The Effect of Prior Educational Achievement on Academic outcomes in Economics at a UK University

Dr. Maria Plotnikova

Abstract

The objective of this study is to ascertain the effect of prior educational achievement on academic outcomes in undergraduate Economics program at a UK University. Academic outcome is measured as the weighted average score for the 2nd and 3rd years of undergraduate study. The analysis is done using Generalized Linear Mixed Model accounting for unobserved factors related to teaching and learning. The results underscore the importance of ability and gender effects in academic performance in Economics. The result suggests that students are not disadvantaged by not studying Economics and Maths prior to entering an Economics programme at University. This study has implications for admissions policy and for approaching students' transition between school and University.

1. Introduction

Economics is one of the subjects studied at both high school and University. It is offered as a degree program at most Universities but it is not necessarily offered as a subject at every high school. Students who come to study Economics at University come from differently funded schools, with and without Economics background, with different A-level subjects taken, as well as from other countries. From the point of view of a teacher, how can students coming from a variety of backgrounds be taught more effectively? One way to tackle these questions for a population of students is to ascertain a) what are the determinants of academic performance in Economics at undergraduate level and b) what are the characteristics of students that choose to study economics?

These are the research questions addressed in this study using data from the Department of Economics at the University of Reading. A wider policy and research issue this study addresses is the connection and the transition between economic education in secondary and higher education.

There is a sizeable literature on the determinants of student performance in higher education (Kuncel et al, 2004, Duff 2004). Subject-specific literature is dominated by small-size data sets, context-specific studies. Park and Kerr (1990) use a multinomial logit model to identify the determinants of a final grade in a money and banking course. Among the studies of performance in Economics Schaur and Watts (2010) analysed MBA student performance in an economics course taught in a one-year U.S.-style MBA program at a German Business School. They found that prior degree in Economics,

entrance standardized test score and class attendance positively affect performance. They also found that native English speakers achieved lower scores which they attribute to native English-speaking students' site-seeing motivation to study in Europe. Other studies that document class attendance also report positive and significant effects of attendance on student performance (Romer, 1993). It is suggested that the effects are nonlinear, i.e. performance is negatively affected after a threshold number of absences (Chen and Lin 2008). Stanca (2006) emphasize the need to control for ability and its positive correlation with attendance. There is also a large literature in Education research on the effects of school and teaching quality on educational outcomes (Case and Deaton, 1999, Eide and Showalter, 1998).

Before describing the details of the study's research design it is important to situate the research problem in the context of Economics Education in the UK.

1.1 Economics Education in Schools

Davies and Durden (2010) review the trends in Economics Education in England in Universities and Schools exploring continuity between School and University education in this subject. They note that Economics undergraduates are becoming increasingly concentrated in elite universities; according to the authors more than half of all economics undergraduates were studying at elite Russell group universities in 2007.

With respect to Economics education in secondary schools, the important marker was the 1988 Education Reform Act that introduced a National Curriculum[1] compulsory for all state schools. Davies and Durden (2010) cite Lumsden, Attiyeh, and Scott (1980)

[1] Currently Russia is about to implement a similar Educational Reform where the subjects will be divided into compulsory and optional. There is a wide opposition to this reform as many important subjects will become optional and many fear that educational outcomes will decline further.

stating that by 1980 Economics was "the fourth most popular choice at advanced level and that economics undergraduates who had studied the subject in school made better progress in University Economics than their colleagues who had not". However in 1988 Economics was not included in the National curriculum that specified ten compulsory subjects to be studied in state schools. Davies and Durden (2010) point to a steady decline in the number of students studying Economics in high school compared to earlier decades. They attribute this to less resources allocated to Economics after 1988 and also to the implemented school competition measures that were another important feature of the Education Reform Act. Competition was created through measures like publication of league tables with ratings linked to students' grades. Because of this students have been encouraged to take subjects that are perceived to be easier to get a higher grade in. The authors put forward an argument that Economics has been viewed as a difficult subject and in response to this subjects that are meant to serve as close substitutes to Economics, such as Business Studies, emerged in secondary schools. Students have been encouraged to take them to achieve better grades than they supposedly would achieve in Economics.

If less students study Economics at University as a result of the 1988 Educational Reform when Economics ceased to be compulsory, then what type of students elect to study economics in high school and further at the University level? This raises interesting questions about self-selection (who are the students?) in addition to "what are the determinants of academic performance?" In a separate quantitative analysis that looks at students' choice of study subjects and school specialization Davies et al., 2009 link

students' taking up to study economics to having professional (as opposed to managerial) aspirations, and having a father in professional employment.

This study addresses academic performance given the selectivity in the characteristics of students who choose to study economics. Ascertaining the effect of observable characteristics of students can help address transition from high school to University. Knowing more about students in that way can help design interdisciplinary and multidisciplinary programs building on their background. This study as a longitudinal study of academic outcomes at one Economics program can be viewed as a case study of country-wide student performance in Economics and can, one could argue, be representative of larger trends.

2. Research Design

Learning outcomes, provided that they are reflected by assessment, are a product of teaching inputs and student-specific inputs (Stanca 2006). In order to address the research questions ideally we should be relating performance to all sets of factors, including students' background, the teaching and the learning (see Gudjarati, 1995 for a discussion of parsimony in a regression model). Because of data limitations all relevant factors cannot be included and this is why Generalized Linear Mixed model is used in this analysis. The approach assumes that there are some unobserved variables (associated with teaching and learning) that enter the linear predictor equation additively. Generalized Linear Mixed models are suited for hierarchical data, i.e. students nested in

classes, schools, programs. These models are extensively used in Education research (Raudenbush and Bryk, 2002). Grilli and Rampichini (2007) use a multilevel logit model to analyse self-reported skills of University graduates.

In addition to differences in students' characteristics, differences in educational outcomes would arise from differences in program-composition by modules (e.g. the level of difficulty of a given module, sequence in which modules are taught) and teacher-specific factors (quality of delivery determined by instructor's area of expertise, experience, effort put in preparation; module-related factors such as assessment type chosen, differences in marking criteria). Given the nature of the data with performance measured by cumulative weighted average score rather than a score obtained in each individual module, it is not possible to directly control for teachers' characteristics in this study. The only teaching-related factor in this research design is the type of program the student is doing. Since students are taught and evaluated by the same person, exam results will be endogenously determined with teacher-specific factors. This would not be the case if the students were taking standardized tests graded by the third party.

To address students' learning the study makes use of proxies for ability and other students characteristics based on information on their past performance in high school. Student-specific factors related to learning at University such as the relationship between effort/attendance and academic outcomes cannot be incorporated as information on absenteeism is not available. Rather than assessing absolute performance (what factors lead to better educational outcomes), this study is poised to asses relative performance (what are the factors that account for better performance vis-à-vis the peer-group).

Program pursued at Reading

Undergraduate programs offered at the School of Economics are Business Analysis, Business Economics, Economics, Economics and Econometrics, Economic Studies, and joint degree programs Business Economics and Organizational Studies, Economic Studies BA, Economics and Sociology, Economics and Geography, Economics and Information Technology.

After the first year (Part 1) students either progress to the 2nd year in their chosen program, switch to a different program in Economics or in a limited number of cases leave the Economics program all together. Information on this small number of students who start in but leave Economics is not available – this creates attrition bias. Because of this the results would overestimate students' academic performance. Likewise the data on students transferring between Economics programs in the course of their study is not available. Until the 2008 entry, there were no effective restrictions on between-program transfers as students took the same Part I required modules. From the 2008 entry different core modules for BA and BSc were introduced making switching between degree programs more difficult. The sorting and self-selection of students between programs affects educational outcome by program. The final data set used in the analysis contains 527 students comprising all students who graduated in Economics between the years 2004 and 2010.

Entry Requirements

Entry requirements determine the type of students who end up studying at a given program. Entry requirements have been qualitatively the same throughout the years covered by study however the number of UKAS points/grade level required for entry has been raised twice – in 2005 and in 2008. Application numbers did not decline following

the increase in UKAS points[2]. One can see how adoption of this strategy of raising entry standards by many Economics programs encourages grade inflation in high schools.

The requirements at the time of the study were ABB with three A Levels and BBBC with three A levels and one AS level. This can be interpreted as a trade-off between applicant's better performance with three subjects and breadth of exposure with four subjects. GCSE English was a requirement. Economics was not a requirement. The entry requirements differ slightly between BA and BSc programs. BA programs require GCSE Mathematics with at least a B grade. BSc programs require AS level mathematics with at least a C grade. There are also requirements for the International Baccalaureate diploma but no comparable information on grades and subjects was collected for entrants with these diplomas.

3. **The Data and Variables**:

The data used in this study was made available by University of Reading Integrated Student Information System (RISIS) for those graduating in years 2004-2010 in Degree programs based in the Department of Economics. The following data was used to create variables for the study:

- Degree Programs students are studying for (various programs in Economics, joint degree programs)
- Student Qualification when they entered the University: A-levels or others. Qualification level was coded in RISIS database on a scale from 0 to 100 with A-level generally coded as 40.

[2] Application trends are related to economic cycles with somewhat lower levels of applications during economic boom times.

- Subjects students did A-levels in and grades obtained. There is no grade or subject information for students who did not do A-levels

- Name of the school they went to prior to coming to University. RISIS database also classified the schools into types – such as comprehensive schools, independent schools.

- Gender[3], ethnicity

- Weighted average score for the two final years of study data was provided by the Department of Economics.

3.1 The Variables

3.1.1 Dependent Variable

The main variable of interest and the dependent variable is the weighted average percentage score for the second and third year module results. First year performance is not counted in the results at the Department of Economics. Students tend to perform worse in the first year and some fail quantitative subjects such as Mathematics for Economists which they have to retake. The weighted average of the second and third year module results for the whole group across the six years was 57.28. Lowest score was 23 and highest score was 86. Checking for differences in scores across years using a t-test, the weighted average for 2004 (55.5) was statistically different from the weighted average for other years combined (57.63). Similarly weighted average for 2007 was 55.57, statistically different from the weighted average for other years combined (57.57). These observed differences in annual average scores point at grade variation across years rather than at a pattern of grade inflation.

[3] In this study I refer to female students as girls when they are in high school and women when they are at University; male students are referred to as boys when they are in high school and men when they are at University.

3.1.2 School Type

While using individual schools as control variables would have likely added to the explanation of variation in student performance, there were not enough observations (students who went to the same school) to control by individual schools. There are about twelve types of schools that the students in the analysed group attended. The types of schools and percentage of student attended are listed in Table 3. School types where most of students came from are Grant Maintained School (12%), Six-Form College (6.7%), Comprehensive school (36%), Grammar School (12%), Independent school (16%) or school in a foreign country (12%). International Schools abroad are included under Grant-maintained school. This is a very general classification but the only one that was available. In a nation-wide cohort study of determinants of academic performance Smith and Naylor (2005) find that the type of school the student attended prior to University has an effect on academic outcomes, in particular they find that attending an Independent school negatively affects performance at University.

Based on univariate mean-comparison tests students who went to the Grant Maintained School had a statistically lower performance than those who went to all other types of school (55.2 versus 57.57). Those who went to grammar schools achieved a statistically significant higher weighted average score of 61; those who did not go to grammar schools achieved 56.9. Those who went to Independent schools achieved a statistically significant lower average of 55 as compared to those who went to other types of schools and achieved 57.73. There were no statistically significant differences associated with other types of schools.

3.1.3 A-level qualification

There were 113 students who did not have A-level qualification. For those who did not do A-levels the level of qualification on entry was higher than A-levels which could be a result of the fact that admission standards for those coming from abroad are higher. There is also a wide variation in the level of qualification on entry for those who did not do A-levels.

Based on univariate means comparison tests there was no statistically- significant difference in average score between those with and without A-level qualification. The variation is greater for those without the A-level qualification. Among those who took A-levels there was no statistically-significant difference in average score between those who took three A levels and those who took four A levels/AS levels.

3.1.4 Subjects of A-levels

There were seventy-three different subjects that students did their A-levels in. Out of these seventy-three forty-five subjects were taken nine or fewer times in the study period. Economics was the subject taken most (19% of all A-levels), followed by Mathematics and Business studies. The full list of subjects can be found in Table 1. In order to analyse the effect of educational background on academic achievement at University sixteen categories grouping the subjects were created. They are listed in Table 2. For the 256 students who did Economics at A-level, the average score was 57.9 which is statistically different from the score for those who did not take Economics at A-level (56.7). Thirty-three students who have done Chemistry have a statistically significant lower mean score

than those who did not take that subject (54.38 vs. 57.45). Doing any other category of A-level at school produced no statistically significant difference in the weighted average score based on a univariate means comparison test.

3.1.5 Gender

Gender effects are an important and controversial subject in explaining academic performance. The 2000 study by Woodfield and Earl-Novell explores whether there are differences in performance between men and women by type of assessment, coursework and unseen exam. The quantitative part of the study finds that women performed better on both types of exams, coursework and unseen exams. The qualitative study suggested that women were putting more effort overall and "working far harder on their degrees than men" (p. 3). A different longitudinal study by Woodfield and Saunders, 1999 has suggested that "women achieve better results in their degrees than men because they attend more timetabled sessions, submit more work that is not formally assessed, and are, generally speaking, more willing to conform to institutional requirements".

There are 160 women and 367 men in this study's data suggesting that more boys choose to study Economics at Reading. This gender ratio is consistent with the trend of underrepresentation of women in Economics (Dynan and Rouse, 1995). Women do better (59.35 for weighted average score vs. 56.39 for men) and the difference is statistically significant. Why could that be? They have a statistically significant higher grade for the first A-level subject (grade1) (3.68 vs. 3.49 for boys) in A-levels but not grade2 and grade3. C is 3 and B is 4, so girls are closer to a B grade while boys are half-way between B and C. Girls also have a statistically different higher grade4 (3.98 vs. 3.33 for

boys). They were taking Maths A-levels in the same proportion as boys. Statistically smaller proportion of girls (4% vs. 11% of boys) took Physics. Statistically smaller proportion 39% took Economics as opposed to 52% for boys. Girls took statistically less IT and computer-related subjects (6.2% vs. 15% for boys). To summarize, girls who chose to study Economics have taken less Economics in high school, got better overall grades in high school, and they do better at University. Given that we have a smaller group of girls studying Economics than boys, one explanation could be that it is a selective group, i.e. the girls of higher ability with better grades self-select to study economics. The other explanation is of course the one suggested by Woodfield and Saunders, 1999 and others that girls apply more effort in their studies, both at high school and at University.

4. Regression analysis of academic performance

Given that much less information was collected about students who did not do A-levels, variables used in the analysis were constructed using data for students who did do A-levels. Students who did not do A-levels are included in the analysis and constitute a default category for variables other than academic program of study at Reading. The explanatory variable is the weighted average grade for the two last years of study as the dependent variable. Subscript *i* denotes individuals and *p* denotes Economics degree program.

The following explanatory variables were included in the regression analysis and β-coefficients denote fixed effects of the dichotomous variables.

- Ability represented by grades in high school – dichotomous variable A for having at least one A-grade.
- Gender (dichotomous variable *G* that takes value 1 for men and 0 for women)
- Educational Background represented by the type of subject the students took in high school. The analysis below uses a dichotomous variables *E* if the student took Economics at A-levels and a dichotomous variable *M* if the student took Maths at A-levels.

Students are nested in degree programs studied at Reading. To account for program effects (e.g. taking a particular combination of modules) random effects are used. Random coefficient η_p for each of the dichotomous variable for A-grade, Economics A-level, Maths A-level and gender is shared by students in the same degree program. For example, taking Maths A-level may impact performance in BA and BSc programs differently and the random effects are meant to pick up these. In addition ability and educational background are not independent of one another - the school (or the type of school) the student went to affects the performance. To account for this latent variables – random slopes for each of the explanatory variables are regressed on school-type the student attended before coming to Reading. The regression equation takes the form:

$$grade_{ip} = \beta_0 + \beta_1 A_{ip} + \beta_2 E_{ip} + \beta_3 M_{ip} + \beta_4 G_{ip} + \eta_{op} + \eta_{1p} A_{ip} + \eta_{2p} E_{ip} + \eta_{3p} M_{ip} + \eta_{4p} G_{ip} + Type_s$$

The estimation was performed using GLLAMM module within Stata program (See Appendix). GLLAMM was developed to estimate Generalized Linear Latent and Mixed Models (Rabe-Hesketh et al, 2002). Grilli and Rampichini (2007) use GLLAMM to estimate their multilevel model of analysis of graduates' skills.

4.1 Results

The regression results are reported in Table 5. The findings are consistent with those of other studies with respect to the effect of prior ability and gender. After accounting for program and school–type effects there was a positive effect of receiving an A-grade in A-levels that adds about 2 points to the weighted average score. There was a significant penalty of about 3 points for men versus women. Controlling for other effects there was no statistically significant effect of taking Economics and Maths at A-level on two-year performance measured by weighted average score. The last result suggests that students are not disadvantaged by not studying Economics and Maths before University. This does not support the elitist perception of Economics as a subject (Davies and Durden, 2010). Variances of random effects for program types had high standard errors meaning that there was no significant variation in the effects of explanatory variables (gender, having an A-grade, having taken Maths A-level and Economics A-level) between Economics degree programs. Conditioning on school type did not help explain variation. The effect of the school type warrants further research.

5. Implications for curriculum design and transition between school and University

Descriptive statistics indicate that there is a lot of variation in the background of students entering undergraduate Economics program. Students without Economics background, with different A-level subjects taken, students from other educational systems and

cultures experience adjustment to University education in Economics. Understanding of determinants of academic performance would help in developing new degree programmes in Economics. For example, those students who took natural sciences (Biology, Physics, Chemistry) as well as those who took Geography in high school would be well-equipped to pursue University degrees emphasizing ecological and economic sustainability. This would help move Economics Education from functional skills to systemic understanding of the world**.**

6. Implications for Admissions Policy

Based on univariate mean comparison tests there was no statistical difference in performance of those who took A-levels and those who did not. This means that those who did not take A-levels did not perform differently from those who took A-levels. Admission should remain open to those with education qualification other than A-levels. Given higher variance in achievement for the group that did not do A-levels, more information should be collected for those who did not do A-levels or come from high schools in foreign countries. Admission criteria for non-UK entrants should be improved to better reflect the quality of educational institutions abroad[4]. One could ask for a score on standardized performance test, like SAT/GRE in the US. The results of the regression analysis show that additional exposure to Economics and Maths did not contribute to better performance: the positive effect is not statistically significant once other factors such as ability and gender are controlled for in regression analysis. So there is no particular advantage to having taken Economics at A-level and it should not be a factor in

[4] For example, Reading admission policy is to require a 5-year diploma from Universities in Russia. Most Russian Universities in compliance with the Bologna process switched to a 3-year Bachelor and a 2-year Master's degree. Reading keeps rejecting many candidates from Russia on the basis of the outdated rule.

admissions. The results support admissions policy of not requiring entrants to have taken Economics in high school. The analysis offers no additional insight on whether students wishing to study economics should take traditional subjects for A-levels.

The positive effect of gender on performance as well as less than proportionate representation of women in the group suggests that girls should be encouraged to apply for Economics programs at University.

7. Further research

The research problem underlying this study has been how can students' learning be enhanced given the variety of students' background and the corresponding research question was what are the determinants of performance given the type of students that choose to study Economics.

An alternative to regression analysis would be to perform cluster analysis clustering on A-level-subjects taken and examine characteristics of the clusters with respect to academic performance.

Current study can be considered as a pilot study for a more extensive study of determinants of academic performance in Economics at more than one University using Higher Education Statistical Agency (HESA) data. A comprehensive study of student performance at many Universities where entry requirements could be matched would have greater reliability and generalizability than a "case study" of performance at a single University. Like Smith and Naylor, 2005, larger study may produce more informative results with respect to the effect of the type of high-school (independent, grant-maintained, etc.) It would be informative to add student satisfaction to the set of explanatory variables if it were possible to make such survey response compulsory and

link it to other student data. (University of Reading has a student satisfaction survey but the response is optional). A different approach would be to look at performance at qualifying exams for entry to Government Economic Service if such data were made available to researchers. Because the exam is set and graded outside of the University where the student studied there is no endogeneity with unobserved teacher effects, but the sample is selective as the best students try to enter Civil Service.

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9. Appendix

Table 1: A-level Subjects

Subject of A-level	Frequency of A-level subject taken	Subject A-level as percentage of all A-levels taken
Economics	310	18.84
Mathematics	201	12.22
Business Studies	158	9.60
Geography	109	6.63
General Studies	104	6.32
History	83	5.05
English Literature	61	3.71
Physics	56	3.40
Psychology	43	2.61
Biology	41	2.49
Sociology	34	2.07
Info. and Comm. Technology	32	1.95
Chemistry	30	1.82
French	26	1.58
Government & Politics	24	1.46
World Affairs	24	1.46
Computing	23	1.40
Physical Education	22	1.34
Law	19	1.16
Media Studies	19	1.16
English Language & Literature	17	1.03
MEI Mathematics	17	1.03
Accounting	16	0.97
Religious Studies	13	0.79
Information Technology	12	0.73
Economics and Business (Nuff)	11	0.67
German	11	0.67
Art and Design -Fine Art	9	0.55
Design And Technology	7	0.43
Further Mathematics	7	0.43

English Language	6	0.36
Spanish	6	0.36
Art	5	0.30
Economics and Business	5	0.30
Business	4	0.24
Classical Civilization	4	0.24
Design & Tech: Product Design	4	0.24
Digital Transmission	4	0.24
English	4	0.24
Modern Greek	4	0.24
Russian	4	0.24
Art & Design - Photography	3	0.18
Art and Design	3	0.18
Communication Studies	3	0.18
Design	3	0.18
Drama and Theatre Studies	3	0.18
Human Biology	3	0.18
Italian	3	0.18
Politics	3	0.18
Pure Mathematics	3	0.18
Chinese	2	0.12
Critical Thinking	2	0.12
Fine Art	2	0.12
Music Technology	2	0.12
Philosophy	2	0.12
Portuguese	2	0.12
Statistics	2	0.12
Art & Design - Textiles	1	0.06
Art and Crafts	1	0.06
Business Management	1	0.06
Computer Studies	1	0.06
Environmental Science	1	0.06
Food & Nutrition	1	0.06
General Paper	1	0.06
Geology	1	0.06
Latin	1	0.06
Leisure and Recreation	1	0.06
MEI Further Mathematics	1	0.06
Mathematics (Statistics)	1	0.06
Nuffield Chemistry	1	0.06
Panjabi	1	0.06
Polish	1	0.06
Total	1645 A-levels	100

Table 2: Created categories of A-levels

Created Categories of Subjects	Subjects included in the Category	Number of A-levels
Economics	Economics	310
Geography	Geography	109
Physics	Physics	56
Biology	Biology, Human Biology	44
English	English, English Literature, English Language, English Language and Literature	88
Business/accounting	Accounting, Business Management, Business, Economics and Business, Business Studies	195
History	History, Religious Studies, Classical Civilization	100
Soc/Psych	Sociology, Psychology	77
Computers/Design Technology	Information and Communication Technology, Computing, Computer Studies, Design and Technology, Information Technology, Digital Transmission	83
Physical Education/Communications	Leisure and Recreation, Food and Nutrition, Communication Studies, Physical Education, Media Studies	46
General studies	General Studies, General Paper	105
Philosophy/Gov	Critical Thinking, Philosophy, Politics, Government and Politics, World Affairs, Law	74
Art:	Art, Art and Design, Art and Craft, Fine Art, Design, Drama and Theatre Studies, Music Technology	32
Mathematics:	Mathematics, Statistics, Mathematics and Statistics, Further Mathematics, Pure Mathematics	232
Chemistry:	Chemistry	33
Languages:	All foreign languages	61

Table 3 Type of Schools

School type (number of students for whom school type was recorded)	Frequency: number of students	Percent
Comprehensive school	192	36.43
Independent School	86	16.32
Grammar School	55	10.44
Sixth Form College	35	6.64
Foreign/unknown	55	10.44
Grant Maintained Special School: Universities, UK schools abroad	64	12
Further Education	15	2.85
Tertiary college	12	2.28
Other Secondary School	3	0.57
Art & Design and Performing Arts	1	0.19
Agriculture and Horticulture College	1	0.19
Special School	1	0.19

Table 4 Type of Program at University (Data for 527 students)

Type of Program	Frequency: Number of Students	Percent
Business Analysis	67	12.7
Business Economics BA	135	25.6
Business Economics BSc	38	7.2
Business Economics and Organizational Studies	11	2.1
Economic Studies BA	14	2.7
Economics BA	132	25.0
Economics BSc	99	18.8
Economics and Econometrics BSc	22	4.2
Economics and Sociology	5	1.0
Economics and Geography	1	0.2
Economics and Information Technology	2	0.4
Economics and Japanese	1	0.2

Table 5: Regression Analysis Results

Dependent variable weighted average score	Coefficient	Z-statistic	P>z	95% Conf. Interval
A-grade at A-level	2.107191	2.54	0.011	.4787584 3.73562
Econ at A-level	.9243732	1.15	0.250	-.6496305 2.498377
Maths at A-level	.6989068	0.91	0.365	-.8138261 2.21164
Gender	-3.080429	-3.99	0.000	-4.591844 -1.569015
Constant	61.37599	37.40	0.000	58.15967 64.59231