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HARD AND SOFT CHOICES? SUBJECT SELECTION BY SCHOOLS AND STUDENTS

Peter Davies^{1,3} & Marco G. Ercolani^{2,3}

University of Birmingham:

¹ School of Education ² Business School

³ Centre for Higher Education Equity and Access

I SUMMARY:

1. We present results from a unique dataset on about two thousand students' A-level subject preferences and subsequent choices between ages 16 and 18.
2. We found substantive differences between students' A-level preferences and actual choices of 'hard' and 'soft' subjects.
3. These differences were strongly associated with falsification of students' expectations of GCSE grades in examinations taken at age 16.
4. This suggests that subject choices are open to influence from new information, persuasion and opportunities.
5. We found stronger direct evidence of school level effects in choices of Business Studies and Economics than for soft or hard choices as a whole.

II BACKGROUND

1. Subject choices in schools matter for future employment, social mobility and the balance of knowledge and skills available for the economy.
2. In the UK, social mobility is associated with subject choice through attendance at 'elite' Russell Group universities.
3. The relative difficulty of different subjects has received considerable attention in the debate about advanced level (A-level) subject choices at age 16 as these affect entry into UK universities.
4. Our study presents a broad comparison between choices of 'hard' and 'soft' choices with a specific focus on two subjects, Economics and Business Studies.
5. Russell Group (2011, but not in 2013) categorised Business Studies as a 'soft' subject and Economics as a 'hard' subject.

6. This study builds on previous research in several ways.
 - a. First we have unique, full data on students' *intended* subject choices and their *actual* choices and this enables an analysis of differences between intentions and outcomes.
 - b. Second, we have unique data on students' *expected* and *actual* General Certificate in Secondary Examination (GCSE-level) grades in Mathematics and English typically taken at age 16.
 - c. Third we are able to examine differences between schools in the private and state sectors.

- In England judgements applications to university are made on the basis of a tariff system which awards points to grades achieved in different types of A-level examination:
A* (140 points), A (120), B (100), C (80), D (60), E(40).
- The problem for each student i is to maximise total grade tariff from three A-level grades:

$$\max \sum_{j=1}^3 g_{ij}^e(A_{ij}^{t-1}, SE_{ij}, D_j)$$

where

A_{ij}^{t-1} is student i 's previous attainment in subject j

SE_{ij} is student i 's self-efficacy (confidence) in subject j

D_j is the difficulty of subject j relative to other subjects.

9. Russell Group universities (2011, 2013) have also expressed their preference for some subjects rather than others:

* *Hard traditional* ('facilitating'): Biology, Chemistry, English Literature, Geography, History, Mathematics, Modern Foreign Languages, Physics.

* *Hard non-traditional* (but not facilitating): Classics, Computer Science, Economics, Law, Music, Non-European Languages, Other Science, Philosophy and Religion, Psychology.

* *Soft*: Art, Beauty, Business Studies, Child Development, Design and Technology, Health and Social Care, Media Studies, Performing Arts, Photography, Physical Education, Sociology, Study Skills, Travel and Tourism.

III DATA

We combined data from three sources to create a unique sample of English schoolchildren before and after their transition at age 16 from basic (GCSE) compulsory to advanced (A-level) voluntary education:

1. A survey of students' GCSE grade expectations at age 15/16
2. School reports of A-level subjects studied when aged 17
3. Examination grades and socio-economic background data from the National Pupil Database (NPD).

Table 1: Summary statistics for the four binary dependent variables

Variable:	<i>Balanced dataset</i> (1983 obs.):		<i>Unbalanced dataset</i> (2929 obs.):	
	Mean	St. dev.	Mean	St. dev.
Intends to study Business Studies A-level	0.149	0.357	0.159	0.366
Actually studied Business Studies A-level	0.115	0.319	0.134	0.341
Intends to study Economics A-level	0.221	0.415	0.206	0.405
Actually studied Economics A-level	0.199	0.399	0.188	0.390

Table 2: Stats for categorical dependent variable: 'A-level subject combination'

A-level subject combin- ation:	<i>Balanced dataset</i>		<i>Unbalanced dataset</i>		Description:
	Freq.	%	Freq.	%	
1 Hard NoEc NoBu	706	38.1	1,031	35.2	Neither Economics nor Business Studies AND 70% or more of subjects are hard (i.e. traditional)
2 Soft NoEc NoBu	594	32.1	1,001	34.2	Neither Economics nor Business Studies AND less than 70% of subjects are hard
3 Hard & Eco, NoBu	172	9.3	251	8.6	Economics (not Business Studies) AND 70% or more of subjects are hard
4 Soft & Eco, NoBu	168	9.1	252	8.6	Economics (not Business Studies) AND less than 70% of other subjects are hard
5 Hard & Bus,	120	6.5	218	7.4	Business Studies (not Economics) AND 50% or more of subjects are hard

NoEc					
6 Soft & Bus, NoEc	64	3.5	130	4.4	Business Studies (not Economics) AND less than 50% of other subjects are soft
7 Eco & Bus	29	1.6	46	1.6	Economics and Business Studies (sample too small for a hard/soft split)
Totals	1,853	100%	2,929	100%	

Table 3: Summary statistics on control variables for balanced dataset

Variable	Obs.	Unique	Mean	Min.	Max.
<i>Individual's Grades</i>					
Expected GCSE Grade Maths [†]	1853	10	7.009	3	8
Expected GCSE Grade English [†]	1853	10	6.859	3	8
Actual - Expected GCSE Grade Maths [†]	1853	11	-0.050	-3	2
Actual - Expected GCSE Grade English [†]	1853	12	-0.206	-3	4
<i>School level variables</i>					
State School	1853	2	0.603	0	1
Peer Effect (normalized school average A-level point score: $N(0,1)$)	1853	44	0.000	-2.26	1.35
<i>Demographics</i>					
Male	1853	2	0.512	0	1
White	1853	2	0.763	0	1

Mother Univ. Graduate	1853	2	0.520	0	1
Father Univ. Graduate	1853	2	0.570	0	1
Mother professional	1853	2	0.484	0	1
Father professional	1853	2	0.671	0	1
Family cultural capital, incl. books (normalized: $N(1,0)$)	1853	43	0.000	-3.47	3.03

[†] GCSE grades are converted to a scale from 8 for an A* down to 2 for an F.

Table 4: Summary statistics on control variables for unbalanced dataset

Variable	Obs.	Unique	Mean	Min.	Max.
<i>Individual's Grades</i>					
Expected GCSE Grade Maths [†]	2866	11	6.900	3	8
Expected GCSE Grade English [†]	2855	11	6.756	2	8
Actual - Expected GCSE Grade Maths [†]	2639	12	-0.083	-4	2
Actual - Expected GCSE Grade English [†]	2620	13	-0.239	-4	4
<i>School level variables</i>					
State School	2931	2	0.615	0	1
Peer Effect (normalized school average A-level point score: $N(0,1)$)	2931	45	0.000	-2.22	1.44
<i>Demographics</i>					
Male	2912	2	0.510	0	1
White	2907	2	0.745	0	1

Mother Univ. Graduate	2583	2	0.518	0	1
Father Univ. Graduate	2561	2	0.568	0	1
Mother professional	2700	2	0.460	0	1
Father professional	2721	2	0.642	0	1
Family cultural capital, incl. books (normalized: $N(1,0)$)	2776	44	0.000	-3.60	3.07

† GCSE grades are converted to a scale from 8 for an A* down to 2 for an F.

IV RESULTS

IV.i BINARY LOGIT REGRESSIONS ON BALANCED DATA

Table 5: Marginal effects from Logit regressions studying Business Studies A-level, using balanced data[†]

	(1)	(2)	(3)	(4)	(5)	(6)
	All schools:			Schools offering Business Studies:		
<i>Took Business Studies:</i>	<i>Intended to</i>	<i>Actually did</i>	<i>Actually did</i>	<i>Intended to</i>	<i>Actually did</i>	<i>Actually did</i>
Expected GCSE Grade Maths	-0.003 (0.01)	-0.033 (0.01)**	-0.033 (0.01)**	0.000 (0.01)	-0.037 (0.01)**	-0.038 (0.01)**
Expected GCSE Grade Engl	-0.041 (0.01)**	-0.031 (0.01)**	-0.041 (0.01)**	-0.039 (0.01)**	-0.034 (0.01)**	-0.044 (0.01)**
Actual – Expected GCSE Grade Maths			-0.019 (0.01)**			-0.024 (0.01)**
Actual – Expected GCSE Grade Engl			-0.032 (0.01)**			-0.032 (0.01)**

State School	-0.037 (0.02)*	-0.041 (0.02)*	-0.040 (0.02)*	-0.046 (0.03)*	-0.074 (0.03)**	-0.069 (0.03)**
Peer Effect	-0.014 (0.01)	-0.045 (0.01)**	-0.036 (0.01)**	-0.023 (0.01)	-0.045 (0.01)**	-0.036 (0.01)**
Male	0.011 (0.02)	0.018 (0.01)	0.010 (0.01)	0.018 (0.02)	0.026 (0.02)	0.017 (0.02)
White	-0.066 (0.02)**	-0.050 (0.02)**	-0.047 (0.02)**	-0.065 (0.02)**	-0.062 (0.02)**	-0.060 (0.02)**
Mother Univ. Graduate	0.025 (0.02)	0.019 (0.02)	0.022 (0.02)	0.026 (0.02)	0.020 (0.02)	0.025 (0.02)
Father Univ. Graduate	-0.058 (0.02)**	-0.039 (0.02)**	-0.036 (0.02)**	-0.078 (0.02)**	-0.044 (0.02)**	-0.040 (0.02)*
Mother professional	-0.010 (0.02)	0.008 (0.02)	0.005 (0.02)	-0.008 (0.02)	0.011 (0.02)	0.007 (0.02)
Father professional	0.049 (0.02)**	0.008 (0.02)	0.009 (0.02)	0.047 (0.02)**	0.006 (0.02)	0.009 (0.02)
Family cultural capital (incl. books)	-0.020 (0.01)**	-0.018 (0.01)**	-0.017 (0.01)**	-0.017 (0.01)*	-0.023 (0.01)**	-0.022 (0.01)**
Observations	1853	1853	1853	1478	1478	1478
Pseudo R^2	0.0384	0.1365	0.1512	0.0439	0.0995	0.1119

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors on marginal effects are reported in (parentheses)

† Using data restricted to all non-missing observations

Table 6: Marginal effects from Logit regressions studying Economics A-level, using balanced data†

	(1)	(2)	(3)	(4)	(5)	(6)
	All schools:			Schools offering		
				Economics:		
<i>Took</i>	<i>Intended</i>	<i>Actually</i>	<i>Actually</i>	<i>Intended</i>	<i>Actually</i>	<i>Actually</i>
<i>Economics:</i>	<i>to</i>	<i>did</i>	<i>did</i>	<i>to</i>	<i>did</i>	<i>did</i>
Expected GCSE Grade Maths	0.068 (0.01)**	0.050 (0.01)**	0.060 (0.01)**	0.085 (0.02)**	0.062 (0.02)**	0.077 (0.02)**
Expected GCSE Grade Engl	-0.033 (0.01)**	-0.032 (0.01)**	-0.043 (0.01)**	-0.040 (0.02)**	-0.033 (0.02)**	-0.046 (0.02)**
Actual - Expected GCSE Grade Maths			0.030 (0.02)*			0.045 (0.02)**
Actual - Expected GCSE Grade Engl			-0.022 (0.01)*			-0.025 (0.02)
State School	-0.072 (0.02)**	-0.065 (0.02)**	-0.065 (0.02)**	-0.070 (0.03)**	-0.052 (0.03)**	-0.051 (0.03)**
Peer Effect	0.053 (0.01)**	0.042 (0.01)**	0.042 (0.01)**	0.035 (0.02)**	-0.003 (0.02)	-0.005 (0.02)
Male	0.106	0.126	0.125	0.131	0.171	0.172

	(0.02)**	(0.02)**	(0.02)**	(0.02)**	(0.02)**	(0.02)**
White	-0.089	-0.045	-0.042	-0.104	-0.059	-0.055
	(0.02)**	(0.02)**	(0.02)**	(0.02)**	(0.03)**	(0.03)**
Mother Univ. Graduate	-0.049	-0.034	-0.035	-0.062	-0.037	-0.040
	(0.02)**	(0.02)	(0.02)	(0.03)**	(0.03)	(0.03)
Father Univ. Graduate	-0.021	-0.013	-0.014	-0.029	-0.013	-0.015
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Mother professional	0.011	0.031	0.029	0.019	0.029	0.028
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Father professional	0.056	0.016	0.016	0.064	0.013	0.015
	(0.02)**	(0.02)	(0.02)	(0.03)**	(0.03)	(0.03)
Family cultural capital (incl. books)	0.013	-0.003	-0.002	0.015	-0.009	-0.008
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	1853	1853	1853	1488	1488	1488
Pseudo R^2	0.1297	0.1011	0.1039	0.1019	0.0691	0.0729

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors on marginal effects are reported in (parentheses)

† Using data restricted to all non-missing observations

IV.ii MULTINOMIAL LOGIT BALANCED DATA

Table 7: Marginal effects from Multinomial Logit regression for the single dependent variable, A-level subject combination, using balanced data†

	Outcomes for the single dependent variable: 'A-Level Subject Combination'						
	(1) Hard NoEc NoBu	(2) Soft NoEc NoBu	(3) Hard & Eco, & NoBu	(4) Soft & Eco, & NoBu	(5) Hard & Bus, & NoEc	(6) Soft & Bus, & NoEc	(7) Eco & Bus
Expected GCSE	0.155	-0.155	0.051	-0.012	-0.022	-0.017	0.001
Grade Maths	(0.02)**	(0.01)**	(0.01)**	(0.01)	(0.01)**	(0.00)**	(0.00)
Expected GCSE	0.069	0.004	-0.024	-0.009	-0.016	-0.014	-0.010
Grade Engl	(0.02)**	(0.01)	(0.01)**	(0.01)	(0.01)*	(0.01)**	(0.00)**
Actual - Expected	0.096	-0.091	0.022	-0.002	-0.011	-0.011	-0.003
GCSE Grade Maths	(0.02)**	(0.01)**	(0.01)	(0.01)	(0.01)	(0.01)**	(0.00)
Actual - Expected	0.027	0.017	0.001	-0.017	-0.019	-0.005	-0.005
GCSE Grade Engl	(0.02)*	(0.01)	(0.01)	(0.01)*	(0.01)**	(0.01)	(0.00)
State	0.109	-0.001	-0.028	-0.038	-0.011	-0.054	0.024
School	(0.02)**	(0.03)	(0.02)*	(0.02)**	(0.02)	(0.01)**	(0.01)*

Peer Effect	-0.007 (0.01)	-0.009 (0.01)	0.025 (0.01)**	0.025 (0.01)**	-0.010 (0.01)	-0.022 (0.01)**	-0.001 (0.00)
Male	-0.022 (0.02)	-0.104 (0.02)**	0.068 (0.02)**	0.048 (0.01)**	0.008 (0.01)	-0.009 (0.01)	0.011 (0.01)*
White	-0.026 (0.02)	0.117 (0.03)**	-0.032 (0.01)**	-0.013 (0.02)	-0.038 (0.01)**	-0.002 (0.01)	-0.007 (0.01)
Mother Univ. Graduate	0.055 (0.02)**	-0.038 (0.02)	-0.016 (0.02)	-0.024 (0.02)	0.004 (0.01)	0.012 (0.01)	0.006 (0.01)
Father Univ. Graduate	0.025 (0.03)	0.019 (0.02)	-0.000 (0.02)	-0.008 (0.02)	-0.015 (0.01)	-0.019 (0.01)*	-0.001 (0.01)
Mother professional	-0.041 (0.02)*	0.012 (0.02)	0.023 (0.01)	0.002 (0.01)	0.016 (0.01)	-0.014 (0.01)	0.002 (0.01)
Father professional	0.002 (0.02)	-0.031 (0.02)	0.009 (0.02)	0.012 (0.02)	0.014 (0.01)	-0.004 (0.01)	-0.002 (0.01)
Family cultural capital (incl. books)	0.007 (0.01)	0.007 (0.01)	0.006 (0.01)	-0.001 (0.01)	-0.008 (0.01)	-0.006 (0.00)	-0.005 (0.00)
Obs	1853						
Pseudo R^2	0.1910						

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors on marginal effects are reported in (parentheses)

† Using data restricted to all non-missing observations

Abbreviations: Hard (A-levels), Soft (A-levels), NoEc(onomics A-level), NoBu(siness Studies A-level), Ec(onomics A-level), Bu(siness A-level)

Table 8: Marginal effects from Multinomial Logit regression for the single dependent variable, A-level subject combination, using balanced data† and no expectations regressors

	Outcomes for the single dependent variable: 'A-Level Subject Combination'						
	(1) Hard NoEc NoBu	(2) Soft NoEc NoBu	(3) Hard & Eco, & Bus, NoBu	(4) Soft & Eco, & Bus, NoBu	(5) Hard & Bus, NoEc	(6) Soft & Bus, NoEc	(7) Eco & Bus
State	0.024	0.061	-0.060	-0.062	0.014	-0.007	0.030
School	(0.02)	(0.02)**	(0.01)**	(0.01)**	(0.01)	(0.01)	(0.01)**
Male	0.003	-0.145	0.084	0.050	0.004	-0.009	0.013
	(0.02)	(0.02)**	(0.02)**	(0.01)**	(0.01)	(0.01)	(0.01)**
White	-0.101	0.190	-0.058	-0.023	-0.022	0.017	-0.003
	(0.03)**	(0.03)**	(0.01)**	(0.01)	(0.01)*	(0.01)	(0.01)
Mother Univ. Graduate	0.098	-0.065	-0.010	-0.023	-0.002	-0.002	0.005
	(0.03)**	(0.03)**	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Father Univ. Graduate	0.067	-0.020	0.011	-0.008	-0.025	-0.021	-0.004
	(0.03)**	(0.03)	(0.02)	(0.02)	(0.01)*	(0.01)*	(0.01)
Mother professional	-0.027	-0.007	0.028	0.006	0.014	-0.018	0.002

	(0.02)	(0.02)	(0.01)*	(0.01)	(0.01)	(0.01)*	(0.01)
Father professional	0.037	-0.057	0.015	0.013	0.008	-0.012	-0.004
	(0.03)	(0.02)**	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Family cultural capital (incl. books)	0.007	-0.003	0.001	0.000	-0.002	-0.002	-0.001
	(0.00)**	(0.00)*	(0.00)	(0.00)	(0.00)**	(0.00)**	(0.00)**
Obs	1853						
Pseudo R^2	0.0800						

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors on marginal effects are reported in (parentheses)

† Using data restricted to all non-missing observations

Abbreviations: Hard (A-levels), Soft (A-levels), NoEc(onomics A-level), NoBu(siness Studies A-level), Ec(onomics A-level), Bu(siness A-level)

IV.iii BINARY AND MULTINOMIAL LOGIT REGRESSIONS ON UNBALANCED DATA USING MULTIPLE IMPUTATION

Table 9: Marginal effects from multiply-imputed Logit regressions on intending to or actually studying Business Studies at A-level, using unbalanced data†

	(1)	(2)	(3)	(4)	(5)	(6)
	All schools:			Schools offering Business Studies:		
<i>Took Business Studies:</i>	<i>Intended to</i>	<i>Actually did</i>	<i>Actually did</i>	<i>Intended to</i>	<i>Actually did</i>	<i>Actually did</i>
Expected GCSE Grade Maths	-0.000 (0.01)	-0.037 (0.01)**	-0.035 (0.01)**	0.001 (0.01)	-0.041 (0.01)**	-0.040 (0.01)**
Expected GCSE Grade English	-0.045 (0.01)**	-0.035 (0.01)**	-0.046 (0.01)**	-0.040 (0.01)**	-0.037 (0.01)**	-0.049 (0.01)**
Actual - Expected GCSE Grade Maths			-0.023 (0.01)**			-0.029 (0.01)**
Actual - Expected GCSE Grade English			-0.036 (0.01)**			-0.036 (0.01)**

State School	-0.024 (0.02)	-0.032 (0.02)*	-0.033 (0.02)*	-0.041 (0.02)*	-0.062 (0.02)**	-0.061 (0.02)**
Peer Effect	-0.002 (0.01)	-0.030 (0.01)**	-0.021 (0.01)**	-0.011 (0.01)	-0.024 (0.01)**	-0.014 (0.01)
Male	0.019 (0.01)	0.032 (0.01)**	0.023 (0.01)*	0.031 (0.02)*	0.043 (0.02)**	0.033 (0.02)**
White	-0.074 (0.02)**	-0.045 (0.01)**	-0.039 (0.01)**	-0.074 (0.02)**	-0.058 (0.02)**	-0.052 (0.02)**
Mother Univ. Graduate	0.011 (0.02)	0.009 (0.02)	0.013 (0.02)	0.008 (0.02)	0.009 (0.02)	0.014 (0.02)
Father Univ. Graduate	-0.060 (0.02)**	-0.046 (0.02)**	-0.043 (0.02)**	-0.066 (0.02)**	-0.050 (0.02)**	-0.047 (0.02)**
Mother professional	-0.027 (0.02)*	-0.009 (0.01)	-0.012 (0.01)	-0.030 (0.02)*	-0.010 (0.02)	-0.013 (0.02)
Father professional	0.050 (0.02)**	0.021 (0.01)	0.025 (0.01)*	0.044 (0.02)**	0.023 (0.02)	0.026 (0.02)
Family cultural capital (incl. books)	-0.008 (0.01)	-0.027 (0.01)**	-0.025 (0.01)**	-0.008 (0.01)	-0.033 (0.01)**	-0.030 (0.01)**
Observations	2929	2929	2929	2399	2399	2399
Imputations	30	30	30	30	30	30
Average relative variance increase	0.0620	0.0694	0.0770	0.0585	0.0688	0.0754

Largest fraction of missing information	0.2074	0.2066	0.2073	0.1833	0.2050	0.2056
<i>F</i> -statistic	7.60**	21.00**	19.45**	6.60**	14.74**	14.04**

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors on marginal effects are reported in (parentheses)

† Using full dataset with 30 imputed observations for each missing observation

Table 10: Marginal effects from multiply-imputed Logit regressions on intending to or actually studying Economics at A-level, using unbalanced data†

	(1)	(2)	(3)	(4)	(5)	(6)
	All schools:			Schools offering Economics:		
<i>Took Economics:</i>	<i>Intended to</i>	<i>Actually did</i>	<i>Actually did</i>	<i>Intended to</i>	<i>Actually did</i>	<i>Actually did</i>
Expected GCSE Grade Maths	0.063 (0.01)**	0.054 (0.01)**	0.062 (0.01)**	0.082 (0.01)**	0.068 (0.01)**	0.080 (0.01)**
Expected GCSE Grade English	-0.032 (0.01)**	-0.034 (0.01)**	-0.041 (0.01)**	-0.038 (0.01)**	-0.038 (0.01)**	-0.048 (0.01)**
Actual - Expected GCSE Grade Maths			0.026 (0.01)**			0.038 (0.02)**
Actual - Expected GCSE Grade English			-0.014 (0.01)			-0.018 (0.01)
State School	-0.076 (0.02)**	-0.076 (0.02)**	-0.076 (0.02)**	-0.072 (0.02)**	-0.071 (0.02)**	-0.070 (0.02)**
Peer Effect	0.054 (0.01)**	0.049 (0.01)**	0.048 (0.01)**	0.044 (0.01)**	0.008 (0.01)	0.005 (0.01)
Male	0.102	0.118	0.118	0.130	0.163	0.164

	(0.01)**	(0.01)**	(0.01)**	(0.02)**	(0.02)**	(0.02)**
White	-0.068	-0.034	-0.032	-0.077	-0.050	-0.048
	(0.02)**	(0.02)**	(0.02)**	(0.02)**	(0.02)**	(0.02)**
Mother Univ. Graduate	-0.052	-0.035	-0.035	-0.067	-0.039	-0.040
	(0.02)**	(0.02)*	(0.02)**	(0.02)**	(0.02)*	(0.02)*
Father Univ. Graduate	-0.010	-0.019	-0.020	-0.017	-0.022	-0.024
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Mother professional	0.008	0.014	0.014	0.009	0.011	0.011
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Father professional	0.036	0.008	0.009	0.044	0.003	0.005
	(0.02)**	(0.02)	(0.02)	(0.02)**	(0.02)	(0.02)
Family cultural capital (incl. books)	0.019	-0.003	-0.002	0.020	-0.007	-0.007
	(0.01)**	(0.01)	(0.01)	(0.01)**	(0.01)	(0.01)
Observations	2929	2929	2929	2280	2280	2280
Imputations	30	30	30	30	30	30
Average relative increase in variance	0.0387	0.0319	0.0530	0.0383	0.0328	0.0571
Largest fraction of missing information	0.1233	0.0871	0.1742	0.1168	0.0868	0.1941
<i>F</i> -statistic	28.32**	24.33**	20.31**	19.84**	14.95**	12.71**

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors on marginal effects are reported in (parentheses)

† Using full dataset with 30 imputed observations for each missing observation

Table 11: Marginal effects from Multinomial Logit regression on all outcomes of the single dependent variable, A-level subject combination, using unbalan data†

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Hard	Soft	Hard	Soft	Hard	Soft	Eco
	NoEc	NoEc	& Eco,	& Eco,	& Bus,	& Bus,	& Bus
	NoBu	NoBu	NoBu	NoBu	NoEc	NoEc	
Expected GCSE	0.136	-0.142	0.054	-0.008	-0.021	-0.022	0.003
Grade Maths	(0.01)**	(0.01)**	(0.01)**	(0.01)	(0.01)**	(0.00)**	(0.00)
Expected GCSE	0.059	0.019	-0.020	-0.011	-0.022	-0.014	-0.010
Grade English	(0.01)**	(0.01)	(0.01)**	(0.01)	(0.01)**	(0.01)**	(0.00)**
Actual - Expected	0.087	-0.079	0.018	0.002	-0.010	-0.016	-0.002
GCSE Grade Maths	(0.01)**	(0.01)**	(0.01)	(0.01)	(0.01)	(0.00)**	(0.00)
Actual - Expected	0.031	0.012	0.005	-0.015	-0.021	-0.009	-0.003
GCSE Grade Engl	(0.01)**	(0.01)	(0.01)	(0.01)*	(0.01)**	(0.01)	(0.00)
State School	0.091	0.023	-0.033	-0.042	-0.010	-0.042	0.013
	(0.02)**	(0.02)	(0.01)**	(0.01)**	(0.01)	(0.01)**	(0.01)
Peer Effect	-0.007	-0.031	0.023	0.030	0.000	-0.014	-0.002
	(0.01)	(0.01)**	(0.01)**	(0.01)**	(0.01)	(0.01)**	(0.00)
Male	-0.021	-0.106	0.056	0.048	0.010	-0.000	0.015
	(0.02)	(0.02)**	(0.01)**	(0.01)**	(0.01)	(0.01)	(0.01)**
White	-0.039	0.117	-0.039	0.005	-0.031	-0.010	-0.003

	(0.02)**	(0.02)**	(0.01)**	(0.01)	(0.01)**	(0.01)	(0.01)
Mother Univ. Graduate	0.036	-0.017	-0.014	-0.017	0.011	0.003	-0.001
	(0.02)*	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Father Univ. Graduate	0.038	0.023	0.003	-0.021	-0.020	-0.019	-0.004
	(0.02)*	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)*	(0.01)
Mother professional	-0.010	0.007	0.011	0.003	-0.002	-0.009	0.000
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Father professional	-0.004	-0.024	0.000	0.006	0.022	-0.005	0.004
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)*	(0.01)	(0.01)
Family cultural capital (incl. books)	0.012	0.011	0.006	-0.003	-0.011	-0.011	-0.004
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)**	(0.00)**	(0.00)
Observations	2929						
Imputations	30						
Average relative variance increase	0.0639						
Largest fraction of missing information	0.2111						
<i>F</i> -statistic	12.79**						

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors for marginal effects reported in (parentheses)

† Using full dataset with 30 imputed observations for each missing observation

Abbreviations: Hard (A-levels), Soft (A-levels), NoEc(onomics A-level), NoBu(siness Studies A-level), Ec(onomics A-level), Bu(siness A-level)

Table 12: Marginal effects from Multinomial Logit regression on all outcomes of the single dependent variable, A-level subject combination, using unrestricted data[†] and no expectations regressors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Hard NoEc NoBu	Soft NoEc NoBu	Hard & Eco, & Eco, NoBu	Soft & Eco, & Eco, NoBu	Hard & Bus, & Bus, NoEc	Soft & Bus, & Bus, NoEc	Eco & Bus
State School	0.107 (0.02)**	0.008 (0.02)	-0.032 (0.01)**	-0.043 (0.01)**	-0.012 (0.01)	-0.039 (0.01)**	0.012 (0.01)
Peer Effect	0.096 (0.01)**	-0.101 (0.01)**	0.042 (0.01)**	0.024 (0.01)**	-0.023 (0.01)**	-0.033 (0.01)**	-0.005 (0.00)*
Male	0.004 (0.02)	-0.140 (0.02)**	0.064 (0.01)**	0.049 (0.01)**	0.009 (0.01)	-0.002 (0.01)	0.017 (0.01)**
White	-0.055 (0.02)**	0.143 (0.02)**	-0.047 (0.01)**	0.004 (0.01)	-0.031 (0.01)**	-0.010 (0.01)	-0.005 (0.01)
Mother Univ. Graduate	0.062 (0.02)**	-0.031 (0.02)	-0.012 (0.01)	-0.018 (0.01)	0.007 (0.01)	-0.006 (0.01)	-0.002 (0.01)
Father Univ. Graduate	0.064 (0.02)**	0.002 (0.02)	0.007 (0.01)	-0.022 (0.01)*	-0.024 (0.01)*	-0.023 (0.01)**	-0.004 (0.01)
Mother professional	-0.000 (0.02)	-0.001 (0.02)	0.012 (0.01)	0.003 (0.01)	-0.004 (0.01)	-0.010 (0.01)	0.000 (0.01)

Father professional	0.016 (0.02)	-0.033 (0.02)*	0.001 (0.01)	0.005 (0.01)	0.018 (0.01)	-0.010 (0.01)	0.003 (0.01)
Family cultural capital (incl. books)	0.041 (0.01)**	-0.005 (0.01)	0.007 (0.01)	-0.004 (0.01)	-0.018 (0.01)**	-0.017 (0.00)**	-0.005 (0.00)**
Observations	2929						
Imputations	30						
Average relative variance increase	0.0571						
Largest fraction of missing information	0.2278						
<i>F</i> -statistic	14.06**						

Notes: * $p < 10\%$, ** $p < 5\%$. Standard errors for marginal effects reported in (parentheses)

† Using full dataset with 30 imputed observations for each missing observation

Abbreviations: Hard (A-levels), Soft (A-levels), NoEc(onomics A-level), NoBu(siness Studies A-level), Ec(onomics A-level), Bu(siness A-level)

V CONCLUSIONS

1. We examined the subject choices of English secondary school students in the context of government policy which has encouraged students to study 'hard/traditional' subjects.
2. We found a strong association between high GCSE grades in Mathematics and English and the likelihood of studying 'hard' subjects.
3. However, whilst there is a positive association between GCSE Mathematics grade and studying Economics at A-level, the association between studying Economics and GCSE English grade is negative.

4. Our data provide some support for two well-known theories (Expectancy Value Theory and Relative Risk Aversion Theory) which predict that males and students from higher socio-economic backgrounds will be more likely to study 'hard' subjects.
5. We found evidence of substantial switching between hard and soft A-level subjects in response to differences between expected and actual GCSE grades in English and Mathematics. (These associations were much stronger for Mathematics than English.)
6. Whilst most schools offer most hard-traditional subjects they supplement these through a range of subjects which have been classified by the Russell Group universities as either 'hard-non-facilitating' or 'soft'. Economics is an example of the former and Business Studies is an example of the latter.