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WILLIAM WALSTAD

University of Nebraska-Lincoln, wwalstad1@unl.edu

Ken Rebeck

University of Nebraska - Lincoln

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Assessing the Economic Understanding of U.S. High School Students

By WILLIAM B. WALSTAD AND KEN REBECK*

Economics instruction in U.S. high schools is basically delivered in two ways. About half of high-school students take a required or elective course in economics, according to transcript data. The great majority of these students (about 95 percent) enroll in a regular course that focuses on basic economic concepts with applications. The remaining small percentage of students take a college-oriented course that is often called "honors" or Advanced Placement (AP) economics. Economics instruction for the other half of high-school students, if it is provided at all, is typically delivered in the context of other courses in the high-school curriculum in what is sometimes called the "infusion" or "integrative" approach. These courses would most likely be required courses taught in the social studies, such as U.S. history or American government, or in elective courses taught in business education.¹

This study investigates what high-school students know about basic economics given the different types of economics instruction. The primary focus is on the achievement of students who complete a basic course in high-school economics. These results are important because they supply insights into what high-school students who have received direct instruction in economics know about the subject. For comparison purposes, the achievement of students who have not taken a formal course in economics will be investigated to identify what they know about economics. The comparison of those students with and without instruction in a separate course in economics gives the best estimate of the importance of direct instruction in eco-

nomics to the economic understanding of most high-school graduates. In addition, similar comparisons between those students with and without direct instruction in economics will be made for two groups of higher-ability students: those who enroll in honors or AP courses in economics and those who enroll in such courses for other social-studies subjects.²

I. Test of Economic Literacy

The data for the study came from high-school students who participated in the national norming of the third edition of the Test of Economic Literacy (TEL). The TEL is a reliable and valid measure of understanding of basic economics taught in high school as supported by the psychometric data in the test manual (Walstad and Rebeck, 2001). The alpha reliability of the TEL is 0.89, a figure indicating that there is a high degree of internal consistency among test items and that the test score serves as an accurate index of economic understanding. The content validity of the test was based on publications prepared by two distinguished national committees of economists: (i) *A Framework for Teaching the Basic Concepts* (Phillip Saunders and June Gilliard, 1995); and (ii) *Voluntary National Content Standards in Economics* (National Council on Economic Education, 1997). Both publications identify and describe the economics concepts and principles that should be

* Department of Economics, University of Nebraska, Lincoln, NE 68588-0402.

¹ For data on course-taking in high-school economics, see Walstad and Rebeck (2000).

² It should be noted that students who take an honors/AP course in economics may be higher-ability students, but they should not be confused with the very select group of students who take an AP economics exam and receive a respectable grade of 3, 4, or 5. Many students enrolled in college-type courses in high school do not take the AP economics exam. Only about 60 percent of those who do take the AP exam in economics receive a grade of 3 or higher.

taught in the nation's schools at different grade levels.³

Extensive work was conducted to ensure that the third edition of the TEL would remain a valid and reliable test of economics. About 40 items that had been rigorously evaluated and successfully used in the second edition were retained for the third edition.⁴ Another 19 new items were written to cover new economics content or to replace discarded items. The test was field-tested with 1,200 students in four states to identify how well items measured their economic understanding. Drafts of the revised TEL were reviewed, and the final norming version of the test was approved by three national committees: the first was composed of five experienced high-school teachers of economics; the second consisted of six directors of centers or councils for economic education who also served as economics faculty members; and the third included five distinguished economists at major universities who had prior experience with test or curriculum projects in economics at the high-school level.

The TEL was administered to 7,243 students in 384 classes in 36 states at the end of the fall and spring semesters of the 1999–2000 school year. Of this group, 4,842 students had completed a course in basic economics and another 1,001 students had completed a course in honors or AP economics. To compare the results for these two groups, 855 students were tested in regular social-studies courses, and another 545 students were tested in honors or AP social-studies courses. These social-studies courses were mostly U.S. history or American government. Students were classified by course type using survey information obtained from teachers.

II. Comparing Achievement in Economics

The TEL consists of two parallel forms of 40 multiple-choice items. To simplify the reporting

³ The cognitive level of the TEL items varied: 45 percent were knowledge or comprehension questions, and 55 percent were application questions.

⁴ Documentation for the second edition is found in John C. Soper and Walstad (1987). The TEL has also been used in testing in at least ten nations (see e.g., Walstad, 1994).

TABLE 1—PERCENTAGE CORRECT ON TEL
FOR U.S. HIGH-SCHOOL STUDENTS

Course/items	Social		Difference
	Economics	studies	
Regular courses			
All items (69)	61.3	41.4	+19.9
Fundamentals (26)	67.0	42.1	+24.9
Microeconomics (15)	62.3	45.4	+16.9
Macroeconomics (17)	57.0	37.9	+19.1
International (11)	53.4	39.6	+13.8
Honors/AP courses			
All items (69)	74.3	57.1	+17.2
Fundamentals (26)	77.8	57.7	+20.1
Microeconomics (15)	74.6	60.9	+13.7
Macroeconomics (17)	72.0	54.1	+17.9
International (11)	69.0	55.3	+13.7

Note: Sample size varies by group (see text).

of results, items on each TEL form were combined, and the 11 common items were counted only once to produce a 69-item test. Table 1 shows the mean percentage correct for the 69 unique items that appear on either or both test forms. The combined analysis produced results that were almost equivalent to those obtained from a separate analysis of each form, because of the close similarity in test content and the type of student tested with each form. For example, the mean TEL score for the students taking a regular course in high-school economics was 24.30 (SD = 7.96) on form A and 24.71 (SD = 7.97) on form B. In percentage terms, the mean was 60.75 on form A and 61.78 on form B, producing a mean of 61.3 for the combined analysis.⁵

The results in Table 1 show a mixed picture of high-school student achievement in economics. On the positive side, taking a separate course in economics made a substantial contribution to what students know about economics relative to the baseline of those students without instruction in a separate course. Students in a regular economics course scored 20-percentage-points higher than students who took a social-

⁵ In the combined analysis, the means are based on sample sizes that vary by item depending on whether it was on either form A or B, or both forms.

studies course.⁶ About the same percentage-point gap (+17.2) was found for students taking an honors or AP economics course relative to those students who took an honors or AP course in another subject in social studies. Clearly, instruction improves the economic understanding of high-school students relative to what it would be if there was only the minimal instruction provided by a social-studies course. This finding holds regardless of the course type or ability level of students.⁷

What is disconcerting, however, is the low level of final achievement. Students who have completed a basic economics course could only answer 61 percent of the test questions correctly, on average. The comparative group of students completing a social-studies course performed far worse, with an average score of 41-percent correct. What both results suggest is that there are significant deficiencies in the economic understanding of typical high-school students, whether or not they have taken an economics course.

The test data can also be analyzed to identify areas of strength or weakness in the four categories of economic concepts of the Framework: fundamental economic, microeconomic, macroeconomic, and international economic concepts. The highest level of achievement occurs in the fundamental economic category, followed by the microeconomic category. The lowest level of achievement is in international economics, followed by macroeconomics. For example, economics students in a regular course scored 67-percent correct on fundamental economic items and 62-percent correct on microeconomic items. These students, however, show less knowledge (about 6–10 percentage points) of macroeconomic and international economic concepts than of fundamental economic and

microeconomic concepts. These results confirm findings from previous studies of economic literacy at the high-school level using the second edition of the TEL (Walstad and Soper, 1988).

The likely reason for the differences in achievement among the categories is the order of presentation and emphasis given to each of them in the teaching of high-school economics. The first part of high-school courses in economics covers fundamental concepts, and these concepts may be given the most extensive treatment. The next content is usually microeconomics, or at least the rudiments of the comparative static model of supply and demand. This material might also be presented in earlier grades, which may explain why students in social studies perform best in this category. Macroeconomic concepts would be taught next. The complexity of the material and controversies about macroeconomics can make this topic difficult both for teachers to teach and for students to learn. International economics is the last content area to be taught in the typical sequence. The low achievement on international economic concepts probably reflects this ordering and the fact that most teachers lack time to teach these concepts.

The comparison of mean scores between the economics and social-studies groups leads to a similar conclusion. More classroom time is given to fundamental concepts in economics courses, which explains why it shows the greatest difference in mean scores (+25) between regular economics and social studies. Conversely, the least amount of instructional time is devoted to the teaching of international concepts which probably explains the small difference in scores (+14 percentage points for regular courses). The same pattern holds for comparisons between honors/AP economics and honors/AP social studies.

III. Understanding of Basic Concepts

Table 2 presents more detailed data on the comparative performance of students in regular economics courses on particular economic concepts by the four categories. For discussion purposes, the mean of 61-percent correct will be used for identifying those concept areas for

⁶ Further evidence to support this statement also comes from the subsample of 1,991 economics students who took the TEL as a pre- and posttest in the spring 2000 semester. These students scored 53 percent on the pretest and 63 percent on the posttest.

⁷ Similar differences in mean percentage correct among student groups were found in regression analysis that controlled for gender, race, verbal ability, grade level, future educational plans, income, location, and school type.

TABLE 2—PERCENTAGE CORRECT ON TEL
BY COURSE AND GROUP

Categories (number of items)	Regular		Honors/AP	
	Economics	Social studies	Economics	Social studies
Fundamentals				
Scarcity (6)	72.8	40.2	83.5	56.2
Opportunity costs/trade-offs (4)	60.2	37.4	74.6	44.9
Productivity (3)	67.8	46.6	78.7	64.0
Economic systems (4)	71.8	43.9	80.5	62.5
Economic institutions and incentives (5)	67.8	45.9	78.1	65.7
Exchange, money, and interdependence (4)	52.0	38.6	63.5	46.4
Microeconomics				
Markets and prices (1)	60.3	36.2	76.1	46.2
Supply and demand (6)	67.1	49.7	79.1	68.6
Competition and market structure (2)	69.3	50.4	78.2	73.5
Income distribution (2)	58.8	42.0	69.7	53.6
Market failures (3)	52.6	41.5	67.7	50.4
Role of government (1)	58.2	37.6	70.4	50.7
Macroeconomics				
Gross Domestic Product (1)	55.3	31.1	70.3	57.5
Aggregate supply and demand (4)	57.9	38.4	74.5	54.2
Unemployment (2)	68.4	49.9	81.1	68.9
Inflation and deflation (4)	58.9	40.6	75.2	59.7
Monetary policy (3)	38.5	23.1	56.5	29.9
Fiscal policy (3)	64.8	42.9	74.4	59.8
International				
Comparative advantage/barriers to trade (5)	57.3	40.1	74.7	56.4
Balance of payments and exchange rates (4)	45.7	37.8	60.7	50.4
International growth and stability (2)	58.9	42.0	71.3	62.2

which there was relatively better or worse achievement.

In the fundamentals category, high-school students taking a regular course in economics scored better on questions in four of the six concepts areas: scarcity (73-percent correct), productivity (68), economic systems (72), and economic institutions and incentives (68). They scored worse on opportunity costs and trade-offs (60) and money and exchange (52) items.

The test items with the lower scores indicate the problems students were having in understanding select concepts. Students had difficulty recognizing the opportunity cost of a new public

high school or new city park (60-percent correct), and in knowing that to produce more of one good requires giving up more of another good when resources are fully employed (45). There was confusion about the effects of specialization of labor on output per work hour (62). They had difficulty recognizing that both the buyer and seller benefit from a voluntary exchange (60). Most students did not know that the major portion of the basic money supply was composed of checkable deposits (36).

In the microeconomics category, there were several areas of relative strength: supply and demand, and competition and market structure (67–69-percent correct). The supply-and-demand questions are applications that ask students to predict what happened to price or quantity based on single shifts in supply or demand or, alternatively, ask students to identify the possible cause of a given change in price or quantity. The market-structure questions ask about the basic features of competition and the effects of a monopoly on price and output in a market. The most likely reason for relatively better performance on these topics is that they are often covered in units in grades both before and during high school.

The content areas that gave students more trouble covered other aspects of microeconomics that are not typically taught: income distribution, market failures, and the economic role of government (53–59-percent correct). Students often failed to see the relationship between high wages and high output per worker (62), did not know that most of the income that businesses earn is paid out in the form of wages and salaries (55), or could not explain why medical doctors generally earned more than farmers (60). Many students could not apply the marginal-cost–marginal-benefit principle to a pollution-control decision (51). Students were generally unable to identify an economic explanation for why public goods are provided by government rather than private businesses (53). When given a tax table, it was difficult for many students to identify whether the tax rate was proportional, progressive, or regressive (58).

In macroeconomics, students showed the most knowledge of unemployment and fiscal policy (65–68-percent correct). On unemployment items, more students than the average

knew that unemployment would increase during a recession (73). They also often knew that unemployment would decline as a result of an increase in economic growth (64). On fiscal-policy questions, many students could identify the definition of a government budget deficit or surplus (65). A majority of students could also predict the effects of a reduction in taxes on consumer spending and the economy (64).

Knowledge of other macroeconomic concepts was relatively weak. Many students could not select a simple definition of the gross domestic product (55-percent correct). Although many could identify a correct definition of inflation (64), significantly fewer could identify who would benefit from unanticipated inflation (45). The basic features of aggregate demand and aggregate supply were a mystery to many students (58). The worst level of achievement, however, was found with questions on monetary policy. Many students did not know that lending by commercial banks increases the nation's money supply (43), and most were not familiar with the basic tools of monetary policy (36).

Students scored poorly on most of the international economic items, which is probably because many teachers do not teach these concepts. Many students had little idea of what the law of comparative advantage was or how to interpret it (51-percent correct). Students often misidentified the economic effects of tariffs (58). Simple calculations of exchange rates and their effects on product prices baffled most students (39). They often did not know what a balance-of-trade deficit or surplus was (52) or recognize real per capita income as the best measure of a nation's standard of living from the set of choices given (52).

Table 2 also shows the level of achievement by students enrolled in other types of courses. The variations in the percentage correct across concepts for the honors/AP economics students are similar to those reported for regular economics students, but there is more consistency in performance across all concepts. What is especially noteworthy for all groups, however, is that the poorest performance occurs on questions related to monetary policy and also money and exchange, despite all the discussion of these topics in the news media.

IV. Implications

No single test can capture all that high-school students know about economics. Any general test of economics such as the TEL is subject to criticism because of its test format, content coverage, cognitive level, test incentives, or some other factor. These potential criticisms need to be put aside for now and a hard look needs to be given to the message and not the messenger. The TEL has a long history of use and has been shown to be a reliable and valid measure. It provides the best current information on achievement in high-school economics.⁸

The overall results are both encouraging and discouraging. Students who complete a separate course in high-school economics do show greater knowledge of economics than those who do not. Without such a course, high-school students would be largely ignorant of the basic concepts in economics that prepare them to understand their economic world. The recommendation that emerges from this finding is that all high-school graduates, whether bound for the job market or college, should take a separate course in economics. Although one course is not sufficient to develop a high level of economic understanding, it does provide some consistency in the amount of instruction given to all high-school graduates, and it will improve basic knowledge. For many high-school graduates, this course may be their only formal education in economics, because some will not attend a college or university, and even those who do may not take an economics course.

University instructors teaching Principles of Economics would also benefit if high-school students take an economics course. High-school graduates often enter university economics courses with mixed experiences, some with high-school economics and some without. The wide variation in what students know about economics as a consequence of differences in high-school preparation makes the teaching of a Principles of Economics course especially dif-

⁸ The results from the TEL have been consistent across time (see Walstad and Soper, 1988). Economics is included in subjects covered by the National Assessment of Educational Progress, but there will be no scheduled testing in economics until 2005, if it occurs at all.

ficult. More economics instruction in high school should reduce background differences, increase the starting level of knowledge, and perhaps allow students to learn more from an undergraduate course in Principles of Economics.

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