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The Effect of Attendance on Grade for First Year Economics Students in University College Cork*

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Abstract: This paper examines the relationship between attendance and grade, controlling for other factors, in first year economics courses in University College Cork. Determinants of both class attendance and grade are specified and estimated. We find that attendance is low, at least by comparison with US evidence. Hours worked and travel time are among the factors affecting class attendance. Class attendance, and especially tutorial attendance has a positive and diminishing marginal effect on grade, while hours worked in a part-time job have a significant negative effect on grade.

I INTRODUCTION

This study has two main objectives: to establish the levels of attendance at lectures and tutorials amongst first year economics students in University College Cork and to identify the relationship between attendance and grade, controlling for other factors. US studies find that attendance rates in undergraduate economics vary from 66 per cent (Romer, 1993) to 89 per cent (Devadoss and Foltz, 1996) while anecdotal evidence in Ireland suggests that attendance rates at universities are much lower. As there is no published

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evidence on the levels of attendance in Ireland, our first objective is to measure them. We then consider whether class attendance at lectures and/or tutorials improves student performance.

Although previous research, which comes exclusively from the US, finds that attendance has a positive and significant effect on grade (Schmidt 1983; Romer 1993; Park and Kerr 1990; Marburger 2001), there are sufficient differences between Irish and US universities – with respect to class size and assessment for instance – to warrant an assessment of the effect of attendance in the Irish context. Moreover in the second quarter of 2003 there was an annual increase in the number of students in employment of 9,500 (Central Statistics Office, 2003). In the context of this increase, it is of interest to study the effect of hours worked on class attendance and ultimately on grade.

We also assess the role of confounding factors. Previous research suggests that ability has a significant independent effect on grade and in some studies it exceeds the effect of attendance (Park and Kerr, 1990). We also explore the role of motivational factors such as interest in economics and structural variables such as gender, social class and travel time to university.

Section II specifies the empirical model applied. It describes the data set including a thorough description of a survey of first year economics students and presents some descriptive statistics. Section III describes the results of the empirical modelling and discusses these results in the context of previous literature. Section IV draws the conclusions.

II EMPIRICAL MODEL AND DATA DESCRIPTION

Similar to recent literature focusing on the relationship between educational attainment and class size (Dustmann *et al.*, 2003, Todd and Wolpin, 2003), university quality (Bratti 2001) and attendance (for instance Durden and Ellis, 1995), we specify the following education production function:

$$P_i = x_i\beta + a_i\gamma + u_i \quad (1)$$

where P_i is grade of student i , a_i is their level of attendance, x_i is a set of other determinants of grade, u_i is an independent, identically distributed error term and β and γ are parameters to be estimated.

The study population is 368 first year economics students in two separate classes in University College Cork, a Commerce class and an Arts class.¹ Although both classes study the Principles of Economics they have different

¹ The Arts class consisted of BA; BA (Language and Cultural Studies), BA (European Studies), BSc (Social Science) and BSc (Computer Science); and the Commerce class consisted of BComm and BComm (European).

lecturers, tutors and examinations. Both courses have two multiple choice in-class examinations worth 10 per cent each and a terminal examination worth 80 per cent. They receive two lectures per week and one tutorial. The tutorial system divides classes into groups of no more than 30. They provide a short review of material covered in lectures and give students the opportunity to practice assignments and sample examination questions. They also provide a forum for discussion and feedback.

To obtain data on the relevant variables we use a mixture of administrative and survey data. The Examinations Office in University College Cork provided administrative data on Leaving Certificate points, grade and whether the student lived within a 20 mile radius of Cork. From this we imputed whether or not they lived at home by making the presumption that a student lived with their parents within this 20 mile radius. The authors and the tutors from October to December 2001 recorded data on attendance. We also conducted our own survey in February 2002 in-class (see Appendix). There was a 63 per cent response rate, while a subsequent mail survey in June 2002 brought the response rate to 74 per cent. Table 1 describes summary statistics for these data.

In the Administrative sample the average grade in Commerce is 64 per cent varying from 37 per cent to 83 per cent. Arts grades are consistently lower with an average of 53 per cent varying from 13 per cent to 80 per cent. The average attendance rate at Commerce lectures is 47 per cent. Six per cent attend no lectures, 27 per cent attend a quarter or less, while 4 per cent attend all lectures. The average attendance rate at Arts lectures is 45 per cent. Seven per cent attend no lectures and 20 per cent attend a quarter or fewer, while only 2 per cent attend all the lectures. There is a significant difference in attendance rates between the sample respondents and the administrative sample, with sample respondents attending 53 per cent of lectures on average, indicating non-response bias with respect to lecture attendance. The average attendance rate at Commerce tutorials is 62 per cent. Thirteen per cent attend no tutorials and 42 per cent attend a quarter or less, while 13 per cent attend all the tutorials. The average attendance rate at Arts tutorials is 50 per cent. Fourteen per cent of Arts students do not attend any tutorial and 25 per cent attend less than one in four, while only 2 per cent attend them all. Survey respondents in Arts had significantly higher attendance rates at tutorials, indicating non-response bias with respect to tutorial attendance.

As we initially suspected, these attendance rates are low compared with other studies of economics students attendance. In the US, Romer (1993) finds an attendance rate of roughly two-thirds, Devadoss and Foltz (1996) find an attendance rate of 89 per cent, while Marburger (2001) finds an attendance rate of 82 per cent.

Table 1: *Summary Statistics (Std Dev. in parentheses)*²

Variable	Administrative Sample		Survey Sample	
	Commerce	Arts	Commerce	Arts
<i>Grade in per cent</i>	64 (9)	53 (13)	65 (9)	55 (12)
<i>Per cent of Lectures Attended</i>	47 (27)	45 (26)	51 (27)	53 (24)*
<i>Per cent of Tutorials Attended</i>	62 (32)	50 (29)	67 (30)	56 (26)*
<i>Leaving Certificate points</i>	479 (33)	415 (66)	480 (34)	414 (74)
<i>Female (%)</i>	58	58	59	61
<i>Live at Home (%)</i>	62	52	62	60
<i>Part-time Hours per week</i>				
0			40	44
1-5			3	3
6-10			18	24
11-15			14	13
16-20			22	13
21+				
<i>Degree of Interest (%)</i>				
Not interested			24	10
Fairly interested			64	52
Interested			12	38
<i>Previous Economics (%)</i>				
			22	25
<i>Grinds (%)</i>				
			2	2
<i>Social Class</i>				
1. Professional			10	8
2. Managerial and Technical			58	53
3. Non-Manual			20	19
4. Skilled Manual			12	13
5. Semi-skilled				3
6. Unskilled				3
7. Other				1
<i>Travel Time (mins)</i>				
5-10			35	32
11-20			25	28
21-30			20	19
31+			20	21
<i>Average Age</i>				
			19	19

* significantly different from administrative sample at 5 per cent level of significance.

² The survey collected data on marital status, foreign and mature students and number of children but we do not report the results due to almost complete homogeneity in responses.

The minimum entry point for a BA (Language and Cultural Studies) was 325 in 2001; it was 390 for a BA, and 455 for a BComm, which are equivalent to entry points at other Irish universities for similar courses. It is evident that a number of students have surplus points. In fact the maximum points in the Arts class is 560 while it is 570 in the Commerce class. Average hours worked in a part-time job per week is 8.5 hours for Commerce students and 7.4 hours for Arts students. Forty-four per cent of Arts students and 40 per cent of Commerce students do not have part-time jobs, while 3 per cent of both classes work more than 20 hours per week. Indeed the maximum number of hours worked was 42 hours. Despite the growing number of students in part-time jobs as reported in the Quarterly National Household Survey (CSO, 2003), the number of hours worked does not seem excessive. By comparison, Marburger (2001) found that students worked an average of 17.4 hours per week, while in Durden and Ellis (1995) they worked an average of 7.8 hours per week.

The survey also provides an interesting profile of first year economics students. Arts students have more interest in economics than Commerce students with 90 per cent being either fairly interested or interested as against 76 per cent of Commerce students. Economics is compulsory in Commerce, which may explain the lower level of interest. Almost two-thirds of Commerce students and just over half of Arts students live at home. Approximately a quarter of students in both classes have studied economics previously. Ninety-eight per cent of students in both classes did not get grinds and just under 2 per cent of students reported having one grind while one student had two grinds. Note, however, that the survey was conducted in February, whereas more students may get grinds later in the academic year as examination pressure mounts.

Students in both Commerce and Arts classes come disproportionately from higher social classes. Eighty-eight per cent of Commerce students come from the top three social classes while no Commerce student comes from the bottom three. Meanwhile 80 per cent of Arts students are from the top three social classes and only 7 per cent are from the bottom three, highlighting access problems for people from more deprived backgrounds.

The average travel time for both Commerce and Arts students is approximately 15 minutes. Results for age and gender are in line with expectations.

III RESULTS

Since the Commerce and Arts students have different lecturers, tutors and examinations, we assess the acceptability of pooling the observations by testing for a structural break between Arts and Commerce (Greene, 1993). We

find that the slope coefficients do not differ between the classes and any structural difference can be modelled using an intercept shift. Table 2 presents the factors effecting attendance rates at both lectures and tutorials for the survey sample.³

Table 2: *Factors Effecting Class Attendance Rates*

Variable	Lectures		Tutorials	
	Coef.	<i>P</i> > <i>t</i>	Coef.	<i>P</i> > <i>t</i>
Previous Economics	-1.25	0.43	-1.57	0.39
Fairly interested	5.80	0.14	<i>10.17</i>	<i>0.03</i>
Interested	0.47	0.92	6.28	0.26
Female	0.19	0.95	<i>7.82</i>	<i>0.03</i>
Leaving Certificate	0.02	0.35	-0.02	0.37
Hours worked	-0.52	<i>0.01</i>	-0.16	0.45
Travel 11-20 mins	2.66	0.45	4.25	0.27
Travel 20-30 mins	-0.43	0.92	-1.43	0.77
Travel 30+mins	<i>8.64</i>	<i>0.04</i>	<i>9.08</i>	<i>0.04</i>
Arts	-2.33	0.51	-4.66	0.20
Constant	<i>41.14</i>	<i>0.00</i>	<i>64.00</i>	<i>0.00</i>
N		283		283
Prob > F		0.04		0.03
Adj R-sq		0.0621		0.0672

Notes: Variables significant at the 5 per cent level are italicised.
Heteroscedasticity robust standard errors are reported.

The principal factors effecting lecture attendance rates are hours worked and travelling more than 30 minutes to university. The effect of hours worked, although significant, is modest. For instance, the effect of working 18 hours per week is to reduce lecture attendance by 9.4 percentage points, say from the sample average of 45.9 per cent to 36.5 per cent.

Someone travelling more than 30 minutes to university has an attendance rate of 8.6 percentage points greater than someone travelling less than 10 minutes. We speculate that this is because they stay on campus for a full day, so their marginal travel time may be much lower than students who live close to the university and may have to walk from home to attend each lecture. In addition, this variable is highly correlated with live at home students, so their class attendance may be due in part to parental 'encouragement'.

³ Results for the administrative sample are not reported as there were no significant variables, which is not surprising.

The three statistically significant factors effecting tutorial attendance are travelling more than 30 minutes to university, being female and being fairly interested in economics. Our explanation of the first of these is as above. It is unclear why females are more likely to attend tutorials but not lectures. Meanwhile, we can understand why being fairly interested in economics is associated with tutorial attendance compared with being uninterested, but we would expect being interested to be significant and it is not.

Attendance may be endogenous in a model assessing the factors effecting grade. We generated two-stage least squares results using the estimates in Table 2 as a first stage regression. We use travel time as an instrument since travel time is correlated with class attendance but does not directly effect grade. We found no evidence of endogeneity using a Hausman (1978) test, so only the ordinary least squares results are reported in Table 3.

Table 3: *Factors Effecting Grade*

<i>Variable</i>	<i>Coef.</i>	<i>P > t </i>	<i>Coef.</i>	<i>P > t </i>
	<i>Survey</i>		<i>Administrative</i>	
Number of lectures	1.38	0.12	<i>1.61</i>	<i>0.03</i>
Number of lectures squared	-0.05	0.54	-0.07	0.29
Number of tutorials	<i>3.29</i>	<i>0.00</i>	<i>2.59</i>	<i>0.00</i>
Number of tutorials squared	-0.37	0.00	-0.24	0.03
Leaving Certificate	<i>0.02</i>	<i>0.05</i>	<i>0.03</i>	<i>0.00</i>
Previous Economics	-0.14	0.85		
Fairly interested	1.77	0.23		
Interested	2.43	0.23		
Female	-0.82	0.54		
Social class 3	-0.39	0.81		
Social class 4- 7	0.96	0.58		
Hours worked	-0.40	0.02		
Hours worked squared	0.01	0.07		
Arts	-9.00	0.00	-8.78	0.00
Constant	<i>44.40</i>	<i>0.00</i>	<i>38.00</i>	<i>0.00</i>
N	272		368	
Prob > F		0		0
Adj R-sq		0.2600		0.3017

Notes: Variables significant at the 5 per cent level are italicised. Heteroscedasticity robust standard errors are reported.

In the administrative sample we find that attending lectures, attending tutorials and its square, Leaving Certificate points, being an Arts student and the intercept are significant. The results of the survey sample are similar, but

hours worked is now significant and lecture attendance is no longer significant. We found in Table 1 that survey respondents from Arts had above average attendance rates at both lectures and tutorials. Thus, for those with above average attendance rates, lecture attendance does not matter although tutorial attendance matters even more. Perhaps while on average tutorials and lectures are complements, tutorials can act as a more effective substitute for lectures for high attendees.

The overall pattern that emerges is that class attendance is statistically significant, and has a reasonably large effect. For instance, according to the administrative model, an Arts student who attends no lectures or tutorials gets a mark 13 percentage points less than if they attend the sample average number of classes. Within the sample predictions for the Commerce class vary from 50 per cent, which is a student who attended one tutorial and one lecture and who was above the 95th percentile of hours worked, to 71 per cent, which is a student who attended five out of eight tutorials, all but one lecture and did not have a part-time job. In addition, we find that the effect of attendance on grade is at least as large as in the above US studies.

Why therefore are attendance rates so much higher in the US? One part of the answer may be due to differences in incentives. The grade in the classes surveyed in this study does not contribute to their degree grade, so the objective of the Irish first year student may be to pass rather than get honours. Our data finds that seven students passed without attending any class. Meanwhile, we ran a probit of pass/fail on the same set of regressors as in Table 3 and find that attendance at lectures (but not tutorials) has a small positive effect on one's probability of passing, for the administrative sample. For the survey sample, attendance has no effect on probability of passing, even when we use the restricted set of covariates available for the administrative data. Thus, for above average attendees (the survey sample) attendance does not effect the probability of passing, whereas when we include low attenders, lecture attendance matters somewhat. Perhaps there is a threshold number of classes to attend, after which one's chances of passing are not effected by class attendance, and that this threshold is quite low. Thus, low attendance could be explained by the irrelevance of attendance to passing, once a threshold is reached. Future research could consider modelling this possibility.

If a student's objective was to maximise grade in those years when grade counts towards degree grade, then we should expect higher attendance in years when grade counts, such as in final year. Future research may test this hypothesis. If this hypothesis is correct, then one way of increasing class attendance would be to increase the contribution of grade in earlier years to degree grade.

Tutorial attendance has a greater effect than lecture attendance on grade.

Perhaps the reduction in class size improves learning outcomes and performance. McSweeney *et al.* (1996) in a survey of economics students in University College Cork find that only 1.7 per cent did not agree that tutorial attendance was necessary, while 82.8 per cent strongly agreed that it was necessary. In addition, this study finds that attendance rates at tutorials exceeded those at lectures. However, a caveat is in order. Administrators in the Department of Economics collect attendance at tutorials because of classroom capacity concerns. Students are told that this information is not used for examination purposes but this may not be apparent to some students, which may contribute to tutorial attendance.

The other covariates included in this study are similar to Durden and Ellis (1995), so it is instructive to compare the results. Similar to Durden and Ellis (1995) and most other studies, ability as measured by high school grade has a positive effect on grade. We find that having an extra 50 points in one's Leaving Certificate increases first year university grade by 1 per cent. This is slightly smaller than the effects reported elsewhere. Again, similar to Durden and Ellis (1995) we find that gender does not effect grade, whereas many studies find that males perform better than females (Seigfried, 1979; Lumsden and Scott, 1987). Unlike Durden and Ellis, however, we find that hours worked effects grade and that this is independent of its effect on attendance, presumably through its effect on time devoted to study. In addition, while Durden and Ellis (1995) find that parental education had a significant effect on grade, we find that social class (which for most students is determined by parental occupation) is unimportant.

As outlined above, the Arts dummy is included to detect the effect of differences in lecturer, tutors and examination between Arts and Commerce students. We find a difference in grade of approximately 9 per cent, highlighting the importance of these institutional factors.

IV CONCLUSIONS

In this study we undertook to establish the level of class attendance of first year economics students in University College Cork and examine whether or not attendance is worthwhile. We find that attendance is low, by comparison with US studies. The principal determinants of lecture attendance are hours worked and travel time to university, while the principal determinants of tutorial attendance were gender, interest in economics and travel time to university. Thus, since hours worked has no effect on tutorial attendance and a small effect on lecture attendance, growing student participation in the labour force is unlikely to have a considerable effect on class attendance.

We find that the principal determinants of grade are tutorial attendance, lecture attendance, Leaving Certificate points and hours worked. The effect on grade is at least as large in this study as those reported in US studies. Attendance is more important for enhancing grade rather than obtaining a pass mark. If Irish educators wish to increase class attendance in first year, consideration should be given to counting first year grades as part of their degree grade. This study also presents an interesting profile of university students, including Leaving Certificate points, percentage living at home, hours worked, travel time to university and social class.

There are a number of recommendations for future research. First, we found that the effect of ability on grade, though significant, was small. Future research should consider a more subject specific measure of ability such as grade in mathematics and science or quantitative subjects, such as the measures used in Durden and Ellis (1995) and Moran and Crowley (1979). Second, our dataset has insufficient details to permit examination of factors that determine hours worked by students, which is an area for future research. Third, this analysis assumes that attendance rates collected from October to December are representative of the full academic year. Future research should consider collecting a full years attendance data. Finally, a panel data set would allow for the dynamic analysis of the factors effecting attendance and grade, which has not been attempted in the literature to date.

APPENDIX

Table A1: *Factors Effecting Grade for Commerce Students*

<i>Variable</i>	<i>Coef.</i> <i>Administrative</i>	<i>P > t </i>	<i>Coef.</i> <i>Survey</i>	<i>P > t </i>
Number of lectures	0.37	0.10	1.16	0.16
Number of lectures squared			-0.06	0.39
Number of tutorials	<i>1.23</i>	<i>0.00</i>	<i>2.81</i>	<i>0.02</i>
Number of tutorials squared			-0.22	0.17
Leaving Certificate	<i>0.08</i>	<i>0.00</i>	<i>0.06</i>	<i>0.01</i>
Previous Economics			-1.24	0.07
Fairly Interested			1.73	0.23
Interested			<i>5.22</i>	<i>0.05</i>
Gender			-1.99	0.20
Social class 3-7			-0.72	0.62
Hours worked			-0.12	0.16
Cons	18.07	0.09	<i>24.21</i>	<i>0.03</i>
N	155		121	
Prob > F	0.00		0.00	
Adj R-sq	0.2625		0.3007	

Notes: Variables significant at the 5 per cent level are italicised.
Heteroscedasticity robust standard errors are reported.

Table A2: *Factors Effecting Grade for Arts Students*

<i>Variable</i>	<i>Administrative</i>		<i>Survey</i>	
	<i>Coef.</i>	<i>P > t </i>	<i>Coef.</i>	<i>P > t </i>
Number of lectures	<i>1.36</i>	<i>0.00</i>	1.34	0.43
Number of lectures squared			-0.01	0.92
Number of tutorials	0.56	0.20	2.79	<i>0.05</i>
Number of tutorials squared			-0.37	<i>0.04</i>
Leaving Certificate	<i>0.02</i>	<i>0.06</i>	0.01	0.34
Previous Economics			0.32	0.79
Fairly interested			3.15	0.28
Interested			2.68	0.38
Gender			0.24	0.91
Social class 3			-0.32	0.90
Social class 4-7			1.43	0.59
Hours worked			-0.41	0.09
Hours worked squared			0.01	0.22
Cons	<i>34.37</i>	<i>0.00</i>	<i>37.92</i>	<i>0.00</i>
N		213		155
Prob > F		0		0.0729
Adj R-sq		0.1065		0.0283

Notes: Variables significant at the 5 per cent level are italicised.
Heteroscedasticity robust standard errors are reported.

Table A3: *Probit Analysis of Determinants of Pass Grade*

<i>Variable</i>	<i>Administrative</i>		<i>Survey</i>	
	<i>Coef.</i>	<i>P > t </i>	<i>Coef.</i>	<i>P > t </i>
Number of lectures	<i>0.31</i>	<i>0.03</i>	0.22	0.42
Number of lectures squared	-0.01	0.33	0.01	0.70
Number of tutorials	-0.07	0.67	-0.04	0.87
Number of tutorials squared	0.02	0.29	0.01	0.78
Leaving Certificate	0.00	0.23	0.00	0.90
Previous Economics			0.34	0.11
Fairly interested			0.47	0.24
Interested			0.54	0.22
Female			0.07	0.83
Social class 3			-0.59	0.12
Social class 4-7			0.04	0.92
Hours worked			-0.08	0.08
Hours worked squared			0.00	0.43
Arts	<i>-1.14</i>	<i>0.00</i>	<i>-1.29</i>	<i>0.00</i>
Cons	0.16	0.84	1.20	0.31
N		382		276
Prob > chi-sq		0.00		0.00
Pseudo R-sq		0.2537		0.3146

Notes: Variables significant at the 5 per cent level are italicised.

DOES CLASS ATTENDANCE EFFECT GRADE IN ECONOMICS?

This study investigates quantitatively whether attendance at lectures and tutorials effects grade. We have already collected data on attendance at lectures and tutorials now we need some background information.

Your answers to this survey will be treated completely confidential and will be used only by persons engaged in the study. They will not be disclosed to others for any purposes whatsoever.

Student Number: _____

Age: _____

Gender: Male Female
Tick the appropriate box)

Marital Status: _____

Do you have children under the age of 18? Yes No

1) Are you a mature student? Yes (if yes Q3 is not applicable)

No

2) Are you a foreign student? Yes (if yes Q3 is not applicable)

No

3) Did you do the Leaving Certificate?
(Tick the appropriate box) Yes No

If "yes" what points did you receive
in your Leaving Certificate?

4) Have you studied Economics before? Yes No

If "yes" for how many years?

5) Did you receive grinds in Economics? Yes No

If "yes" did you receive them Last year

First term this year

Approximately how many grinds did you receive? _____

- 6) Rate your interest in this subject? Not interested
 Fairly interested
-

- 7) Occupation of the Main Earner:
What is the occupation of the main earner in the household? If retired or unemployed give previous occupation
(Write full title of job and tick appropriate box below)
-
-
-
-

- | | |
|---|--|
| <input type="checkbox"/> Self-employed | <input type="checkbox"/> Skilled manual worker |
| <input type="checkbox"/> Farmer | <input type="checkbox"/> Unskilled manual worker |
| <input type="checkbox"/> Professional/Senior managerial | <input type="checkbox"/> Never worked |
| <input type="checkbox"/> Other non-manual | <input type="checkbox"/> Don't know |
-

- 8) Have you a job? Yes No

If "yes" for how many hours on average per week do you work? _____

- 9) Do you live with Parent(s) Other
-

- 10) How long does it take you on average to travel into college per day?
(Tick the appropriate box)

5-10 min 11-20 min 21-30 min more than 30 min

Thank you for your cooperation

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