaged pupils at higher levels of attainment.

Pupil characteristics

- There were significant **regional** variations in attainment at the end of secondary school after controlling for basic characteristics and deprivation proxies. However, these effects are mostly already present at the end of primary education and accounting for prior achievement at this age largely eliminates the regional differences found.

- In keeping with previous research, there were residual differences in attainment when comparing **ethnic** minorities to White British children, after controlling for socio-economic deprivation proxies that account for much of the underachievement by some minority ethnic groups. When the fact that different ethnic groups start at different levels of key stage 2 achievement is accounted for by controlling for prior attainment, it was found that ethnic-minority pupils make more progress during secondary school than White British pupils, effectively reducing the ethnic differences in attainment by the end of secondary school⁵.

Aims and objectives

The government currently uses pupils' histories of eligibility for FSM (whether they have been eligible during the last six years) to allocate the pupil premium and other school funding, and to provide accountability for the attainment of disadvantaged children. With changes to the benefits system expected to occur in the next few years affecting the underlying eligibility criteria for FSM, it is timely to reflect on the range of data which might be used as a proxy for deprivation and how it is associated with attainment. This research explores which possible proxies for deprivation are the strongest predictors of achievement at the end of secondary school.

The central tasks of this project were to assess the relationship between FSM eligibility, pupil achievement and measures that may act as proxies for socio-economic status (SES). The research is exploratory but pragmatic – a broad range of measures were explored, but with the knowledge that not all of these measures would be available to DfE in the future. The research questions framing the project are:

1. **Can FSM histories be improved on as a proxy for social deprivation?**
2. **What alternative (practical) proxy measures of SES can be used that better capture variation in achievement?**
3. **Do alternative proxy measures better enable us to identify pupils at risk of low achievement?**

Methodology

At the core of the study is a combination of survey and administrative data on more than 15,000 young people taken from the first Longitudinal Study of Young People in England (LSYPE1), matched with data from the National Pupil Database (NPD). The research uses multi-level models to assess the relationship between the factors used as predictors of achievement. The outcome variable used in this research was the total capped GCSE points score, also known as the 'Best 8' measure.

⁵ Similarly, the research found that **younger children within the year group** make more progress than older children, thus reducing the effect of age on attainment by the end of secondary school.

Conclusions

The socioeconomic gaps reported are stark and substantial. However, these gaps may have been even larger if there had not been a long-running redistributive and compensatory system aimed at alleviating disadvantage in place. This highlights why it is crucial to identify poor / disadvantaged pupils at risk of underachievement as early as possible – in order that additional resources can be targeted at this group in particular.

Some combinations of neighbourhood based measures are stronger predictors of pupil achievement, but using neighbourhood based measures may be harder to interpret and in any case neighbourhood measures are not associated with the individual child. Indeed, if one measures socio-economic deprivation only at the neighbourhood level, measuring the attainment and progress of the disadvantaged pupil group within a school or area will not be possible and this is a major drawback of the area based approach to measuring deprivation. Combining individual pupil FSM histories with neighbourhood based measures of deprivation was found to have small predictive gains in terms of key stage 4 outcomes. However, the interpretation of any such combination is particularly difficult, and would require a re-evaluation of how deprivation is defined.

Survey measures of SES such as parental education and occupation, perform slightly better than pupils' histories of FSM. However, these measures of parental background are currently not available to government and there are likely to be substantial costs associated with collecting such data at scale. For example, parental education is a strong predictor of pupil achievement but collecting robust data on parental education level for all pupils would be difficult and involve significant additional data collection costs.

Stepping aside from data that describe the socio-economic circumstances of children, prior achievement at the end of primary school is found to be the most powerful available predictor of secondary school attainment. However, this does not address the policy aim of closing deprivation-specific attainment gaps and ensuring better social mobility for children born into deprived families. While prior attainment could be used to identify children at risk of low attainment, it would not of itself ensure better representation of socio-economically disadvantaged pupils at higher levels of attainment.

Recommendation

The overall recommendation is that FSM history is retained as the preferred measure of deprivation, measured either as cumulative years of eligibility over the pupil's school life, or as FSM eligibility ever in the years preceding the outcome of interest. The latter is already used by DfE and so for continuity reasons may be preferred at this time. Other options might usefully be explored in future work, such as using data on household income held by other government departments or combining FSM history with prior attainment.



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