

WHAT WORKS:
A Review of Research on Outcomes and Effective Program Delivery
in Precollege Economic Education

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EXECUTIVE SUMMARY

Research literatures from several academic fields were reviewed to address the following key questions: 1) Can elementary and secondary students learn basic economic concepts? 2) If so, what kinds of programs and policies are effective in promoting student learning, including initiatives in such areas as curriculum reform, requirements for separate secondary courses in economics and/or infusion in other subject areas and grade levels, teacher training in economics and economic education, instructional materials, and assessment of outcomes? 3) What evidence is there, if any, that student learning of economics leads to different behaviors as adults, in roles as consumers, savers, investors, producers, and citizens/voters? 4) How much economics is typically taught in U.S. schools, in separate courses and as part of other subject areas? 5) How much support for, or opposition to, K-12 economic education programs is found in related literatures, including social studies and business and vocational education, and other parts of the general education literature?

Articles to be included in the reviews were identified through keyword searches in several electronic data bases, including EconLit, ERIC, and the *Journal of Economic Education* web page. In most sections of the report the earliest articles included were published in 1990.

Following a general introduction, the report is presented in six sections. The first section, coauthored with William B. Walstad, reviews specialized studies in the field of economic education as reported in the *Journal of Economic Literature* code for precollege economic

education. These are primarily studies published in the *Journal of Economic Education* or other economics journals. The second section spans a wider but more fragmentary set of publications by economists that consider how economics instruction may, or may not, result in long-term differences in adult behavior as consumers, workers, and citizens/voters. The third section reviews studies on economic education published in the field of social studies education, in academic journals and other outlets. The fourth section deals with a much smaller number of papers published in business and vocational education outlets. The final two sections deal with research related to economic education from two specialized areas in the general education research literature: domain-specific features of learning and cognitive development, and expert-novice differences in understanding various academic fields of knowledge, including economics.

Briefly summarizing the key conclusions of each section:

1) Economic Education Studies

- At both the elementary and secondary levels, students of teachers who know more economics, who spend more time teaching economics, and who use good instructional materials, learn more economics. That may well reflect the limited amount of time in the curriculum devoted to economics and the limited training teachers have in economics, and might not always be true for other subjects that receive much more time in the curriculum, such as language, math, and science.
- A formal secondary course in economics is the safest way to improve students' knowledge of

economics, but it is not at all likely that one course in economics is enough to consider students economically literate.

- Some prominent economists have argued against teaching economics at the secondary level, in part because they would prefer to see students take university courses and begin those courses as *tabulae rasae*. But not taking a secondary economics course does not guarantee that a student will be a *tabula rasa*, because economics is a subject particularly affected by public misinformation and misconceptions. Moreover, most secondary students today will never take a college course in economics, and in fact most U.S. high school graduates—let alone dropouts—do not take an economics course in high school.

- Students who have taken high school economics courses begin university economics courses knowing more economics, but often do not maintain that advantage through the courses. They may simply choose to put more time into other courses or activities, but even that suggests they learned some economics correctly in the secondary course, which may include rejecting or avoiding mistaken ideas about economic ideas and issues that students who did not take a secondary course acquired or maintained.

- We know far less about what changes attitudes on economic ideas and issues than we do about what affects content knowledge and learning, largely because attitudes are more difficult to measure and change than knowledge and understanding. Many of the studies on attitudinal outcomes were published two or more decades ago, and couched in terms of whether students became more liberal or conservative after completing coursework in economics. Such labels proved difficult to reliably define, measure, and track over time; but it does appear that the more economics a person takes, or the higher they score on an economics exam, the more likely they are to think like economists on a wide variety of economic issues. On different issues however,

academic economists may or may not show consensus.

- More empirical and conceptual research on precollege economic education is needed, and more tools are needed to do it—particularly more output measures (including, but not limited to, standardized tests) and national data bases. To see a notable increase over current levels of research on these grade levels, significant additional resources will be required.

2) Studies on the Long-Term, Behavior Effects of Economic Education

- There have been relatively few studies on how learning economics affects people in their adult roles as consumers, producers, and citizens/voters.

- The effects of economics coursework on income has been studied most extensively for college majors, and even there it is difficult to separate the effects of self-selection and differences in general cognitive and non-cognitive ability from the effects of coursework and training received. There appears to be some earnings premium for economics majors, even compared to students with similar abilities who major in other fields. However, students' choice of majors is usually more closely related to their interest in different fields and subjects than to expected earnings differentials.

- There are lasting effects to economics instruction at both the college and precollege levels, but that knowledge “decays” over time. There is some evidence of a “critical mass”/threshold effects in learning economics, suggesting that taking at least four courses is required before major long-term differences in understanding are attained.

- Returns to compulsory education through grade 12 and to a required course in economics were questioned in two recent studies, in terms of the opportunity cost of the last year of education

and performance on the SAT exam, respectively. The study on the required economics course is subject to sample selection issues based on characteristics of the small number of states that require the course, and the students in those states who chose to take (or not) the SAT exam. Another study found that in states with broadly worded mandates for personal finance education, students scored no higher on a test of personal finance than students in states without such mandates. In the relatively few states that mandate a specific course on personal finance, however, students did score higher. Still another study surveyed graduates from different states and found that respondents from states with mandates were exposed to more instruction on personal finance decisions and likely to save more as adults.

- A recent study in Canada found that participation in consumer education programs led to increased search activity for product testing results when major appliance purchases were made. In most cases, however, consumer education received from “informal” educational materials performed better than consumer education provided in a formal classroom setting. A recent U.S. study using data from the Federal Reserve’s Surveys of Consumers found that knowledge about credit, saving, and investment was significantly linked to recommended financial practices in four areas: cash-flow management, credit management, saving, and investment.
- Several recent studies have found that adult education programs on employer-sponsored retirement programs lead to differences in behavior by participants, in terms of the level and composition of saving and investment. These participants clearly have stronger and more direct motivations and incentives to attend and learn in these programs than elementary and secondary students studying economics or personal finance, so whether or how much these results transfer to the precollege setting is open to question.
- Surveys indicate that most workers are poorly informed about their benefits under Social Security and employer-provided pension benefits, but knowledge is systematically related to information provided by firms and unions in the workplace, and to other factors related to the costs and benefits of gathering information.
- The more economics adults (including teachers) know, the more similar their opinions on current economic issues are to opinions held by economists. Most adults say that they want to be well informed about economic issues, but get most of their information from television reports. One recent study found that personal values were more important than knowledge of economics in shaping opinions on many issues, but both of those factors were more important than respondents’ self-interest on different issues. Among professional economists, opinions are influenced more by personal values than by their individual estimates about the nature and strength of relationships between variables affected by different policies.
- Economics majors and graduates appear to act more in their self-interest than other majors, but that may well reflect self-selection into the major more than the content of what is studied. Economists and economics students clearly engage in altruistic behavior, too, although there is relatively little in their course of study that actively promotes such behavior.
- Economists who take high-level administrative positions in government or academic institutions have regularly noted both advantages and disadvantages of their training as economists in those jobs. The advantages include a clear framework and conceptual tools for decision making, including such basic concepts as opportunity costs, sunk cost, marginalism, incentives, and unintended consequences of policy measures. The disadvantages noted include over-reliance on models of rational behavior, naiveté with respect to political

environments and responding to ideological agendas, and an emphasis on efficiency concerns to the point of sometimes downplaying equity concerns.

3) Studies from Social Studies Education

- Most of the studies on economic education that appear in social studies journals and outlets are published by education professors who specialize in the field of economic education. Ideas on the rationale and goals of economic education in this literature are virtually identical to those found in the more specialized economic education literature reviewed in the previous section, as are discussions about infusion of economics into other courses (which for this group means especially in history, civics, geography, and elementary social studies courses) and on the separate high school course in economics. Some empirical studies are published in this literature, featuring more basic analytical frameworks and statistical tests than found in economic education published in economics journals. There is relatively little cross-referencing (in either direction) between the studies from this body of literature and the economic education studies published in economics journals.

- Economic education studies comprise a relatively small part of the social studies literature. Far more studies deal with history, civics and government, social studies as a general field, or even geography – in line with the distribution of specializations among the academics in this field. A large portion of the economic education publications in this literature appeared in special issues of leading social studies journals, which were entirely or largely devoted to economics. Without those special issues, economic education would be even more underrepresented in the social studies literature.

4) Business and Vocational Education Studies

- Only a handful of studies have appeared in this field dealing specifically with economic education. Those papers and policy statements support traditional rationales for incorporating basic economic concepts in business and vocational education programs, and in many cases call for expanding those programs to reach more students. Secondary teachers in these fields have typically taken considerably more economics coursework as undergraduates than teachers from other fields, including social studies.

5) Education Studies on Domain-Specific Features of Learning

- The key idea in this literature is that cognition is modular in nature, partly because of different structural properties for knowledge from different subject areas. A few studies have argued and provided limited evidence to support the claim that economic knowledge and learning is, in key ways, domain specific.

- In fields where conceptual understanding is domain specific, early/prior knowledge in the field is a major determinant of later learning, which supports calls to provide instruction on economic concepts in early grades and other subject areas. But it also means that the economic concepts and examples presented must be developed fully enough to establish the unique aspects of economic understanding, which may be a key determinant and metric of the success of infusion programs.

- There are many examples of gender differences across different subject areas in the domain-specific literature, and there have been numerous studies on gender differences at all grade levels in economic education. Surprisingly, however, the economic education studies on this topic rarely make direct references to the gender

differences noted in domain-specific studies for other fields.

6) Education Studies on Expert-Novice Differences in Cognitive Understanding

- Studies on expert-novice differences in conceptual understandings are, if not directly complementary, at least compatible with the general framework and conclusions developed in the domain-specific studies discussed in the previous section. Only a few studies have tried to establish theoretical or empirical evidence on expert-novice differences in economics, but those studies claim to find clear and predictable differences in patterns of problem-solving and cognitive understanding used by experts and novices. This literature may eventually be useful in the area of assessment, in attempts to develop evaluation items and procedures that gauge depth rather than breadth of understanding. In that context depth of understanding would be measured against expert patterns in approaching problems. That might be taken to mean, as economists are so fond of saying about their goals for teaching economics at any level, how much students move toward “thinking like an economist” – but establishing specific meaning and metrics for that goal has not proven to be an easy task.

General Conclusions

Most of what we know from the research that has appeared since 1990 is broadly supportive of precollege economic education, in suggesting that even young students can understand basic concepts that may help people make better decisions as consumers, workers, and citizens. A separate secondary course in economics seems likely to be the single most important way to increase students’ level of economic understanding, and there is also some evidence supporting calls for a separate course on personal finance.

On the other hand, how much can be accomplished in one or even two one-semester courses is open to serious question, so infusion of this material in other courses and grade levels, while difficult to implement and (especially) maintain, may be a necessary condition for producing high school graduates with basic and lasting levels of economic literacy. To the extent that secondary history, civics/government, and geography courses will inevitably deal with economic concepts and topics, the infusion question is, by default, already a question of how well – not whether – the infusion is done. At the elementary level, many of the most creative and effective instructional materials available in economic education feature infusion into language and mathematics lessons.

Students’ general cognitive and noncognitive skills, and teachers’ training in economics and economic education, are clearly important determinants of how much students learn. Good instructional materials also make a difference, as does the amount of time teachers spend teaching economics. Taken together, that suggests major sets of instructional materials, including video and computer components as well as good textbooks and other printed materials, can have a greater effect than a few individual lessons scattered over a course or school year.

There are, however, high costs associated with developing and implementing instructional materials or new course requirements. Financial costs are substantial, especially for major sets of materials, but the opportunity costs of reallocating time in the curriculum away from other subjects or materials, and of determining how to effectively infuse instruction in two or more subject areas, are also major constraints. Costs of teacher training are also serious considerations.

Beyond those broad ideas, and some specific examples and applications of those ideas concerning specific courses or training programs, or instructional materials, the research literatures

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reviewed here have little more to offer. That is disappointing, of course, because we would certainly like to have more evidence on many other questions, both large and small. Developing research answers for many of the large questions would, however, itself be an expensive proposition, requiring years, not months, to do. That kind of research has rarely been funded in economic education, with the major recent exception being the recent series of studies on the effects of various kinds of education and training programs on household saving and investing behavior, some of which were funded by Federal Reserve banks.

In contrast, most published studies in economic education receive little or no external funding, and instead are conducted at a scale consistent with what an individual researcher, or a small team of researchers, is able to fund using departmental university resources. The greater part of the progress that has been made in economic education research has been accomplished that way, so this kind of work should certainly not to be dismissed lightly. On the other hand, some of the big questions that are now being asked more frequently by educational and political leaders may well require a different scale of effort to develop more complete and definitive answers.

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I. INTRODUCTION

Specialized research on economic education at the precollege level has been published regularly at least since the first issue of the *Journal of Economic Education*, which appeared in 1969. Over that period, many important topics have been studied, and much has been learned concerning the effectiveness of economic education programs. Most notably, students learn more economics when teachers spend more time teaching basic economic concepts and issues, when teachers themselves know more about economics and are trained in teaching economics, and when they use accurate and motivating instructional materials. Also, as in virtually all fields of study, it is clear that high ability students learn more economics (or at least learn faster) than weaker students. There are other findings that fill in details about what can happen in the classroom, at different grade levels using different instructional materials or methods, and in different kinds of classes – including separate high school course on economics or cases in which economics instruction is infused into courses on other social studies, language arts, or mathematics – but on the fundamental question of whether precollege students can learn basic economic concepts the broad picture from the research findings is solidly affirmative and reassuring.

Other important questions are not so fully answered, however, including:

1) How does learning economics change behaviors in people's roles as consumers, producers, and citizens once they finish their schooling? 2) How much economics is typically taught in the schools? 3) How effectively can economics instruction be incorporated in classes on other subjects, both in theory and in practice, and how much infusion really takes place in today's schools? 4) How much support for (or opposition to) K-12 economic education is there in related fields, and how do professionals in

those fields view the need and effective delivery strategies for such programs? 5) Is there research from the related fields that adds to or modifies the specialized research on economic education?

There are clear reasons why our knowledge on these questions is so incomplete. First and foremost, it is difficult and expensive to track students through all years of their schooling, and even more so to follow them after graduation, into the home, workplace, and voting booth. Simply establishing what the representative curriculum for K-12 economic education is in the United States today is a major task, given the extensive variation across states and local school districts, in terms of curriculum requirements, teacher training, student ability and interests, and regional and local economic conditions. Cross- or interdisciplinary work is even more difficult to track and measure, because in addition to all of the problems noted above there are also the barriers/costs of disciplinary specialization to face. Rarely are resources available to fund those kinds of studies, even when major funding is provided to develop curriculum guidelines or major sets of instructional materials for national distribution.

But there is a reasonably rich research literature in economic education to build on, and researchers in other fields have, at times, studied different aspects of economic education, or more general issues that are clearly pertinent to many of the questions listed above. Therefore, this document is presented as a set of research reviews, bringing together in one place findings from studies written by a wide range of researchers trained in different fields, to present a more comprehensive picture of what we know, and in several cases what we don't know, about these questions. Because this report was prepared over a period of only about eight months, and mainly by one person trained in one particular field, it seems inevitable that other readers will point to studies that could or should have been included in one or more sections of the

report. Some may even suggest other fields or topics that should have been included as additional sections. But of course in some ways that is exactly the kind of discussion it is hoped that this report will promote, so without any further apologies or excuses here is a brief summary of the sections that are included.

The first section was written with William B. Walstad and presented at the meetings of the American Economic Association in January 2005, dealing with the specialized research literature on precollege economic education. There have been earlier research reviews and agendas on this literature, but none had appeared for about 15 years. Accordingly, this paper compares the studies that have appeared since 1990 to those that were summarized in those previous review and agenda pieces, with particular attention to progress that has been made (or not) on the key recommendations from those earlier works. The 1990 starting point for current research reviews was then also used for the later sections of the report dealing with studies from other academic fields.

The second section of the report reviews the scattered and rather fragmentary literature on the long-term effects of economic education programs, in terms of what adults know and think about economics and, most important, on their behaviors as consumers, workers, savers and investors, and citizens/voters. Because of the focus on long-term, adult outcomes, this is the one section of the report that considers some programs offered after high school, in cases where there are clear links between those kinds of training programs and individuals' economic behavior.

The third section of the report covers articles published in social studies education journals and other outlets since 1990. Some of the authors of these studies are, in fact, specialists in economic education who hold appointments in education schools and colleges, rather than economics departments. In rarer cases some of the

publications are by economists who wrote a paper for the social studies outlets. But as a general rule, the economists who publish in the area of economic education publish the vast majority of their work in the *Journal of Economic Education* or other journals aimed mainly at academic economists, while the social studies educators are much more likely to publish in the social studies journals.

The fourth section of this report deals with the limited number of studies on economic education published in outlets focusing on business and vocational education. Historically, at the secondary level much more emphasis has been given to linkages between economic education and social studies courses such as history, geography, and civics/government, but business and vocational education courses often include even more direct content overlap with economics, and teachers in these fields have typically completed more undergraduate coursework in economics than social studies teachers. There are therefore clear opportunities for cooperative programs in these fields, too, although far fewer U.S. students enroll in business and vocational courses than in social studies courses.

The fifth section of this report is the first of two drawing on studies from a research topic in the general education literature – in this case studies that have found evidence that cognitive learning is often different across disciplines. To the extent that effective learning and teaching is domain specific, the applicability of general models of learning and teaching are limited, and may have to be modified or largely abandoned given the special demands placed on students and teachers in a specific discipline. Very few studies in this literature have, thus far, explicitly dealt with the field of economics; but a few studies do claim to find evidence that skills related to economics learning are domain specific, while other studies have argued that learning in most fields is substantially domain specific.

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The final section of this report also draws from a body of work from the general education literature, on expert-novice differences. This work is generally complementary, or at least compatible, with the work on domain-specific learning. Once again, only a few studies have looked at expert-novice differences in the field of economics, but they offer some interesting results that are in line with expert-novice studies from other fields. This work may also have special relevance to the question of teaching and assessing “deep learning” in economics and other fields.

An Appendix provides a brief report on how literature searches were conducted for each of the sections, including the search engines used for each section.

II. RESEARCH ON ECONOMIC EDUCATION IN THE SCHOOLS: A REVIEW OF FINDINGS AND A NEW AGENDA

Michael Watts and William B. Walstad¹

In recent decades economics has become an increasingly important subject in U.S. schools. Economics content is now included in the content standards for precollege education in 48 states, with 34 of those states requiring that the economics standards be taught at one or more points in the K-12 curriculum. School districts are required to offer separate high school courses in economics in 17 states, and 14 states now require students to take some type of economics course as a high school graduation requirement. Knowledge of economics is tested as part of student assessments in 27 states, and four other states are in the process of developing such tests. Even in states with no such requirements local school districts, including some large metropolitan districts, often include economics standards in their curricula, offer elective or required courses in economics, and test student learning in economics.²

This increased emphasis on economic education in the schools makes it more important to conduct research and evaluation studies that will help make economic education more effective. As a first step in meeting that demand, we offer here a review of the existing literature and a new agenda for research on economic education for U.S. schools. Our recommendations are based largely on an assessment of what has and has not been accomplished since about 1990, when two

previous reviews/agendas were published. The first focused on the K-12 program sponsored by the National Council on Economic Education (NCEE) (Brenneke et al. 1988). The second discussed the implications of findings from research on economic education for high school economics, and offered recommendations for future research and evaluation at that level (Becker, Greene, and Rosen 1990) (BGR). Although we focus mainly on works that have appeared since these two articles were published, we cite some studies that were discussed in the earlier works to explain the rationale for recommendations and conclusions offered here or in the earlier review papers, or to compare and contrast findings with more recent studies on the same topics.³

Our discussion is presented in five sections. We first review recent developments related to the specification of what economics content should be taught at the pre-college level. Next we consider basic issues and questions that have been raised about the best ways—or at least the best feasible and practical ways—to measure student understanding and learning of economics. In the third section we review related questions on how best to model and estimate which factors are most important in promoting student understanding and learning. In section four we offer a summary of empirical studies and findings, primarily in table form, dealing with the relative importance of different characteristics of students, teachers, and schools as factors affecting economic education. In the same section we offer a parallel table that provides the basic framework for our new agenda

NOTES

¹ Purdue University and University of Nebraska-Lincoln, respectively.

² For data on economics requirements, course offerings, and enrollments see NCEE (2003), Walstad (2001), and Walstad (1992).

³ We do not consider the growing body of literature on how precollege economics is taught in other countries, or on instructional materials developed and used in those countries, or papers that investigate factors affecting the teaching and learning of economics in other nations, where school structures, educational policies, and other institutional arrangements are often quite different from the U.S. experience. For a discussion of these issues see the chapters and references cited in Walstad (1994) and Watts and Walstad (2003).

for future research and evaluation. The final section is a succinct summary of key results and recommendations developed throughout this paper.

Economics Content Standards in the Nation's Schools

One major change in pre-college economic education since 1990—and quite possibly the major change—was the development and publication of content standards in economics.⁴ National standards in math, science, and English were developed with federal funding as part of the educational reform movement that arose in response to the *Nation at Risk* report of 1983. Economics standards were not included in the initial federal legislation calling for standards in “basic” academic subjects and providing grants to states to test students annually in these subjects. In later legislation economics was added as one of the subjects to be tested in the National Assessment of Educational Progress (NAEP), but no federal funding was provided for the development of economics standards to direct the content of that assessment, and due to postponements the NAEP in economics will not be administered for the first time until 2006 (Buckles and Walstad forthcoming).

Relying on private funding, the NCEE, in cooperation with other economic education organizations, stepped in to develop and publish national content standards in economics (NCEE 1997). The standards were written by a team of 11 economists and educators, and extensively reviewed by groups of other prominent

economists and educators.⁵ They have gained widespread acceptance and use, and are referenced and/or clearly reflected in most of the state standards in economics discussed earlier, and in most of the comprehensive textbooks for high school textbooks that are widely used in U.S. high schools today (Lopus and Leet 2005). The NCEE standards were also used as the content guide for the development of the NAEP test in economics (Buckles and Walstad forthcoming).

Nevertheless, as individual states began to develop their own economics standards, and/or social studies standards that included economics, as Buckles and Watts (1998) predicted, they soon faced a fundamental dilemma. Separate standards documents that include substantial coverage of economics were published for history, civics, geography, and social studies. Like the economics standards, these other standards documents are fairly ambitious in terms of the amount of content coverage called for in K-12 classrooms. And unfortunately, as Buckles and Watts (1998) show, the economics content in the other documents is sometimes wrong but more often seriously incomplete in terms of coverage of some specific topics and concepts, while in general all of the documents assume that pre-college students will somehow achieve or already have achieved an unrealistically high level of economic understanding.⁶

Reflecting many of these problems, and especially the limited amount of time available for economic and social studies education in the already overcrowded K-12 curriculum, few of the state standards documents in economics or social studies include all of the economics content found

⁴ Previous work on the issue of content for economic education at the pre-college level emphasized concepts/ topics rather than principles/standards. See Saunders and Gilliard (1995) for an example of a conceptual framework and Walstad (2001, 198-200) for a discussion of the transition from a concept-based framework to standards.

⁵ See Siegfried and Meszaros (1998) for a discussion on how the standards were developed, by whom, and an overview of their content and structure.

⁶ Conrad (1998) has suggested that the economics standards should be evaluated in terms of their coverage of the other social sciences. To date, so far as we know, that has not been done.

in the NCEE standards. Even in states where economics coverage in state guidelines is fairly extensive, such as Indiana, economics is sometimes not included in the statewide testing programs. Precollege teachers and school district administrators are under considerable pressure to have their students do well on the statewide exams—exactly as intended by those who support such testing—so in states where economics is well covered on both the state standards and the state tests the demand for teacher training and classroom time devoted to economics is strong and often rising. In other states demand is sometimes declining. Many of the incentive effects and basic rationales for and against standards and high-stakes testing were debated by Bishop (1998) and Becker (1998).

Another important part of the standards reforms was the attempt to establish benchmarks at selected earlier grade levels to gauge progress toward the final achievement of the standards by the time students graduate from high school. There is, however, little empirical research on what particular order of teaching concepts works better than others, if any. When the NCEE published its scope and sequence guidelines in 1988, which were later incorporated as benchmark grade-level outcomes in the 1997 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.⁷

Soon after the economics standards were published, Hansen (1998) criticized them for being principles-based, and thus offering more complicated expository statements about

economic relationships than earlier concept-based frameworks that also identified key economic content to be taught in the schools (e.g., Saunders and Gilliard, 1995).⁸ Hansen also recommended adding discussion in the standards document on the specific skills students will require to develop the level of economic literacy called for in the standards, noting that the history and geography standards documents already do that. Another area in which the economics standards seem out of line with standards in other disciplines, according to Hansen, is that little emphasis is given to the need for any factual information on the economy. In later years, other economists also attacked the economics standards for the failure to reflect feminist or other heterodox viewpoints (Ferber 1999; Schneider and Shackelford 2001).

Most of these criticisms of the standards were not unexpected. In fact, many were foreshadowed by similar critiques of earlier versions of NCEE curriculum guidelines published in the 1970s and 1980s, and by George Stigler's dissent from an AEA task force in the 1950s that tried to spell out the key content for good high school economics (see note 12, below). The most notable collection of the earlier challenges appeared in the Spring 1987 issue of the *Journal of Economic Education*.

Even with these (relatively mild) controversies, it is clear that the economics standards have had a major impact on which states and schools are including economics in the K-12 curriculum and which aren't, on what and how economics is taught in the states and schools that do teach it, on how economics is tested in many of the states where it is taught, and how it will soon be tested in the NAEP.

⁷ There is some work now underway by economic educators outside the United States using the idea of threshold concepts from the general education literature (Meyer and Land 2003), but the work in economic education is as yet unpublished and largely focused at the university level (e.g., Shanahan and Meyer 2003; Davies 2003).

⁸ Although the standards were developed for precollege use, the principles-based statements also have appeal at the college and university level, especially for introductory courses (Hansen, Salemi, and Siegfried 2002).

Defining and Measuring Outcomes

Standardized multiple choice tests for precollege economics have been available since 1963, when the Test of Economic Understanding for high school economics and social studies courses was published by the Psychological Corporation. Today the NCEE publishes the only nationally normed exams for precollege economics (at least in the United States, but as far as we know in the rest of the world, too), the Test of Economic Literacy for grades 11–12 (Walstad and Rebeck 2001a), the Test of Economic Knowledge for grades 7–8 (Walstad and Soper 1987), and the Basic Economics Test for grades 5–6 (Walstad and Robson 1990). All of these exams were reviewed by blue ribbon panels of economists before norming data were collected from national samples of schools, but despite that there was one published exchange concerning charges of ideological bias in the Test of Economic Literacy, or alternatively bias in the charges that were leveled against the test (Nelson and Sheffrin 1991 and Walstad 1991).

All of the NCEE exams are designed to be administered in a typical class period of an hour or less, and a large share of the studies on precollege students' levels of economic knowledge and/or learning have long been based on student scores on these exams. In the earlier agendas and reviews, and still today, it is clear that without those exams what we could say about what precollege students know about economics, or don't know, and what they learn during a school year or in different kinds of classes, would be far more limited and anecdotal in nature. Accordingly, Brenneke et al. (1988, 9) called for regular and frequent updates of these tests, and for the development of additional kinds of standardized tests, including an exam designed specifically for precollege teachers and another test for adults designed to measure "the application of economic knowledge to 'real-world' situations." They also called for the development of standardized attitude surveys and

evaluation forms for precollege courses and teacher training programs in economic education.

The actual pace of revisions of the existing economics tests did not meet that 1988 recommendation. There was a fourteen-year lapse between the second and third editions of the high school test, and at best the revision cycle for the middle school and elementary economics test will run even longer. None of the recommended standardized tests for special groups, including precollege teachers or adults, have been developed. There have been several national surveys of adults that included some items on respondents' knowledge of economic concepts and/or attitudes about current economic issues, however (Gleason and Van Scyoc, 1995; Walstad 1997; Walstad and Rebeck 2002). But there has not been any collection of data on decisions former K-12 students have made as consumers, workers, savers, investors, and voters, related to their school experiences in economics or social studies coursework, as is currently being done for samples of college graduates who attended one of four U.S. universities in 1976, 1986, or 1996 (see Allgood et al. 2004).

Although not opposing the continued development and use of multiple choice exams, BGR (1990) raised questions about the interpretation of test scores as relative measures rather than a unique cardinal standard for grades or other evaluations, and about related specification issues concerning the use of change scores (posttest minus pretest scores) or achievement measures (posttest scores as a function of pretest scores and other variables) as dependent variables. Becker (2004) has recently noted that test scores, grades, and course or instructor ratings can introduce data truncation/ceiling effects, and continues to argue for using a wider range of different learning and output measures, which students and their teachers may view as important during and/or after their schooling (such as dropping or taking

additional economics courses, or income and employment after graduation).

Many, if not all, of these broader measures are probably at best weakly related to scores on standardized tests or course exams, or to final grades in courses, or to a course or instructor evaluation item or index of items—in other words, to the kinds of measures that are typically used as dependent variables in economic education research and evaluation studies at both the precollege and college levels. But there are some exceptions in recent studies. For example, in addition to the surveys of adults and college graduates already noted, Ashworth and Evans (2001) considered student decisions on which courses to take in high school and college, and Bosshardt (2004) studied college principles students' choice to take (or not) upper-level courses in economics and how performance in principles courses affected their success in those courses. Still, it is fair to say that relatively little has been done using the wider range of output measures recommended in BGR, especially at the precollege level where it is even more difficult to obtain information on alternative outcome measures.

A narrower but nevertheless important part of the discussion on the appropriate use of test scores as output measures is the question of whether multiple choice questions and essay and/or short answer questions measure the same kinds or depths of understanding. The answer to that may depend, in part, on the format of the free response (essay and short answer) questions that are used. For example, on the Advanced Placement exam in economics, taken by students who are usually trying to earn advanced standing credit for college principles courses, Walstad and Becker (1994) found that the multiple choice section of the exam explained the major part of the overall score, while the free response section contributed relatively little additional information. The AP free response sections are scored by dozens of different graders, who are explicitly told and

trained to follow a detailed grading rubric to maintain a high degree of inter-rater reliability. To use that kind of key, the free response questions themselves must be written to direct students to write about the topics graders using the rubric will be looking for. Consequently, a five-point question will often have five distinct parts (not infrequently listed in the question and/or grading rubric as a–e), while a nine-point question will have nine parts (or a total of nine parts and subparts for sections of the response that are worth more than one point), etc. With that kind of question, not surprisingly, most students don't really write broad, general essays on a general topic or issue, but more often list a series of short answers to a series of fairly discreet questions on a related set of questions or material. The end result is to make the question less like a true essay question, and more like an objective (if still not multiple choice) question.

There are other kinds of free response questions, of course, and other studies have found that there can be important differences in what and what kind and depth of knowledge students reveal using essay or other kinds of free response items, compared to scores on multiple choice questions (e.g., Harris and Kerby 1997, and at the college level Chan and Kennedy 2002). Relying just on multiple choice items or constructed-response items to assign grades may also lead to grading or classification errors that disadvantage a small percentage of students who benefit from a particular type of item format, as found in a study using AP data in economics (Kennedy and Walstad, 1997).⁹

There is another longstanding debate on the question of whether males have an advantage over

⁹ A study using test scores for high school students from one region of Australia found no systematic relationship between students' scores on essay and multiple choice questions on an exam, after correcting for simultaneous equations bias and controlling for the effect of student ability on scores for both types of questions (Becker and Johnston 1999).

females in their knowledge and perhaps even learning of economics during a typical course, especially as measured by multiple choice exams. Walstad and Robson (1997) found that on the TEL the male advantage occurred mainly on a small number of questions, and that removing those items eliminated some, but not all, of males' advantage on the exam. As noted in the later citations and discussion in Table 1, the number of articles focusing on gender differences at the precollege level seems to have declined over the past 15 years, although gender still regularly appears as a control variable in both precollege and college-level studies of economic education.

Specification, Data Loss, and Other Estimation Issues

The list and discussion of concerns related to statistical estimations of learning that were briefly mentioned in BGR (1990) was updated, expanded, and developed at considerably greater length in Becker (2004). That in itself is an indication that these problems continue to be important in empirical research on precollege economic education and, Becker argues, if anything they are even more problematic in the surprisingly limited empirical literature from general education.¹⁰

The major estimation problems identified in BGR (1990) and/or Becker (2004) are: 1) ignoring issues of sample selection bias and data loss, treating results from non-random samples as if

¹⁰ Becker (2004, 265) cites DeNeve and Heppner (1997) and provides updated information to show that very few general education studies, even on such widely accepted and promoted teaching strategies as active learning, have directly compared the approaches to other teaching methods or featured quantitative studies with inferential statistics. Instead, most of the general education articles are based on casual, anecdotal evidence, or offer theoretical arguments favoring a particular teaching style or method.

they were drawn from random samples,¹¹ 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 abilities or knowledge at the beginning of a course or other instructional unit, 5) relying on self-reported data from students (for example, grade point averages used to control for student ability and motivation), and 6) overemphasizing the importance of statistical significance. In recent correspondence Becker has added the issue of failing to recognize the possible effects of unobserved latent variables.

One reason Becker and others are speaking out 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 (Becker and Greene 2005). Many of

¹¹ This is a relative, not absolute issue, because as Becker (2004, 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 example, see Becker and Walstad (1990), Emerson and Taylor (2004), and Becker and Powers (2001). Becker and Walstad (1990) is an early attempt to deal with data loss problems in the TEL norming data; Grimes (1995) also adjusts for data loss in a precollege study.

those procedures are now included as standard parts of large statistical estimation programs such as Stata and Limdep, and those procedures have been featured in several recent studies, though usually in papers dealing with college principles courses (for example, Emerson and Taylor 2004).

Finally, to be fair to psychometricians and general education researchers, there are many issues and procedures from that literature that are not always recognized or dealt with when economists investigate teaching, learning, and testing, including reliability and validity issues for tests and attitude instruments, debates over the unidimensionality or multidimensionality of student evaluations of courses and instructors, and various kinds of estimation procedures that are more widely used in the general education literature than in economics. This all points out that one reason economic education is a difficult field is because, at its best and most demanding, it draws on work from both economics and education, which is a lot to keep up with and, sometimes, to try to reconcile.

Summary of Empirical Studies and a New Agenda for Future Research

Despite the issues and problems discussed above, Brenneke et al. (1988) and BGR (1990) drew several general and specific findings from the precollege economic education literature, concerning the effects of various student, teacher, school, curriculum, and instructional materials characteristics or policy variables. Generally those findings have not been overturned, and many have been supported by later studies. In Table 1 we present a brief summary of the major findings discussed in BGR and Brenneke et al. in the left column, and a similarly brief summary of later studies addressing the same topics in the right column. Several of the more general findings are marked by asterisks, for which the discussion of key references is provided immediately following the table. The body of research over the past 25 years shows clearly that economics can be effectively taught and learned at the secondary and even elementary level, and is being taught and learned in a substantial number of U.S. schools, though quite possibly not yet in a majority of schools and classrooms.

Table 1: Research Summaries on Precollege Economic Education**From BGR (1990) and Brenneke et al. (1988)***Studies of Economic Education Programs*

Few studies of the results of economic education programs conducted by Junior Achievement, chambers of commerce, and trade associations have been undertaken, and none has appeared in the academic, refereed journals typically read by economists. In contrast, there is a substantial body of published research on the [NCEE's] Developmental Economic Education Program (DEEP). (BGR 233) The literature on DEEP is summarized in Brenneke et al. (1988) and reviewed in Watts (1991).

Method of Instruction

Standardized test scores show no great difference between one method of instruction or program and another. There is little research that shows any existing technology to be superior to another, or that anything is superior to the classroom teacher. Good instructional materials help good teachers, and may partially substitute for teachers who are not well trained to teach economics.* (BGR 231, 235-6)

Aptitude

The higher a student's aptitude or intelligence, the greater the learning in economics.*

From Later Studies

Additional studies on NCEE instructional materials, curriculum guidelines, and major program initiatives in the transition economies have been published. The DEEP program has been renamed EconomicsAmerica Schools and become even more decentralized, however, and there have been no new published studies on it. Evaluation of programs sponsored by other organizations are still not found in economics journals, although reviews of textbooks and on-line classroom stock market games for secondary economics classes have appeared, and the IMF funded a general assessment of instruction on international economics in U.S. high schools.**

There is still no empirical evidence favoring a particular teaching method or technology at the precollege level; but see Krueger (forthcoming), and at the college level there is now some evidence supporting the use of classroom experiments and preliminary evidence supporting the effectiveness of some computer programs and materials, but not others. Most evaluations of NCEE materials remain positive, even when used by teachers who have received NCEE training in the transition economies, or even by teachers who have not received that training. Perhaps the most popular classroom activity in precollege economic education of the past 10–15 years, however, is the classroom stock market game. That game, and some of the NCEE materials designed to support it, have been criticized on the grounds of weak or inappropriate content.**

Still essentially a universal finding.**

From BGR (1990) and Brenneke et al. (1988)

Pretest Score

The pretest score is typically the single most important variable in explaining attainment. It also influences change scores.* (BGR 233)

Gender and Ethnicity

Gender and race are often found to be related to economics knowledge and perhaps even learning, though measurement formats of test instruments (e.g., multiple choice vs. essay) may also affect these findings.* (BGR 237)

Age

Older students know more economics and are able to learn more abstract concepts than younger students, but younger students can learn economics.* (BGR 237)

Teachers' Knowledge of Economics

Next to student ability, teacher ability may be the most important variable in the learning equation. Teachers' knowledge of economics is positively related to students' learning of economics, and teacher attitudes toward economics may influence student attitudes. Teachers want training programs on instructional materials more than programs on economic content. Whether a school district is in a formal economic education program or not may be of little importance compared with how successful it is in getting students and teachers to spend more class time on the study of economics.* (BGR 234)

From Later Studies

Also still a universal finding, whenever pretest scores are available.**

The gender effect remains an important regressor in achievement or learning equations, especially at the secondary level. The gender effect appears to be larger and more regularly significant than race or ethnicity. **

Though not a key focus in recent studies, this is still observed across different grade levels in norming samples for a particular standardized test, and in some studies based on those data sets, although other studies now report separate estimations for different grade levels.

More seemingly eternal verities of precollege economic education. Most precollege teachers continue to have little or no formal training in economics.**

Table 1: Research Summaries on Precollege Economic Education

(cont.)

From BGR (1990) and Brenneke et al. (1988)

Attitude towards Economics

Attitudes toward economics likely affect the learning of economics, with some evidence that causality is in the direction of learning improving attitudes but not the reverse.* (BGR 233)

Separate versus Infusion Courses

Limited evidence on separate courses on economics vs. infusion in other subjects shows larger gains in a formal course, while infusion sometimes works but is difficult to implement and maintain effectively, and so not a reliable way to deliver economics as a national or statewide economic education program. There is no uniformity in the content of high school economics courses or the economics that is taught as a part of social studies, history, and other more general courses, despite NCEE *Framework and Scope and Sequence* curriculum guidelines. Soper and Walstad (1988) find that courses on consumer economics may reduce learning.* (BGR 235)

From Later Studies

Becker, Walstad, and Watts (1994) find that secondary economics teachers respond to over 20 items on current economic issues more like economists and economic educators than other secondary social studies teachers, but that all of the teachers respond more like a sample of journalists than economists, suggesting the importance of the media as teachers' primary source of information on these issues. Instructional effects on attitudes in particular courses or units are generally not found to be as large or certain as effects on knowledge, and are more difficult to measure (Walstad 2002 and Grimes 1995). Phipps and Clark (1993) used factor analysis to identify seven different dimensions of affective learning in high school economics.

Walstad (2001) finds significant progress with the high school economics course over two decades, reflecting contributions by economic education organizations and many economists. Less than half of high school graduates take an economics course, however, as Walstad and Rebeck (2000) reported using data from the National Center for Education Statistics.

From BGR (1990) and Brenneke et al. (1988)

Mandated Courses

Whether mandated courses are as effective as other economics courses is open to some question. (BGR, citing Marlin 1991).

High School Courses and Performance in College Principles Courses

High school courses in economics affect pretest scores in college principles courses, but not posttest scores, suggesting that students with high school economics spend less time on college economics to achieve a target grade and spend more time in other activities. (BGR 238)

From Later Studies

Mandate studies are problematic given varying course definitions and data problems. In 14 states that mandated some kind of economics or free enterprise courses, Belfield and Levin (2004) found that general achievement scores on the SAT for students who would not otherwise have enrolled in an economics course were reduced by 0.08 standard deviation. Soper and Lynn (1994) also show negative effects from state mandates for economics. Tennyson and Nguyen (2001) found that broadly defined curriculum mandates for personal financial management were not associated with higher student test scores on a test of personal financial literacy, but mandates requiring specific financial education coursework were.

Lopus and Maxwell (1994) found that students who have taken a high school course in economics are not better prepared for college principles courses; but among students who have taken a high school course it does matter whether the high school course they took focused on basic micro or macro concepts, or was more general, descriptive, or focused on consumer economics. Brasfield, Harrison and McCoy (1993) reported a positive and significant effect for the high school course on performance and grades in both micro and macro college principles courses. Lopus (1997) found positive effects from high school economics courses that emphasized micro and macro concepts on pretest scores in college economics courses, but positive effects on posttest scores were limited to high school courses with a micro emphasis.

Table 1: Research Summaries on Precollege Economic Education

(cont.)

From BGR (1990) and Brenneke et al. (1988)

From Later Studies

Advanced Placement Courses in Economics

Effects of the [then new] advanced placement (AP) courses in economics are unknown. (BGR 238)

Comparing the performance of students from selected sections of principles classes at 14 universities to secondary AP students who took the same AP exams in micro and/or macro, Melican, Debebe, and Morgan (1997) found that the secondary AP students performed better. Zaveri, Pedisich, and Greene (2000) report on economics research projects conducted by students participating in the Intel Science Talent Search (formerly sponsored by Westinghouse).

Employment

Employment over 20 hours a week reduces knowledge and learning of economics, but modest part-time employment has little effect. (BGR 237, citing Jackstadt and Gootaert 1980 and Lillydahl 1990)

Value of Learning Economics

A few studies raised questions about who values student learning of economics, and what kind of learning is valued by different groups (students, teachers, educational administrators, political leaders, etc.). (BGR, citing Hansen, Kelly, and Weisbrod 1970, Beron 1990, and Vredevelde and Jeong 1990)

Private versus Public Schools

Grimes (1994), after adjusting for self-selection, found students at private secondary schools performed below their potential in economics classes, with public schools more effective.

* On instructors and the effect of teacher training on student learning, BGR and/or Brenneke et al. cite Bosshardt and Watts (1990), who found important instructor effects for secondary teachers; Lopus (1990), who found that student knowledge of economics is significantly related to school districts having more teachers with advanced degrees and smaller class sizes, but not greater experience; Lynch (1990), who found a nonlinear effect of teacher training in economics, with few gains until teachers take at least four

classes; Grimes and Register (1990), who found larger gains in economics test scores in schools where teachers are unionized, though the rationale and causation were not clear; two reports (Walstad and Soper 1989 and Soper and Walstad 1988) analyzing TEL norming data; and Watts's reports (1987a, 1986a, and 1985) on a statewide assessment of a stratified random sample of over 6,000 students and 200 Indiana teachers in grades 5, 8, 11, and 12. The question of whether school district participation in formal economic education programs has any effects beyond those resulting from teacher training and building economics into the curriculum are addressed in Becker and Walstad (1990), Peterson (1992), and many of the chapters in Walstad and Soper, eds. (1991). The major studies cited on instructional materials and technologies were by Chizmar et al. (1985), Martin and Bender (1985), and Chizmar and Halinski (1983). Most of these studies also included measures of student intelligence or ability, and used pretest scores as a regressor in student achievement or change score equations. On attitudes the key BGR references are to Walstad's (1987) study using two-stage least squares to determine the direction of causality for simultaneously observed changes in understanding and attitudes; Beron (1990); Walstad and Soper (1989); and Soper and Walstad (1988). On student age the key studies cited were by Buckles and Freeman (1984) and Watts (1987a, 1986a, and 1985). On gender and race the main references were to Walstad and Soper (1989), Heath (1989), Peterson (1992), Lumsden and Scott (1987), Watts (1987a), Buckles and Freeman (1984), and Ferber, Birnbaum, and Green (1983). On the infusion approach vs. a formal course in economics, the key references were Walstad and Watts (1985), Martin and Bender (1985), and Buckles and Freeman (1984).

** On instructors and the impact of teacher training on student learning see Walstad (2001 and 2002); Walstad and Rebeck (2000 and 2001b); Allgood and Walstad (1999); and Bosshardt and Watts (1994). At the college level see Watts and Bosshardt (1991). On teachers' limited training in economics see Bosshardt and Watts (forthcoming), Walstad and Kourilsky (1996), and an earlier review of state studies by Walstad and Watts (1985). Evaluations of NCEE programs, curriculum guidelines, and instructional materials are featured in Maier (2002); Lopus (2001); Ferber (1999); Grimes (1995); Kagan, Mayo, and Stout (1995); and Wood, O'Hare, and Andrews (1992). Reviews of commercially published textbooks are found in Lopus and Leet (2005) and Watts, ed., (1986b). The review of on-line stock market games for use in secondary classes is by Lopus and Placone (2002). The IMF-sponsored survey on international economics in U.S. secondary schools is by Watts and Highsmith (1992). Emerson and Taylor (2004) conducted the empirical evaluation of the effects of using classroom experiments in college principles courses. Preliminary and mixed findings on using recent computer applications and software at the college level appear in Sosin et al. (2004). As with the pre-1990 studies, many of the studies listed above also included measures of student intelligence or ability, and used pretest scores as a regressor in student achievement or change score equations. On gender and race, Evans (1992) found sizeable negative differences for female and black students in different kinds of secondary economics courses. He also identified a large positive role-model effect for black students who were taught by black teachers, but found no similar effect for female students who were taught by female teachers. Lopus and Maxwell (1994) also reported a significant advantage for male secondary students. In four elementary grades, however, Sosin, Dick, and Reiser (1997) found only one case each where gender and ethnicity were important determinants of economic understanding of four different groups of basic economic concepts. The key determinant of student learning in their study was how much time teachers spent teaching the concepts.

In addition to the calls for revised and expanded standardized tests, and for the use of a broader range of output measures, BGR and Brenneke et al. (1988) called for several other kinds of work and studies. These are summarized in the left column of Table 2, grouped into the same general categories used in Brenneke et al. (baseline data, quantitative studies, qualitative studies, and cooperative work with other groups) plus BGR's call for developing a better conceptual framework to model both teacher and student incentives and constraints to teach or learn economics. The right

column in Table 2 lists the items in our current agenda, which often echo the earlier agenda items. In some cases that simply indicates that an item is so important that it will always deserve replication and extension, to monitor the status of economic education in U.S. schools and families. In other cases it reflects a lack of progress in the research over the past 15 years, either because the questions are too difficult to measure or analyze, or because not enough resources have gone into the effort to address the questions, or both.

Table 2: Past and Present Research Agendas for Precollege Economic Education

From BGR (1990) and Brenneke et al. (1988)

New (Including Continued) Recommendations

Baseline Data:

For a representative sample of schools and students, determine:

- 1) What is the general level of economic knowledge of both students and teachers, their knowledge of selected concepts, and their opinions on selected economic issues?
- 2) How much economics instruction are students receiving, and how much instruction and training are received by teachers?
- 3) What barriers exist to increasing the quantity and quality of economics taught in the schools?
- 4) What basic economic concepts are included in or excluded from student instructional materials and texts?
- 5) What is the general structure of economics in the schools: separate courses, units of study, or infusion within other subjects?

Although more information is available on several of these questions today, the general picture is still far from complete. Even if it were, it would remain important to regularly update this kind of information.

From BGR (1990) and Brenneke et al. (1988)

New (Including Continued) Recommendations

Quantitative studies:

- 1) Identify the major factors influencing student knowledge and attitudes.
- 2) Evaluate the role of formal instruction in learning economics.
- 3) Estimate the impact of a) teacher training in preservice and in-service economics courses and workshops; b) textbooks, other instructional materials, and technologies; c) alternative curriculum strategies (e.g., separate courses in economics vs. infusion); d) how much administrative staff time is devoted to the implementation of economic education; e) expenditures for economics texts, other instructional materials, and teacher training.
- 4) Determine whether student attitudes, knowledge, and learning are different in DEEP vs. other schools and school districts, overall and/or depending on the degree of involvement. Establish a pathline for changes in student performance based on school involvement in such programs.
- 5) Determine the relationship between student learning in economics and other subject areas.

More insights on the role of individual student and teacher characteristics may be developed in future studies, but the more pressing issue is to identify what curriculum and classroom interventions affect student understanding *and behaviors*, and at what costs, especially in terms of classroom time and achievement in other key subjects. If there is a cost-effective way to integrate economics into other subjects in elementary and secondary grades, and to sustain that infusion in the face of teacher and administrator turnover, the overcrowded curriculum, and the steady stream of fads in educational reforms, it is past time to identify it. At least one alternative to a formal infusion program in a school district, however, may be raising the level of economics training for teachers who cover subjects in which economics is or can be taught, and improving the quantity and quality of economics content in the instructional materials for those courses. Different impacts for different kinds of secondary courses on economics—for example, college prep/theory-based courses versus courses on consumer economics or more descriptive and applied economics courses—should be carefully studied, controlling for differences in the kinds of students who take the different kinds of courses.

Qualitative Studies:

Recognize that districts vary widely in commitment and approaches to economic education, and develop case studies of successful and unsuccessful approaches used by different schools and districts.

Still valuable but rarely done in published studies, and even more rarely over the past 15 years.

Table 2: Past and Present Research Agendas for Precollege Economic Education (*cont.*)

From BGR (1990) and Brenneke et al. (1988)

New (Including Continued) Recommendations

Cooperative work with other groups and organizations:

- 1) Offer conferences or workshops to review existing studies and findings, or to focus on current research questions or methods.
- 2) Award grants for research and evaluation projects in schools with formal economic education programs.
- 3) Circulate research results, baseline data, and national data sets.
- 4) Expand opportunities to present papers on precollege economic education, and special issues of journals.
- 5) Sponsor awards and other recognition for research on precollege economic education.

Major conferences and grants have reliably led to published studies; smaller programs are of more questionable value. There are still very few national data sets to circulate, but the number of sessions featuring research on college and precollege research on economic education increased substantially in the last 15 years. There are increasingly serious concerns about the small and perhaps shrinking number of economics departments supporting people who are most likely to do this kind of research, due to such factors as: retirements of economists who began working in economic education in the 1970s; a “higher bar” for published studies, which makes it increasingly difficult for general economists to publish empirical papers in any field; a greater focus on personal finance in precollege economic education, which is less likely to attract the interest and support of university economics departments; and falling demand for economic education programs in states where economics is not included in state education standards or standardized testing programs. Workshops for new and current researchers in the field, modeled on the Pew Trust program at Princeton of the late 1990s, might help with several of these issues, especially if again linked with the development of new national data sets on precollege economic education, and with conferences to present results and other publication opportunities.

Conceptual Framework:

“A better conceptual basis ... is needed to integrate the why, how, and what teachers teach with what motivates students to learn.” (BGR 240)

This is still badly needed, and almost certainly closely linked to questions about whether and how economic understanding affects decisions and behaviors people exhibit not only as students, but as consumers, workers, savers, investors, and citizens/voters.

Conclusions

Our review of the past and more recent research shows that although much has been done, still more remains to be done, including much more on many of the basic questions that have been raised but not always answered in earlier studies, literature reviews, and agendas. To emphasize the progress that has been made and our recommendations for new and continuing initiatives, it seems worthwhile to restate the key results and recommendations succinctly, without citations and other details:

- At both the elementary and secondary levels, students of teachers who know more economics, who spend more time teaching economics, and who use good instructional materials, learn more economics. That may well reflect the limited amount of time in the curriculum devoted to economics and the limited training teachers have in economics, and might not always be true for other subjects.
- A formal secondary course in economics is the safest way to improve students' knowledge of economics, but it is far from clear that one course in economics is enough to consider students economically literate.
- Although some prominent economists have argued against teaching economics at the secondary level, in part because they would prefer to see students take university courses and begin those courses as *tabulae rasae*.¹² But not taking secondary economics course does not guarantee a

¹² For example, Stigler (1970) said it was not yet time to make economics part of every person's 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. Colander (2005) made the *tabula rasa* argument at a 2004 conference on teaching undergraduate economics, and McCloskey (2000) also argues against teaching economics in high schools. There is no evidence that students who have taken a high school course do worse than other principles students but there is, of course, an opportunity cost if students take a high school course in economics, or if they do not.

tabula rasa, because economics is a subject particularly affected by public misinformation and misconceptions. Moreover, most secondary students will never take a college course in economics, and currently most U.S. high school graduates—let alone dropouts—do not take an economics course in high school.

- Students who have taken high school economics courses begin university economics courses knowing more economics, but often do not maintain that advantage through the courses. They may simply choose to put more time into other courses or activities, but even that suggests they learned some economics correctly in the secondary course, which may include rejecting or avoiding mistaken ideas about economic ideas and issues that students who did not take a secondary course either acquired or maintained.
- We still know even less about what changes attitudes on economic ideas and issues than we do about what affects content learning, largely because attitudes are more difficult to measure and change than knowledge and understanding. Many of the studies on these topics that were published several decades ago were couched in terms of whether students became more liberal or conservative after completing coursework in economics. Such labels proved difficult to reliably define and track over time. It does appear, however, that the more economics courses a person takes, or the higher they score on an economics exam, the more likely they are to think like economists on a wide variety of economic issues, for which economists themselves may or may not show consensus.¹³

- More empirical and conceptual research on precollege economic education is needed, and more tools are needed to do it—particularly more output measures (including, but not limited to,

¹³ For a summary of the earlier articles on liberal or conservative effects of instruction see Siegfried and Fels (1979). For a recent study on the consensus (or not) views of economists on various economic issues see Fuller and Geide-Stevenson (2003).

standardized tests) and national data bases. To see a notable increase over current levels of research on these grade levels, significant additional resources will be required.

It is probably past time to offer a new round of training programs on research in economic education, updating the Pew Trusts program that the NCEE offered at Princeton University in the late 1980s. Such a program might well now be open to international economic educators, not just those from the United States.

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III. RESEARCH ON THE LONG-TERM EFFECTS AND OUTCOMES OF ECONOMIC EDUCATION

Every academic discipline claims to offer benefits to those who study and master it. Sometimes those benefits are pecuniary, as in human capital models where, for example, most accounting, medical, and engineering students acquire knowledge and skills that raise their lifetime earnings more than enough to offset the initial costs and risks of investing in such education and training. Pecuniary rewards from education also result, although for different reasons, in screening and signaling models of education, in which those who are brighter and/or more productive use academic degrees and other performance measures to identify their abilities for prospective employers.

There are also academic disciplines in which some or even most benefits are psychic, including such general ideas as a deeper understanding of and appreciation for life, or of certain parts of life, as in aesthetic fields such as literature and fine arts. Even in these cases education helps to create more producers (as well as consumers) of music, poetry, painting, etc. It can further be claimed that education in the arts increases the demand for public support of the arts, which many people (especially those who like, produce, or sell the arts) consider to be a part of a better society.

Writing in the first issue of the *Journal of Economic Education*, and consistent with his other writings and positions on departmental policies for course requirements at the University of Chicago, George Stigler (1970, 82) was content to leave the case for economic education at the level of consumer sovereignty. Students would have their own reasons for taking or not taking coursework (and specific courses) in economics, and economics instructors and courses provided to satisfy whatever the level of demand turned out to be. Stigler was generally sanguine about the prospects for economic education and economists,

because although he conceded that "In the best of all worlds it might be most desirable to have musical or theological literacy," he was convinced that "...in [our world] the public wants to talk about money." He did not address the fact that most people who take courses in economics do so because those courses are required for graduation by schools, school districts, state laws, or for particular majors at the college level (most notably in business and management),¹ but presumably that feature of educational regulation can still fit under the heading of the public's interest in talking about money more than religion or the arts.

Stigler did not claim that studying economics would make most people wealthy, nor do most other economists. Deirdre McCloskey (1990) explicitly argued that the case for learning economics should not rest on promises that studying economics is a sure and certain (or even likely) path to amassing a personal fortune in her book, *If You're So Smart: The Narrative of Economic Expertise*. While it is true that economists can point to Keynes and a few other economists who succeeded in amassing personal fortunes, on the other side of that ledger there are such examples as Irving Fisher predicting the stock market was at a new, permanently higher, plateau just shortly before the crash of 1929. After the crash Fisher's friends and colleagues had to help him cover an estimated \$8-10 million loss on stock options (Tobin, 1987, 371). Recent history provides similar examples: in 1998, the investment fund in which Nobel laureates Myron Scholes and Robert Merton were partners, Long-

NOTES

¹ Stigler (1970, 84) did, however, conclude his article by saying: "I do not despair of raising the economic literacy of the American public unless we fall prey to the superficial idea that all that is necessary is a course or two for every young American. We shall have to combine vast efforts and creative experimentations if we are to produce the first economically literate society in history."

Term Capital Management, nearly collapsed. A consortium of 14 financial institutions had to be organized by the Federal Reserve Bank of New York to provide funds to allow the fund time to end its operations without declaring bankruptcy. Even with that assistance, losses wiped out more than 90 percent of the firm's value and were large enough to increase panic selling in global bond, stock, and currency markets (Pacelle and Smith, 1999, A2). At best, then, economists can hope and expect that the average returns to degrees in economics will be at least competitive with returns to degrees in other fields, after adjusting for the other benefits and costs associated with the work that those who receive degrees in economics do, compared to those who work as accountants, engineers, poets, or artists.

If the personal income motive for economic education is that limited, are there other reasons supporting calls for public and private support of programs to develop the general public's economic literacy? Since the founding of the National Council on Economic Education in 1949 (originally known as the Joint Council on Economic Education), and other organizations that promote economic education at the precollege level, it has become popular to claim that the general case for economic education rests largely on making students better consumers, workers, and citizens. On the surface this seems reasonable: Won't people who have a better understanding of how markets and market systems work be better prepared to make decisions about spending, saving, investing, education and training, and public policies put forward or opposed by different political leaders?

One key problem with these claims is that the discipline of economics itself is largely based upon the idea that competitive markets lead to efficient outcomes in the markets for goods and services (in the absence of market failures such as public goods and externalities), whether or not consumers or producers have taken courses in the principles of economics. Put differently, if people

believe that markets generally work, and have worked for centuries when only a small minority of the population had studied economics, can't we rely on laissez faire policies when it comes to economic education, too? Or put even more bluntly, why do we have to train people to be price takers? In fact, there is recent confirmation (List 2003 and 2004) that experience in well-functioning markets drives individual behavior to what is predicted in standard, neoclassical models, despite a wide range of differences in institutional arrangements and initial individual endowments.

Experience may still be an inefficiently inexpensive way to learn about market forces and other economic concepts, compared to other kinds of education and training programs; but there is little or no evidence on that question. Another possible response is to ask how well experience teaches in markets that are not well functioning, and then to argue that the modern economy has become far less competitive than it was in Adam Smith's nation of shopkeepers. That might make economic education more important now than it was in the past, and in fact over the past three decades the field of microeconomics has changed notably in ways that could be used to support such a case for economic education. Luis Putterman described those changes in a 2005 review published in the *Journal of Economic Literature*:

There's a new microeconomics on the block, and it's not the microeconomics you were taught in school. The new microeconomics takes seriously that many markets and contracts are incomplete, that agents are differentially informed, that much that is pertinent to their interactions is not verifiable or admissible in a court of law. While those first elements would shock no one trained in the past thirty years, the new microeconomics goes much further, allowing that people sometimes display social preferences such as concern over fairness, a desire to reciprocate when treated well, and a desire to punish when taken advantage of. More radically, still, this new microeconomics takes institutions as not only

critical, but variable and scarce, and it treats their evolution and selection as a central problem of economics. Indeed, this new microeconomics sometimes take preferences or institutions as the variables to be explained, modeling selection of agent types and institutional outcomes under relevant evolutionary pressures. (p. 135)

Using these arguments as a key part of a new rationale for economic education has not yet been done in any systematic way in publications by economists or economic educators, beyond very general statements that the world has become increasingly complex with new technologies offering a wider range of economic choices for individuals to make (e.g., Santomero 2003). Instead, many of the most vocal and dedicated supporters of economic education fall in the camp of those who still believe (as George Stigler did) that markets generally work, and that models of competitive markets provide generally useful predictions and insights.

This all becomes even more interesting when particular economic behaviors and ongoing public policy issues are involved. For example, determining whether or not the right amount of saving takes place to maintain macroeconomic equilibrium and reasonable levels of economic growth is widely recognized as a controversial issue, with prominent economists holding opposing viewpoints. There is comparatively little in the professional economics literature, however, to suggest that, given current incentives and policies, individuals systematically save more or less than they should to maximize their personal level of satisfaction. Only recently have some studies begun to report that educational programs change the share of income people spend and save, other things being equal. Notably, most of those studies do not deal with traditional coursework in economics at either the college or precollege levels, but rather with financial education programs offered for adults, often by employers or pension management

organizations, for participants in saving, investment, or retirement programs.²

The citizenship argument for economic education, claiming that there are public good features of economic literacy, has long generated even more controversy among those who have discussed the goals of and rationales for economic education. Richard McKenzie (1977) used basic arguments from public choice theory to question why anyone who understood economics would ignore their self-interest to change their voting patterns (including not voting at all, in many cases). In other words, having all voters take principles courses in economics won't eliminate special-interest problems in the economy, and so won't change people's incentives to work a lot harder for or against policies that have large financial effects on them than they do facing issues that have very small effects. I have argued (Watts 1998) that McKenzie's argument is still valid, but only up to a point. As Frank (1988), Alchian and Woodward (1988), and now many others have shown, the satisfaction many people derive from voting and engaging in other behaviors not in line with a narrow, short-term view of self interest (such as tipping at restaurants where they will never eat again) are not only commonplace, but often socially useful – even from the perspective of economic efficiency. In terms of economic literacy, that implies that when a majority of people voting for candidates and issues do not have strong pecuniary reasons to support any one candidate or ballot initiative – and it is at least arguable that that is the typical kind of election – having an electorate in which many (or ideally median) voters understand the costs of trade barriers, or problems with various kinds of price ceilings or floors, or something about the economic incidence and progressivity of different kinds of taxes, might in fact lead to better public policies. Of course, as McKenzie also pointed

² Many of these papers, including several co-authored by Douglas Bernheim, are briefly discussed later in this section.

out, for that to happen it must also be true that the economically literate voters either remember or update their training in economics over their lifetimes.

Unfortunately, there are few published studies that directly examine how students who have completed more courses in economics, or earned higher grades in economics courses, or scored higher on standardized achievement tests in economics, differ from those who know or studied less economics, in terms of later behaviors as consumers, workers, or voters. Several literature review or research agenda articles have expressed strong concern over the failure to measure outputs other than scores on standardized (usually multiple choice) achievement tests or course grades (e.g., Becker 1997, 1364). Although most of the complaints have not focused specifically on the question of long-term effects of learning economics, clearly studies of the long-term effects of learning economics would lead researchers to consider other kinds of outputs. The key problem is, of course, that conducting studies to address those issues with reasonably representative samples of students from many different educational achievement levels and schools, over a long number of years, is difficult and expensive to do.

But there have been some studies, conducted both by economic education researchers and by other economists, addressing particular aspects of these issues, including:

- i) earnings of students with bachelors' degrees in economics compared to earnings by students who majored in other fields;
- ii) the relative performance of undergraduate economics majors on the Law School Admissions Test (LSAT);
- iii) the relationship between scores on cognitive tests and earnings or other employment outcomes;

iv) the effects of taking additional high school courses in English, math, science, social sciences, and economics on wages and postsecondary education decisions;

v) the lasting effects and threshold levels of coursework and learning in economics;

vi) the effects of curriculum mandates in the area of household financial decision-making on adults' asset accumulation;

vii) the effects of consumer information and education programs on consumer search behavior;

viii) the effects of corporate training programs on saving and investment programs on employees' saving and investment decisions;

ix) low levels of public understanding about pensions and Social Security;

x) peoples' attitudes on public policy issues and their relationship to different individuals' or groups' knowledge of economics;

xi) how economists, economics students, and business students compare to others in terms of selfish or free-riding behavior; and

xii) how economists serving as national policy advisors or as university chief administrators use economics in their jobs, and how those they work with respond to their use of economics.

In the following section I briefly review those studies.

A Brief Review of Related Research

1) Lifetime Earnings of Economics and Other Undergraduate Majors. Using 1990 census data, Hecker (1995) reports that in the 25-34 age group of college graduates, men holding bachelor's degrees in economics have median earnings three percent higher than the overall average; by ages

35-44 they earn 53 percent more than average. Black, Sanders, and Taylor (2003) found that among college economics graduates who do not earn advanced degrees, economics majors generally earn more than similar individuals with other majors. Economics majors who pursue advanced degrees in business and law also earn more than undergraduate majors in most other disciplines.

Rumberger and Thomas (1993) found that the effects of institutional quality and educational performance are not uniform for graduates with different college majors. Hammermesh and Donald (2004) find that earnings differentials across majors are less than half as large after adjusting for response bias in survey data, but Arcidiacono (2004) finds large earnings and ability differences across majors even after controlling for selection, with very little of the ability sorting due to differences in monetary returns. Instead, virtually all of the ability sorting is due to preferences for particular majors in college and the workplace, with preferences for majors playing a larger role than workplace preferences.

Choice of an undergraduate major turns out to be a key issue in many areas for those interested in economic education. Allgood et al. (2004) and Bosshardt and Watts (2005) find that how much economics coursework undergraduate students take, and what kinds of courses they take, are largely determined by their choice of a major. Turner and Bowen (1999) concluded that gender differences in choice of majors have not decreased for two decades within arts, sciences, and engineering fields, while differences in the life science and math/physical science fields actually increased. Differences in SAT scores account for part of these gaps, but most of the differences are attributable to “residual forces” including tastes, labor-market expectations, and gender-specific effects of the college experience. Dynan and Rouse (1997) report similar findings for gender

differences in decisions to major in economics at Harvard University.

2) *The relative performance of undergraduate economics majors on the LSAT.* Nieswiadomy (1998) argues that the discipline of economics offers special benefits to students preparing for law school. He examined the performance of economics majors on the LSAT in 1991-1992 and 1994-1995. Among the 14 majors with more than 2,000 students taking the exam, economics students received the highest average score in both years. In a forthcoming update for the 2003-04 class, he finds that economics students still rank first among the 12 disciplines with the most students (at least 2,200) taking the LSAT. Economics majors rank third (behind physics/math and philosophy/religion students) on a longer list that includes 29 different groupings of similar majors, each with at least 700 students taking the LSAT.

3) *The Relationship Between Cognitive Skills and Earnings or Other Employment Outcomes.* Many studies have noted the weak link between standardized test scores and labor market or other educational outcomes. For example, see Card and Krueger (1996, 1n), and also Wenger (2000, 28-29), who explores the negative correlation between the perhaps conflicting output measures of gains in test scores and high school graduation rates.

On the other hand, using data from two longitudinal surveys of U.S. high school seniors, Murnane, Willett, and Levy (1995) showed that cognitive skills had a larger impact on wages of 24-year-old workers in 1986 than in 1978, and that the effects were much smaller two years after graduation than they were four years later. In a study of high school dropouts who last attempted the GED exams in Florida and New York between 1984 and 1990, Tyler, Murnane, and Willett (2000) find large earnings returns to cognitive skills (measured by the GED scores) for all groups except white males. Murnane, Willett,

Duhaldeborde, and Tyler (2000) found mixed evidence indicating that the effects of teenagers' cognitive skills on later earnings might range from only modest to quite important. They also found some evidence that college benefits only students who enter with strong basic skills, but more evidence not supporting that claim. Green and Craig (2003) find positive returns for both cognitive and unobserved skills.

Tyler (2004) finds that higher scores on a post-schooling math test are associated with higher earnings for dropouts during their first three years in the labor market. In a literature review article Bishop (1998) argued that returns are increasing for job and occupation-specific cognitive skills, and from good work habits and people skills, but not from general reading, writing, and mathematics skills. Murnane and Levy (1996) argue that the "new basic skills" include basic mathematics, problem-solving, and reading, but also "soft skills" such as the ability to work in groups, make effective oral and written presentations, and use personal computers to do simple tasks such as word processing.

In a recent series of related publications, working with many different co-authors, Nobel Laureate James J. Heckman has provided extensive empirical analysis of the returns to education and to both cognitive and non-cognitive skills. This work also features a fascinating synthesis of theoretical and empirical findings from the research literatures on the economics of education, early childhood education and development, developmental psychology, and skill formation.³ Key findings from these papers include: 1) early intervention programs that target disadvantaged children have their largest effect on noncognitive skills such as motivation, self-control, and time preference, which are strongly predictive of many socioeconomic measures and outcomes, including crime, teenage pregnancy,

and education (Heckman, Stixrud, and Urzua 2004); 2) early intervention programs (from ages of 3 months to eight years) lead to large and lasting increases in IQ scores, which can probably not be done with older children because early advantages in cognitive and noncognitive skills are both complementary and self-productive in terms of raising the stock of later skills (Heckman 2005; Heckman, Carneiro, and Cunha 2004; Cunha, Heckman, Lochner, and Masterov 2005; Heckman and Rubinstein 2001; and Cunha 2005); 3) parental income is a strong predictor of racial and ethnic disparity in college attendance rates, but more important in terms of long-run factors (such as skill development) than credit constraints facing families during college-going years (Cameron and Heckman 2001); 4) modeling both schooling and achievement test scores as being generated by an unobserved latent ability, the effects of schooling on test scores are found to be roughly linear across schooling levels, but slightly larger for lower latent ability levels (Hansen, Heckman, and Mullen 2004).

In broadest terms, Heckman argues that well functioning families confer major advantages to young children by mediating deficiencies in noncognitive skills. Because that often doesn't happen in disadvantaged families, Heckman concludes "The family is the major source of human inequality in American society." (Clement 2005, p. 8) Differences in cognitive and noncognitive skills persist and indeed compound over time ("skill begets skill"), leading to major economic effects for older students and adults. For example, in a forthcoming book comparing traditional high school graduates to the 20 percent of total high school equivalency degrees that are now awarded through the GED exam, Heckman reports that the GED group has the same average scores on the Armed Forces Qualifying Test as high school graduates who do not go on to college, but earns no more than high school dropouts who do not receive the GED (after controlling for slightly higher cognitive skills in the GED group).

³ See Clement's (2005) interview with Heckman for a nontechnical discussion of much of this work.

4) *Effects of the High School Curriculum on Education and Labor Market Outcomes.* In the first rigorous attempt to measure the effects of specific high school courses on wage rates and years of education, Altonji (1995) found small effects for additional coursework in math, science, and foreign language, and negative coefficients for additional coursework in the social studies. Data were taken from the 1986 follow up to the National Longitudinal Survey of the High School Class of 1972, for students from 897 high schools and information on wages available through 1985. Overall, the return to a year of high school courses was much less than the value of a year spent in high school. The effects on postsecondary education were also very small, especially for coursework in the social studies. These results appear to be more consistent with a credentialing or screening interpretation of secondary education than with a human capital model.

Belfield and Levin (2004) found that in 14 states that mandate a high school course in economics or free enterprise, students scored about 0.08 of a standard deviation lower on the Scholastic Aptitude Test, while taking elective courses in French, German, and biology raised SAT scores. There is, of course, self-selection by students who take these elective “college prep” courses, and by states that adopt course mandates in economics and free enterprise, and by which students decide to take the SAT exam (with considerable variation across different states), all of which may be driving these results.

5) *Lasting Effects and Threshold Levels of Coursework and Learning in Economics.* Bach and Saunders (1965) found that social studies teachers who had taken only one or two courses in economics did not score higher on a standardized test than teachers with no coursework in economics. Differences for teachers with three or four courses were significant but not quantitatively large. Considering the effect of teachers’ coursework on how much their students

learned, Lynch (1990) found strikingly similar results. Only students taking courses from teachers who reported completing at least four courses in economics exhibited statistically significant gains.

Using cross sectional data from students and alumni at 23 schools, Saunders (1971) found evidence of lasting but diminishing differences in scores on standardized tests among groups of students who had just completed principles courses, those who had completed the course two years ago, and those who graduated five years ago, compared to students in the same cohorts who had not taken principles courses.

In a national random sample of college seniors, Walstad and Allgood (1999) found that students who had taken principles courses scored two points higher on a 15-item test of concepts typically covered in principles courses than a group of seniors who had not taken principles courses.

6) *Effects of Curriculum Mandates in Personal Finance on Education and Adult Saving Decisions.* Tennyson and Nguyen (2001) found that broadly defined curriculum mandates in the area of personal finance did not lead to higher student scores on a test of personal financial literacy, but that students in states requiring specific financial education course work scored significantly higher than students in states with no mandates or only a general mandate. Bernheim, Garrett, and Maki (1997) analyzed a cross-sectional household survey conducted in 1995 that included items on the states in which respondents attended high school, and self-reported data on rates of saving and the accumulation of net wealth. They found that students who attended high school in states with such mandates were exposed to more financial education, with the level of exposure increasing steadily over time after the mandates were adopted. Rates of saving for these respondents followed a similar pattern, and respondents from those states were more

likely to show significant differences in net wealth if they graduated after the mandates took effect. There was no indication that the state mandates were correlated with a pre-existing inclination to offer, require, or have students take such coursework prior to the mandate. Nor was there strong evidence of other systematic differences among the respondents with regard to time preferences or other determinants of saving and the accumulation of wealth. Instead, after controlling for systematic differences across the states, the authors found "strong indications that mandates not only increased exposure to financial education, but also systematically altered adult behavior by stimulating greater saving." (p. 3)

7) *Effects of Consumer Education Programs and Knowledge on Behavior.* Fast, Vosburgh, and Frisbee (1989) investigated the effects of six kinds of consumer education and information programs, ranging from formal academic courses to less formal workshops and the simple dissemination or readership of consumer education and information materials. For a sample of 1,000 English-speaking Canadian females, they concluded that participation in consumer education programs led to increased search activity on product test results in the purchase of major household appliances (after controlling for wage rates, education levels, family size, and other background variables). But they also found that, for three of the four information sources they monitored, "consumer education received from informal educational materials performed better, statistically, than consumer education received in a classroom setting." (p. 84) Hilgert, Hogarth, and Beverly (2003), using data from the Federal Reserve's Surveys of Consumers, found that knowledge about credit, saving, and investment was significantly linked to recommended financial practices in four areas: cash-flow management, credit management, saving, and investment.

8) *Effects of Employee Education Programs on Employee Savings, Retirement, and Investment Programs.* Bernheim and Garrett (1996 and

2003) argued that because people poorly understand their economic vulnerabilities on the one hand, and the incentives provided by some tax laws on the other, individuals do not save as much as they should. The U.S. Department of Labor has undertaken a national pension education program to address this presumed market failure. There is little evidence of the effectiveness of such programs, however, except anecdotal reports from Japan where alternative hypotheses are also plausible (such as differences in time preferences that are also correlated with levels of educational attainment).

In the U.S. private sector, many firms are offering financial education to their employees. Bernheim and Garrett (1996) reported that, by 1994, 88 percent of large employers offered some form of financial education, with more than two-thirds of the firms initiating these programs after 1990. The programs were most often offered by firms providing 401(k) plans or defined benefit retirement programs.

To evaluate the impact of these programs, an expanded version of the Merrill Lynch annual survey (written by Bernheim and the Luntz Research Companies) was prepared, with new items about employer-based financial education, household assets and liabilities, rates of saving, earnings, income, pension coverage, employment status, gender, marital status, age, ethnicity, education, household composition, economic and financial knowledge, sources of information and advice on retirement planning, and childhood experiences of potential relevance to later financial decisions. The telephone survey was completed by 2,055 individuals, drawn from a nationally representative sample of respondents aged 30-48.

Results indicate that when employers provide these educational programs, 27 percent of the respondents rely primarily on the employer for retirement planning information, compared to only seven percent of other respondents. Results

from logit analysis indicate that the employer programs displace some authoritative sources of information, but are much more likely to displace non-authoritative sources. The educational programs significantly increase rates of saving, both for general and retirement purposes (by 1.65 percentage points and almost one percentage point, respectively). The programs also greatly increase employee participation in 401(k) plans when they are available. The program effects were most pronounced among the employees who were otherwise least inclined to save.

Bayer, Bernheim, and Scholz (1996) reviewed a survey of employers that offered financial education programs to their employees to estimate the effects of education on financial decision-making skills. They found that participation in and contributions to voluntary savings plans were significantly higher when employers offered retirement seminars, with much stronger effects for lower-income workers than for highly compensated employees.⁴ The frequency of seminars was a particularly important correlate of behavior, but no effects were noted for providing written materials (such as newsletters or summary plan descriptions). Hira and Loibl (2005) analyzed a national survey of employees of one large insurance company and found that financial education programs increased employees' understanding of personal finance and also increased workers' satisfaction with the company.

Weisbenner (1999) found that retirement plans that allow employees to choose how funds are invested were significantly more likely to result in employees investing in stock outside of their employer plans, compared to plans where employees did not make fund allocation decisions.

⁴ Beverly and Sherraden (1999) argue that low-income families are more likely to save less than other families not only because of the direct effects of lower incomes, but also due to less access and familiarity with four institutional variables: institutionalized savings mechanisms, targeted financial education, attractive saving incentives, and facilitation programs.

Choi, Laibson, Madrian and Metwick (2002 and 2004) also find that plan design features affect employee behavior – for better or worse – with employees generally choosing to follow “the path of least resistance.”

9) Public understanding about pensions and Social Security. Gustman and Steinmeier (2005) matched pension plan descriptions from the 1992 Health and Retirement Study to descriptions provided by employers, and compared earnings histories reported by the respondents with histories provided by the Social Security Administration. About half of all respondents were unable to report expected Social Security and pension benefits, and for only half of those who did report were estimates within 25 percent of objective measures. Knowledge was systematically related to information provided by firms and unions in the workplace, and to other factors related to the costs and benefits of gathering information.

10) Economics Students' Attitudes on Public Policy Issues and Their Relationship to Student Scores on Standardized Tests in Economics. The most active period of research on the links between economic learning and attitudes on public policy issues was the 1970s; this research is reviewed in Siegfried and Fels (1979). Findings in these studies were often contradictory, with some reporting that coursework in economics moved students toward more liberal views, and others finding a positive link between conservative views and test scores or gains from pre- to posttest scores. An influential study by Walstad (1987) cast doubts on many of the earlier studies by modeling the relationship between changes in cognitive understanding and changes in attitudes using simultaneous equations, and concluding that changes in students' levels of understanding affect changes in attitudes, but not *vice versa*.

Measuring attitudes on a modified version of the survey form developed by Alston, Kearl, and

Vaughn (1992)⁵ to identify areas of consensus or disagreement among academic economists, Becker, Walstad, and Watts (1994) used rank-order correlations to show that high school teachers responded more like journalists than economists. High school economics teachers were closer to economists' positions than other social science teachers, but still closer to the journalists than to the economists. Allgood and Walstad (1999) used the same questions to show that teachers who completed a three-year master's degree in economics responded increasingly more like the national sample of economists over the three-year period, and less like the sample of journalists. Analyzing data from a national Gallup telephone survey of 1,005 adults, Walstad (1997) found that measures of general economic knowledge, or knowledge of a particular economic issue, were the most important factors affecting public opinion on a wide range of economic issues. Among professional economists, Fuchs, Krueger, and Poterba (1997) found that policy positions are more closely related to personal values than to estimates of related parameters (e.g., demand and supply elasticities for labor in discussions of employment effects of minimum wages) or identification with a political party.

Blinder and Krueger (2004) analyzed results from a telephone survey of 1,002 adults (age 18 and over) conducted by the Princeton Survey Research Center, and found that most respondents expressed a strong desire to be well informed on economic policy issues. Their dominant source of information was television, however, and on a variety of major policy issues (including taxes, social security, and health insurance) ideology was the most important determinant of public opinion, with self-interest least important. Knowledge about the economy was less important

⁵ The survey on consensus positions among economist was adapted from an earlier study by Frey, Pommerehne, Schneider and Gilbert (1984), and most recently updated in Fuller and Geide-Stevenson (2003).

than ideology, but more important than measures of self-interest.

11) How economists, economics students, and business students compare to others in terms of selfish or free-riding behavior. Marwell and Ames' (1981) seminal paper in this area has the provocative and telling title, "Economists Free Ride, Does Anyone Else?" In two recent studies, Frey and Meir (2003) and Meir and Frey (2004), pro-social behaviors of economics and business students at the University of Zurich were documented, despite the traditional image of these students being more selfish than students in other majors. Additional evidence was then offered supporting the idea that students who are more selfish/individualistic are more likely to choose an economics or business major, but not claims that these students' citizenship behavior is changed by "negative indoctrination" during their courses of study. On the other hand, there is relatively little "positive indoctrination" in undergraduate economics programs, either.⁶ Davies (2004) argues that coursework in economics and business can and should contribute to citizenship education by improving the quality of students' arguments.

12) The Usefulness of Economics to Economists Serving as National Policy Advisors or as University Chief Administrators. The final way of evaluating the long-term usefulness of economics I will consider here are testimonials about what happens to academic economists when they become high ranking policy advisers or university central administrators (specifically, presidents or provosts). There are many articles

⁶ A notable exception, though clearly an exception and not the rule, is McGoldrick and Ziegert's (2002) work on service learning in economics. There is some support for this approach in the general education literature: for example, in a longitudinal study of over 12,000 students from 209 institutions, Astin, Sax, and Avalos (1999) found that student participation in volunteer service organizations as undergraduates was positively associated with cognitive and affective outcomes measured nine years after entering college.

and books on the public policy roles economists have played in different historical periods. Examples for recent periods include a *Journal of Economic Perspectives* symposium on the fiftieth anniversary of the Council of Economic Advisers (CEA), featuring articles by Stein (1996), Schultz (1996) and DeLong (1996), and an earlier article by Nelson (1987). The interviews of economists serving as chief central administrators at colleges and universities were reported by Siegfried (1997).

There are interesting similarities in some of the key conclusions drawn in these articles, including the importance of the professional consensus on basic microeconomic concepts, and the broader perspective or framework for decision-making that seems to result from that consensus. The basic concepts often noted include such ideas as opportunity and sunk costs, incentives, and the indirect and often unintended consequences of changes in policies. Possible disadvantages resulting from the economic perspective, or at least the public perception of the economic perspective, are also noted in some of the articles. These include an over-reliance on models of rational behavior, notable naiveté with respect to political environments and responding to ideological agendas, and an emphasis on efficiency concerns to the point of sometimes downplaying equity concerns. Stein (1996) also felt that the CEA tended to focus too much on short-run concerns, ignoring such long-term issues as "the culture of poverty" that partly grew out of programs developed during the War on Poverty initiatives, and the effects of federal budget deficits that persisted for decades.

Implications and Conclusions

The most important and, unfortunately, most obvious conclusion to draw from this review of the limited research dealing with the long-term, behavioral effects of economic education is that we know relatively little about how learning economics affects people in their adult roles as

consumers, producers, and citizens. While a surprising number of studies have appeared in recent years documenting changes in saving and investment behavior by participants in educational programs, most of those studies have dealt with employer education programs for adults who had direct financial stakes in those particular programs, and were old enough to be seriously thinking about building assets for retirement or other major expenditures. How strongly, or indeed even whether, that implies financial educational programs for precollege and college students dealing with similar concepts and issues will have similar results is open to serious question.

Nor is the general literature on cognitive skills clear or complete enough to answer many key questions about what, how much, and when education on economics and/or personal finance can be taught most effectively. Developing general skills in early grades is clearly important, while specific skills required in different careers and college majors almost certainly become more important by secondary grades. There is little or no empirical evidence on how economics and personal finance comes into that very broad picture, however, especially for students with different general abilities and interests. Findings that even young students can learn basic economics – given time in the (crowded) curriculum, teachers who have been trained to teach economics,⁷ and the availability of good instructional materials – and that there are lasting effects of that learning, are reassuring and encouraging. But there are financial and other costs to these programs, and it is both politically and administratively costly to get the programs into the curriculum and make them educationally effective.

⁷ There is evidence that different instructors and types of instructors at both the college and precollege levels have important effects on how much economics students learn (Watts and Lynch, 1989; Bosshardt and Watts, 1990; Watts and Bosshardt, 1991).

Having said all that, most economic educators would be clearly be happier to have even the limited kind of evidence now available for personal finance programs, establishing more direct links between educational programs on general economic concepts and issues and adult behaviors as consumers, workers or voters. With major support from Federal Reserve Banks and other sponsors of household and employer surveys, and for analysis of those surveys by prominent economists at leading universities and other organizations, the personal finance wing seems to have “stolen a march” on those who study and promote more general forms of economic education.

A final point here concerns the special case of economic education at the college and university level, where how much economics students take is so largely determined by their choice of major. To the extent that choice of major appears not to be largely driven by financial considerations, but more by students’ interest in different fields of study even at the time they enter college, the relatively small number of students who have taken even a one-semester high school course in economics, or have had systematic but more limited exposure to economics in other elementary or secondary classes, seems likely to put economics departments at a serious disadvantage in attracting majors.⁸ If only for that reason, economics departments at colleges and universities might want to take more interest in developing more and better economic education programs at the precollege level.

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⁸ As noted earlier, in note 1, however, Stigler opposed a mandated precollege course in economics, and some leading economists still do, including Colander (2005) and McCloskey (2000) who both worry about the quality of economics instruction and learning that will usually occur in secondary schools.

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IV. A REVIEW OF RESEARCH ON OR RELATED TO PRECOLLEGE ECONOMIC EDUCATION FROM SOCIAL STUDIES EDUCATION

Ross and Marker (2005, p. 142) point out that social studies education is characterized by “contentious debates regarding the social studies curriculum and pedagogy. The very lack or agreement regarding the purposes of the field ... has become the hallmark of social studies.” Evans (2004, p. 4; and also 2003) goes so far as to characterize these differences among social studies educators as a “civil war,” and in fact Ross, Marker, and Evans were responding to a volume of recent conservative complaints about strong liberal biases in most current social studies publications, titled *Where Did the Social Studies Go Wrong?* (Ellington and Porter, eds. 2003). That work features articles by self-styled “contrarians” from social studies education (including James Leming, Lucien Ellington, and Mark Schug) and by conservative academics from related fields (including Diane Ravitch, J. Martin Rochester, and Chester E. Finn, Jr.).

The ideological, liberal-conservative divisions illustrated in this debate are frequently recast along other lines, using different labels. For example, conveying various degrees of approval or disapproval, conservatives’ goals for social studies education have been described as “citizenship transmission,” “defending the status quo,” or “indoctrination,” and liberal positions as promoting “social justice and reform,” “critical thought,” or “indoctrination.” Other categories and labels that apply to at least parts of these debates include deconstructionism versus constructionism; and pluralism, relativism, and political correctness versus objective knowledge and standards for normative (including moral) and/or positive statements and positions.

While these sweeping debates about goals, content, and pedagogy for social studies education probably have even more direct impact on civic and citizenship education than on economic

education, they nevertheless play an important role in economic education, too. Not surprisingly, given these fundamental and underlying sharp differences of opinion, there are considerable differences in goals, approaches, and content recommendations in the writings on economic education from the social studies literature. Because of that, in the following summary of works published since 1990, which is organized (as are most other sections in this report) using various categories, the categories themselves and the assignment of particular works to a particular category are at times open to question.

National and State Standards in Economics

(VanFossen 1999) summarizes the NCEE standards and benchmarks in economic education, and discusses how they are related to education for democratic citizenship. Since 1998, the NCEE has conducted a biennial survey to identify which states have adopted standards in economics and/or personal finance for precollege education, which states require students to take separate courses in one or both of these areas or at least require schools to offer these courses as electives, and which require that content from these areas be included as part of other courses (such as history and civics at the secondary level, and social studies or language arts in elementary grades). The results from these surveys are issued with the title: *Report Card – Survey of the States: Economic and Personal Finance Education in Our Nation’s Schools*. Since 1998, there has been relatively little change noted in these reports, with the most recent listing 14 states that required high school students to take a course in economics (or free enterprise, in some states) and four requiring a course in personal finance. The key role of state-level assessment practices related to content standards and course requirements in the social studies and economics are discussed in Buckles, Schug, and Watts (2001), with national survey data provided on which states were then conducting such assessments.

Dalgaard (1994) called for discussions on the role of economics and other social sciences in the social studies to be set in the context of the national education reforms that led to the national and state standards documents. Highsmith (1990) also stressed state mandates for course requirements (which predate mandates for content standards), together with teacher training in economics, as key factors in determining where high school economics courses are (or are not) offered and how effective they are. Highsmith then provided an outline for a “typical” one-semester high school course in economics, and survey data on teachers’ ratings of course goals in those classes taken from the Joint Council on Economic Education’s 1987 National Assessment of Economic Education.

Teaching Methods and Content for Precollege Economic Education

Infusion approaches have long been suggested for K-12 economic education by social studies educators, who see many different opportunities to incorporate the study of basic economic concepts, problems, and issues in other subjects and at different grade levels. Some social studies educators, such as Ravitch, favor teaching economics at the precollege level only as part of other courses, usually history or civics, and not as a separate course.¹ Others see infusion approaches culminating with a separate capstone course as the ideal. Given that one-semester courses in any field are rarely deemed adequate to establish basic (let alone lasting) competence, this may even be a necessary condition for developing economic literacy. But establishing and maintaining an effective K-12 program in economic education that incorporates a high

degree of infusion of economics into earlier grades and other subject areas has proven to be extremely difficult to do.²

Not surprisingly, many social studies educators suggest infusion of economics in traditional social studies courses (e.g., Mullins 1990 [reporting on recommendations of a National Commission on Social Studies in the Schools]; Schug and Wentworth 1999; Schug and Laney 1998; Schug 1996; Rader 1995; Schug 1994; Valentine 1994; Schug and Walstad 1991; and Reinke, Gilliard, and Morton 1990), and/or in citizenship education (Branson 1991, 1997, 2003a, and 2003b; Gallavan and Davis 1999; VanFossen 1999; Nelson 1997; Wentworth and Schug 1993), or in courses teaching about or using the Internet and other computer technologies (e.g., Risinger 2001, Shiveley and VanFossen 2001, Robinson and Davis 1999, and VanFossen 1998a and 1998b).³ Clark (1994) provided an introduction to the NCEE’s *Eyes on the Economy* and *Handy Dandy Guide for Solving Economic Mysteries* publications and three early computer activities (including the popular *Oregon Trail* simulation), which he suggested could be used effectively in secondary U.S. history courses.

NOTES

¹ Deirdre McCloskey, an eminent economic historian for much of her career, makes a similar argument for teaching economics at the precollege level only by “indirection,” in history and other non-economics courses.

² Much of the research on infusion versus separate-course approaches to K-12 economic education was conducted in connection with the Joint Council on Economic Education’s (JCEE) Developmental Economic Education Program (DEEP), and is reviewed in Watts (1991). In the social studies literature there is far more widespread and uniform support for infusion – as indicated by the number of studies and authors cited later in this section who call for infusing economic education into a wide range of social studies courses. Similarly, it is far more rare to find a social studies paper questioning the (high and certain) costs and (low, uncertain, and difficult-to-measure) benefits of infusion; but for the rare example see Schug and Cross (1998).

³ The ERIC data base also includes some works dealing with links between economic education and business, career, or vocational education, which are discussed in a separate section of this report.

Others have suggested more topical and occasionally even unusual linkages for teaching economics, such as combining global environmental education and service learning through a project that involved a community in supporting a school in Brazil (Hamot and Johnson 1998); children's theater using the "Barnyard Economics" children's play produced by Students in Free Enterprise (Shotick and Walsko 1997); magazine and newspaper articles on a wide range of current events and issues (Carr 1994); environmental education (Schug 2000; Holahan and Schug 1997; Schug and Shaw 1997; and Wentworth, Schug and Morton 1997); art education (Laney, Moseley, and Pak 1996; and Laney and Moseley 1994); labor education and other "popular education" programs (Delp et al. 2002); teaching about moral decisions (Schug and Clark, 2001); and programs for at-risk students (Elder 1991).

Puglisi et al. (1993) advocate using a "whole language" approach for elementary and secondary level economic education, describing what they also refer to as a "wonderfully undefinable" approach. From the description they provide, it appears to mean everything but the kitchen sink taken from current pedagogical writings, with elements from developmental, experiential, and active learning, plus critical thinking approaches building up to student and class research projects, and culminating activities promoting social change. A portfolio approach is then recommended for student assessment

Sunal et al. (1991) discuss Piaget and developmentally appropriate content in economic education, then call for instruction in early grades on economic topics including scarcity, wants vs. needs (a common error in social studies materials – from the perspective of economics), resources, planning, prioritizing goals, producers and consumers, goods and services, and money as a medium of exchange.

Laney (1990a, 1990b, and 1991) developed instructional materials based on Wittrock's generative model of teaching and learning, and in

a later study (1995) claimed that cooperative and mastery learning methods improved primary students' economic understanding and language development.

VanFossen (1995) and Miller and VanFossen (1994) describe preliminary work based on the expert-novice research literature, applied to economic understanding and problem solving behaviors. These works are discussed in a separate section of this report, dealing with the expert-novice framework for studies in economic education.

Gallavan and Davis (1999) call for more focus on what they view as practical economics at the middle school level to build a stronger sense of community among young adolescents. Hahn (1991) calls for putting controversial issues at the heart of economic education to support citizenship education. The issues approach for social studies education and economic education is also supported in Evans and Saxe, eds. (1996).

Educational Technology

Several social studies educators have encouraged elementary and secondary teachers to make greater use of computers and other technology-based resources to teach economic concepts and issues. Risinger (2001) provides an annotated bibliography of Web sites dealing with globalization. VanFossen (1998b) describes an early version of the CD-ROM ("Virtual Economics") resource library produced by the National Council on Economic Education, and four Web sites that elementary and secondary teachers can use to teach economics. Nelson (1997) found growing use of these and other instructional technologies in precollege economic education.

Robinson and Davis (1999) contend that the use of statistical models and simulations has substantially changed college-level teaching of economics, and recommend different content and instructional methods for secondary economics courses as well, including many computer and

Web resources. They even propose a rule to limit “chalk and talk” traditional lectures to no more than 25 percent of all class time.

Morgan (1991) described how teachers could use the *Econ and Me* video series for primary grades, produced by the Agency for Instructional Television and the Joint Council on Economic Education (now renamed the Agency for Instructional Technology and the National Council on Economic Education, respectively).

Niedermeyer (1990) reviewed 22 sets of educational materials (including software, multimedia kits, and print materials), which he described as “industry-sponsored” economic education materials, from an educational technology perspective. Some of these materials were actually produced by commercial educational publishers, others by non-profit educational organizations that receive some or in some cases most of their support from business (including Junior Achievement and the National [then Joint] Council on Economic Education), with other materials produced and distributed by individual corporations or by business groups such as the Chamber of Commerce and NFIB. His major recommendation was that the JCEE’s list of basic economic concepts be used to develop a set of instructional objectives that could then be used by the developers and users (especially classroom teachers) of these materials.

Empirical Studies

Patrick (1991) compares results from Walstad and Soper (1988) to findings from the National Assessment of Educational Progress on social studies, which was administered in 1988 with reports and results released in 1990. Notably, the NAEP social studies assessment covered history, geography, and civics, but not economics. Patrick concluded that “High School students performed about as poorly in a Joint Council on Economic Education survey as similar respondents did in the NAEP tests of knowledge of history and geography.” The NAEP findings in civics were mixed, with students relatively well informed in

one of four main categories. Comparisons of the 1988 NAEP results to an earlier (1982) NAEP assessment in these same fields (again, not including economics) showed little or no change in most areas, and declines in some areas in some grade levels, including civics scores for senior high school students.

Pearce (1991) compared performance of Georgia college students in principles courses to high school students taking economics courses, and also compared scores across different colleges and by demographic characteristics. He concluded that there are significant advantages in having high school seniors take an economics course.

Laney (1993) compared three different instructional approaches (experience-dictation, experience-debriefing, and debriefing only) in transitional first-grade classes, and found some evidence of larger gains from pre- to post test scores in classes that made greater and more effective use of experience-based instruction. Laney (1995) compared 120 students who were randomly assigned to four different treatment settings (including a control group), and compared results on a survey and pre- and posttests to find that cooperative and mastery learning methods improved both concept understanding and language mastery for students in primary grades. Laney (1991) compared the use of verbal only, imagery only, and integrated (verbal to imaginal) strategies in teaching the use of cost-benefit analysis to 66 fifth graders. One-way ANOVA showed no significant differences among the groups on a pretest; all groups showed significant gains on both immediate and delayed posttests, but the mean score for the integrated group was higher than for the verbal-only group, which in turn was higher than the imagery-only group, which Laney claims is consistent with brain lateralization research and generative models of teaching and learning. In an earlier study Laney (1990a) conducted a similar study with 111 third-grade students. Laney (1991) reported no difference in high school seniors’ use of basic ideas about costs, benefits, and economic

reasoning when presented with hypothetical or real choices involving the use of 30-minutes of “free time.”

Sweeny and Baines (1993) report pre-post data for three third-grade classes that viewed some of the video programs from the *Econ and Me* series. They found significant gains but average posttest scores of 65 percent or less, which they described as a “smaller than expected” improvement, especially in light of comments about the student learning that took place submitted by the facilitators who taught the lessons.⁴

Susskind (1997) administered a 20-item pre- and posttest, developed from the NCEE’s *Test of Economic Literacy*, to 22 U.S. history classes in Pennsylvania schools. Over a four-week period, in eleven of the classes at least two lessons were covered from the NCEE volume *United States History: Eyes on the Economy*, all featuring the “handy dandy guide for solving economic mysteries.” The other 11 classes served as a comparison group. The treatment group was viewed as being much more adept at solving economic mysteries at the end of the four weeks, with some relative (but no absolute) performance measures provided on pre- and posttest scores in the classes. Apparently there was no attempt to control for any other student, instructor, or school characteristics beyond a comparison of class average pretest scores. The treatment group improved on 11 items, showed no change on three, and scored lower on six items. The comparison classes “showed a similar pattern” (p. 45), improving on 10 items, no change for two, and lower on eight. The treatment group had

⁴ As noted in the first section of this report, there is considerable discussion about how effectively objective tests – and in this case tests with only eight items – really measure student learning. Moreover, in selecting items with reliable discrimination properties, it is commonplace to construct test instruments with average post-test scores of around 50 percent, because items that all students (or none) answer correctly have no power to discriminate between students who know more or less than others.

significantly higher scores than the comparison classes on six of the 20 items on the pretest, and significantly lower scores on seven questions. On the posttest the treatment group scored significantly higher on eight items, and lower on four.

Arora, Holahan, and Schug (2000) surveyed 157 Wisconsin science and social studies high school teachers, and found that most of these teachers generally approved of nonmarket policies to prohibit or reduce pollution, and generally disapproved of market-oriented policies.

Implications for Economic Education Programs and Research

With only a few exceptions (e.g., Hallows and Becker 1994) authors publishing in social studies outlets nearly exclusively cite other social studies authors publishing in similar outlets. There is relatively little overlap with those who publish about economic education in the *Journal of Economic Education (JEE)* or other journals where authors are more likely to be economists by training. The converse is also true, with relatively few citations to articles from social studies journals appearing in *JEE*. While it may be asking too much to expect authors to keep abreast of research methods and results from “another” field, the fundamental problem this phrasing points out is that as long as this pattern persists the fields remain, at least in practice, essentially different fields even though they often deal with the same subject matter content, in terms of economic concepts and issues. It has been said that England and the United States are two countries separated by a common language, and economists and social studies educators who work in the field of economic education seem to offer a similar kind of story: two academic fields largely separated by (or despite) a common field of interest, mainly because of different conceptual frameworks for the field itself and, perhaps especially, in research methods.

ERIC searches for social studies works appearing since 1990 found relatively few pieces that made

extensive use of studies from the fields of general education, or from educational and developmental psychology, except in the rare cases where that was a main theme in a paper (e.g., Sunal et al. 1991; Laney 1991, 1993, 1994; Puglisi et al. 1993; Schug 1994; and Schug and Laney 1998). Those exceptions appeared mainly in the earlier years of the search period, and the paucity of such works especially in more recent studies appears to be in marked contrast to social studies publications dealing with economic education that appeared from 1950 to 1990. (A better dating point for the inflection point would be 1994, to capture the works that appeared early in this search period.) Schug (1994, p. 26) counted “about thirty” studies that appeared from 1950 to 1990 dealing with work by Piaget and other developmental theorists. If this difference since 1990 or 1994 is not somehow a function of ERIC’s selection procedures or assignment of keywords for recent works included in its database, this may indicate a shift towards other concerns and issues, or perhaps even the emergence of more distinct and separate subfields (in the general field of education) of social studies and economic education. Or it may indicate that some of the developmental psychology issues have been settled as well as they can be, and perhaps studied to a point of diminishing returns – at least in terms of providing specific insights, applications, and uses for economic education work by social studies educators. Retirements and new cohorts of social studies educators could also result or support one or more of these changes.

Finally, while the general field of social studies education is itself a smaller field than language, mathematics, and science education, only a small percentage of social studies educators (and a correspondingly small part of academic writings in this field) deal with economic education. History and civics or citizenship education, and perhaps even geography education, are more popular and prominent – as reflected by their inclusion in the first NAEP social studies

assessments and the exclusion of economics.⁵ Judging the attention economic education receives in the social studies by the number of journal articles devoted to the subject may, in fact, overstate its true status, because many journals, including *The Social Studies*, *Social Education*, *The International Journal of Social Education*, *Social Studies and the Young Learner*, *Theory Into Practice*, and the *Georgia Social Science Journal*, have all published at least one special issue devoted to economic education. Without those special issues, the amount of journal space devoted to economic education in the U.S. social studies and general education journals that are included in the ERIC database would have been extremely limited.

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⁵ The first NAEP in economics is now scheduled to be administered in 2006.

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V. A REVIEW OF RESEARCH ON OR RELATED TO PRECOLLEGE ECONOMIC EDUCATION FROM BUSINESS AND VOCATIONAL EDUCATION

The Policies Commission for Business Education (2002a) lists economics and personal finance as one of 11 key content areas for business education – the other areas listed are accounting, business law, career development, communication, computation, entrepreneurship, information technology, international business, management, and marketing. The rationale for including economics and personal finance is stated as: “Individuals will be able to use knowledge about the economy and economic systems to manage the individual’s role as an informed citizen and wise consumer and producer of goods and services; understand how to effectively manage personal finances” (pp. 20-21). These content areas and the rationales for each of them are adapted from the National Business Education Association’s (2001) *National Standards for Business Education: What America’s Students Should Know and Be Able To Do In Business*. Economic understandings are also directly mentioned in the rationale statements for the content areas of entrepreneurship (responding to “legal and economic environments”) and international business (“explore the interrelatedness of political policies and economic practices among countries,” and “economic [and other] factors that shape and impact the international business environment”).

The Policies Commission (2002b) also calls for building partnerships in business education involving business, government, education, and community representatives. An earlier paper by Leopard (1993) made many of the same arguments for partnerships and closer links between economic and business education, after citing evidence from a 1992 Gallup survey conducted for the National Council on Economic Education, and then NCEE President Stephen

Buckles’ conclusion that “Economic illiteracy is rampant in America” (p. 35). Schug and Cross (1996) also describe “easy” ways to integrate basic economic reasoning in the business education curriculum.

As discussed in more detail in the social studies section of this report, Niedermeyer (1990) surveys characteristics of what he calls industry-sponsored instructional programs in economics. He recommends that for future such programs a list of basic economic concepts published by the Joint (now National) Council on Economic Education be translated into a framework of instructional objectives.

Zinderman (1997) explores the implications of changing technology and technology education for secondary technical and vocational education (STVE), with a special focus on policies and trends in developing nations. He begins by recognizing “This is an area of much controversy, among policy-makers, among economists, and among educationists...”, and he admits that, as in earlier works, he adopts a “critical stance in relation to STVE” policies in developing countries (p. 351). In particular, he recommends policies that increase the market orientation of these programs, featuring improved information links with employers, follow-up surveys of graduates, a more flexible curriculum, more responsiveness to labor market information and signals, stronger incentives, improved cost effectiveness, and building larger vocational schools to take advantage of economies of scale. Similar themes are included in Gahrns and Pfeiffer (1998).

Implications for Economic Education Programs and Research

Business education programs at the K-12 level have always included considerable economics content, sometimes taught as economics content per se, and other times as background to or part of other branches of business education. In the

United States, where the great majority of students follow a general education curriculum in grades K-12, and business and vocational education programs are not popular except in some large urban school districts, or in vocational schools that are often operated independently from public school districts, there has been much more attention to building economics into the social studies curriculum than developing similar links to business and vocational education – but in other countries the patterns can be quite different. And even given the enrollment patterns that prevail in the United States, it could easily be argued that not enough has been done to promote economic education in business and vocational education programs, given the clear content overlaps and stronger instructor training and interest in economics and business topics in these programs, vis a vis social studies teachers.

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VI. A REVIEW OF RESEARCH ON OR RELATED TO PRECOLLEGE ECONOMIC EDUCATION FROM THE DOMAIN-SPECIFIC EDUCATION LITERATURE

The central point in this line of research, as pointed out by writers such as Matthews (2000) and Goldsmith (1991), is that cognition is modular in nature, partly because of different structural properties for knowledge from different subject areas. Matthews argues that children's ideas in science are often "triggered" rather than learned, in ways that are not always expressible in language or susceptible to change from later learning. To the extent that is true, theories of teaching and learning that are based on ideas of domain-free, general purpose learning or processing of information are more likely to fail.

Bruner's (1960) influential work, *The Process of Education*, stressed a "structure of academic disciplines" approach, arguing that children learn better, and faster, when they see how concepts are related. In the social studies this put more emphasis on the individual social sciences, and led to what became known as "the new social studies."¹ As described by Rader (1995), Bruner's early work featuring the structure of academic disciplines coincided with the development and publication of new instructional programs in economics, particularly series developed for elementary students by Lawrence Senesh at Purdue University and by Rader (who had worked with Senesh) and others at the University of Chicago.

Byrnes (1995) reviews the literature on intellectual ability, and then identifies situations in which general abilities are expected to moderate

the relationship among domain-specific knowledge and other processes. After reviewing recent studies in which general abilities were used as independent variables or covariates he suggests that, in general, domain-general skills are far less important than domain-specific skills.

Some studies (e.g., Murphy and Alexander, 2002; and Veal, Tippins, and Bell, 1999) find that students with prior instruction in a content domain are in a better position to develop pedagogical content knowledge and understand educational psychology concepts such as strategic processing. Hirsch (2001) argues that decisions about curriculum content should recognize that learning is a domain-specific skill, and that while general learning ability is highly correlated with general knowledge, learning a subject requires comprehension of general principles illustrated by specific examples. Jacobs et al. (2002) document domain-specific growth trajectories for 761 students in grades 1-12. They find significant gender differences in most domains, but with differences not systematically increasing with age.

Two studies conducted in The Netherlands deal with economic education and are set in domain-specific learning framework. Dochy and Bouwens (1990) found that economics students performed better than law students in two undergraduate courses on economics and business, and from that concluded that the courses were not truly multifunctional for students from different subject domains. Dochy and Valcke (1992) assessed prior knowledge of economics and law students enrolled in two economics courses, classifying the 154 items on their assessment instrument into 10 different dimensions. They found that some of the dimensions helped to differentiate between economics and law students, but did not identify specific contrasts that were useful in terms of defining specific strengths and weaknesses of the two groups.

NOTES

¹ Edwin Fenton was another leading figure in founding the New Social Studies. Fenton's own reflections on this movement were published in Fenton (1991).

Two Key Implications for Economic Education

1) It is often argued that economics can and should be taught as part of other subjects. Some go so far as to argue that it is the best way to teach economics or, given the overcrowded K-12 curriculum, the only feasible way to teach economics. There is an idea that domain specific learning in economics can only be done successfully if specific examples of economic concepts and issues are included. This points to a key problem (and perhaps also to a key metric) in assessing how much the integration/infusion approach is happening, in practice given

- the limited number of economic examples included in textbooks for other subject areas (e.g., U.S. history) or in classroom lessons (given teachers limited training in economics), and
- the limited and in some ways flawed coverage on economics included in standards for the other subject areas, including social studies, civic education, geography, and history (Buckles and Watts, 1998).

2) The issue of gender differences in economic education has been a major research topic in economic education for nearly 50 years, now, with a preponderance of the evidence showing that female students do not perform as well as male students – particularly on standardized multiple-choice tests – from elementary grades through college principles courses. While many possible causes and some possible remedies for the problem have been considered, it is surprising that so few of these studies have set the discussion in a broader context of gender differences found in many other subject areas. Usually, that line of discussion goes no further than suggesting possible gender differences in mathematics and quantitative skills on the one hand, or on the other hand differences in verbal abilities that may be related to different performance outcomes on multiple choice versus

essay or other forms of constructed-response items.

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VII. A REVIEW OF RESEARCH ON OR RELATED TO PRECOLLEGE ECONOMIC EDUCATION FROM THE EXPERT-NOVICE EDUCATION LITERATURE

A general summary of how work in cognitive science, and especially on prior learning and expert-novice differences, has reshaped understanding of what learning is and how it takes place, and how that affects teaching and assessment programs designed to promote deep understanding of a subject, is provided in Niemi (1997).

Swanson (1990) provides qualitative evidence comparing 24 expert and 24 novice teachers, and finds that when asked to “think aloud” about how to deal with classroom discipline problems, the expert teachers employ procedural plans and put more attention into defining the problem than novice teachers. Westerman (1991) finds similar differences between expert and novice classroom teachers on a wider range of measures, including interviews concerning lesson plans and follow-up interviews after classes were taught, videotapes of the lessons, self-reviews by the teachers, and printed materials.

Heyworth (1999) found that the major problem-solving differences between experts and novices in the field of chemistry were conceptual understandings, use of a qualitative procedure, and the type of strategy adopted.

Tudor (1992) compared problem-solving strategies for environmental issues, comparing 17 environmental experts to novice groups of 53 academic experts from other fields and 15 graduating college students. She found significantly higher scores on evaluation instruments for the environmental experts, and concluded that the skills to solve these kinds of multidisciplinary issues are domain specific.

Mitchell and Chesteen (1995) use work on expert-novice differences by information theorists to argue that entrepreneurial expertise in adult-learning programs is influenced by providing experienced mentors.

Miller and VanFossen (1994) adapt a model from work by cognitive psychologists to contrast expert and novice approaches to problem-solving in economics, and offer preliminary support for the model’s ability to describe both expert and novice approaches. Gijsselaers and Woltjer (1997) presented economic problems to six experts, six fourth-year undergraduate economics majors, and six first-year students with only one course in economics. When asked to sort the problems according to similarities in solutions, the experts sorted by major economic principles, while novices sorted by literal clues provided in the problems. The results were stable over time, with the same results found when the experiment was repeated six weeks later.

Segers, Dochy, and De Corte (1999) call for improved assessment practices based on research findings from the fields of cognitive psychology – especially the expert-novice literature. They describe an assessment system they have used for a problem-based curriculum in economics and business administration at the University of Maastricht.

Implications for Economic Education Programs and Research

How useful the expert-novice literature is for models of teaching, learning, and instruction in economics depends to a great extent on whether (and how much) best practices in economics (and other fields) are domain-specific. As noted here, and in the separate section of this report on the domain-specific research, there are a number of studies that suggest that may well be the case. If so, more work on expert-novice differences in economics will certainly be required before there is enough information and consensus about how

to use those differences in developing more effective instructional methods and materials, and assessment techniques and instruments.

Particularly in the area of assessment, however, where there are longstanding criticisms about the limited scope of most standardized assessment instruments in economics, the expert-novice approach may have something to offer in developing materials that assess at deeper levels of cognitive understanding, to see whether students are in fact beginning to “think like an economist.” That is the often-stated goal of many economics instructors and textbooks; but as yet that goal has not been especially well defined, at least in specific and operational terms that clearly identify which textbooks or evaluation items do that more effectively than others.

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APPENDIX: METHODOLOGY FOR LITERATURE SEARCHES IN DIFFERENT SECTIONS

forgiving and generous in sharing that information with me.

As explained in the introduction and Section II, two earlier reviews of works from the field of economic education were published around 1990, so the decision was made to begin the current review of studies in the field of economic education with publications that appeared no earlier than 1990. For consistency, the same starting date was also adopted for other sections of the report.

Works cited in Sections II and III were typically identified using keyword or author searches in the American Economic Association's EconLit database, or the *Journal of Economic Education's* search engines on its Web page at Indiana University, or in references from other works that were identified with the database searches.

The works in Section IV-VII were identified from keyword and author searches using the ERIC database, and by checking references in various sections of the American Educational Research Association's *Handbook on Research on Teaching*, 4th ed., published in 2001. Unfortunately, there are recent reports noting that the ERIC database has been lagging in updating entries for the past year or two, so some very recent studies may well have been missed.

It is also fair to say that I am considerably more experienced and comfortable using the EconLit and *JEE* search engines than I am in using ERIC, and in general more familiar with the studies from the literatures reviewed in Sections II and III than those in the later sections. Of course, given the constraints of time, ability, and specialization, which are all too real, there are no guarantees that I have not missed some relevant works for Sections II and III, let alone the later sections. So I apologize in advance for any sins of omission as well as commission in this report, and hope that anyone who identifies such errors will be both