

An Assessment of Children's Economic Knowledge*

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Abstract

For many years, Korean economic educators have been concerned about children's economic illiteracy. This study attempts to measure the economic knowledge of Korean 5th and 6th grade students in comparison with that of U.S. students. In addition, this study performs regression analyses to identify various factors influencing Korean children's test scores.

According to the results of the test administered, Korean children have less economic knowledge than American children, thus confirming the fears of Korean economic educators. In particular, Korean students are weak in such basic concepts as opportunity cost, supply and demand, and competition. In addition, they are weaker in forms of useful comprehension than in forms of more factual knowledge. The regression analyses also suggest that female 6th grade students, those who read more books, those with positive attitudes toward social studies, those from higher-income families, and urban area students tend to have higher test scores.

Key words : economic education, economic knowledge, basic economics test

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1. The Need for an Assessment

There is considerable and growing concern expressed by educators and the general public about the lack of economic literacy among Korean students. In an effort to address this serious problem, the demand to upgrade economic education and to allocate more class hours in economics to the standard school curricula is rising. However, this demand may lack strong support without concrete evidence demonstrating the insufficient economic knowledge of Korean students. Concrete evidence of the low economic literacy levels of Korean school children, either absolutely or relatively in comparison with foreign students, is needed. Studies to measure the economic literacy of Korean children, or to compare their economic knowledge with students from other countries, have seldom been performed. Therefore, the need to assess the level of economic literacy of Korean elementary students has naturally emerged.

It is also one of the basic duties of economic educators to assess the understanding of the basic economic concepts that students should know to fulfill their present and future roles as consumers, workers, savers, investors, and voters. This kind of research helps educators develop the most effective way to deliver economic education and write new materials.

It is obvious that a good test kit is needed to accurately measure students' economic knowledge and to precisely diagnose the current situation. Regrettably, such a normed test for economic understanding has not yet been developed in Korea. On the other hand, fortunately, a reliable test of that sort has already been developed in the U.S. Recognizing that developing a normed test for national assessment requires a nation-wide effort and support system, items far

beyond the ability of one researcher to mobilize, this study used the test developed in the U.S.

The purposes of this study are to assess the economic understanding of Korean elementary students, to compare the test results with those obtained from U.S. students, and to identify relative weaknesses in Korean students' understanding of economics. In addition, this study investigates the effects of some input variables on students' test scores.

II. Economic Understanding Test

A. The BET

The test this study used is the Basic Economics Test (BET) developed by a U.S. committee and administrated throughout the U.S. The BET is the national normed and standardized test of economic literacy used to assess U.S. elementary students' economic understanding. The BET was developed by the Joint Council on Economic Education (now National Council on Economic Education) and reviewed, revised, and pilot tested by reading specialists and a national panel of experts.

The BET consists of 29 questions, with four choices available for each question, designed to measure the economic understanding of 5th and 6th grade students. The test questions are broken down into four distinct content categories: fundamental economic concepts, microeconomic concepts, macroeconomic concepts, and international economic concepts. In addition, some questions involve basic measurement concepts and methods required to effectively understand economics. The structure of the test and the weight of each category are based on the standard economics

curriculum for elementary school students.

It is also noted that the BET is based upon the knowledge, comprehension, and application levels presented in Bloom's Taxonomy (Bloom, 1956). These three levels are the main focuses in instruction at the elementary school level.

The BET consists of two parallel forms (Forms A and B), with 11 items common to each form. The use of 11 common items or so-called "anchor items" enables us to equate the two forms with the norming sample based on standard test development procedures (Angoff, 1984). Table 1 combines the content categories with the cognitive levels in an overall specification matrix for both forms of the BET. The total number of items are entered into the specification matrix cells according to their content and cognitive categories.

Table 1. Economic Concept and Cognitive Level Matrix of the Test

Form A	Cognitive Levels			
Concepts	Knowledge	Comprehension	Application	Total
Fundamental	2	9	2	13 (44.8%)
Microeconomic	4	4	4	12 (41.4%)
Macroeconomic	2	0	0	2 (6.9%)
International	1	1	0	2 (6.9%)
Total	9 (31.0%)	14 (48.3%)	6 (20.7%)	29(100.0%)

Form B	Cognitive Levels			
Concepts	Knowledge	Comprehension	Application	Total
Fundamental	3	8	1	12 (41.4%)
Microeconomic	4	4	5	13 (44.8%)
Macroeconomic	2	0	0	2 (6.9%)
International	1	1	0	2 (6.9%)
Total	10 (34.5%)	13 (44.8%)	6 (20.7%)	29(100.0%)

Notes: The entries in the matrix cells are the total number of items. The weights are in parentheses.

B. Administrating the Test in Korea

To administer the BET to Korean elementary school students, first it had to be translated into Korean. To ensure that the test results of the two countries would be statistically parallel, a translation faithful to the original was emphasized. However, those questions containing cultural differences were modified to prevent Korean students from choosing wrong answers, not because of a lack of economic knowledge, but because of an inability to understand the question itself. For example, cents and hotdogs were translated into won and kimbap (Korean rice roll), respectively. These translated questions were then pilot tested in April 2006 with 5th grade students. Then classroom teachers reviewed and revised the expressions of some items to improve readability. The resulting test was dubbed as the Korean BET.

Walstad and Robson (1990) said that because the BET was designed as a power test rather than as a speed test, most students would probably complete it within 30 minutes. To maintain parallel test conditions, Korean students were also given 30 minutes to complete the test.

The Korean BET was administered in 20 elementary schools (classes) in Seoul, Gyeonggi, and Incheon, in a pencil-and-paper format. The allocation of schools was based on the populations of three areas: 8 schools in Seoul, 8 in Gyeonggi, and 4 in Incheon.¹⁾ Thus, it should be pointed out that the results in this study might have a bias, considering

¹⁾ According to the population and housing census data published by the Korea National Statistical Office, these three areas have 9.8, 10.4, and 2.5 million people, respectively.

that the population of the Capital area is half of the total population.

A total of 1,385 usable responses was obtained, and the aggregate statistics for both forms of the test are summarized in Table 2. The test scores were measured by the number of correct answers to ensure proper comparison with the U.S. results. The statistics in Table 2 indicate that the mean of Form A of the Korean BET is slightly higher than that of Form B, by 0.12 points, and that the standard deviation of Form B is higher by 0.26 points. The results from 9,182 U.S. students show a mean of 16.82 for Form A and 17.74 for Form B. Thus, while American students' mean was only a little bit higher than Korean students' mean for Form A, the American students' mean was somewhat higher for Form B. This result indeed shows that Korean children have less economic knowledge than corresponding U.S. children.²⁾

Table 2. Aggregate Statistics for Korean BET Sample

	Form A	Form B	Total
Number of Students	691 (100)	694 (100)	1,385 (100)
by Area			
Seoul	265 (38.6)	259 (37.3)	524 (43.3)
Gyeonggi	293 (42.4)	307 (44.2)	600 (37.8)
Incheon	133 (19.2)	123 (18.4)	261 (18.8)
by Grade Level			
Grade 5	346 (50.0)	337 (48.6)	683 (49.3)
Grade 6	345 (49.9)	357 (51.4)	702 (50.7)
Mean	16.62	16.50	
Standard Deviation	4.64	4.80	

Note: The weights in percent are in parentheses.

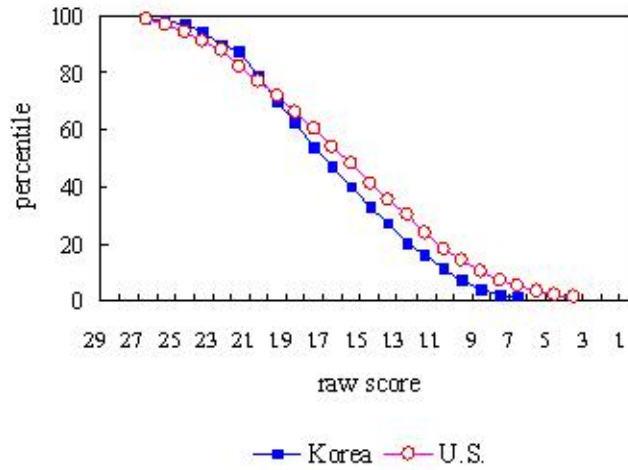
²⁾ A referee pointed out that U.S. children might have an advantage over Korean children in the test based on the U.S. curriculum.

III. Data Analysis

A. Comparing Percentile Ranks

The raw scores can be converted to percentile ranks for the appropriate grade level by calculating the total percentage of students in a given group who scored at or below a certain raw score. Figure 1 compares the percentile ranks of Korean and U.S. students. In raw test scores, Korean students for Form A show higher percentile ranks above 21, but lower percentile ranks below it, implying lower standard deviation than U.S. students. (Korea = 4.64 and U.S. = 5.52) In the case of Form B, the overall features are similar to Form A, but the reversion score is now 13 and the percentile gaps between the two countries are much smaller. Actually, the standard deviations of the two countries for Form B differ only slightly. (Korea = 4.80 and U.S. = 4.99)

Figure 1. Percentile Ranks for Korea and U.S.
Form A



Form B

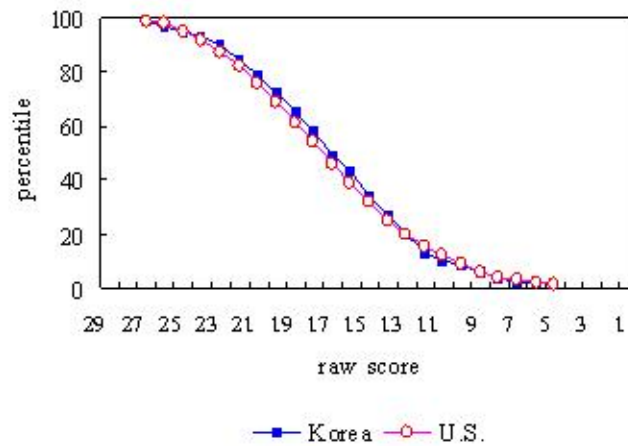


Table 3 presents the percentile ranks obtained from 5th and 6th grade students according to the different Forms of the Korean BET. This table allows comparisons to be made among students in different grades, by simply reading across from the raw score column to the column of percentile rankings. For example, a 6th grade student who obtains a

raw score of 20 on Form A of the Korean BET is performing as well as or better than 77 percent of all 5th grade students taking Form A. It can be concluded from the table that 6th graders scored consistently better than 5th graders on both forms of the test.

Table 3. Percentile Ranks for the Korean BET by Grade

Raw Score	Form A			Form B		
	Overall	Grade 5	Grade 6	Overall	Grade 5	Grade 6
29						
28						
27	99	99	99	99	99	99
26	98	98	98	97	98	97
25	97	98	97	95	96	94
24	94	96	92	93	94	92
23	90	94	86	90	92	87
22	87	92	81	84	87	81
21	79	85	73	79	83	75
20	70	77	62	72	76	68
19	62	70	55	65	69	61
18	54	64	44	58	64	53
17	47	54	39	49	53	44
16	40	49	32	43	47	39
15	33	41	25	34	39	29
14	27	34	19	27	30	23
13	20	26	13	20	23	16
12	16	22	10	13	15	12
11	11	15	7	10	11	9
10	7	11	4	8	8	7
9	4	8	1	6	7	5
8	2	3		4	5	4
7	1	2		2	2	3
6		1		2	2	1
5				1	1	
4						
3						
2						
1						

B. Item Analysis

Because students have different degrees of understanding of different aspects of economics, it is necessary to know how Korean students performed on specific parts of the test. To identify relative weaknesses in economic concepts, the percentage of correct responses can be used. In addition to the percentage of correct responses, the percentages of responses to each of the other options also provide useful information on the relative weaknesses of students. If a substantial percentage of students answered ① when the correct answer is ②, educators might study distracter ① to determine the reason. Table 4 presents these data for each item of Forms A and B, along with the percentage of blank or omitted responses.

This study arbitrarily defined weak items as those which less than 40 percent of the students answered correctly. There are 6 items for Form A and 5 items for Form B whose percentage of correct response is below 40 percent, with the lowest percentage being 14.4 percent on item 6 of Form B. We can find that the economic concepts in which Korean students demonstrated weakness in their understanding were opportunity cost, and supply and demand.

The opportunity cost is the most fundamental economic concept, and it must be considered in every financial decision. A proper understanding of opportunity cost surely leads to a rational choice. When a boy uses his \$1.00 to buy candy instead of ice cream, the opportunity cost is buying the ice cream (item 8 of Form A). Similarly, if a girl chooses piano lessons instead of violin lessons, her opportunity cost is violin lessons (item 6 of Form B). However, only 20.3 percent of the students selected the correct answer, ice cream, and even fewer, 14.4 percent, selected violin lessons. Most Korean

elementary students failed to understand that opportunity cost is the highest valued alternative that must be forgone when another option is chosen.

Table 4. Percentage Responses to Each Option for the Korean BET

Item	Form A					Form B				
	①	②	③	④	Blank	①	②	③	④	Blank
#1	15.5	7.8	20.3	<u>54.8</u>	1.6	18.3	6.8	22.0	<u>51.3</u>	1.6
2	20.8	<u>73.5</u>	2.9	2.3	0.4	7.1	<u>57.8</u>	20.7	13.1	1.3
#3	12.7	48.2	13.9	<u>24.3</u>	0.9	16.0	45.2	15.1	<u>22.9</u>	0.7
#4	20.5	<u>44.3</u>	13.0	21.0	1.2	16.0	<u>52.4</u>	12.5	18.0	1.0
5	10.1	10.6	<u>76.7</u>	1.9	0.7	<u>86.2</u>	5.6	4.2	3.5	0.6
6	<u>86.5</u>	3.8	3.9	5.5	0.3	<u>14.4</u>	9.4	69.9	6.1	0.3
#7	29.1	5.1	<u>63.5</u>	1.7	0.6	26.9	6.1	<u>61.8</u>	3.5	1.7
8	35.6	2.9	<u>20.3</u>	40.2	1.0	2.4	7.1	<u>86.0</u>	4.2	0.3
9	15.6	10.9	8.0	<u>64.8</u>	0.7	5.3	<u>61.7</u>	5.8	26.4	0.9
10	0.4	<u>97.4</u>	0.9	1.3	0.0	2.2	1.6	2.6	<u>93.7</u>	0.0
11	4.6	6.9	8.7	<u>76.7</u>	3.0	21.2	16.9	4.9	<u>56.6</u>	0.4
12	<u>43.3</u>	24.2	16.5	15.5	0.6	<u>59.2</u>	15.6	9.1	13.5	2.6
#13	8.0	<u>47.9</u>	4.9	36.3	2.9	8.4	<u>60.2</u>	6.1	24.9	0.4
14	9.6	14.9	27.9	<u>45.3</u>	2.3	<u>45.4</u>	12.5	31.7	8.2	2.2
15	4.1	14.3	<u>50.7</u>	30.7	0.3	21.3	<u>47.6</u>	24.1	5.3	1.7
#16	13.2	29.8	<u>35.0</u>	20.4	1.6	12.5	24.9	<u>42.5</u>	19.0	1.0
17	<u>30.5</u>	32.7	12.4	23.3	1.0	30.5	9.9	<u>45.1</u>	13.5	0.9
#18	6.1	9.1	<u>80.0</u>	4.2	0.6	7.9	10.8	<u>75.4</u>	4.0	1.9
19	<u>64.3</u>	5.9	14.3	14.9	0.6	<u>49.7</u>	16.3	13.8	18.6	1.6
#20	5.1	9.4	6.8	<u>78.0</u>	0.7	2.9	13.5	11.0	<u>71.8</u>	0.9
#21	<u>70.8</u>	13.0	4.1	9.6	2.6	<u>65.7</u>	15.3	5.0	11.8	2.2
#22	<u>73.8</u>	12.2	3.8	9.3	1.0	<u>71.0</u>	11.5	6.3	10.7	0.4
23	7.2	16.1	<u>65.4</u>	10.6	0.7	6.1	5.2	<u>82.1</u>	5.8	0.9
24	4.2	<u>61.9</u>	10.1	22.7	1.0	4.5	<u>29.3</u>	60.5	4.9	0.9
25	<u>33.6</u>	11.1	17.1	37.5	0.7	40.6	<u>49.1</u>	3.5	6.6	0.1
26	38.4	3.6	3.9	<u>53.3</u>	0.9	<u>74.9</u>	9.8	10.5	4.5	0.3
27	20.5	10.7	31.8	<u>35.2</u>	1.7	23.1	28.0	16.7	<u>30.5</u>	1.7
#28	28.5	<u>46.2</u>	12.7	8.4	4.2	32.4	<u>39.5</u>	18.0	8.6	1.4
29	4.8	<u>68.3</u>	15.2	10.6	1.2	5.5	11.0	11.8	<u>68.4</u>	3.3

Notes: _ Correct response.

The item is on both Forms.

For item 8 of Form A of the Korean BET, 35.6 percent of the sample incorrectly thought that \$1.00 was the opportunity cost, while 40.2 percent also incorrectly chose that opportunity cost was everything else he could buy for \$1.00. For item 8 of Form B, an astonishing 69.9 percent of the sample thought that money for piano lessons is the opportunity cost of choosing piano lessons. This is a very typical type of misunderstanding observed from economically illiterate children. Those who misunderstand the concept of opportunity cost tend to believe the amount of money someone pays for something is the opportunity cost.

Korean students also did poorly in regards to supply and demand, and price determination as well. The concept of substitutes is also included in this test item: if the price of a product rises, the demand for substitute goods increases. Only 33.6 percent for Form A (item 25) and 29.3 percent for Form B (item 24) correctly answered the item regarding the relationship between price changes and the demand for substitutes. It is likely that these two items are difficult for 5th and 6th graders to answer because they have to know substitutional behavior in response to price changes as well as price determination.

It is worthwhile to note that for the same item from Form A, 37.5 percent of the sample, more than the percentage of correct responses, thought that the price of apples would fall if insects destroyed that year's apple crop. This is another typical example in which students whose economic knowledge is weak tend to answer incorrectly. Their way of thinking is as follows. If insects destroy apple crop, then the price goes up. Therefore the demand for apples decreases and then the price of apples fall. This improper way of thinking mainly comes from failing to distinguish changes in demand

from changes in the quantity demanded.

Korean students were also weak in understanding the consequences of competition, although it appears in the social studies textbook for 5th graders. The share of students who correctly answered that competition would help keep prices down was 30.5 percent. About a quarter of students thought that competition would guarantee a profit to all businesses in a market, and even more students (32.7 percent) answered that competition would help prevent depressions.

In addition, there were many Korean students who were unable to grasp the definition of inflation, one of the basic economic concepts. The meaning of tariffs was another concept that many Korean students failed to understand properly. Less than 40 percent correctly understood that inflation refers to general increases in the prices of individual goods and services, and tariffs are taxes on imported goods. Perhaps it is just as well that these two terms are considered beyond the scope of the Korean curriculum, but it seems unfortunate that these terms are very widely used words in both everyday life and in the news. In regards to inflation, the percentages of correct responses for the U.S. students were 51.0 percent (Form A) and 53.4 percent (Form B), while 48.7 percent correctly identified tariffs, as is shown in Table 5. Thus, U.S. elementary students clearly had better knowledge of these definitions than Korean students.

Finally, only 35.0 percent of the Korean sample knew the meaning of the term monopoly. Although "monopoly" is not included in the curriculum either, it is somewhat surprising that many students regarded the situation as only applying to labor unions or governments.

It should be noted from Table 5 that there are two test items about opportunity cost on each form: one is classified as pertaining to knowledge and the other pertaining to

comprehension, following Bloom's cognitive taxonomy. Students of both countries were worse in regards to comprehension than in regards to knowledge, thus suggesting future teaching focus and direction for economic educators.

Table 5. Low Percentage of Correct Responses and Corresponding Concepts

Form	Item	Economic Concept	Cognitive Level	Percent Correct	
				Korea*	U.S.
A	3**	Opportunity Cost	Knowledge	24.3	44.4
A	8	Opportunity Cost	Comprehension	20.3	32.1
A	16	Monopoly	Comprehension	35.0	36.5
A	17	Competition	Comprehension	30.5	41.6
A	25	Supply & Demand	Application	33.6	34.1
A	27	Inflation	Knowledge	35.2	51.0
B	3**	Opportunity Cost	Knowledge	22.9	40.3
B	6	Opportunity Cost	Comprehension	14.4	23.1
B	24	Supply & Demand	Application	29.3	71.9
B	27	Inflation	Knowledge	30.5	53.4
B	28	Barriers to Trade (Tariffs)	Knowledge	39.5	48.7

Notes: * Lower than 40 percent only.

** Item is on both Korean BET forms.

IV. Regression Analysis

A. The Regression Model

The students' test scores can be regarded as the output, the learning production function of the input students may bring to the learning environment. In this respect, it is of interest and importance to identify key background factors influencing the scores. For this purpose, the participating students were asked to fill out a short survey regarding personal factors, right after taking the Korean BET. Gender, grade, interest in reading, educational level of parents, and preference for social studies were items included in the survey. These personal factors or human capital factors were

believed to affect economic literacy in previous studies, for example, Schug (1991), Walstad (1997), and Hahn (2002). Although a number of economic education research studies have proposed three categories of input for the production function, this study focused only on some human capital input. The other two categories, the utilization rate (study and class time) and technology (alternative teaching methods or equipment), were not used in this study because elementary school children who took the Korean BET were essentially identical in terms of these input variables.

The specific independent variables used in the linear regression model are as follows:

ones in this category of studies, are included to measure differences in the sex and age of students. The gender variable is still of interest, in that empirical evidence regarding the role of gender in economic knowledge is mixed. Davison and Kilgore (1971), Buckles and Freeman (1983), Kim et al. (1997), and Hahn (2002), for example, found no significant difference between males and females in learning economics at the elementary school level. On the other hand, MacDowell et al. (1977), Walstad and Soper (1988), Heath (1989), Gleason and Van Scyoc (1995), and Walstad (1997) found significant differences in the level of economic knowledge in favor of males among high school and college students.

The sign of the coefficient on the grade variable is usually believed to be positive because economic knowledge tends to accumulate with increasing maturity (Schug, 1991). However, the other effect is also plausible: retention declines over time. Because in Korea the subject of economics appears in 4th and 5th grade textbooks but does not appear in 6th grade textbooks, 6th graders might achieve lower scores than 5th graders as a result of diminishing economic knowledge. Therefore, the sign of the estimated coefficient is ambiguous.

The variable for the number of books students read in a month is included to test a positive relation between test scores and the number of books read. Because economics is a social science concerned mainly with the problems of real life, economic knowledge can also be obtained from books as well as from formal economics instruction in the classroom. Although to our knowledge no study has ever investigated the impact of reading books on economic knowledge, a positive estimate is expected from this variable.

The family education variable measures the effect of parents' educational levels on economic understanding. The

inclusion of this education variable is based on the hypothesis that students at higher socioeconomic levels, as measured by parents' educational levels, would score better on an economic test than would students at lower levels. Although the educational levels of parents are very highly correlated (the correlation coefficient is 0.609 for the entire sample), the educational variable is applied to both mothers and fathers to identify which parent has more influence on children's test scores.

Finally, a preference variable was included to measure the influence of students' attitudes toward social studies on their test scores. Because existing studies tend to indicate that attitudes toward a subject positively influence test scores, this variable is expected to be positive.

The Korean BET also asked the teachers administering the test in their classes to fill out information on family income and the type of community. Some estimates obtained from the teachers, in particular income estimates, were obviously very crude and subject to significant error.³⁾ However, this supplementary information was necessary to compare the results of the Korean BET with those of the U.S. progenitor. The type of community in which schools are located was broken down into three categories: namely, urban, suburban, or rural. Thus, the dummy variables for these estimates were

B. Regression Results

Although unbiased and minimum variance estimators can be obtained using the OLS method, conventional standard errors are no longer valid in the presence of heteroskedasticity. To detect it, White's heteroskedasticity test was carried out. The null hypothesis of no heteroskedasticity was rejected at the 5 percent significance level. White (1980) proposed heteroskedasticity consistent covariance matrix estimator to obtain correct estimates. The results are reported in Table 6, where the dependent variable equals the raw test scores and thus is given values between 0 and 29.

The first three equations of Table 6 were estimated for the merged samples from Types A and B, whereas equation (4) was used for Type A and equation (5) was used for Type B. Because the estimated results for the total and separate samples are basically similar, the following analyses will focus only on equations (1), (2), and (3).

Table 6. Regression Results for the Korean BET Sample

Independent Variables	Equations				
	(1)	(2)	(3)	(4)	(5)
	0.89 (3.61)	0.92 (3.71)	0.88 (3.57)	1.10 (3.24)	0.73 (2.00)
	1.78 (7.07)	1.84 (7.35)	1.73 (6.94)	2.32 (6.75)	1.24 (3.32)
	0.87 (2.05)	0.86 (2.03)	0.93 (2.21)	1.04 (1.72)	0.68 (1.14)
	2.06 (5.01)	2.06 (5.05)	2.14 (5.24)	2.20 (3.85)	1.96 (3.32)
	0.87 (1.08)	1.20 (1.53)	-	-0.65 (-0.61)	3.24 (3.18)
	1.46 (1.74)	1.54 (1.98)	-	0.04 (0.04)	3.70 (3.31)
	0.84 (1.13)	-	1.17 (1.70)	1.00 (1.04)	0.60 (0.55)
	0.38 (0.48)	-	1.06 (1.54)	0.35 (0.35)	2.34 (0.20)
	1.13 (3.68)	1.15 (3.80)	1.11 (3.63)	1.61 (3.86)	0.59 (1.30)
	2.63 (6.76)	2.60 (6.71)	2.56 (6.60)	2.71 (5.11)	2.48 (4.32)
	0.67 (2.38)	0.64 (2.28)	0.68 (2.43)	0.38 (0.95)	0.83 (2.03)
	1.33 (2.85)	1.28 (2.80)	1.38 (2.95)	1.55 (2.44)	0.99 (1.40)
	10.06 (9.43)	10.46 (10.97)	10.71 (12.51)	10.51 (7.49)	8.96 (6.10)
	10.32 (10.28)	10.73 (11.91)	11.01 (14.06)	11.05 (8.45)	9.00 (6.43)
	1,307	1,317	1,315	647	660
	0.12	0.12	0.12	0.15	0.10
	-3,786	-3,816	-3,812	-1,850	-1,926

Notes: The dependent variable equals the raw test scores.

The

For all of the equations, most variables, with the exception of the parents' educational level, are statistically significant and have positive signs. The gender variable has a positive estimate, suggesting higher scores for female students. This finding is different from the previous results by Davison and Kilgore (1971), Buckles and Freeman (1983), and Kim et al. (1997). On the Korean BET, female elementary students scored better than male students by 0.88-0.92 points, other things being equal.

A significant advantage for 6th graders is apparent. Korean 6th graders had substantially more economic knowledge by 1.73-1.84 points, as measured by the Korean BET, than 5th graders, meaning that the "maturity effect", whereby students' economic knowledge increases with age, surpassed the "lasting effect", whereby 6th graders lose some economic knowledge they have acquired in previous grades. Two explanations for this result are likely to be possible. For one, students' economic understanding is acquired not only from classroom learning, but through various channels, such as books, newspapers, television, dialogues with peers or parents, personal experience, and so forth. Another possible explanation is that the retention of economic knowledge does not decline substantially within the first two years after classroom learning.

Reading more books has contributed to improved test scores, as expected, supporting the idea of "learning by reading". The

1 book.

Students' preference for social studies contributed significantly to their greater economic knowledge across all equations. Students with a positive preference for social studies outperformed students with a neutral or negative preference. Table 6 shows that students with a positive preference scored 2.56-2.63 points higher, and students with a neutral preference scored 1.11-1.15 points higher, respectively, than students with a negative preference. These results are generally consistent with previous studies revealing the positive effects of attitudes on test performance.

For all of the equations, the income variable is statistically significant and has a positive sign as well. The children of middle-income parents outperformed the children of low-income parents by 0.64-0.68 points, depending on the equations used, with a 5 percent significance level. The performance difference between high and low income students was even wider: the students of parents whose income is relatively high scored 1.28-1.38 points higher than students of low-income parents. The estimates on the high income variable are significant at the 1 percent level.

The most striking results emerged from the effect of schools' locations: locational differences emerged as a strong predictor of performance on the Korean BET. Students from schools located in urban areas scored 10.32-11.01 points higher, and students from suburban areas have scored 10.06-10.71 points higher, respectively, than students from rural areas. However, no significant difference between urban and suburban areas was found. It is generally accepted in Korea that the educational environment is worse in rural areas than in other areas, and thus that the academic performance of students from rural areas is poorer. It can be shown that the difference in the economics performance of

elementary school students, as measured by these test scores, is not exceptional.

Contrary to the variables mentioned above, parental education, initially believed to be an important factor, was actually an insignificant determinant of test scores, even though weakly significant estimates, say at the 10 percent level, are found depending upon the equation employed. All the educational variables are included and estimated in equation (1), and mothers' educational levels are excluded in equation (2), and fathers' educational levels are excluded in equation (3). No remarkable differences from the three equations are found, as shown in Table 6. A couple of points might be mentioned from these results: fathers' educational levels were slightly more significant than mothers' educational levels, and students with fathers who have obtained college education scored better.

The coefficients of determination, measured by the adjusted

V. Conclusions

For many years Korean economic educators have stressed the importance of children's understanding of economics. In order to assess children's economic literacy level, the Korean BET was carried out. An analysis of the test results shows that Korean elementary students are weak in such economic concepts as opportunity cost, supply and demand, and competition. The results also suggest that Korean children have less economic knowledge, as measured by the BET, than U.S. children.

The results of the regression analysis indicate that test scores are significantly related to gender, age level, interest in reading books, preference for social studies, family income, and school location. It should be pointed out that an attempt to gather some of the more important missing variables in the learning production function needs to be done.

Given the limitations of the sample and data with respect to important input variables, this study yields some important implications for improving Korean students' understanding of economics. It is also possible that more stress needs to be placed on materials dealing with concepts such as opportunity cost, supply and demand, price determination, and the outcomes of competition.

As Becker (1983) has stated that replication is the essence of inductive scientific inquiry, empirical results need to be reconfirmed with various samples. Walstad and Soper (1989) have also stated that replication is a vital component of the research in economic education, because there is little formal theory of the educational process to guide model specification. Collecting new and reliable data is the key, and more of this type of research needs to be carried out in

Korea in the future.

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