

Predicting A level grades using AS level grades

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1. Introduction

The university application process for candidates in England is run by UCAS, an organisation with responsibility for processing applications to universities and colleges across the UK. In the UCAS application process, a referee for each candidate is required to submit predicted grades for the candidate's pending qualifications. These referee predicted grades are forwarded to universities and colleges, and are used to inform the offers that these institutions make to their applicants.

The main qualification completed by candidates in England before university entry is the A level. A level qualifications are usually undertaken across a two year period, with candidates typically completing corresponding AS level qualifications at the end of the first year of this period. For these candidates, a potential alternative to referee predicted grades is therefore actual AS level results.

The purpose of this report is to explore the possibility of using AS level results as an alternative to referee predicted grades in the UCAS application process. Specifically, this report aims to analyse how accurately AS level grades were able to predict A level grades for candidates in England in the 2010 examination year.

2. Data and method

Data for this report were extracted from the Key Stage 5 (KS5) National Pupil Database (NPD) for the 2010 examination year. The NPD is compiled by the Department for Education using data supplied by awarding bodies. The 2010 KS5 NPD extract contains individual candidate-level attainment records for all candidates reaching the end of KS5 in England in the 2009/10 academic year.

For the 2010 A level prediction analysis, the KS5 NPD extracts were screened for and cleaned of any erroneous duplicate records. The extracts were then restricted to retain only:

1. 2009 AS level (January and June) and 2010 A level (January and June) results (see Appendix A for details of alternative, extended analyses which retained January 2009, June 2009 and January 2010 AS level and June 2010 A level results).
2. Grade A* to U results (not pending or incomplete).
3. The highest result for any re-sit records.
4. Results for candidates who completed three or more A levels in 2010 (the candidates who were most likely to have submitted a UCAS application).
5. Matching results, where candidates had taken both an AS level and an A level in the same subject. 77% of all 2009 AS level grade A to U results (restrictions 1 to 4) could be matched to a 2010 A level result, and 67% of all 2010 A level grade A* to U results could be matched to a 2009 AS level result.

Overall 431,827 pairs of 2009 AS level and matching 2010 A level results remained in the KS5 NPD extract following these restrictions. Table 1 presents a breakdown of these 431,827 pairs of results by 2009 AS level grade, gender, level of deprivation and centre type. For each of these pairs of results, descriptive statistical analyses were conducted to evaluate the correspondence between 2009 AS level grade and 2010 A level grade and, hence, to establish how accurately AS level grades were able to predict A level grades.

Table 1: 2009 AS level and 2010 A level pairs of results meeting the analysis restrictions, by gender, level of deprivation and centre type

	N (pairs of results)	Column %
2009 AS level grade		
A	117,911	27.31
B	109,201	25.29
C	103,807	24.04
D	68,128	15.78
E	29,057	6.73
U	3,723	0.86
Gender		
Female	240,331	55.65
Male	191,496	44.35
Level of deprivation[†]		
Low deprivation	97,070	22.48
Medium deprivation	85,028	19.69
High deprivation	63,529	14.71
Missing	186,200	43.12
Centre type		
Comprehensive	188,046	43.55
FE/Tertiary College	45,082	10.44
Grammar	46,526	10.77
Independent	30,763	7.12
Secondary Modern	4,377	1.01
Sixth Form College	111,135	25.74
Academy	3,412	0.79
Other	2,484	0.58
Missing	2	0.00
All	431,827	100

Note: [†]Low, medium and high deprivation groups represent the upper, middle and lower thirds of the IDACI deprivation index for all candidates in the 2010 KS5 NPD.

3. Results

The overall correspondence between 2009 AS level grades and matched 2010 A level grades is presented in Table 2.

Table 2: 2009 AS level grade by 2010 A level grade

2009 AS level grade	N (pairs of results)	2010 A level grade (row %)					
		A*/A	B	C	D	E	U
A	117,911	<u>76.33</u>	21.61	1.87	0.14	0.05	0.00
B	109,201	19.58	<u>52.83</u>	24.68	2.65	0.19	0.07
C	103,807	4.74	25.43	<u>47.34</u>	19.72	2.54	0.24
D	68,128	1.34	9.19	30.97	<u>40.08</u>	16.30	2.12
E	29,057	0.46	3.63	15.10	32.52	<u>34.25</u>	14.03
U	3,723	1.45	4.35	11.36	24.36	30.35	<u>28.12</u>
All	431,827	27.19	27.10	24.13	14.17	5.81	1.59

To clarify this correspondence, the remainder of this results section examines three measures of correspondence between 2009 AS level grades and matched 2010 A level grades:

- 3.1: A level grade equal to, higher than, or lower than AS level grade.
- 3.2: A level grade within one grade of AS level grade.
- 3.3: A level grade two or more grades higher/lower than, one grade higher/lower than, or equal to AS level grade.

For each of these measures, correspondence is examined by 2009 AS level grade, gender, level of deprivation and centre type. Throughout these results, it should be noted that candidates were only able to obtain an A* grade in their A level qualification, and not their AS level qualification. Grades A* and A in the A level results are therefore treated as a single grade.

3.1 Results: 2010 A level grade equal to, higher than, or lower than 2009 AS level grade

Table 3 presents the proportion of 2010 A level grades that were equal to, higher than, or lower than matched 2009 AS level grades. Overall:

- AS level grades were equal to matched A level grades 54% of the time.
- AS level grades were equally optimistic (A level grade lower than AS level grade) and pessimistic (A level grade higher than AS level grade) in predicting A level grades: 23% of A level grades were lower and 23% of A level grades were higher than matched AS level grades.

Table 3: 2010 A level grade equal to, higher than, or lower than 2009 AS level grade

2010 A level grade:	N (pairs of results)	%
<u>Equal to</u> 2009 AS level grade	235,139	54.45
<u>Higher</u> than 2009 AS level grade	98,682	22.85
<u>Lower</u> than 2009 AS level grade	98,006	22.70
Total	431,827	100

Table 4 breaks down the proportion of 2010 A level grades that were equal to, higher than, or lower than matched 2009 AS level grades, by 2009 AS level grade, gender, level of deprivation and centre type. Overall:

- 2009 AS level grade – High AS level grades were a better predictor of A level grades than low AS level grades: 76% of A grade AS levels were equal to matched A level grades, compared to just 28% of U grade and 34% of E grade AS levels. AS level grades A and B were more optimistic than pessimistic (24% and 28%, respectively, of A level grades were *lower* than matched AS level grades), while AS level grades C, D, E and U were more pessimistic than optimistic (30%, 42%, 52% and 72%, respectively, of A level grades were *higher* than matched AS level grades).
- Gender – AS level grades were a slightly worse predictor of A level grades for male candidates (53% equal) than female candidates (56% equal). For male candidates AS level grades were slightly more likely to be optimistic than for female candidates: 24% of A level grades for male candidates were lower than matched AS level grades.
- Level of deprivation – AS level grades were a slightly worse predictor for candidates from areas of high deprivation (52% equal) than candidates from areas of low (55% equal) or medium (54% equal) deprivation. For candidates from areas of high deprivation AS level grades were both slightly more optimistic and slightly more pessimistic than for candidates from areas of medium or low deprivation: 24% of AS level grades were higher and 23% of AS level grades were lower than matched A level grades for candidates from areas of high deprivation.
- Centre type – AS level grades were best at predicting A level grades for candidates from independent (64% equal) and grammar (59% equal) schools. This result is likely to be an artefact of higher candidate AS level attainment within these centres (see Appendix B for a breakdown of 2009 AS level grade by centre type).

Table 4: 2010 A level grade equal to, higher than, or lower than 2009 AS level grade, by 2009 AS level grade, gender, level of deprivation and centre type

	N (pairs of results)	2010 A level grade (row %)		
		<u>Equal to 2009 AS level grade</u>	<u>Higher than 2009 AS level grade</u>	<u>Lower than 2009 AS level grade</u>
2009 AS level grade	(431,827)			
A	117,911	76.33	0.00	23.67
B	109,201	52.83	19.58	27.59
C	103,807	47.34	30.17	22.50
D	68,128	40.08	41.50	18.41
E	29,057	34.25	51.72	14.03
U	3,723	28.12	71.88	0.00
Gender	(431,827)			
Female	240,331	55.60	22.97	21.43
Male	191,496	53.02	22.70	24.29
Level of deprivation	(245,627)			
Low deprivation	97,070	55.40	22.76	21.84
Medium deprivation	85,028	54.27	23.29	22.44
High deprivation	63,529	52.02	24.49	23.48
Centre type	(431,825)			
Comprehensive	188,046	53.01	24.15	22.84
FE/Tertiary College	45,082	51.06	23.26	25.68
Grammar	46,526	59.08	20.16	20.75
Independent	30,763	64.47	20.13	15.39
Secondary Modern	4,377	51.04	24.54	24.42
Sixth Form College	111,135	53.88	22.25	23.86
Academy	3,412	51.41	25.47	23.12
Other	2,484	49.88	21.50	28.62
All	431,827	54.45	22.85	22.70

3.2 Results: 2010 A level grade within one grade of 2009 AS level grade

Table 5 presents the proportion of 2010 A level grades that were within one grade of matched 2009 AS level grades. This table highlights that the majority of A level grades were within one grade of matched AS level grades (93%).

Table 5: 2010 A level grade within one grade of 2009 AS level grade

2010 A level grade:	N (pairs of results)	%
<u>Within 1 grade</u> of 2009 AS level grade	402,685	93.25
<u>Not within 1 grade</u> of 2009 AS level grade	29,142	6.75
Total	431,827	100

Table 6 breaks down the proportion of 2010 A level grades that were within one grade of matched 2009 AS level grades, by 2009 AS level grade, gender, level of deprivation and centre type. Overall:

- 2009 AS level grade – A level grades were more likely to be within one grade of high AS level grades than of low AS level grades: 98% of A levels were within one grade of matched grade A AS levels, while only 58% of A levels were within one grade of matched grade U AS levels, and only 81% of A levels were within one grade of matched grade E AS levels.
- Gender – A level grades were very slightly less likely to be within one grade of matched AS level grades for male candidates (93%) than for female candidates (94%); however, this difference was very small.
- Level of deprivation – A level grades were very slightly more likely to be within one grade of matched AS levels for candidates from areas of low deprivation (94%) than from areas of high (93%) or medium deprivation (93%); however, this difference was very small.
- Centre type – A level grades were slightly more likely to be within one grade of matched AS level grades for candidates from independent (95%) and grammar (94%) schools.

Table 6: 2010 A level grade within one grade of 2009 AS level grade, by 2009 AS level grade, gender, level of deprivation and centre type

	N (pairs of results)	2010 A level grade (row %)	
		<u>Within 1 grade of 2009 AS level grade</u>	<u>Not within 1 grade of 2009 AS level grade</u>
2009 AS level grade	(431,827)		
A	117,911	97.94	2.06
B	109,201	97.10	2.90
C	103,807	92.48	7.52
D	68,128	87.35	12.65
E	29,057	80.80	19.20
U	3,723	58.47	41.53
Gender	(431,827)		
Female	240,331	93.76	6.24
Male	191,496	92.62	7.38
Level of deprivation	(245,627)		
Low deprivation	97,070	93.56	6.44
Medium deprivation	85,028	93.28	6.72
High deprivation	63,529	92.54	7.46
Centre type	(431,825)		
Comprehensive	188,046	93.03	6.97
FE/Tertiary College	45,082	92.26	7.74
Grammar	46,526	93.93	6.07
Independent	30,763	94.92	5.08
Secondary Modern	4,377	93.12	6.88
Sixth Form College	111,135	93.38	6.62
Academy	3,412	92.20	7.80
Other	2,484	90.42	9.58
All	431,827	93.25	6.75

3.3 Results: 2010 A level grade two or more grades higher/lower than, one grade higher/lower than, or equal to 2009 AS level grade

Table 7 presents the proportion of 2010 A level grades that were two or more grades higher or lower than, one grade higher or lower than, or equal to matched 2009 AS level grades. Table 8 then presents a breakdown of this proportion by 2009 AS level grade, gender, level of deprivation and centre type. These tables reinforce the results from sections 3.1 and 3.2, but present these results to a finer level of detail.

Table 7: 2010 A level grade two or more grades higher/lower than, one grade higher/lower than, or equal to 2009 AS level grade

2010 A level grade:	N (pairs of results)	%
<u>2 or more grades higher</u> than 2009 AS level grade	19,219	4.45
<u>1 grade higher</u> than 2009 AS level grade	79,463	18.40
<u>Equal to</u> 2009 AS level grade	235,139	54.45
<u>1 grade lower</u> than 2009 AS level grade	88,083	20.40
<u>2 or more grades lower</u> than 2009 AS level grade	9,923	2.30
Total	431,827	100

Table 8: 2010 A level grade two or more grades higher/lower than, one grade higher/lower than, or equal to 2009 AS level grade, by 2009 AS level grade, gender, level of deprivation and centre type

	N (pairs of results)	2010 A level grade compared to 2009 AS level grade: (row %)				
		2 or more grades higher	1 grade higher	Equal to	1 grade lower	2 or more grades lower
2009 AS level grade	(431,827)					
A	117,911	0.00	0.00	76.33	21.61	2.06
B	109,201	0.00	19.58	52.83	24.68	2.90
C	103,807	4.74	25.43	47.34	19.72	2.78
D	68,128	10.53	30.97	40.08	16.30	2.12
E	29,057	19.20	32.52	34.25	14.03	0.00
U	3,723	41.53	30.35	28.12	0.00	0.00
Gender	(431,827)					
Female	240,331	4.33	18.64	55.60	19.52	1.91
Male	191,496	4.60	18.10	53.02	21.50	2.78
Level of deprivation	(245,627)					
Low deprivation	97,070	4.38	18.38	55.40	19.79	2.05
Medium deprivation	85,028	4.58	18.71	54.27	20.31	2.13
High deprivation	63,529	4.91	19.58	52.02	20.94	2.54
Centre type	(431,825)					
Comprehensive	188,046	4.75	19.40	53.01	20.62	2.22
FE/Tertiary College	45,082	4.69	18.57	51.06	22.64	3.05
Grammar	46,526	3.87	16.29	59.08	18.55	2.20
Independent	30,763	4.02	16.12	64.47	14.33	1.06
Secondary Modern	4,377	4.84	19.69	51.04	22.39	2.03
Sixth Form College	111,135	4.16	18.10	53.88	21.40	2.47
Academy	3,412	5.01	20.46	51.41	20.34	2.78
Other	2,484	5.43	16.06	49.88	24.48	4.15
All	431,827	4.45	18.4	54.45	20.4	2.3

4. Summary

The analysis presented in this report aimed to explore how accurately AS level grades were able to predict A level grades for candidates in England in the 2010 examination year. The results of this analysis identified that 2009 AS level grades were able to perfectly predict matched 2010 A level grades 54% of the time. However, they also identified that 2009 AS level grades were within one grade of matched 2010 A level grades 93% of the time. AS level grades were thus a reasonable predictor of A level grades in the 2010 examination year.

Where 2009 AS level grades did not perfectly predict matched 2010 A level grades, the AS level grades were equally optimistic and pessimistic: 23% of A level grades were lower and 23% of A level grades were higher than matched AS level grades.

Analysis by 2009 AS level grade, gender, level of deprivation and centre type revealed that 2009 AS level grades were slightly better and worse at predicting 2010 A level grades for some candidates:

- High AS level grades were better predictors of A level grades than low AS level grades, with low AS level grades more likely to be a pessimistic predictor.
- AS level grades were a slightly better predictor of A level grades for female than for male candidates, with male candidates' AS level grades slightly more likely to be optimistic.
- AS level grades were a slightly worse predictor for candidates from areas of high deprivation than for candidates from areas of low or medium deprivation, with AS level grades for candidates from areas of high deprivation slightly more likely to be both optimistic and pessimistic.
- AS level grades were a better predictor for candidates from independent and grammar schools than for candidates from other centre types; however, this result is likely to be an artefact of high AS level attainment for candidates from these centres (Appendix B).

These differences indicate that AS level grades may be a very slightly disproportionate predictor of A level grades for some subgroups of candidates.

Appendix A: Addendum - January 2010 AS levels re-sits and new entries

The 'Predicting A level grades using AS level grades' statistics report aimed to identify how accurately 2009 (January and June) AS level grades were able to predict 2010 (January and June) A level grades for candidates in England. The report identified that 2009 AS level grades were a reasonable predictor of 2010 A level grades, with 54% of A level grades equal to matched AS level grades, and 93% of A level grades within one grade of matched AS level grades.

This short report extends these outcomes, and aims to identify how accurately 2009 (January and June) and January 2010 AS level grades were able to predict June 2010 A level grades. The purpose of this extension is to establish whether the inclusion of the additional AS level re-sit and new entry results from January 2010 would improve the predictive capacity of the AS level grades.

For this extension, data were again extracted from the 2010 Key Stage 5 National Pupil Database (KS5 NPD), using the same sample restrictions as were applied in the initial report. In this case, however, AS level results from January 2009, June 2009 and January 2010 were matched to corresponding A level results from June 2010. Overall 439,968 pairs of AS level and matching A level results were extracted following the sample restrictions.

Table A1 presents a breakdown of the 439,968 pairs of results by session of AS level completion. For AS levels that were completed in January 2010, the table also identifies whether the AS levels were re-sits or new entries. Overall, just 7% (N = 29,698) of the AS levels were completed in January 2010, the inclusion of AS levels from January 2010 did not substantially increase the number of AS level results that were available for use as predictors. Given that the KS5 NPD only contains records of 'cached' (or aggregated) AS level results, this low proportion is perhaps unsurprising. Of the AS levels that were cached in January 2010, the majority were re-sits (4.30% of all pairs of results), but some were also new entries (2.43% of all pairs of results).

Table A1: 2009 or January 2010 AS level and June 2010 A level pairs of results meeting the analysis restrictions, by session of AS level completion

AS level completion	N (pairs of results)	Column %
January or June 2009	410,330	93.26
January 2010: <u>re-sit AS level</u>	18,933	4.30
January 2010: <u>new AS level</u>	10,705	2.43
ALL	439,968	100

For each of the pairs of results, descriptive statistical analyses were conducted to evaluate the correspondence between 2009 or January 2010 AS level grade and June 2010 A level grade. The outcomes of these analyses were then compared to those of the initial report, in order to establish whether the inclusion of the additional AS level results from January 2010 improved the predictive capacity of the AS level grades.

Table A2 presents the proportion of A level grades that were equal to, higher than, or lower than matched AS level grades in both the initial report (2009 AS level grades used to predict 2010 A level grades) and in this extension (2009 and January 2010 AS level grades used to predict June 2010 A level grades). Overall:

- The inclusion of January 2010 AS level results improved the predictive capacity of the AS level grades, but only very slightly: 2009 AS level grades were equal to matched 2010 A level grades 54% of the time, while 2009 or January 2010 AS level grades were equal to matched June 2010 A level grades 55% of the time.
- The inclusion of January 2010 AS level results created a more optimistic predictor: 2009 AS level grades were an equally optimistic and pessimistic predictor of 2010 A level grades (23% of A level grades were both higher and lower than matched AS level grades), while 2009 or January 2010 AS level grades were more likely to be an optimistic than a pessimistic predictor of June 2010 A level grades (20% of A level grades were higher and 25% of A level grades were lower than matched AS level grades).

Table A2: A level grade equal to, higher than, or lower than AS level grade predictor (2009 AS level grades compared with 2009 or January 2010 AS level grades)

A level grade:	Predictor (column %)	
	Initial report: 2009 AS level grade (predicting 2010 A level)	Extension: 2009 or Jan 2010 AS level grade (predicting Jun 2010 A level)
<i>N (pairs of results)</i>	431,827	439,968
<u>Equal to</u> predictor	54.45	55.33
<u>Higher</u> than predictor	22.85	20.07
<u>Lower</u> than predictor	22.70	24.60
Total	100	100

The outcomes of this comparison suggest that the additional inclusion of January 2010 AS level results did not have a substantial impact upon the predictive capacity of the AS level grades. However, this analysis only included AS level results cashed in January 2010. The fact that it was not a requirement to cash AS levels completed in January 2010 means that the additional numbers of January 2010 AS level re-sits and new entries available for inclusion in this analysis were low. Arguably, if candidates had been required to cash all AS levels completed in January 2010 as part of the formal UCAS application process then the number of January 2010 AS level results would have been greater, and the predictive capacity of the AS level grades in this extension may have been further improved.

Appendix B: 2009 AS level grade by centre type

Table B1: 2009 AS level grade by centre type

Centre type	N (pairs of results)	2009 AS level grade (row %)					
		A	B	C	D	E	U
Comprehensive	188,046	23.87	24.92	24.87	17.26	7.86	1.23
FE/Tertiary College	45,082	19.34	24.70	27.70	19.74	7.80	0.73
Grammar	46,526	<u>40.33</u>	26.42	19.68	9.95	3.13	0.49
Independent	30,763	<u>51.20</u>	23.95	14.78	6.77	2.60	0.70
Secondary Modern	4,377	16.70	23.71	27.48	19.92	10.12	2.06
Sixth Form College	111,135	25.00	26.11	25.32	16.29	6.86	0.41
Academy	3,412	24.06	24.71	23.86	17.12	8.09	2.17
Other	2,484	18.00	25.68	28.42	20.21	6.76	0.93
Missing	2	100	0	0	0	0	0
All	431,827	27.31	25.29	24.04	15.78	6.73	0.86