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TEST OF ECONOMIC LITERACY

EXAMINER'S MANUAL
(*Fourth Edition*)

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William B. Walstad
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Funding

The Council for Economic Education, Office of Innovation and Improvement, Excellence in Economic Education: Advancing K-12 Economic & Financial Education Nationwide grant award U215B100002. The contents of this book developed under the grant from the Department of Education do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the federal government.

ISBN 978-1-56183-706-9 5 4 3 2 1

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FOREWORD

The Council for Economic Education (CEE) is proud to introduce the fourth edition of the *Test of Economic Literacy (TEL)*. Publication of this updated assessment instrument continues the CEE's commitment to providing the highest-quality products for teachers to use in their classrooms and to help them give their students the economic tools and skills that are required for every student.

This examiner's manual provides the test administrator with detailed information on the test and instructions for administering the test. Also, because the test has been normed using different norming populations, it gives teacher or school administrators information to compare their students' performance with that of similar students across the nation.

One feature of the *TEL* is that the two forms of the test are closely parallel, both in content coverage and difficulty. Thus, teachers may give students a pretest and post-test to ascertain their enhanced understanding of economics or, for comparative purposes, they may give half of the class one form of the test and the other half of the class the other form, with the knowledge that the content and the level of difficulty of the two forms of the tests are similar.

Revision of the *TEL* was needed because although many of the original test questions were still content-relevant and performed well with students, others were in need of updating. In addition, since the previous edition of the *TEL*, the CEE published a second edition of the *Voluntary National Content Standards in Economics*. It was critical that a primary assessment tool such as the *TEL* be updated to be consistent with the content covered in the revised *Standards*.

The CEE is truly indebted to many individuals who shared their multitudes of talent and precious time to review, revise, and correlate the questions in the *TEL* to the *Standards*. Special thanks go to Bill Walstad, Ken Rebeck, and Roger Butters for undertaking and managing this work. Other economists, economic educators, and teachers with teaching and testing expertise reviewed the questions in their various stages of development and contributed to revisions improving the quality of the questions and tests.

Last, but certainly not least, the CEE gratefully acknowledges the generous funding of the U.S. Department of Education, Office of Innovation and Improvement, Excellence in Economic Education: Advancing K–12 Economic & Financial Education Nationwide grant award U215B100002.

Council for Economic Education

The Test of Economic Literacy: EXAMINER'S MANUAL
(Fourth Edition)

The *Test of Economic Literacy* is a nationally normed and standardized test for measuring the achievement of high school students in economics. This test has a long and distinguished history of use in schools across the United States for assessing what high school students know about basic economic concepts. This tradition should continue with this fourth edition.

The purposes of the examiner's manual are threefold. First, it provides test users with a detailed description of the economic content on the test so they are fully informed about test coverage and the rationale for each item. Second, it explains how the test should be administered to students and also discusses the possible uses of the test for assessment and instruction. Third, it presents statistical evidence documenting the reliability and validity of the test as an achievement measure of high school economics.

1. THE HISTORY OF THE TEST

The revision of the *Test of Economic Literacy (TEL)* is an evolutionary step in the process of improving the quality of cognitive achievement tests available nationally through the Council for Economic Education (CEE) for the assessment of student learning in economics.[1] This evolution introduced significant changes in many of the old test items, added new items to reflect changes in the content of economics, placed tighter controls over the norming sample, increased documentation of test reliability and validity, and established better procedures for equating test forms. A brief history of high school achievement tests in economics helps trace this evolution and the changes embodied in the fourth edition of the *TEL*.

In 1961, the National Task Force on Economic Education released its report *Economic Education in the Schools* (CED, 1961), a detailed and objective outline of basic economic concepts for use in the nation's schools. Following the release of the task force's report, a void was perceived in the library of economic education materials, namely, an appropriate instrument to measure the economic knowledge of high school students. As a result, the *Test of Economic Understanding (TEU)* was developed in 1964 through the efforts of the CEE (Stalnacker et al., 1964). The primary purpose of the *TEU* was to help school systems assess gains in economic knowledge through the use of a standardized, nationally normed instrument. The test served this function adequately for a number of years. In addition, the *TEU* became one of the first tools available to test economic knowledge in experimental settings. It thereby fostered the development of a substantial body of research in the field of economic education (e.g., Bach and Saunders, 1965). The *TEU* set the foundation for achievement tests in economics.

First Edition

In 1977, the CEE released the first major update of the work of the National Task Force on Economic Education, the *Master Curriculum*

[1]Since its inception, the first part of the name of this organization changed from "Joint Council" to "National Council" to "Council." Only the acronym "CEE" will be used in the text for this manual to eliminate confusion with previous names.

Guide in Economics for the Nation's Schools, Part I, A Framework for Teaching Economics: Basic Concepts (Hansen, Bach, Calderwood, and Saunders, 1977). This document was designed to specify an optimum base of economic knowledge for the typical high school graduate. The *Framework* did not attempt to provide detailed guidelines on how to teach economics in school systems; it was, rather, designed to describe the basic structure of the discipline of economics in a relatively brief volume. The other publications in the Master Curriculum Guide (MCG) series were grade-level and course-specific teaching guides.

Concurrent with the MCG project, the CEE moved ahead with a substantive revision of the outdated *Test of Economic Understanding*. This work culminated in the publication of the first edition of an examiner's manual for the *Test of Economic Literacy* (Soper, 1979). This two-form multiple-choice test provided school systems with a new evaluation instrument for assessing student achievement in economics. It also gave researchers an updated set of tests for use in experimental settings.

Second Edition

In 1984, the CEE completed a revision of the *Framework* to incorporate new changes in the content and structure of economics and to reorganize the presentation of the basic concepts (Saunders, Bach, Calderwood, Hansen, and Stein, 1984). The major differences between the old and new versions of the *Framework* were in the fundamental and macroeconomics concept listings. There was also more emphasis given to international economic concepts. The *Framework* served as the basis for the content validity of the *TEL*, so when it was revised it required that the first edition of the *TEL* be revised as a measure of student economic understanding. The national norms also were almost a decade old and were thus suspect as current indicators of economics achievement in high schools.

The work on the second edition of the *TEL* began in 1985 by a national committee composed of economists, economic educators, and high school teachers of economics. Five drafts of this test were developed and revised. These drafts were extensively field tested with students. At each stage of the revision process, advice and suggestions were obtained from the national committee reviewing the test work. The data for the national norming of this edition of the *TEL* were collected in May 1986 from 8,205 high school students. The norming results and documentation on test reliability and validity for Forms A and B of the test were published in an examiner's manual (Soper and Walstad, 1987).

Third Edition

During the mid-to-late 1990s, two new publications by the CEE set the stage for the preparation of the third edition of the *TEL (TEL3)*. The first publication was another revision of the *Framework* (Saunders and Gilliard, 1995). This version updated economic terms and slightly reorganized the content outline. It also included scope and sequence guidelines that gave teachers and administrators more description of the economic content for students at different grade levels. For content validity, the *TEL* needed to be changed to reflect the revision in this major document.

The second publication was the *Voluntary National Content Standards in Economics* (CEE, 1997). Five national committees that included about 30 economists, economic educators, and teachers participated in the development and review of these standards over a two-year period. A revision of the *TEL* was needed in order to cover more of the economic content in these standards and their associated benchmarks so teachers would have a general measure for assessing student achievement of the basic economic concepts.

The construction of the third edition of the *TEL* began in fall 1999 and continued through summer 2000. The first draft of this test was developed and revised with extensive comments and advice from three national committees. One committee was composed of high school teachers. A second committee consisted of directors of university centers and state councils for economic education. The third committee was a panel of distinguished

economists. The second draft was field tested with a large and diverse sample of students.

After further review and revision with the committees, the norming version of the *TEL3* was administered to more than 7,000 students during the 1999–2000 academic school year. The results from the national norming and extensive evidence on the test reliability and validity were presented in a detailed examiner's manual (Walstad and Rebeck, 2001a).

Fourth Edition

By 2010, several developments had contributed to a growing rationale for preparation of a fourth edition of the *TEL (TEL4)*. The first, and most important, comprised changes to the content validity documents for the *TEL*. During the early 2000s, the CEE phased out the use of the *Framework,* so it could no longer be used to establish content validity of the test. Instead, the CEE focused on the *Standards* (CEE, 1997) as its content guide for economics. The *Standards* also was revised and the second edition published in 2010. Therefore, a revision of the *TEL* was needed to align its economic content with the revised *Standards,* providing teachers with a current assessment measure of economics achievement.

A second factor contributing to the need for test revision was one that affects most tests over time — the age of the test. There was a need for changes to the content of particular test items because of changes in content emphasis and interpretation in the discipline of economics. In addition, new national norming data were needed so that the test results would better reflect current student achievement in economics, given that such achievement levels can change over time as student populations change.

Another force for revision was the continuing trend to larger enrollments in honors and college-level courses in economics over the past two decades. In 1994, only 1 percent of high school graduates took a college-level economics course during high school, but by 2009 at least 5 percent did so (Walstad and Rebeck, 2012). The major impetus for this growing trend was the offering of Advanced Placement (AP) exams in microeconomics and macroeconomics that began in 1989. These exams stimulated the offering of more college-oriented economics courses, taught in high schools under honors and college-level course titles. To reflect this change, the *TEL4* needed to include updated norming tables with results for regular and advanced economics courses in high school, as first introduced in the *TEL3*.

The above changes affecting economic content, student populations, and course offerings created a strong rationale for a revision of the *TEL*. The revision was needed to make it more current and useful for students and teachers over the next decade.

2. TEST REVISION

The work on the fourth edition of the *TEL* began in winter and spring 2011 and continued through summer 2012. The first part of this work was the preparation of the new revised version of the test by the test developers. The second part of the work was collection of data for the national norming of this new edition that involved student testing and data analysis.

Test Preparation

The test developers began work on the fourth edition of the *TEL* in spring 2011. One significant advantage in the preparation of this edition was that the results from the third edition provided a strong base from which to revise the test in terms of test item content, overall test reliability, test validity, appropriate reading level, test equating between forms, and other factors (Walstad and Rebeck, 2001a). The comprehensive work on the third edition also reduced the time needed to develop the norming version for the fourth edition.

The revision work began with an analysis of the test content and past item data to identify those questions from the third edition that might be used as is or revised for the fourth edition. Questions from the third edition were rated by each of the test developers and selected for further use based on their coverage of key economic content and the appropriate level of difficulty and discrimination

as discussed in test and measurement texts (e.g., Miller, Linn, and Gronlund, 2012; Thorndike and Thorndike-Christ, 2011). In addition, gaps in content were identified for which new questions needed to be written.

The third edition of the *TEL* had 69 unique items. From this set, 66 items were rated by the test developers as acceptable for possible further use on the fourth edition, either as is or with some revision. To this total, another 22 new items were written to cover content gaps in the *Standards*. This test revision work created a beginning pool of 88 unique items for the new edition.

Field Testing

The next step in the test development process was to field test the items. Given the time constraints in the classroom, it was not possible or efficient to administer all 88 items in the item pool to students. Accordingly, a decision was made to field test only the items from the third edition that had undergone significant revision. Of the 66 unique items taken from *TEL3,* only 18 were field tested to check how well they would work with students. The other 48 items from the third edition were rated as acceptable for use as is, based on their economic content and past item statistics. All new items, however, were included in the field test because it was not known how well the new items would measure student economic understanding. Thus, the field test contained a total of 40 items, 18 revised ones from the third edition and 22 new ones.

The field test was administered in November 2011 to 867 students. Of this group, 389 students had not taken any economics, 220 students were enrolled in a basic or regular high school economics course, and 258 students were taking either a college-level economics course taught in high school or they were college students. Diversity in the amount and level of economics instruction (none, basic, advanced) for students was sought for the item analysis with the expectation that students without economics instruction would be less able to answer questions than students with economics instruction. The inclusion of students with college-level instruction also would help differentiate item responses and offer more insights about the quality of the revised and new test questions.

Norming Version

After field testing, several decisions were made that affected the norming version of the test. The first decision involved the trade-off between the number of items on a test and the classroom time available for testing. The previous edition had 40 questions on each form (A and B). Since no problems had been reported with this test length in previous administrations (e.g., Walstad and Rebeck, 2001a; Butters and Asarta, 2011), some increase in the number of test items was reasonable and would improve content coverage. Accordingly, a decision was made to add five new questions to each form to bring the total to 45. This test length was not considered to be a problem for most students because they typically spend less than a minute on a test question, which meant that a test could be completed in a 40-minute time period. This time period was well within the time period for most classes.

The other decision affecting test revision was the need to make the two forms more parallel in structure and content than in past editions. Matching and balancing items by content coverage across the two forms achieved this objective. Some items were made as matched pairs that covered similar content but presented a different example or application. Other items were matched-pair opposites. For example, in cases where an item on one form focused on a "surplus," an item on the other form would focus on a "deficit." Also, many items (10 in the final edition) were kept exactly the same on both forms so that the scores on these common items could be used to equate the raw scores on the two forms of the test.

The field test results were extensively analyzed and used to produce the norming version of the new test. Items were retained for the norming version that showed reasonable difficulty levels and the ability to discriminate between students of greater or lesser economic understanding. Of the 22 new items field tested, 16 were retained for the

norming version. Of the 18 revised *TEL3* items that were field tested, all were kept and used in the norming version. Of the 48 items from *TEL3* that had good item statistics and were not revised and field tested, 46 were selected and used for the norming version. Thus, the total number of unique items for the norming version was 80 (16+18+46).

Two 45-item forms (A and B) were created for the norming version from this pool of 80 items. Using 70 of the 80 items, 35 matched pairs (one for A and one for B) were made that covered similar economic content and the same economics standard. The other 10 items were used to construct 10 matched pairs by including the same item on both forms.

This draft of the norming version underwent further review and revision by the test developers before it received final approval. A few items were moved from one form to the other to help balance the item difficulty and item discrimination so the averages for both forms were roughly the same. In addition, the letter (A, B, C, or D) for the correct answer for test items was adjusted on each form so that each letter was equally likely to represent the correct answer. Minor edits also were made to some items for clarity.

A strong case is being made that this norming version of the *TEL,* consisting of two 45-item forms, is a sound measure of high school student understanding of basic economic concepts, given the extensive work for the test development and revision. The revised and newly written items for the test are well distributed across the national standards for precollege economics (see next section). Most of the test items (80 percent) were the same or modified versions of ones that had already been found to be acceptable for use in the previous edition *(TEL3)*. The field test results showed that the new items would work well for measuring student achievement in economics. The findings from the national norming with 7,368 students (described in Section 7) show that this new edition of the *TEL* offers a valid and reliable measure of economic understanding for high school students who are taking either a basic economics course or an advanced (honors or college-level) economics course.

3. TEST CONTENT AND STRUCTURE

The economic content of the *Test of Economic Literacy* is based on the *Voluntary National Content Standards in Economics* (CEE, 2010). This document served as the guide to content validity for the development of the fourth edition.

Content

The *Standards* is an authoritative and comprehensive description of what expert economists and economic educators consider to be the core concepts that should be taught to precollege students. It has been widely accepted and used to shape economic instruction in high schools. For example, the *Standards* was the main document that was used to specify and organize the content framework for the National Assessment of Educational Progress in economics (NAGB, 2006; Buckles and Walstad, 2008). The *Standards* also has been used to develop the instructional materials created for schools by the Council for Economic Education.

The *Standards* contains 20 content statements of economic principles and explains why these standards are important to learn. Underlying the general statement for each standard are sets of benchmarks at the fourth, eighth, and 12th grades that explain the specific economic knowledge that students should understand. Associated with the benchmarks are examples or explanations of what students can do with that economic knowledge to demonstrate their understanding.

Table 1 shows the distribution of the items for each form of the *TEL* across the content standards in economics. For the sake of parsimony, only the major economic concepts or topics related to each standard are shown in the table. A complete description of the 20 standards statements can be found in Appendix 2. The left side of Table 1 shows the 20 economic concepts (or topics) that are used to describe the standards. The right side of Table 1 shows the distribution of the 45 items across the 20 economics standards.

TABLE 1. Distribution of *TEL* Items by Economics Standards

Standard with selected key concepts	Form A		Form B	
	Items	Total	Items	Total
1. Scarcity, choice, productive resources	1, 2, 3	3	1, 2, 3	3
2. Decision-making, marginal analysis	4	1	4	1
3. Economic systems and allocation mechanisms	5, 6	2	5, 6	2
4. Economic incentives — prices, wages, profits, etc.	7, 8	2	7, 8	2
5. Voluntary exchange and trade	9, 10	2	9, 10	2
6. Specialization and comparative advantage	11, 12	2	11, 12	2
7. Markets and prices	13, 14	2	13, 14	2
8. Supply and demand	15, 16, 17	3	15, 16, 17	3
9. Competition	18, 19, 20	3	18, 19, 20	3
10. Economic institutions	21, 22	2	21, 22	2
11. Money and inflation	23, 24, 25	3	23, 24, 25	3
12. Interest rates	26, 27	2	26, 27	2
13. Labor markets and income	28, 29	2	28, 29	2
14. Entrepreneurship	30	1	30	1
15. Physical and human capital investment	31, 32	2	31, 32	2
16. Economic role of government	33, 34	2	33, 34	2
17. Government failure, special interest groups	35	1	35	1
18. Output, income, employment, and the price level	36, 37, 38 39, 40	5	36, 37, 38 39, 40	5
19. Unemployment and inflation	41, 42	2	41, 42	2
20. Fiscal and monetary policy	43, 44, 45	3	43, 44, 45	3
Total Number of Questions		**45**		**45**

Notes: (1) For a complete description of an economics standard, see Appendix 2 or *Standards* (CEE, 2010).
(2) Items 5, 7, 18, 19, 24, 29, 34, 36, 38 and 43 are the same on both forms of the *TEL.*

Table 1 shows that the *TEL* is achieving its content goal of testing student understanding of the basic economic concepts as outlined in the *Standards*. Each form of the test has 45 questions. The 45 test items are well distributed across the 20 standards so they provide a sampling of the content domain in economics. Each standard has at least one test item associated with it and some have more. The average number of items per standard is two. This allocation of test items is consistent with the design of the *TEL* as a general measure of economic understanding across the content of high school economics.

Several points should be remembered in evaluating the economic content of this test. First, the *TEL* is not designed as a test of each economic standard listed in Table 1. There are too few test items per concept or standard to make a sound judgment about whether a student has mastered a particular standard. That type of standards assessment is beyond the scope of this test project. It was not feasible under the time constraints for *TEL* testing to include the number of items needed to assess all the benchmarks included with each standard. The *TEL* is a general achievement test that measures the economic understanding of high school students on a sample of basic test items considered to be important for assessing student learning.

Second, the classification of a test item by standard is not exact. Some items might fit into more than one standard. The distribution in Table 1 reflects the best judgment of the test developers on the placement of an item in a standard. The distribution also reflects the test developers' interpretation of what *ought* to be included in a general test of high school economics based on the economic content outlined by the *Standards*. These optimal weights for the test content were determined on the basis of judgment of the test developers and past test use. The extent to which the test developers were able to write test items that adequately reflected this optimal test structure is a completely different question and is, of course, open to critical comment by reviewers and users of this test.

Cognitive Levels

Test items also can be classified by cognitive level. Although several taxonomies for the cognitive domain have been proposed, the most widely used was developed by Bloom (1956). This cognitive work specified six levels: knowledge, comprehension, application, analysis, synthesis, and evaluation. The first two editions of the *TEL* used a five-level adaptation that omitted synthesis. The third edition of the *TEL* reduced the cognitive specification to just three levels — *knowledge, comprehension,* and *application*. This three-level classification scheme is also used for this fourth edition.

The meaning of the three cognitive levels can be briefly described. The knowledge level (I) is associated with recognition and recall. It is the ability to remember or recall facts or definitions in a form that is close to the way they were presented to the student. The comprehension level (II) refers to understanding the meaning of the information or educational material. It is the ability to show understanding by giving examples or by restating it in one's own words. The application level (III) involves the use of information. It is the ability to apply learning to new situations and circumstances. It may also involve the use of analysis and evaluation as part of the application.

The reason for using just three cognitive levels is that test experts have found Bloom's Taxonomy to be more useful for classifying instructional objectives than it is for classifying test items (Ebel and Frisbie, 1991, pp. 51–52). This problem applies to the *TEL* because cognitive ratings of test items in the first two editions were sometimes arbitrary, especially at the three highest levels — analysis, synthesis, and evaluation. To address this issue, the number of cognitive levels was reduced in the third edition to the first three because they were the most well defined and justified. Educators have found it easier to work with these three levels, or a modification of them, rather than the entire six that were described by Bloom (Davis, 2001).

It should be noted that for the *TEL,* the application category was broadened to include items that would have been classified as analysis and evaluation items in other taxonomic schemes. Analysis refers to the ability to break down learned material into its parts. Evaluation is the ability to assess or judge learned material based on standards, rules, or criteria. The reason that analysis and evaluation items are included in the application level for the *TEL* is that many application items often involve some type of economic analysis or evaluation.

Table 2 displays the distribution of *TEL* items across the three cognitive levels. On each form there are 6-7 knowledge, 13-14 comprehension, and 25 application items. In percentage terms, 44 percent of the items fall into the knowledge or comprehension levels, and 56 percent of the items are at the application level. Table 2 demonstrates that the test contains a range of cognitive levels. The *TEL* is not just a knowledge or recall test. The *TEL* gives its primary emphasis to test items that require students to apply their economic understanding to situations or circumstances and use economic analysis in selecting a correct answer.

4. USES OF THE TEST

The *Test of Economic Literacy* was designed primarily to aid teachers in assessing student learning and to improve their teaching. There are several ways of using it throughout a course to achieve these goals.

At the Beginning of a Course

The *TEL* can be administered as a pretest at the outset of a unit of instruction or at the beginning of a semester to assess the students' prior knowledge of economics. This use is important to high school teachers because many school districts now begin instruction in economics — sometimes only on a limited basis — well below the high school grades. If this prior instruction in economics has been effective, many students will have acquired some knowledge of economics. Thus, high school teachers will want to know the students' areas of strength and weakness to balance the course's content.

To assess areas of students' relative strength or weakness in economic knowledge, teachers can compare the scores of their students with the national scores for each test item. The relevant national scores for comparison with those *without economics* are found later in the manual (Section 7, Tables 6–11). Small differences between scores reported for a given question in this manual and those obtained in the classroom should not be emphasized. Certain kinds of item comparisons, however, may prove useful for assessing student understanding. For instance, if the average score of students on the test as a whole is as good as or better than the national scores, significantly lower scores on selected items may indicate areas of economics the teacher may wish to emphasize in subsequent teaching. The manual also provides brief rationales for each question (Sections 8 and 9). Teachers might want to examine those before deciding whether a particular concept deserves greater attention in the classroom. If still in doubt, the teacher should refer to the relevant pages of the *Standards*.

Teachers can group their students' responses by the content or cognitive categories as shown in Tables 1 and 2. This work will enable the teacher to compare scores in several different areas of economic content or by levels of cognition. For example, the scores of students in a given class can be compared with national scores by grouping items across related standards. Comparisons also can be made using cognitive categories such as comprehension or application. Students' incorrect responses often tend to cluster around specific topics; the identification of such topics may lead teachers to give them greater emphasis and to develop strategies for teaching them more effectively. Whether a comparison is made on the basis of individual items or across several content standards, the *TEL* can be used to discover the areas in which students have strengths and weaknesses before formal teaching begins so that the teacher can make some adjustments in time.

TABLE 2. Cognitive Level of *TEL* Items by Economics Standards

Standard with selected key concepts	Form A			Form B		
	I	II	III	I	II	III
1. Scarcity, choice, productive resources		2, 3	1		2, 3	1
2. Decision-making, marginal analysis			4			4
3. Economic systems and allocation mechanisms		5, 6			5, 6	
4. Economic incentives — prices, wages, profits, etc.	7		8	7		8
5. Voluntary exchange and trade			9, 10			9, 10
6. Specialization and comparative advantage			11, 12			11, 12
7. Markets and prices			13, 14			13, 14
8. Supply and demand			15, 16, 17			15, 16, 17
9. Competition		20	18, 19		20	18, 19
10. Economic institutions	22	21		22	21	
11. Money and inflation	25	23	24	25	23	24
12. Interest rates			26, 27			26, 27
13. Labor markets and income		28	29		28	29
14. Entrepreneurship		30		30		
15. Physical and human capital investment		32	31		32	31
16. Economic role of government		33	34		33	34
17. Government failure, special interest groups			35			35
18. Output, income, employment, and the price level	36, 37	38, 39	40	36, 37	38, 39	40
19. Unemployment and inflation		41	42		41	42
20. Fiscal and monetary policy	44		43, 45	44		43, 45
Total Number of Questions	**6**	**14**	**25**	**7**	**13**	**25**
Percent of Total	**13.3**	**31.1**	**55.6**	**15.6**	**28.8**	**55.6**

Notes: (1) Cognitive levels: I = Knowledge; II = Comprehension; and III = Application

(2) *For a complete description of an economics standard, see Appendix 2; or the *Standards* (CEE, 2010).

(3) Items 5, 7, 18, 19, 24, 29, 34, 36, 38 and 43 are the same on both forms of the *TEL.*

At the End of a Course

The *TEL* can be used at the end of a semester or unit of instruction to measure the extent to which understanding has improved. Post-test scores for a given group of students may be compared with their pretest scores and with the appropriate national scores for students in the norming tables that follow. A pretest and post-test use of the *TEL* should help to provide evidence of the effect of a given curriculum and teaching strategy on economic literacy. This assessment will be a particularly useful tool of comparison if the test is administered on both a pretest and post-test basis to classes in a school system in which varying degrees of emphasis are placed on economics and different teaching approaches are employed. It is hoped that the *TEL* will be used this way to measure the impact of varying teaching treatments on student performance in economics. Rigorous evaluations of this kind can contribute significantly to the improvement of teaching effectiveness in high schools.

When used as a post-test, the *TEL* should be administered early enough to allow one or two class periods to be used for discussion of test scores, groups of test items, and topic areas. The teacher can take advantage of the students' interest in their relative standing in the class and in relation to the norming sample of students who have had previous training in economics.

During a Course

A third use of the *TEL* is to administer one of its forms midway during a course or unit of instruction and to use the results for *formative* evaluation purposes. Data on student performance near the halfway point can then be used to alter instructional strategies for the balance of the course, thereby more closely reaching the instructional goal — greater student economic literacy.

When the test is used on a pretest, midterm, and post-test basis, it is likely that some student "learning" will result because students will then take one form of the test twice. Students may "remember" items from one test administration to the next. This effect can be reduced substantially by using alternating forms of the test. If, however, an entire quarter or semester intervenes between administrations, the same form of the *TEL* may be given without concern for major "incidental learning" effects through the testing process.

In Other Courses

The *TEL* can be used in economics and other courses. The norming sample contains a mixture of students taking basic courses and students taking AP courses. This norming sample, therefore, was divided into two groups, basic and advanced, each of which has two subgroups — with and without economics. Separate norms are reported for each course type and by form of the *TEL* in Section 7. High school teachers of basic or advanced economics courses will find the norms particularly useful for comparing how their students perform on the *TEL* relative to the national sample that took the test. Teachers of students in business education, personal finance, and other courses may find these norms for the *TEL* useful, particularly if the courses include significant amounts of economic content. The norms also may be useful for students in non-economics courses to see how they compare with a national sample of students who have not taken economics.

College economics instructors may find the *TEL* useful in evaluating student achievement in introductory and principles of economics courses. The test can be given to students at the beginning of a college economics course to find out what they know about basic economic concepts and standards. It can be given as a post-test to see if students have mastered these basic economic concepts. In this case, it would be best to use the norms for honor or college-level (e.g., AP) economics courses that were taught in high school for the comparisons with college students in introductory and principles of economics courses.

College and university faculty in economics or education who provide pre-service courses for

prospective elementary and secondary teachers or in-service courses and workshops for current teachers may find the test worthwhile as an assessment tool for learning. Teachers in these courses and workshops are often taught the economic concepts and principles as outlined in the *Standards*. Lesson materials that they are likely to use with their students also will cover these economic concepts and principles. If the economic content covered in the course or workshop corresponds to the content on the *TEL,* then it may be a useful test for measuring achievement.

Uses of Item Information

This *TEL* manual contains a wealth of item data that test users can easily access and use to compare their students' results from particular test items with the item results reported from the norming sample.

Item Difficulty. The difficulty of a test item can be estimated by how well a particular group of students performs on that test item as shown by the percentage of correct responses. Theoretically, the percentage can range from 0 to 100 percent, but most items will fall in the 40 to 80 percent correct range for those students with economics. Students without economic instruction will have a lower percentage correct for each item. The contrasts in the item difficulties between those students with and without economics instruction by group type (total, basic, and advanced) are shown in several tables (Section 7, Tables 6–11). In addition, item rationales for the correct answers are supplied later in the manual, along with the item difficulties for students with and without economics based on the total sample (Sections 8 and 9).

The manual also provides extensive data for comparing responses of each item alternative (A, B, C, or D) of a given group of students with a relevant group from the norming sample (total, basic, and advanced) (Section 7, Tables 12–21). In these tables, the percentage for the correct response is printed in boldface and the percentages for the incorrect alternatives are not bolded. Particularly useful for teachers who teach a basic or general economics course are the data on the item responses for basic students with economics (Section 7, Tables 16 and 17) compared with the responses for basic students without economics (Section 7, Tables 18 and 19).

An item analysis of the kind presented in Tables 12–21 can be very useful because it shows the percentages selecting each of the test alternatives. For example, if a substantial percentage of students answered A when the correct answer was C, the teacher would do well to study distractor A in an attempt to determine the reason. Perhaps the students were misled by the teacher's or textbook's presentation of the material. It should also help to consult the item rationales (Sections 8 and 9) for an explanation of the reasons for correct and incorrect responses.

Teachers also should remember that data on item difficulty is to be interpreted with care. Item difficulty (percentage of correct responses) depends on many things besides the complexity of the fact, concept, or principle being tested. Such matters as classroom emphasis on the specific point in question, the closeness or plausibility of incorrect alternatives, or distractors, and how the item content relates to students' outside activities, experiences, reading, and awareness may also affect item difficulty. It is worth emphasizing, therefore, that undue attention should not be placed on small differences between the percentage reported in this manual and those obtained in the classroom.

Item Discrimination. Also reported in this manual's statistical data are the discrimination coefficients for test items (Section 7, Tables 6–11). This coefficient is the corrected item-to-total score correlation, or the point-biserial correlation.[2] It, too, should be interpreted with care. This coefficient measures the correlation between the students' total test scores (less the particular item) and their scores on a particular item. It is an assessment of the functioning of that item with the students who were tested. This correlation coeffi-

[2]See Thorndike and Thorndike-Christ (2011) for further discussion of this statistic

cient ranges from −1 to 1. The *higher* the value of the coefficient, the better the item functions as a discriminator between those students who know more and those who know less economics. If this coefficient were zero, it would indicate that this item fails to discriminate between those with more and those with less knowledge of economics as measured by their total score.

In general, if an item has a discrimination coefficient below 0.20, the item may either be a weak discriminator or there may be limited student knowledge of the tested concept. Questions with a *negative* coefficient are *reverse discriminators* (indicating that more lower-scoring students get the question right than do higher-scoring students). Teachers should be aware that the item discrimination coefficient does *not* adjust for the reading level or general ability of students in the norming sample. Thus, higher-ability students may do well on a given question regardless of whether they have had economics instruction.

Discussion of Test Items. When students cannot answer a question or find it difficult to select the correct answer, they are often interested in what the correct answer is and why it is correct. Students' incorrect responses tend to be concentrated on specific topics. It is on those topics that review time can be spent most profitably, because the clustering of errors is an indication of confusion about the topic. Depending on the class, the teacher may wish to read the rationale for each correct answer directly from the item rationales (Sections 8 and 9) or simply use it as a basis for their own remarks. Discussion can then continue between students and teacher, using the class's textbook as well as supplementary materials for background information. The *TEL* can become a powerful teaching tool if used in this way.

Caution should be exercised in reading or paraphrasing item answers to students from the item rationale, particularly if the test is used on a pretest and post-test basis. After post-testing, "reading the correct response and its rationale should cause no harm and is likely to be effective as a teaching/learning activity. This practice, however, should not be followed after *pretesting* if a subsequent post-test is to be administered — not even if the alternate test form of the *TEL* is used — because there are 10 "anchor items" that are common to both forms of the *TEL*. The validity of the test would be seriously impaired if users were to violate this rule.

For Research and Assessment

Past editions of the *TEL* have been used in research and assessment studies of the teaching and learning of economics in the United States over the years (e.g., Walstad and Soper, 1988; Becker, Greene, and Rosen, 1990; Allgood and Walstad, 1999; Butters and Asarta, 2011; Gill and Gratton-Lavoie, 2011). The *TEL* also has been translated and used as a measure of economics achievement of high school students around the world. National studies using the *TEL* have been conducted in the United Kingdom, Germany, Austria, Switzerland, South Korea, Australia, Bulgaria, Japan, China, Korea, the Philippines, Australia, and New Zealand (e.g., Walstad, 1994; Asano, Yamaoka and Abe, 2004). The *TEL* has been used in research studies of student learning and teacher training in nations that were making a transition to a market economy, including Lithuania, Ukraine, Kyrgyzstan, Poland, and Russia (e.g., Walstad and Rebeck, 2001b; Grimes and Millea, 2011).

It is anticipated that this edition of the *TEL* will continue to be used for research studies both in the United States and in other nations. Researchers and evaluators employing the *TEL* in experimental and nonexperimental settings should pay particular attention to the technical data reported in Section 7 in this manual to make sure that the *TEL* serves as a reliable and valid measure for their specific applications and objectives. It is possible to use a shortened version of the test for research studies, but such use will require careful selection of items and additional documentation.

5. ADMINISTERING THE TEST

The *Test of Economic Literacy* was primarily designed for high school teachers and administrators to use with high school students taking courses in economics, social studies, personal finance, business education, and other subject areas in which economics is directly or indirectly taught. The *TEL* can also be used by college and university faculty with students in introductory and principles of economics and with teachers enrolled in pre-service and in-service courses in economics and economics education. Researchers may also find it to be a valuable tool for assessing the effects of programs on economic understanding at the high school level.

Those individuals who administer the test should be familiar with the test procedures that are described below. The *TEL* is easy to administer and may be scored by hand or by computer. Note, however, that unless standard procedures are followed when the *TEL* is administered to students, the results obtained at different times may not be strictly comparable with the national norms.

The norming data provided in this manual are the result of testing many student groups throughout the United States. To ensure meaningful comparisons with the national sample, it is essential that examiners follow the test instructions during the administration of the *TEL*. Specific directions for the student are provided in the test booklet. Although these instructions will be adequate for most situations, it is suggested that the examiner carefully look over the test and the answer sheet before the testing session begins in anticipation of any problems.

Printed Materials or Online

If the students are taking a printed version of the test, the *TEL* booklets are reusable provided students follow instructions and do not write in them. After each testing session, you should inspect the booklets for pencil marks. Either erase any marks completely before using the booklets again or discard them.

The test questions may be answered on a facsimile of the blank answer sheet provided in Appendix 3 or on a machine-readable answer sheet having at least 45 answer positions, each with at least four options. If answers are to be machine scored, the teacher must use answer sheets that are compatible with the scoring equipment to be used, and the students must mark the answer sheets with the appropriate pencils (usually No. 2 lead). In any event, students should be cautioned not to use a ballpoint pen. Use of a pen makes it difficult for the students to change responses, and most machines will not score ballpoint markers. For machine scoring, it is advisable to have on hand additional pencils of the appropriate type.

All test materials should be counted and assembled prior to the testing session. Placing an answer sheet under the front cover of every test booklet so that both answer sheet and test booklet can be distributed together may save testing time. Make certain that each student receives only one booklet.

The room in which the test is to be administered should be well lighted, well ventilated, and reasonably quiet. The students should have sufficient working space to accommodate both the test booklet and answer sheet. Students should be seated so as to minimize opportunities to see each other's answers (unless the group-testing method is used).

If you are administering the test online, refer to the procedural information located at http://tests.councilforeconed.org. Check with the instructional technology specialist in your school about arranging optimal conditions for computer testing.

Timing the Test

The *TEL* requires about 40 minutes of testing time for high school students, depending on the group. If testing is done in a class period that is shorter and the time cannot be extended, allowance should be made for this factor when test scores are evaluated and compared with the national norms. The *TEL* was designed as a power

test rather than as a speed test, so it is most likely that the majority of students will complete it in less time than allowed. Analysis of the norming data showed that most students completed the *TEL* well within 40 minutes. Since many class periods are around this time length, the testing should begin as soon as possible after the start of class. To ensure that students do not arrive late, it may be helpful to remind them in the class prior to the test to be on time and to bring No. 2 pencils if they are taking a printed version of the test.

Directions for the Examiner

If using a printed version of the test, first distribute the answer sheets (and No. 2 pencils if necessary) and instruct those taking the test to fill in the appropriate information on the answer sheet. Make sure the students mark which form of the test, A or B, they are taking. If the test booklets and answer sheets are not passed out together, distribute the booklets while the students are completing the preliminary information on the answer sheet. Test booklets should remain face up and closed until the examiner gives the signal to begin.

When students have received the materials, say:

"Read the directions to yourselves as I read them aloud:

1. Please fill out the information requested on the answer sheet before beginning your test.
2. Do not write in this booklet or make other marks in it unless your teacher tells you to do so.
3. When marking your answer sheet, use *only* a regular No. 2 pencil. DO NOT USE A BALLPOINT PEN. Do not make any stray marks on the answer sheet. If you make a mistake, erase completely the answer you wish to change.
4. This test is designed to measure your understanding of economics. Not all students will have taken a separate course in economics, but most have learned something about the subject in their other courses, through reading newspapers, listening to the radio, and watching television, and from other sources. These questions will measure how well you understand the principles of economics and the way our economy works.
5. You should try to answer *every* question by marking which you think is the best choice. You might not know the answers to some questions, but use the information you *do* have to eliminate those you think are incorrect and select your best answer. Work at a comfortable speed, but do not spend too much time on any one item. The test consists of 45 questions or incomplete statements, for which you should choose the **one best answer**. With some items, more than one answer may appear to be correct, but your task is to choose the *best* answer from the choices given for each item."

After reading the directions say:

"Sample questions 1 and 2 on the front cover of the test booklet give examples of a properly marked answer. Notice that response C on question 1 and response A on question 2 have been completely filled in. When you begin the test, read the question carefully and choose your answer. Then use your pencil to blacken the lettered space *on the answer sheet* that corresponds to the letter of the answer you have chosen."

Whether the sheets are to be scored by hand or by machine, say:

"When you finish the test go back and check your answers. If you have any questions, raise your hand now. I cannot answer *any* questions about the content of the test after it has begun. However, if your pencil breaks or if you find you have a faulty booklet or answer sheet, raise your hand."

When you have answered all questions, say:

"You will have 40 minutes for the test. Remember — make no marks on the test booklet itself, only on the answer sheet. All right. Begin."

During the first few minutes of the test, check to make sure that the students are marking their answers properly on the answer sheet. Also check throughout the test period that students are doing

their own work. When testing is completed, collect all materials. Verify that all materials have been collected before students leave the room. Teachers should be especially careful to check that each student has indicated the form of the test (A or B) on the answer sheet.

If you have copyright permission to administer an online version of the test, you should modify the above instructions to fit your testing situation. This modification should reflect the conditions for online testing in your classroom/school. Be sure that students are familiar with the procedures and equipment for online testing before administering the *TEL*.

6. SCORING THE TEST

The score for the *Test of Economic Literacy* is the number of correct responses. The maximum possible score on each form is 45. A single answer sheet should be used, and this sheet may be scored by hand or by machine.

Each question on the *TEL* has four possible choices: one correct answer and three distractors. Chance alone would dictate an aggregate correct score of 25 percent (11 points on the *TEL*) for those who had absolutely no knowledge of economics. If some students score below 25 percent on the test, their answer sheets in particular should be carefully checked for systematic errors in test marking, scoring, and test administration. For instance, the key for Form A might have been used inadvertently to score a Form B test. Such a low score may also mean that a student has not taken the test seriously and is just randomly supplying answers. It may be necessary to omit such test forms from the analysis of the test data.

To score the test by hand, use the key and facsimiles of the answer sheet in Appendix 3. Scan each answer sheet to make certain the student marked only one answer for each question; if more than one answer space has been marked, the response to that question is incorrect. To use the scoring key, punch out the blackened circles for Form A or B and place the key over the answer sheet. Make sure that the scoring key is the same form (A or B) as the test. The raw score is the total number of answer marks showing through the holes minus any multiple-marked items.

After the tests have been graded and returned to the students and if the *TEL* is not to be given again during the course, the teacher may want to conduct an instructional session. The teacher can read each test item aloud (as the students read silently from their test booklets and take note of their responses), asking those who answered correctly to raise their hands. The number of correct responses divided by the number of students taking the test and multiplied by 100 is the class percentage correct for that item. The percentage for each test item may be compared with the appropriate groups based on the data for students with and without economics for one of the three samples: total, basic, and advanced (see Section 7, Tables 6–11). This instructional session, however, should only be done if the test content can be kept secure for future test use by this teacher or by other teachers.

Most high schools are equipped to score tests by machine. In most cases, a special answer sheet is required that is compatible with the available scoring machine. Usually, No. 2 pencils *must* be used to mark answers. If machine scoring will be used, check with the scoring service in advance about required answer sheets and pencils.

Machine scoring of tests often also produces a printout of the student roster with raw scores and percentiles for the scores by group tested. In addition, the group mean, standard deviation, and a frequency distribution are often provided. Such data can be useful in the interpretation of group results. The results can be compared against the national scores and norms shown in Tables 3–5.

If students take the test online, teachers may have access to test data that display the results in graphs or charts. Such output can be useful for easily identifying strengths and weaknesses in learning and offering feedback to students.

7. TECHNICAL DATA

This section of the manual provides a detailed explanation of the procedures used to collect the data from the norming sample and the characteristics of that sample. It also presents the results from the analysis of the norming data, including the item analysis. In addition, psychometric data are reported on the test reliability and validity.

Norming Sample

To conduct the national norming, a testing website was created. The reason for collecting the data online was to make the testing process more efficient and to permit easier access for all teachers. Most schools have ready access to computers for such online testing and teachers prefer this method of testing so they can obtain fast feedback on the results.

Online testing also has significant advantages over the traditional paper-and-pencil testing used with past editions of the *TEL*. Experience with developing other economics tests, such as the *Basic Economic Test (BET)* (Walstad, Rebeck, and Butters, 2010a) for fifth- and sixth-grade students and the *Test of Economic Knowledge (TEK)* (Walstad, Rebeck, and Butters, 2010b) for eighth- and ninth-grade students, showed that online testing worked well for teachers and students and attracted a broader voluntary sample for the test norming. In addition, research with both the *BET* and the *TEK* indicated that online testing improved the efficiency of data collection, minimizing test fatigue for students, and provided more data for test analysis (Butters and Walstad, 2011).

The construction of the website at the University of Nebraska–Lincoln (UNL) was done under the direction of Roger Butters. He worked in conjunction with the information technology staff in the UNL College of Business Administration to establish the website, to put the questions online, and to monitor website use by teachers. He had previous experience with online student testing in economics based on high school competitions (Butters and Asarta, 2011).

Extensive work was conducted to recruit teachers and obtain the norming data via the website. A teacher recruitment letter was sent to the national network of directors of state councils and centers for economic education and to other individuals working in economic education. The letter explained the purpose of the testing and requested that they help by sending the e-mail with the website link to teachers and school administrators in the relevant grades. In addition, the Council for Economic Education arranged to have a recruitment letter sent to teachers who were members of the Global Association of Teachers of Economics (GATE).

After recruitment, teachers interested in participating in the national norming went to the website and registered with their names and school addresses. They were also asked the number of classes, the number of students in each class who would be tested, and whether students had been taught economics. Teachers did not have to be economics instructors to have their students participate in the national norming.

The teacher-supplied information was reviewed by Roger Butters to eliminate any odd or extraneous signups and to obtain more complete information. Once approved, teachers returned to the website and created class groups by completing a classroom questionnaire and declaring the number of students in each class. Teachers were then able to download spreadsheets containing unique access codes for each student in each class. Access codes were assigned to students by teachers to protect student anonymity.

At the time of testing, teachers took the students to a computer lab or the students used classroom computers. Students were given instructions from the teacher, then they logged in to the website with their student codes and completed the test. To minimize any problems with the computer testing, teachers were given detailed instructions about how to conduct the testing, in several e-mail communications as well as via online instructions and updates on the website. Teachers also were able to contact Roger Butters to obtain advice on how to handle any testing problems.

To reduce the potential for cheating, teachers were asked to proctor students during testing. Students within each class were randomly assigned either Form A or Form B by the computer server. Question order for each student was determined randomly, questions were displayed individually, and students were unable to revisit a test question once an answer was submitted. The random assignment of test forms to students within a class and the random order of questions within a test made it difficult for students to compare or see each other's answers. One significant advantage of this randomization was that it produced about equal sample sizes of students taking each form within each class. It also resulted in similar student, school, and community characteristics in the groups taking each form of the test.

Testing Time. The available time to complete the test was another concern. The specified time period for the test was 40 minutes, and students were told that time limit. To allow for possible problems with website logins or computers, a general decision was made to set the computer-allowed testing time for up to two hours once a student began taking a test. After the two-hour period, the computer server logged out the test as incomplete and these test data were considered invalid. The timing issue did not turn out to be a problem because in almost all cases, students completed the test within 40 minutes.

This timing issue also was investigated by studying a sample of students taking each form who spent at least 15 minutes taking the test. The reason that this 15-minute minimum was used in selecting the sample was to eliminate any downward bias on testing time from students who spent only a minimal amount of time answering the 45 test questions. The results showed that the mean test time was 22.68 minutes for 2,187 students who took Form A and 22.75 minutes for 2,178 students who took Form B. The respective standard deviations were 6.49 and 6.44. The conclusion from this analysis was that almost all students completed the test within a 36-minute period, which was to be expected given that it was two standard deviations above the mean test time.

Student Sample

The fourth edition of the *TEL* was normed at the end of the fall semester 2011 and the end of the spring semester 2012. A national sample of high school students, teachers, and schools participated in the norming (Appendix 1). About half of the norming sample had taken an economics course in high school. In most cases, the economics course covered basic economics, but some data were also collected from students taking an advanced course in economics (honors or college-level).

The purpose of collecting the norming data was to make the test scores as meaningful as possible for interpretation and use by teachers. The test data collected from high school students and reported in this manual provide national norms against which test users may compare the scores of the teachers' students. In addition, statistical information obtained from the norming data were used to judge the measurement properties of this edition of the *TEL*.

Table 3 reports the aggregate statistics obtained from the 7,368 students who took the test. These results are shown for the overall test by form. The means for the two forms are basically equivalent (difference = 0.15 points), as are the standard deviations. Also reported are the results by form of the test, with economics and without economics. The means and standard deviations based on with economics for each form are essentially the same, and so are the means and standard deviations by form without economics instruction. The same pattern holds when the means and standard deviations are compared across forms based on type of course (basic or advanced) and with or without economics. For example, the mean score on Form A for students enrolled in a basic course with economics is 25.28 compared with a mean score of 25.31 on Form B for students enrolled in a basic course with economics. Regardless of the group, the means and standard deviations across forms are almost equivalent, as would be expected given that the test forms were developed with that objective. More analysis of this equivalence is provided in a later subsection.

TABLE 3. Aggregate Statistics for *TEL* Norming Sample

	Form A	Form B
Sample Size		
Number of students	3,682	3,686
Percent with economics	50	49
Reliability		
Coefficient alpha	.91	. 90
Standard error of measurement	2.99	2.97
Means		
Overall (total sample)	23.32	23.17
[A = 3,682; B = 3,686]	(9.70)	(9.29)
With Economics	27.02	27.03
[A = 1,829; B = 1,816]	(9.77)	(9.30)
Basic (general/regular)	25.28	25.31
[A = 1,494; B = 1,493]	(9.25)	(8.70)
Advanced (honors/college)	34.75	34.97
[A = 335; B = 323]	(8.16)	(7.75)
Without Economics	19.68	19.43
[A = 1,853; B = 1,870]	(8.12)	(7.60)
Basic (general/regular)	19.09	19.01
[A = 1,702; B = 1,733]	(7.84)	(7.40)
Advanced (honors/college)	26.35	24.75
[A = 151; B = 137]	(8.27)	(8.20)

Notes: (1) Sample sizes are in brackets.
(2) Standard deviations are in parentheses.

Another feature of the test is its reliability, or the capacity to accurately measure student achievement in economics. The coefficient alpha estimate of reliability is quite high and almost the same for the two forms. The standard error of measurement is relatively low and about the same on both forms. (The meaning of these two terms will be discussed later in this section.)

The norming data were collected from classes in the 239 high schools listed in Appendix 2. The approach taken in selecting schools was to obtain a diverse group that would include students from: (1) different geographical regions (Northeast, Midwest, South, and West); (2) different types of communities (urban, suburban, and rural); (3) different school sizes; (4) different courses (economics, social studies); and (5) different levels of instruction (basic and advanced). We also allowed a few classes of English-speaking students in other nations to participate in the norming.

No claim is made that the group tested is representative of the student population enrolled in high schools throughout the United States. It was not possible or economical to obtain a stratified, random sample of U.S. high school students for this classroom test. Data were collected, however, from students and teachers so that information was available for judging the characteristics of the norming sample. The data are subdivided into categories by course type, gender, grade level, race and ethnicity, verbal ability, preferred language for communication, school size, student-teacher ratio, percentage of students receiving a free lunch in school, type of community, and census region. A case can be made that the norming sample contains a broad group of students who have diverse characteristics. Results supplied later in this section contain scores broken down across characteristics (Tables 23 and 24).

The norming data should not be considered as an indicator of the absolute standard of achievement in high school economics, but rather as a measure of relative achievement. They are intended to aid teachers in comparing their students with larger national samples. The comparisons will be meaningful to the extent that composition of the students in any class is similar to the norming sample or its subgroups, such as high school students taking courses in basic or advanced economics.

Tables of Norms

Tables 4 and 5 present the raw test scores and corresponding percentile ranks based on the test data obtained from the norming sample of high school students. The percentile ranks were determined by calculating the total percentage of students in a given grade who scored at or below a certain raw score. These tables permit the conversion of raw scores to percentile ranks according to whether students have had prior instruction in economics or not and by type of course within each category. The *with economics* norms show the results for students taking a basic course in economics and students taking an advanced course (honors or college-level) in economics.

TABLE 4. Percentile Norms by Type of Course: *TEL Form A*

Raw Score	With Economics		Without Economics	
	Basic (*n* = 1,494)	Advanced (*n* = 335)	Basic (*n* = 1,702)	Advanced (*n* = 151)
45		99		
44		98		
43		92		
42	99	85		99
41	98	79		98
40	97	71		97
39	95	64		97
38	93	59	99	96
37	90	54	98	94
36	87	47	97	92
35	84	43	97	87
34	81	39	96	83
33	77	35	94	78
32	73	33	93	76
31	70	27	92	72
30	67	25	90	68
29	63	22	88	60
28	59	20	86	57
27	56	18	84	48
26	53	16	82	44
25	50	15	79	38
24	46	13	76	36
23	43	11	73	34
22	39	10	70	31
21	36	8	67	29
20	33	8	62	24
19	30	7	59	21
18	28	7	54	19
17	25	5	49	17
16	22	4	44	17
15	19	3	38	12
14	16	3	33	10
13	13	2	28	9
12	10	2	22	6
11	7	2	16	5
10	5	1	12	3
9	3	1	8	3
8	2		5	
7	1		3	2
6	1		2	1
5			1	1
4				
3				
2				
1				

TABLE 5. Percentile Norms by Type of Course: *TEL Form B*

Raw Score	With Economics		Without Economics	
	Basic (*n* = 1,493)	Advanced (*n* = 323)	Basic (*n* = 1,733)	Advanced (*n* = 137)
45		99		
44		97		
43		89		
42	99	81		
41	98	76		
40	97	69		
39	95	63		99
38	93	55		96
37	91	52		92
36	88	50	99	88
35	86	46	98	86
34	84	43	97	84
33	81	40	96	83
32	77	36	95	80
31	73	33	94	77
30	69	28	92	75
29	65	25	90	71
28	61	21	88	69
27	58	18	84	68
26	55	15	83	61
25	51	12	81	55
24	47	11	77	51
23	43	9	73	47
22	39	7	69	45
21	35	6	66	39
20	31	5	62	36
19	28	4	57	28
18	25	4	52	24
17	21	3	48	20
16	19	3	43	18
15	16	2	37	13
14	13	2	31	8
13	10	1	26	7
12	8		21	4
11	6		16	3
10	4		11	2
9	3		8	2
8	2		5	1
7	1		3	1
6			1	1
5				1
4				
3				
2				
1				

The *without economics* norms show the results from the sample of students who took a course that did not include economics. Within this category are two types of high school students: (1) those who took some type of basic course that did not teach economics and (2) those who took an advanced course (honors or college-level), in such subjects as U.S. history or government, that had no economics instruction.

Percentile ranks allow comparisons to be made among students in different groups. For example, a student who completes a high school course in basic economics and obtains a raw score of 30 on Form A of the *TEL* has a percentile rank of 67. A raw score of 30 on Form A for a student who completes a non-economics basic course would put the student at the 90 percentile for this no-economics group. Therefore, a student completing a basic economics course and with a raw score of 30 on Form A is performing as well as or better than 90 percent of students with the same score in a non-economics basic course.

Item Difficulty and Discrimination

Test administrators may want to know how their students performed on certain items on the *TEL*. This information would be important in cases in which the teacher covered only some of the standards on the test. Tables 6–11 show the percentage of correct responses for each item for students with and without economics, or item difficulty. They also show the corrected item-total correlation, or item discrimination (terms described in Section 4).

Tables 6 and 7 show the item analysis by form for the entire norming sample based on whether students were in courses with and without economics. (These tables also are the source for the item data that are included in the rationale sections of the manual.) Tables 8 and 9 present a similar item analysis, but limit it to students taking a basic course. Tables 10 and 11 show the item analysis for students enrolled in an advanced course (honors or college-level) with and without economics.

One problem should be noted with test item 17 on Form B of the *TEL*. Some of the individual results for this item were affected by an error in computer coding. This error had only a minor and inconsequential effect on the aggregate statistics reported in Table 3 when compared with omitting 17B. No change was made, therefore, in calculating the aggregate statistics in order to keep the same number of test items on each form and to maximize sample sizes. Item discrimination coefficients are based on the reliability analysis with 45 items and the full sample for each group. Item difficulties for 17B, however, are reported only in the Total Sample table (Table 7) and are based on the reduced sample sizes to correct for the coding error. Insufficient data were available for reliable reporting of item results for 17B in Tables 8–21.

Item Responses

Tables 12–21 show the percentages of all students responding to each of the four options (A, B, C, or D) for a test item and the percentage of omitted responses. Tables 12 and 13 present the item responses by form for the total norming sample. Tables 14 and 15 give the results for those students taking a basic course in high school with and without economics. Tables 20 and 21 report the data for students taking an advanced course in high school with and without economics.

The basic sample is the largest (n=3,196 for Form A and n=3,226 for Form B) because this group was the primary focus for this high school economics test. Accordingly, further breakdown of the basic sample was made for those students with and without economics to obtain the item responses for each subgroup. The item results for basic students with economics (n=1,494 for Form A and n=1,493 for Form B) are shown in Tables 16 and 17. The item results for basic students without economics (n=1,702 for Form A and n=1,733 for Form B) are shown in Tables 18 and 19. These tables should be useful for teachers of basic courses who wish to compare the item responses of their students with those of a large national sample, with and without economics.

TABLE 6. Item Discrimination and Percentage of Correct Responses: *TEL Form A*

Total Sample

Item	Correct Answer	Corrected Item — Total Correlation (n = 3,682)	Percent Correct With Economics (n = 1,829)	Percent Correct Without Economics (n = 1,853)
1	D	.46	61.8	34.5
2	B	.46	57.4	32.5
3	C	.47	72.0	49.0
4	D	.40	50.0	36.9
5†	B	.37	55.6	39.7
6	C	.45	77.6	50.2
7†	A	.47	70.4	44.6
8	C	.39	54.2	42.3
9	A	.31	55.2	45.8
10	C	.43	70.0	57.4
11	B	.39	70.8	52.6
12	A	.45	57.4	41.1
13	A	.43	64.0	55.4
14	B	.10	40.4	38.8
15	A	.44	65.8	48.4
16	B	.44	62.3	42.6
17	A	.44	69.1	59.1
18†	B	.36	55.1	41.1
19†	D	.43	58.9	43.9
20	A	.42	46.3	28.6
21	D	.42	47.8	29.1
22	C	.24	54.8	47.1
23	D	.43	70.6	48.8
24†	D	.39	42.0	18.8
25	C	.46	67.3	49.8
26	B	.36	77.0	66.3
27	A	.33	49.9	35.5
28	B	.42	65.2	53.1
29†	D	.38	62.3	43.6
30	C	.45	69.8	52.2
31	A	.41	57.5	35.9
32	B	.33	48.0	36.1
33	C	.34	46.8	30.9
34†	B	.24	63.8	48.1
35	C	.35	52.3	39.7
36†	D	.47	58.6	37.4
37	A	.41	62.7	49.0
38†	C	.41	61.8	39.5
39	D	.42	57.0	38.5
40	C	.46	72.3	56.7
41	C	.42	63.9	46.1
42	B	.43	66.8	52.2
43†	D	.46	69.4	60.8
44	D	.46	65.2	46.3
45	A	.26	35.0	23.7

Note: (1) †Item is on both forms.

TABLE 7. Item Discrimination and Percentage of Correct Responses: *TEL Form B*

Total Sample

Item	Correct Answer	Corrected Item — Total Correlation (n = 3,686)	Percent Correct With Economics (n = 1,816)	Percent Correct Without Economics (n = 1,870)
1	C	.39	58.3	33.9
2	A	.45	79.3	52.6
3	B	.40	63.3	43.7
4	C	.35	58.1	46.4
5†	B	.40	56.7	38.7
6	C	.31	71.9	55.3
7†	A	.48	72.0	45.2
8	D	.41	46.5	36.0
9	A	.26	46.9	34.7
10	C	.40	62.2	43.7
11	C	.38	63.5	48.2
12	A	.44	54.6	33.5
13	A	.47	65.0	52.5
14	B	.30	44.9	30.8
15	A	.40	67.5	52.6
16	A	.46	79.0	64.1
17	D	.29	37.1*	33.3^
18†	B	.39	58.7	44.0
19†	D	.43	62.5	44.9
20	C	.48	73.4	55.2
21	C	.37	48.2	34.5
22	C	.35	62.9	50.4
23	D	.19	46.4	31.0
24†	D	.38	43.5	19.7
25	C	.42	64.6	44.5
26	D	.43	46.5	27.1
27	C	.40	54.4	40.0
28	B	.29	65.1	47.4
29†	D	.41	64.0	44.1
30	C	.41	77.6	57.8
31	D	.35	56.4	45.4
32	B	.31	70.1	64.0
33	B	.38	65.1	42.0
34†	B	.25	66.5	47.2
35	B	.43	62.8	49.1
36†	D	.47	59.2	36.5
37	A	.34	52.6	41.3
38†	C	.43	62.8	40.4
39	A	.48	71.7	52.6
40	D	.40	42.0	26.3
41	B	.38	87.6	79.4
42	B	.35	48.5	30.9
43†	D	.43	72.6	61.4
44	A	.49	69.9	46.4
45	A	.23	30.8	22.1

Note: (1) †Item is on both forms.
(2) *n=1,328; ^n=315

TABLE 8. Item Discrimination and Percentage of Correct Responses: *TEL Form A*

Basic (general or regular courses)

Item	Correct Answer	Corrected Item — Total Correlation *(n = 3,196)*	Percent Correct With Economics *(n = 1,494)*	Percent Correct Without Economics *(n = 1,702)*
1	D	.40	57.3	32.6
2	B	.41	52.1	30.0
3	C	.44	68.4	47.6
4	D	.35	44.3	35.3
5†	B	.33	51.8	38.4
6	C	.43	74.8	48.4
7†	A	.44	66.5	42.7
8	C	.34	49.2	39.3
9	A	.27	50.7	44.8
10	C	.41	67.2	56.1
11	B	.37	67.0	51.7
12	A	.42	53.2	39.7
13	A	.41	59.8	54.0
14	B	.07	38.0	38.7
15	A	.42	62.5	46.7
16	B	.43	59.0	41.0
17	A	.42	65.9	57.6
18†	B	.34	52.6	40.0
19†	D	.42	55.8	42.4
20	A	.38	42.2	27.6
21	D	.38	43.8	27.9
22	C	.24	53.8	46.9
23	D	.40	67.3	47.2
24†	D	.32	37.0	18.3
25	C	.43	63.4	48.5
26	B	.34	74.7	65.3
27	A	.30	47.2	34.5
28	B	.41	62.0	52.3
29†	D	.36	58.6	42.7
30	C	.44	67.7	51.0
31	A	.36	51.9	34.6
32	B	.26	42.6	34.7
33	C	.28	41.4	29.9
34†	B	.20	60.4	47.6
35	C	.31	48.3	38.3
36†	D	.45	54.5	35.6
37	A	.38	58.1	47.9
38†	C	.37	57.4	37.3
39	D	.38	51.7	37.0
40	C	.44	68.4	54.9
41	C	.39	60.2	44.8
42	B	.40	63.0	50.7
43†	D	.43	64.9	59.3
44	D	.43	61.4	44.6
45	A	.19	29.9	23.3

Note: (1) †Item is on both forms.

TABLE 9. Item Discrimination and Percentage of Correct Responses: *TEL Form B*

Basic (general or regular courses)

Item	Correct Answer	Corrected Item — Total Correlation *(n = 3,226)*	Percent Correct With Economics *(n = 1,493)*	Percent Correct Without Economics *(n = 1,733)*
1	C	.34	53.5	33.1
2	A	.43	76.8	51.3
3	B	.35	58.1	42.9
4	C	.30	52.9	45.6
5†	B	.35	52.4	37.6
6	C	.28	69.5	53.8
7†	A	.45	68.1	43.3
8	D	.38	42.5	35.0
9	A	.23	43.6	33.9
10	C	.37	58.9	42.6
11	C	.35	60.2	47.1
12	A	.38	49.0	32.1
13	A	.48	62.2	51.9
14	B	.23	39.8	30.4
15	A	.38	64.1	51.6
16	A	.44	76.5	62.9
17^	D	—	—	—
18†	B	.36	55.2	43.3
19†	D	.41	59.1	43.9
20	C	.47	70.2	54.3
21	C	.33	44.3	34.2
22	C	.32	59.1	50.0
23	D	.10	41.3	30.5
24†	D	.30	37.5	19.3
25	C	.38	60.8	43.2
26	D	.38	41.4	26.1
27	C	.37	50.6	38.8
28	B	.26	62.1	47.0
29†	D	.39	60.6	43.3
30	C	.40	75.5	57.1
31	D	.34	53.3	44.1
32	B	.28	66.5	63.5
33	B	.35	61.8	41.3
34†	B	.21	63.7	47.0
35	B	.40	59.5	48.2
36†	D	.45	55.5	34.3
37	A	.30	48.8	41.0
38†	C	.39	58.3	38.3
39	A	.46	67.9	51.1
40	D	.32	35.4	24.6
41	B	.38	85.6	78.5
42	B	.28	43.7	29.7
43†	D	.41	68.9	60.4
44	A	.46	66.6	44.3
45	A	.16	26.9	22.5

Note: (1) †Item is on both forms.
(2) ^Insufficient data

TABLE 10. Item Discrimination and Percentage of Correct Responses: *TEL Form A*

Advanced (honors/college-level courses)

Item	Correct Answer	Corrected Item — Total Correlation (n = 486)	Percent Correct With Economics (n = 335)	Percent Correct Without Economics (n = 151)
1	D	.53	82.1	56.3
2	B	.47	80.6	60.9
3	C	.56	87.8	64.9
4	D	.43	75.2	55.0
5†	B	.39	72.4	55.0
6	C	.42	90.2	71.5
7†	A	.50	88.1	66.2
8	C	.42	76.4	63.6
9	A	.36	74.9	57.0
10	C	.39	82.7	72.2
11	B	.37	87.5	62.3
12	A	.45	76.4	57.6
13	A	.37	82.4	70.9
14	B	.19	51.0	39.1
15	A	.40	80.9	66.9
16	B	.36	77.0	60.3
17	A	.43	83.0	76.2
18†	B	.39	66.0	54.3
19†	D	.39	72.5	60.9
20	A	.51	64.5	39.7
21	D	.52	65.4	42.4
22	C	.26	59.4	48.3
23	D	.46	85.1	66.9
24†	D	.54	64.2	24.5
25	C	.47	84.5	64.2
26	B	.37	87.2	78.2
27	A	.33	62.1	47.0
28	B	.44	79.7	61.6
29†	D	.35	78.8	54.3
30	C	.42	78.8	65.6
31	A	.47	82.4	51.7
32	B	.41	72.2	51.7
33	C	.41	70.5	42.4
34†	B	.37	78.8	53.6
35	C	.42	70.2	55.0
36†	D	.41	77.0	57.6
37	A	.42	83.3	60.9
38†	C	.41	81.5	64.2
39	D	.42	80.3	56.3
40	C	.44	89.6	76.8
41	C	.42	80.0	61.6
42	B	.45	83.6	69.5
43†	D	.44	89.3	77.5
44	D	.49	82.1	64.9
45	A	.42	57.6	27.8

Note: (1) †Item is on both forms.

TABLE 11. Item Discrimination and Percentage of Correct Responses: *TEL Form B*

Advanced (honors/college-level courses)

Item	Correct Answer	Corrected Item — Total Correlation (n = 460)	Percent Correct With Economics (n = 323)	Percent Correct Without Economics (n = 137)
1	C	.52	80.8	43.1
2	A	.46	91.0	69.3
3	B	.53	87.0	54.0
4	C	.48	82.0	56.2
5†	B	.49	76.2	52.6
6	C	.29	83.0	73.7
7†	A	.43	90.4	68.6
8	D	.47	65.3	48.9
9	A	.30	61.9	44.5
10	C	.39	77.4	57.7
11	C	.42	79.0	62.8
12	A	.51	80.5	51.1
13	A	.37	78.0	59.9
14	B	.42	68.7	35.8
15	A	.37	83.0	65.0
16	A	.45	90.4	79.6
17^	D	—	—	—
18†	B	.44	74.6	53.3
19†	D	.44	78.0	57.7
20	C	.50	87.9	67.2
21	C	.52	66.3	38.0
22	C	.41	80.2	56.2
23	D	.42	69.7	37.2
24†	D	.53	71.2	25.6
25	C	.45	82.0	61.3
26	D	.48	70.3	39.4
27	C	.37	71.8	54.0
28	B	.33	79.0	53.3
29†	D	.41	79.9	54.0
30	C	.42	87.3	67.2
31	D	.28	70.9	61.3
32	B	.35	86.7	70.1
33	B	.36	80.5	50.4
34†	B	.35	79.6	48.9
35	B	.47	78.0	61.3
36†	D	.42	76.5	64.2
37	A	.42	70.0	44.5
38†	C	.38	83.6	67.9
39	A	.45	89.5	70.8
40	D	.49	72.5	48.2
41	B	.26	96.9	90.5
42	B	.50	70.6	46.0
43†	D	.42	90.1	74.5
44	A	.45	85.5	72.3
45	A	.50	48.6	17.5

Note: (1) †Item is on both forms.
(2) ^Insufficient data

TABLE 12. Percentage Response to Each Alternative: *TEL Form A* (n = 3,682)

Total Sample (with and without economics)

Item	A	B	C	D	Blank
1	15	13	20	**48***	4
2	18	**45***	20	13	5
3	8	12	**60***	15	5
4	8	12	34	**43***	4
5†	8	**48***	17	20	7
6	12	10	**64***	10	4
7†	**57***	8	18	12	4
8	14	17	**48***	18	4
9	**50***	39	5	4	3
10	10	15	**64***	7	5
11	9	**62***	10	11	8
12	**49***	27	9	10	6
13	**60***	13	11	13	4
14	31	**40***	17	9	4
15	**57***	11	20	9	4
16	19	**52***	11	14	4
17	**64***	12	12	9	3
18†	3	**48***	31	14	3
19†	7	19	18	**51***	4
20	**37***	14	19	21	9
21	33	9	14	**38***	6
22	7	19	**51***	17	6
23	13	16	7	**60***	4
24†	21	21	21	**30***	7
25	17	10	**58***	12	3
26	5	**72***	14	6	4
27	**43***	11	17	23	6
28	14	**59***	13	9	5
29†	4	30	11	**53***	2
30	10	13	**61***	12	4
31	**47***	12	15	21	6
32	27	**42***	9	16	7
33	33	14	**39***	8	6
34†	9	**56***	25	5	5
35	20	9	**46***	17	8
36†	17	16	15	**48***	4
37	**56***	22	14	4	5
38†	12	17	**51***	17	4
39	15	19	14	**48***	4
40	11	8	**64***	12	4
41	13	14	**55***	15	3
42	10	**59***	13	13	4
43†	18	8	6	**65***	3
44	8	22	11	**56***	4
45	**29***	29	16	18	9

Notes: (1) *Correct answer
(2) †Item is on both forms.

TABLE 13. Percentage Response to Each Alternative: *TEL Form B* (n = 3,686)

Total Sample (with and without economics)

Item	A	B	C	D	Blank
1	31	12	**46***	7	4
2	**66***	14	11	7	3
3	21	**53***	12	11	3
4	12	15	**52***	15	6
5†	9	**48***	17	20	7
6	5	18	**64***	11	3
7†	**58***	9	18	11	3
8	23	19	12	**41***	5
9	**41***	49	5	3	3
10	14	14	**53***	13	7
11	9	18	**56***	11	7
12	**44***	29	12	4	11
13	**59***	16	11	9	5
14	27	**38***	18	13	5
15	**60***	15	10	12	4
16	**71***	9	9	8	3
17^	—	—	—	—	—
18†	4	**51***	28	14	3
19†	7	16	19	**54***	4
20	9	11	**64***	12	4
21	18	19	**41***	15	8
22	8	11	**57***	19	6
23	27	7	24	**39***	3
24†	22	18	21	**31***	7
25	26	11	**54***	6	3
26	14	9	38	**37***	3
27	11	20	**47***	12	10
28	16	**56***	12	12	4
29†	5	29	11	**54***	2
30	9	11	**68***	9	3
31	14	19	12	**51***	4
32	7	**67***	13	9	3
33	13	**53***	11	15	7
34†	9	**57***	26	4	4
35	10	**56***	17	10	7
36†	17	17	15	**48***	4
37	**47***	33	10	4	6
38†	10	16	**52***	18	4
39	**62***	8	11	16	4
40	14	17	31	**34***	4
41	3	**83***	7	4	2
42	31	**40***	16	7	6
43†	17	8	5	**67***	3
44	**58***	16	13	9	4
45	**26***	18	24	23	9

Notes: (1) *Correct answer
(2) †Item is on both forms.
(3) ^Insufficient data

TABLE 14. Percentage Response to Each Alternative: *TEL Form A* (n = 3,196)

Basic (with and without economics)

Item	A	B	C	D	Blank
1	16	14	22	**44***	4
2	20	**40***	22	13	5
3	9	13	**57***	16	5
4	8	13	35	**40***	4
5†	9	**45***	18	21	8
6	13	11	**61***	11	4
7†	**54***	9	20	14	4
8	15	18	**44***	20	4
9	**48***	40	5	4	3
10	10	16	**61***	7	6
11	10	**59***	11	12	8
12	**46***	28	9	11	6
13	**57***	14	12	14	5
14	31	**38***	17	9	4
15	**54***	12	21	10	4
16	20	**49***	11	15	4
17	**62***	13	13	10	3
18†	4	**46***	33	14	3
19†	8	20	19	**49***	4
20	**34***	16	20	21	9
21	34	9	14	**35***	7
22	7	20	**50***	17	7
23	14	18	8	**57***	5
24†	22	22	22	**27***	7
25	18	10	**55***	13	3
26	5	**70***	15	6	4
27	**40***	12	17	24	6
28	14	**57***	14	9	6
29†	5	32	11	**50***	2
30	11	14	**59***	13	4
31	**43***	12	17	23	6
32	28	**38***	9	16	8
33	34	15	**35***	9	7
34†	10	**54***	26	6	5
35	21	10	**43***	17	9
36†	18	17	17	**44***	4
37	**53***	23	15	5	5
38†	13	18	**47***	18	4
39	16	21	15	**44***	5
40	12	9	**61***	14	4
41	14	16	**52***	16	3
42	11	**56***	15	14	4
43†	20	9	6	**62***	3
44	8	23	12	**52***	5
45	**26***	30	16	18	9

Notes: (1) *Correct answer
(2) †Item is on both forms.

TABLE 15. Percentage Response to Each Alternative: *TEL Form B* (n = 3,226)

Basic (with and without economics)

Item	A	B	C	D	Blank
1	33	13	**43***	8	4
2	**63***	15	12	7	3
3	22	**50***	13	12	3
4	13	16	**49***	16	6
5†	9	**45***	18	20	8
6	5	18	**61***	12	3
7†	**55***	10	19	13	3
8	24	20	13	**39***	5
9	**38***	50	6	3	3
10	14	15	**50***	13	7
11	10	19	**53***	11	7
12	**40***	31	13	5	12
13	**57***	17	11	10	6
14	28	**35***	19	13	5
15	**57***	16	10	12	4
16	**69***	10	9	9	3
17^	—	—	—	—	—
18†	4	**49***	29	15	3
19†	7	17	20	**51***	5
20	10	12	**62***	13	4
21	19	19	**39***	15	8
22	8	12	**54***	20	6
23	29	7	25	**36***	4
24†	23	20	22	**28***	7
25	28	11	**51***	7	3
26	14	9	40	**33***	4
27	11	21	**44***	12	11
28	17	**54***	13	12	4
29†	5	31	11	**51***	2
30	10	12	**66***	9	4
31	14	21	12	**48***	4
32	8	**65***	14	10	3
33	14	**51***	12	16	8
34†	10	**55***	26	5	5
35	11	**53***	17	11	8
36†	18	18	16	**44***	4
37	**45***	34	11	4	7
38†	11	17	**48***	20	4
39	**59***	9	11	17	4
40	15	18	33	**30***	4
41	4	**82***	8	5	2
42	32	**36***	18	8	7
43†	18	9	5	**64***	3
44	**55***	17	14	10	4
45	**25***	19	24	24	9

Notes: (1) *Correct answer
(2) †Item is on both forms.
(3) ^Insufficient data

TABLE 16. Percentage Response to Each Alternative: *TEL Form A* (n = 1,494)

Basic (with economics only)

Item	A	B	C	D	Blank
1	14	11	15	**57***	2
2	18	**53***	17	10	3
3	8	9	**68***	11	3
4	6	11	36	**44***	3
5†	8	**52***	18	18	5
6	7	8	**75***	7	3
7†	**67***	8	15	8	2
8	14	18	**49***	17	3
9	**51***	39	5	4	2
10	8	15	**67***	6	3
11	8	**67***	9	11	5
12	**53***	27	8	9	4
13	**60***	13	11	13	3
14	32	**38***	19	8	3
15	**62***	12	17	7	2
16	16	**59***	10	13	2
17	**66***	13	10	10	2
18†	2	**53***	29	14	2
19†	8	18	16	**56***	3
20	**42***	13	19	20	6
21	32	8	12	**44***	4
22	7	20	**54***	16	3
23	12	11	7	**68***	3
24†	21	18	20	**37***	4
25	14	9	**63***	12	2
26	5	**75***	13	5	2
27	**47***	10	17	21	5
28	13	**62***	12	9	4
29†	3	25	12	**59***	2
30	9	10	**68***	11	2
31	**52***	10	15	19	4
32	29	**43***	8	16	5
33	34	13	**41***	7	5
34†	8	**60***	23	6	3
35	19	10	**48***	17	6
36†	17	16	11	**55***	1
37	**58***	22	14	4	2
38†	11	16	**57***	13	2
39	12	20	13	**52***	3
40	11	8	**68***	11	2
41	12	12	**60***	14	2
42	11	**63***	11	12	3
43†	22	7	5	**65***	1
44	7	20	10	**61***	3
45	**30***	28	17	20	5

Notes: (1) *Correct answer
(2) †Item is on both forms.

TABLE 17. Percentage Response to Each Alternative: *TEL Form B* (n = 1,493)

Basic (with economics only)

Item	A	B	C	D	Blank
1	26	13	**53***	6	2
2	**77***	9	9	4	1
3	23	**58***	9	8	2
4	13	16	**53***	13	5
5†	9	**52***	16	19	4
6	3	16	**70***	9	2
7†	**68***	8	14	9	2
8	26	18	10	**43***	4
9	**44***	48	4	3	2
10	13	13	**59***	11	4
11	8	17	**60***	10	5
12	**49***	29	11	4	8
13	**62***	17	10	9	3
14	28	**40***	17	12	3
15	**64***	13	9	11	3
16	**77***	7	8	7	2
17^	—	—	—	—	—
18†	2	**55***	25	15	3
19†	6	16	16	**59***	3
20	8	9	**70***	10	2
21	18	21	**44***	11	6
22	8	10	**59***	17	5
23	25	5	27	**41***	3
24†	23	16	20	**38***	5
25	23	9	**61***	5	2
26	14	9	34	**41***	2
27	11	21	**51***	10	8
28	12	**62***	10	12	3
29†	4	23	11	**61***	2
30	7	8	**76***	7	2
31	14	19	10	**53***	3
32	6	**67***	16	9	3
33	10	**62***	11	13	4
34†	8	**64***	22	4	3
35	9	**60***	16	10	6
36†	15	15	13	**56***	2
37	**49***	36	8	3	4
38†	9	15	**58***	15	3
39	**68***	6	10	14	2
40	13	18	30	**35***	4
41	3	**86***	6	5	1
42	31	**44***	15	6	4
43†	19	7	4	**69***	2
44	**67***	14	10	7	2
45	**27***	18	26	24	5

Notes: (1) *Correct answer
(2) †Item is on both forms.
(3) ^Insufficient data

TABLE 18. Percentage Response to Each Alternative: *TEL Form A* (*n* = 1,702)

Basic (without economics only)

Item	A	B	C	D	Blank
1	18	16	28	**33***	6
2	22	**30***	26	16	7
3	10	16	**48***	20	6
4	10	14	35	**35***	5
5†	10	**38***	18	24	10
6	18	13	**48***	14	6
7†	**43***	10	24	18	5
8	16	19	**39***	22	5
9	**45***	42	6	5	4
10	12	16	**56***	8	8
11	11	**52***	13	13	11
12	**40***	30	11	12	8
13	**54***	14	12	14	6
14	30	**39***	16	10	5
15	**47***	11	25	12	5
16	23	**41***	13	17	6
17	**58***	12	16	10	4
18†	5	**40***	35	15	4
19†	9	22	22	**42***	5
20	**28***	18	21	22	11
21	36	11	17	**28***	9
22	7	20	**47***	17	10
23	15	23	8	**47***	6
24†	24	25	23	**18***	10
25	22	12	**49***	14	4
26	6	**65***	16	7	5
27	**35***	14	17	27	8
28	16	**52***	16	9	7
29†	6	37	11	**43***	3
30	12	18	**51***	14	5
31	**35***	14	19	25	8
32	28	**35***	11	17	10
33	34	16	**30***	11	9
34†	12	**48***	28	6	6
35	23	10	**38***	18	12
36†	18	18	21	**36***	7
37	**48***	24	16	5	7
38†	14	20	**37***	23	8
39	19	21	17	**37***	7
40	13	11	**55***	16	5
41	16	18	**45***	18	3
42	12	**51***	18	15	5
43†	18	11	8	**59***	4
44	10	26	13	**45***	6
45	**23***	33	16	16	13

Notes: (1) *Correct answer
(2) †Item is on both forms

TABLE 19. Percentage Response to Each Alternative: *TEL Form B* (*n* = 1,733)

Basic (without economics only)

Item	A	B	C	D	Blank
1	38	13	**33***	9	7
2	**51***	21	15	9	4
3	22	**43***	16	16	4
4	13	16	**46***	18	8
5†	10	**38***	19	22	11
6	7	20	**54***	15	4
7†	**43***	12	25	16	4
8	22	22	14	**35***	7
9	**34***	52	7	4	4
10	15	17	**43***	15	10
11	12	20	**47***	12	9
12	**32***	32	14	6	15
13	**52***	17	13	10	8
14	28	**30***	21	14	7
15	**52***	19	11	13	5
16	**63***	12	11	11	4
17^	—	—	—	—	—
18†	6	**43***	33	14	4
19†	8	19	23	**44***	6
20	12	14	**54***	15	5
21	20	17	**34***	18	10
22	8	13	**50***	22	7
23	33	9	24	**31***	4
24†	24	23	25	**19***	9
25	31	13	**43***	9	4
26	15	9	45	**26***	5
27	12	22	**39***	14	14
28	21	**47***	15	12	5
29†	6	37	11	**43***	3
30	12	15	**57***	10	5
31	14	22	14	**44***	5
32	10	**64***	12	11	4
33	17	**41***	13	18	11
34†	12	**47***	30	5	6
35	12	**48***	19	12	9
36†	20	21	19	**34***	5
37	**41***	32	13	6	9
38†	13	20	**38***	25	5
39	**51***	12	12	19	5
40	18	18	35	**25***	5
41	5	**79***	9	5	3
42	33	**30***	20	9	9
43†	18	11	6	**61***	4
44	**44***	20	18	13	6
45	**23***	19	23	23	13

Notes: (1) *Correct answer
(2) †Item is on both forms.
(3) ^Insufficient data

TABLE 20. Percentage Response to Each Alternative: *TEL Form A* (*n* = 486)

Advanced (with and without economics)

Item	A	B	C	D	Blank
1	8	7	10	**74***	2
2	7	**75***	8	7	3
3	4	6	**81***	6	2
4	3	4	23	**69***	2
5†	4	**67***	12	4	4
6	6	4	**84***	3	3
7†	**81***	6	7	4	2
8	6	11	**72***	9	2
9	**70***	27	1	1	2
10	6	8	**79***	4	3
11	6	**80***	5	6	4
12	**71***	19	3	5	3
13	**79***	8	5	6	3
14	30	**47***	13	8	2
15	**77***	8	10	3	3
16	14	**72***	5	7	2
17	**81***	7	5	5	1
18†	0	**62***	24	13	1
19†	4	9	15	**69***	3
20	**57***	6	12	18	8
21	27	3	8	**58***	4
22	11	13	**56***	14	6
23	5	10	3	**79***	3
24†	13	15	16	**52***	5
25	8	5	**78***	7	2
26	3	**84***	7	4	3
27	**57***	5	16	16	5
28	9	**74***	8	6	2
29†	1	19	8	**71***	1
30	8	7	**75***	7	4
31	**73***	7	5	13	2
32	16	**66***	2	12	4
33	24	7	**62***	4	3
34†	4	**71***	20	2	4
35	12	6	**65***	13	4
36†	10	11	5	**71***	4
37	**76***	14	6	1	3
38†	6	10	**76***	6	1
39	6	12	8	**73***	2
40	6	3	**86***	4	1
41	7	7	**74***	11	2
42	4	**79***	6	9	3
43†	8	3	1	**86***	2
44	3	12	5	**77***	3
45	**48***	18	13	15	5

Notes: (1) *Correct answer
(2) †Item is on both forms.

TABLE 21. Percentage Response to Each Alternative: *TEL Form B* (*n* = 460)

Advanced (with and without economics)

Item	A	B	C	D	Blank
1	18	6	**70***	4	3
2	**85***	6	4	3	2
3	11	**77***	5	5	2
4	5	10	**74***	7	3
5†	4	**69***	8	15	4
6	1	12	80*	4	2
7†	**84***	5	6	3	2
8	17	14	6	**60***	3
9	**57***	39	2	0	2
10	9	9	**72***	8	4
11	4	11	**74***	9	3
12	**72***	16	5	0	7
13	**73***	11	8	6	3
14	19	**59***	11	9	2
15	**78***	7	6	7	3
16	**87***	3	6	2	2
17^	—	—	—	—	—
18†	1	**68***	19	10	3
19†	5	10	11	**72***	3
20	5	5	**82***	6	3
21	13	15	**58***	10	4
22	6	5	**73***	12	4
23	15	4	18	**60***	3
24†	14	10	14	**58***	5
25	12	7	**76***	3	2
26	8	5	24	**61***	2
27	6	13	**67***	7	7
28	8	**71***	7	9	4
29†	1	17	8	**72***	2
30	5	5	**81***	7	2
31	14	11	5	**68***	2
32	2	**82***	9	4	2
33	5	**72***	6	14	3
34†	3	**70***	21	2	3
35	3	**73***	12	5	6
36†	9	8	9	**73***	2
37	**62***	28	7	1	2
38†	5	9	**79***	5	2
39	**84***	2	5	8	2
40	5	11	16	**65***	3
41	1	**95***	2	1	1
42	20	**63***	9	5	4
43†	9	3	1	**85***	2
44	**82***	10	4	2	2
45	**39***	13	24	19	6

Notes: (1) *Correct answer
(2) †Item is on both forms.
(3) ^Insufficient data

Equivalence of Test Forms

Several methods can be used to equate the raw scores on the two forms of the *TEL*. They produce somewhat different conversions, so test users will have to decide which one to use for their purposes. A case can be made for either of the two equating methods used for the *TEL*. For each one, the changes in a raw score from Form A to a scale on Form B will be relatively minor given the similarity in scores by form.

Equipercentiles. In the equipercentile method, a score on Form A and a score on Form B may be viewed as equivalent if the corresponding percentile ranks of any given group are equal (Angoff, 1984, p. 86). This work yields a table for the conversion of raw scores on Form A to scores on a scale for Form B (Table 22).

The results show slight differences in the raw score on Form A and its equivalent on Form B. This outcome was expected because there was great similarity in the norming samples of both forms. The test development process was also designed to make the two tests as parallel as possible. Items were often written so they would be a matched pair covering the same content.

Linear equating. The inclusion of 10 common, or anchor, items that were the same on both *TEL* forms also contributes significantly to the close equivalence of raw scores between the two forms. These common items were 5, 7, 18, 19, 24, 29, 34, 36, 38, and 43. They represent 22.2 percent of each test and are well distributed across the economics standards (see Table 1).

These 10 common items are distributed across the test and its economics standards on each test form. Six common items are found on six standards (3, 4, 11, 13, 16, and 20). Four common items are found on two standards (9 and 18). The 10 common items also are distributed across the cognitive levels. There are 2 comprehension items and 1 knowledge item. Eight of the common items are application questions. These economic content and cognitive level distributions indicate that the anchor items are spread broadly across each form of the *TEL*.

TABLE 22. Equivalent Scores of *TEL* Forms A and B Norming Sample

Basic *(A = 1494; B = 1,493)*		***Advanced*** *(A = 335; B = 323)*	
Score on		*Score on*	
A	**B**	**A**	**B**
45	45	45	45
44	44	44	44
43	43	43	43
42	42	42	42
41	41	41	41
40	40	40	40
39	39	39	39
38	38	38	38
37	37	37	38
36	36	36	35
35	34	35	34
34	33	34	33
33	32	33	32
32	31	32	31
31	30	31	30
30	29	30	29
29	28	29	28
28	27	28	28
27	26	27	27
26	25	26	26
25	25	25	26
24	24	24	25
23	23	23	24
22	22	22	23
21	21	21	23
20	20	20	22
19	20	19	22
18	19	18	22
17	18	17	20
16	17	16	18
15	16	15	17
14	15	14	16
13	14	13	15
12	13	12	14
11	12	11	14
10	11	10	13
9	9	9	12
8	8	8	8
7	7	7	7
6	7	6	6
5	5	5	5
4	4	4	4
3	3	3	3
2	2	2	2
1	1	1	1

The second method, linear equating, used the results from the 10 common items on both forms to equate scores on the two forms (Angoff, 1984, pp. 94–95). For the sample of students in basic courses with and without economics, the mean score for the 10 common items was 4.768 on Form A (n=3,196). It was 4.887 for the group taking Form B (n=3,226). The respective standard deviations for A and B for these common items were 2.391 and 2.428. The equation converting raw scores on Form A to the scale of Form B is:

$$B^* = 1.015\ (A) + 0.046$$

where B* is the raw score of A transformed to the B scale and A is the raw score on A. For example, a student with a raw score of 25 on Form A would have a score of 25.421 on the scale of Form B.

For the students in advanced courses (honors or college-level) the mean and standard deviation for the 10 common items on Form A was 7.064 and 2.312 (n=486). The mean and standard deviation for Form B was 7.307 and 2.335 (n=460). For this group, the equation converting raw scores on Form A to the scale of Form B is:

$$B^* = 1.010\ (A) + 0.174.$$

Reliability

The reliability of a test is the degree of consistency with which it measures student achievement in the test subject. For example, two students taking the same test in economics are likely to obtain different scores, but each student taking the test again (without intervening instruction in the subject tested) should obtain about the same score as the first time. Of course, many factors, including practice in taking the test or remembering test questions, cause changes in student performance from day to day. As a result, we can never measure a student's performance perfectly (that is, obtain a student's "true" score).

SEM. Fortunately, it is possible to estimate the amount of variation in test scores that is due to measurement error, and therefore to specify a range within which one can be relatively certain the "true" score will fall. By taking account of such measurement error, the reliability of the test as a whole can be estimated.

The standard error of measurement (SEM), which is reported in Table 3 for Forms A and B, is an estimate of the amount of variation that can be expected in a test score. A raw score of 30 on a test with an SEM of 2.99 indicates about 67 percent certainty that a person's "true" score lies in a range from 27.01 to 32.99 (30 +/– 2.99), or that we can be 95 percent certain that the "true" score lies in a range from 24.02 to 35.98 [30 +/– (2 × 2.99)]. The smaller the SEM, the more accurate a test is as a measuring instrument. Individual test scores are best thought of as lying within a range, rather than as a single score, because of our inability to measure perfectly (the SEM is never zero).

Alpha. Another measure of overall test reliability is the coefficient alpha (Cronbach, 1951). Alpha is a measure of the internal consistency among test items for measuring the common focus of the test, which for the *TEL* is an understanding of basic concepts taught in high school economics courses. One way to conceptualize internal consistency is to think of splitting the test in half and correlating student scores on both halves. The alpha coefficient provides an estimate of the average of all possible split half correlations from test scores.

The alpha statistic ranges from zero to 1.00. The higher the coefficient, the better items work together in measuring the test construct, and thus the greater the statistical reliability of the test. An alpha of 1.00 would indicate a perfectly reliable test, while an alpha of zero would indicate a totally unreliable one. The alphas of 0.91 for Form A and .90 for Form B of the *TEL* indicate that there is good internal consistency among items and that both forms of the *TEL* are highly reliable measures of economic achievement among high school students.

Test-retest. In addition to the reliability evidence provided by the coefficient alphas,

evidence was obtained on the test-retest reliability for the *TEL*. Test-retest reliability takes into account factors other than just the degree of relationship among test items or the homogeneity of test items. Essentially, test-retest reliability involves correlating scores from a test administered at one time to a sample of students with test scores from the same test administered after a short interval to the same group, without intervening instruction. The correlation will not be perfect because of the variability of student responses over time and because of differences in testing procedures and conditions.

Estimates of test-retest reliability are difficult to obtain because it involves two administrations of the same test. It was not practical to perform this procedure with the 7,368 students in the norming sample, so two small sample studies were conducted with college students. As an initial check on test-retest reliability, one instructor in an intermediate economics course in college administered Form A of the *TEL* to 22 students one day and the same form again the next day. The Pearson correlation coefficient between the two sets of scores was .83. Another teacher in a principles course in college administered Form B of the *TEL* to 27 students on one day and Form A of the *TEL* at the next class session two days later. The correlation was .84. Both of these test-retest results indicate that the *TEL* is a stable measure over time. These small sample estimates of test-retest reliability also are consistent with findings from the third of edition of the *TEL* (a .94 correlation with 37 high school students).

Finally, it should be stressed that the reliability of the *TEL* is substantially higher than that of most teacher-made tests for high school economics. The major question to be determined by each user of the *TEL* is whether the test as a whole and the individual questions on it are appropriate for the testing of his or her students. The use of a normed, reliable, and valid standardized test such as the *TEL* has much to recommend it to the teacher. National instruments such as the *TEL* are carefully designed and developed to reflect the subject matter that ought to be taught (and tested). The national norming data provided significant detailed evidence on the properties and characteristics of the instruments, including substantial statistical support. Classroom tests made by teachers are unlikely to attain these standards for test development and norming. Some teachers may feel that the questions on national tests have too broad a focus and cover concepts that the teacher does not teach. The concept coverage in national tests is broad simply because they reflect consensus among a panel of national experts as to what ought to be taught in a given subject. In short, the use of standardized achievement tests such as the *TEL* for measuring achievement in a subject has many advantages (e.g., Miller, Linn, and Gronlund, 2012).

Validity

Substantial evidence was collected for establishing the validity of the *TEL* as an achievement measure of understanding of high school economics. This validity evidence was of two types: (1) content; (2) construct.

Content. A most important question for an educational achievement test such as the *TEL* is whether or not it measures what *ought* to be measured. This question cannot be answered by reference to statistics. The work that was done to establish the *content validity* of the *TEL* was described in detail in Sections 2 and 3 of this manual. In brief, the specification of the economic content that should be represented on this test was explained in the guidelines for the teaching of economics at the precollege level: *Voluntary National Content Standards in Economics* (CEE, 2010). This document served as the guide for the development and selection of test questions to be included on the *TEL*. It also has served as the content guide for the development of the content framework for the National Assessment of Educational Progress (NAEP) in economics (Buckles and Walstad, 2008).

The results of the content work are shown in the content specification table (Table 1). In addition, the item rationales supplied in the manual

(Sections 8 and 9) give an explanation for the correct answer for each test item that is based on the economic content for the standards and benchmarks in this economic content document. Finally, the *TEL* covers economic content that is considered to be important in textbooks for high school economics.

The process used for test development and revision also ensured that the items on the *TEL* would contain valid content as outlined in the *Standards*. The test developers were three economists with extensive experience in working with high schools and teachers on programs to improve the teaching and learning of economics. Each test developer also had worked on previous large-scale test projects in economics. In addition, most of the test items were originally developed and normed in the previous edition of the test. The development of those test items were subject to careful review by national committees of high school teachers, economic educators, and economists and were still considered valid questions for current use by the test developers. All items, both old and new, underwent field testing and further review before they were included on the norming version of the test. During the field testing, some teachers and economic educators provided feedback on questions that was useful for revising or selecting the final set of test items.

The content validity of the *TEL* was determined by comparing the test questions with the content judged to be important by authoritative academic experts and sources in economics and economic education. It is not a test of faddish or popular notions of economics. It is designed as a test of basic understanding of economics that would typically be taught in basic or advanced economics courses in U.S. high schools. Nevertheless, there is no one standard for content validity. Whether the *TEL* is a valid test often depends on the purpose for which it is used. Some teachers or users may disagree with the economic content emphasized by the test developers and based on the *Standards* document for economics. Any alternative perspective, however, would need to be well justified if it is to replace the economics typically taught in high school.

Construct. There is substantial evidence from the norming sample on the *construct* validity of the *TEL*. Construct validity refers to the ability of the test to measure the underlying construct or focus of the test. The *TEL* is designed to measure "economic understanding" among high school students. One type of evidence for construct validity that is presented is whether the test performs well with different groups of students and in the expected direction.

As shown in Table 3, high school students with either basic or advanced economics instruction scored 7.34 points higher on Form A, compared with basic or advanced students without economics instruction. On Form B, basic and advanced students with economics scored 7.6 points higher than basic and advanced students without economics. These are statistically significant differences in performance in the expected direction. The probability that the differences arise due to chance is virtually zero (probability less than 0.001).

Similar expected differences were found by courses or type of high school students. High school students who have completed basic economics courses scored higher on Form A (+6.19) and Form B (+6.30) than high school students who have completed other basic courses but who had not received economics instruction. Also, high school students who have completed advanced (honors or college-level) economics courses score higher on Form A (+8.40) and Form B (+10.22) than high school students in advanced non-economics courses.

A further check on the construct validity of any individual test item may be made by reviewing the performance on each item for students with and without economics instruction (Tables 8–13). Comparing the percent correct from each group makes it clear that the with economics group performed better than the without economics group *on all 45 items* on each *TEL* form.

Other variables. Tables 23 and 24 present additional descriptive statistics derived from the total norming sample by *TEL* form. The data are

broken down by gender, grade level, race or ethnic origin, verbal ability, communication skills, school size, student teacher ratio, percent of students receiving a free school lunch, type of community, and geographical region. For each subgroup, the mean *TEL* score, standard deviation, and subgroup sample sizes are given. As the tables show, the distinctions between those students with and those without economics prevail across *all* categories for which there are complete data. Performance on the *TEL* is responsive to instruction in economics, regardless of the characteristics. These breakdown data provide further evidence that there is *construct* validity to the *TEL*.

The compilations by gender, grade level, race and ethnic origin were obtained from student replies to online questions. There are the expected differences for those with and without economics across these categories. There are also differences within categories (e.g., gender) that may suggest that there is some bias in test items. The test developers, however, reviewed all items for bias in the content and wording that would disadvantage particular groups. A study using differential item functioning by gender of the second edition of the *TEL* was also taken into account when selecting items (Walstad and Robson, 1997). Such score differences within groups are not unique to the *TEL* test and have been reported for achievement tests in high school economics (e.g., NAEP, see Mead and Sandene, 2007). There are likely to be factors unrelated to the test that account for these differences within groups.

At this point, it is important to stress that these categorical breakdowns must be interpreted with caution. The reason is that some of the cell sizes (the subgroup *n*'s) are small. The breakdowns are also for single characteristics without control over other characteristics. To control for confounding caused by other factors requires the use of more advanced statistical procedures and careful model development that are beyond the scope of this manual.

Verbal ability. One variable that is of special interest is verbal ability because an argument could be made that the *TEL* is more of a vocabulary test than an economics test. To address this concern, an estimate of verbal ability was obtained from a short vocabulary test that was given online to the 3,682 students who took Form A and the 3,686 who took Form B. This method for testing verbal ability was originally developed by Borgatta and Corsini (1964). The alpha reliability for this 8-item word test was .63 for students taking Form A of the *TEL* and .62 for students taking Form B of the *TEL*. This type of word test also had been used successfully to measure verbal ability in the national norming of the second and third editions of the *TEL*.

For the purposes of reporting in Tables 23 and 24, the word score was divided into three categories. A score of 4 or less was classified as "low." A score of 5-6 was classified as "middle." A score of 7-8 was classified as "high." This breakdown produced three groups of sufficient size to make comparisons across the three levels. The results showed expected differences in *TEL* scores across verbal ability with students in the high group outscoring the middle group and the middle group outscoring the low group. The results also show that exposure to economics instruction made a significant difference at each level. These findings provide further evidence for the construct validity of the *TEL,* and suggest that it is not a proxy for verbal ability.

Further study was given, however, to the question of whether the *TEL* could detect differences between groups after controlling for verbal ability because this variable is thought to have significant influences on economic achievement. This issue was studied with regression analysis with the total norming sample. The *TEL* score was the dependent variable in the regression equation. The vocabulary test score (X) was included as a control variable. In addition, a dummy variable was included in the regression for whether or not a student had taken an economics course (Y) in high school. Only these two variables were included in the regression equation.

TABLE 23. Descriptive Statistics for Groups Within the Total Norming Sample: *TEL Form A*

	With Economics			Without Economics		
	Mean	Std. Dev.	Number	Mean	Std. Dev.	Number
By student gender						
Female	26.17	9.43	893	18.89	7.70	942
Male	27.82	10.02	936	20.51	8.46	911
By grade level						
Grade 9	25.65	9.62	178	18.46	7.86	194
Grade 10	24.26	10.00	87	17.92	7.27	241
Grade 11	25.90	10.03	391	19.20	7.67	475
Grade 12	27.80	9.60	1,773	20.63	8.48	943
By race/origin						
African American/black	21.34	9.72	83	15.98	6.60	278
Asian	33.45	9.13	131	22.19	8.28	78
Caucasian/white	27.28	9.55	1,343	20.78	8.24	1,219
Hispanic	24.61	8.95	171	17.79	7.44	191
Other	23.89	9.92	101	18.06	7.92	87
By verbal ability level						
Low	19.09	6.73	434	14.89	5.47	575
Middle	22.24	8.32	602	19.02	6.87	631
High	28.90	9.31	793	24.59	8.45	647
By communication skills						
Best in English	27.15	9.84	1,690	19.89	8.12	1,683
Best in another language	26.32	8.98	28	17.56	8.53	36
Equal in English and another language	25.19	8.70	111	17.73	7.74	134
By school size						
Fewer than 1,500 students	26.54	9.59	939	19.51	7.98	1,054
1,500 or more students	28.18	9.68	824	20.26	8.46	688
By student/teacher ratio						
17 to 1 or less	27.87	9.79	642	20.18	8.29	690
More than 17 to 1	27.00	9.58	1,121	19.63	8.10	1,041
By percent free lunch						
17 or less	28.45	9.55	976	21.60	8.12	591
More than 17	24.71	9.14	616	18.46	7.81	950
By type of community						
City	27.70	8.85	371	20.67	8.34	544
Suburb	27.12	10.55	638	19.82	8.11	487
Town	26.71	8.83	311	18.51	7.75	305
Rural	26.75	9.17	413	19.38	8.15	436
By region						
Northeast	27.24	9.07	91	16.11	6.01	63
Midwest	26.32	9.88	995	20.62	8.23	947
South	29.17	9.65	312	18.37	7.70	538
West	27.03	9.55	431	19.83	8.41	305
All students	27.02	9.77	1,829	19.68	8.12	1,853

TABLE 24. Descriptive Statistics for Groups Within the Total Norming Sample: *TEL Form B*

	With Economics			Without Economics		
	Mean	Std. Dev.	Number	Mean	Std. Dev.	Number
By student gender						
Female	26.20	8.85	853	18.62	7.11	97
Male	27.76	9.63	963	20.31	8.01	898
By grade leve						
Grade 9	25.38	9.34	177	17.70	7.51	193
Grade 10	23.74	8.19	74	17.77	6.93	239
Grade 11	26.10	9.63	393	19.58	7.42	450
Grade 12	27.80	9.15	1,172	20.10	7.76	988
By race/origin						
African American/black	21.79	8.30	85	15.95	6.14	291
Asian	31.93	10.66	143	21.43	8.46	84
Caucasian/white	27.03	9.07	1,285	20.52	7.64	1,210
Hispanic	25.37	8.12	172	17.92	6.78	200
Other	27.43	9.52	121	17.41	7.95	85
By verbal ability level						
Low	19.68	7.50	379	14.74	5.10	560
Middle	25.33	8.02	618	18.91	6.52	682
High	31.71	8.27	819	24.18	7.78	628
By communication skills						
Best in English	27.16	9.24	1,660	19.53	7.54	1,711
Best in another language	24.71	11.95	38	18.57	7.94	30
Equal in English and another language	25.97	9.21	118	18.29	8.23	129
By school size						
Fewer than 1,500 students	26.20	9.09	923	19.61	7.57	1,077
1,500 or more students	28.47	9.34	829	19.54	7.76	682
By student/teacher ratio						
17 to 1 or less	27.59	9.52	622	20.01	7.72	693
More than 17 to 1	27.10	9.12	1,130	19.36	7.58	1,058
By percent free lunch						
17 or less	28.46	9.06	980	21.06	8.12	594
More than 17	24.43	8.71	604	18.40	7.00	964
By type of community						
City	28.59	8.47	376	20.41	7.47	543
Suburb	26.72	10.21	623	19.47	8.07	501
Town	27.15	8.26	321	19.27	7.75	310
Rural	25.93	8.43	400	18.61	7.08	435
By region						
Northeast	25.79	9.13	95	16.58	5.68	67
Midwest	26.18	9.28	981	20.73	7.72	950
South	29.31	9.32	316	17.74	7.07	548
West	27.56	9.09	424	19.07	7.76	305
All students	27.03	9.30	1,816	19.43	7.60	1,870

The resulting equation from the regression analysis for Form A was: 5.365 + 2.634X + 6.181Y [n=3,682; adjusted R-squared: .388]. The standard error was .069 for X and .252 for Y. The estimated equation from the regression analysis for Form B was: 6.112 + 2.438X + 6.402Y [n=3,686; adjusted R-squared: .387]. The standard error was .067 for X and .242 for Y. Both results showed significant and meaningful differences (+6.18 for Form A and +6.40 for Form B) between students with and without economics instruction after controlling for the effects of verbal ability.

Further regression analysis was conducted by including other demographic variables (gender, race and ethnicity, and grade level) in addition to verbal ability and taking an economics course. The regression results showed similar size differences between students with and without economics instruction even when these other control variables were included in the analysis.

Conclusion

The technical data from the national norming of this fourth edition of the *Test of Economic Literacy* show that it is a reliable and valid measure of high school student understanding of economics. Both forms of this test can be used by teachers, school administrators, program evaluators, and researchers to assess student economic understanding in a basic economics course for general or regular high school students and in advanced economics courses (honors or college-level) offered in high school. The test content is based on the national standards for economics and covers economic concepts typically taught in the nation's high schools. This manual, with its extensive test data and analysis, gives teachers and school administrators a valuable and flexible instrument for assessing high school student achievement in economics.

With the discussion of the technical data and the presentation of evidence on test reliability and validity now complete, the focus in the remainder of the manual turns to the economic content of each test question and the rationale for the correct answer for each item. The item rationales are presented in the next two sections of the manual (Sections 8 and 9).

The item data that are reported with the item rationales are taken from Tables 6 and 7. The percentage correct for students with economics includes all students in the norming sample who took an economics course (basic or advanced). The percentage correct for students without economics includes all students in the norming sample who did not take an economics course at the time of test administration. The item discrimination coefficient refers to the corrected item-total correlation.

8. ITEM RATIONALE: *TEST OF ECONOMIC LITERACY*

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
1. The opportunity cost of a new public high school is the *A. money cost of hiring teachers for the new school.* *B. cost of constructing the new school at a later date.* *C. change in the annual tax rate to pay for the new school.* ***D. other goods and services that must be given up for the new school.***	The opportunity cost of producing a good or service is the next best alternative good or service that might have been produced with the same resources. In other words, opportunity cost refers to what is forgone once money or resources are used for a specific purpose. [1/4/5] [Code for bracket item: Standard / Grade Level / Benchmark (CEE, 2010)]	61.8	34.5	.46
2. Which one of the following do economists consider to be an example of capital goods? *A. Money in a bank.* ***B. Machines in an auto plant.*** *C. Corporate bonds of an oil company.* *D. Common stocks in a computer business.*	Capital goods are a type of productive resource that is used for making goods and services. Capital goods include buildings, equipment, roads, and other constructed items. Machines in an auto plant are an example of capital goods because they are used for producing autos. No other options can be directly used in production. [1/4/9]	57.4	32.5	.46
3. What is meant by the statement that every economic system faces the problem of scarcity? *A. The additional benefits of goods and services are greater than their additional costs.* *B. There are times when some products can be purchased only at high prices.* ***C. There are never enough productive resources to satisfy all human wants.*** *D. All economies have recessions during which scarcities exist.*	"Scarcity," in economics, means that society has more economic wants than it has available productive resources to satisfy all of these wants. This concept underlies the idea that ordinarily consumers, businesses, and governments tend to choose the most effective use of limited resources, i.e., they must follow the principle of "economizing." The problem of scarcity is faced continually by every society, whatever the form of its government or economic system. [1/8/1]	72.0	49.0	.47

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
4. From an economic point of view, which approach to controlling pollution is most efficient? *A. Abolish the use of toxic chemicals in all production.* *B. Use economic resources to eliminate all pollution.* *C. Adopt laws and regulations that prohibit economic activities that cause pollution problems.* ***D. Reduce pollution as long as the additional benefits are greater than the additional costs.***	Efficiency requires undertaking an activity as long as the additional benefit of more of the activity is greater than the additional cost. The most efficient approach to pollution control is to reduce pollution as long as the extra benefits of reduction exceed the extra costs. The other solutions would reduce pollution, but the costs of these policies are likely to far outweigh the extra (or marginal) benefits. [2/8/3]	50.0	36.9	.40
5. The essential difference between a command economy and a market economy is that in a market economy *A. shortages occur more often than surpluses.* ***B. buyers and sellers determine resource allocation.*** *C. central planning creates an effective incentive system for consumers and producers.* *D. the prices of products and resources are largely determined by government regulation of businesses.*	An economic system is a society's institutional framework that coordinates economic activity. Two general types of economic systems are command-based and market-based. In a command economy, central planning by government determines how productive resources are allocated to the production of goods and services. In a market economy, buyers and sellers pursue personal goals and interact through markets, and this determines the allocation of resources. [3/8/2]	55.6	39.7	.37
6. Which is a basic economic question that must be answered by all economic systems? *A. What will be the share of profits that go to businesses?* *B. What will be the amount of the minimum wage for workers?* ***C. How will goods and services be produced?*** *D. How will government collect income taxes?*	The condition of scarcity (relatively unlimited wants and limited resources) means that people in all economic systems must decide: (1) which goods and services will be produced; (2) how these goods and services will be produced; and (3) who will get these goods and services. Not all economic systems include profits, minimum wage laws, or income taxes, so these questions are not basic. [3/8/3]	77.6	50.2	.45

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
7. *Profits are equal to total* ***A. revenue minus total cost.*** *B. assets minus total liabilities.* *C. sales minus wages and salaries.* *D. sales minus taxes and depreciation.*	Profit is what is left over after all costs of production (total costs) are subtracted from total revenues (price per unit times the number of units sold). Profit is the fundamental incentive for firms or individuals to engage in business in a market economy. [4/8/3]	70.4	44.6	.47
8. *If the government decides to reduce the payroll taxes on the wages and salaries of workers, then there will most likely be* *A. a decrease in saving.* *B. a decrease in investment.* ***C. an increase in consumption.*** *D. an increase in unemployment.*	Reducing payroll taxes increases workers' disposable, or after-tax, income. More income can lead to more of the activities for which income can be used, such as saving and consumption. Firms will find it less expensive to hire workers, so unemployment would not increase. There is no clear direct effect of payroll tax changes on investment. [4/12/1]	54.2	42.3	.39
9. *A high school student buys a sweatshirt from a store. The sweatshirt is on sale at a 20 percent discount off the regular price. In this* ***exchange,*** ***A. the student and the store benefit.*** *B. the student benefits, but the store does not.* *C. the store benefits, but the student does not.* *D. neither the student nor the store benefits.*	Voluntary exchange occurs only when the people involved expect to gain from the trade. If neither the student nor the store expects to gain from this trade (the purchase of the sweatshirt), neither would have made the exchange. [5/4/3]	55.2	45.8	.31
10. *If Nation A adopts public policies that restrict imports from another nation that is a major trading partner, then in Nation A* *A. the cost of producing products will decrease.* *B. job opportunities in export industries will increase.* ***C. consumers will pay higher prices for products.*** *D. saving and investment will increase.*	Restrictions on imports reduce the supply of imported products. As the supply of these products decrease, the prices of the imported products rise. None of the other options are directly affected by import restrictions. [5/12/2]	70.0	57.4	.43

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
11. Specialization and division of labor by nations followed by increasing international trade probably would *A. increase the level of worldwide unemployment.* ***B. increase total world production of goods and services.*** *C. lower living standards in the poor nations of the world.* *D. eliminate differences in standards of living among nations.*	The case for specialization and division of labor among nations is the same as within nations — that it will allow each unit to produce those things at which it is relatively most efficient. The result is that the world's production of goods and services increases. Although differences in standards of living among nations might be reduced because of specialization and division of labor, the differences are not likely to be eliminated. [6/8/2]	70.8	52.6	.39
12. If Britain has a comparative advantage over France in the production of cars, then ***A. the opportunity cost of producing cars in Britain is lower than in France.*** *B. the opportunity cost of producing cars in Britain is higher than in France.* *C. there are no gains from specialization and trade in cars between Britain and France.* *D. only Britain will gain from specialization and trade in cars between Britain and France.*	If Britain has a comparative advantage over France in the production of cars, then the opportunity cost of producing cars in Britain is lower than in France. Britain will give up less production of other goods and services to produce cars than what France must give up. If this is the case, then there are gains for both countries from specialization and trade in cars. [6/12/1]	57.4	41.1	.45
13. When there is a shortage of a product in a competitive market, it is usually the case that the ***A. market price of the product will eventually increase.*** *B. market price of the product will eventually decrease.* *C. quantity of the product exchanged in the market will eventually decrease.* *D. quantity of the product exchanged in the market will not change, but demand will increase.*	The market equilibrium price equates the amount buyers wish to buy with the amount sellers wish to sell. A shortage occurs in a market when the selling price is below the market equilibrium price, leading to a greater amount demanded than supplied. At this relatively low price, competition among buyers places upward pressure on the price until the market equilibrium is reached. As the market price rises, sellers will be willing and able to bring more of the product to market, increasing the quantity exchanged. [7/12/4]	64.0	55.4	.43

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
14. The exchange rate between the U.S. dollar and the euro changes from $1=1.50 euros to $1=1.25 euros. Germany uses the euro as its currency. This change means that *A. U.S. goods will be more expensive for Germans.* ***B. German goods will be more expensive for Americans.*** *C. there will be an increase in U.S. imports from Germany.* *D. there will be a decrease in German imports from the U.S.*	If the exchange rate between two currencies changes, the relative prices of products traded using those currencies change. If it originally takes $1 to obtain 1.50 euros, and now $1 purchases only 1.25 euros, then from the American perspective, the price of German products has become more expensive. Thus, U.S. imports of German products will fall, not increase. German imports of U.S. goods will increase, not decrease, because the U.S. goods are less expensive for Germans. [7/12/5]	40.4	38.8	.10
15. In a competitive market, the price of a product is $5.00. If the government passes a law that sets a minimum price of the product at $6.00, this change will most likely result in ***A. a surplus of the product.*** *B. a shortage of the product.* *C. a decrease in the supply of the product.* *D. an increase in the demand for the product.*	If the product price is above the equilibrium, a surplus is likely because sellers offer more for sale at that price than consumers are willing to purchase. Normally, the surplus pushes prices downward to equilibrium and eliminates the surplus. In this case, the law sets a minimum price above the equilibrium and the surplus remains. No factors shifting supply or demand are present in this question, thus eliminating the last two options. [8/12/4]	65.8	48.4	.44
16. Which would most likely increase the quantity of gasoline sold in a competitive market? *A. An increase in the price of crude oil.* ***B. A decrease in the price of automobiles.*** *C. A decrease in the income of consumers.* *D. An increase in taxes on gasoline products.*	For the quantity of gasoline sold to increase, either supply or demand must increase, all else equal. A fall in the price of automobiles decreases the price of a "complementary good," a factor that increases the demand for gasoline. An increase in the price of crude oil or an increase in taxes on gasoline will decrease the supply of gasoline. A decrease in consumer incomes will reduce the demand for gasoline. [8/8/1]	62.3	42.6	.44

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
17. *In a competitive market, the price of wheat is likely to be increased by* ***A. a decrease in the supply of wheat.*** *B. a decrease in the demand for wheat.* *C. more capital investment in wheat farms.* *D. new machines reducing the cost of producing wheat.*	This is another example of how price is determined by supply and demand in competitive markets. A decrease in the supply of wheat with demand unchanged will increase the equilibrium price of wheat. The factors referred to in the other answers would reduce the equilibrium price of wheat. [8/12/2]	69.1	59.1	.44
18. *Business firms wish to sell their products at high prices. Households wish to buy products at low prices. In a market economy, this conflict of interest is resolved by* *A. lawsuits.* ***B. competition.*** *C. collective bargaining.* *D. government regulation.*	In a market economy, competition among sellers places downward pressure on prices, which benefits households. At the same time, competition among households (buyers) keeps prices high enough to allow firms to cover costs and obtain a reasonable profit as incentive to continue to produce the products households want. [9/4/1]	55.1	41.1	.36
19. *A newspaper reports, "COFFEE GROWERS' MONOPOLY BROKEN INTO SEVERAL COMPETING FIRMS." If this is true, we would expect the coffee-growing industry to* *A. decrease output and decrease prices.* *B. increase output and increase prices.* *C. decrease output and increase prices.* ***D. increase output and decrease prices.***	A monopolized or, in this case, a cartelized industry differs from a competitive one because a cartel generally places production or marketing limits on each member and also imposes a minimum price on the product. Moving from a monopoly (or cartel) situation to a competitive one should lead to increased output of coffee and decreased prices. [9/8/2]	58.9	43.9	.43

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
20. *In a market economy, the public interest is likely to be served even when individuals pursue their personal economic goals because of* ***A. the operation of competitive markets.*** *B. the social responsibility of business leaders.* *C. central planning and coordination of market activity.* *D. individuals' understanding of what is in the public interest.*	In a market economy, the desire of business owners to make profits and the desire of workers to obtain higher wages lead to the production of those goods and services consumers want most. A market economy relies on competition to assure that if consumer demand goes up, increased output is supplied at the lowest prices that will cover all costs of production and still leave a reasonable profit. Thus, competitive markets play a stronger role than any of the forces proposed in the other answers. [9/12/1]	46.3	28.6	.42
21. *Which characteristic makes the most positive contribution to people's incentive to produce and exchange goods and services in a market economy?* *A. An equal distribution of income.* *B. Controls on the supply of gold.* *C. Restrictions on consumer choice.* ***D. The right to own private property.***	In a market economy, people have the incentive to produce and exchange because they are able to reap the benefits of private ownership of property. If all property were considered community property, people would have less incentive to produce and exchange because the benefits of additional production will not accrue to the individual. [10/12/1]	47.8	29.1	.42
22. *Common stocks, limited liability, and unlimited life are basic characteristics of* *A. cartels.* *B. partnerships.* ***C. corporations.*** *D. proprietorships.*	Proprietorships, partnerships, and corporations are the three legal categories of businesses in the United States. Only corporations have the three given characteristics: (1) the ability to issue common stock, (2) protection from liability beyond that which has been invested in the firm, and (3) continuation of life that does not depend on the lives of its owners. Cartels are not a legal form of business nor do they necessarily possess these characteristics. [10/12/2]	54.8	47.1	.24

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
23. What primary function is money serving when it is used to buy a ticket to a movie? *A. Store of value.* *B. Flow of funds.* *C. Unit of account.* ***D. Medium of exchange.***	Money serves three major functions in our economy: (1) as a medium of exchange; (2) as a store of value; and (3) as a unit of account. In purchasing a movie ticket, a person is using money in exchange for the opportunity to see a movie. A person is not trying to use money as a store of value in this case because the money is being spent. The primary purpose is also not to measure the value of things (be a unit of account). [11/4/1]	70.6	48.8	.43
24. When commercial banks increase their loans to businesses and consumers, this usually results in *A. a decrease in the spending power of consumers and businesses.* *B. an increase in government control over the economy.* *C. an increase in the banks' excess reserves.* ***D. an increase in the nation's money supply.***	When commercial banks make loans to businesses or consumers, these funds are in the form of demand deposits at banks, i.e., checking accounts credited to the borrowers. Banks thereby "create money," and the nation's money supply increases. [11/12/2]	42.0	18.8	.39
25. Inflation is an increase in *A. interest rates over time.* *B. the standard of living over time.* ***C. the general level of prices over time.*** *D. real gross domestic product over time.*	Inflation is a sustained increase in the general price level of the entire economy. Interest rates increase in response to inflation, and they are not inflation because they represent only one type of price. Economic growth is an increase in real gross domestic product over time. An increase in the standard of living of a nation occurs if the real rate of economic growth outpaces population growth over time. [11/12/4]	67.3	49.8	.46

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
26. *An increase in real interest rates provides an incentive for people to save* *A. less and borrow less.* ***B. more and borrow less.*** *C. less and borrow more.* *D. more and borrow more.*	Real (inflation adjusted) interest rates increase or decrease to balance the amount saved with the amount borrowed. As these rates increase, the incentive to save money increases because of a higher rate of return on saving. Borrowing money, however, becomes more expensive because the cost of borrowing increases with a rise in real interest rates. [12/12/2]	77.0	66.3	.36
27. *Which would likely increase the average level of interest rates for auto loans?* ***A. An increase in inflation.*** *B. An increase in the unemployment rate.* *C. A decrease in the level of business investment.* *D. A decrease in the amount of consumer spending.*	Interest rates for auto loans are determined by the supply of and demand for loanable funds. If inflation increases, lenders, or suppliers of loanable funds, will require a higher return to compensate for the lost purchasing power of the money lent. Each of the other three options presents a situation where demand for loanable funds will decrease, thus reducing interest rates for auto loans. [12/12/7]	49.9	35.5	.33
28. *Over time the economic condition that would most likely lead to an increase in worker wages is an increase in* *A. the payroll taxes of the workers who make the product.* ***B. the demand for the product that is made by the workers.*** *C. the cost of the materials for the product the workers make.* *D. government regulation of the product the workers make.*	Labor, like other productive resources, is a "derived demand," meaning that demand for labor is derived from the demand for the product labor produces. If demand for a product increases, more labor will be demanded to produce it, and the wages of the workers providing this labor will increase. Demand for the product workers produce has a much greater effect on wages over time than any of the other economic conditions provided in the other options. [13/12/5]	65.2	53.1	.42

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
29. Why do medical doctors generally earn more than farmers? *A. Medical doctors are more efficient than farmers.* *B. Medical doctors provide a service rather than make a product.* *C. There are fewer medical doctors than farmers in our economy.* ***D. Medical doctors are scarcer, given the demand for their services.***	Salaries or wages earned by most individuals depend on the demand for their services relative to the supply of such services. Since medical doctors are scarce relative to the strong demand for their services, the salaries they receive are higher than those received by many other individuals. The other options might be true, but do not provide the fundamental reason for wage differences between doctors and farmers. [13/8/5]	62.3	43.6	.38
30. A basic role of entrepreneurs in the economy is to *A. create dividends for investors in new businesses.* *B. buy and sell the common stocks of new corporations.* ***C. take the risks associated with starting new businesses.*** *D. show government what new products the economy can produce and sell.*	Entrepreneurs are individuals who are willing to take risks to create new products and start new businesses. Such activity is risky because consumers must decide whether they will purchase the product at a price that is profitable. Profits are the incentive and the income that successful entrepreneurs receive in return for their effort and risk. [14/4/1]	69.8	52.2	.45
31. Which would most likely increase the productivity of labor? ***A. An increase in capital investment.*** *B. A decrease in the pay of corporate executives.* *C. An increase in interest rates for business loans.* *D. A decrease in the use of labor-saving technology.*	When businesses increase capital investment, workers are provided with more and/or better tools and machines to work with and can produce more output in less time. This is an increase in the productivity of labor. The opposite occurs when firms reduce the use of labor-saving technology. If interest rates rise, firms are less likely to invest in capital. The effect of a decrease in the pay of corporate executives depends on the situation. [15/4/2]	57.5	35.9	.41

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
32. *How does a nation typically acquire more capital goods and increase productivity?* A. *By increasing the money supply and the rate of inflation.* ***B. By increasing private saving and business investment.*** C. *By decreasing the length of the workweek for the labor force.* D. *By increasing the growth rate of the population in the nation.*	When workers have more and/or better tools and machines to work with, their productivity, or output per hour worked, increases. Businesses often invest in these "capital goods" by borrowing funds that a nation saves, so more private savings provide more funds with which to invest. Increasing the money supply when this leads to inflation will not necessarily increase capital goods and productivity, nor will reducing the workweek or increasing the population. [15/12/5]	48.0	36.1	.33
33. *Government rather than private business provides national defense because* A. *it is a benefit and not a cost.* B. *it is a cost and not a benefit.* ***C. not all who benefit from it would pay for it.*** D. *if some benefit from it, less is available for others.*	National defense is a public good, i.e., a good not subject to the exclusion principle. Beneficiaries of national defense cannot be excluded from consuming it if they refuse to pay for those benefits. A private business is unlikely to provide national defense because it would have great difficulty in collecting fees from all who benefit from it. So if society wants national defense, it must use government to collect taxes and provide the public good. [16/8/2]	46.8	30.9	.34
34. *The tax described in the table below is a* A. *flat tax on income.* ***B. progressive income tax.*** C. *proportional income tax.* D. *regressive income tax.*	With a progressive income tax, the tax rate increases as an individual moves into higher income brackets or ranges. This situation is found in the table. With a regressive tax, the tax rate decreases as an individual moves into higher income brackets or ranges. A proportional income tax, often referred to as a flat tax, would keep the same tax rate across all income levels. [16/12/10]	63.8	48.1	.24

STATE TAX TABLE

Income	*Percentage Tax Rate*
$0–$10,000	*0*
$10,001–$40,000	*10*
$40,001–$90,000	*20*
$90,001 and above	*30*

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
35. Which statement about tariffs is true? *A. Tariffs increase the market for exports.* *B. Tariffs decrease employment in protected industries.* ***C. Tariffs benefit some groups at the expense of others.*** *D. Tariffs encourage the growth of a nation's most efficient industries.*	Tariffs protect domestic industries that might otherwise be eliminated or reduced in size by foreign competition. The workers and owners in such protected industries benefit from the tariff, but the national standard of living suffers because all consumers must pay higher prices for the goods produced by the protected industry. Tariffs may increase employment in domestic industries whose products they protect. But tariffs may decrease the market for exports because other nations gain less foreign exchange with which to buy exports. The most efficient domestic industries will tend to grow with or without tariff protection. [17/12/3]	52.3	39.7	.35
36. Gross domestic product (GDP) is a measure of *A. the price level of goods and services sold.* *B. total spending by federal, state, and local governments.* *C. the quantity of goods and services produced by private businesses.* ***D. the market value of the nation's output of final goods and services.***	Gross domestic product, the principal gauge of a nation's economic activity, is a measure of the value of its total output of final goods and services in terms of their market prices. The other options cover only part of a nation's total output and are not definitions of GDP. [18/8/1]	58.6	37.4	.47
37. A nation has an international trade deficit when ***A. its imports are greater than its exports.*** *B. its exports are greater than its imports.* *C. its government expenditures are greater than its tax revenues.* *D. its gold reserves are greater are than the gold reserves of its trading partners.*	An international trade deficit exists when a nation buys goods of greater value from other countries than it sells to them, or in other words, it imports more than it exports. The other options are not measures of trade deficits. [18/8/3]	62.7	49.0	.41

FORM A

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
38. *Which best measures a nation's standard of living over time?* *A. Rate of inflation.* *B. Rate of unemployment.* ***C. Real income per capita.*** *D. Money income per capita.*	Real income per capita is the best measure of a nation's standard of living over time for two reasons. One is that measuring income in real terms removes the distorting effects of a changing price level. The other is that total income may be high or low merely because a country has many or few people, e.g., China vs. Norway. Dividing total real income by the population adjusts for such a difference. [18/12/1]	61.8	39.5	.41
39. *An economy's potential output at any time is limited by* *A. the amount of money in circulation.* *B. government regulations and spending.* *C. business demand for final goods and services.* ***D. the quantity and quality of labor, capital, and natural resources.***	Although all options may influence the amount of an economy's real output at any specific time, the upper limit is set by the quantity and quality of its productive resources. Business demand, the amount of money in circulation, and government spending may help to increase real output, but the ceiling on output is set by the resources available for production. [18/12/2]	57.0	38.5	.42
40. *Which would usually reduce total spending in the economy?* *A. A fall in interest rates.* *B. A decrease in business taxes.* ***C. A decline in consumer incomes.*** *D. A reduction in personal income tax rates.*	Total spending on the output of our economy consists of spending by consumers, businesses, government, and foreigners. Since consumers spend most of their after-tax income, a decline in consumer income will reduce consumer spending and thus total spending. The other events would increase total spending, all else the same. [18/12/4]	72.3	56.7	.46
41. *An economy will typically experience a decline in its unemployment rate when there is* *A. an increase in population.* *B. a decrease in consumer incomes.* ***C. an increase in economic growth.*** *D. a decrease in business investment.*	When a nation experiences economic growth, output of goods and services increases over time and more workers are needed to produce these goods and services. Some people not working but actively seeking work (the unemployed) are hired, and thus there is a fall in the unemployment rate. Declining consumer income and business investment typically reduce economic growth, whereas the effects of an increase in the population depend on the type of population growth. [19/12/3]	63.9	46.1	.42

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
42. *If your annual income rises by 50% while prices of the things you buy rise by 100%, then your* *A. real income has risen.* ***B. real income has fallen.*** *C. money income has fallen.* *D. real income is not affected.*	If the prices of the goods and services a person buys rise more than the increase in that person's income, that individual's purchasing power, i.e., the ability to buy a given quantity of goods and services, has declined. In other words, "real income" has fallen. [19/8/2]	66.8	52.2	.43
43. *One reason the federal government might reduce taxes is to* *A. slow the rate of inflation.* *B. slow a rapid rise in interest rates.* *C. decrease business spending on plant and equipment.* ***D. increase consumer spending and stimulate the economy.***	If the government reduces taxes, taxpayers are left with more disposable income to spend or save. Since consumers are likely to spend most of each additional dollar of disposable (after-tax) income, an increase in consumer spending is likely. This, in turn, would tend to stimulate the economy. [20/12/1]	69.4	60.8	.46
44. *A government budget deficit exists when* *A. tax revenues are falling.* *B. government spending is rising.* *C. the national debt is decreasing.* ***D. government spending is greater than tax revenues.***	A government budget deficit is defined as an excess of government expenditures over tax receipts for a time period (usually a year). A budget surplus is just the opposite. Falling tax revenues and rising government spending can occur during times when the budget is in surplus or deficit. A budget deficit will add to the national debt, not reduce it. [20/12/4]	65.2	46.3	.46
45. *Which monetary policy would the Federal Reserve most likely adopt as the economy moves into recession during a period of low inflation?* ***A. Lower the federal funds rate.*** *B. Increase federal income tax rates.* *C. Decrease purchases of government bonds.* *D. Raise the reserve requirements for banks.*	The Federal Reserve System can attempt to stimulate economic activity to reduce the severity of a recession by lowering interest rates through open market operations directed at the federal funds rate (the rate at which banks loan overnight funds to each other). This policy would be accomplished through increasing, not decreasing, purchases of government bonds. Raising reserve requirements would have the opposite effect. The Federal Reserve System does not set income tax rates. [20/12/8]	35.0	23.7	.26

9. ITEM RATIONALE: *TEST OF ECONOMIC LITERACY*

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
1. The opportunity cost of a new city park is the *A. cost of staff and maintenance for the park.* *B. increased congestion from traffic around the park.* ***C. best alternative use of resources given up for the park.*** *D. lack of personal incentive for people to take care of a public park.*	The opportunity cost of producing a good or service is the next best alternative good or service that might have been produced with the same resources. In other words, opportunity cost refers to what is forgone once money or resources are used for a specific purpose. [1/4/5] [Code for bracket item: *Standard / Grade Level / Benchmark (CEE, 2010)*]	58.3	33.9	.39
2. Which do economists consider to be a productive resource (factor of production)? ***A. Labor.*** *B. Profit.* *C. Money.* *D. Interest.*	Productive resources (sometimes called factors of production) are inputs used to produce goods and services. They consist of capital goods, labor resources, natural resources, and entrepreneurial ability. The other options are not productive resources. Interest and profits are payments for or income from resources. Money serves other functions in an economy. [1/4/9]	79.3	52.6	.45
3. In every economic system, people must choose how to *A. satisfy all of the wants of society.* ***B. make the best use of scarce resources.*** *C. create an equal distribution of income.* *D. save money to reduce the national debt.*	The economic wants of people in any society are virtually limitless. In this light, all resources are scarce, and every economic system must choose how to make the most efficient use of its scarce resources to produce those goods and services it desires or needs the most. [1/8/1]	63.3	43.7	.40

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
4. A small business would like to hire more workers. Each additional worker hired costs the business $100 a day. The additional revenue the business receives from having more workers is $150 per day for first worker, $130 per day for the second worker, $110 per day for the third worker, and $90 for the fourth worker. How many workers in total should the business hire to maximize its profits? *A. One worker.* *B. Two workers.* ***C. Three workers.*** *D. Four workers.*	Businesses in a market economy attempt to maximize profit. Profit maximization includes hiring more workers as long as the marginal benefit of each additional worker is equal to or greater than the cost of hiring the additional worker. In this situation, the first three workers add more to revenue than it costs to hire them, so each would increase profits. The fourth worker would cost more than the revenue the worker would generate and would reduce profits. [2/12/1]	58.1	46.4	.35
5. The essential difference between a command economy and a market economy is that in a market economy *A. shortages occur more often than surpluses.* ***B. buyers and sellers determine resource allocation.*** *C. central planning creates an effective incentive system for consumers and producers.* *D. the prices of products and resources are largely determined by government regulation of businesses.*	An economic system is a society's institutional framework that coordinates economic activity. Two general types of economic systems are command-based and market-based. In a command economy, central planning by government determines how productive resources are allocated to the production of goods and services. In a market economy, buyers and sellers pursue personal goals and interact through markets, and this determines the allocation of resources. [3/8/2]	56.7	38.7	.40
6. Which is a basic economic question that must be answered by all economic systems? *A. How will corporations be organized?* *B. How can markets be kept competitive?* ***C. Which goods and services will be produced?*** *D. Which form of central planning will the government use?*	The condition of scarcity (relatively unlimited wants and limited resources) means that people in all economic systems must decide: (1) which goods and services will be produced; (2) how these goods and services will be produced; and (3) who will get these goods and services. None of the other options must be answered by all economic systems. [3/8/3]	71.9	55.3	.31

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
7. *Profits are equal to total* ***A. revenue minus total cost.*** *B. assets minus total liabilities.* *C. sales minus wages and salaries.* *D. sales minus taxes and depreciation.*	Profit is what is left over after all costs of production (total costs) are subtracted from total revenues (price per unit times the number of units sold). Profit is the fundamental incentive for firms or individuals to engage in business in a market economy. [4/8/3]	72.0	45.2	.48
8. *If the government decides to increase the payroll taxes on the wages and salaries of workers, then there will most likely be* *A. an increase in saving.* *B. an increase in investment.* *C. a decrease in unemployment.* ***D. a decrease in consumption.***	Increasing payroll taxes decreases workers' disposable, or after-tax, income. Less income can lead to less of the activities for which income can be used, such as saving and consumption. Firms will find it more expensive to hire workers, so unemployment would not decrease. There is no clear direct effect of payroll tax changes on investment. [4/12/1]	46.5	36.0	.41
9. *A high school student buys a dinner at a restaurant. The restaurant offers a special price that takes 20 percent off the regular price of the dinner. In this exchange,* ***A. the student and the restaurant benefit.*** *B. the student benefits, but the restaurant does not.* *C. the restaurant benefits, but the student does not.* *D. neither the student nor the restaurant benefits.*	Voluntary exchange occurs only when the people involved expect to gain from the trade. If neither the student nor the restaurant expects to gain from this trade (the purchase of a dinner), neither would have made the exchange. [5/4/3]	46.9	34.7	.26
10. *Some members of Congress want to increase the general level of tariffs. If this increase occurs, then we should expect* *A. a decrease in U.S. inflation.* *B. a decrease in U.S. import quotas.* ***C. a decrease in imports into the U.S.*** *D. an increase in U.S. exports to other nations.*	If tariffs are increased, we should expect U.S. imports to decrease because it raises the price of an import. However, we should also expect U.S. exports to decrease because other countries will have fewer dollars with which to buy our goods. Foreign nations are quite likely to retaliate against new U.S. tariffs by raising their own. Inflation would likely rise in the U.S. due to less competition from foreign firms. [5/12/2]	62.2	43.7	.40

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
11. *The specialization of labor usually results in* *A. an increase in inflation.* *B. a more equal distribution of income.* ***C. an increase in output per hour worked.*** *D. a decrease in economic interdependence.*	Specialization of labor means that workers produce those products at which they are most efficient. The increase in efficiency increases labor productivity (output per hour worked), but also reduces self-sufficiency and increases economic interdependence. The increased productivity would tend to reduce inflation, not increase it. [6/4/3]	63.5	48.2	.38
12. *Which best describes what the law of comparative advantage means for trading nations? Each trading nation can benefit by exporting goods that* ***A. it produces at low opportunity costs and importing goods it produces at high opportunity costs.*** *B. it produces at high opportunity costs and importing goods it produces at low opportunity costs.* *C. people enjoy least and importing goods that they enjoy most.* *D. people enjoy most and importing goods that they enjoy least.*	Comparative advantage means that a country can benefit by selling those goods it produces at low opportunity costs and buying from other nations those goods it produces at high opportunity costs. The law of comparative advantage simply tells us to specialize in what we do relatively well, and trade our output from these relatively efficient industries for goods from other nations that can produce them at relatively lower costs. [6/12/1]	54.6	33.5	.44
13. *When there is a surplus of a product in a competitive market, it is usually the case that the* ***A. market price of the product will eventually decrease.*** *B. market price of the product will eventually increase.* *C. quantity of the product exchanged in the market will eventually decrease.* *D. quantity of the product exchanged in the market will not change, but supply will increase.*	The market equilibrium price equates the amount buyers wish to buy with the amount sellers wish to sell. A surplus occurs in a market when the selling price is above the market equilibrium price, leading to a greater amount supplied than demanded. At this relatively high price, competition among sellers places downward pressure on the price until the market equilibrium is reached. As the market price falls, buyers will be willing and able to purchase more of the product, increasing the quantity exchanged. [7/12/4]	65.0	52.5	.47

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
14. *The exchange rate between the U.S. dollar and the Japanese yen changes from $1=100 yen to $1=125 yen. This change means that* *A. there will be an increase in U.S. exports to Japan.* ***B. there will be a decrease in U.S. exports to Japan.*** *C. Japanese goods will be more expensive for Americans.* *D. U.S. goods will be less expensive for Japanese.*	If the exchange rate between two currencies changes, the relative prices of products traded using those currencies change. If it originally takes 100 yen to obtain $1, and now it takes 125 yen to obtain $1, then from the Japanese perspective, the price of U.S. products has increased, and thus U.S. exports to Japan will fall as they become more expensive for the Japanese. Japanese goods will become less expensive for Americans because $1 will buy more yen and thus more Japanese goods. [7/12/5]	44.9	30.8	.30
15. *If the government charges a new tax of $1 on every pair of blue jeans sold, which would most likely result?* ***A. Consumers would pay a higher price for blue jeans and buy fewer pairs of blue jeans.*** *B. Consumers would pay a higher price for blue jeans and blue jeans sellers would make larger profits.* *C. Consumers would pay a higher price and blue jeans sellers would limit the number of blue jeans consumers could buy.* *D. Blue jeans sellers would increase the quantity sold in order to make up for the taxes paid to the government.*	A new tax will increase the price that consumers face when buying blue jeans. According to the law of demand, a higher price for blue jeans decreases the number of blue jeans consumers will purchase. The tax must be paid to the government, so sellers will make a smaller, not larger, profit. The number of blue jeans consumers can buy will not be limited due to the tax — if blue jeans became more popular, sellers would still increase the amount for sale. [8/4/1]	67.5	52.6	.40

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
16. *Which would most likely decrease the quantity of corn sold in a competitive market?* ***A. An increase in the price of fertilizer.*** *B. An increase in the incomes of consumers.* *C. A decrease in the price of farm equipment.* *D. An improvement in the technology of growing corn.*	To explain this event, either supply or demand decreases, all else equal. An increase in the price of an input to production such as fertilizer decreases supply. A decrease in the price of an input (farm equipment) or an improvement in corn-growing technology increases supply. An increase in consumer income increases the demand for corn. [8/4/1]	79.0	64.1	.46
17. *A newspaper reports that the price of oranges increased and the quantity sold decreased. In a competitive market, this situation would most likely be the result of* *A. a decrease in demand.* *B. an increase in demand.* *C. an increase in supply.* ***D. a decrease in supply.***	Only a decrease in the supply of oranges will both increase price and decrease the quantity sold of oranges. An increase in demand will increase price and quantity, and conversely a decrease in demand will decrease price and quantity. An increase in supply will decrease price and increase quantity. [8/12/2]	37.1	33.3	.29
18. *Business firms wish to sell their products at high prices. Households wish to buy products at low prices. In a market economy, this conflict of interest is resolved by* *A. lawsuits.* ***B. competition.*** *C. collective bargaining.* *D. government regulation.*	In a market economy, competition among sellers places downward pressure on prices, which benefits households. At the same time, competition among households (buyers) keeps prices high enough to allow firms to cover costs and obtain a reasonable profit as incentive to continue to produce the products households want. [9/4/1]	58.7	44.0	.39
19. *A newspaper reports, "COFFEE GROWERS' MONOPOLY BROKEN INTO SEVERAL COMPETING FIRMS." If this is true, we would expect the coffee-growing industry to* *A. decrease output and decrease prices.* *B. increase output and increase prices.* *C. decrease output and increase prices.* ***D. increase output and decrease prices.***	A monopolized or, in this case, a cartelized industry differs from a competitive one because a cartel generally places production or marketing limits on each member and also imposes a minimum price on the product. Moving from a monopoly (or cartel) situation to a competitive one should lead to increased output of coffee and decreased prices. [9/8/2]	62.5	44.9	.43

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
20. *Which is most essential for an efficient market economy?* A. *Effective labor unions.* B. *Strong government regulation.* ***C. Active competition in the marketplace.*** D. *Responsible decisions by business leaders.*	In a market economy, the desire of business owners to make profits and the desire of workers to obtain higher wages lead to the production of those goods and services consumers want most. A market economy relies on competition to assure that if consumer demand goes up, increased output is supplied at the lowest prices that will cover all costs of production and still leave a reasonable profit. Thus, competitive markets play a stronger role than any of the forces proposed in the other options. [9/12/1]	73.4	55.2	.48
21. *The major purpose of the commercial banking system in the economy is to* A. *sell corporate stocks and bonds.* B. *hold financial assets for the Federal Reserve System.* ***C. loan funds from depositors to credit-worthy borrowers.*** D. *earn a rate of return on money invested with government agencies.*	In a market economy, people and firms at times want to save and at other times want to purchase things with money they borrow. Through banks, savers can deposit money they wish to save, and a large percentage of these deposits can be loaned by the banks to those people and firms that wish to borrow and spend. Banks therefore play a vital role as "financial intermediaries" by efficiently bringing savers (depositors) and borrowers together. [10/12/1]	48.2	34.5	.37
22. *When workers join unions and elect representatives to negotiate with their employers, this is referred to as* A. *a closed shop.* B. *the seniority system.* ***C. collective bargaining.*** D. *right to work legislation.*	Collective bargaining occurs when workers join a union and elect representatives to negotiate with their employer about wages, fringe benefits, and the conditions of work. A "closed shop" means that all workers of a given employer or industry are required to join the union. The "seniority system" means that worker rights to, e.g., promotion or vacation are directly tied to length of employment or duration of union membership and that if employees are laid off, those with the most seniority are laid off last and are rehired first. "Right to work" legislation consists of state laws that mandate the opposite of a closed shop, i.e., workers are not required to join the union of a given industry or employer. [10/8/3]	62.9	50.4	.35

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
23. *Which item is included in the basic money supply in the U.S.?* *A. Gold.* *B. Silver.* *C. Corporate bonds.* ***D. Checking account deposits.***	The basic money supply, often called M1, is the most restrictive definition of the money supply and includes just currency (coins and paper money) and deposits in checking accounts at financial institutions and the value of traveler's checks. [11/12/1]	46.4	31.0	.19
24. *When commercial banks increase their loans to businesses and consumers, this usually results in* *A a decrease in the spending power of consumers and businesses.* *B. an increase in government control over the economy.* *C. an increase in the banks' excess reserves.* ***D. an increase in the nation's money supply.***	When commercial banks make loans to businesses and consumers, these funds are in the form of demand deposits at banks, i.e., checking accounts credited to the borrowers. Banks thereby "create money," and the nation's money supply increases. [11/12/2]	43.5	19.7	.38
25. *Inflation is a* *A. sharp rise in the price of a major product.* *B. substantial decline in the consumer price index.* ***C. sustained increase in the general level of prices.*** *D. rapid movement of the economy toward full employment.*	Inflation is a sustained increase in the general level of prices of the economy, not an increase in the price of one product. The consumer price index is an index of the average prices consumers pay for consumer products, and thus an increase, rather than a decline, in it suggests inflation. A rapid movement of the economy toward full employment is an increase in output. [11/12/4]	64.6	44.5	.42
26. *A decrease in real interest rates provides an incentive for people to save* *A. more and borrow more.* *B. less and borrow less.* *C. more and borrow less.* ***D. less and borrow more.***	Real (inflation-adjusted) interest rates increase or decrease to balance the amount saved with the amount borrowed. As these rates decrease, the incentive to save money decreases because of a lower rate of return on saving. Borrowing money, however, becomes less expensive because the cost of borrowing decreases with the decline in real interest rates. [12/12/2]	46.5	27.1	.43

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
27. *Which best describes the general relationship between the risk that a business will default on a loan and the interest rate charged for the loan?* *A. A lower interest rate is charged on loans with more risk of default.* *B. A higher interest rate is charged on loans with less risk of default.* ***C. A lower interest rate is charged on loans with less risk of default.*** *D. The interest rate charged on loans is the same regardless of the risk of default.*	The risk of default, or nonrepayment, of a loan is a factor that influences the interest rate charged for a loan. Lenders find it less profitable to loan to more risky borrowers compared with less risky borrowers, and they would choose to lend only to less risky borrowers if they were not able to charge a higher interest rate on a loan to the more risky borrowers. [12/12/4]	54.4	40.0	.40
28. *In a market economy, high wages depend mostly on* *A. responsible business leaders.* ***B. high output per worker.*** *C. actions of government.* *D. minimum wage laws.*	In a market economy, the amount that businesses can pay workers depends primarily on the contribution workers make to the output of businesses. Employers will pay higher wages (or salaries) to employees who produce more, or have better output per work hour. The other options may increase some workers' wages, but they are secondary factors. Productivity is the most important factor for explaining high wages. [13/8/4]	65.1	47.4	.29
29. *Why do medical doctors generally earn more than farmers?* *A. Medical doctors are more efficient than farmers.* *B. Medical doctors provide a service rather than make a product.* *C. There are fewer medical doctors than farmers in our economy.* ***D. Medical doctors are scarcer, given the demand for their services.***	Salaries or wages earned by most individuals depend on the demand for their services relative to the supply of such services. Since medical doctors are scarce relative to the strong demand for their services, the salaries they receive are higher than those received by many other individuals. The other options might be true, but do not provide the fundamental reason for wage differences between doctors and farmers. [13/8/5]	64.0	44.1	.41

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
30. *People who take the risks of organizing productive resources to produce goods and services in the expectation of making profits are* *A. economists.* *B. stockbrokers.* ***C. entrepreneurs.*** *D. business managers.*	Entrepreneurs are individuals who are willing to take risks to create new products and start new businesses. Such activity is risky because consumers must decide whether they will purchase the product at a price that is profitable. Profits are the incentive and the income that successful entrepreneurs receive in return for their effort and risk. [14/4/1]	77.6	57.8	.41
31. *Which would most likely decrease the productivity of labor?* *A. A rise in the pay of workers.* *B. A fall in the rate of interest.* *C. A reduction in the tax rates on income.* ***D. A decline in the amount of capital goods.***	A decline in the amount of capital goods will likely decrease the productivity of labor because workers would have less machines and tools to help them produce goods and services. Thus there would be a decrease in output per hour worked. The other options are more likely to increase productivity rather than decrease it. [15/4/2]	56.4	45.4	.35
32. *Economies that grow rapidly over time usually have a high rate of* *A. growth in gold reserves.* ***B. capital investment.*** *C. unemployment.* *D. tariffs.*	A high rate of capital investment (defined as the accumulation of more machinery, industrial plants, equipment, and the like) characterizes all rapidly growing economies. Growth in gold reserves has little, if anything, to do with high rates of economic growth. A high rate of tariffs would tend to reduce economic growth. A high rate of unemployment is often a symptom of declining or negative economic growth. [15/12/1]	70.1	64.0	.31
33. *Government rather than private business provides a public good such as flood control because* *A. private businesses do not like to produce services for the government.* ***B. those who do not pay for a public good still receive the benefits.*** *C. when a person uses a public good, less is available for others.* *D. a public good does not benefit individuals.*	Flood control is a public good, i.e., a good not subject to the exclusion principle. Beneficiaries of flood control cannot be excluded from consumption of flood control if they refuse to pay for those benefits. A private business is unlikely to provide flood control because it would have great difficulty collecting fees from all who benefit from flood control. So if society wants flood control, it must use government to collect taxes and provide the public good. [16/8/2]	65.1	42.0	.38

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
34. *The tax described in the table below is a* *A. flat tax on income.* ***B. progressive income tax.*** *C. proportional income tax.* *D. regressive income tax.* **STATE TAX TABLE** *Income* / *Percentage Tax Rate* *$0–$10,000* — *0* *$10,001–$40,000* — *10* *$40,001–$90,000* — *20* *$90,001 and above* — *30*	With a progressive income tax, the tax rate increases as an individual moves into higher income brackets or ranges. This situation is found in the table. With a regressive tax, the tax rate decreases as an individual moves into higher income brackets or ranges. A proportional income tax, often referred to as a flat tax, would keep the same tax rate across all income levels. [16/12/10]	66.5	47.2	.25
35. *Suppose that the U.S. Congress sets up a program to provide financial assistance to banks to prevent them from failing. This action will likely create a moral hazard problem because it may* *A. restrict bank investments in real estate.* ***B. encourage bank officials to make riskier loans.*** *C. reduce the amount of deposits made by bank customers.* *D. increase the screening by banks of deposits from bank customers.*	Moral hazard occurs when people or institutions change their behavior due to an insulation from risk, and this change in behavior results in a potentially negative outcome for others. This type of assistance to banks will partially insulate them from the risk of bad loans and thus could encourage them to make more of them. [17/12/Box]	62.8	49.1	.43
36. *Gross domestic product (GDP) is a measure of* *A. the price level of goods and services sold.* *B. total spending by federal, state, and local governments.* *C. the quantity of goods and services produced by private businesses.* ***D. the market value of the nation's output of final goods and services.***	Gross domestic product is a measure of the value of a nation's total output of final goods and services in terms of their market prices. The other options cover only part of a nation's total output and are not definitions of GDP. [18/8/1]	59.2	36.5	.47

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
37. *A nation has an international trade surplus when* ***A. its exports are greater than its imports.*** *B. its imports are greater than its exports.* *C. its tax revenues are greater than its government expenditures.* *D. its gold reserves are greater than gold reserves of its trading partners.*	An international trade surplus exists when a nation sells goods of greater value to other countries than it buys from them, or in other words, it exports more than it imports. [18/8/1]	52.6	41.3	.34
38. *Which best measures a nation's standard of living over time?* *A. Rate of inflation.* *B. Rate of unemployment.* ***C. Real income per capita.*** *D. Money income per capita.*	Real income per capita is the best measure of a nation's standard of living over time for two reasons. One is that measuring income in real terms removes the distorting effects of a changing price level. The other is that total income may be high or low merely because a country has many or few people, e.g., China vs. Norway. Dividing total real income by the population adjusts for such a difference. [18/12/1]	62.8	40.4	.43
39. *The maximum output a nation could possibly produce in any one year is limited by its* ***A. productive resources.*** *B. business investment.* *C. unemployment rate.* *D. consumer income.*	A nation's maximum output (GDP) in any given year is set by its total productive resources. The amount businesses invest in a year or the amount consumers spend (determined in large part by consumer income) may help increase output, but the ceiling on output is set by the resources available for production. [18/12/2]	71.7	52.6	.48
40. *Which would usually increase total spending in the economy?* *A. An increase in tax rates.* *B. An increase in interest rates.* *C. An increase in the savings rate.* ***D. An increase in business investment.***	Total spending on the output of our economy consists of spending by consumers, businesses, government, and foreigners. An increase in business spending on output, or business investment, thus increases total spending. The other events would lead to a decrease in total spending, all else the same. [18/12/4]	42.0	26.3	.40

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
41. *During a recession in an economy, there will be an increase in* *A. imports.* ***B. unemployment.*** *C. economic growth.* *D. business spending.*	A recession is a period of negative economic growth when real GDP declines for two consecutive quarters. As output falls, fewer workers are needed, and unemployment increases. During a recession, domestic consumers have less income to spend on imports, and businesses spend less as the demand for their products falls. [19/12/3]	87.6	79.4	.38
42. *Unexpected inflation is most likely to benefit people* *A. saving money in accounts at financial institutions.* ***B. owing money on loans at fixed interest rates.*** *C. living on fixed incomes and pensions.* *D. holding life insurance policies.*	Unexpected inflation benefits people who owe money because after inflation they pay back less in terms of real purchasing power for the amount they have borrowed. The three groups named in the other answers lose from inflation. [19/12/6]	48.5	30.9	.35
43. *One reason the federal government might reduce taxes is to* *A. slow the rate of inflation.* *B slow a rapid rise in interest rates.* *C. decrease business spending on plant and equipment.* ***D. increase consumer spending and stimulate the economy.***	If the government reduces taxes, taxpayers are left with more disposable income to spend or save. Since consumers are likely to spend most of each additional dollar of disposable (after-tax) income, an increase in consumer spending is likely. This, in turn, would tend to stimulate the economy. [20/12/1]	72.6	61.4	.43
44. *A government budget surplus exists when* ***A. tax revenues are greater than government spending.*** *B. government spending is decreased.* *C. the national debt is increasing.* *D. taxes are increased.*	A government budget surplus is defined as an excess of tax receipts over government expenditures for a time period (usually a year). A budget deficit is just the opposite. Government spending can decrease or taxes can increase when a budget is in surplus or deficit. A budget surplus will reduce the national debt, not increase it. [20/12/4]	69.9	46.4	.49

FORM B

ITEM	RATIONALE	% Correct With Econ.	% Correct Without Econ.	Discrimination Coefficient
45. Which monetary policy would the Federal Reserve most likely adopt to fight high inflation during a period of low unemployment? ***A. Raise the federal funds rate.*** *B. Increase the supply of money.* *C. Increase federal government spending.* *D. Lower the reserve requirements for banks.*	The Federal Reserve System can attempt to reduce economic activity to lower the rate of inflation from an "overheated economy" by raising interest rates through open market operations directed at the federal funds rate (the rate at which banks loan overnight funds to each other). This policy would be accomplished through reducing, not increasing, the supply of money. Lowering reserve requirements would have the opposite effect. The Federal Reserve System does not determine the level of government spending. [20/12/8]	30.8	22.1	.23

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Appendix 1. Schools Participating in Norming the *TEL*

ALABAMA

Greenville High School
Greenville 36037

Oak Mountain High School
Birmingham 35242

Saint James School
Montgomery 36116

Wilcox Central High School
Camden 36726

Woodlawn Magnet High School
Birmingham 35212

ARIZONA

ACYR Center of Excellence High School
Phoenix 85003

Arizona Conservatory for Arts & Academics
Chandler 85226

Benson High School
Benson 85602

Desert Mountain High School
Scottsdale 85259

North Canyon High School
Phoenix 85024

Raymond S. Kellis High School
Glendale 85305

Thunderbird High School
Phoenix 85023

University High School
Tucson 85711

ARKANSAS

Bay High School
Bay 72411

Cabot Junior High South
Cabot 72023

Jack Robey Junior High School
Pine Bluff 71603

CALIFORNIA

Acaciawood School
Anaheim 92801

Bishop O'Dowd High School
Oakland 94605

Chaffey High School
Ontario 91762

Godinez Fundamental High School
Santa Ana 92704

Helix Charter High School
La Mesa 91941

Heritage Woods Secondary School
Port Moody 92264

Jesuit High School
Carmichael 95608

La Sierra High School
Riverside 92505

Los Altos High School
Hacienda Heights 91745

Mater Dei High School
Santa Ana 92707

Midland School
Los Olivos 93441

Monte Vista High School
Danville 94526

Pasadena High School
Pasadena 91107

Phineas Banning High School
Wilmington 90744

Ramona High School
Ramona 92065

San Pasqual Valley High School
Winterhaven 92283

Vintage High School
Napa 94558

West Valley High School
Hemet 92545

COLORADO

Burlington High School
Burlington 80016

Cherokee Trail High School
Aurora 80016

Summit Academy
Denver 80219

CONNECTICUT

Ridgefield High School
Ridgefield 06877

DELAWARE

Delaware Military Academy
Wilmington 19804

FLORIDA

Indian Ridge School
West Palm Beach 33411

Mainland High School
Daytona Beach 32114

Mandarin High School
Jacksonville 32258

Palm Beach Lakes High School
West Palm Beach 33407

Pedro Menendez High School
St. Augustine 32086

Pembroke Pines Charter High School
Pembroke Pines 33331

Robert E. Lee High School
Jacksonville 32205

School for Advanced Studies-South
Miami 33176

St. Francis Catholic High School
Gainesville 32606

Timber Creek High School
Orlando 32828

GEORGIA

Burke County High School
Waynesboro 30830

Catoosa Performance Learning Center
Ft. Oglethorpe 30742

Early College
Garden City 31408

Greater Atlanta Christian School
Norcross 30093

Appendix 1. Schools Participating in Norming the *TEL* (Continued)

GEORGIA (cont.)

Gwinnett Intervention Education (GIVE) Center East
Lawrenceville 30046

Richmond Hill High School
Richmond Hill 31324

HAWAII

Iolani School
Honolulu 96826

Kamehameha Schools Maui
Pukalani 96768

IDAHO

Skyline High School
Idaho Falls 83402

ILLINOIS

Adlai E. Stevenson High School
Lincolnshire 60069

Alan B. Shepard High School
Palos Heights 60463

Astoria High School
Astoria 61501

Dwight D. Eisenhower High School
Blue Island 60406

East Leyden High School
Franklin Park 60131

Eureka High School
Eureka 61530

Evanston Township High School
Evanston 60201

Hampshire High School
Hampshire 60140

Harrisburg High School
Harrisburg 62946

Jacobs High School
Algonquin 60102

LaMoille High School
LaMoille 61330

Moline High School
Moline 61265

Mount Assisi Academy
Lemont 60439

Riverside Brookfield High School
Riverside 60439

ROE Alternative Program of Lake County
Zion 60099

Sangamon Valley High School
Niantic 62551

South Elgin High School
South Elgin 60177

Timothy Christian High School
Elmhurst 60126

Waubonsie Valley High School
Aurora 60504

West Leyden High School
Northlake 60164

Whitney M. Young Magnet High School
Chicago 60607

INDIANA

Goshen High School
Goshen 46526

Zionsville Community High School
Zionsville 46077

IOWA

Chariton High School
Chariton 50049

Iowa City High School
Iowa City 52245

KANSAS

Bennington High School
Bennington 67422

Blue Valley High School
Stilwell 66085

Field Kindley High School
Coffeyville 67337

Moundridge High School
Moundridge 67107

Salina South High School
Salina 67401

KENTUCKY

The Academy at Eleventh Street
Bowling Green 42101

Carroll County Area Technology Center
Carrollton 41008

LOUISIANA

Mount Carmel Academy
New Orleans 70124

MARYLAND

Mt. Hebron High School
Ellicott City 21042

Overlea High School
Baltimore 21206

St. Paul's School
Brooklandville 21022

MASSACHUSETTS

Reading Memorial High School
Reading 01867

MICHIGAN

Eisenhower High School
Shelby Township 48316

Grosse Pointe North High School
Grosse Pointe Woods 48236

Lahser High School
Bloomfield Hills 48302

Romeo Engineering and Technology Center
Washington 48094

Woodhaven High School
Brownstown 48134

MINNESOTA

Becker High School
Becker 55308

Buffalo High School
Buffalo 55313

Burnsville High School
Burnsville 55337

Centennial High School
Circle Pines 55014

Delano High School
Delano 55328

Appendix 1. Schools Participating in Norming the *TEL* (Continued)

MINNESOTA (cont.)

Elk River High School
Elk River 55330

Hastings High School
Hastings 55033

Irondale High School
New Brighton 55112

Kennedy High School
Bloomington 55420

Little Falls High School
Little Falls 56345

Mounds View High School
Arden Hills 55112

Osseo Senior High School
Osseo 55369

Rogers High School
Rogers 55374

Sauk Rapids-Rich High School
Sauk Rapids 56379

Two Harbors High School
Two Harbors 55616

Underwood High School
Underwood 56586

White Bear Lake High School–South Campus
White Bear Lake 55110

MISSISSIPPI

Center Hill High School
Olive Branch 38654

Clinton High School
Clinton 39056

Durant Public School
Durant 39063

Grenada High School
Grenada 38901

Kosciusko/Attala Vocational Center
Kosciusko 39090

Laurel High School Career and Technical Center
Laurel 39440

Lawrence County High School
Monticello 39644

Leland Vocational Technical Center
Leland 38756

Northwest Rankin High School
Flowood 39232

Picayune Memorial High School
Picayune 39466

Starkville High School
Starkville 39759

Stone High School
Wiggins 39577

Tupelo High School
Tupelo 38801

West Lauderdale High School
Collinsville 39325

MISSOURI

Lafayette High School
Wildwood 63011

Parkview High School
Springfield 65807

Ruskin High School
Kansas City 64134

Springfield Catholic High School
Springfield 65809

NEBRASKA

Bennington High School
Bennington 68007

Lyons-Decatur Northeast High School
Lyons 68038

Bellevue West High School
Bellevue 68123

Deshler Public School
Deshler 68340

Gordon-Rushville High School
Gordon 69343

Howells Public School
Howells 68641

HTRS High School
Humboldt 68376

Johnson-Brock High School
Johnson 68378

Lincoln Northeast High School
Lincoln 68507

Lincoln Southeast High School
Lincoln 68506

McCook Senior High School
McCook 69001

Minden High School
Minden 68859

Potter-Dix High School
Potter 69156

Sandhills Public Schools
Dunning 68833

Sargent Public Schools
Sargent 68874

South Platte Public Schools
Big Springs 69122

Stanton High School
Stanton 68779

Wakefield Community Schools
Wakefield 68784

Waverly High School
Waverly 68462

NEW JERSEY

Bergen County Academies
Hackensack 07601

NEW YORK

Academy for Young Writers
Brooklyn 11211

G. W. Fowler High School
Syracuse 13204

Garden City High School
Garden City 11530

Guilderland High School
Guilderland Center 12085

Johnstown High School
Johnstown 12095

Piers High School
New York 15553

Smithtown Central School District
Smithtown 11787

Teachers Preparatory School
Brooklyn 11212

NORTH CAROLINA

Fuquay-Varina High School
Fuquay-Varina 27526

Appendix 1. Schools Participating in Norming the *TEL* (Continued)

NORTH CAROLINA (cont.)

Military and Global Leadership Academy at Marie G. Davis
Charlotte 28203

NORTH DAKOTA

Jamestown High School
Jamestown 58402

OHIO

Bishop Watterson High School
Columbus 43214

Hayes High School
Delaware 43015

Jane Addams High School
Cleveland 44115

Lakeview High School
Cortland 44410

Shelby High School
Shelby 44875

OKLAHOMA

Catoosa High School
Catoosa 74015

Kingfisher High School
Kingfisher 73750

Metro Career Academy
Oklahoma City 73111

OREGON

Century High School
Hillsboro 97123

Clackamas High School
Clackamas 97015

Enterprise High School
Enterprise 97828

Milwaukie High School
Milwaukie 97222

Redmond High School
Redmond 97756

Sheldon High School
Eugene 97401-4898

PENNSYLVANIA

Dallas High School
Dallas 18612

PENNSYLVANIA (cont.)

Delone Catholic High School
McSherrystown 17344

Jenkintown High School
Jenkintown 19046

Mid Valley High School
Throop 18512

Montoursville Area High School
Montoursville 17754

Octorara Area High School
Atglen 19310

SOUTH CAROLINA

Christ Church Episcopal School
Greenville 29607

Christian Academy
Myrtle Beach 29577

Marion High School
Marion 29414

West Ashley High School
Charleston 29414

TENNESSEE

Bartlett High School
Cordova 38134

Collierville High School
Collierville 38017

Community High School
Unionville 37180

Franklin High School
Franklin 37064

Richard Hardy Memorial School
South Pittsburg 37380

South-Doyle High School
Knoxville 37920

Southwind High School
Memphis 38125

Tennessee School for the Blind
Nashville 37214

TEXAS

Bellaire High School
Bellaire 77401

Cypress Ridge High School
Houston 77041

TEXAS (cont.)

Jack E. Singley Academy
Irving 75038

Lorena High School
Lorena 76655

Lutheran High North
Houston 77018

MacMarthur High School
Irving 75062

McKinney High School
McKinney 75070

University Charter Schools
Round Rock 78665

VIRGINIA

Battlefield High School
Haymarket 20169

Booker T. Washington High School
Norfolk 23504

Briar Woods High School
Ashburn 20148

Central High School
Victoria 23974

Eastern Montgomery High School
Elliston 24087

Fort Defiance High School
Fort Defiance 24437

Freedom High School
South Riding 20152

Hampton Roads Academy
Newport News 23603

Hanover High School
Mechanicsville 23116

John Marshall High School
Richmond 23227

King William High School
King William 23086

Liberty High School
Bedford 24523

Loudoun County High School
Leesburg 20175

Madison County High School
Madison 22727

Appendix 1. Schools Participating in Norming the *TEL* (Continued)

VIRGINIA (cont.)

Norfolk Christian High School
Norfolk 23505

Patrick Henry High School
Roanoke 24015

Virginia Beach Public Schools
Virginia Beach 23456

West Springfield High School
Springfield 22152

William Byrd High School
Vinton 24179

WISCONSIN

Brookfield Central High School
Brookfield 53005

Eau Claire Memorial High School
Eau Claire 54701

Fox Valley Lutheran High School
Appleton 54913

Germantown High School
Germantown 53022

Hamilton High School
Sussex 53089

Marathon High School
Marathon City 54448

New Richmond High School
New Richmond 54017

Tomahawk High School
Tomahawk 54487

Watertown High School
Watertown 53098

Westosha Central High School
Salem 53168

Wilmot Union High School
Wilmot 53192

INTERNATIONAL

CANADA

Bayview Secondary High School
Richmond Hill
Ontario L4C 2L4

JAPAN

American School in Japan
Chofu-shi Tokyo 182-0031

THAILAND

Wells International School
Bang Na Bangkok 10260

UNITED KINGDOM

Chichester College
West Sussex RH20 1DL

Appendix 2. Voluntary National Economics Content Standards

1. Productive resources are limited. Therefore, people cannot have all the goods and services they want; as a result, they must choose some things and give up others.

2. Effective decision making requires comparing the additional costs of alternatives with the additional benefits. Most choices involve doing a little more or a little less of something: few choices are "all or nothing" decisions.

3. Different methods can be used to allocate goods and services. People acting individually or collectively through government must choose which methods to use to allocate different kinds of goods and services.

4. People respond predictably to positive and negative incentives.

5. Voluntary exchange occurs only when all participating parties expect to gain. This is true for trade among individuals or organizations within a nation and usually among individuals or organizations in different nations.

6. When individuals, regions, and nations specialize in what they can produce at the lowest cost and then trade with others, both production and consumption increase.

7. Markets exist when buyers and sellers interact. This interaction determines market prices and thereby allocates scarce goods and services.

8. Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.

9. Competition among sellers lowers costs and prices and encourages producers to produce more of what consumers are willing and able to buy. Competition among buyers increases prices and allocates goods and services to those people who are willing and able to pay the most for them.

10. Institutions evlove in market economies to help individuals and groups accomplish their golas. Banks, labor unions, corporations, legal systems, and not-for-profit organizations are examples of important institutions. A different kind of institution, clearly defined and enforced property rights, is essential to a market economy.

11. Money makes it easier to trade, borrow, save, invest, and compare the value of goods and services. The amount of money in the economy affects the overall price level. Inflation is an increase in the overall price level that reduces the value of money.

12. Interest rates, adjusted for inflation, rise and fall to balance the amount saved with the amount borrowed, which affects the allocation of scarce resources between present and future uses.

13. Income for most people is determined by the market value of the productive resources they sell. What workers earn depends, primarily, on the market value of what they produce.

14. Entrepreneurs take on the calculated risk of starting new businesses, either by embarking on new ventures similar to existing ones or by introducing new innovation. Entrepreneurial innovation is an important source of economic growth.

15. Investment in factories, machinery, and new technology and in the health, education, and training of people stimulates economic growth and can raise future standards of living.

16. There is an economic role for government in a market economy whenever the benefits of a government policy outweigh its costs. Governments often provide for national defense, address environmental concerns, define and protect property rights, and attempt to make markets more competitive. Most government policies also have direct or indirect effects on people's income.

17. Costs of government policies sometimes exceed benefits. This may occur because of incentives facing voters, government officials, and government employees, because of actions by special interest groups that can impose costs on the general public, or because social goals other than economic efficiency are being pursued.

18. Fluctuations in a nation's overall levels of income, employment, and prices are determined by the interaction of spending and production decisions made by all households, firms, government agencies, and others in the economy. Recessions occur when overall levels of income and employment decline.

19. Unemployment imposes costs on individuals and the overall economy. Inflation, both expected and unexpected, also imposes costs on individuals and the overall economy. Unemployment increases during recessions and decreases during recoveries.

20. Federal government budgetary policy and the Federal Reserve System's monetary policy influence the overall levels of employment, output, and prices.

Source: CEE (2010).

Appendix 3. Answer Form and Scoring Keys, *TEL* (4th Edition)

Answer Form

	A	B	C	D
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○
10	○	○	○	○
11	○	○	○	○
12	○	○	○	○
13	○	○	○	○
14	○	○	○	○
15	○	○	○	○
16	○	○	○	○
17	○	○	○	○
18	○	○	○	○
19	○	○	○	○
20	○	○	○	○
21	○	○	○	○
22	○	○	○	○
23	○	○	○	○
24	○	○	○	○
25	○	○	○	○
26	○	○	○	○
27	○	○	○	○
28	○	○	○	○
29	○	○	○	○
30	○	○	○	○
31	○	○	○	○
32	○	○	○	○
33	○	○	○	○
34	○	○	○	○
35	○	○	○	○
36	○	○	○	○
37	○	○	○	○
38	○	○	○	○
39	○	○	○	○
40	○	○	○	○
41	○	○	○	○
42	○	○	○	○
43	○	○	○	○
44	○	○	○	○
45	○	○	○	○

_____ RAW SCORE

_____ PERCENTILE SCORE

NAME _____ DATE _____
month day year

AGE _____ DATE OF BIRTH _____ SEX M F
month day year (circle one)

SCHOOL OR TEST CENTER _____

ADDRESS _____
number and street city state zip

INSTRUCTOR _____ GRADE OR YEAR _____ SEMESTER _____

Appendix 3. Answer Form and Scoring Keys, *TEL* (4th Edition) (Cont.)

Scoring Key Form A

	A	B	C	D
1	○	○	○	●
2	○	●	○	○
3	○	○	●	○
4	○	○	○	●
5	○	●	○	○
6	○	○	●	○
7	●	○	○	○
8	○	○	●	○
9	●	○	○	○
10	○	○	●	○
11	○	●	○	○
12	●	○	○	○
13	●	○	○	○
14	○	●	○	○
15	●	○	○	○
16	○	●	○	○
17	●	○	○	○
18	○	●	○	○
19	○	○	○	●
20	●	○	○	○
21	○	○	○	●
22	○	○	●	○
23	○	○	○	●
24	○	○	○	●
25	○	○	●	○
26	○	●	○	○
27	●	○	○	○
28	○	●	○	○
29	○	○	○	●
30	○	○	●	○
31	●	○	○	○
32	○	●	○	○
33	○	○	●	○
34	○	●	○	○
35	○	○	●	○
36	○	○	○	●
37	●	○	○	○
38	○	○	●	○
39	○	○	○	●
40	○	○	●	○
41	○	○	●	○
42	○	●	○	○
43	○	○	○	●
44	○	○	○	●
45	●	○	○	○

Appendix 3. Answer Form and Scoring Keys, *TEL* (4th Edition) (Cont.)

Scoring Key Form B

	A	B	C	D
1	○	○	●	○
2	●	○	○	○
3	○	●	○	○
4	○	○	●	○
5	○	●	○	○
6	○	○	●	○
7	●	○	○	○
8	○	○	○	●
9	●	○	○	○
10	○	○	●	○
11	○	○	●	○
12	●	○	○	○
13	●	○	○	○
14	○	●	○	○
15	●	○	○	○
16	●	○	○	○
17	○	○	○	●
18	○	●	○	○
19	○	○	○	●
20	○	○	●	○
21	○	○	●	○
22	○	○	●	○
23	○	○	○	●
24	○	○	○	●
25	○	○	●	○
26	○	○	○	●
27	○	○	●	○
28	○	●	○	○
29	○	○	○	●
30	○	○	●	○
31	○	○	○	●
32	○	●	○	○
33	○	●	○	○
34	○	●	○	○
35	○	●	○	○
36	○	○	○	●
37	●	○	○	○
38	○	○	●	○
39	●	○	○	○
40	○	○	○	●
41	○	●	○	○
42	○	●	○	○
43	○	○	○	●
44	●	○	○	○
45	●	○	○	○

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ISBN 978-1-56183-706-9

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