

**DETERMINANTS OF ECONOMICS PROFICIENCY AMONG ARKANSAS K-12  
TEACHERS AND THEIR ROLE IN TRAINING WORKSHOP EFFECTIVENESS**

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# **DETERMINANTS OF ECONOMICS PROFICIENCY AMONG ARKANSAS K-12 TEACHERS AND THEIR ROLE IN TRAINING WORKSHOP EFFECTIVENESS**

## **ABSTRACT**

This paper assesses the impact of teacher-training workshops on economic literacy rates among high school teachers in the state of Arkansas. After the 2010 adoption of new frameworks for teaching economics, many Arkansas social studies teachers will be working in unfamiliar subject areas. To address this, Economics Arkansas, a non-profit educational organization, held a statewide series of activity-based teacher training workshops throughout the summer of 2010. These workshops were specifically designed to familiarize teachers with fundamental concepts in microeconomics, macroeconomics, international economics and personal finance as specified in the state frameworks.

Workshop effectiveness is measured using the TEL, or Test of Economic Literacy, a nationally standardized economics exam for high school students. Pre and post-tests were administered at the beginning and end of the workshop, respectively. Scores from 7 teacher-training workshops are then aggregated to provide an overall assessment of workshop effectiveness on economic literacy rates among the sample of teachers in attendance.

## **INTRODUCTION**

The Council for Economic Education is a non-profit organization that promotes economy literacy and personal finance skills. The council delivers its educational programs through a diversified network of state councils and university-based centers for

economic education. The state councils and centers provide these educational services/programs according to state educational frameworks, teacher licensing requirements, and resource availability.

The Council for Economic Education reported in their Survey of States that forty-nine states as well as the District of Columbia had adopted economic standards into their state curriculum by 2004 (CEE, 2005). Additionally, an economics class is required as a course offering in 17 states, while students are required to attend an economics course in 15 states. Rebeck and Walstad (2000) show that student enrollment in economics courses as a percentage of all high school graduates steadily increased from less than 24% to almost 44% between 1982 and 1990. Since that time, enrollment levels have continued to increase, so that by 2005 at least one-third of all U.S. high school graduates have received some formal economic instruction. As of 2005, 49 states and the District of Columbia include economics in their state-mandated frameworks (CEE, 2005). Some studies have argued that the majority of secondary social studies teachers are inadequately prepared to teach economics (Cargill, Jurosky and Wendel, 2008, and Angrist and Guryan, 2004). Several studies such as Taylor, Yates, Meyer and Kinsella (2011), Angrist and Guryan (2004), and Walstad (2001) promote teacher-training workshops that are specific, concise, and comprehensive in their coverage of the material.

The Arkansas Department of Education has recently mandated that economics is to be a required course in the high school curriculum. Up until this year, economics was offered as an elective in many high school social studies curricula. School districts have the choice to include economics in their social studies curriculum or their business and career planning curriculum. Most schools have taken a social studies approach, pairing

economics and civics into one semester classes for ninth grade Arkansas students. As a result, many social studies teachers will be instructing in economics with relatively little experience with the subject. To address this concern, Economics Arkansas held a series of 5-day workshops throughout the state in June and July 2010.

This change in state educational mandates creates an opportunity to assess the effectiveness of such workshops on economic literacy rates of K-12 teachers. Teachers were given a pre-test at the beginning of the workshop and a post-test at the end. The pre-tests and post-tests are very similar, but are not the same exam. Scores from the completed exams were compiled, along with background demographic and educational information from the participating teachers. These scores were used to assess the effectiveness of Economic Arkansas workshops on the economic literacy rates of K-12 Arkansas teachers.

## **RELATED STUDIES**

Horton and Weidenaar (1975) states that the objective of economic education is to “improve our understanding of the world in which we live” (p.42). They refer to this statement as the *consensus goal* that was developed based on the distribution of questionnaires to various economists, economic educators, teachers, and social scientists. This goal includes smaller components of the economic big picture such as market participants, decision-making and societal impacts.

Many of the states and school systems requiring economic instruction do not require teacher certification in economics. Many fear that this results in “less-than-qualified teachers” (Marlin, 1991, p. 5) tasked with the challenge of instructing in a field

where they have little experience. Furthermore, these teachers may develop negative attitudes towards the course that may adversely influence students' perceptions of economics. Marlin (1991) investigates the relevance of these concerns using data from a National Assessment of Economic Education (NAEE) survey conducted in 1987. The findings of this study show that state mandates do have a negative effect on teacher attitudes regarding economics as a subject. Secondly, negative teacher attitudes have a direct impact on student learning. Lastly, Marlin (1991) finds that increased economic education such as teacher training seminars and developmental instruction can have a positive influence on teachers' attitudes thereby improving student performance.

Teacher motivation levels may also be positively influenced by active-based learning as discussed in Salemi (2003) and Salemi, Saunders and Walstad (1996). Active learning advocates argue that activity-based learning engages the participants and holds their interest, thus leading to potentially higher comprehension levels. Michel, Cater, and Varela (2009) suggest that this teaching style helps students to develop analytical skills as well as engages the students in reflective learning.

To address the lack of experience in economics observed for a substantial number of secondary social studies teachers, Cargill, Jurosky and Wendel (2008) conduct a study of a proposed Pilot Transition Program designed to help teachers integrate economics into pre-existing civics classes. This is referred to as the "compromise path" in which teachers were invited to attend a series of training seminars. Participating teachers received condensed economics training in which they were presented an autonomous nine-week course module designed to be included with a one-year high school civics course. Pre- and post tests were administered to measure resulting changes in teacher

performance on the Test of Economic Literacy (TEL). Results demonstrated that overall, participating teachers showed improvement in their levels of economic literacy. It is assumed that higher levels of economic literacy rates among teachers will result in better student outcomes.

## **DATA COLLECTION**

This analysis is based on a similar study conducted by the Mississippi State University Center for Economic Education and Financial Literacy. There have been very few statewide studies of student economic literacy and even fewer studies of teacher aptitude using generally accepted standardized test scores. The method employed as well as the process of data collection in this research is closely based on the procedures used in Grimes, Millea, and Thomas (2010).

Release and Consent forms were initially distributed and explained, thus all teachers choosing to take part in this study did so voluntarily and informed of their rights as human subjects. Teachers were then asked to fill out a questionnaire asking demographic and education-related questions. Participating teachers were given a pre-test to determine their initial level of economic literacy. At the end of the workshop, teachers took a post-test. Pre and post-test scores were then aggregated and compiled in order to assess the amount of improvement (or reduction in some cases) in understanding among the participating teachers. The inclusion of the post-test scores allows for comparisons of teachers' economic literacy rates before and after the training workshop.

The Test of Economic Literacy, or TEL, was administered as the testing instrument for the pre-test and post-test. The TEL exam consists of 40 multiple choice

questions. This test is divided into four individual parts: (1) Fundamentals of economics, (2) Microeconomics, (3) Macroeconomics and (4) International Economics.

Economics Arkansas conducted a series of seven teacher-training workshops throughout the state during the summer of 2010. These workshops lasted for five days. Each day focused on a subset of the state-mandated frameworks in the following order: (1) Economic Fundamentals, (2) Microeconomics, (3) Macroeconomics, (4) International Economics, and (5) Personal Finance. From these seven training workshops, 182 teachers attended. Of the 182 teachers in attendance, 178 agreed to participate in the study, providing 167 usable surveys and exams.

## **METHODOLOGY**

The analysis in this study follows the econometric approach presented in Becker and Walstad (1987) and used in Grimes, Millea, and Thomas (2010). This approach estimates an educational production function where a measure of economic literacy is modeled as a function of teachers' demographic characteristics, personal endowments, and environmental influences. Specifically, this model projects the following relationship for individual teachers in the sample:

$$\text{Personal Economic Literacy} = f(\mathbf{D}, \mathbf{E}, \mathbf{H}, \mathbf{T})$$

Where  $\mathbf{D}$  denotes a vector of teachers' demographic characteristics,  $\mathbf{E}$  denotes a vector of educational attainment,  $\mathbf{H}$  denotes a vector of teachers' human capital development, and  $\mathbf{T}$  denotes a vector of the teaching environment. Each teacher's personal economic literacy is measured based on their observed pre-test score. Equation [1] is provided below:

$$[1] L = \alpha_0 + \alpha_1 D_i + \alpha_2 E_i + \alpha_3 H_i + \alpha_4 T_i + \varepsilon_i.$$

Specifically,  $D_i$  = (gender, age, race, first generation);  $E_i$  = (economics hours, master, major);  $H_i$  = (training, continuing education credits earned);  $T_i$  = (subjects, average class size, and high school) for each teacher,  $i$ . Table 1 provides a summary of the explanatory variables and their expected signs. An explanation of their predicted signs is presented below.

Demographic characteristics of teachers may explain a portion of initial economic literacy rates, and thus pre-test scores, of participating teachers. GENDER and RACE are controlled for using dummy variables. Specifically, studies estimating the gender gap between male and female standardized test scores in economics have found that males significantly outperformed females (Allgood and Walstad, 1999; Heath, 1989).

Additionally, racial minorities are predicted to have lower economic literacy rates relative to Caucasian teachers as discussed in Grimes and Nelson (1998). The predicted coefficient sign on the AGE variable is negative, implying that older teachers may react more adversely to changes in curriculum relative to younger teachers. The predicted coefficient sign for the 1<sup>st</sup> GENERATION variable is negative, suggesting that teachers coming from a household in which one or both parents attended college may have grown up with a larger emphasis on education relative to those whose parent(s) did not attend college.

Teachers' educational attainment is measured using the number of college economics hours earned; the attainment of a Master degree, as well as the teacher's declared undergraduate major as reported on surveys. The predicted positive coefficient sign for ECON HOURS and MASTER suggests that either teachers with more economics hours or those with more overall hours are expected to earn relatively higher pretest

scores. This assumption is based on the findings of Lamb and Jacobs (2009). Lastly, the estimated DEGREE MAJOR coefficient is predicted to be positive, suggesting that teachers with a major in a disciplinary field will outperform teachers who majored in education as discussed in Angrist and Guryan (2004) and Ballou (1996).

Teachers acquire professional development by attending training seminars and accumulating continuing education units (CEUs) as required by school districts. This study hypothesizes that as teachers attend additional training seminars conducted by Economics Arkansas and the Federal Reserve, their economic literacy rates should improve. Additionally, as teachers earn more credits in continuing education, comprehension levels should increase in subjects where he/she teaches as discussed in Green (2010) and Morewood, Ankrum and Bean (2010). For this reason, the predicted coefficient sign on CONTINUING EDUCATION is predicted to be positive.

This study uses survey responses to measure factors of the teaching environment such as the number of additional subjects taught within an academic year, average class size, and whether the teacher instructs at the high school level or K-8 level. On the other hand, the estimated coefficient signs on SUBJECTS and CLASS SIZE are hypothesized to be negative based on the reasoning that as either the number of subjects taught or the average class size increases, teachers' resources are further stretched leading to lower economic literacy rates. This prediction is based on the findings of Wyss, Tai and Sadler (2007), Boozer and Rouse (2001), and Nye and Hedges (2001).

Lastly, the inclusion of the HIGH SCHOOL dummy variable allows for the overall sample of teachers to be divided into various cohorts for comparison purposes as seen in Grimes, Millea, and Thomas (2010). The individual cohorts include the overall

group of K-12 teachers, K-8 teachers, and high school teachers for grades 9-12.

Estimated coefficient signs on HIGH SCHOOL are predicted to be positive since many high school teachers have already taught economics either as an individual elective or as part of another course such as civics while K-8 teachers are less likely to have much experience teaching economics.

## **RESULTS**

Table 2 provides an overview of observed descriptive statistics including variable means and standard deviations across the various grade levels taught. Pre-test (Form A) and post-test (Form B) scores are presented for each teacher cohort. Pre-test score means were 75.27%, for the overall sample. Subsample pre-test score means were 78.09% and 60% for high school and K-8 teachers, respectively. In each teacher cohort, the Microeconomics section of the test received the highest scores in percentage terms. The International section of the pre-test acquired the lowest scores for high school teachers as well as the overall sample while K-8 teachers scored the lowest on the Macroeconomics test section.

Post-test scores show very similar results, with score means of 78.8% for the overall sample while high school and K-8 teachers had score means of 80.89% and 67.5%, respectively. As seen with the pre-tests, the International section of the TEL displayed the lowest performance levels for high school teachers as well as the overall sample while K-8 teachers again scored the lowest on the Macroeconomics section.

Observing the change in scores from pre-tests to post-tests, K-8 teachers demonstrated the highest improvement in test scores. As shown in Table 2, high school

teachers demonstrated an improvement in economic literacy of over 2.8% while the overall sample showed an improvement of over 3.5%. The K-8 teaching cohort observed an increase in test scores of 7.5%. Likewise, K-8 teachers improved their test scores in each section, with the highest gains shown in the Fundamentals section of the TEL. This section also exhibits the highest improvement in scores for high school teachers as well as the overall sample. Although K-8 teachers displayed improved scores for each section, this was not the case for the other teacher cohorts. High school teachers as well as the overall sample displayed modest losses in the Macroeconomics section, again demonstrating a weakness in this section among teachers.

The results were statistically insignificant for changes in performance levels from the pre-tests to the post-tests. However, there are a few findings to take note. First, corresponding standard deviations decline from the pre-test observations to the post-test scores. This shows that as performance rates increased, variability was reduced, suggesting better uniformity of economic literacy rates among trained teachers relative to prior observed knowledge. This could be a benefit of training programs for those who create and implement frameworks to help understand the effectiveness of curriculum. The curriculum is unlikely to be effectively administered with excessive variance in economic literacy among teachers.

Many high school teachers have been instructing economics either as an individual elective or as a part of another course, making them more familiar with the concepts included on the TEL. Additionally, the TEL is designed for high school students that have been learning high school level economics while K-8 teachers may not cover the same concepts. This observed discrepancy between high school teachers and

K-8 teachers supports the findings of France, Summary, and Vasegh-Daneshvary (1989) and explains a certain “catch-up-effect” occurring within this teacher cohort relative to the others.

The observed TEL scores show that Arkansas teachers are literate in economics relative to national high school students. When compared to the aggregate statistics for high school students involved in the 1999-2000 TEL norming sample, Arkansas teachers’ scores demonstrate their level of understanding of the material. Norming sample statistics show that the overall sample of U.S. students scored approximately 59.63% on the pre-test and 61.25% on the post-test. Additionally, high school students with some economics instruction scored 62.68% on the pre-test and 64.35% on the post-test (Walstad and Rebeck, 2001). Notice that each sub-sample of teachers scored a higher mean score than those reported in the norming sample for high school students.

### **Pre-Test Results**

Equation [1] was estimated using the pre-test TEL scores for three separate groupings of teachers: K-12 teachers, K-8 teachers, and 9-12 teachers. Standard Ordinary Least Squares (OLS) was used and the results are presented in Table 3. The resulting coefficients are provided with the corresponding t-statistics shown in parentheses.

The coefficient on GENDER is positive and significant at the 5% critical value level for the K-12 teacher group. This estimate suggests that male teachers performed significantly better on the TEL relative to female teachers. This result supports the findings discussed in Allgood and Walstad (1999) and Heath (1989). Although the

resulting coefficients for the remaining two subsamples were also positive they were not significant.

The estimated coefficient on AGE is observed to be negative and significant at the 5% critical value level for K-8 teachers. This finding is consistent with earlier predictions. However, the AGE coefficient is positive and significant at the 10% level for high school teachers. Although this second finding contradicts the initial predictions of the paper, perhaps it suggests that a learning curve exists for high school economics teachers. In other words, those with more experience teaching economics at a level with higher rigor relative to teachers in grades K-8 tend to demonstrate a higher level of proficiency.

The results suggest that racial minorities scored significantly lower on the TEL relative to Caucasian teachers. The coefficient on RACE is negative and statistically significant at the 1% critical value level in each case. As shown in Table 3, the coefficient of -24.17 shows that racial minorities tend to score approximately 24 percentage points lower than Caucasian teachers in the overall sample. This finding is consistent with earlier studies of college student performance on nationally standardized economics exams such as Grimes and Nelson (1998).

Economics hours earned in a teacher's college experience are statistically significant and positively correlated with economic literacy rates for the overall sample as well as for high school teachers. As ECONOMICS HOURS earned increased by one, economic literacy rates increased by approximately 0.79 percentage points for K-12 teachers and 0.75 percentage points for high school teachers. These results support the findings of several previous studies (Walstad, 2001; Allgood and Walstad, 1999;

Bosshardt and Watts, 1990). Neither of the remaining educational attainment variables were found to be significant in this analysis.

The coefficient for TRAINING was positive and statistically significant for teachers in the K-8 cohort. Estimates were positive but not significant for the overall sample as well as for high school teachers. This finding implies that teachers in the K-8 teacher cohort gained the most from professional development training. The results show that K-8 teachers were likely to demonstrate a higher proficiency level on the TEL, approximately 12.85 percentage points, relative to the other teacher cohorts. This finding supports earlier predictions.

The estimated coefficient on class SIZE is negative and statistically significant for teachers in the overall sample as well as high school teachers. The findings imply that as class sizes increase, K-12 teachers tend to score 0.5 percentage points lower on the TEL while high school teachers are likely to score 0.61 fewer points. These results support the findings of Wyss, Tai and Sadler (2007), Boozer and Rouse (2001) and Nye and Hedges (2001).

Lastly, the HIGH SCHOOL categorical variable included in the overall sample is positive and statistically significant. This indicates that high school teachers outperformed their K-8 counterparts by over 12 percentage points. These results are not surprising since economics has been an elective in the majority of state high schools for many years.

## **Post-Test Results**

Equation [1] was again estimated using the post-test TEL scores for three separate groupings of teachers: K-12 teachers, K-8 teachers, and 9-12 teachers. Standard Ordinary Least Squares (OLS) was used and the results are presented in Table 4. The resulting coefficients are provided with the corresponding t-statistics shown in parentheses.

The resulting coefficients for the demographic characteristic variables are similar to those discussed in the pre-test results. The coefficient on GENDER is positive and significant at the 10% critical value level for the K-12 teacher group. This estimate suggests that male teachers continued to outperformed their female colleagues at the end of the weeklong seminar. This finding supports the results discussed in Allgood and Walstad (1999) and Heath (1989). The estimated coefficient on AGE is negative and significant at the 5% critical value level for K-8 teachers. This finding is consistent with earlier predictions.

The results continue to demonstrate that racial minorities tend to score lower on the TEL test relative to Caucasian teachers following the training seminar. The coefficient on RACE is negative and statistically significant at the 1% critical value level for the overall sample as well as for high school teachers. As shown in Table 4, the coefficient of -18.11 shows that racial minorities tend to score approximately 18 percentage points lower than Caucasian teachers in the overall sample. This finding is consistent with Grimes and Nelson (1998).

Economics hours earned continues to be positively correlated with economic proficiency in this analysis. Following the 5-day training seminar, teachers with college ECONOMIC HOURS were likely to outperform their peers by 0.54 percentage points for

the overall sample and by 0.49 percentage points among high school teachers. The estimated coefficients are significant at the 5% critical value level in both cases. These results continue to support the findings of several previous studies (Walstad, 2001; Allgood and Walstad, 1999; Bosshardt and Watts, 1990). Neither of the remaining educational attainment variables were found to be significant.

The estimated coefficient on class SIZE is negative and statistically significant for teachers in the overall sample as well as high school teachers. The estimates demonstrate that as class sizes increase, K-12 teachers tend to score 0.36 percentage points lower on the TEL while high school teachers are likely to score 0.48 fewer points. These findings support Wyss, Tai and Sadler (2007), Boozer and Rouse (2001) and Nye and Hedges (2001).

Lastly, the HIGH SCHOOL categorical variable included in the overall sample is positive and statistically significant. This indicates that high school teachers outperformed their K-8 counterparts by over 11 percentage points following the weeklong training seminar. These results are consistent with findings from the pre-test teacher performances, suggesting a persistent difference between high school and K-8 teachers.

### **Pre - Post Results**

Equation [1] was estimated using the difference between pre-test and post-test scores. The specification is included to provide a clearer view of the relationship between the determinants of teacher proficiency and workshop effectiveness. Results from this estimation are shown in Table 5.

The estimated coefficients for RACE are positive and significant for each teacher cohort. Recall the robust results of a negative correlation between racial minorities and economic proficiency discussed previously in the paper. The earlier finding suggested that teachers in a racial minority came to the workshop with a relatively lower level of economic proficiency than Caucasian teachers. The estimated coefficients reported in Table 5 demonstrate that teachers belonging to a racial minority showed relatively larger gains in economic proficiency between the pre-test and post-test at the end of the 5-day seminar. In other words, the economic workshop helped to improve economic literacy more among teachers of a racial minority relative to Caucasian teachers that attended the training. Although this result is the strongest for teachers in the K-8 cohort, this cohort was the smallest in the sample with 26 of the 167 usable surveys and exams. Closer inspection of the K-8 data reveals an imbalance between the number of minority and Caucasian teachers coupled with an extreme outlier among the post - pre scores calls into question the reliability of the race coefficient for the K-8 subsample.

Teachers with a MASTER degree did not perform at a higher level of efficiency on the TEL exam following the workshop. This finding contradicts earlier predictions of the paper. The interpretation of the authors is similar to the one suggested above. Due to the small size of this particular cohort, a few teachers with Master degrees could be establishing this correlation. For some teachers with Master degrees that have a relatively high level of proficiency, large gains in economic proficiency are not reasonable expectations given their experience and mastery. All other variables in the post-pre specification are insignificant.

## **CONCLUDING REMARKS**

This analysis identifies several factors that explain a teacher's initial performance on a standardized economics exam prior to receiving formal training in the subject.

Heterogeneity among teachers participating in this study was observed, with significant differences in test scores correlated with differences in gender, age, race, and economic hours attended in college. Additionally, this study examines the role of these factors in the effectiveness of a select number of teacher training seminars for Arkansas teachers.

Workshop effectiveness is measured in terms of performance gains across the multiple sections of the pre-test and post-test scores for the TEL. All teacher cohorts showed improvement from pre-tests to post-tests, with K-8 teachers experiencing the largest aggregate performance gains. These findings suggest that workshops are effective across teacher groups, even with varying incoming proficiency levels. This study demonstrated that some teachers in a racial minority came to the workshop with relatively low levels of economic proficiency relative to the Caucasian teachers.

However, it was observed that this same group of teachers experienced larger improvements in the TEL scores from the pre-test to the post-test. These results indicate that workshops help lower proficiency groups catch up while still advancing economic literacy rates for those with higher incoming proficiency levels.

There are several opportunities for future research regarding economic literacy rates among teachers and workshop effectiveness. First, time series data would be useful in tracking performance levels over time to measure experience factors as well as specific workshop topics and coverage. Longitudinal data was used in Allgood and Walstad (1999), showing that comprehensive teacher training in economics produces a long-run

payoff in economic literacy rates for teachers as well as their students. Second, the reliability of estimated results would be improved by a larger sample size. This may involve a joint-state effort or an increase in the number of workshops provided, thus allowing for increased teacher participation in the study. Third, perhaps additional testing instruments should be included along with or as a replacement to the TEL. One potential testing instrument would be the PRAXIS, provided by educational testing services for teachers as discussed in Angrist and Guryan (2004). Fourth, other explanatory variables might help explain differences in economic literacy rates among teachers such as school size to distinguish between urban and rural school districts where available resources for teachers may differ greatly. Also, changes in teacher attitudes may be possible to quantify, thus allowing for comparison across various teacher cohorts as discussed in Marlin (1991). Lastly, the methodology may be improved by controlling for quantitative literacy skills. Some teachers may be inherently strong in the quantitative skills, thus giving them a relative advantage over teachers whose math skills may be considered somewhat weak. Burrus, McGoldrick and Schuhmann (2005) address this concern, explaining that strong quantitative skills may falsely appear as economic literacy unless it is correctly controlled for. All of these potential outlets for economic literacy could provide a better overall picture of current economic literacy rates among K-12 teachers and potential workshop effectiveness at addressing demonstrating strengths and weaknesses across teacher cohorts.

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**Table 1: Variable Specifications and Predicted Coefficient Signs**

<u>Variable</u>	<u>Specification</u>
<i>Dependent Variable:</i>	
Pre-Test Score	(Form A) TEL score from pre-test
Post-Test Score	(Form B) TEL score from post-test
Post-Pre Test Score	Form B score - Form A score
<i>Demographic Characteristics:</i>	
GENDER [+]	1=male; 0=female
AGE [-]	teacher's age in years
RACE [-]	1 = racial affiliation is minority; 0=otherwise
1 <sup>st</sup> GENERATION [-]	1=first generation college attendee
<i>Educational Attainment:</i>	
ECON HOURS [+]	number of economic college credit hours earned
MASTER [+]	1=Master degree; 0=otherwise
DEGREE MAJOR [+]	1=college degree earned in disciplinary field; 0=college degree earned in education
<i>Human Capital Developments:</i>	
TRAINING [+]	1=has attended workshop(s) conducted by Economics Arkansas or the Federal Reserve; 0=otherwise
CONTINUING EDUCATION [+]	number of continuing education credits earned by the teacher in a typical year
<i>Teaching Environment:</i>	
SUBJECTS [-]	Number of other courses taught during academic year.
CLASS SIZE [-]	Average number of pupils taught in each class
HIGH SCHOOL [+]	1=teaches high school; 0=teaches elementary or middle/junior high school

**Table 2: Computed Means and Standard Deviations of Variables by Teacher Cohort**

<b>Variable</b>	<b>K-12 Teachers</b>	<b>K-8 Teachers</b>	<b>9-12 Teachers</b>
<i><u>Dependent Variable</u></i>			
TEL (Form A) score	75.269 (15.301)	60.00 (16.852)	78.085 (13.251)
I: Fundamentals	76.176 (18.162)	59.615 (20.597)	79.230 (15.969)
II: Microeconomics	76.766 (18.474)	61.538 (18.696)	79.574 (17.066)
III: Macroeconomics	75.808 (18.703)	58.846 (22.150)	78.936 (16.243)
IV: International	69.760 (22.302)	60.256 (27.112)	71.513 (20.944)
TEL (Form B) score	78.802 (11.796)	67.50 (11.381)	80.887 (10.666)
V: Fundamentals	82.934 (12.879)	72.802 (14.711)	84.802 (11.639)
VI: Microeconomics	79.581 (15.614)	67.308 (17.789)	81.844 (14.122)
VII: Macroeconomics	74.791 (17.210)	60.385 (16.366)	77.447 (16.054)
VIII: International	74.551 (20.924)	67.308 (19.137)	75.887 (21.028)
<i><u>Demographic Characteristics</u></i>			
Gender	0.425 (0.496)	0.154 (0.368)	0.475 (0.501)
Age	43.922 (11.872)	45.077 (13.142)	43.709 (11.661)
Race	0.048 (0.214)	0.038 (0.196)	0.057 (0.232)
1 <sup>st</sup> Generation	0.563 (0.498)	0.423 (0.504)	0.589 (0.494)

Educational Attainment

Econ Hours	4.653 (4.055)	1.385 (3.201)	5.255 (3.914)
Master	0.467 (0.501)	0.308 (0.471)	0.496 (0.502)
Major	0.551 (0.499)	0.154 (0.368)	0.624 (0.486)

Human Capital Development

Training	0.347 (0.478)	0.231 (0.430)	0.369 (0.484)
CEUs	70.365 (15.117)	80.000 (17.262)	68.589 (14.048)

Teaching Environment

Subjects	2.503 (1.598)	4.231 (2.673)	2.184 (1.046)
Avg Class Size	22.341 (5.102)	20.538 (5.798)	22.674 (4.914)
High School	0.844 (0.364)	-.----- -.-----	-.----- -.-----
Observations	167	26	141

**Table 3: Assessment of Economic Literacy Among Participating K-12 Teachers (Pre-Test)**

<b>Variable</b>	<b>K-12 Teachers</b>	<b>K-8 Teachers</b>	<b>9-12 Teachers</b>
Constant	66.280*** (8.000)	81.467*** (4.453)	76.112*** (8.635)
<i>Demographic Characteristics:</i>			
Gender	4.472** (2.186)	12.290 (1.151)	3.158 (1.555)
Age	0.090 (0.997)	-0.552** (-2.525)	0.186* (1.958)
Race	-24.170*** (-5.145)	-36.488*** (-2.982)	-25.126*** (-5.559)
1 <sup>st</sup> Generation	-0.387 (-0.186)	2.674 (0.406)	-1.641 (-0.766)
<i>Educational Attainment:</i>			
Econ Hours	0.789*** (2.978)	0.407 (0.258)	0.755*** (2.850)
Master	3.069 (1.505)	6.919 (1.075)	1.717 (0.806)
Major	2.684 (1.313)	9.487 (0.905)	1.034 (0.495)
<i>Human Capital Development:</i>			
Training	2.051 (0.971)	12.853* (1.785)	0.877 (0.411)
CEUs	-0.009 (-0.136)	-0.134 (-0.858)	0.047 (0.635)
<i>Teaching Environment:</i>			
Subjects	-0.651 (-0.949)	-0.897 (-0.845)	-0.217 (-0.205)
Avg Class Size	-0.501** (-2.561)	0.448 (0.712)	-0.608*** (-2.680)
High School	12.661*** (3.726)	-.--- -.---	-.--- -.---
F-Statistic	9.231	3.893	5.056
Adjusted R <sup>2</sup>	0.373	0.561	0.242

Statistical significance at the 10%, 5%, and 1% critical value levels are denoted by \*, \*\*, and \*\*\*, respectively.

**Table 4: Assessment of Economic Literacy Among Participating K-12 Teachers (Post-Test)**

<b>Variable</b>	<b>K-12 Teachers</b>	<b>K-8 Teachers</b>	<b>9-12 Teachers</b>
Constant	73.056*** (10.812)	67.721*** (4.342)	83.102*** (11.256)
<i>Demographic Characteristics:</i>			
Gender	2.772* (1.663)	-0.851 (-0.093)	2.071 (1.217)
Age	-0.002 (-0.027)	-0.403** (-2.164)	0.072 (0.902)
Race	-18.111*** (-4.729)	-13.282 (-1.273)	-19.140*** (-5.056)
1 <sup>st</sup> Generation	-1.265 (-0.746)	-1.472 (-0.262)	-1.965 (-1.095)
<i>Educational Attainment:</i>			
Econ Hours	0.544** (2.520)	1.866 (1.389)	0.486** (2.191)
Master	2.306 (1.387)	-2.424 (-0.442)	2.212 (1.240)
Major	1.415 (0.849)	9.507 (1.064)	0.246 (0.141)
<i>Human Capital Development:</i>			
Training	0.491 (0.285)	7.351 (1.198)	0.260 (0.145)
CEUs	0.013 (0.234)	0.016 (0.117)	0.036 (0.593)
<i>Teaching Environment:</i>			
Subjects	-0.171 (-0.306)	-1.281 (-1.416)	0.226 (0.255)
Avg Class Size	-0.364** (-2.282)	0.896 (1.670)	-0.485** (-2.552)
High School	11.031*** (3.983)	-.--- -.---	-.--- -.---
F-Statistic	6.902	1.968	3.774
Adjusted R <sup>2</sup>	0.299	0.299	0.179

Statistical significance at the 10%, 5%, and 1% critical value levels are denoted by \*, \*\*, and \*\*\*, respectively.

**Table 5: Assessment of Economic Literacy Among Participating K-12 Teachers**  
(Pre - Post Test)

<b>Variable</b>	<b>K-12 Teachers</b>	<b>K-8 Teachers</b>	<b>9-12 Teachers</b>
Constant	6.776 (1.144)	-13.747 (-0.931)	6.991 (1.091)
<i>Demographic Characteristics:</i>			
Gender	-1.699 (-1.163)	-13.141 (-1.523)	-1.087 (-0.737)
Age	-0.092 (-1.426)	0.149 (0.843)	-0.114 (-1.655)
Race	6.058* (1.805)	23.205** (2.350)	5.986* (1.822)
1 <sup>st</sup> Generation	-0.878 (-0.591)	-4.146 (-0.779)	-0.324 (-0.208)
<i>Educational Attainment:</i>			
Econ Hours	-0.245 (-1.292)	1.459 (1.147)	-0.269 (-1.396)
Master	-0.763 (-0.524)	-9.343* (-1.798)	0.495 (0.320)
Major	-1.269 (-0.869)	0.021 (0.002)	-0.788 (-0.519)
<i>Human Capital Development:</i>			
Training	-1.560 (-1.034)	-5.502 (-0.947)	-0.617 (-0.398)
CEUs	0.022 (0.457)	0.149 (1.187)	-0.011 (-0.191)
<i>Teaching Environment:</i>			
Subjects	0.480 (0.979)	-0.385 (-0.449)	0.443 (0.577)
Avg Class Size	0.137 (0.981)	0.448 (0.883)	0.123 (0.747)
High School	-1.630 (-0.671)	-.--- -.---	-.--- -.---
F-Statistic	2.111	2.133	1.074
Adjusted R <sup>2</sup>	0.074	0.333	0.017

Statistical significance at the 10%, 5%, and 1% critical value levels are denoted by \*, \*\*, and \*\*\*, respectively.