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WILLIAM WALSTAD, Section Editor

Teacher and Student Economic Understanding in Transition Economies

William B. Walstad and Ken Rebeck

Abstract: This study describes a new data set and uses it for an exploratory investigation of whether seminars for teachers conducted by the National Council on Economic Education through its International Education Exchange Program (IEEP) had a beneficial effect on the economic understanding of the high school students of these teachers. The data were collected using a non-equivalent control group design that sorted teachers into two groups based on whether or not they participated in an IEEP seminar. Pre- and posttests of economics were administered to the students of these teachers in Lithuania, Ukraine, Kyrgyzstan, and Poland. The exploratory results showed a larger increase in the economic understanding of students of teachers who participated in the IEEP seminars compared with students of teachers who did not. The results also showed that knowledge of economics among IEEP teachers was a factor for improving student achievement in economics. The findings should be viewed with caution because of data limitations.

Key words: data set, economic understanding, students, teachers, transition economies

JEL codes: A2, P2, P3

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This study describes a new data set and uses it for an exploratory investigation of the effects of seminars for teachers in transition economies on the economic understanding of their students.¹ The National Council on Economic Education (NCEE) through its International Education Exchange Program (IEEP) conducted seminars in 1995 and 1996 for secondary school teachers in four nations making a transition to a market economy: Lithuania, Poland, Ukraine, and Kyrgyzstan. The IEEP seminars were designed to increase teacher understanding of basic economics and how a market economy works. They included instruction to improve the skills of the participants in teaching economics and gave teachers content and lesson materials they could use with students.²

The direct effects of each teacher seminar were evaluated by the Education Development Center (EDC 1996, 1997). That analysis found that each seminar increased teacher understanding of micro- and macroeconomic concepts. The results also showed that teachers developed more positive attitudes toward a market economy. In addition, teachers reported an improvement in their teaching skills and a greater understanding of how to teach economics to students using the IEEP materials.³

After participating in the seminars, teachers were expected to return to their high school classrooms and use their IEEP training and materials to improve the economic education of their students. The focus in our exploratory study was whether IEEP had beneficial effects on the economic understanding of the students of these teachers. Research in economic education in the United States shows that teacher training in economics is an important factor influencing student economic understanding and attitudes after accounting for personal characteristics (Becker, Greene, and Rosen 1990; Bosshardt and Watts 1990). This research also suggests that economic education is most effective when good curriculum materials are available for teaching economics (Walstad 1992). It is not known whether these findings also apply to economic education for teachers and students in nations making a transition to a market economy.

Creating a new data set and using it for an exploratory study of the IEEP project in these four nations posed challenges that should be instructive for other researchers conducting economic education studies in transition economies. First, the evaluation and data collection design had to be flexible because it was not possible to conduct a true experiment in each nation. The design, however, still had to produce useful data and results that would at least be suggestive of what would be found if it was possible to conduct a true experiment. Second, and related to the first, the evaluation required the cooperation of teachers and administrators to obtain data. They had to agree to participate in the study and administer tests to students in the four nations and in multiple school sites within each nation. Third, teaching materials and test instruments had to be translated for each nation. They needed to be checked for language accuracy and common meaning so that they conveyed the same idea in all four nations. Fourth, the cost of collecting the data and conducting the evaluation was extensive. The complexity of the project required hiring and working closely with a firm that translated the materials, managed the testing, and processed the data. Finally, there

were problems with the statistical analysis of the data as will be explained in the discussion that follows.

DATA, DESIGN, AND GROUPS

The plan for data collection was based on a nonequivalent control group design with pre- and posttesting (Cook and Campbell 1979). The characteristics of the teachers determined group membership. The experimental group of students was taught by economics teachers who were trained in the IEEP seminars.⁴ The control group of students was taught by economics teachers not trained at IEEP seminars. The question to be answered was whether students of teachers with IEEP training would show a greater understanding of economics than students of economics teachers without IEEP training. Although both groups studied economics over the same time period and under the same conditions in each nation, the IEEP students were expected to have an advantage in learning economics because of the economic education received by IEEP teachers.

The teachers who participated in the study were recruited by EDC, the firm contracted to collect the data. EDC recruited these teachers through their in-country partners, who were college faculty or school officials working with teachers in those nations. EDC selected the IEEP teachers for the study on the basis of teacher survey responses on a Participant Information Form indicating that (1) they had participated in the 1995 and 1996 IEEP seminar(s); (2) were currently teaching economics as a subject; and (3) were teaching economics in grades 9 and 10 in their country. EDC also had their country partners identify a similar group of non-IEEP teachers in each nation who were teaching economics as a subject at grade 9 or 10, but who never attended an IEEP seminar. The study, therefore, focused only on economics instructors teaching the subject at grade 9 or 10 in their respective nations.

The nonequivalent design is one of the most common used in evaluations because random assignment of subjects to groups is often not possible or feasible, which was the case in this study. The nonrandom assignment of teachers, however, does raise concerns about sample selection. There may have been some characteristics associated with the economics teachers who volunteered for the IEEP seminars, who met the three criteria, and who volunteered for the study that account for why students of IEEP teachers, on average, gained more economic knowledge during a course than students of economics teachers in the control group. An argument could be made that the IEEP teachers were more motivated or were better teachers initially than the control teachers. These initial differences in teacher characteristics, in turn, may explain the difference in student scores between the groups rather than IEEP training.

The selection issue was investigated for this study, although the possibility could not be diminished or eliminated. According to EDC, the control teachers were willing to participate in the study because of the credibility of the in-country partners. When the in-country partners asked teachers to cooperate, that was sufficient reason and incentive for them to volunteer. Many teachers also thought the research project would be an interesting one to be involved in and were will-

ing to take the time to administer the tests and questionnaires. EDC found no evidence to suggest that the control teachers were in some way a less motivated or less able group, which would be expected because both teacher groups were composed of volunteers. In the opinion of the EDC manager in charge of data collection, both the IEEP and non-IEEP teachers were “fully comparable.” Unfortunately, the data on all teachers who could have participated in the study were incomplete, so this EDC assessment could not be tested in a sample selection model.

TESTING AND SAMPLE

The assessment of student understanding of economics was conducted with the Test of Economic Literacy (TEL) (Soper and Walstad 1987). The TEL was originally developed for use with high school students in the United States. It has been translated and used as a standardized measure of economic understanding in studies with high school students in at least eight nations (Walstad 1994). The TEL was administered to students in this study as a pretest between October 15–30, 1996, and as a posttest, between March 10–20, 1997.

Only 23 of the 46 TEL items were administered to students. The shorter test was used so that students had time to complete the test and respond to survey items during a typical class period lasting about 45 minutes. A re-analysis of the U.S. norming data indicated that this shorter version of the TEL would be a valid and reliable measure. The analysis of the TEL data collected for this study also showed that the shorter version of the TEL was reliable and valid for assessing knowledge of basic economics of students in these nations.⁵

EDC used rigorous procedures to translate materials, to ensure uniformity of data collection, and to maintain test security. The economics test and teacher questionnaires were translated into the local languages and then double checked by EDC language consultants. The testing instructions were given to teachers at EDC briefings in Lithuania and Poland and at briefings by EDC’s in-country partners in Ukraine and Kyrgyzstan. Numbered copies of the test were given to each teacher for pretesting. The teachers then returned all tests in signed and sealed envelopes, so a check could be made that all tests were returned. The in-country partners for EDC kept the test materials under lock and key until they were distributed for posttesting. Answer sheets were then returned by all teachers to EDC in sealed envelopes through the in-country partners. According to EDC staff, there was no reason to suspect cheating or deviations from the uniform testing and data collection procedures.

The total data set included information on 136 teachers (77 IEEP and 59 control) and 4,151 students (2,328 IEEP and 1,823 control). Not all information, however, was complete and usable for this study because (1) some teachers did not complete a teacher survey; (2) some teachers did not give a posttest to students; (3) some students did not take the posttest; and (4) some students did not answer questions about gender or age.

In Table 1, we report the descriptive statistics for the variables on which there were complete teacher and student records for this study. There were 77 teachers

TABLE 1
Descriptive Statistics for IEEP Study

| | IEEP | Control | Total |
|---|-----------------|-----------------|-----------------|
| Sample size | | | |
| Teacher | 42 | 35 | 77 |
| Student | 1,113 | 840 | 1,953 |
| Variables: for students | | | |
| Age: mean in years | 15.66 (0.74) | 15.63 (0.82) | 15.65 (0.77) |
| Gender: % male | 42.50 | 41.43 | 42.01 |
| Teacher experience: mean (years teaching economics) | 3.90 (4.52) | 4.97 (6.20) | 4.36 (5.34) |
| TEL pretest: mean | 12.61 (3.30) | 13.21 (3.45) | 12.87 (3.38) |
| Lithuania (<i>n</i> = 69; 113) | 11.67 (2.84) | 11.67 (3.10) | 11.67 (2.99) |
| Ukraine (<i>n</i> = 647; 407) | 13.33 (3.29) | 13.91 (3.25) | 13.56 (3.28) |
| Kyrgyzstan (<i>n</i> = 148; 103) | 12.30 (3.38) | 12.85 (4.18) | 12.53 (3.73) |
| Poland (<i>n</i> = 249; 217) | 11.19 (2.86) | 12.84 (3.29) | 11.96 (3.17) |
| TEL posttest: mean | 14.79 (4.15) | 14.17 (3.81) | 14.52 (4.02) |
| TEL change: mean | 2.18 (3.69) | 0.97 (3.50) | 1.67 (3.66) |

Note: Standard deviations are in parentheses.

in this subgroup (42 IEEP and 35 control). The teachers were distributed across the four nations: Lithuania (4 and 7); Ukraine (21 and 14); Kyrgyzstan (7 and 5); and Poland (10 and 9). Complete data were also available for 1,953 students (1,113 IEEP and 840 control) who were taking an economics course in secondary schools from these teachers in the four nations.

What is interesting to note in Table 1 are the TEL scores for the IEEP and control groups of students. The pretest scores were similar for each group, overall and by nation. Both groups showed an increase in economic understanding. This gain would be expected given that the students in both groups were being taught economics. The gain for the IEEP group, however, was greater than the gain for the control group, suggesting that IEEP students are benefiting from the education in western economics received by their teachers.

REGRESSION AND RESULTS

To control for the influence of other variables on TEL scores, we specified a regression model estimated with the data. The dependent variable was the change in a student's TEL scores from pretest to posttest (TELCHANGE). The regressors were student and teacher variables expected to influence the amount of economics learned over the sample period. The model was similar to that specified in studies evaluating economics programs in secondary schools in the United

States (Becker, Greene, and Rosen 1990), although there were no adjustments made for potential problems with sample selection. The purpose of the regression analysis was exploratory and not inferential. The results are only suggestive of what might be found if a random sample of teachers and students had been available for the analysis.⁶

A dummy variable was included in the regression to test for differences in gains in the economic understanding of students of IEEP teachers compared with students of control teachers. A variable for student AGE was included because research in the United States and other nations has found older students often learn more economics than younger students and better handle abstract subject matter.⁷ A variable for GENDER (1 = male) was included because some studies show that males learn more economics in courses than females (Walstad and Robson 1997).

One teacher variable that has been found to be important in some economic education studies is the number of years of experience the student's teacher has in teaching economics (T-EXPERIENCE).⁸ It was expected that, on average, the more years of experience a teacher had in teaching economics, the more students would learn about the subject. This variable, however, was of special interest because the direction of its effect on learning may indicate whether economics teachers in these former socialist nations are teaching much western economics. It might be that more experienced teachers know less about western economics than less experienced economics teachers, in which case the coefficient on this variable would be negative.

The regression analysis also controlled for the effects of national differences in gains in economic understanding. There may have been factors related to curriculum, courses, or the translation of materials that may have affected the average gain in student scores within each nation. To control for these national differences, dummy variables were specified for Lithuania, Ukraine, and Kyrgyzstan. The omitted variable was for Poland.

The results from the IEEP variable confirmed *a priori* expectations (Table 2). Students with a teacher trained in an IEEP seminar received an additional benefit of 1.5 TEL points relative to students with a teacher without these IEEP characteristics, after accounting for the influence of other relevant variables. The coefficient estimates represent an 11.3 percent improvement in the gain of students on the TEL relative to the mean pretest score (12.87), which is similar to the gain reported in research studies of high school economics in the United States (Becker, Greene, and Rosen 1990).⁹ This finding suggests that students' learning of economics benefited from having a teacher who attended an IEEP seminar, at least with the sample of students for this study.

The years of experience in teaching economics had a positive influence on the gain in the economic knowledge of students. This finding suggests that prior experience in teaching economics in these transitional nations, controlling for other factors including IEEP participation, was not a hindrance to teaching western economics and facilitated economic learning.

The gains in economic understanding differed by nation. Students in Lithuania and Kyrgyzstan had higher gains than in Poland. By contrast, the gains for

TABLE 2
Regression Results for IEEP and Control Students

| Regressor | Dependent variable = TELCHANGE [1.65; 3.66] | Absolute values of <i>t</i> statistics |
|------------------------------|--|---|
| AGE [15.65; 0.77] | -0.002 | 0.193 |
| GENDER [42.04%] | 0.131 | 0.803 |
| T-EXPERIENCE [4.36; 5.34] | 0.123** | 7.990 |
| IEEP [56.99%] | 1.452** | 8.938 |
| LITHUANIA [9.31%] | 0.261 | 0.823 |
| UKRAINE [53.97%] | -1.050** | 5.177 |
| KYRGYZSTAN [12.85%] | 0.705* | 2.245 |
| Constant | 1.046 | |
| <i>N</i> | 1,953 | |
| <i>F</i> | 28.008** | |
| \bar{R}^2 | .088 | |

Note: Variable mean and standard deviation, or percentage for dummy variables, are in brackets.

*Significant at the .05 Type I error level, two-tailed test; **significant at the .01 Type I error, two-tailed test.

Ukrainian students were less than those for Polish students. As previously noted, these differences most likely resulted from unknown differences in curriculum, instruction, or testing.

TEACHER KNOWLEDGE OF ECONOMICS

At each of the IEEP seminars, teachers were administered the 46-item TEL as a posttest. This teacher TEL score can be entered in the specified regression equation to capture the effect of the level of teacher knowledge (TCHSCORE) on student economic understanding. Research in economic education in the United States has found that teacher knowledge of economics is one of the primary factors influencing student understanding of economics (Allgood and Walstad 1999). It is unknown whether this conclusion holds true in nations making a transition to a market economy. This change, however, substantially reduced the sample size for the analysis because teacher scores in economics were only available for IEEP students.¹⁰

The results (Table 3) show, as expected, that TCHSCORE had a positive effect on students' learning of economics. Previous evaluations of the seminars by EDC (1996, 1997) found that teacher knowledge of economics was increased by participation at the IEEP seminars, so it is reasonable to conclude that some of this effect of teacher knowledge on student learning in economics is attributable to the IEEP seminars.

The addition of the TCHSCORE variable addresses an alternative explanation

TABLE 3
Regression Results for IEEP Students Only

| Regressor | Dependent variable = TELCHANGE [2.07; 3.51] | Absolute values of <i>t</i> statistics |
|------------------------------|--|---|
| AGE [15.68; 0.79] | 0.007 | 0.307 |
| GENDER [40.53%] | 0.581* | 2.189 |
| T-EXPERIENCE [3.64; 3.83] | 0.007 | 1.754 |
| TCHSCORE [33.36; 3.75] | 0.107** | 2.861 |
| LITHUANIA [11.37%] | 1.068* | 2.387 |
| UKRAINE [28.50%] | -2.027** | 5.692 |
| KYRGYZSTAN [19.11%] | 2.000** | 4.474 |
| Constant | -2.945 | |
| <i>N</i> | 607 | |
| <i>F</i> | 25.121** | |
| \bar{R}^2 | .218 | |

Note: Variable mean and standard deviation, or percentage for dummy variables, are in brackets.

*Significant at the .05 Type I error level, two-tailed test; **significant at the .01 Type I error, two-tailed test.

for the influence of IEEP found in Table 2. It might be argued that the characteristics represented by IEEP are simply capturing the effects of the IEEP seminars on increased student learning in economics, not through increases in teacher knowledge of economics or their ability to use the IEEP materials in the classroom, but through its likely influence on teachers' coverage of topics in the classroom. IEEP teachers simply might be more likely to cover concepts found on the TEL. The results in Table 3 show that IEEP contributes to student learning in economics through improved teacher understanding (TCHSCORE).

A notable change in the results from Table 2 to Table 3 is that the estimated coefficient for the years of experience in teaching economics becomes insignificant. This finding suggests that this experience variable serves as a proxy for teacher knowledge of economics. To check this conclusion, the equation was re-estimated with the same sample, but excluding the variable for teacher knowledge. In this re-estimation, the results show that years of experience in teaching economics was an important factor affecting student learning in economics.

CONCLUSION

In this article, we report on the development and use of a new data set for investigating the relationship between teacher economic education and student learning of economics in transition economies. The major question for which answers were sought was whether IEEP seminars for high school teachers were effective in improving the economic understanding of their students. Data were

collected from a pre- and posttest sample of students in high school economics courses in 1996–1997 in four transition economies: Lithuania, Ukraine, Kyrgyzstan, and Poland.

We found that students of teachers who had attended IEEP seminars had a greater gain in economic understanding than did students of teachers who did not participate in an IEEP seminar. The positive effect of teacher education on student learning in economics has long been reported in economic education research in the United States. This study provides evidence that the same link exists between teacher education and student learning in those nations making a transition to a market economy.

The results from the study are only suggestive because there may be other explanations that account for the findings. Chief among the alternatives is sample selection. It may be that the type of teacher who volunteered for the IEEP seminars was qualitatively different from non-IEEP teachers. This qualitative difference in the initial characteristics of teachers, and not the IEEP program, may explain the results of the differences in student scores. Although it was not possible to test for this selection problem with the data, the possibility still exists and will need to be investigated in future economic education studies in transition economies.

NOTES

1. The data set and computer routines used for this study are available from the authors.
2. Each week-long seminar included about 32 hours of direct instruction in basic economic content and lesson materials for teaching, plus another 4 hours for pretesting, posttesting, and data collection. Many of the content handouts and lesson materials were translations or adaptations of existing NCEE curriculum materials. A sample seminar agenda and listing of seminar lessons and handouts can be obtained from the NCEE.
3. Information on the data collected by EDC from IEEP seminars (1995–2000) can be obtained from the NCEE (1140 Avenue of the Americas, New York, NY 10036; e-mail: ncee@eaglobal.org).
4. The selection procedure for teacher participation at IEEP workshops varied and did not follow a precise rule. The teachers were chosen for IEEP seminars by the local partners of the NCEE in each nation, who recruited teachers from recommendations by education officials and responses to ads in newspapers. The most important criteria for selecting the volunteer teachers was that they be teaching currently or be likely to be teaching economics at the pre-university level. A few school administrators and university faculty were also admitted to the seminars.
5. As for reliability, the coefficient alpha for the 46-item TEL was .87 when it was administered to 4,235 students in the United States. A re-analysis of the U.S. norming data produced an estimate of .72 for a 23-item TEL. For students in the four nations in this study, the estimated alpha was .75. The TEL also met the requirements for content and construct validity. For content validity, the proportion of items in the four content categories on the TEL (fundamental, micro, macro, and international) was about the same on the 23-item TEL as on the 46-item TEL. As for construct validity, the shortened TEL detected expected differences in economic knowledge. For example, a re-analysis of the U.S. data showed that students with economics instruction scored 3 points higher than those without economics. The results from students in the four nations in this study showed an average difference of 1.85 points for students with and without economics instruction. This gain is smaller than that for the United States, but it was to be expected given some differences in content coverage between the United States and the four nations in the study. The gain should not be discounted because there are many reasons why research studies in economic education often report differences of this small size (Walstad 1992, 2028).
6. A selection issue that may affect the regression results was nonrandom data loss for students between the pre- and posttest (Becker and Walstad 1990). It was not possible to specify a selection equation to adjust the results for this potential problem given the limited set of student and teacher variables for explaining why the posttest was not taken. This issue was studied with the

- available data. An equal percentage of teachers (12 IEEP and 9 control) in each group gave a pretest but did not give a posttest to students (327; 284). This equivalence suggests that group membership was not likely to affect the decision of the teacher to posttest, and thus inflate the IEEP gains. The average score on the pretest for students of IEEP and control teachers who did not give a posttest was essentially the same (11.11; 11.58).
7. Whether age is an important factor may depend on the variation in age and the complexity of the material. If the age range is limited, and the material equally challenging for younger and older students, there may not be an age effect. Age may capture the effects of grade differences. The problem with including a grade variable was that many students did not report their grade.
 8. Research findings in the United States on the effects of teacher experience on student learning in economics in high school have been mixed. Teacher knowledge of economics or course work in economics has been found to influence learning. If years of experience in teaching economics captures these qualities, then it serves as a reasonable proxy for teacher education in economics.
 9. Similar results for IEEP were found when the regression was estimated in semilog form, and when the posttest was the dependent variable and the pretest was a regressor.
 10. The sample size was further reduced because the TEL was not given to 16 IEEP teachers.

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