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The Impact of Analyzing Economic Events on the Learning of Undergraduate Economic Theory

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1. Introduction

Much of the economics education literature has focused on improving performance and general economic literacy in principles courses. Intermediate theory courses however are the basis for the field courses and have largely been ignored in these studies. Additionally, while many different studies have been done on various teaching methods, little has been examined in how we relate the material to current or historical events. We examine the effects of having students read and respond to articles regarding economic events. Having students relate real world economic events to the economic theory in Intermediate Microeconomics and Intermediate Macroeconomics courses has spillover effects into the learning of theoretical models.

Our study took place in two Microeconomic Theory and two Macroeconomic Theory courses over the Fall '07 and Spring '08 semesters at the University of Colorado, Boulder. Weekly articles from various news sources such as Slate.com, the New York Times, and CNN.com were assigned. They related to such topics as sunk costs or aggregate demand. Students read and completed a written summary of the article and a response to directed questions relating the articles to the course material. Student performance was then measured on three non-cumulative exams. To obtain individual variation across exams, each student chose eight of the twelve articles to complete. The exams covered only theoretical material and did not test on the current and historical events from the articles. After controlling for demographic and academic ability indicators, we find that each additional article a student completed resulted in an improvement of approximately one percent on a given exam across the full sample. In order to ensure that both "finish everything early" students and "procrastinate as long as possible" students were represented for a given exam we then restricted our sample to the middle of the three exams. In doing so, we observe an increased grade of approximately three percentage points per article completed on the test. A student who completed all four articles during that section of the course would have averaged a twelve percentage point improvement over a student

3.1 Data

Data are cross sectional observations of student performance. We have 174 students in the sample representing two courses and two semesters for a total of four individual classes. Students took all three exams during the period, and we have complete data on all students, giving us a grand total of 522 observations[2]. These Observations come from courses taught by the authors in the fall of 2007 and the spring of 2008 at the University of Colorado at Boulder. The data was supplemented by surveys completed by the students and available student data. Our unit of observation is the student exam score measured in percentage points (i.e. 85 is an 85%), and we measure outside learning in the form of number of article assignments completed. The maximum completed during an exam observation is 4 and the minimum is 0. Our data includes information on both sexes and six ethnicity types. Additionally, we have SAT math and verbal maximum scores achieved by students[3]. Information on student57164(a)8.38316(l)-5.15007( )-0.475(u)-0.957164-0.9.50724(t)d

Summary Statistics are presented in Table 2. Highlighting some of our summary statistics, we see that the average exam score is approximately 70, ranging from a maximum of 101[5] to a

articles increase exam scores for the first two exams. As we can see looking at the first two exams, each additional article is associated with a higher standardized average. The strongest trend seems to be for the second exam. We believe this is the most controlled exam period since by this time students have made decisions about how much time to spend on the course, have settled into a routine, and they are still avoiding the end of semester rush. Additionally, any student whose procrastinates would have been forced to complete articles during this exam period. The third exam seems to have contradictory evidence. Specifically the highest standardized average is for students only completing one article assignment. This we believe is due to the fact that the best students will typically frontload their work at the beginning of the semester, whereas students who have generally decided not to work hard in the course will wait until the end to complete assignments. Ideally we would prefer to have a random sample of students of all ability across all exam periods, bu

4. Results

As noted above our coefficient of interest is not statistically significant for a single additional article. It may be that additional article analyses are not helpful in increasing students' exam scores. However when looking at the r-squared values of the above equation we believe another story may be to blame. It can be noted that our r-squared never exceeds 0.32 for non random effects models. We believe this means that we are not controlling adequately for student work ethic, so in our experiment we are facing an endogeneity problem. Students with strong work ethics, the "finish everything early" students, will tend to complete earlier article assignments, and score higher in class work, whereas students with poor work ethics, the "procrastinate as long as possible" students, will tend to complete the latest article analyses. One method to control for this is to use an instrumental variables approach. Another is to look more closely at individual exams. We believe that this strong work ethic will lead to coefficients on the number of articles completed being biased upward for earlier periods and biased downwards for later periods. This means our best chance of eliminating this problem is to look closely at the second exam[10]. In order to do this we present Table 5 below which is a re-estimation of equation **(1)** for exam 2 only. As can be seen the same broad patterns as were found in Table 4, with the exception that the coefficient of interest is now larger and statistically significant. In fact we see that in specifications (vii)-(ix) the coefficient on additional articles is statistically significant at the 5% level. In addition and additional article assignment is associated with an increase in exam score of approximately 3 percentage points. Lastly r-squared values have increased across all specification indicating the fact that we have less of a problem of omitted variable bias from work ethic in this sub sample. We see this as strong evidence that additional article analysis that incorporate ideas outside of the classroom increase student understanding.

5. Conclusion

We find evidence article analysis assignments that incorporate material outside of the traditionally theoretical course material for Intermediate Economics courses increase exam

[10] Additional regressions on the first and third exams are presented in tables 7 and 9.

scores. While the results on all three exams indicate small effects per article these are significant enough to show statistically and economically significant differences between students completing all articles and those completing none. When we limit the sample to the second exam observations only we find strong effects on the order of three percentage point higher grades per article on this exam. This is the sub-sample least likely to be influenced by outside work ethic and thus the most conclusive.

Students do better in completing mathematical problems when they are better able to relate the results to a concrete real world example. It is the opinion of the authors that having students complete assignments requiring that they relate economic models to current and historical events improves their ability to do mathematics required t

Table 3
Standardized average scores by exam and # of articles completed

Number of article exams completed	Exam 1 standardized average	Exam 2 standardized average	Exam 3 standardized average
4	0.121	0.192	-0.058

Table 4

Dependent variable is exam score					
	i	ii	iii	iv	v
Number of Articles	**0.74**	**1.03**	**0.88**	**0.55**	**0.19**
	[0.76]	**[0.73]**	**[0.74]**	**[0.68]**	**[0.55]**
College GPA			**2.30*** **	**4.10*** **	**3.93*** **
			[0.80]	**[1.36]**	**[1.40]**

Table 5
Exam 2 only

Dependent variable is exam score					
	vi	vii	viii	ix	x

Table 6
Exams 1-3 complete results, all variables included

Dependent variable is exam score

Graduate Mother Education				0.51	0.32
				[2.42]	[2.40]
H.S. Mother Education				2.61	2.46
				[3.91]	[4.09]
No Degree Mother Education				-16.04**	-16.49*

Table 7

Exam 1 complete results, all variables

Dependent variable is exam score

				[5.65]	
Post Graduate Mother Education				-18.68**	
				[8.97]	
Some College Mother Education				6.48	
				[4.80]	
Blank Father Education				2.46	
				[3.56]	
Graduate Father Education				-2.73	
				[8.13]	
H.S. Father Education				0.84	
				[2.80]	
No Degree Father Education				5.33	
				[5.60]	

Table 8

Exam 2 complete results, all variables

Dependent variable is exam score					
	vi	vii	viii	ix	x
Number of Articles	1.74	3.11**	2.86**	2.73**	1.74
	[1.47]	[1.23]	[1.22]	[1.33]	[1.36]
Macro Fall 2007		3.46	7.66**	4.32	
		[3.40]	[3.34]	[3.40]	
Macro Spring 2008		-9.21***	-8.76***	-11.04***	
		[3.46]	[3.13]	[3.25]	
Micro Fall 2007		13.31***	13.31***	10.23***	
		[3.39]	[3.06]	[3.35]	
College GPA			3.03***	3.07*	
			[1.07]	[1.79]	
Max SAT English			0.03*	0.04**	
			[0.01]	[0.02]	
Max SAT Math			0.04**	0.02	

				[9.49]	
Post Graduate Mother Education				8.09**	
				[3.45]	
Some College Mother Education				1.71	
				[3.27]	

Table 9

Exam 3 complete results

Dependent variable is exam score					
	xvi	xvii	xviii	xix	xx
	OLS	FE course and exam	FE ability variables	FE all relevant	RE

				[3.58]	
H.S. Mother Education				1.72	
				[4.63]	
No Degree Mother Education				-16.43	
				[11.18]	
Post Graduate Mother Education				2.42	
				[4.61]	
Some College Mother Education				-7.89*	
				[4.43]	
Blank Father Education				-17.70**	
				[8.25]	
Graduate Father Education				-0.53	
				[3.17]	
H.S. Father Education				0.19	
				[6.67]	
				8.54	
				[5.86]	