Establishing State Specific Benchmarks in Economic Education

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A recent national survey of K-12 public schools indicates that economics is included in the educational standards of all states in some form (National Council on Economic Education, 2007). Of these, 40 states require the standards to be implemented and 17 states require students to take a course in economics prior to graduation. While it is impressive that so many states have a mandatory standards component, only 22 require some form of economic testing (National Council on Economic Education, 2007). The lack of testing, combined with uneven or non-existent training requirements for teachers specializing in economics, business, and consumer science, results in students receiving an economics education of highly variable quality. This research seeks to establish a baseline measure of economic literacy among students and teachers in secondary schools to help direct future educational and teacher training efforts.

This assessment is especially important in Nebraska as there are neither uniform classroom curricula nor mandatory graduation requirements in economics for K-12 students (Nebraska State Board of Education, 2006; Nebraska Department of Education, 2007). This is not unique to Nebraska and represents an ongoing problem for educators nationwide as consistent metrics of student performance do not exist (Lyons, Palmer, Jayaratne, & Scherpf, 2006).

The problem is not a trivial one in light of research showing that economic and financial literacy education makes students better savers, more aware of risk, and better financial decision makers (Danes, Huddleston-Casas & Boyce, 1999). While there is national data on the economic and financial literacy of high school students, there is little state-level data available, making it difficult to ascertain the impact and value-added associated with implementing state standards in economic education.
Furthermore, policy makers, school districts, and other interested parties are unable to determine whether implemented programming is achieving its stated objectives and whether student outcomes are improving or if additional emphasis should be placed on economic literacy. This paper represents the first state-level assessment of secondary economic education in Nebraska.

The Nebraska Department of Education plans to implement mandatory standards testing and reporting in 2009-2010. The primary purpose of this study is to replicate national student testing within the state of Nebraska to establish a benchmark measure of economic literacy for students in grades 9-12. This baseline measure can be used to document changes in students’ economic achievement once mandatory testing and reporting standards have been implemented (Rebeck & Walstad, 2000; Allgood & Walstad, 1999). A secondary purpose of this paper is to utilize testing and questionnaire data to identify key teacher and classroom characteristics that could positively impact students’ economic learning and achievement. Replicating national efforts at the state level, using state-specific content standards, provides valuable insight into actions that educators, school administrators, and policy makers can take at the local level to promote and improve economic literacy.

Methodology

To produce a benchmark that could easily be used by teachers and administrators at the district or classroom level, we closely followed the procedures used for creating and norming national assessments of economic knowledge. We measured student knowledge using Form A of the Test of Economic Literacy (TEL). Teacher knowledge was measured using a representative subset of the Macro and Micro Forms from the Test for Understanding in College Economics (TUCE) (Walstad & Rebeck, 2001, 2007).

Teachers representing a cross-section of Nebraska’s population were recruited to take the TUCE and to administer the TEL to their students. Specifically, teachers specializing in economics, business, social science, or math were selected by geographical location and course type to reflect the diversity of the state of Nebraska.

The TEL and TUCE are nationally normed, reliable and valid tests in economics for high school and college students. The TEL is designed for pre- and post-testing of high school students and measures economic knowledge of macro and microeconomic topics such as aggregate supply and demand, unemployment, inflation, the role of government, monetary policy, scarcity, opportunity costs, production, and topics such as market structure and income distribution. The TUCE is used to measure economic knowledge of college students following a semester course in either macro or microeconomics and covers topics traditionally taught in these courses. The microeconomics test covers basic economic problems (e.g., scarcity, opportunity costs, and choice), markets and price determination, theories of the firm, factor markets, the role of government in a market economy, and international economics. The macroeconomics test covers aggregate economic performance, aggregate supply and demand, money and financial markets, monetary and fiscal policies, policy debates and applications, and international economics.

Each participating teacher was provided with test manuals and materials. Once recruited and trained, teachers administered the TEL to their students. Testing occurred in a traditional pencil-and-paper format under strict protocols to ensure that the data collected were consistent and comparable across all participating teachers and classrooms. In addition to administering the TEL to their students, teachers were asked to complete the TUCE to measure their own level of economic knowledge. They were also asked to complete a comprehensive classroom questionnaire, which included items regarding classroom type, composition, and content (Bosshardt & Watts, 1990). In addition, teachers were asked to report their level of education, certifications, quantity and type of post-graduate education, tenure, experience in teaching economics, as well as other relevant information.
Teachers returned their completed TUCE, classroom questionnaire, and student tests to the researchers for scoring and analysis. For their participation in the study, teachers were paid an honorarium.

During the fall of 2006, a total of 23 teachers and 942 students in grades 9-12 throughout the state of Nebraska were recruited to participate in the study. The majority of students were in grades 11 and 12 (720 students), with an additional 222 students in grades 9 and 10. Although smaller in size than national norming samples (i.e., 94 teachers, 3000 students for the TEL), the Nebraska sample was representative of the state both geographically and demographically.

Data

Within the sample, the number of male and female students was approximately equal, as was the number of urban and suburban public schools compared to the number of rural schools. The sample also included students from a broad range of socio-economic backgrounds in the state, with an average of 33% of the students qualifying for free or reduced-price lunches compared to the state average of 34% (Nebraska Department of Education, 2006).

The sampled classrooms included eight economics classes, ten business classes, four social science classes, and one math class. The classes represented a range of economics instruction, from dedicated courses in economics to infusion-based courses where economic content was integrated into non-economic classes such as history, government, or geography. Teachers surveyed had, on average, 17.7 years of general teaching experience and 10 years of experience in teaching economics within their subject area.

Taking a 40-item subset of the TUCE, sampled teachers scored 22.9 points on average (the minimum score was 12 while the maximum was 36). Thus, the average percentage correct was 57%. Secondary educators assessed in previous studies, using the same subset of questions, scored 59% on average at the national level. We thus conclude that our sampled teachers had a representative knowledge of economics (Allgood & Walstad, 1999). Test results also showed that, when compared to teachers nationally, Nebraska teachers had a good understanding of macroeconomic topics but struggled with more advanced
microeconomic topics such as the theory of the firm, perfect competition, and the microeconomic role of government.

Student scores on the TEL from the subsample of infusion-based classes compared favorably with national averages, with a mean score of 18.7 out of 30 points for social studies students, placing them firmly in the 70th percentile of students nationally (the average national score was 16.1) (Walstad & Rebeck, 2001). Less encouraging, however, was that students in dedicated economics classes answered only 19 of the 30 questions correctly on average, placing them in the 28th percentile of students nationally. This finding improved slightly when the sample was restricted to 12th graders. Seniors enrolled in high school economics classes scored 20.5 points, yielding a 32nd percentile ranking when compared to students nationally with basic economics training. Since most dedicated economics classes are taught during the senior year in Nebraska, this is perhaps a more appropriate measure of economic performance and competency.

In addition to these findings, the mean test scores for males and females (18.3 and 18.2, respectively) were comparable, as were the scores for students in rural versus urban settings (18.0 and 18.5, respectively). See Table 1 for a summary of the students’ test scores by grade level, economic instruction, and demographics.

Model

To examine the determinants of student test scores, we estimate the following equation using Ordinary Least Squares (OLS):

\[ \text{TelScore}_i = \alpha_0 + \alpha_\text{Gender}_i + \alpha_\text{Race}_i + \alpha_\text{Urban}_i + \alpha_\text{PercentLunch}_i + \alpha_\text{SchoolSize}_i + \alpha_\text{InService}_i + \alpha_\text{EconTenure}_i + \alpha_\text{EconClass}_i + \alpha_\text{PostGradHours}_i + \epsilon_i \]

In this equation, the dependent variable is \( \text{TelScore}_i \), which represents the TEL test score for the \( i \)th student, which can range from 3 to 39.

With regard to the independent variables, the model first controls for two standard student characteristics - gender and race. \( \text{Gender} \) is a dummy variable that equals “1” if the student was male, and \( \text{Race} \) is a dummy variable that equals “1” if the student was White/Caucasian. The next set of variables controls for school and socio-economic characteristics. Specifically, \( \text{Urban} \) is a dummy that equals “1” if the school was located in an urban/suburban area rather than a rural area, \( \text{PercentLunch} \) controls for the percentage of students that received free or reduced-price lunches, and \( \text{SchoolSize} \) represents the size of the school by student population. The final set of variables controls for teacher and classroom characteristics. \( \text{InService} \) is the number of years that the teacher taught economics as a subject, \( \text{InService} \) denotes the number of hours of in-service education the teacher attended over the course of their career, \( \text{EconTenure} \) indicates whether the class taught by the teacher was a dedicated economics course or an infusion-based course, and \( \text{PostGradHours} \) represents the number of post-graduate credit hours earned by the teacher. We expect the signs of the estimated coefficients for all of the above variables to be consistent with previous research (Boeshrardt & Watts, 1990).

The regression results are presented in Table 2. Note that 25 of the 942 observations had to be dropped due to missing information for key variables. The final sample used for the regression analysis included 917 observations. Also, note that standard errors were adjusted for potential heteroskedasticity.

Results

The findings from Table 2 show that the coefficient on \( \text{Gender} \) was positive but insignificant, suggesting that males may be more likely than females to perform better on the TEL. The coefficient on \( \text{Race} \) was both positive and significant at the 1% level, suggesting that white students may also be more likely than non-whites to perform better. In addition, students in urban and
suburban schools scored better than rural students, with the coefficient on Urban being significant at the 1% level. This is consistent with prior research which shows that increased resources and teacher specialization in urban and suburban schools positively impact student performance (Becker, Greene, & Rosen, 1990). As expected, the coefficient on PercentLunch was negative and significant such that a 20% increase in student participation in reduced-price lunch programs resulted in a decrease of the average TEL score by 1.1 points. The coefficient on SchoolSize was positive and significant. Thus, students from larger schools may perform better than those from smaller schools.

Table 2
OLS Regression for Students' TEL Scores Controlling for Student, Teacher, and School Characteristics (n=917)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
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<tbody>
<tr>
<td>Constant</td>
<td>15.209</td>
<td>(1.123)**</td>
</tr>
<tr>
<td>Gender</td>
<td>0.421</td>
<td>(0.447)</td>
</tr>
<tr>
<td>Race</td>
<td>3.584</td>
<td>(0.590)**</td>
</tr>
<tr>
<td>Urban</td>
<td>2.780</td>
<td>(0.733)**</td>
</tr>
<tr>
<td>PercentLunch</td>
<td>-5.594</td>
<td>(1.533)**</td>
</tr>
<tr>
<td>SchoolSize</td>
<td>1.005</td>
<td>(0.498)*</td>
</tr>
<tr>
<td>EconTenure</td>
<td>0.176</td>
<td>(0.023)**</td>
</tr>
<tr>
<td>InService</td>
<td>-1.969</td>
<td>(0.346)**</td>
</tr>
<tr>
<td>EconClass</td>
<td>2.383</td>
<td>(0.563)**</td>
</tr>
<tr>
<td>PostGradHours</td>
<td>0.477</td>
<td>(0.237)*</td>
</tr>
</tbody>
</table>

R-squared          | 0.17        |
Adjusted R-squared | 0.16        |
F-statistic        | 20.68       |
Log likelihood     | 3043.48     |
* p < 0.05, ** p < 0.01

The variables used to control for teacher and classroom characteristics provide additional insight into what might be driving students’ economic achievement. Tenure in the economics classroom (EconTenure), which represents a proxy for learning economics by doing, was positive and significant at the 1% level. In addition, students who took a course dedicated to economics scored 2.4 points higher on average than students who took no course or an infused course, and the effect was significant at the 1% level. Consistent with Algood and Walstad (1999), the number of post-graduate credit hours earned by teachers (PostGradHours) also had a significant and positive effect on students’ economic achievement. Curiously, the number of general in-service educational hours attended by teachers (InService) had a significant and large negative impact on economic achievement. In our sample, there was some polarization between non-credit in-service training and post-graduate education, with teachers selecting one or the other for continuing education. We intend to investigate this effect in future research to determine whether there is selection into in-service training versus post-graduate education or whether there is a substitution effect between the two.

We also estimated an additional regression which used the teachers’ scores on the TUCE to control for teacher’s level of economic knowledge. The results indicated that performance on the TUCE was a poor predictor of student achievement with the coefficient being small and insignificant. The findings from this regression are available from the authors upon request.

Conclusions

In summary, the results from our analysis using a sample of Nebraska high school students are consistent with findings from national research studies that have used standardized economics tests such as the TEL to measure economic literacy and its determinants. Based on the TEL and survey data collected from a representative group of students and teachers in Nebraska, we found that students were performing at levels comparable to students across the nation in social science and non-economics
courses. However, students in dedicated economics courses were performing well below national averages. Despite these findings, students in Nebraska were found to benefit from participating in dedicated economics courses, as demonstrated by higher scores than students in infusion-based courses. Regression analysis further revealed that teacher training (i.e., post-graduate education), tenure, and school size had a positive impact on students' proficiency in economics.

The results from this research provide meaningful policy recommendations for local schools and curriculum specialists. Specifically, the findings suggest that students' economic achievement could be improved if schools offered more dedicated courses in economics. Schools might also be able to increase students' proficiency in economics by supporting economic training opportunities for teachers, as well as long-term teaching specialization in economics to allow skills creation through tenure in the classroom. Recall that teacher testing using the Test of Understanding College Economics (TUCE) also identified several advanced microeconomic topics where Nebraska teachers could benefit from receiving more ongoing education and training.

Overall, this study has resulted in the establishment of a Nebraska-specific benchmark of economic literacy that can be used to direct future programming, educate the public, inform teachers and administrators, and shape the debate over the importance and efficacy of economic and financial literacy education. This benchmark provides a snapshot of economic learning in Nebraska. It also serves as a baseline that can be used to track changes in student knowledge and proficiency in subsequent years. To date, this research represents the only statewide, consistent measure of students' economic knowledge available to educators and policy makers in Nebraska. As such, it can provide a valuable starting place to document future changes in course offerings and student learning as Nebraska implements its new statewide standards testing in 2009-2010.

References


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