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Widening Participation in Higher Education: private schooling, disability and degree results

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Research questions include:

- RQ1: What is the range and extent of UOB undergraduate student attainment within and across academic departments?
- RQ2: What differences emerge when one adjusts for prior attainment at 18 years?
- RQ3: What student background, departmental, contextual/peer group or other factors may explain differences in student progress across departments/faculties?
- RQ4: What is the effect of properly adjusting for missing data?

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Existing evidence

- Students from State school/non-selective schools were 2% -17% more likely to obtain 2:1 or above in comparison to independent/selective school students (HEFCE 2014, Crawford, 2014)

- For all UK HE institutions, after accounting for student background, state-schooled outperform independently schooled students at all institutions. However, the negative independent school effect is smaller for students with high A-level achievement…so we would expect the most highly selective HE institutions to have a smaller independent school effect. (HEFCE, 2014)

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New analyses of Bristol data 2008-2011

- Dataset issues:
  - No entry level measures for some students e.g. overseas
  - Coding difficulties for e.g. parental education
  - Missing data on disability
  - Missing ethic status
  - Only ~60% 'complete' records in complex models and missingness non-random

- 21% missing parent completed higher education (PIHE) only
- 7% missing A-level tariff, GCSE tariff, PIHE
- 2% missing private school only
- 2% missing A-level tariff, GCSE tariff
- 2% missing A-level tariff, GCSE tariff, PIHE, private school

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Basic Model 1: Probability 2.1 or above

Estimate	Model 5a: complete cases. (3801)	Model 5b: full data with imputation. (6010)
Intercept	1.10 (0.089) *	1.03 (0.090) *
GCSE	0.204 (0.035) *	0.221 (0.029) *
A level (or equiv)	0.229 (0.045) *	0.200 (0.037) *
Private schooling	-0.083 (0.057)	-0.046 (0.046)
Parent higher education	0.161 (0.058) *	0.146 (0.054) *
Disability	-0.229 (0.085) *	-0.258 (0.068) *
Non-white ethnic	-0.251 (0.084) *	-0.296 (0.062) *
A level * private school	0.129 (0.064) *	0.153 (0.053) *
A level * disability	-0.198 (0.087) *	-0.164 (0.075) *
Level 2 variance	0.151 (0.054) *	0.177 (0.060) *

Note reduction in se. Also changes some coefficients such as private schooling and ethnic.

Handling missing data values

- Uses imputation that is
  - Efficient by conditioning on measured values
  - Helps to correct missingness bias by conditioning on measured values + auxiliary variables
  - A Bayesian procedure that allows for interactive and multilevel models
  - Implemented in STATJR (Centre for Multilevel Modelling, Bristol: http://www.bristol.ac.uk/cmm/software/statjr/)

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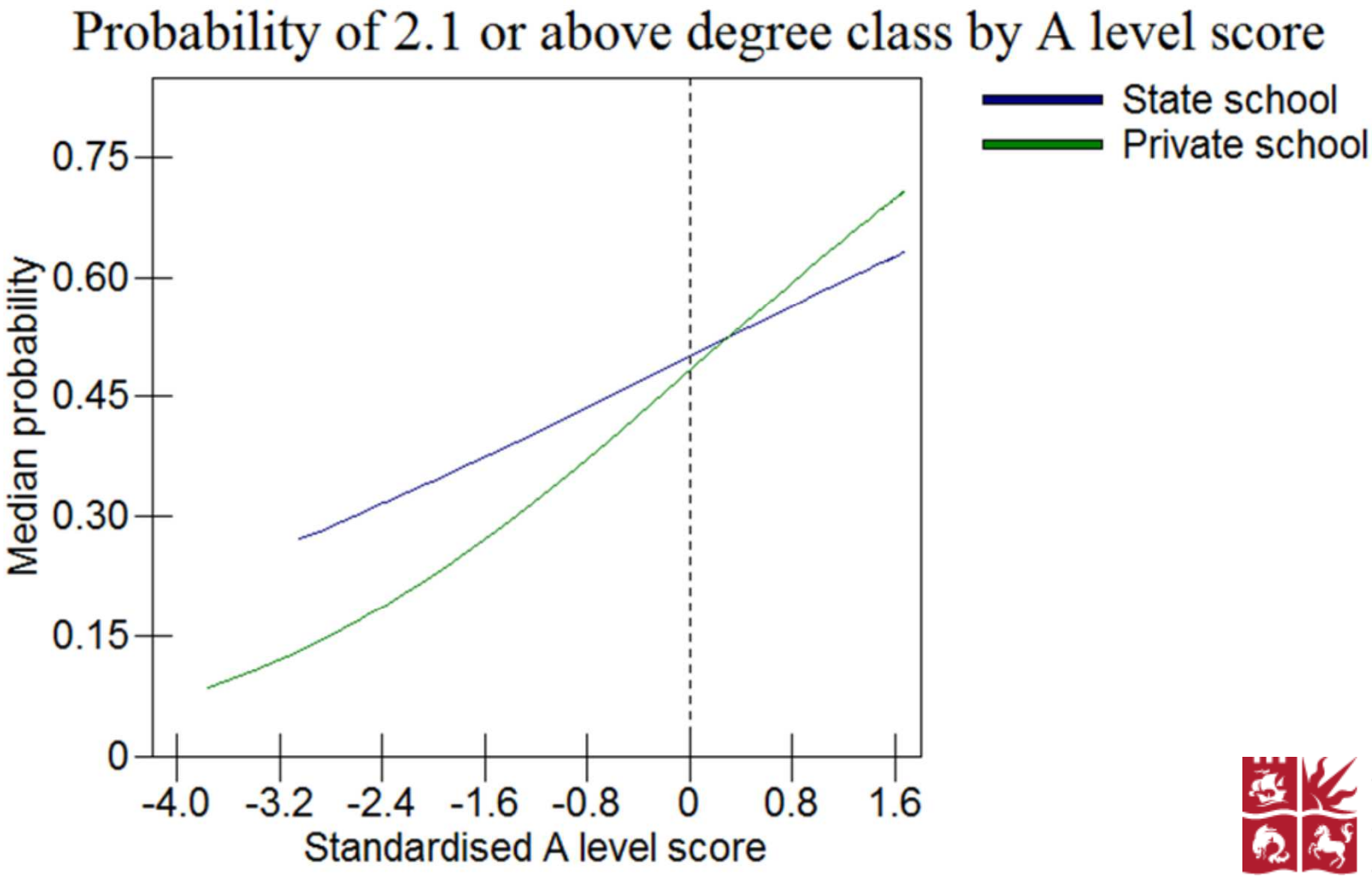
Probability 2.1 or above, with and without random effect for A level.

Adjustment also made for 2011 difference. 6010 records.

Estimate - fixed	Full imputation model. A	Full imputation model. B
Intercept	1.07 (0.11)	1.03 (0.08)
GCSE	0.23 (0.03)	0.23 (0.03)
A level	0.21 (0.04)	0.21 (0.04)
Private school	-0.05 (0.05)	-0.05 (0.05)
Parent had higher education	0.15 (0.06)	0.15 (0.06)
Disability	-0.25 (0.06)	-0.25 (0.06)
Non-white	-0.30 (0.06)	-0.30 (0.06)
Year 2011	-0.03 (0.05)	-0.03 (0.05)
WP indicator	0.01 (0.06)	0.01 (0.06)
Alevel * private school	0.15 (0.06)	0.15 (0.06)
Alevel * Disability	-0.16 (0.07)	-0.16 (0.07)
Intercept variance	0.198 (0.071)	0.175 (0.062)
A level coefficient variance	0.011 (0.011)	-
covariance	0.008 (0.022)	-



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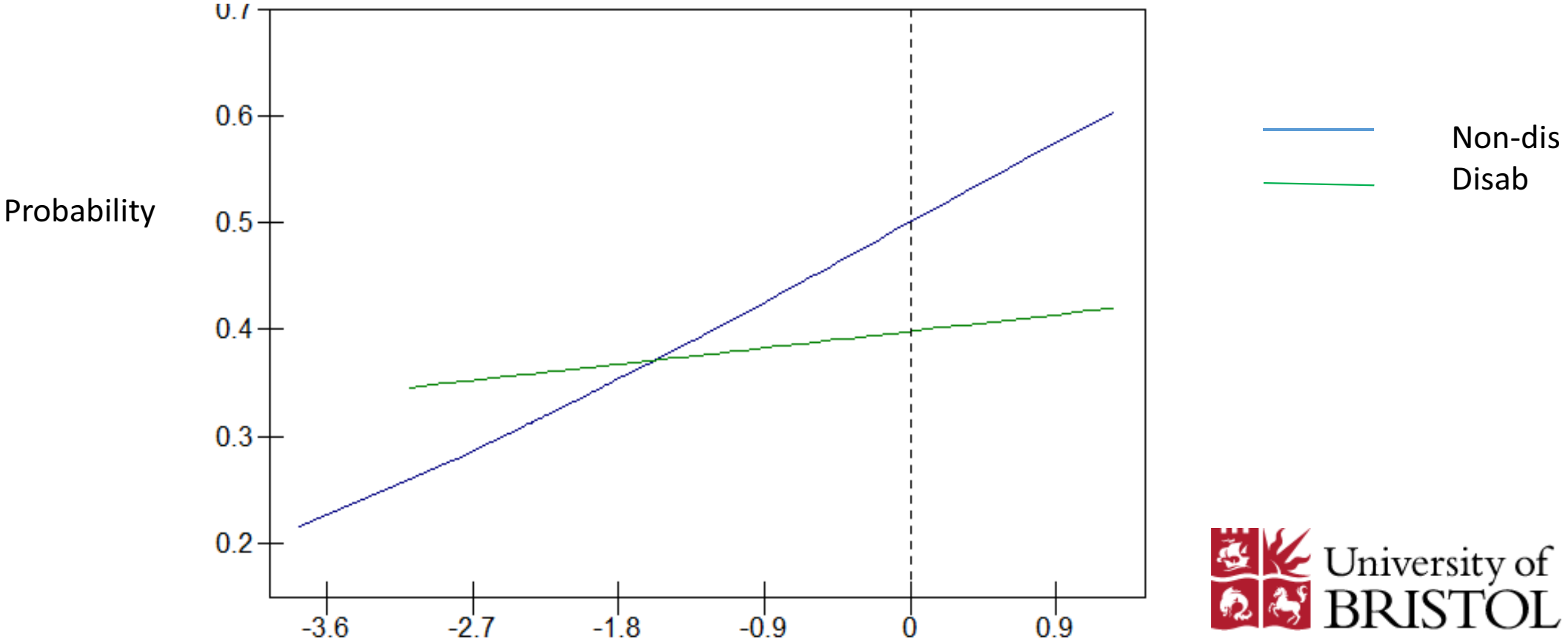
Probability of 2.1 or above by A level score and disability



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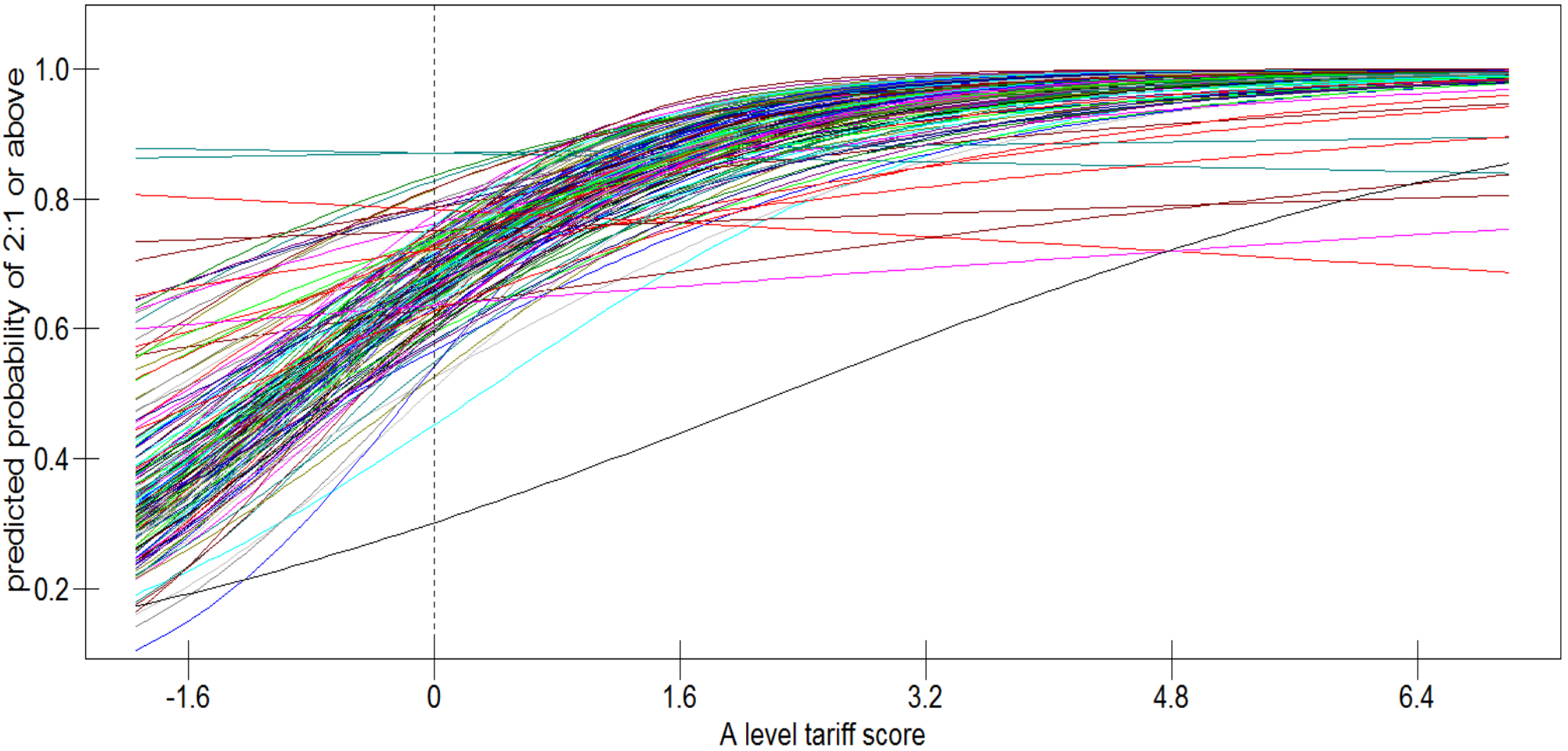
Tentative conclusions …but need further research using complete UK universities dataset

- Given the Bristol Dataset is relatively limited the results should be treated with caution. Further research is ongoing using the much larger HESA All UK universities dataset which will be completed July 2017.
- The Best student outcome measure is the binary measure "achieved 1st /2.1 degree".
- Prior attainment (A level tariff and GCSE scores) were found to be statistically significant in predicting degree outcomes …so should be controlled for in HE value added analyses, alongside individual student characteristics.
- Students privately educated, disabled, with non-white ethnicity or parents without higher education… were typically found to perform less well than other students, although interaction effects also suggested this was not the case for the most able privately educated and least able disabled students.
- So need to consider… what possible explanations underlie the observed lower performance of disadvantaged groups. Is more assistance required for these groups while at university to support their progress?
- Bristol WP indicator "secondary school with low performance" (which triggers students' eligibility for a lower UCAS entrance score admission criteria) was not found to be statistically significant in predicting student performance, after controlling for students individual characteristics…so the assumptions underlying this policy may need to be reconsidered.

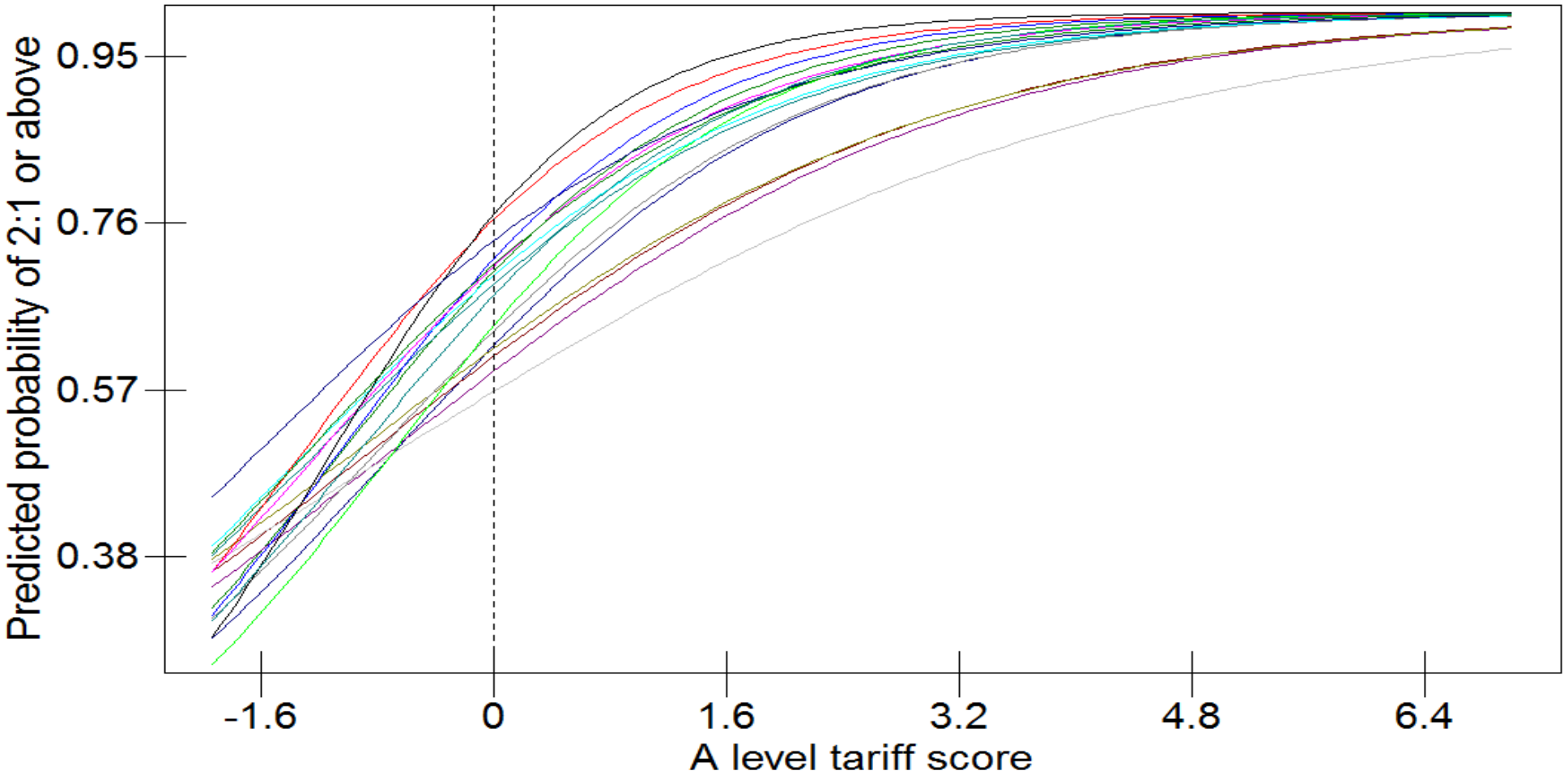
All UK University prediction lines: probabilities of getting 2.1 or above

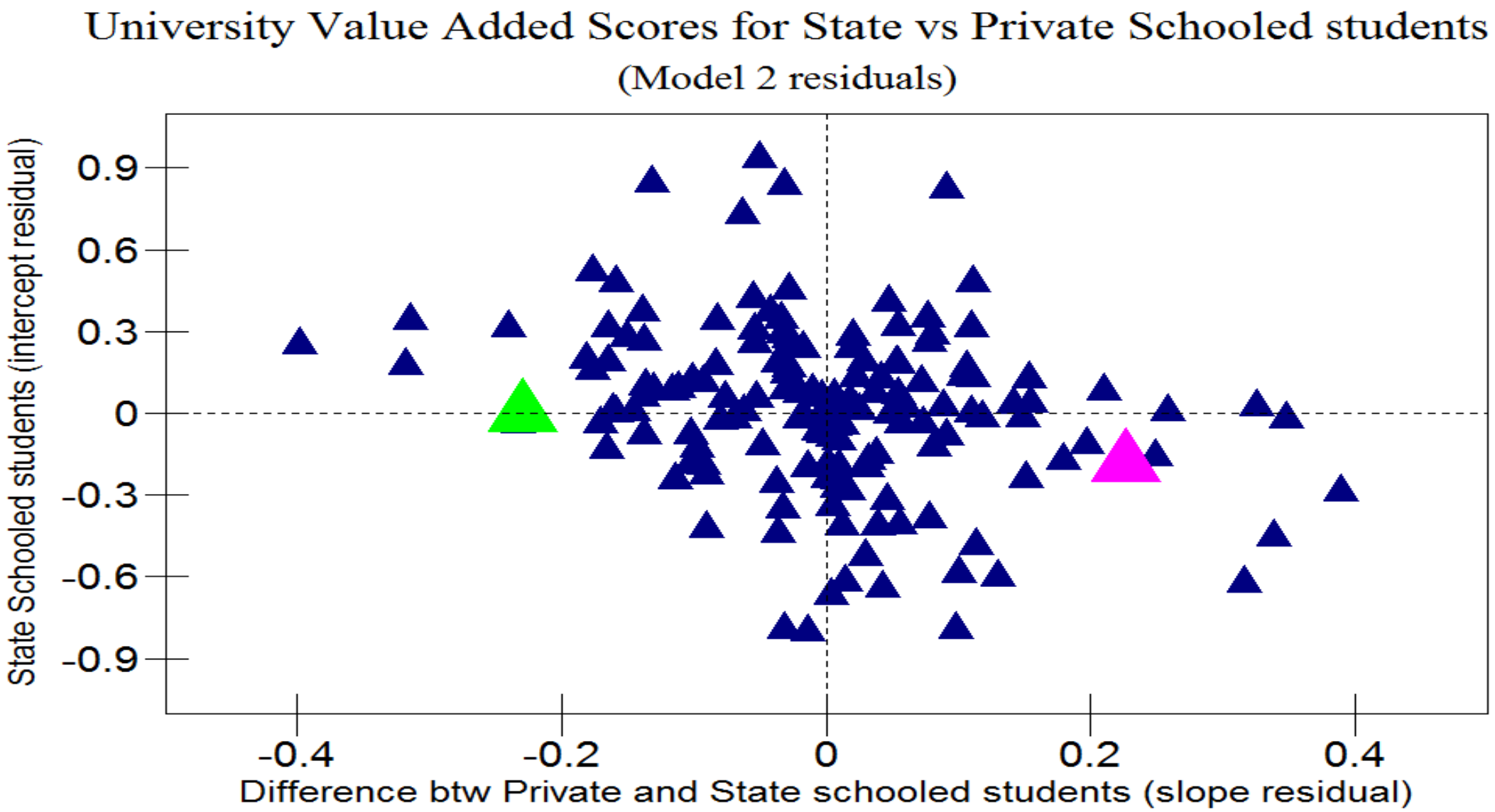
(cross-classified [university and subject area] random slope model by prior attainment; n = 838,248)

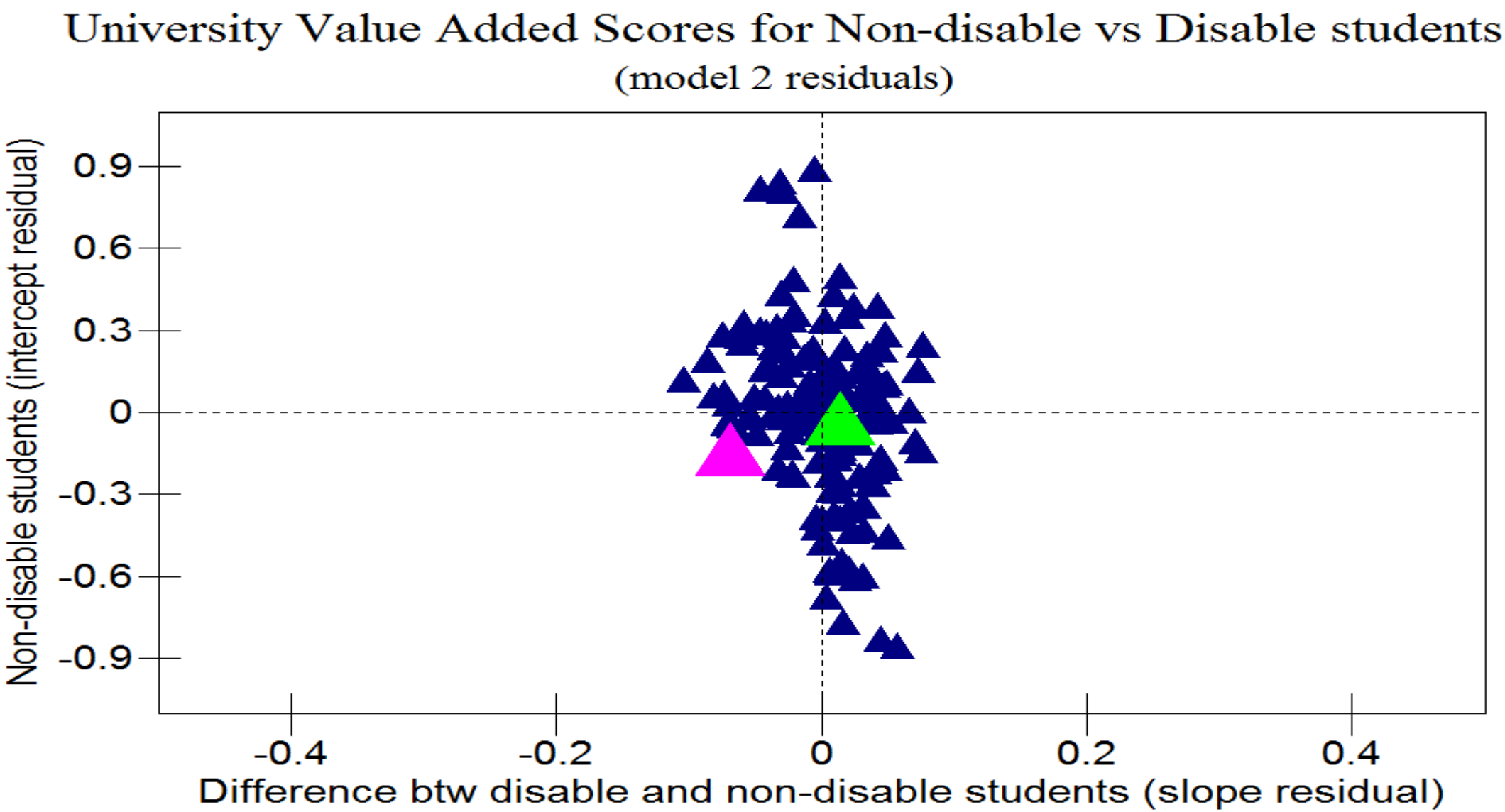


All UK Subject Area prediction lines: probabilities of getting 2.1 or above

(cross-classified [university and subject area] random slope model by prior attainment; n = 838,248)




University Value Added Scores for State vs Private Schooled students
(Model 2 residuals)
State Schooled students (intercept residual)
0.9
0.6
0.3
0
-0.3
-0.6
-0.9
-0.4
-0.2
0
0.2
0.4
Difference btw Private and State schooled students (slope residual)


University Value Added Scores for Non-disable vs Disable students
(model 2 residuals)
Non-disable students (intercept residual)
0.9
0.6
0.3
0
-0.3
-0.6
-0.9
-0.4
-0.2
0
0.2
0.4
Difference btw disable and non-disable students (slope residual)

Conclusions

- Some initial evidence that there are significant differences between subject areas and UK universities in the probability of getting a 2.1 or above.

- Also different universities potentially have a different profile of results for different disadvantaged or advantaged groups.

- Further research is required to replicate and clarify all the analyses conducted using Bristol dataset …so watch this space.

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Thank you for listening!