Issues & Evidence

CEM CENTRE Distributed Research Network

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Predicted GCSE Performance for Lower Ability Pupils in the Independent Sector

It is often the case that the regression lines used to make GCSE predictions for Independent school pupils are higher and flatter than the corresponding lines for the National sample. When these Independent sector lines are applied to lower ability pupils they may overestimate the likely GCSE performance of those pupils.

In this newsletter we aim to explain why the Independent sector lines behave this way and offer advice on how best to interpret and use this data.

National and Independent Analyses

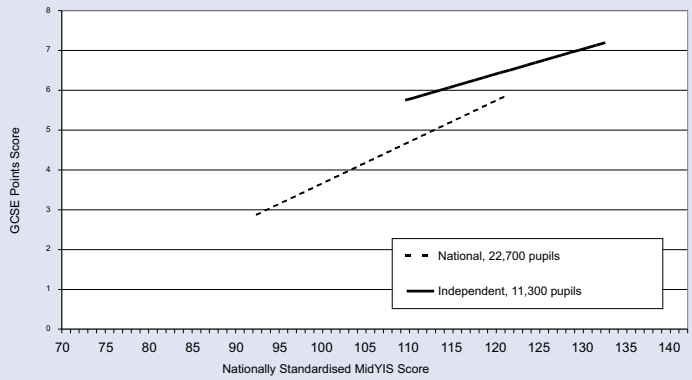
In the MidYIS Project we carry out two analyses for each MidYIS cohort that reaches GCSE. One, the National analysis, is based on a nationally-representative sample drawn from all schools within the sample, the other is based solely on the Independent schools in the sample.

For each GCSE subject we calculate two regression lines, a National line and an Independent sector line. These regression lines are then used in the calculation of Value Added for those pupils who have taken GCSE examinations, and to make predictions of future GCSE performance for those pupils who have just taken a MidYIS test. (Independent sector predictions of future GCSE performance are available in the PARIS software package which is provided as part of the MidYIS Project.)

The behaviour of the regression equations for Maths, shown in Figure 1, is typical of many subjects with the Independent sector regression line higher and flatter than the corresponding line for the National sample.[2]

The explanation for the behaviour of the Independent sector line lies with two factors, the higher value-added in Independent schools and the ability profile of Independent school pupils.

Figure 1: Regression Segments Mathematics[1]



1 MidYIS Year 9 1998/99 to GCSE Maths 2001. Here each regression segment is the part of the regression line which covers the range μ-d to μ+d, where μ and d are the mean and standard deviation respectively of the distribution of MidYIS scores.

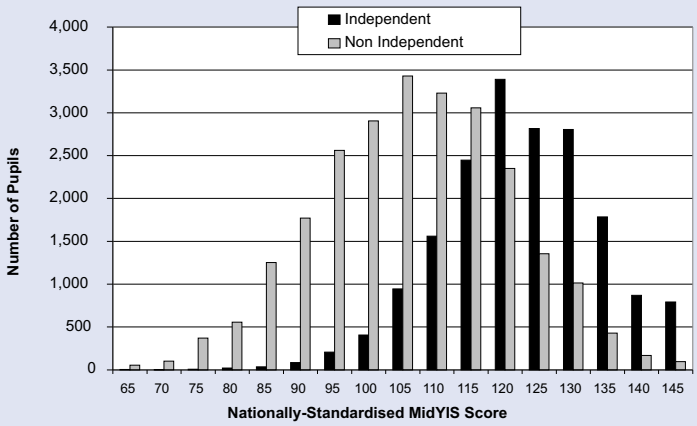
2 To make the comparison we first need to recalibrate the Independent sector MidYIS scores and the Independent sector regression lines to the National Scale.

Since value-added is generally higher in Independent schools the Independent line is higher than the corresponding National line. The comparative flatness of the Independent line results from the ability profile of the Independent sector. Figure 2 (overleaf) shows a typical ability distribution of pupils in Independent schools and pupils in non-independent schools.

Since many Independent schools are selective the Independent sample is heavily skewed towards high ability pupils.

Due to the structure of GCSE pupils cannot achieve beyond A*. Their achievement at GCSE is effectively capped which acts to flatten the regression line. Also there is little data on the GCSE results of low ability pupils in Independent schools to influence the line's behaviour; such data would probably act to steepen the line. The range of grades generally achieved at GCSE in Independent schools is high and very narrow.

Figure 2:
Ability Distribution (MidYIS Score), in GCSE 2001 Sample
Note the small number of pupils below a score of 100 in the Independent Sector



Accuracy of the Independent Regression Lines

The Independent sector lines simply reflect the data on which they are based (i.e. the GCSE results of high ability pupils) and work well for the majority of Independent school pupils. **Regression lines are most accurate near the mean of the data on which they are based; for the Independent sector maths sample this mean is at a MidYIS score of 120.**

Due to the flatness of the lines the predictions decrease only slowly as the MidYIS score falls and hence may become unrealistically high for lower scores. In our Maths example as the score falls the Independent and National predictions diverge by one grade roughly every 25 MidYIS points. At 110 the two predictions are one grade apart (which may be realistic), at 85 they are two grades apart.

Implications

The behaviour of the Independent predictions has the following implications:

- For pupils with lower MidYIS Scores the predictions may be unrealistically high.
- For higher ability pupils, because it is never the case that all pupils from one MidYIS score get A*, the predictions may seem unduly modest. This situation is exacerbated by the 'cap' effect of no grades beyond A*. Pupils cannot achieve better than A* but they can do worse. Consequently, the average achievement at GCSE of high ability pupils will be less than A* and the predictions will reflect this.
- For those Independent schools whose average pupil ability is much lower than typical of the Independent sector, their overall value-added results may be negatively biased, i.e. they may be unduly low. Note that for the vast majority of Independent schools this negative bias does not occur. Within the Independent schools' GCSE sample the average value-added result is by definition (and by regression analysis theory) zero. Similarly, the overall value-added results for a typical Independent school are not biased to negative results, the 'expected values' of value-added results within the school will be zero.

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