

**DOES GENDER, CLASS STANDING, AND HIGH SCHOOL ECONOMICS
INFLUENCE STUDENTS' ECONOMIC LEARNING**

Submitted by:

Deborah E. Bridges
Department of Economics,
University of Nebraska at Kearney, Kearney NE 68849-4570

Kenneth L. Casavant
Department of Agricultural Economics,
Washington State University, Pullman, WA 99164-6210

Presented at Western Agricultural Economics Association Annual Meeting

July 11-14, 1999

Fargo, ND

**DOES GENDER, CLASS STANDING, AND HIGH SCHOOL ECONOMICS
INFLUENCE STUDENTS' ECONOMIC LEARNING**

ABSTRACT

This paper investigates how gender, maturity of the student, and previous economics study in high school contribute to economic learning. Economic learning is measured using the difference between pre- and post-test scores. OLS results suggest that high school economics plays a larger role in economic learning than either gender or maturity.

DOES GENDER, CLASS STANDING, AND HIGH SCHOOL ECONOMICS INFLUENCE STUDENTS' ECONOMIC LEARNING

INTRODUCTION

A recurrent theme in the literature is interest in the factors influencing students' performance in economics courses, particularly in introductory economic courses. Various studies have examined the relationship between the performance in introductory courses and gender and/or if the student had economics in high school. Use of standardized tests of economic knowledge have facilitated these investigations, allowing researchers to examine the variables that influence the stock and flow of economic knowledge. First differentiated by Siegfried (1979), the stock of knowledge refers to the amount of understanding at a specific point of time, whereas the flow of economic knowledge represents the level of knowledge gained over a period of time, and is referred to as learning. This differentiation is important in terms of identifying the variables affecting students' performance and was the focus of this study.

The findings from previous studies examining the factors influencing students' performance include conflicting results. Many studies indicate that when multiple choice exams are used to evaluate performance, men perform statistically better than women (Heath, 1989; Walstad and Soper, 1989), especially at the college level (Ferber et al., 1983; Gohmann and Spector, 1989; Lumsden and Scott, 1987; Watts and Lynch, 1989). Two-thirds of the studies relating gender to the level of economic understanding (stock of knowledge) in Siegfried's (1979) detailed literature survey found that males performed statistically better than females. However, when essay exams are used to evaluate

performance, women outperform their male counterparts (Ferber et al., 1983; Lumsden and Scott, 1987). Other studies (Rhine, 1989; Watts, 1987; Williams et al., 1992) reported no significant difference in exam performance due to gender. Research also suggests (Buckles and Freeman, 1983; Jackstadt and Grootaert, 1980; Heath 1989) that gender differences appear during adolescence, but after adolescence economic knowledge accumulates at equivalent rates for both genders. This implies that gender differences are established in high school, differences which may exist well into college.

Studies investigating the relationship between students having taken high school economics and their performance in college economics courses suggests that high school economics has a positive influence on the stock of knowledge at beginning of the course, but the influence diminishes as one measures performance over an entire semester (Moyer and Paden, 1968; Peterson, 1992; Saunders, 1970).

In summary, an important determinant of a student's success in learning economics, or any other subject, is their ability to master, or learn, new material. Various factors such as previous exposure or experience with the subject matter and the maturity of the student (discussed later) may influence the students' ability to learn new subjects. Additionally, gender and natural ability, or affinity for the subject matter, may play a role in learning economics.

PURPOSE AND OBJECTIVES

The objective of this study was to investigate some of the factors that influence economic learning (flow of economic knowledge). Although there are many important factors influencing the amount of learning achieved by students (i.e., psychological,

socioeconomic, intelligence, and learning styles, etc.) that could be considered in any investigation, this study focused on three factors. Specifically, the study sought to determine if economic learning is attributable to gender, the maturity of the student (as measured by class standing, e.g., freshmen, sophomore, etc.), and/or previous economics courses. We hypothesized that the higher the class standing, the more prepared the student is to learn, in terms of having been exposed to more world experiences, as well as having more of the necessary study habits and class experience that help students master new subject matter. Previous economics courses were expected to have a positive effect on the student's level of economic learning. Gender, if our results are consistent with previous studies (this study used a multiple choice test), should result in men having a higher level of performance.

Although much of the literature discussed the influence of gender and high school economics on students' performance, the majority of these studies evaluated students' performance in classes composed of both economics and non-economics majors. Since students choosing to study economics as a career may be assumed to have a pre-disposition or an affinity for economics, the mixture of majors and non-majors may bias the analysis or cloud the results. What differentiates this study from most of the others is that the class was composed entirely of non-majors. Although students may switch majors after taking this course, which fulfills a general studies requirement, the class is designed for non-majors. Additionally, many of these earlier studies measured students' stock of economic knowledge at the conclusion of the economics course. In this study, we

evaluated the stock of economic knowledge at both the beginning and end of the course to determine the level of economic learning.

METHODOLOGY

The Test -- A measure of economic learning is the change in the stock of economic knowledge during a given period of time. In this study, the Test of Economic Knowledge (TEK) (Walstad and Soper, 1987) was used to measure students' stock of knowledge at two points in time, at the beginning and again at the end of the semester. The TEK is an exam composed of multiple choice questions covering economic concepts in four distinct categories: fundamental economic concepts, microeconomic concepts, macroeconomic concepts, and international economic concepts.

The test, designed in 1987 by a national committee composed of test experts, economists and classroom teachers, is a valid measure of economic understanding at the 8th and 9th grade level (Walstad and Soper, 1987). Although initially designed for use in evaluating middle school curriculum, this does not preclude its use at other grade levels. When used as a pre-test and a post-test, the test can provide a measure of the stock and flow of knowledge gained over the course period.

The Class -- The data used in this study were collected from students enrolled in a general studies economics course at the University of Nebraska at Kearney during the fall 1997 and spring 1998 semesters. The class format is primarily lecture and consists of non-business, non-economics students. (For those students with a declared major, a wide spectrum of non-economic or business majors were represented.) The class is typically dominated by freshmen, although all class ranks are represented. Students were given the

TEK as a pre-test during the first week of the semester and as a post-test during the 15th week of the semester. The difference between the post- and pre-test scores was used as a measure of the change in the stock of economic knowledge, or a proxy for the rate of economic learning. In addition to test scores, demographic information collected from the students included: gender (male/female); class standing (freshmen; sophomore; junior; senior); and whether the student had economics in high school.

The sample, summarized in Table 1, limited to those students for which both pre- and post-test scores were available, includes observations on 214 students (46% males, 54% females). Of the 214 students, 97 are freshmen (45%), 77 are sophomores (36%), 29 are juniors (14%), and 11 are seniors (5%). The make up of class standing is fairly even between male/female students. Of the 98 male students 48% are freshmen, 36% are sophomores, 12% are juniors and 4% are seniors. Among the 116 female students, 43% are freshmen, 36% are sophomores, 15% are juniors, and 6% are seniors. Out of the 214 students in the sample, 26% of students had economics in high school (33% of males, 21% of females). Students reporting having had economics in high school varied by year in school with 29% of freshmen, 21% of sophomores, 38% of juniors, and 9% of seniors having had economics in high school. In addition, a slightly larger percentage of the male students had economics in high school with 16% of freshmen, 9% of juniors, 6% of sophomores, and 1% of seniors. This is compared to the female students (10% of freshmen, 6% of sophomores, and 4% of juniors) having had economics in high school.

RESULTS

Pre-test scores for the class are compared in Table 2. In absolute terms, freshmen performed better on the pre-test than their counterparts and, interestingly, there was an overall 7% decrease in performance from freshmen to senior. The scores for male students (26.65) were not statistically different from those of their female counterparts (26.33). Students with high school economics had higher mean scores (28.07) than students without high school economics (25.91), a difference that was statistically significant ($p < .01$).

Post-test scores for the class are also compared in Table 2. As on the pre-test, freshmen performed better, in absolute terms, on the post-test than their counterparts. The scores for male students (30.10) were not statistically different from those of their female counterparts (29.94). Although students with high school economics had higher absolute mean scores (30.07) than students without high school economics (29.99), the difference was not statistically significant.

Paired t-tests were used to determine if the performance on the post-test was significantly different from pre-test performance for each group. With the exception of seniors (SR), each group's post-test performance was statistically significantly different ($p \leq .01$) from their pre-test performance. This suggests that improvement, or economic learning, did occur over the course.

The objective of this study was to determine factors affecting economic learning. We hypothesized that the rate of economic learning (represented by the difference between the post-test and pre-test score (DIFSCOR)) was affected by gender, class

standing, and whether the student had economics in high school. Binary variables (= 1 if true; = 0 otherwise) were used to represent the independent variables gender (MALE, FEMALE), class standing (FR = freshmen; SO = sophomore; JR = junior; and SR = senior), and having economics in high school (ECHS). Since maturity and experience in test taking generally increases with class standing, we expected class standing to have a positive influence on economic learning (coefficients on SO, JR, and SR should be greater than zero). Students with economics in high school were expected to have, on average, a higher stock of economic knowledge at the beginning of the semester than students without economics in high school (implying their pre-test scores would be higher). However, if our results are consistent with the literature, the initial benefit of having had high school economics should diminish over the course of the semester with little difference between the two groups in terms of economic learning. Thus, although we would expect a positive influence on economic learning from having had economics in high school (expect ECHS > 0), the influence may not be a strong one. Given the multiple choice question format of this test, the literature discussed above would suggest an expectation of males performing better than female students. However, we did not have an a priori expectation as to the influence of gender on the level of economic learning.

Ordinary least squares was used to estimate the model: DIFSCOR = f(gender (FEMALE), class standing (SO, JR, SR), high school economics (ECHS)). The resulting estimated equation is listed below (t-statistics are in parentheses):

$$\text{DIFSCOR} = 4.149 - 0.0925 \text{ FEMALE} - 0.077 \text{ SO} + 0.047 \text{ JR} + 0.192 \text{ SR} - 2.099 \text{ ECH}$$

(7.66)	(- 0.167)	(- 0.127)	(0.055)	(1.277)	(- 3.310)
--------	-----------	-----------	---------	---------	-----------

The regression results indicated that having had economics in high school had a negative impact on economic learning ($\text{ECHS} < 0$) and was the only significant coefficient in the equation. Although initially counter intuitive, what this result shows is that the initial benefit of having had economics in high school did diminish over the course of the semester. Gender did not appear to influence economic learning. The negative but statistically insignificant coefficient (-0.0925) on the gender variable ($\text{FEMALE} < 0$), given the multiple choice format, is consistent with much of the literature cited earlier. Class standing also appears to have little influence on economic learning, thus concerns about combining all classes of students (freshmen, sophomore, etc.) in introductory economic courses may be overstated.

SUMMARY AND CONCLUSIONS

This initial study investigated, through measuring the change in the stock of economic knowledge during the semester, three factors affecting students' economic learning. The results indicated that students having had economics in high school entered introductory courses with a higher stock of economic knowledge. This initial advantage did diminish over the semester so that the two groups were similar, in terms of economic learning, at the end of the semester. The results also indicated that gender differences in performance, at the beginning and the end of the semester, were not nearly as pronounced

as previously identified in the literature. This study also indicated that performance was not influenced by class standing (freshmen, sophomore, etc.).

Many factors affecting students' performance in economic courses, such as socioeconomic factors, intelligence, learning styles, gender, and college major are identified in the literature. This study focused only on three initial variables (gender, maturity, and previous economics courses) and the results suggest that other factors beyond those examined in this study , and many interactions among these factors, may contribute to students' performance

Since, unlike most studies in the literature, this sample is composed of only non-majors, it raises the possibility that differences in economic learning identified in other studies may be attributable to the student's major. If there are indeed differences in economic understanding due to the student's major, a possible bias exists when evaluating students' performance in classes where majors and non-majors are mixed. This topic also warrants further development and investigation.

Table 1. Characteristics of Students in the Sample.

Group	Total	Male	Female
<i>All students</i>	214	98	116
Freshmen	97	47	50
Sophomore	77	35	42
Junior	29	12	17
Senior	11	4	7
<i>Students with high school economics</i>	56	32	24
Freshmen	28	16	12
Sophomore	16	9	7
Junior	11	6	5
Senior	1	1	0

Group	% of Total	% of Males	% of Females
<i>All students</i>			
Freshmen	45%	48%	43%
Sophomore	36%	36%	36%
Junior	14%	12%	15%
Senior	5%	4%	6%
<i>Students with high school economics</i>	26%	33%	21%
Freshmen	29%	16%	10%
Sophomore	21%	9%	6%
Junior	38%	6%	4%
Senior	9%	1%	

Table 2. Comparison of Pre- and Post-test Scores by Group.

Pre-test	N	Mean^z	Std. Dev.	CV^y	Range
All Students	214	26.48	5.012	0.19	30
Freshmen	97	26.81	5.306	0.20	23
Sophomore	77	26.58	4.479	0.17	21
Junior	29	25.72	4.817	0.19	17
Senior	11	24.73	6.420	0.26	24
Male	98	26.65	5.348	0.20	22
Female	116	26.33	4.729	0.18	30
With High School Economics	56	28.07	4.895	0.17	19
Without High School Economics	158	25.91	4.946	0.19	30
Post-test	N	Mean^z	Std. Dev.	CV^y	Range
All Students	214	30.01	4.726	0.16	29
Freshmen	97	30.31	5.126	0.17	29
Sophomore	77	30.17	3.948	0.13	17
Junior	29	29.07	5.331	0.18	20
Senior	11	28.82	4.490	0.16	15
Male	98	30.10	5.461	0.18	29
Female	116	29.94	4.025	0.13	19
With High School Economics	56	30.07	4.472	0.15	21
Without High School Economics	158	29.99	4.826	0.16	29

^zMaximum score 40 points

^yCoefficient of variation

LITERATURE CITED

- Buckles, S. and V. Freeman. 1983. Male-female differences in the stock and flow of economic knowledge. *Review of Economics and Statistics* 65(2):355-358.
- Ferber, M.A., B.G. Birnbaum, and C.A. Green. 1983. Gender differences in economic knowledge: a reevaluation of the evidence. *Jour. of Economic Education* 14(2):24-37.
- Gohmann, S., and L.C. Spector. 1989. Test scrambling and student performance. *Jour. of Economic Education* 20 (3):235-238.
- Heath, J.A. 1989. An econometric model of the role of gender in economic education. *American Economic Review* 79 (2):226-230.
- Jackstadt, S.L. and C. Grootaert. 1980. Gender, gender stereotyping, and socioeconomic background as determinants of economic knowledge and learning. *Jour. of Economic Education* 12(1):34-40.
- Lumsden, K.G. and A. Scott. 1987. The Economics student reexamined: male-female differences in comprehension. *Jour. of Economic Education* 18(4):365-375.
- Moyer, M.E. and D.W. Paden. 1968. On the efficiency of the high school economics course. *American Economic Review* 58(4): 870-877.
- Peterson, N.A. 1992. The high school economics course and its impact on economic knowledge. *Jour. of Economic Education* 23(1): 5-16.
- Rhine, S.L.W. 1989. The effect of state mandates on student performance. *American Economic Review* 79 (2): 231-235.
- Saunders, P. 1970. Does high school economics have a lasting impact? *Jour. of Economic Education* 2(1):39-55.
- Siegfried, J.J. 1979. Male-female differences in economic education: a survey. *Jour. of Economic Education* 10(1):1-11.
- Siegfried, J.J. and S.H. Strand. 1977. Sex and the economics student. *Review of Economics and Statistics* 59 (2): 247-249.
- Walstad, W.B. and J.C. Soper. 1987. *Test of Economic Knowledge, Examiner's Manual*. Joint Council on Economic Education, New York, N.Y.

- Walstad, W.B. and J.C. Soper. 1989. What is high school economics? Factors contributing to student achievement and attitudes. *Jour. of Economic Education* 20(1): 23-38.
- Watts, M. 1987. Student gender and school district differences affecting the stock and flow of economic knowledge. *Review of Economics and Statistics* 69(3): 561-566.
- Watts, M. and G.J. Lynch. 1989. The principles course revisited. *American Economic Review*. 79 (2): 236-241.
- Williams, M.L., C. Waldauer, and V.G. Duggal. 1992. Gender differences in economic knowledge: an extension of the analysis. *Jour. of Economic Education* 23(3):219-231.