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What the Empirical Research Tells Us about Precollege Economic Education*

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I. General Caveats and Concerns, and Some First (Mostly Sobering) Conclusions

At its best, which also means at its most demanding, economic education blends theory and empirical methods from both economics and general education. For quantitative research this means blending, or at least directly addressing, ideas, estimation techniques, and sometimes debates from both psychometrics and econometrics. Unfortunately, but not really surprisingly, it is often difficult to do this well, and so all too often it just isn't done.

One key reason for that is that few economists take coursework in education, including psychometrics, while few educators take courses in economics, including econometrics. That's important because many of the topics that are standard fare in psychometrics are not usually studied by economists—ranging from validity and reliability standards for assessment instruments and methods, to debates about the unidimensionality or multidimensionality of student evaluations of teaching, to analysis of variance and many nonparametric procedures, and so on up to meta-analysis (or down, depending on one's assessment of how valid these procedures are, and how well they are done). On the other hand, while some researchers in education have recently begun to use input-output specifications of educational production functions that have been widely used by economists since the 1960s, as Becker (2004) and others have pointed out the total body of formal empirical work in the general education literature dealing with basic questions about how students learn best is very limited, both in terms of the number of studies that have been published and the quality of those studies in dealing with statistical problems that have been stressed by prominent economists and econometricians in recent decades.

Therefore, the first point I want to make is that most researchers in the fields of education, economics, and economic education – including me – don't know enough about what *both* groups of researchers are doing.

The second, equally important point is that we should be careful and modest in what we claim to know from research on economic education, especially at the precollege level, especially in making claims about effective teaching methods and curriculum reforms.

That may be surprising to those who have read many or even some of the hundreds of articles and chapters from general education journals and books published over the past decade advocating the use of active learning techniques for all or especially certain groups of students. Some writers in education who have done that, or published such research, have gone so far as to claim “The picture of what encourages students to learn effectively at university is now almost complete” Ramsden (1998, p. 355).

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Unfortunately, as DeNeve and Heppner (1997) and Becker (2004) have shown, very few of these studies have directly compared active learning techniques to other teaching methods, or featured quantitative studies with inferential statistics. Instead, most of the articles have featured casual, anecdotal evidence, or offered theoretical arguments favoring a particular teaching style of method.

Becker (2004) goes on to criticize a large part of the empirical research that has been published for failing to address the statistical problems identified by many prominent economists and econometricians in recent decades, especially for: 1) ignoring issues of sample selection bias, and treating results from non-random samples as if they were drawn from random samples,¹ 2) ignoring problems with data clustering when individual students are used as the unit of observation (for example, by ignoring instructor effects for subgroups of students who were taught by different teachers), 3) failing to adjust for different numbers of observations across different class means or other aggregate measures when that is the unit of observation, 4) failing to control for students' general ability or knowledge at the beginning of a course or other instructional unit, 5) focusing too narrowly on a particular and limited measure of learning outcomes (such as a score on a multiple choice exam, or a course grade, or an SET item or index of items), which often introduce data truncation in the form of "ceiling effects," and ignoring other outcomes and incentive issues that are important to students during and/or after their coursework, 6) relying on self-reported data from students (for example, grade point averages used as a control for student ability and motivation), and 7) overemphasizing the importance of statistical significance. The issue of statistical significance deserves special comment, because it appears to be so deeply imbedded in educational research and evaluation (as it once was in economics). There are two basic problems with measures of statistical significance. First, whether a difference in two means or other values is significant has very little to do with how large the difference is, and much more to do with sample size. Adding more observations is the most reliable way to have differences pass this test, and that says very little about whether or not the differences are large enough to have any real practical meaning. Second, a finding that a difference is not statistically significant does not prove the null hypothesis. In other words, it does not prove that a treatment effect is not more effective than the control method.

All of these issues that are found in the general education research literature are germane to research in economic education as well, including the fundamental problem of having a relatively small number of empirical studies to draw on. Like many other subfields in both education and economics, there are only a small number of active researchers in the field of economic education, which helps to explain why there are so few studies in the

¹ This is a relative, not absolute issue, because as Becker (2004, p. 277) points out, "no one has ever designed an absolutely perfect experiment—randomization is not an absolute; it is achieved in degrees. The best we can do in social science research is to select the treatment and control groups so that they are sharply distinct and yet represent events that could happen to anyone...." Nevertheless, reports of research and (especially) evaluation results from general education rarely take the problem of nonrandom samples into account in meaningful ways, no matter how serious problems of sample selection may be. There are some cases in the economic education research literature where sample selection appears to make little or no difference to results, but other cases where it clearly does. For examples of this see Emerson and Taylor (2004) and Becker and Powers (2001).

field. But there are special factors at work in economic education, too, especially for precollege studies. First is the point already noted, that in some sense the demands of economic education are particularly high because of the interdisciplinary features of the work, which introduce a wider range of issues, estimation techniques, and literatures to consider. The second point is an institutional constraint, which at least partly explains why a large percentage of the comparatively few empirical studies that have appeared in the general education literature, and a clear majority of the empirical studies in economic education, deal with university students and teachers. One key reason that happens is simply because it is easier for researchers to collect data from their own institutions, departments, and classes. Another is that most of the researchers teach at the university level, and so may be more interested in those questions on the one hand, or find that studies featuring students in university settings are of more interest to their colleagues, and so of more value for departmental decisions on promotion, tenure, and annual salaries. Because most of the empirical work in economic education has been done by faculty in departments of economics, not schools of education, this problem appears to be even more important in the economic education literature than in general education.

A final point to make in this general overview of empirical research on teaching methods, in both the general education and economic education literatures, concerns Becker's list of specific failings in many of the empirical studies. It is important to note that one reason Becker and other econometricians are speaking out so stridently about these problems is that prominent economists and econometricians have, over the past few decades, not only identified how these problems can sometimes affect statistical estimates of treatment effects, but also developed procedures to avoid or correct for many of these problems. Indeed, many of these procedures are now included as standard parts of large statistical estimation programs such as Stata and Limdep. And there are, increasingly, examples of good studies that do make use of these tools – for example, Emerson and Taylor (2004), who find that using classroom experiments does increase student learning in university principles of microeconomics courses.

II. Better Tidings, and Reasons for Continuing Faith, Hope, and Good Works

Despite all of the important caveats and criticisms discussed above, which may have the unintended effect of discouraging and turning away those who are interested in past, present, and future empirical research in economic education, there are some important and even encouraging findings from the published research on economic education at the precollege level. Replication of even these basic findings, based on new studies that explicitly account for the statistical problems and issues noted above would certainly be welcome, but unless and until such studies turn out to refute rather than replicate the results discussed below, it seems to me these basic findings seem reasonably safe, though perhaps as much for underlying theoretical and institutional reasons as the empirical findings themselves. But in most cases, these results have been found in a reasonably large number of studies, using very different data sets and samples, and in some cases even different estimation techniques. I group studies together to discuss five key findings:

- 1) Students in classes taught by teachers who have more training in economics and economic education, and who spend more time teaching economics, using good materials produced by academic economists and economic educators, learn more economics. This finding has been reported in a wide range of studies, conducted in different countries, at different grade levels (including elementary, middle school, and secondary classes), using different estimation procedures, and different sampling procedures, ranging from opportunistic samples of schools and classes to a statewide, stratified random sample of schools. (Allgood and Walstad 1999; Bosshardt and Watts 1990 and 1994; Buckles and Freeman 1984; Lopus 1991; Lopus and Maxwell 1994; Sosin, Dick, and Reiser 1997; Walstad 2001 and 2002; Walstad and Rebeck 2001a and 2001b; Walstad and Soper 1988, 1989, and 1991; and Watts 1985, 1986, and 1987a).

Generally these studies have not controlled for students or teachers/classes who dropped out of the sample during the treatment period, and some of the studies did not feature distinct control and treatment groups. Almost all of the studies used standardized multiple choice exams to measure learning.

Therefore, many of the general concerns voiced by Becker and others clearly come into play here. Despite these limitations, however, this group of studies strongly supports the basic idea that more time on task, by teachers with more training in economics who use academically sound instructional materials, leads to more learning by students. Given the limited amount of time in the curriculum devoted to economics and the limited amount of training teachers have in economics,² that result is not particularly surprising. Put differently, it is possible that the same findings might not hold in subjects that receive much more time in the curriculum and where teachers have received considerably more training (such as basic language, math, and science education).

But what this most basic finding about precollege economic education lacks in surprise it gains in providing assurance that economics can be taught at the precollege level. That's important for many reasons, one being that some prominent economists have argued, and continue to argue, that economics either can not or should not be taught to precollege students because the subject is just too difficult and complex for these students (and perhaps teachers) to understand.³ The major reason it is important, however, is that a sizeable block of resources have been devoted to enhancing and expanding

² On these points see Bosshardt and Watts forthcoming; Walstad and Kourilsky 1996; Walstad and Watts 1985; and the country studies included in the volume edited by Watts and Walstad 2002).

³ For example, George Stigler (1970) said that the time had not yet come to make economics part of every person's basic education, not because economics wasn't important enough to be taught at the precollege level, but because we didn't know how to teach it. David Collander argued against teaching economics in precollege grades at a conference on "What We Teach and How We Teach It," held in Adelaide, Australia in July 2004, arguing that students should ideally get their economics training at universities starting from a *tabula rasa*. Other prominent economists have disagreed with this position for over a century, often noting that too many students never go on to colleges or universities, or take economics courses even if they do.

precollege economic education programs in dozens of nations, and this research provides basic support for continuing those efforts.

- 2) Several studies point to the importance of the separate high school course in economics, ideally as a capstone course building on infusion of economics in early grades and other subjects, but also important if, as in most school districts, the infusion and integration is not present, or at least not consistent and systematic. (Bosshardt and Watts 1990; Lopus 1997; Lopus and Maxwell 1994; Melican, Deebe, and Morgan 1997; Walstad 2001; Walstad and Rebeck 2001a; Watts 1985, 1986, and 1987a). The separate course on economics is safest and surest way to be sure that students receive at least some introduction to basic economics. Institutionally, the separate course is easier to deliver and monitor than a K-12 infusion approach, and the teacher of this course is more likely to “think like an economist” – and therefore presumably more likely to teach like an economist – than other secondary social studies teachers (Becker, Walstad, and Watts 1994). While few educators would claim that a one-semester course – the most typical length of the secondary economics course – or even year-long course in any complex subject can develop basic literacy in the subject, such a course may be the single most important delivery point in achieving that goal, and may well be a necessary component of such a program, as well as the most promising starting point to deliver such a program. Only a few U.S. states and a handful of nations have so far made such courses compulsory for all students, however.
- 3) As an extension to the first finding discussed in this section, I will immodestly point to a series of three articles I wrote with Bill Bosshardt, in which we used panel data estimation techniques to show that instructor effects are important in teaching economics – again measured on standardized multiple choice exams – in elementary, middle school, secondary, and university principles of economics classes. The instructor effects are not as important as student ability and other characteristics, which are four to six times as large, so the sad but undeniable truth is that the best way to be a great teacher is to have great students. Nevertheless, attributing a fourth to a sixth of the learning that takes place in classrooms to the instructor suggests that he or she still has a very important role in the learning process. (See Bosshardt and Watts 1990 and 1994, and Watts and Bosshardt 1991.)
- 4) There has been some recent research on the relationship between economic understanding and people’s attitudes on current public policy issues, such as free trade agreements, putting price ceilings on oil prices when the market price rises rapidly, raising legal minimum wages, using tariffs and other trade barriers to reduce unemployment or deal with balance of payments problems, etc. A much larger number of articles were published on these topics several decades ago,⁴ often couched in terms of whether students became more liberal or conservative after taking coursework in economics. The findings in those

⁴ For a summary of these earlier articles, see Siegfried and Fels (1979).

earlier studies were quite mixed, and I suspect the main reason for that is that the terms liberal and conservative just don't really match up all that closely with understanding economics. After all, there are very liberal and very conservative Ph.D economists, and both groups tend to support free trade, oppose wage and price controls, etc.

The more recent work on attitudes has focused more on such questions as whether changes in understanding cause changes in attitudes (they do) or vice versa (they don't) (Walstad 1987). Other studies have investigated how different levels of training in economics, or in measured levels of economic understanding, affect people's attitudes on public policy issues (Becker, Walstad, and Watts 1994; Walstad and Rebeck 2002). There, it turns out that the more economics courses you have taken, or the higher your score on an economics exam, the more likely you are to think like economists. That should not be interpreted as meaning that economists have a consensus position on all public policy issues, because economists show strong consensus on some policy issues, but not on others (Fuller and Geide-Stevenson 2003).

During the late 1980s and 1990s, many surveys on public attitudes toward economic issues were conducted (often as part of surveys conducted by sociologists and political scientists) in the transition economies. (See Watts, Walstad, and Skiba 2002 for a survey of this work.) There are certainly opportunities to update this work, and investigate the effects of economic understanding and instruction on students and citizens in these countries today. Two papers have been published comparing attitudes on various economic issues for teachers in the United States and in some of the transition economies (Lopus 1996, McCorkle and Watts 1996).

5. We really have very little empirical research on what specific teaching methods work most effectively with precollege students, and what particular order of teaching concepts works better than others (if any). When the National Council on Economic Education published its scope and sequence guidelines, which were later incorporated as benchmark grade-level outcomes in its voluntary national standards document, two surveys of classroom teachers and U.S. state and local social studies supervisors were commissioned (Watts 1987b and 1989), but no formal empirical testing of these guidelines has ever been done. The closest approach to this is a paper by Sosin, Dick, and Reiser (1997), which investigates student achievement in elementary grades for four broad groups of concepts (basic concepts, economic systems, market concepts, and macroeconomic and international concepts). There is some work now underway by economic educators outside the United States using the idea of "threshold concepts" from the general education literature (see Meyer and Land 2003), but the work in economic education is in very preliminary stages, and largely focused at the university

level. (Davies 2003; Reimann and Jackson 2003, and Shanahan and Meyer 2003).

III. Conclusions

These remarks were intended to be a brief overview of rather complex issues, so I will offer only a few additional conclusions, in the form of recommendations:

- 1) The conclusion that is almost always made is still true, and by no means trite. We need a lot more empirical research on economic education, especially at the precollege level. There are several important general messages to be taken, at least on a provisional basis, from the research that has been published to date. But that body of work is thin and can be strengthened in many respects, including the breadth of questions studied, the range of output measures investigated, and in paying more attention to estimation problems such as sample selection bias and clustering. That's not likely to happen, however, at least in terms of any notable increase over current levels of research activity at these grade levels, unless significant additional resources are provided to fund and otherwise support such initiatives.
- 2) Along the same lines, it is probably past time to offer a new round of training programs on research in economic education, updating the Pew Trusts programs that the NCEE offered at Princeton University in the 1980s. Such a program might well be open to international economic educators, not just those from the United States.
- 3) If the first two initiatives/recommendations are successful, it would be helpful to provide enough support to the *Journal of Economic Education (JEE)* to increase the number of articles it publishes each year. A number of new journals in economic education have been appearing over the past few years, both internationally and in the United States. That's encouraging and a very good thing to see, but the *JEE* is, and should remain for at least the foreseeable future, the flagship journal in the field. This was recently recognized by its inclusion in the prestigious JSTOR group of journals.

We should also be doing more to encourage readership and subscriptions (both individual and institutional) to economic education journals, and in particular to the *JEE*.

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