Contextual Value Added Measures for the Access Project

2017/18 - 2019/20

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Background

Measures of educational outcomes (e.g. the attainment of pupils at a school) often reflect differences in the characteristics and backgrounds of learners rather than the effectiveness of a particular school or programme.

Value-added measures are a common way of addressing this problem and are used in School Performance Tables (LINK). The most widely known of these measures is Progress 8, a measure of Key Stage 4 performance for secondary schools that compares the average (mean) score in a measure of attainment (Attainment 8) not to the national average score but to an "expected" score that reflects the average national performance of pupils with *similar prior (Key Stage 2) attainment*.

Value-added measures can also be calculated for young people who take part in a particular programme or intervention. For instance, we could calculate the average Progress 8 score of pupils who participate in The Access Project (TAP) programme. This would give a sense of how the attainment of participants compares to pupils with similar prior attainment nationally.

However, value-added measures can be extended to include other factors known to be associated with outcomes over and above prior attainment. These would include gender, ethnicity, first language and so forth. When these factors are included we refer to the measures as *contextual value added (CVA).*

CVA Measures

We calculate CVA measures for the following outcomes:

Stage	Outcome	Prior attainment measures
Key Stage 4	Attainment 8	Key Stage 2 reading and maths tests
Key Stage 5	Score in Best 3 A levels (A level students only)	Key Stage 4 average point score in GCSEs, GCSE English, GCSE maths
	Score in Best 3 qualifications	
Higher education	Attends a super-selective university Attends a highly-selective university Attends a selective university	Key Stage 5 score in best 3 qualifications

The additional contextual factors we include are

- Gender
- Ethnicity
- First language (English/ other)
- Month of birth
- Disadvantage (eligible for free school meals in the 6 years up to the end of Key Stage 4)
- Income Deprivation Affecting Children Index (IDACI) of home postcode
- Region

Additionally, we include the following school and college level measures at Key Stage 4 and Key Stage 5:

- At Key Stage 4
  - Mean school-level KS2 score of the cohort
  - % of pupils with first language other than English
  - % of pupils eligible for free school meals
- At Key Stage 5
  - Mean school-level KS4 score of the cohort
  - Whether the pupil attends a school or college

The KS4 and KS5 measures are calculated using ordinary least squares (OLS) regression. The higher education models (which use binary outcomes) use logistic regression. For each pupil for each measure, an expected score is calculated which reflects the average score of pupils nationally with similar prior attainment, characteristics and attending similar schools in similar regions.

Characteristics of TAP participants

Firstly, we compare the characteristics of TAP participants to the national population of pupils attending state-funded mainstream schools. This underlines the importance of taking account of pupil characteristics when examining the outcomes of TAP participants.

In Table 1, we show the characteristics of pupils who participated in TAP during Key Stage 4.

Table 1: Characteristics of pupils assessed at the end of Key Stage 4 2018-2020

	TAP participants	England
KS2 mean fine grade in reading and maths	4.98	4.51
No prior attainment data	4%	6%
Female	60%	50%
Disadvantaged	57%	25%
Mean IDACI score	0.35	0.20
First language other than English	56%	17%
White British ethnic background	14%	69%
Attends school in East Midlands	5%	9%
Attends school in London	81%	15%
Attends school in West Midlands	14%	11%
Attends Grammar School	0%	5%
Number of pupils	1010	1581885

Compared to all other pupils from state-funded mainstream schools, TAP participants

- Tend to have higher levels of Key Stage 2 attainment
- Are slightly more likely to be female
- Are more than twice as likely to be disadvantaged or more likely to live in disadvantaged areas
- Are much less likely to be of a White British ethnic background
- Are much more likely to speak a first language other than English
- Are far more likely to go to school in London

Table 2 shows the characteristics of pupils who complete Key Stage 5. Nationally, these pupils represent a subset of the national population since not all pupils go on to study post-16 level 3 qualifications. In addition, our definition of pupils who complete Key Stage 5 mirrors that used by Department for Education when calculating 16-18 Performance Tables (LINK). This excludes some applied general and technical level 3 qualifications following the recommendations of the Wolf Review (LINK).

Table 2: Characteristics of pupils assessed at the end of Key Stage 5 2018-2020

	TAP participants	England
KS4 percentile rank	62.95	49.64
Complete KS5 2 years after KS4	90%	86%
Female	61%	56%
Disadvantaged	49%	13%
Mean IDACI score	0.35	0.16
First language other than English	57%	16%
White British ethnic background	13%	62%
Attends school or college in East Midlands	6%	8%
Attends school or college in London	77%	17%
Attends school or college in West Midlands	17%	10%
Attends a college	4%	30%
Total	865	754840

Compared to all other pupils from state-funded mainstream schools and colleges, TAP participants:

- Tend to have higher levels of Key Stage 4 attainment
- Are slightly more likely to be female
- Are more than twice as likely to be disadvantaged or more likely to live in disadvantaged areas
- Are much less likely to be of a White British ethnic background
- Are far more likely to go to school or college in London
- Are much less likely to attend a College (and therefore more likely to attend a school).

For analysis of higher education participation, we use the population of pupils at the end of Key Stage 5. Consequently, the characteristics of pupils included in CVA measures of higher education are exactly the same as those reported in Table 2 above.

Table 3 shows summary Key Stage 5 attainment and higher education participation measures for TAP participants compared to the population of pupils nationally who reach the end of Key Stage 5.

Table 3: Key Stage 5 attainment and higher education participation of pupils at the end of Key Stage 5, 2018-2020

	TAP participants	England
Score in best 3 qualifications (A level and equivalents)	114.8	96.7

Score in best 3 A levels	109.6	78.6
Entered for 2 or more A levels	97%	78%
Enrols at a university	89%	68%
Enrols at a top third university	66%	30%
Number of pupils	865	754840

Compared to all other pupils from state-funded mainstream schools and colleges, TAP participants:

- Tend to be higher achieving at the end of Key Stage 5
- Are more likely to have entered 2 or more A levels
- Are more likely to enrol at university
- Are more than twice as likely to enrol at a top-third university

CVA Results 2018-2020

Key Stage 4

The table below shows Key Stage 4 CVA scores for the period 2018-2020 broken down by a range of pupil characteristics.

The table also shows the mean outcome for the measure on which CVA is based. In this case, this is Attainment 8.

Two CVA measures are presented. The first is as described in the previous section, comparing the Attainment 8 scores of TAP participants to pupils nationally with similar characteristics attending similar schools in similar regions. The second adjusts for the specific school attended by TAP participants. If TAP participants tend to go to higher attaining schools then this second measure would be lower than the first.

By design, the national average CVA score for all the groups shown is 0. Positive results indicate achieving higher Attainment 8 scores than similar pupils nationally.

Table 4: Contextual Value Added, Key Stage 4

			CVA		
		Actual outcome	Unadjusted	Adjusted for school attended	Pupils
Year	2018	64.6	7.7	6.5	285
	2019	66.3	8.6	7.2	345
	2020	69.2	8.4	7.7	380
Gender	Male	68.4	10.0	8.5	405
	Female	65.9	7.2	6.3	605
Region	East Midlands	63.2	7.5	7.0	55
	London	67.5	8.8	7.3	820
	West Midlands	65.3	5.5	6.8	140
First language	English	65.7	8.6	7.2	440
	Not English	67.9	8.0	7.2	570
Disadvantage	Not disadvantaged	69.1	6.7	5.7	430
	Disadvantaged	65.3	9.4	8.2	580

Pupils participating in TAP tend to achieve higher Attainment 8 scores than pupils with similar prior attainment and characteristics nationally. In both 2019 and 2020, they achieved a score more than 8 points higher than expected, equivalent to an additional grade higher in 8 of the 10 entries[1] on which Attainment 8 is based.

The CVA figures adjusted for school attended tend to be slightly lower, indicating that a small proportion of the unadjusted CVA score is due to school attended.

Boys, disadvantaged pupils and those attending schools in London in particular tend to achieve high CVA scores.

Key Stage 5

We calculate two CVA measures:

1. Based on the score achieved in pupils' best 3 qualifications (A levels and equivalent qualifications) for all pupils who reach the end of Key Stage 5
2. Based on the score achieved in pupils' best 3 A-levels (pupils who enter 2 or more A-levels)

Young people who do not enter level 3 qualifications (A-level and equivalent) are not included in Key Stage 5 CVA. In a national cohort of young people, around 35-40% do not enter level 3 qualifications by age 19.

We also only calculate CVA for young people who complete Key Stage 5 two years after Key Stage 4. This is due to the amount of change in indicators of attainment at Key Stage 4 in recent years. For instance, the majority of pupils who completed Key Stage 5 in 2020 would have completed Key Stage 4 in 2018. However, a small proportion would have completed Key Stage 4 in 2017. Apart from English and maths, pupils who entered GCSEs in 2017 would have been graded on the A*-G scale. Pupils assessed at Key Stage 4 in 2018 would have mostly taken GCSEs graded 9-1. The resulting average point scores (used as the prior attainment measure in CVA) are not comparable. Although they could be made more comparable, this is outside the scope of this short report.

These limitations notwithstanding, the tables below reports the two Key Stage 5 CVA measures.

Table 5a: Contextual value added, Key Stage 5 (all qualifications)

		Mean outcome	CVA	pupils
Year	2018	107.9	8.0	205
	2019	103.1	4.0	275
	2020	121.7	4.4	300
Gender	Male	118.3	9.4	305
	Female	107.2	2.5	475
Region	East Midlands	115.1	10.0	50
	London	112.5	5.1	605
	West Midlands	105.4	3.5	125

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[1] Although Attainment 8 is a measure based on 8 qualifications, English and maths are double-counted.

First language	English	116.2	6.9	325
	Not English	108.3	4.0	460
Disadvantage	Not disadvantaged	114.4	4.8	360
	Disadvantaged	109.1	5.5	425

Table 5b: Contextual value added, Key Stage 5 (best 3 A levels)

		mean outcome	CVA	pupils
year	2018	108.4	8.1	205
	2019	108.0	4.5	260
	2020	123.6	4.3	295
Gender	Male	120.0	9.3	300
	Female	110.3	2.8	460
Region	East Midlands	116.3	10.7	50
	London	115.2	5.4	590
	West Midlands	108.3	3.0	120
First language	English	116.7	7.0	320
	Not English	112.3	4.2	440
Disadvantage	Not disadvantaged	116.5	5.1	350
	Disadvantaged	112.1	5.6	410

The overwhelming majority of TAP participants enter 2 or more A levels, hence there are minimal differences between the two CVA measures shown in Tables 5a and 5b.

The picture is slightly more mixed than that for Key Stage 4. Participants in 2018 achieved 8 points above expectation across their 3 best qualifications. In the scale used here (A* at a level=60 points, A=50 points etc.), one grade in one subject would be equivalent to 10 points. However, 2019 and 2020 participants achieved lower CVA scores (around 4 points above expectation).

Male pupils and those with English as a first language tended to achieve higher CVA scores than other pupils.

The small number of pupils attending schools and colleges in the East Midlands appear to have been particularly successful, achieving 10 points higher on average, equivalent to one grade higher in one subject.

Higher Education

We use a classification of higher education institutions (HEIs) based on their degree of 'selectivity'. This is defined based on a list of universities supplied by the Access Project, which identifies 51 universities as 'top third'. The top third is further divided into three tiers.

The three tiers, in decreasing order of selectivity, are classified as:

- Super selective
- Highly selective
- Selective

For all young people who reached the end of Key Stage 5 between 2018 and 2020 we calculate the probability of them subsequently enrolling at a HEI in each of the tiers above between 2019 and 2021 based on Key Stage 5 prior attainment, region and pupil characteristics as described above.

We also observe that some young people take a "gap year" between Key Stage 5 and higher education entry. Consequently, we would expect a higher proportion of the 2018 and 2019 cohorts to be observed in higher education compared to the 2020 cohort as any pupils from 2020 taking a gap year would be observed in higher education data for the first time in 2022. In other words, were we to re-run the analysis to include 2022 data, we would most likely see a higher rate of HE participation among the 2020 cohort.

To avoid having to suppress data due to small numbers, we present three sets of tables comparing TAP participants to statistically similar pupils for the following outcomes:

- Attending a super selective or highly selective HEI
- Attending a selective HEI
- Attending any top third HEI (in other words, attending a HEI of any of the types listed in the preceding set of bullets).

Table 6a: Contextual value added, Higher Education (attending a super selective or highly selective HEI)

		mean outcome	CVA	pupils
year	2018	36%	9%	225
	2019	33%	7%	310
	2020	34%	6%	330
Gender	Male	39%	6%	340
	Female	31%	8%	525
Region	East Midlands	SUPP	SUPP	55
	London	35%	7%	665
	West Midlands	SUPP	SUPP	145
First language	English	36%	7%	375
	Not English	33%	7%	490
Disadvantage	Not disadvantaged	34%	6%	440
	Disadvantaged	34%	8%	425

33-36% of TAP participants in each cohort progressed to a super selective or highly selective university. This represents a higher success rate than pupils with similar prior attainment and characteristics attending schools and colleges in similar regions. An additional 9% of participants than might have been expected progressed to a super or highly selective HEI in 2018. In other years this figure was 6-7%.

Table 6b: Contextual value added, Higher Education (attending a selective HEI)

		mean outcome	CVA	pupils
year	2018	30%	8%	225
	2019	32%	12%	310
	2020	33%	13%	330
Gender	Male	30%	9%	340
	Female	33%	13%	525
Region	East Midlands	SUPP	SUPP	55
	London	35%	13%	665
	West Midlands	SUPP	SUPP	145
First language	English	27%	9%	375
	Not English	35%	14%	490
Disadvantage	Not disadvantaged	30%	10%	440
	Disadvantaged	34%	13%	425

CVA scores for selective HEIs tend to be slightly lower than those for super selective or highly selective HEIs. In general, the proportions of TAP participants taking up places at selective universities is in line with expectation given the Key Stage 5 attainment and backgrounds of participants.

Finally, we combine the outcomes from tables 6a and 6b to examine the total proportion of participants who take up places at any top third HEI (i.e. a super selective, highly selective or selective HEI). Note that to avoid suppressing data, we have combined the rows relating to the East Midlands and West Midlands region.

Table 6c: Contextual value added, Higher Education (attending any top third HEI)

		mean outcome	CVA	pupils
year	2018	66%	17%	225
	2019	65%	19%	310
	2020	66%	19%	330
Gender	Male	69%	15%	340
	Female	64%	21%	525
Region	East and West Midlands	53%	14%	200
	London	70%	20%	665
First language	English	63%	16%	375
	Not English	68%	20%	490
Disadvantage	Not disadvantaged	63%	16%	440
	Disadvantaged	68%	21%	425

Overall, around two thirds of pupils who participated in TAP during Key Stage 5 in 2018 and 2020 are subsequently observed to attend a top third HEI. The CVA scores suggest that these figures are 17 to 19 percentage points higher than we might have expected given the prior attainment and characteristics of pupils and the regions in which they went to schools and Colleges.

Although male participants were slightly more likely than female participants to take up places at top third universities, they were also less likely to do so given their prior attainment and characteristics. The higher CVA score for girls is suggestive of the TAP programme having slightly more of an effect for them than for boys.

Similarly, the CVA scores are slightly higher:

- For pupils who attended schools and colleges in East and West Midlands compared to those who attended schools and colleges in London
- For pupils with a first language other than English compared to those with English as a first language

The fact more disadvantaged pupils than non-disadvantaged participants progressed to university may be slightly surprising. 68% of disadvantaged pupils who participated in TAP took up places at top third universities. The implied expected value from the CVA score is 47%. On the surface this may seem slightly high. However, this is based on pupils who complete Key Stage 5. The issue for disadvantaged pupils nationally in terms of HE entry is that many do not progress to level 3 study at Key Stage 5 in the first place, let alone complete it. Just 24% of disadvantaged pupils from the 2018 Key Stage 4 cohort went on to complete Key Stage 5[2] by the end of 2020. This compares to 46% of other pupils.

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[2] Based on qualifications counted in Key Stage 5 Performance Tables. Not all qualifications approved for students aged 16-18 are considered in-scope of Performance Tables.

GCSE to Higher Education Transition Matrix

We now show how rates of progression to higher education vary by GCSE Attainment nationally.

To do this, we first convert the Attainment 8 scores of pupils in the 2018 end of Key Stage 4 cohort into percentile ranks. This is necessary because pupils in 2018 entered a mixture of reformed (9-1) and legacy (A*-G) GCSEs. Consequently, Attainment 8 scores in 2018 are not directly comparable with subsequent years.

Table 7 illustrates this by showing the average Attainment 8 score for selected percentile ranks in 2018 and 2019.

Table 7: Average Attainment 8 scores for selected percentile ranks in 2018 and 2019 end of Key Stage 4 cohorts

	Average Attainment 8 score by KS4 cohort	
Percentile	2018	2019
1	0.0	0.0
10	21.4	21.4
20	30.3	30.3
30	36.8	36.8
40	42.0	42.0
50	47.0	47.1
60	52.2	52.3
70	57.8	58.0
80	64.3	64.8
90	73.1	73.5
100	89.2	89.4

Table 8 (overleaf) shows the percentage of pupils in the 2018 end of Key Stage 4 cohort nationally who progressed to super selective, highly selective, or selective HEIs. Results are broken down by pupils' Attainment 8 ranking. Where numbers of pupils are small, percentile ranks are grouped.

Rates of progression to top third HEIs increase with increasing Key Stage 4 attainment. For example, around 6% of pupils whose Attainment 8 score was between the 51st and 55th percentile progressed to any top third HEI, compared with around 48% of pupils whose score was in the 90th percentile.

In general, progression to a super selective HEI was rare, apart from among pupils with the very highest Key Stage 4 attainment (54% of those in the top percentile). Among those with slightly lower Key Stage 4 attainment, rates were much lower (around 7% of those in the 90th percentile).

Table 8: Higher Education progression by HEI tier and Attainment 8 percentile, 2018 end of Key Stage 4 cohort

Att 8 percentile	No of pupils	% pupils by HEI tier			% pupils by HEI tier (cumulative)		
		Super selective	Highly selective	Selective	Super selective	Highly selective or better	Any top third
1 - 30	151,830	<1%	<1%	<1%	<1%	<1%	<1%
31 - 40	50,610	<1%	<1%	1%	<1%	<1%	2%
41 - 50	50,610	<1%	1%	2%	<1%	1%	3%
51 - 55	25,300	<1%	2%	4%	<1%	2%	6%
56 - 60	25,300	<1%	2%	5%	<1%	2%	7%
61 - 65	25,300	<1%	3%	6%	<1%	3%	9%
66	5,060	<1%	3%	7%	<1%	4%	11%
67	5,060	1%	4%	7%	1%	4%	12%
68	5,060	<1%	4%	9%	<1%	5%	13%
69	5,060	1%	4%	9%	1%	5%	14%
70	5,060	1%	5%	9%	1%	5%	14%
71	5,060	1%	4%	9%	1%	5%	15%
72	5,060	1%	6%	9%	1%	7%	16%
73	5,060	1%	7%	11%	1%	8%	19%
74	5,060	1%	7%	10%	1%	7%	17%
75	5,060	1%	8%	10%	1%	9%	19%
76	5,060	2%	8%	11%	2%	10%	21%
77	5,060	1%	8%	12%	1%	9%	21%
78	5,060	2%	9%	12%	2%	11%	23%
79	5,060	2%	10%	13%	2%	12%	25%
80	5,060	2%	11%	13%	2%	13%	27%
81	5,060	2%	12%	14%	2%	15%	28%
82	5,060	3%	13%	15%	3%	16%	31%
83	5,060	3%	14%	15%	3%	17%	32%
84	5,060	3%	16%	15%	3%	20%	34%
85	5,060	4%	16%	16%	4%	20%	36%
86	5,060	4%	17%	16%	4%	21%	37%
87	5,060	5%	21%	17%	5%	25%	42%
88	5,060	6%	21%	16%	6%	27%	42%
89	5,060	6%	24%	17%	6%	30%	47%
90	5,060	7%	25%	16%	7%	32%	48%
91	5,060	9%	28%	15%	9%	37%	53%
92	5,060	10%	30%	16%	10%	39%	55%
93	5,060	12%	29%	15%	12%	41%	56%
94	5,060	13%	33%	13%	13%	46%	60%
95	5,060	16%	34%	13%	16%	50%	63%
96	5,060	20%	33%	12%	20%	53%	65%
97	5,060	24%	35%	10%	24%	59%	70%
98	5,060	29%	34%	10%	29%	63%	73%

99	5,060	38%	32%	7%	38%	70%	77%
100	5,060	54%	24%	5%	54%	78%	83%
Total	**506,050**	**3%**	**4%**	**2%**	**6%**	**10%**	**12%**