Economic Understanding in U.S. High School Courses

By WILLIAM B. WALSTAD*

*Department of Economics, University of Nebraska-Lincoln, Lincoln, NE 68588-0489. (e-mail:wwalstad1@unl.edu). The Calvin K. Kazanjian Economics Foundation helped support this research.

The National Assessment of Educational Progress (NAEP) in economics was conducted for the first time in 2006 with a representative U.S. sample of 11,490 twelfth-grade students. A prior study of NAEP economics used public-release data, which only supplies mean scores, to describe differences in achievement across demographic, opinion, and instruction variables (Walstad and Buckles 2008). In this study the previous analysis is extended by using restricted data with individual responses and regression methods to study factors associated with economic understanding.

The *Voluntary National Content Standards in Economics* describes 20 standards and associated benchmarks for economics that are important for students to learn by graduation from high school (Siegfried and Meszaros 1997). The NAEP committees for economics re-arranged these standards and benchmarks to create a test framework with three sections: market economy (micro); national economy (macro); and, international economy (micro).[1] NAEP scores are reported for the overall test and also for each section. The prior study only analyzed the results with the overall score, but the current study also uses the three subscores to investigate the full range of economic understanding.[2]

One problem with the public-release data for NAEP economics is that the course variable merged some courses, making it impossible to report results for specific courses. To correct this problem for this study, the NAEP sample is sorted in this study into eight discrete categories that cover the major course types: (1) Advanced Placement economics (APEcon: 5.3 percent), a college-level course for high-ability students preparing for an AP exam; (2) honors economics (HonEcon: 5.5 percent), a course for high-ability students taught as a college-preparatory or advanced high school course; (3) general economics (GenEcon: 42.3 percent), a basic course for all students; (4) government and economics (GovEcon: 8.9 percent), a basic course for all students that combines the teaching of government or civics

[1] See www.nagb.org/frameworks/economics_06.pdf.

[2] NAEP set the mean for each score at 150. The standard deviation was 34.33 for the overall score and 34.99 for each subscore.

with economics and is most likely taught over a year; (5) some other economics course or unit for an unknown mix of students (OthEcon: 2.5 percent); (6) a basic course in business (Business: 3.6 percent) for all students that focuses on business principles or entrepreneurship; (7) a basic course on topics in consumer economics or personal finance (PerFinance: 4.8 percent) for all students; and, (8) no economics (27.1 percent), a category for all students who did not take one of the above seven economics or related courses.

Another problem with the public-release data is that reported differences in the mean overall scores for students taking different courses are small (e.g., 152.7 for advanced; 150.8 for general and 150.7 for no economics) when greater differences would be expected. The problem is most likely because students overstated their taking of economics and related courses based on a response to only one survey item. To address this issue, students were coded as having taken a course only if their "yes" response to one survey item was not contradicted by a "no" response on one of three other items in the dataset asking about coursetaking.[3] This restriction made the NAEP percentages for coursetaking similar to the percentages for course enrollments based on high school transcript data (Walstad and Rebeck 2012). The change produced sizable and expected differences in means scores by courses (e.g.., 168.4 for APEcon; 151.9 for GenEcon; and, 140.6 for no economics).

I. Course Effects on Achievement

The four achievement scores (Overall, Market, National, International) were each used as a dependent variable in a regression equation to analyze the effects of coursework on economic understanding. The NAEP data provide five plausible values that are used to provide a proficiency estimate of each test score for the regression analysis.[4]

Thirteen dummy variables were included in each equation to control for characteristics that are likely to affect test scores. The demographic variables included gender (Male: 50.1 percent), and race and ethnicity variables (Black: 13.3 percent; Hispanic: 13.7 percent; Asian or Pacific Islander: 5.7 percent; Other: 2.1 percent; and White omitted: 65.2 percent). Two other variables were whether a student had a general learning problem (Disability: 7.5 percent) and whether a student was currently or had recently been an English language learner (EngLearn: 5.4 percent).

[3] The student survey can be obtained from the NAEP website at http://nces.edu.gov/nationsreportcard/bgquest.asp. The items were VB595669 (B), VC099117 (A), and VB595239 (A for all courses).

[4] See Mislevy, Johnson, and Muraki (1992) for an explanation of plausible value methods for NAEP. AM software was used to obtain estimates in the plausible values regressions (www.am.air.org).

The effects of socio-economic status were controlled with several variables. The first was the highest level of a parent's education (ColSome for some education in college: 22.3 percent; ColGrad for graduated from college: 48.3 percent; with only a high school education or less as the omitted term: 29.4 percent). Another indirect measure of socio-economic status or family influence was the number of books in the home (Books equals one if greater than 100: 36.2 percent).

Other variables were included in the regression to capture some education effects. The type of school program (academic versus general or vocational) would likely affect achievement (Academic: 53.4 percent). A measure of attendance was included based on whether a student reported being absent more than three or more days in the last month (Absences: 24.2 percent). Another variable was added to capture student effort, with TestEffort coded one if a student reported not trying as hard as on this test as other tests (36.5 percent). Included too in each regression were the previously described set of dummy variables for courses. The students who did not take economics, business, or personal finance courses were the omitted group.[5]

As indicated by the data in Table 1, the four equations are each statistically significant and so are the coefficient effects for almost all variables (standard errors are in parentheses). The coefficients are fairly similar in size across equations, so for the sake of brevity in the discussion that follows the focus will be on the findings for the total score.

The results show a number of significant differences for the demographic variables, but none of them are unique to NAEP economics. In fact, the demographic differences are comparable with those reported for NAEP math, science, and other subjects.[6] Males outscore females by six points. Whites score significantly higher than other racial and ethnic groups with the exception of Asians and Pacific Islanders. Two characteristics associated with lower test scores were whether students had a disability (−28 points) and whether students are or were recently English language learners (−15 points).

As for socio-economic variables, students with a parent who attended some college or graduated from college had higher scores by 9 to 13 points than students whose parents did not graduate from high school or who were

[5] It was not possible to include controls for teachers in the analysis because the ones surveyed for NAEP may not have taught the tested students. Variables to account for school (public or private) and community (urban, suburban, rural) were included in the initial analysis, but the contributions were minor so they were omitted to reduce the exposition.

[6] Score comparison for math, science, and other subjects on demographic and background variables can be conducted with NAEP Data Explorer (http://nces.ed.gov/nationsreportcard/nde).

TABLE 1— REGRESSION RESULTS (N=11,490)

	Overall	Market	National	Inter
Male	6.033	5.888	6.261	5.856
	(0.59)	(0.61)	(0.87)	(1.10)
Black	−25.486	−25.144	−26.476	−23.873
	(1.01)	(1.21)	(1.21)	(1.61)
Hispanic	−13.695	−13.203	−14.015	−14.315
	(1.56)	(1.56)	(1.75)	(2.44)
AsianPI	−3.831	−3.210	−4.265	−4.533
	(3.09)	(2.79)	(3.46)	(3.75)
Other	−10.677	−9.797	−9.800	−15.655
	(2.42)	(2.47)	(3.18)	(4.05)
Disability	−28.478	−30.397	−27.642	−24.954
	(1.47)	(1.74)	(1.67)	(1.55)
EngLearn	−15.035	−16.337	−14.381	−12.874
	(2.58)	(2.63)	(2.86)	(3.52)
ColSome	9.046	9.661	9.313	6.485
	(0.96)	(1.09)	(0.99)	(1.09)
ColGrad	12.567	12.840	12.993	10.610
	(0.84)	(0.91)	(1.09)	(1.26)
Books	10.651	10.693	10.808	10.106
	(0.74)	(0.76)	(0.85)	(0.74)
Academic	13.468	13.349	13.764	13.037
	(0.81)	(0.74)	(1.04)	(0.99)
Absences	−5.421	−5.283	−5.776	−4.889
	(0.97)	(0.98)	(1.19)	(0.99)
TestEffort	−4.146	−3.767	−4.246	−5.013
	(0.73)	(0.79)	(0.71)	(0.87)
APEcon	18.676	17.563	19.004	21.140
	(1.70)	(1.71)	(1.81)	(2.40)
HonEcon	14.776	15.103	15.789	11.094
	(1.87)	(1.94)	(2.12)	(2.36)
GenEcon	9.036	10.003	8.948	6.370
	(1.04)	(1.23)	(1.19)	(1.42)
GovEcon	8.072	8.393	7.908	7.546
	(1.38)	(1.50)	(1.58)	(1.76)
OthEcon	6.932	6.868	7.500	5.613
	(2.64)	(2.63)	(2.89)	(2.83)
Business	6.118	7.031	5.041	6.252
	(1.89)	(2.156)	(1.841)	(2.263)
PerFinance	4.638	5.178	4.007	4.700
	(1.89)	(1.75)	(2.28)	(2.36)
Constant	132.353	131.627	131.997	135.476
Adj. Wald	170.345	160.23	155.423	112.79
R-square	0.382	0.377	0.380	0.320

only high school graduates. The number of books in the home (>100) is a proxy for family interest in reading. It was associated with higher test scores by about 11 points.

Education factors too are associated with higher test scores. Students enrolled in an academic or college-bound program score 13 points higher than students enrolled in a general or vocational program. Attendance and student effort also make a difference, but but the association is about the same for both variables. Students who were absent three or more days in the past month scored five points lower and students who did not try as hard on this test scored four points lower.

As for courses, the main conclusion to be drawn from this analysis is that high school courses appear to contribute significantly to economic understanding, but the amount of the contribution varies by the type of course and type of students taught. Students enrolled in AP economics courses are high-ability students in twelfth grade who are likely to take an AP exam and use their results to obtain college credit. They scored about 19 points higher than students who have not taken an economics or related course. Next in order of contribution are honors courses for high-ability students that may or may not be taught as a college course. Students in these courses scored 15 points higher than students without economics. Students in a general economics course, the one taken by the largest number of high school students, scored nine points higher than students without economics. For students taking combined courses in government and economics, which also enrolls a broad range of students and is likely to be taught over a year, the difference is eight points compared with students without

economics. Students taking some other economics course also do well by scoring almost seven points higher than the omitted group, but these results should be treated with caution because it is an eclectic category with varying types of instruction.

The results also offer some insights about students taking courses that include economic content but are not separate courses. Students taking courses on business principles or entrepreneuship show a significantly higher level of economic understanding compared with students with no economic instruction, but the 6-point difference is two-thirds of what students achieve in general economics courses. Students in personal finance courses also show some economic understanding, but the score differential is half of what it is for students in general economics courses. For students in both of these courses, the highest achievement in economics is shown in the market economy section of the test and the lowest achievement is shown in the national economy section. This finding is consistent with the content focus in these courses, which is primarily on micro concepts. Overall, the above results suggest that courses in business or personal finance can complement and reinforce the economics taught in general economics courses, but they are not substitutes for an economics course.

The coefficient estimates for coursework in the international equation show the greatest variation compared with the other scores. One reason for the difference is that there are fewer test items on the international subscale because by NAEP design students were to spend only about 15 percent of their time on it compared with 40 or 45 percent of test time spent on national or market sections. The test items also contain a unique blend of micro concepts (voluntary exchange, comparative advantage) and trade policy (e.g., tariffs). It is unknown how much of this content is taught in each of the courses. Apparently, this content is well covered in AP economics, which has the highest score of any course. The international content, however, is given less emphasis in honors economics, general economics, and government and economics.

II. Course Effects on Perceptions

As an additional check on course outcomes, a probit model was specified and estimated in this study to examine the degree to which students perceived that an economics or related course helped them understand economic matters. The analysis was possible because the survey asked students to agree or disagree with whether the course they took helped them understand: (1) the U.S. economy (US) (86 percent agree); (2) the international

economy (Inter.) (70 percent agree); (3) what they hear on the news about current events and public policy (CEvents) (80 percent agree); and (4) how to manage their personal finances, now and in the future (PFinances) (69 percent agree). Although most students agreed with each statement, the responses were not unanimous and there was variation in responses by course type. To investigate these perceptions, the responses for each of the four survey items were dichotomized (with a one being agree) and used as dependent variables in the probit analysis. The demographic, socio-economic, education, and coursework variables for each probit were the same as previously used in the regression analysis. The no economics group (n=3,090), however, was excluded from the sample because they did not have to answer this survey item. The omitted course variable was personal finance.

Table 2 shows the marginal effects from the probit analysis. Only the results from the course variables are included in the table to simplify the reporting because they were the prime target of this study. The course effects were mixed for whether students thought a course helped them understand the U.S. economy. Students in AP economics, honors economics, and general economics courses were significantly more affirmative in their responses. In fact, students in general economics courses were nine percent more likely to agree than students in personal finance courses. By contrast, the answers given by students in government and economics courses and business courses were not significantly different from the responses of students in personal finance courses.

The results for the international question show even greater course effect. Students in AP economics courses were 17 percent more likely to state that the course helped them understand the international economy than were students in personal finance courses. This positive assessment is consistent with the high scores shown by the AP students on the international portion of NAEP economics. Students in honors economics and general economics courses also were 15 percent more likely to respond that these courses helped them understand the international economy. The responses from students in government and economics courses and business courses showed no meaningful difference from those of students in personal finance courses.

TABLE 2— MARGINAL EFFECT OF COURSE VIEWS

Courses	US	Inter.	CEvents	PFinances
APEcon	0.064**	0.171**	0.085**	−0.182**
HonEcon	0.051**	0.148**	0.087**	−0.198**
GenEcon	0.087**	0.147**	0.078**	−0.129**
GovEcon	0.028	0.058	0.054*	−0.336**
OthEcon	0.045*	0.087**	0.054	−0.189**
Business	−0.032	0.013	0.012	−0.184**
Eq. F	11.46	7.53	6.21	11.55
N	8,360	8,340	8,330	8,340

Note: The omitted course is personal finance.

**Significant at the 1 percent level.

*Significant at the 5 percent level.

Presumably an economics or related course should contribute to students' ability to understand current events and public policy. That expectation is supported by the responses of students in AP economics, honors economics, and general economics courses. Students in these courses were 8 to 9 percent more likely than students in personal finance courses to hold that view. Students in courses on government and economics were 5 percent more likely to supply a positive response than were students in personal finance courses. The views of students in business and personal finance courses were essentially the same.

The last survey item allowed a check to be made on the consistency of the responses. Compared with students taking personal finance courses, it would be expected that students taking one of the economics or business courses would be less likely to state that the courses help them understand how to manage personal finances. The results from the probit analysis support this expectation. The marginal effects for economics and business courses are significantly negative for this personal finance item, with the most negative response coming from students in government and economics courses (−33 percent) and the least negative responses coming from students in general economics courses (−13 percent). Economics or business courses are not considered by students to be substitutes for instruction in personal finance.

One final point is worth noting about the broader topic of economic understanding in high schools. In 2012, the NAEP in economics was again administered to a representative sample of U.S. high school students. The new dataset will permit further analysis to confirm the findings in this study and to study economic understanding over time.

REFERENCES

Mislevy, Robert J., Eugene G. Johnson, and Eiji Muraki. 1992. "Scaling Procedures in NAEP." *Journal of Educational Statistics*, 17(2): 131–54.

Siegfried, John J., and Bonnie Meszaros. 1997. "Voluntary National Economics Content Standards for Pre-college Education." *American Economic Review*,87(2): 247–53.

Walstad, William B., and Stephen Buckles. 2008. "The National Assessment of Educational Progress in Economics: Findings for General Economics." *American Economic Review*, 98(2):541–46.

Walstad, William B. and Ken Rebeck. 2012. "Economics Course Enrollments in U.S. High Schools." *Journal of Economic Education*, 43(3): 339–47.