

# Analyzing Student Achievement in High School Economics over Time

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The National Assessment of Educational Progress (NAEP), often called the Nation's Report Card, gives results on what students know in the key academic subjects taught in schools in the United States. NAEP testing is conducted in academic subjects such as mathematics, reading, science, writing, history, civics, and geography. In 2006, NAEP economics was administered for the first time to a national sample of twelfth-grade students.<sup>2</sup> It was administered again in 2012.

The analysis for this paper is based on the results that were publicly released from the 2006 and 2012 administrations of the economics assessment (Mead and Sandene 2007; NCES 2013). The 2006 data are also available for public access through NAEP Data Explorer (NDE).<sup>3</sup> A restricted-use dataset from the 2006 testing was released in 2008 that contains complete data on all variables and will be used for this analysis. The 2012 data are only available using NDE because the restricted-use dataset has not been prepared and is not likely to be released until later in 2014. Nevertheless, the available data from the restricted-used dataset for 2006 and publicly available results for 2012 make it possible to compare the average results from NAEP economics in 2006 and 2012 and investigate how student understanding of economics and other characteristics of the student sample have changed over the six-year period.

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<sup>2</sup> For a discussion of issues and content for 2006 NAEP economics, see Buckles and Walstad 2008.

<sup>3</sup> Available at: <http://nces.ed.gov/nationsreportcard/naepdata/>

This study builds on past research of the 2006 NAEP economics data, but focuses only on the results from all students rather than on a subset or a particular course. A preliminary study with the 2006 data reported that the achievement of students in general economics courses was affected by demographic characteristics of the students and some instructional practices of teachers (Walstad and Buckles 2008). Further analysis with the 2006 restricted-use data showed the type of economics course mattered and that the more intensive the economics coursework, the greater the achievement of students and better the perception of economics (Walstad 2013).

### **SAMPLES: 2006 AND 2012**

In 2012, the NAEP economics data were collected from a nationally representative sample of 10,900 twelfth-grade students in 480 public and private schools to represent a target population of 3,343,000 students. The 2006 NAEP economics data were collected from a nationally representative sample of 11,490 twelfth-grade students in 590 public and non-public schools to represent a target population of 3,059,000 students. Following typical NAEP procedures, both the 2012 and the 2006 samples were selected using a stratified, three-stage design that involved sampling students from selected public and private schools across the nation. NAEP data are then weighted so that the sample results can be used to draw valid inferences about the population of twelfth-grade students for each year of testing (Johnson 1989).

In 2012, the weighted national school participation rate for the economics assessment was 87 percent (88 percent for public schools, 74 percent for private schools, and 86 percent for Catholic-only schools). In 2006, it was 79 percent (83 percent for public schools and 41 percent for private schools). To reduce the potential for nonresponse bias, NAEP statistical standards require that analysis of nonresponses be conducted for any sample with a school participation rate below 85 percent even if it is greater than the 70 percent required for separate reporting of public and private school results. This type of analysis was conducted for the private school

samples in 2012 and 2006. The results showed that including substitute schools and adjusting the sampling weights to account for school nonresponse reduced the potential for nonresponse bias.<sup>4</sup> Further, in 2012, a nonresponse bias analysis was conducted for the public school sample because there were no participating public schools in Texas, which account nationally for approximately 9 percent of the public schools. In this case the potential nonresponse bias was reduced only by adjusting the sampling weights to account for school nonresponse because there were no substitute schools.

Additional nonresponse analysis was conducted based on the weighted student participation rate if it falls below 85 percent. In 2012 this rate was 85 percent so it met the cutoff. In 2006, however, the rate was only 72 percent (72 percent for public school students and 87 percent for private school students), so the public school student sample was the focus of further study. The outcomes showed that the work done to reduce school nonresponse through school substitutions and adjustment of the sample weights also reduced the observable nonresponse bias for public school students.

### **SCORES: 2006 AND 2012**

After both the 2006 and 2012 administrations of NAEP economics the test data were analyzed for a year and then the basic findings were released in a public report (Mead and Sandene 2007; NCES 2013). One way that the student results are reported is as scores on an achievement scale that goes from 0 to 300, with the mean set at 150. The scale scores are developed using item response theory methods for scaling and estimation with plausible values (Beaton and Johnson 1992; Misley et al. 1992). A primary focus is on the scale scores for the overall performance of

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<sup>4</sup> A rule from the NAEP governing board forbids the reporting of public and private school results if the school participation rate is below 70 percent, which occurred in 2006 with the private school sample. The rule also applied to the reporting of 2006 data from the western region which did not meet the 70-percent threshold.

students. The same scaling procedures are used to construct subscores for three major content areas: market economy (microeconomics), national economy (macroeconomics), and the international economy (a combination of international topics in micro (exchange rates, trade) and macro (exchange-rate systems, economic growth)).

As shown in Table 1, the average NAEP score in economics for all questions and also the average scores for questions in the three content subsections of the assessment changed little over the six years. The scale score overall increased by only 2 points, from 150 to 152, a difference that is not statistically significant. Similarly, scale scores for the subsections of the assessment related to the market economy, national economy, and international economy increased by only 1 to 2 points, changes that are insignificant. What these results indicate is minimal improvement in the economics achievement of twelfth-grade students over the six-year period, the possible reasons for which will be discussed in a last section.

### **Insert Table 1**

A complementary method for the reporting of NAEP to score reporting is the rank-ordering of scores and sorting students into levels of achievement based on ranges or cutoffs for scores. NAEP defines three achievement levels for economics. Students at or above the *basic* level demonstrate partial mastery of the prerequisite knowledge and skills that are fundamental for proficient work (in 2006 from about 124 to 160). Students at the *proficient* level demonstrate solid academic performance by showing competency, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter (scores from 160 to about 208). Students at the *advanced* level demonstrate superior performance on each of the testing tasks (scores above 208). Students with low scores are classified as “below basic” (a score below 124).

As might be expected from the results from achievement scores, students showed little movement across achievement levels from 2006 to 2012. The percentage of twelfth-graders performing at or above the basic level increased from 79 percent in 2006 to 82 percent in 2012, but the difference was not statistically significant. The major reason why this occurred is that the percentages for the three achievement levels at or above basic were about the same for 2006 and 2012: basic (38 and 39 percent), proficient (39 and 40 percent), and advanced (3 and 3 percent) achievement level. The only statistically significant improvement was found in the below basic category, which showed a decline in the percentage of students in 2006 compared with 2012 (from 21 to 18 percent) as three percent of the students moved into higher categories.

#### **MULTIPLE-CHOICE ITEMS: 2006 AND 2012**

In 2006 the NAEP test in economics contained 186 items, 87 on the market economy, 72 on the national economy and 27 on the international economy.<sup>5</sup> A similar number of items also were used for the 2012 assessment in economics. For each testing, about 85 percent were multiple-choice items and about 15 percent were short or long constructed-response items for which a student had to supply a written response. Each student, however, answered only a small portion of the test questions (about 36 to 40) based on the test booklet given to that student. Each test booklet also contains questions to collect background data from students.

To prepare the test booklets the developer sorts the assessment items into ten cognitive blocks. Each block takes about 25 minutes for students to complete and contains about 18 test items that are a representative mix of items from the three content areas. Different combinations of two cognitive blocks from the ten cognitive blocks are included in 50 test booklets that are constructed for the assessment. The combinations are arranged using a balanced incomplete

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<sup>5</sup> [http://nces.ed.gov/nationsreportcard/tdw/instruments/2006/cog\\_dev\\_econ\\_number2006.aspx](http://nces.ed.gov/nationsreportcard/tdw/instruments/2006/cog_dev_econ_number2006.aspx)

block (BIB) design in which each cognitive block appears an equal number of times in every possible position and is paired with every other cognitive block in a test booklet exactly the same number of times.<sup>6</sup> The test booklets are then randomly distributed to students who have been selected by district, school, and class using a stratified, three-stage sampling procedure.

To report results from the 2006 NAEP economics, three cognitive blocks (E1, E2, and E4) totaling 53 items or about 28 percent of the test were publicly released and made available on the NDE website.<sup>7</sup> These blocks were then replaced with three new ones containing about the same number of test items as part of the preparation for the 2012 NAEP economics. When the results from the 2012 NAEP economics were released in spring 2013, three additional blocks (E1, E2, and E4) were released. The 59 items in these three blocks also had been used for the 2006 NAEP economics. The NDE website reports the percentages of correct responses and the standard errors for six blocks (three from 2006 and three from 2012). These item data also can be cross-tabulated with major demographic and background variables.

Another way to analyze the NAEP results is to study the percentage of correct response for the 2012 released test items that were used in both 2006 and 2012 and are exactly the same. This work required access to the restricted-use dataset from the 2006 NAEP economics to identify the released items in 2012 that also had been administered to students in 2006. The potential pool of items from the three release blocks in 2012 was 59, but several adjustments reduced the set to 48 items for the comparative analysis. First, the results could be confounded by the mixing of testing formats—multiple-choice and constructed-response. The great majority of items were multiple-choice so to retain the most test information and prevent the mixing of

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<sup>6</sup> [http://nces.ed.gov/nationsreportcard/tdw/instruments/2006/cog\\_dev\\_econ\\_booklets2006.aspx](http://nces.ed.gov/nationsreportcard/tdw/instruments/2006/cog_dev_econ_booklets2006.aspx)

<sup>7</sup> <http://nces.ed.gov/nationsreportcard/itmrlsx/search.aspx>

testing formats from affecting the results, only the 50 multiple-choice items were selected and the 9 constructed-response items were eliminated. Second, two questions in the released 2012 blocks were excluded because they were new ones that were not used in 2006.

The AM statistical program was used to analyze the 2006 restricted-use data to calculate how students performed on these 48 items because this information was not available at the NDE website.<sup>8</sup> The 2006 population estimates for the item percent correct were then compared with the 2012 population estimates for item percent correct that were obtained from the NDE website. Following NAEP procedures, we conducted a *t*-test for two independent groups.<sup>9</sup> The major advantage of conducting this item analysis was that it offered a perspective on student achievement based on a representative sample of actual test items rather than relying on a scaled score that is difficult to interpret because it is based on estimates from five “plausible values.”<sup>10</sup>

Table 2 shows the results of the calculation of the mean percent correct in 2006 and 2012 for all 48 items. The list includes 23 on the market economy, 17 on the national economy, and 8 on the international economy. The item difficulty in 2006 for ranged from 15 percent correct to 87 percent correct; in 2012 it ranged from 14 percent correct to 89 percent correct. Although the list contains a mixture of items with a statistically significant increase (13) and decrease (5) in percent correct, the great majority of items (30 or 63 percent) showed no significant change. Among the items that do show a significant increase or decrease, the change was modest.

### **Insert Table 2**

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<sup>8</sup> The AM software is described at <http://am.air.org/>.

<sup>9</sup> [http://nces.ed.gov/nationsreportcard/tdw/analysis/2004\\_2005/infer\\_compare2\\_indep.aspx](http://nces.ed.gov/nationsreportcard/tdw/analysis/2004_2005/infer_compare2_indep.aspx)

<sup>10</sup> <http://nces.ed.gov/nationsreportcard/tdw/analysis/est.aspx>

## ITEM EXAMPLES AND ANALYSIS

Appendix 1 provides the complete wording for all 48 items and reports the percentage response for each item's options (A, B, C, or D) in 2006 and 2012. Several items are presented here to illustrate the variety of possible outcomes, but the general conclusion is that there is only a minor change in response patterns from 2006 to 2012 regardless of an item characteristic. For example, the most difficult item was a comparative advantage question (#42). A likely reason for the difficulty is that the concept is not taught to students because it is part of the international section of the course for which many teachers often do not have the time to teach.

OUTPUT OF RICE AND WHEAT PER ACRE (in bushels)					
YEAR 1			YEAR 2		
	<u>Rice</u>	<u>Wheat</u>		<u>Rice</u>	<u>Wheat</u>
Country A	100	100	Country A	60	30
Country B	80	40	Country B	40	40

The tables above show the amounts of rice and wheat (in bushels per acre) that Country A and Country B can produce each year over a two-year period. Which of the following statements about comparative advantage is correct?

- A. In both years, Country A has a comparative advantage in wheat. (06:05)<sup>11</sup>
- B. In both years, Country A has a comparative advantage in rice. (64:69)
- C. From year 1 to year 2, Country B's comparative advantage shifts from wheat to rice. (14:12)
- D. **From year 1 to year 2, Country B's comparative advantage shifts from rice to wheat. (15:14)**

What is noteworthy for this difficult item is that the percentage of correct responses is essentially unchanged from 2006 to 2012. A similar insignificant change is found with the least difficult item (#21) asking students to identify the equilibrium price in a supply and demand graph.

Some items do have a significant increase in correct responses from 2006 to 2012, but the maximum increase is eight percentage points or less. One such item is on opportunity cost (#8).

Rashad wants to buy a video game and a new shirt. Each item costs \$40. Rashad has only \$40 to spend. He decides to buy the new shirt instead of the video game. The video game represents which of the following?

- A. **Opportunity cost (52:60)**
- B. Equilibrium price (10:10)
- C. Economic efficiency (12:09)
- D. Comparative advantage (23:21)

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<sup>11</sup> The first number is the percentage response for 2006 and the second is for 2012.

Figuring out why this change occurs is a more speculative exercise with varying degrees of validity. Perhaps the reason for the increase with this item is that it is an introductory concept that is now more likely to be taught if economics has been given more emphasis in multiple grades and courses since 2006. By contrast, the reason why another item (#25) shows a large gain over time seems more obvious.

Which of the following changes is most likely to cause an increase in employment?

- A. **An increase in consumer spending** (66:74)
- B. An increase in interest rates (13:09)
- C. A decrease in business investment (10:10)
- D. A decrease in income (10:07)

The recession of 2007–2009, government response, and the rise in the unemployment rate during and after that time certainly led to more discussion of the topic for this item in the news media, in homes, and in the schools during the time interval, so an increase in student achievement on this item would be expected.

A review of the five items in Table 2 with a significant decrease in correct responses over time reveals no clear pattern or content characteristic associated with each one. What follows is an example of a market economy item (#1) with a decrease.

A headline states: “National Shortage of Nurses Reported by United States Labor Department.” Which of the following would most likely reduce the nursing shortage reported in the headline?

- A. **Increasing the wage rate of nurses** (60:55)
- B. Opening additional hospitals in cities (13:18)
- C. Decreasing the number of nursing school scholarships (08:09)
- D. Raising the certification requirements for registered nurses (18:17)

Why students would show less understanding of this economic relationship between an increase in the wage rate and the elimination of a shortage is difficult to fathom other than to say that it indicates that many students do not know how labor markets work, even less so in 2012.

A similar analysis to the scale score analysis can be conducted using the item data as shown in Table 3. The overall score is estimated by averaging the percent correct across the 48 items. The mean of 53 percent in 2006 is almost identical to the mean of 54 percent in 2012.

The item analysis also permits estimation of sub-scores for the market, national, and international economy based on the summation of the percentage correct for items in each content category. These sub-scores increased by only one percentage point from 2006 to 2012, which is insignificant. This item mean analysis using a reduced set of the NAEP items produces the same results across time as the scale score analysis based on all NAEP items.<sup>12</sup>

### **Insert Table 3**

## **SCORES AND DEMOGRAPHICS**

The focus now returns to the full assessment and its use to study change in scale scores from 2006 to 2012 as they related to student characteristics or change in student characteristics in the 2006 and 2012 samples to identify any significant differences. The data for the study of student characteristics is largely based on the survey from students, but supplemented with data collected through other surveys administered to teachers and the school principal.<sup>13</sup> The data analysis was conducted using NDE.

Table 4 presents findings from the 2006 to 2012 analysis of six characteristics. The ones chosen had been used in previous studies with 2006 NAEP economics to show different characteristics likely related to NAEP scores (Walstad and Buckles 2008; Walstad 2013). The demographic variables include gender, race and ethnicity, whether a student had a general learning problem and whether a student was currently or had recently been an English language learner. The effects of socio-economic status are reflected in the level of a parent's education,

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<sup>12</sup> The standard error in this analysis is estimated in Table 3 using an average of the standard errors across items in a category (overall, market, national, and international). It was not possible to calculate the standard error across a set of items because all students take each test item. To check the robustness of the results, the smallest standard error from an item in a set also was used because it would offer the most conservative test for statistical significance. The result from these proxy estimations using either the average S.E. or minimum S.E. showed that all the changes from 2006 to 2012 by score and content were not statistically significant.

<sup>13</sup> For the economics surveys, go to <http://nces.ed.gov/nationsreportcard/bgquest.asp>.

which ranges from less than a high school graduate to a college graduate. An important education-related variable is the type of high school program (academic versus general or vocational) in which the student is enrolled.

#### **Insert Table 4**

The first observation about these results is that there is minimal change in the characteristics of NAEP students who were tested in 2006 and those who were tested in 2012. Support for this statement comes from comparing the percentages for each characteristic in 2006 and 2012. The only significant difference in the percentages is for students with a learning disability, but it only increased by two percentage points. These results indicate that the high school population who took the NAEP test in 2006 is quite similar to the high school population took the test in 2012 on these major characteristics.

Also revealing from the data is the pattern in the scale scores associated with particular student characteristics. These NAEP scores are more likely to be more sensitive to change than the percentages associated with a characteristics because they can be influenced by education or related factors. Among the demographic factors the only significant change recorded across years was for Hispanics, who scored significantly higher on the test in 2012 than in 2006. As for socio-economic characteristics, students of parents who did not finish high school had significantly higher scores in 2012 than in 2006. Also students in a general or vocational program in high school scored significantly higher in 2012 than in 2006. Although these changes are noteworthy, from an overall perspective, the score results by student characteristic shows more stability than change for most comparisons across the six-year period.

#### **CONCLUSION**

What is remarkable about the test findings presented in this study is how similar they are from 2006 to 2012. Students show about the same level of achievement each year on the overall test

and also on subtests with questions about the market economy, the national economy, and the international economy. This conclusion holds based on work by the NAEP developers to produce scale scores representing student achievement across the approximately 186 items included in the assessment. It also holds based on the item analysis for this study that used a subset of 48 multiple-choice items taken by students in 2006 and administered to students again in 2012. One advantage of this subset analysis is that it permits inspection of the actual test items that were publicly released whereas most test items used to produce the NAEP scale scores are not released or publicly available.

Attaching meaning to these results is a difficult task. The worst outcome would have been for the scores to deteriorate over time suggesting that there are significant problems with economics instruction. The available evidence from the 2006 and 2012 does not support that conclusion. Rather, the stability in student scores over time can be interpreted as a positive development because it shows that the economics achievement of high school student is not a product of the swings in the U.S. economy that occurred because of the recession or other changes to society during that period. Given this neutral outcome, the obvious question to ask is what remained stable that might explain the results. The most likely answer is that student characteristics remained relatively stable from 2006 to 2012 as was previously shown (Table 4).

Other changes, however, within secondary education in the schools suggest that the test scores should have improved if more students are receiving economics instruction over that time period. The available evidence here does show an increase in the economics instruction in the schools from 2006 to 2012. The percentage of high school graduates who had taken an economics course rose from 44 in 2005 to 58 in 2009 based on the most recently available data from high school transcripts (Walstad and Rebeck 2012). Around this period too the number of states requiring that an economics course be taken rose from 14 in 2004 to 22 in 2011 (CEE

2012). This increase in the number of states in 2011 with a mandate suggest that the percentage of high school students who have taken an economics course increased even after 2009. The NAEP dataset also includes a variable sorting students by type of economics course taken and it shows a significant increase in the percentage taking economics courses from 2006 to 2013.<sup>14</sup>

What is perplexing given the increase in economics instruction in the schools is that there is no corresponding increase in economics achievement among students. Several possible reasons may explain the outcome. It may be that there were fewer teachers, or fewer qualified teachers, available to handle the influx of students into economics classrooms. It also may be the schools were not able to provide a sufficient number of economics courses that meet acceptable standards for economics instruction. Another factor to consider is that the type of student shifted into taking economics because of new mandates or course requirements during this period was qualitatively different and less interested in the studying economics than students taking economics in previous years. Why this dichotomy exists between the lack of change in test scores and the significant increase in percentage of high school graduates taking course work in economics remains a curious mystery to be explored in future research.

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<sup>14</sup> The same coding procedures were used to construct this variable in 2006 and 2012, so this coursework variable is a rough indicator of the changes over time. There are, however, coding problems with the variable that make it unsuitable for assessing the effects of coursework on student achievement in a particular year (see Walstad 2013).

## REFERENCES

- Beaton, A.E., and E. G. Johnson. 1992. Overview of the scaling methodology used in the national assessment. *Journal of Educational Measurement* 29(2): 163–75.
- Buckles, S., and W. B. Walstad. 2008. National Assessment of Educational Progress in Economics: Test framework, content specifications, and results. *Journal of Economic Education* 39(1): 100–106.
- Council for Economic Education (CEE). 2012. *Survey of the states: Economic and personal finance education in our nation's schools, 2011*. New York: CEE. Available at: <http://www.councilforeconed.org/news-information/survey-of-the-states/>
- Johnson, E. G. 1989. Considerations and techniques for the analysis of NAEP data. *Journal of Educational Statistics*, 14(4): 303–34.
- Mead, B., and N. Sandene. 2007. *The nation's report card: Economics 2006*. (NCES 2007-475). Washington, DC: U.S. Department of Education. Available at: <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007475>
- Misley, R. J., A. E. Beaton, B. Kaplan, and K.M. Sheehan. 1992. Estimating population characteristics from sparse matrix samples of item responses. *Journal of Educational Measurement* 29(2): 133–61.
- National Center for Education Statistics (NCES). 2013. *The nation's report card: Economics 2012*. (NCES 2013-453). Washington, DC: U.S. Department of Education. Available at: <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2013453>
- Walstad, W. B. 2013. Economic understanding in U.S. high school courses. *American Economic Review*. 103 (2): 659–63.
- Walstad, W. B., and S. Buckles. 2008. The National Assessment of Educational Progress in Economics: Findings for general economics. *American Economic Review*. 98(2): 541–46.
- Walstad, W. B., and K. Rebeck. 2012. Economics course enrollment in U.S. high schools. *Journal of Economic Education* 43(3): 339–47.

**Table 1: Achievement Levels and Scores for NAEP Economics: 2006 and 2012**

<b>Achievement</b>	2006	S.E.	2012	S.E.	<i>t</i> -statistic
Advanced	3	0.3	3	0.3	0.00
Proficient	39	1.0	40	1.0	0.71
Basic	38	0.6	39	0.8	1.00
Below Basic	21	0.8	18	0.8	2.65
<b>Scale scores</b>					
Overall	150	0.9	152	0.8	1.661
Market	150	0.9	151	0.9	0.786
National	150	0.9	152	0.8	1.661
International	150	0.9	151	1.0	0.743

**Table 2: Percent Correct for Same MCItems: 2006 and 2012**

Item	Content	2006		2012	
		Percent Correct	S.E.	Percent Correct	S.E.
1	Market	60	1.13	55*	1.0
2	Market	69	1.21	73	1.4
3	Market	42	1.29	37*	1.4
4	Market	69	0.98	69	1.1
5	Market	53	1.43	53	1.5
6	Market	69	1.34	74*	1.1
7	Market	47	1.31	42*	1.0
8	Market	52	1.38	60*	1.7
9	Market	75	0.99	78*	0.9
10	Market	78	1.11	78	0.9
11	Market	58	1.1	60	1.1
12	Market	52	1.29	52	1.0
13	Market	39	1.02	43*	1.4
14	Market	43	1.14	42	1.5
15	Market	72	1.05	73	0.9
16	Market	84	0.96	87*	1.1
17	Market	82	0.92	86*	0.7
18	Market	52	1.32	51	1.5
19	Market	53	1.22	55	1.3
20	Market	30	0.95	29	1.4
21	Market	87	0.83	89	0.6
22	Market	50	1.38	49	1.2
23	Market	68	1.21	72*	1.3
24	National	70	1.12	71	1.1
25	National	66	1.13	74*	0.9
26	National	44	1.08	42	1.3
27	National	59	1.11	59	1.2
28	National	23	0.94	22	1.1
29	National	64	1.16	66	1.5
30	National	51	1.22	56*	1.2
31	National	32	1.09	29*	1.1
32	National	36	1.14	35	1.2
33	National	42	1.11	39	1.3
34	National	57	1.02	58	1.2
35	National	44	1.15	47	1.3
36	National	53	1.27	59*	1.3
37	National	42	1.18	39*	1.1
38	National	48	1.11	53*	1.3
39	National	22	0.91	20	1.0
40	National	41	1.18	42	1.2
41	International	52	1.25	51	1.3
42	International	15	0.81	14	0.9
43	International	50	1.33	51	1.2
44	International	63	1.17	65	1.1
45	International	49	1.17	55*	1.5
46	International	45	1.06	45	1.3
47	International	44	1.26	47	1.4
48	International	55	1.05	59*	1.1

\*statistically significant at the .05 level.

**Table 3: Percent Correct for Same MC Items: 2006 and 2012**

Content	2006		2012		<i>t</i> -statistic*
	Percent	S.E.*	Percent	S.E.*	
Overall (n = 48)	53.15	1.14	51.57	1.19	1.328
Market (23)	60.17	0.83	59.46	1.17	0.433
National (17)	46.71	1.11	45.55	1.19	0.711
International (8)	46.63	1.14	45.50	1.23	0.6.73

\*estimated

**Table 4: Student Characteristics: Scores and Percentages for 2006 and 2012**

	2006		2012		2006	2012
	Score	S.E.	Score	S.E.	Percent	Percent
Gender						
Male	152	1.0	155	0.9	50	50
Female	148	0.9	149	0.9	50	50
Race/Ethnicity						
White	158	0.8	160	1.0	65	61
Black or African-American	127	1.2	131	1.4	13	15
Hispanic	133	1.2	138*	1.4	14	16
Asian-Pacific Islander	153	3.5	159	2.0	6	6
Am. Indian/Alaska native	137	4.1	136	4.7	1	1
Learning Disability						
Yes	116	1.9	121	1.7	7	9*
No	153	0.9	155	0.9	93	91*
English language learner						
Yes	110	3.2	101	3.4	3	3
No	151	0.8	153	0.8	97	97
Parents' education						
Did not finish high school	129	1.4	134*	1.5	7	8
Graduated high school	138	1.2	139	1.1	18	17
Some college	150	0.8	150	0.8	23	22
Graduated college	160	0.9	161	0.8	49	50
Unknown	118	2.5	122	3.5	3	3
High School Program						
Academic	160	1.0	160	1.1	54	56
General	138	1.0	142*	0.9	46	44

\*significantly different from 2006 (0.05 level).

## APPENDIX 1: Released MC Items with Percentage Responses by Option: 2006 and 2012

### MARKET ECONOMY ITEMS

1. A headline states: “National Shortage of Nurses Reported by United States Labor Department.” Which of the following would most likely reduce the nursing shortage reported in the headline?
- A. **Increasing the wage rate of nurses** (60:55)<sup>15</sup>
  - B. Opening additional hospitals in cities (13:18)
  - C. Decreasing the number of nursing school scholarships (08:09)
  - D. Raising the certification requirements for registered nurses (18:17)

#### MARKET FOR NOTEBOOKS

<u>Price</u>	<u>Quantity of Notebooks Supplied</u>	<u>Quantity of Notebooks Demanded</u>
\$1.00	100 units	100 units
\$2.00	125 units	75 units
\$3.00	150 units	50 units
\$4.00	175 units	25 units

2. According to the table above, what is the equilibrium price of notebooks?
- A. **\$1.00** (69:73)
  - B. \$2.00 (17:14)
  - C. \$3.00 (09:09)
  - D. \$4.00 (04:04)
3. After watching part of a movie she rented, Samantha finds that it is not as good as she expected. Which of the following should she consider in deciding whether to continue watching the movie?
- A. The price she paid to rent the movie (32:40)
  - B. The amount of time she already spent watching the movie (22:20)
  - C. **The activity she could do if she stopped watching the movie** (42:37)
  - D. The time it would take to return the movie (03:02)
4. Janet decides to drop out of college to work full-time. What is most likely to happen to Janet’s income relative to that of a classmate who stays and graduates from college?
- A. Janet’s income will be greater than the classmate’s income now and in the future. (04:04)
  - B. **Janet’s income will be greater than the classmate’s income now but will be lower in the future.** (69:69)
  - C. Janet’s income will be lower than the classmate’s income both now and in the future. (21:23)
  - D. Janet’s income will be lower than the classmate’s income now but will be greater in the future. (04:04)
5. Which of the following statements best explains why a large increase in the price of gasoline will result in only a small decrease in quantity demanded?
- A. Gasoline is a luxury good. (10:10)
  - B. Gasoline takes a large portion of consumers’ budgets. (27:29)
  - C. **Gasoline has no close substitutes.** (53:53)
  - D. Gasoline taxes remain high. (08:08)

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<sup>15</sup>The first number is the percentage response for 2006 and the second is for 2012. The data on the 2012 released items were obtained from <http://nces.ed.gov/nationsreportcard/itmrlsx/search.aspx>. Data for 2006 were calculated from the restricted-used dataset for the 2006 NAEP economics.

6. Of the following, which is the most important factor in improving a country's human capital?
- A. **Job training** (69:74)
  - B. Computer technology (15:11)
  - C. Factory machinery (07:10)
  - D. Highway construction (06:05)
7. As the demand for T-shirts increases and the price of T-shirts rises, how will T-shirt producers in a competitive market most likely respond?
- A. By laying off T-shirt workers to reduce production costs (09:12)
  - B. By making fewer T-shirts to meet their income goals (10:11)
  - C. **By buying more cotton fabric to make more T-shirts** (47:42)
  - D. By increasing advertising spending to increase T-shirt sales (30:35)
8. Rashad wants to buy a video game and a new shirt. Each item costs \$40. Rashad has only \$40 to spend. He decides to buy the new shirt instead of the video game. The video game represents which of the following?
- A. **Opportunity cost** (52:60)
  - B. Equilibrium price (10:10)
  - C. Economic efficiency (12:09)
  - D. Comparative advantage (23:21)
9. Which of the following economic roles does a government play when it provides copyright protection for recorded music?
- A. **Granting property rights** (75:78)
  - B. Preventing monopoly (11:9)
  - C. Setting fiscal policy (08:08)
  - D. Providing public goods (05:05)
10. Assume that an influential new study shows that eating sweet potatoes reduces the risk of heart attacks. Which of the following is most likely to be the initial effect of the study on the sweet-potato market?
- A. The supply of sweet potatoes will increase, and the price of sweet potatoes will rise. (10:12)
  - B. The supply of sweet potatoes will decrease, and the price of sweet potatoes will fall. (06:04)
  - C. The demand for sweet potatoes will decrease, and the price of sweet potatoes will fall. (05:06)
  - D. **The demand for sweet potatoes will increase, and the price of sweet potatoes will rise.** (78:78)
11. Which of the following is most likely to reduce the number of people who own their own homes?
- A. Removing controls on rent so that apartment rents can rise (07:05)
  - B. Increasing the property tax rates on rental property (28:29)
  - C. **Eliminating tax advantages for homeowners on federal income taxes** (58:60)
  - D. Offering a discount on homeowners insurance expenses for first-time buyers (06:06)
12. Carol owns a T-shirt shop in a busy tourist town. Because she has many competitors, she has no control over the price of T-shirts. If Carol's rent for the store space doubles, which of the following is most likely to occur?
- A. **Her profits will decrease.** (52:52)
  - B. Her revenues will decrease. (19:22)
  - C. Her sales of T-shirts will increase. (21:17)
  - D. Her inventory will increase. (07:09)
13. Which of the following best describes an opportunity cost for a student who chooses to quit a full-time job to go to college?
- A. Paying state and federal income tax (05:05)
  - B. Having a higher level of education (47:45)
  - C. **Giving up current wages and benefits** (39:43)
  - D. Paying for housing and meals (08:07)

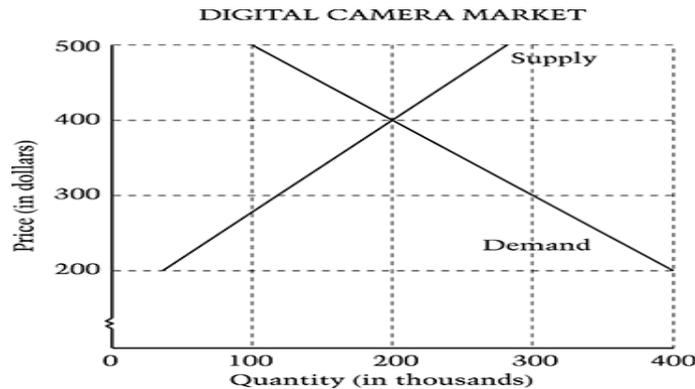
14. In which of the following situations would an economist recommend expanding an existing government program?
- A. When the total cost of the program is greater than the total benefits produced by the program (10:11)
  - B. When the total benefits produced by the program are greater than the total cost of the program (39:41)
  - C. When the additional benefits of expanding the program are greater than the additional costs (43:42)**
  - D. When the additional costs of expanding the program are greater than the additional benefits (06:06)
15. Last year Emery’s annual salary was \$20,000. At the end of the year, Emery received a \$2,000 raise. Six months later the company increased Emery’s salary again because he finished his master’s degree. His new salary is \$25,000. What is the additional benefit of his having earned a master’s degree?
- A. \$25,000 (05:04)
  - B. \$22,000 (05:04)
  - C. \$5,000 (16:18)
  - D. \$3,000 (72:73)**
16. A headline states: “Local School District Hires New Teachers.” The headline refers to which of the following productive resources?
- A. Natural resources (02:01)
  - B. Human resources (84:87)**
  - C. Capital goods (05:07)
  - D. Renewable resources (06:04)
17. Which of the following is a characteristic of a market economy?
- A. Prices are determined by the interaction of buyers and sellers. (82:86)**
  - B. Government determines the quantity of goods purchased. (11:09)
  - C. Tax policies are used to eliminate scarcity. (05:04)
  - D. Deregulation serves to limit most imports. (02:01)
18. Which statement best explains why all countries face the problem of scarcity?
- A. Governments spend too much money. (11:13)
  - B. Increases in inflation have an impact on economic choices. (12:12)
  - C. Changes in demand and supply occur. (25:24)
  - D. People’s wants are greater than their resources. (52:51)**

DARA’S SHOP

Number of <u>Workers</u>	Total Revenue <u>per day</u>
1	\$200
2	\$320
3	\$400
4	\$460

19. Assume that the daily wage of a worker at Dara’s Shop is \$100 and that labor is the only cost of production at the shop. To earn the largest profit, how many workers should Dara hire?
- A. 1 (10:08)
  - B. 2 (53:55)**
  - C. 3 (13:11)
  - D. 4 (23:25)

20. A city currently has one recreation center to serve its young people. To reduce crime, the city is considering building a second recreation center to provide more young people with healthy alternative activities. According to economic reasoning, under what conditions should the city build a second center?
- A. If the second center is expected to be used more than half the time (08:07)
  - B. If the second center is expected to reduce the crime rate by 10% (33:34)
  - C. When the cost of the second center is expected to be less than the benefits from it (30:29)**
  - D. When the total cost of both of the recreation centers is expected to be less than their total benefits (28:30)



21. According to the graph above, which of the following is the equilibrium price for digital cameras?
- A. \$200 (07:07)
  - B. \$300 (03:02)
  - C. \$400 (87:89)**
  - D. \$500 (02:02)
22. Which of the following is a form of business organization that offers limited liability to its owners and helps them raise financial capital?
- A. Sole proprietorship (18:18)
  - B. Monopoly (19:19)
  - C. Corporation (50:49)**
  - D. Consultancy (10:13)
23. Which of the following would give a business more control over the price of its product?
- A. A decrease in consumers' incomes (04:04)
  - B. A decrease in the number of competitors in the market (68:72)**
  - C. An increase in the number of substitute goods available (14:13)
  - D. An increase in the cost of production (11:11)

**NATIONAL ECONOMY ITEMS:**

24. Spending on training and education programs for workers as a percentage of gross domestic product is greater in Country A than in Country B. Which of the following is most likely to be true over the long term?
- A. Country A's economic growth rate will be higher than Country B's. (70:71)**
  - B. Country A's interest rate will be lower than Country B's. (10:9)
  - C. Country A's trade surplus will be higher than Country B's. (12:11)
  - D. Country A's minimum-wage rate will be lower than Country B's. (07:08)
25. Which of the following changes is most likely to cause an increase in employment?
- A. An increase in consumer spending (66:74)**
  - B. An increase in interest rates (13:09)
  - C. A decrease in business investment (10:10)
  - D. A decrease in income (10:07)

26. Which of the following is most likely to cause a drop in short-term interest rates?
- A. An increase in government spending (22:20)
  - B. An increase in the money supply (44:42)**
  - C. An increase in bank reserve requirements (16:17)
  - D. An increase in the national debt (17:20)
27. How would a large increase in the number of business and personal bankruptcies over several years tend to affect the interest rates that banks charge for loans?
- A. Interest rates would fall because the supply of funds would decrease. (13:17)
  - B. Interest rates would rise because banks would find it riskier to lend funds. (59:59)**
  - C. Interest rates would stay the same because banks are not affected by bankruptcies. (11:09)
  - D. The answer cannot be determined because the government sets interest rates that banks charge for loans. (16:14)
28. Which of the following actions can the Federal Reserve take to reduce inflationary pressures in the United States?
- A. Increase government spending (15:15)
  - B. Increase the money supply (32:30)
  - C. Increase interest rates (23:22)**
  - D. Increase taxes (27:32)
29. In a market economy, most decisions about which goods and services to produce, how to produce them, and who will consume them are made primarily by which of the following?
- A. The national government (09:08)
  - B. Industry planning groups (14:11)
  - C. Local and state governments (12:14)
  - D. Consumers and producers (64:66)**
30. The federal government receives the greatest amount of tax revenue from which of the following sources?
- A. Estate taxes (06:05)
  - B. Property taxes (17:15)
  - C. Sales taxes (24:24)
  - D. Income taxes (51:56)**
31. A United States senator relies on the political support of cattle ranchers. Which position on a United States tariff on imported beef is most likely to increase the senator's support among cattle ranchers?
- A. The tariff should be decreased to increase United States cattle prices. (24:24)
  - B. The tariff should be decreased to decrease United States cattle prices (19:21)
  - C. The tariff should be increased to increase United States cattle prices. (32:29)**
  - D. The tariff should be increased to decrease United States cattle prices. (24:26)
32. Which of the following is the most likely effect of a large decrease in total demand for goods and services?
- A. Inflation will increase and unemployment will decrease. (14:13)
  - B. Inflation will decrease and unemployment will decrease. (12:09)
  - C. Inflation will decrease and unemployment will increase. (36:35)**
  - D. Inflation will increase and unemployment will increase. (37:42)
33. What is most likely to happen following a decrease in demand for consumer loans?
- A. Interest rates will increase. (36:39)
  - B. Interest rates will decrease. (42:39)**
  - C. Federal government spending will decrease. (13:13)
  - D. Federal government spending will increase. (09:09)

34. Resource allocation in competitive markets is primarily guided by which of the following?
- A. **The interaction of supply and demand** (57:58)
  - B. Regulations established by governments (20:21)
  - C. Negotiations between labor unions and management (15:14)
  - D. Investment decisions made by commercial banks (07:06)
35. Which of the following policies would most likely increase a country's long-term economic growth?
- A. Encouraging more energy consumption (09:10)
  - B. **Encouraging business investment in equipment** (44:47)
  - C. Increasing government spending on retirement payments (12:10)
  - D. Increasing the growth of the money supply (34:34)
36. Which of the following conditions must Marta meet to be counted as unemployed?
- A. She must be working part-time. (02:01)
  - B. She must have been fired from her previous job. (14:13)
  - C. She must have been out of work for at least eight weeks. (31:28)
  - D. **She must be out of work and actively looking for a job.** (53:59)
37. Which of the following is the most commonly used measure of inflation?
- A. Gross domestic product (37:43)
  - B. Index of Leading Economic Indicators (09:09)
  - C. **Consumer price index** (42:39)
  - D. Dow Jones Industrial Average (10:08)
38. Suppose a large increase in government borrowing competes with private borrowing. What would most likely happen to interest rates and business investment?
- |    | <u>Interest Rates</u> | <u>Business Investment</u> |                |
|----|-----------------------|----------------------------|----------------|
| A. | Decrease              | Decrease                   | (09:09)        |
| B. | Decrease              | Increase                   | (26:21)        |
| C. | <b>Increase</b>       | <b>Decrease</b>            | <b>(48:53)</b> |
| D. | Increase              | Increase                   | (16:16)        |
39. Which of the following will increase the money supply in the United States?
- A. The Federal Reserve raises the discount rate. (36:35)
  - B. A company sells shares of a new stock offering. (26:28)
  - C. A customer pays a monthly credit card bill (15:17)
  - D. **A bank makes a loan to a business.** (22:20)
40. Assume that the current interest rate is 7 percent and that the current rate of inflation is 3 percent. Under these conditions, which of the following is the real interest rate?
- A. 3 percent (04:04)
  - B. **4 percent** (41:42)
  - C. 7 percent (12:11)
  - D. 10 percent (41:42)

**INTERNATIONAL ECONOMY ITEMS:**

41. Suppose that the value of the Japanese yen declines relative to the United States dollar in foreign exchange markets. United States exports to Japan and United States imports from Japan are most likely to change in which of the following ways?
- |    | <u>U.S. Exports to Japan</u> | <u>U.S. Exports from Japan</u> |                |
|----|------------------------------|--------------------------------|----------------|
| A. | Increase                     | Increase                       | (09:08)        |
| B. | Increase                     | Decrease                       | (28:27)        |
| C. | <b>Decrease</b>              | <b>Increase</b>                | <b>(52:51)</b> |
| D. | Decrease                     | Decrease                       | (10:13)        |

OUTPUT OF RICE AND WHEAT PER ACRE (in bushels)

	YEAR 1			YEAR 2	
	Rice	Wheat		Rice	Wheat
Country A	100	100	Country A	60	30
Country B	80	40	Country B	40	40

42. The tables above show the amounts of rice and wheat (in bushels per acre) that Country A and Country B can produce each year over a two-year period. Which of the following statements about comparative advantage is correct?
- A. In both years, Country A has a comparative advantage in wheat. (06:05)
  - B. In both years, Country A has a comparative advantage in rice. (64:69)
  - C. From year 1 to year 2, Country B's comparative advantage shifts from wheat to rice. (14:12)
  - D. **From year 1 to year 2, Country B's comparative advantage shifts from rice to wheat.** (15:14)
43. Which of the following would most likely result if the United States Congress were to place a tariff on imports of aluminum?
- A. **United States consumers would pay higher prices for goods made with aluminum.** (50: 51)
  - B. The tariff would increase the United States economy's growth rate by raising productivity rates. (14:14)
  - C. An increase in costs would cause United States producers of aluminum to decrease production. (22:22)
  - D. United States manufacturers that use aluminum to produce goods would benefit. (13:12)
44. Which of the following best explains why a product once manufactured in the United States is no longer made here and is now imported from other countries?
- A. The technology needed to make the product has become less expensive in the United States. (04:04)
  - B. The technology needed to make the product has become more expensive in other countries. (07:06)
  - C. The opportunity cost of making the product in other countries has increased. (26:25)
  - D. **The opportunity cost of making the product in the United States has increased.** (63:65)
45. Which of the following is one way in which economic growth can help a nation reduce its poverty level and increase its standard of living?
- A. Economic growth increases the demand for imports, thereby raising the demand for foreign exchange. (09:11)
  - B. Economic growth increases the supply of labor, thereby increasing wages. (28:25)
  - C. Economic growth increases disposable income, thereby decreasing the demand for luxury items. (12:09)
  - D. **Economic growth increases the demand for labor, thereby raising income levels.** (49:55)
46. Which of the following must be true if a country has a comparative advantage in the production of computers?
- A. **It has a lower opportunity cost in producing computers than do its trading partners.** (45:45)
  - B. It has more workers producing computers than do its trading partners. (28:29)
  - C. It has less advanced technology in producing computers than do its trading partners. (11:10)
  - D. It imports more computers than do its trading partners. (14:15)
47. Country X and Country Y are trading partners. Country X has a comparative advantage in the production of cars. Country Y has a comparative advantage in the production of wheat. Which of the following events would most likely change the comparative advantages of these countries?
- A. **A new dam floods half the farmland in Country Y.** (44:47)
  - B. The price of bread in Country X decreases. (18:18)
  - C. Country X removes its tariff on automobiles. (18:16)
  - D. The value of Country X's currency increases. (19:19)

48. Under a flexible exchange rate system, the international value of a country's currency is determined primarily by which of the following in the foreign exchange market?
- A. The educational achievements of the country's population (07:06)
  - B. The quality and availability of the country's technology (13:13)
  - C. The supply of and demand for the country's currency (55:59)**
  - D. The strength of the country's industries (23:23)