DETERMINANTS OF PRINCIPLES OF MACROECONOMICS HOMEWORK PERFORMANCE

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ABSTRACT

We examine the determinants of satisfactory homework performance among Principles of Macroeconomics students. Using OLS and LOGIT regressions, we find that a student's GPA, the time spent studying and the perceived usefulness of homework assignments in preparing for exams significantly influence homework performance.

INTRODUCTION

The factors influencing performance among undergraduate economics students are of considerable interest to educators. A broad literature (see, for example, Paden and Moyer 1969, Schmidt 1983, Durden and Ellis 1995 and Durden, Ellis and Gaynor 1998) suggests that overall GPA, class attendance, year in school, mathematical aptitude, gender, participation in outside activities, and the number of hours carried exert significant influence on economics performance. Similarly, Romer (1993) concludes that the fraction of homework sets completed is significant in describing economics course grades. Romer's study is consistent with the findings in other disciplines that successful homework completion encourages better academic performance. Indeed, in a broad review of research studies comparing homework with no homework, Goldstein (1960) finds that homework is an important determinant in improving student performance.

The focus of existing homework studies is generally upon the impact of homework grading style on overall student learning. Austin (1979) examines a sample of elementary and secondary school mathematics students. He shows that comments on graded homework assignments are associated with higher exam grades. Pascal, Weinstein and Walberg (1984) confirm these results in their review of studies

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examining homework and homework grading strategies. Among the only considerations of economics-related homework, Miller and Westmoreland (1998) find that selective grading of homework questions does not hinder overall student homework performance. They model total homework performance as a function of this selective grading and GPA.

We extend these earlier examinations with a set of new explanatory variables that describe homework grades and the probability of a student earning an A. In the following section, we discuss our method of data collection and introduce our explanatory variables. We then develop a model to test our premises. Empirical results are reported. Concluding remarks are provided in the final section.

DATA COLLECTION

Ninety-eight students in Principles of Macroeconomics, a prerequisite for all business majors, are surveyed about their perception of homework effectiveness during the Spring and Fall semesters of 1999. Students provide information on their GPA's (GPA), hours spent studying course material (HSD), the perceived usefulness (USE) of the homework in exam-preparation and the time (TME) allowed to complete the assignments. Students complete the surveys during the final class meeting and are assured that the surveys are not examined until after the assignment of final grades.

During each semester, six homework assignments are given to the classes seven days prior to the due date. The professor grades each problem on all homework assignments; he supplements the grading with written comments. The final homework average (HW) is calculated as the total number of points earned on the homework assignments divided by the total points possible multiplied by one hundred. Late homework assignments are not accepted absent a valid excuse. Valid excuses include sickness, family tragedy, and school-sponsored events. Students are allowed to work together on the assignments and are not required to attend class. The weight of the homework average in the final course grade (WGT) is .15 during the Spring 1999 semester and .20 during the Fall 1999 semester.

Independent explanatory variables are constructed from student self-reported data. As Principles of Macroeconomics is generally taken during the sophomore year, students have prior GPA's. GPA takes on the value 0 if a student's grade point average is below a 1.0, 1 if the student's GPA is between 1.0 and 2.0, 2 if the student's GPA is between 2.0 and 3.0, and 3 if the student's GPA is between 3.0 and 4.0. HSD takes the value 0 if students report studying between 0 and 4 hours per week, 1 if students report between 4 and 8 hours per week, and 2 if students report between 8 and 12 hours per week.

The variables USE and TME are constructed from student perceptions. Students report whether homework assignments help them to prepare for exams and whether assignments are given with enough advanced warning. The responses "strongly disagree," "disagree," "maybe," "agree" and "strongly agree" take on values of 0, 1, 2, 3, and 4, respectively.

Finally, to allow for gender and race, GEN takes on the value of 0 if the student is female and 1 if the student is male. RACE takes on the value of 0 if the student is African American and 1 if the student is not African American. Fifty-one percent of the students are male and less than 5% are African American.

MODEL

We predict that student performance on homework assignments depends positively on motivation and ability, measured by prior GPA. Student performance depends also on HSD, USE, TME and WGT. We expect to find a positive relationship between each of these four factors and homework performance. Though other studies find that hours spent in outside activities, year in school and the number of hours carried are significant in determining economics course grades, we propose that hours studied for the course proxy for these other potential influences, an assumption that we later confirm.

We estimate the following homework performance equation:

 $HW = b_0 + b_1GPA + b_2HSD + b_3USE + b_4TME + b_5WGT + b_6GEN + b_7RACE + e_1$

where HW denotes homework performance. We first conduct a conventional OLS analysis of the relationships between the independent variables and the final homework average. In the second, LOGIT analysis, a dichotomous dependent variable HW is 1 if the student earned an A average (90-100) on homework assignments and 0 otherwise.

RESULTS

Results of the OLS analysis are provided in Table 1.

Table 1 OLS Estimates			
Independent Variable	Parameter Estimate	T-statistic	
Intercept	25.209	1.643	
GPA	8.934	3.734*	
HSD	4.963	2.029**	
USE	7.643	2.690*	
TME	-0.635	-0.259	
WGT	3.843	0.075	
GEN	-0.176	-0.066	
RACE	9.587	1.471	
Ν	98		
\mathbf{R}^2	0.291		
F[7,90]	5.28*		
* Significant at the 1% lev ** Significant at the 5% lev	el. el.		

We find that prior GPA, hours spent studying for the class (HSD) and the perceived usefulness (USE) of the homework for exam preparation are positively and significantly related to the final homework grade. No other variable in the homework performance equation is statistically significant. These results are robust to tests for heteroskedasticity and multicollinearity. Further regression results (not reported here) show that hours spent in outside activities, year in school, and the number of hours carried are also not significant in the determination of homework performance.

The implication of the sign and significance of the USE variable is noteworthy. The perception that homework assignments help students prepare for exams motivates students to higher quality homework performance. This parameter estimate is significant at the 5% level.

Binomial logit results in Table 2 further support these findings.

Table 2 LOGIT Estimates			
Independent Variable	Parameter Estimate	T-statistic	
Intercept	-18.208	-3.923	
GPA	2.237	3.653*	
HSD	0.216	0.432	
USE	1.050	1.841***	
TME	0.261	.525	
WGT	39.642	3.399*	
GEN	0.384	0.714	
RACE	1.504	0.783	
Ν	98		
$R(p)^2$	0.786		
Log-Likelihood Ratio	35.538*		
* Significant at the 1% level. *** Significant at the 10% level.			

Parameter estimates for GPA and USE are positive and significant. As well, the probability of an A increases significantly with WGT. However, this result is weakened by potential collinearity between the WGT variable and other differences between the two survey semesters. This significance disappears if the dependant variable is defined as the probability of an A or a B.

CONCLUSION

We examine non-grading factors influencing Principles of Macroeconomics homework performance. We find that GPA, hours of study and student perception of the usefulness of homework assignments in preparing for exams increase students' homework performance. However, only GPA and student perception of the

homework's usefulness for exam preparation are significant across model specifications. Instructors seeking to motivate student homework activity should ensure a clear link between homework material and exam content.

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