

# *Determinants of Principles of Macroeconomics Homework Performance*

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# *Determinants of Principles of Macroeconomics Homework Performance*

## **Abstract**

We examine the determinants of satisfactory homework performance among Principles of Macroeconomics students. Using OLS, we find that the student's GPA, the time spent studying and the perceived usefulness of homework assignments in preparing for exams favor improved homework performance. In a LOGIT analysis, we discover the probability of making an 'A' is increased with a greater weight granted to the homework in determining the final grade.

## **I. 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.<sup>1</sup>

The focus of earlier homework studies is 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 et al. (1984) confirm these

results in their review of studies 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. In Section III, we develop a model to test our premises. Empirical results are reported in Section IV. Concluding remarks are provided in Section V.

## **II. 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.<sup>2</sup> Students provide categorical 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*) given to complete the assignments.<sup>3</sup> 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.<sup>4</sup> 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. *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.<sup>5</sup>

### **III. Model**

We predict that student performance on homework assignments depends positively on motivation and ability, measured by *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. (See endnote six.)

We estimate the following homework performance equation:

$$HW = \beta_0 + \beta_1 GPA + \beta_2 HSD + \beta_3 USE + \beta_4 TME + \beta_5 WGT + \beta_6 GEN + \beta_7 RACE + \epsilon$$

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

#### IV. Results

Results of the OLS analysis are provided in Table 1. We find that prior GPA, hours spent studying for the class and the perceived usefulness of the homework for exam preparation are positively and significantly related to the final homework grade. No other factor is statistically significant.<sup>6</sup> 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.

Binomial logit results in Table 2 support these findings. Parameter estimates for *GPA* and *USE* are positive and significant. As well, the probability of an 'A' increases significantly with *WGT*.<sup>7</sup> The policy implication is straightforward. If the weight of homework in the final grade is raised, the probability of an 'A' is increased.<sup>8</sup>

## V. Conclusion

This paper examines non-grading factors influencing Principles of Macroeconomics homework performance. We find that hours of study and student perception concerning the usefulness of homework assignments in preparing for exams increases a student's performance on homework assignments. In addition, the weight of homework assignments in the final course average raises the probability of an 'A' average on homework assignments.

The usefulness of these results is clear. If students perceive that homework is relevant in preparing for exams, student involvement on homework assignments is increased. It is, probable, however, that student learning of macroeconomics is best served where exam questions are not taken word for word from homework assignments. Similarly, an exorbitant increase in the weight of homework assignments in the final course grade may give students an incentive to reallocate time spent studying for exams to time spent preparing homework assignments. This reallocation of time may decrease student learning of macroeconomic principles.

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<b>Table 1: OLS Estimates with Homework Average as the Dependent Variable</b>		
Independent Variable	Parameter Estimate	t-statistic
<i>Intercept</i>	25.209	1.643
<i>GPA</i>	8.934	3.734*
<i>HSD</i>	4.963	2.029**
<i>USE</i>	7.643	2.690**
<i>TME</i>	-0.635	-0.259
<i>WGT</i>	3.843	0.075
<i>GEN</i>	-0.176	-0.066
<i>RACE</i>	9.587	1.471
N	98	
R <sup>2</sup>	0.291	
F[7,90]	5.28*	

\* Significant at the 1% level.

\*\* Significant at the 5% level.

<b>Table 2: LOGIT Estimates with the Probability of an A on Homework Assignments as the Dependent Variable</b>		
Independent Variable	Parameter Estimate	t-statistic
<i>Intercept</i>	-18.208	-3.923
<i>GPA</i>	2.237	3.653*
<i>HSD</i>	0.216	0.432
<i>USE</i>	1.050	1.841***
<i>TME</i>	0.261	.525
<i>WGT</i>	39.642	3.399*
<i>GEN</i>	0.384	0.714
<i>RACE</i>	1.504	0.783
N	98	
R(p) <sup>2</sup>	0.786	
Log-Likelihood Ratio	35.538*	

\* Significant at the 1% level.

\*\* Significant at the 5% level.

\*\*\* Significant at the 10% level.

## Notes

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<sup>1</sup> See Goldstein (1960) and Austin (1979).

<sup>2</sup> Survey respondents are students of the first author.

<sup>3</sup> Categorical reporting reduces the self-reporting bias of the *GPA* and *HSD* variables.

<sup>4</sup> Viable excuses include sickness, family tragedy, and school sponsored events.

<sup>5</sup> Fifty-one percent of the students are male and less than 5% are African American.

<sup>6</sup> These results are robust to tests for heteroskedasticity, multicollinearity and model-specification. In other tests, we find that hours spent in outside activities, year in school, and the number of hours carried are not significant in the determination of homework performance.

<sup>7</sup> This significance disappears if the dependant variable is defined as the probability of an 'A' or a 'B'.

<sup>8</sup> We also note that the *WGT* variable may capture other differences between the two survey semesters.