Improving Economic Literacy:
The Role of Concurrent Enrollment Programs

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Abstract

This paper introduces Concurrent Enrollment Programs (CEPs), within the context of Syracuse University Project Advance (PA) Economics, as a way to improve economic literacy. We describe measures implemented to operate PA Economics as a high-quality CEP, as well as the establishment of the National Alliance of Concurrent Enrollment Partnerships to set national standards. This study also investigates the performance of PA Economics students on the nationally normed Test of Economic Literacy (TEL). PA students average nearly one percentage point higher than the AP/Honors Economics Group, and score considerably better than AP/Honors Economics in fundamentals and international economics. By cognitive level, PA Economics students score over four percentage points higher than AP/Honors Economics in the knowledge area, and the findings present evidence of better performance on application questions. PA Economics students average over seventeen percentage points better than those taking the TEL in AP/Honors Social Studies courses.

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1. Introduction

Economic literacy has attracted widespread attention within the US, and its importance continues to be communicated in a variety of different venues. Stern (2002, p. 3), for example, asserts that, "I am convinced that … the invisible hand works better when participants in the economy and its myriad of markets – when consumers, business people, elected officials, investors, policymakers, and so on – when they are economically and financially literate. Going one step further, the economy performs better when its participants are well-informed because well-informed participants make decisions that enhance resource allocation, and thus contribute to rising efficiency, productivity, and living standards." Citing results from research on economic education, he states that those who have had classes in economics or finance on the secondary school level tend to have significantly higher levels of wealth in adulthood. They are also better equipped to deal with setbacks in wealth accumulation and in making major investments such as higher education.

In the National Council of Economic Education *Survey of the States* (2003b), the organization's President and Chief Executive Officer, Robert Duvall, echoes these sentiments. He writes (p. 2), "Educating young people in economics and personal finance is vital to our nation's future. Indeed, it is a key to building a nation of knowledgeable investors and savers, informed consumers, productive members of the workforce, responsible citizens, and effective participants in the global economy."

Yet, as discussed in Hansen, Salemi, and Siegfried (2002) and a number of other places, there are substantial deficiencies in Americans' knowledge of economics. For example, Walstad and Rebek (2001a) find that high school students who completed a standard high school course in economics average just 61% on their Test of Economic Literacy (TEL), based upon administering the test to nearly 6000 high school students nationwide. Students without a stand-alone economics course fare even worse, from 57% for those tested in Advanced Placement (AP) or Honors social studies courses to 41% for students in regular social studies classes. Walstad and Rebek (2002), using data from surveys conducted in 1992, 1994, 1996, 1998, and 1999, find an average score of 48% for

the entire sample. The National Council of Economic Education (2003a), the source of the 1999 survey, reports an average grade on their exam of 57% for adults and 48% for high school students.

This paper introduces Concurrent Enrollment Programs as a way to help improve economic literacy. Concurrent Enrollment Programs (CEPs) – also referred to as a dual enrollment programs – consist of college-sanctioned classes taken by high school students for college credit. These courses are offered either at their own schools taught by high school teachers, or on college campuses. Upon completion, students can apply to transfer their credits to the college or university of their choice. Colleges and universities typically use a student's course grade to determine whether the student receives credit, placement, or exemption. The grade from the CEP course is determined by continuous assessment of performance throughout the course. This characteristic distinguishes CEPs from the AP or International Baccalaureate (IB) programs, in which college credit is determined by performance on their standardized test. As Gehring (2001) describes, beyond accumulating college credit, CEPs keep college-bound students challenged and help to diminish senioritis. They also give students an early indication of the increased rigor expected from college work.

Syracuse University (SU) offers college courses in a variety of disciplines through its CEP called Project Advance (PA), established in 1973. Gehring (2001) reports that PA is the largest program of its kind in the nation, with about 4000 students per year in 120 high schools. He states that PA has served as a model for similar programs, including Indiana University, the University of Pittsburgh, and the University of North Carolina at Greensboro. SU began offering principles level Economics courses through PA in 1988.

In this study, our discussion and empirical investigation of the CEP model focuses on the following points.

- Rigorous college introductory courses offered to high school seniors, such as quality CEPs, serve as an excellent way to develop long-lasting tools for economic literacy.

- These courses work, and yet only a small percentage of the college-bound student population enrolls in such courses.
- Among the CEP, AP, and IB models, CEPs offer the greatest potential for reaching a broader population of high school students, and thus to expand economic literacy.
- By offering a college/high school partnership model that melds the content expertise of college faculty with the pedagogical expertise of high school teachers, CEPs empower teachers to offer high quality college introductory Economics courses.
- Empirical evidence from this study indicates that a high quality CEP in Economics generates student performance at least equivalent to that of AP or Honors Economics.
- CEPs may also offer positive spillover effects toward the teaching of the basic high school Economics course or infusing Economics in social studies courses.

Walstad (2001) argues that the high school level is the most critical period for improving economic understanding. In this regard, Walstad and Rebek (2001a) strongly indicate that college-bound high school students increase their economic understanding if they take a higher level Economics course. The study finds that students who took an AP/Honors course in Economics scored over 17% higher than those taking the exam after completing AP/Honors Social Studies courses. This result reinforces Walstad (2001), who contends that due to inadequate treatment of Economics in social studies books, attempts to infuse Economics in other courses tend to be ineffective relative to a stand-alone course.

Furthermore, economic literacy gained from college courses appears to be long-lasting. Walstad and Rebek (2002) show a significantly positive effect on economic literacy of adults who took at least one college Economics course, even after controlling for years of higher education, household income, and demographic characteristics. The effect is not only statistically significant but economically significant, with an estimated

increase in test score of over 10%. In contrast, they find that standard high school Economics courses are not significantly related to adult knowledge of Economics.

Unfortunately, while the benefits of college level courses are real and durable, relatively few students enjoy them. There seems to be a substantial gap between the total college-bound student population and the number taking such courses. Walstad (2001) reports that while 63% of high school graduates enrolled at colleges or universities in 2000, only 1% took a college-level economics course of any type (AP or CEP) in 1994. The reasons do not appear to involve lack of students taking Economics courses in general. According to the National Council on Economic Education (2003a), only 14 states require an Economics course for high school graduation as of fall 2002. But the study goes on to note that this set includes the four largest states by population – California, Texas, New York and Florida – and comprises 33% of students in US public high schools. In addition, Walstad (2001) reports that between 1982 and 1994, enrollment in high school Economics in the US rose from about 24% of high school students to almost 44%.

As part of this trend, AP Economics is becoming increasingly popular. According to Walstad (2001), 23,761 students took the AP macroeconomics exam and 17,464 students took the AP microeconomics exam in 2000, about a seven-fold increase from when the tests were first administered in 1989.

But even this dramatic growth in AP leaves a huge unserved population of college-bound students. Moreover, this limited service of AP may wane over time. Many colleges and universities have raised the bar for credit from AP from a minimum score of 3 to 4 (out of 5). And as Walstad and Rebek (2001a) note, even under the lower standard of 3, only about 60% of those who actually take the exam receive a grade of 3 or better.

In contrast, CEPs appeal to a much broader student population. Gehring (2001) states that CEPs target the general population of college-bound students, as opposed to just the top academic performers. CEPs do so by granting college credit based upon continuous assessment of performance. Besides being more consistent with fundamental educational principles than the standardized test criterion, the CEP criteria diminish the

risk of a false negative, "the bad day effect", and thus enable more students to obtain college credit.

By tailoring the college course to the high school schedule, CEPs also address several perverse structural issues associated with AP, particularly those pertaining to Economics. For example, students who complete either the AP micro or macro course in the fall semester must wait until May to take the corresponding AP exam. Furthermore, in New York state, students taking an AP Economics course in the spring must take the AP exam nearly 6 weeks before their course is completed, because the national date accommodates schools in regions of the US that finish the school year much earlier.

SU Economics offered through PA stands as a time-tested example of a CEP offering college Economics courses. In the 2002-03 academic year, the program consisted of 26 high schools throughout New York state, serving nearly 500 students. Section 2 of this study describes PA Economics and its operation.

Section 2 also looks at two important challenges facing CEPs – ensuring quality and establishing national credibility. As noted by Gehring (2001) and many others, CEPs have been harshly criticized as "cash cows" for some institutions of higher education, which collect the money and yet maintain little quality control. As a result, these CEP courses could lack the rigor of college coursework. The section explains measures implemented to ensure the integrity and quality of PA sections of the SU Economics course. It also describes efforts of the National Alliance of Concurrent Enrollment Partnerships (NACEP), to establish and enforce national standards.

Section 3 contains the investigative part of this study. It reports the performance of PA Economics students on the TEL of Walstad and Rebek (2001b). Published by the National Council of Economic Education, Walstad (2001) states that questions for this multiple choice test were prepared by a national committee of economists and educators using standards set forth in Saunders and Dilliard (1995) for content validity. Walstad (2001) refers to the TEL, now in its third edition, as a reliable test of economic understanding among US high school students. He writes that the TEL has been used extensively in research studies with high school students in many nations during the past two decades.

The TEL was administered to over 250 PA Economics students at the end of the fall 2002 semester. We compare these results to those obtained by Walstad and Rebek (2001a,2001b) in their national norming of the TEL within US high schools. The findings reveal that PA Economics students average nearly one percentage point higher than the AP/Honors Economics Group. Following Walstad and Rebek (2001b), we break down the relative performance by subject area. The evidence indicates nearly equal performance between PA Economics and AP/Honors Economics in macroeconomics and microeconomics. PA Economics students, though, score considerably better in fundamentals and international economics. Examining the performance by cognitive level as in Walstad and Rebek (2001b), the results point to nearly equal performance on questions testing comprehension. PA Economics students, though, score considerably higher on questions in the knowledge area, and the findings present some evidence of better performance on application questions.

The overall results point to the potential of a well-designed CEP in Economics to improve economic literacy. Beyond the favorable comparisons to the AP/Honors Economics group, the findings reveal a marked difference in economic knowledge of PA Economics students relative to the nationally normed group taking the TEL in AP/Honors Social Studies courses, as in Walstad and Rebek (2001a). This finding indicates that a CEP in Economics can offer particularly high value-added to this college-bound set of students. Section 4 concludes the paper.

2. SU Economics Through Project Advance

Program Description

The staff of PA Economics consists of the Project Advance administrative office, a unit of SU located within Undergraduate Studies, and the two Economics faculty members co-authoring this paper. Both professors are full-time tenured SU Economics department faculty members. SU Economics courses offered through PA consist of principles level Economics courses at client high schools, taught by suitably trained high school teachers. Nearly all the sections of these courses are the one-semester principles of microeconomics and macroeconomics course, listed in the SU catalogue as ECN 203. This course is also taught to SU undergraduates each semester on campus. The PA

sections of ECN 203 use Evensky (2003) as the primary textbook, which some professors use in the corresponding course on campus.

The benefits of the one-semester course and the relatively conceptual focus of Evensky (2003) correspond to the arguments of Hansen, Salemi, and Siegfried (2002) for improving economic literacy. At the same time, the book's coverage of models and the corresponding graphical analysis are pitched at a technical level corresponding to standard principles of economics courses. In this regard, at SU ECN 203 serves as the standard path of entry into the Economics program, including the major. Two high schools in the PA Economics program offer the two-semester sequence of principles of micro and principles of macro. They use standard college textbooks as well – Parkin (2003) and Baumol and Blinder (1997,1998).

High schools offering the SU Economics course through PA span upstate and downstate New York, and represent a broad range of demographic characteristics. The Appendix reports the list of participating high schools as of the 2003-04 academic year. These schools include urban, small city, suburban, and rural high schools. They also cover schools across the set of income demographics. Participating high schools generally offer the SU Economics course at least once during the school year, although most schools offer at least one section each semester. PA sets limits for class size at 10 to 25 students. Due to the restricted class size and the popularity of the course, some schools have multiple sections during a semester.

Students seeking college credit for their SU Economics course must register for the course and pay tuition substantially below that charged for courses offered on campus ($267 for three credits in academic year 2002-03). The PA office offers assistance for those with financial hardship. Upon completion of the course, the student's grade goes onto her SU transcript. She can then have that transcript sent to the college or university of her choice for the purposes of receiving transfer credit. Colleges or universities typically either grant credit for their one-semester economics course, or credit/placement out of a principles of micro or macro course (we recommend macro principles). Students who attend SU begin with this transcript, and the grade is counted as part of their GPA.

PA teachers must be certified and full-time tenured or tenure-track employees of their high schools. Those interested in joining PA Economics need to fill out an

application, from the PA website <*supa.syr.edu*>. Along with the application, candidates must submit transcripts of their academic record and at least one letter of recommendation, generally from the high school principal.

High school teachers receive no pecuniary benefit for participating in PA Economics. Their incentive is primarily working with very good students in a higher order realm of ideas and issues. This has proven to be a very strong incentive, stemming from the excellent teacher's drive to motivate and grow talented minds. They also enjoy the ongoing professional development provided by PA Economics and the interaction with other high school teachers in the PA Economics program. Indeed, they tend to be the in-house Economics reference person of their social studies departments.

SU Economics through a CEP – Advancing Economic Literacy

As a CEP, the SU Economics course offered through PA provides a number of visible benefits in advancing economic literacy.

First, the course makes college Economics accessible to most college-bound students, as opposed to the relatively elite clientele that tends to take AP or IB Economics. To be eligible for the SU Economics course taught through PA, students must have at least an 85 average in eleventh grade social studies. Thus the course is designed for college-bound students, but has a much wider reach than AP or IB. Furthermore, the greater probability of getting college credit for the Economics course relative to AP or IB creates an increased incentive for students to choose the CEP. As a consequence, courses like SU Economics through PA can attract more students out of the basic high school Economics course and expose them to college Economics.

This higher probability of obtaining college credit, placement, or exemption is supported by the results of Edmonds, Mercurio, and Bonesteel (1998), which compares AP and PA over a range of subjects. The study finds that 54% of the students taking the AP exams scored 3 or above, similar to the estimate reported in Walstad and Rebek (2001a) for AP Economics. This number clearly overstates the percentage of students in AP courses who receive college credit, since many students in AP courses don't take the exam at all. In contrast, 91% of the students taking SU courses through PA receive college credit, exemption, and/or placement.

Second, the structure of high school instruction provides inherent advantages to the CEP in advancing economic literacy. PA Economics sections are taught within small high school classes, as opposed to the much larger size of principles courses offered at most colleges and universities (over 100 students per class, for example, at SU). The notably smaller class size enables teachers to expect more from students in the form of more frequent and demanding homework assignments, including papers and projects.

Moreover, students taking the SU Economics course in participating high schools average nearly 90 days of 40-45 minute instruction per day. This is over twice as many total direct contact hours as in most principles of Economics courses taken at colleges or universities. This immense time advantage gives teachers more time to cover more topics, and/or go into greater depth. Students receive a great deal of personalized instruction, substantially more so than most principles of Economics courses taught on college campuses.

Third, a CEP like PA develops the economic literacy of the broad college-bound population, including the elite students. They receive exposure to college Economics relatively early and within a high-quality teaching environment. This aspect can enhance their enjoyment of the subject, lead to taking more Economics courses in college, and possibly result in choosing Economics as a major. Even though college credit may be less likely for elite students due to their college choice, there are incentives for this group to take SU Economics through PA. While the most selective colleges and universities tend not to give credit for the CEP class, they look closely at such courses in admissions decisions.

Fourth, high school teachers are trained professionals in education. With fewer students per class, more contact time, and training in pedagogy, they tend to be more willing and able to implement methods of active learning in their classrooms. This issue addresses a visible sore spot within Economics education. A number of studies have harshly criticized college teaching of Economics as predominately using the passive "chalk-and-talk" lecture method, as opposed to active learning strategies (see e.g. Salemi, Siegfried, Sosin, Walstad, and Watts 2001, Hansen, Salemi, and Siegfried 2002). Becker and Watts (2001) argue that this passive learning environment may lead to adverse consequences in terms of declining enrollments in Economics courses.

In the high school context, teachers of PA Economics tend to be among the better teachers. Self-selection certainly occurs here. Courses like SU Economics through PA present opportunities generally chosen by the most talented and motivated educators.

Fifth, CEP courses like PA Economics may generate spillovers toward advancing economic literacy within the high school level Economics courses. Most instructors of these courses teach the high school Economics course as well. Their ongoing activity in learning, preparing, and teaching college Economics can generate spillover effects, as teachers include more college material in their high school courses. Thus, more students gain exposure to important Economic concepts and issues, with the potential for comprehensibility further increased by high quality instruction.

CEP Challenge #1 – Ensuring Internal Quality

The underlying structure, philosophy, and experience of PA as a CEP clearly speaks to the need for active faculty participation along with responsive administrative staff. Faculty participation is critical to ensuring that the courses contain the rigor of college Economics classes and that high quality teaching is taking place. PA Economics involves its member faculty in a number of different ways.

Applications for the PA Economics program are reviewed by Economics faculty. Besides evidence of teaching quality, faculty examine the teacher's background in Economics. We look for high quality performance in intermediate level microeconomics and macroeconomics taken as undergraduates, or courses in masters level microeconomics and macroeconomics. Applicants who have not taken these courses must complete the masters level courses. While, this criterion falls short of Walstad's (2001) recommendation of six Economics courses, it sets a standard for training in Economics that requires mastery of theory beyond the principles level. Teachers approved to offer PA Economics must also go through an intensive week-long training session given by Professor Evensky, before they first teach the course. This training centers on teaching the Evensky (2003) text, as well as general strategies and issues about teaching this course and college Economics.

PA includes ongoing formative assessment to ensure and enhance quality. Economics faculty send teachers the midterm and final exam from one of the ECN 203

courses given on campus. Teachers are expected to form a substantial percentage of their exams from these questions (some use the entire test). New PA Economics teachers are required to send samples from high and low performers to the Economics faculty associated with PA, so that the standard applied can be assessed and feedback can be offered.

PA Economics teachers must also administer student evaluations at the end of the course. The program requires that they use the same form – which includes both open-ended and closed-ended questions – administered in all Economics courses taught on the SU campus. Teachers send the completed evaluation forms to the PA office, which processes the material and sends it to the member SU Economics faculty for review. Issues reflected in the evaluations are identified and discussed with the teacher in question. In addition, SU Economics faculty associated with PA are "on call" to handle any course-related issues arising during the semester, or to assist students with the transfer of credits afterward.

A key aspect of quality assurance involves site visits. One of the two SU Economics faculty visits each high school every semester the course is offered. The faculty member meets with the PA Economics section(s) that day. He gathers information from the teacher about course coverage and discusses any pertinent issues. The site visits also provide an opportunity for the SU faculty to meet with administrators if needed.

Site visits play a vital role in the partnership formed by the CEP between the high school and the institution of higher education. The physical presence and interaction of the SU faculty member in the high school send a powerful message to students, teachers, and administrators about the importance of the course. For students, it affords them an opportunity to have a conversation with a "real" college professor, and to gain some early insights about college or further courses in Economics.

In addition to ongoing assessment and visits, the program calls for continued professional development for the PA teachers. Each subject discipline in PA, including Economics, holds a seminar each semester that all PA teachers are required to attend. It includes a speaker or workshop on some aspect of Economics –subject matter, research, or educational methods. The member SU Economics faculty host the seminar. Due to

travel logistics, we provide two seminars each semester – one at SU for the upstate NY schools and one in the New York City metropolitan area for the downstate schools.

SU Economics offered through PA also depends upon an agile and efficient administrative office staff. The PA office receives applications and passes them on to the member faculty. They handle the logistical details and the financing of training sessions, seminars, and site visits. They process the registration materials each semester, and respond to questions about transferring course credit. They serve as a contact point from the schools or students for any administrative issues that arise, and work with the SU Economics faculty on academic problems.

Conducting a high quality CEP raises issues regarding cost. The PA office is a self-financed division of SU. A portion of the organization's revenues goes to the general university fund to cover overhead. The office also sponsors CEP-related research or projects involving teaching innovation. Participating SU faculty receive compensation each semester – accounted for at PA as a cost – as consultancy payment, based upon the number of high schools offering the course during the period. Like other consultancies, involvement in PA competes with teaching, research, and service for faculty time. And ensuring the integrity of the SU course within the PA sections requires non-trivial time investment. We find, though, that with the time management skills essential to faculty survival, faculty can strike a reasonable balance between PA duties and normal tasks.

CEP Challenge #2 – Increasing External Credibility: The Role of NACEP

As suspect as standardized testing is in reflecting educational fundamentals, AP and IB provide a clean way for colleges and universities to determine whether to award college credit. If the student's score on the exam meets or exceeds the threshold required by her chosen individual college or university, she receives credit; otherwise no. The CEP philosophy of credit based upon course performance, combined with the notable heterogeneity in quality of CEPs offered by different institutions of higher education, make the determination of whether to award college credit much more difficult. Some colleges in fact address this problem by rejecting all CEP courses for college credit. SU Economics courses offered in the high schools sometimes fall prey to this issue of "guilt by association".

For the CEP model to advance economic literacy, it must attract students. Therefore, success hinges upon offering students at least a reasonable probability of being able to transfer the credit to their chosen institution of higher education. This in turn requires that CEPs establish clear signals of quality college Economics coverage that allow colleges and universities to effectively and efficiently assess creditworthiness of the courses.

The variation in quality of CEPs nationwide presents a serious issue in evaluating these courses for college credit. How can colleges and universities know, or find out without significant time spent, that the student has completed a true college level Economics course? Thus a challenge for CEPs centers on developing a screen that a college or university can use to ensure the quality of a CEP course. Such a screen must be effective – it must distinguish quality. It must also be efficient – it can't require that every institution of higher education continuously assess the quality of every CEP.

With the SU Economics course offered through PA, most colleges and universities routinely accept the course for three college credits or placement in a higher level Economics course. Our program's reputation undoubtedly helps in this regard. Occasionally Economics departments request a course description or conversation with an SU Economics faculty member before deciding upon credit. Others, though, can be considerably more reluctant.

We recommend a micro-oriented strategy to students completing the course who encounter resistance at their institute of higher education. We suggest that the student make an appointment with the Economics department chairperson – bypassing general undergraduate advising – and show the chair her exams, quizzes, homework assignments, class notes, etc. The student may even volunteer to take a challenge test as well from one of the college or university's own principles courses. This strategy has generally worked well. Department chairs can easily discern that the student took a college level Economics course, for the student's materials in fact generally reveal high quality principles level coverage at any level. Indeed, individual students following this route have received credit at some highly selective schools. However, this strategy is too cumbersome for large-scale use.

A number of leading CEP institutions have formed NACEP to address the need for a nationally recognized screen for colleges and universities. NACEP accredited members consist of a nationwide group of CEPs that meet explicit quality standards. These standards include many currently in place within PA, such as faculty involvement, site visits, and continued professional development for the high school teachers. Interested CEPs must apply for membership to NACEP and submit materials about the structure of their program, with a decision made by the NACEP Board of Directors.

The central objective of NACEP is to provide colleges and universities with a clear, immediate signal that its member schools run top quality, college level CEPs. Given general recognition of NACEP by institutions of higher education, membership in NACEP can serve as the screen for awarding college credit in a more routine and efficient manner. NACEP was formed in 1998 with Gerald Edmonds, a co-author of this paper, as its founding President. The organization has developed a set of written standards, and has begun to process membership applications.

A future step in the evolution of NACEP may entail having subdivisions for individual subjects. This has the potential to further advance economic literacy by placing greater focus upon the teaching of Economics within high schools. The Economics subgroup might implement additional requirements more specific to the subject matter, possibly drawing upon the recommendations of Walstad (2001) and related work. For example, it could call for a minimum number of Economics courses required by the teachers. Coming to consensus on subject core, though, may be more difficult, given the wide differences of opinion regarding material to be included in principles level courses (see e.g. Hansen, Salemi, and Siegfried 2002). Despite these limitations, the maturation and spread of the CEP paradigm in Economics clearly provides the potential to advance economic literacy.

3. TEL Results – The CEP Model Versus AP/Honors

The TEL and the results obtained from the norming for the third edition are described in very well-explained detail in Walstad and Rebek (2001b). The test consists of two forty-question multiple choice exams, referred to as Form A and Form B. Eleven questions appear on both Forms A and B, which are identified in Tables 8-13 of Walstad

and Rebek (2001b). These Tables also present the percentage of students in the norming sample that chose the correct answer for each question, as well as the total number of students in the group. In this study, we focus on the population of AP/Honors students, those who took Economics and those in other social studies courses. This sample is clearly made up of college-bound students, the clientele for the CEP.

We administered the TEL near the end of the fall 2002 semester to the PA Economics schools offering the course. All of these sections consisted of ECN 203, the one-semester micro/macro principles course. Sets of tests and scan-tron forms were mailed to the participating high schools. Teachers were instructed not to mention the exams or even look at them on their own until the exams were administered, directions similar to those for the New York State Regents Exam. Students had one standard class period – 40 to 45 minutes – for the test. Teachers mailed the completed materials back to the PA office, which processed the scan-tron forms.

The sample consists of 254 CEP students altogether, with 111 taking Form A and 143 taking Form B. Selection of whether the school was given Form A or Form B was done by random assignment. The CEP sample size is sufficiently large for statistical purposes, but smaller than Walstad and Rebek's (2001b) norming samples of 1001 students for AP/Honors Economics and 545 for AP/Honors Social Studies.

Our presentation of the test results follows Walstad and Rebek (2001a). For reporting purposes, they treat the TEL as one exam. For each question, they record the percentage of students in the group who chose the correct answer. Questions distinct to Form A or B come directly from findings reported in Tables 12-13 of Walstad and Rebek (2001b). For questions that appear on both Forms A and B, they compute the weighted average of the percentages of correct responses on each Form, again based upon information in Tables 12-13. From there, they compute the mean of the percentages of the 69 distinct questions. Besides reporting convenience, this method accounts for a small discrepancy in difficulty between Forms A and B. We follow the same reporting procedure for the CEP sample.

We do, though, find the need to throw out one question from the TEL. Question 14 on Form B gives an erroneous answer. It asks which asset makes up the major portion of the basic money supply in the US, with deposits in checking accounts listed as the

correct answer. The alternative choices are gold, currency and coins, and Federal Reserve notes. The explanation of the correct answer in Walstad and Rebek (2001b) cites M1, stating that the measure is comprised of nearly 70 percent checking deposits.

While this answer and analysis are accurate for past periods, the levels of demand deposits and other checkable deposits in the US have markedly decreased over the past decade due to sweep programs (see e.g. Dutkowsky and Cynamon 2003). As a result, the sum of the two assets has become much closer in magnitude to currency held by the public, and is in fact smaller. For example, in December 2002 demand deposits and other checkable deposits in the US equal about $297 and $278 billion, compared to currency holdings of the public of around $627 billion (based upon seasonally adjusted data taken from the Federal Reserve Economic Database 2003). We view the correct answer, currency and coins, as too close to the alternative of Federal Reserve notes and omitted the question from the subsequent analysis.

Table 1 reports the mean percentage correct from the CEP sample. The Table includes averages for the AP Honors/Economics and AP/Social Studies groups from Walstad and Rebek (2001b), recomputed with question 14 on Form B removed. The overall findings indicate that the CEP group compares favorably to AP/Honors Economics, and reveals a wide gap in performance relative to AP/Honors Social Studies. Overall, the CEP sample averages 0.7 percentage points better than AP/Honors Economics, and over 17 percentage points more than AP/Honors Social Studies.

The next four rows of results in Table 1 show averages for sets of questions in each of the four major content areas – fundamentals, microeconomics, macroeconomics, and international economic concepts. This demarcation follows Walstad and Rebek (2001b), who provide a grouping of the TEL's specific questions for each subject area in their Table 1. Like the AP/Honors Economics group, CEP students score highest in fundamentals and lowest in international. But in contrast, for fundamental concepts the CEP group averages 1.5 percentage points higher than AP/Honors Economics, and over 80 percent in all. CEP students also average 1.7 percentage points higher than AP/Honors Economics in international. The two groups show nearly equal performance in microeconomics and macroeconomics.

The last three rows of results in Table 1 report averages classified by cognitive level. Taken from Table 3 of Walstad and Rebek (2001b), the cognitive levels consist of Knowledge or recognition and recall, defined as the ability to remember facts in a form close to the way they were first presented; Comprehension or grasping the meaning and intent of information, defined as the ability to tell or translate in own words; and Application or the use of information, defined as the ability to apply learning to new situations and circumstances. Table 4 in Walstad and Rebek (2001b) provide a classification of TEL questions into each of these categories.

The findings show that the CEP group performs over four percentage points better than AP/Honors Economics in the knowledge area. For the remaining two categories, averages between the two groups are nearly equal.

Table 2 presents results with the more disaggregated breakdown of subject areas, following Walstad and Rebek (2001a). We categorize questions in each area using Table 1 of Walstad and Rebek (2001b). For purposes of focusing on differences, we focus on spreads between the CEP and AP/Honors Economics of at least 1.5 percentage points. Based upon this criterion, the findings in the fundamentals subject area point to better performance for the CEP in opportunity costs/tradeoffs, productivity, and economic institutions and incentives. AP/Honors Economics scores higher in economic systems.

Microeconomics presents few distinctions between the two groups, reflecting their near-equal performance. The CEP scores better in competition and market structure while AP/Honors Economics averages considerably higher on the one question on the role of government. This question, which appears on both Form A and B, tests the recognition of a progressive income tax. Macroeconomics does exhibit a few wide discrepancies between the groups. CEP students score higher on aggregate supply and demand, and on fiscal policy. But the AP/Honors Economics group performs better on the three questions in monetary policy, two of which cover open market operations. In the international subject area, the only notable difference favors the CEP on the balance of payments and exchange rates.

The high performance of CEP students in the fundamental subject area speaks well to the program's potential for advancing economic literacy. Topics in this area are arguably at the heart of an economically literate public need to know. The higher

performance in international points to another attraction of a well-designed CEP course in Economics. As Walstad and Rebek (2001a) discuss, the relatively low scores for international may be due in part to teachers not having sufficient time to cover the subject area. The CEP, with the material structured for college courses that have about half as much class time as the one-semester high school courses, allows for greater chance to complete the material.

We now turn to more formal statistical comparison of the CEP performance versus AP/Honors. Taking the percentage correct on an individual question as an observation, the CEP performance is regressed on the AP/Honors group. Specifically, we estimate the following equation by OLS:

$$\hat{p}_{CEP,i} = \alpha + \beta\, \hat{p}_{APH,i} + \mu_i \,, \qquad (1)$$

where $\hat{p}_{CEP,i}$ and $\hat{p}_{APH,i}$ are the observed percentages of students from CEP and AP/Honors (Economics or Social Studies) with the right answer on question *i*, for *i* = 1, 2, 3, … 68, and μ_i is the residual.

Simple rearrangement on (1) yields an interpretation in terms of the difference between CEP and AP/Honors, as follows:

$$\hat{p}_{CEP,i} - \hat{p}_{APH,i} = \alpha + (\beta - 1)\hat{p}_{APH,i} + \mu_i \,. \qquad (2)$$

The intercept parameter α describes whether the CEP performance is a level shift higher or lower than the AP/Honors group. The slope parameter β relative to unity portrays what happens to the difference as the questions become easier for the norming group. If $\alpha = 0$ and $\beta = 1$, the performance of the CEP and AP/Honors can be regarded as identical, except for random influences.

Our estimation results are as follows: (standard errors appear in parentheses):

AP/Honors Economics: $$\hat{p}_{CEP,i} = \underset{(6.183)}{-8.147} + \underset{(0.082)}{1.119}\hat{p}_{APH,i}, \quad (3)$$

$$R^2 = 0.74, \text{ SE} = 6.93;$$

AP/Honors Social Studies: $$\hat{p}_{CEP,i} = \underset{(5.528)}{41.703} + \underset{(0.093)}{0.585}\hat{p}_{APH,i}, \quad (4)$$

$$R^2 = 0.38, \text{ SE} = 10.71.$$

The findings indicate that the CEP performance corresponds closely to that of AP/Honors Economics. The estimated intercept in equation (3) is not significantly different from zero at the 10% level. The slope estimate is significantly different from zero, but not from one. To corroborate these results, an F test of the null hypothesis: H_0: $\alpha = 0$ and $\beta = 1$ generates a statistic of 1.11, implying that H_0 cannot be rejected at the 10% level of significance. The estimated slope being greater than unity suggests that the difference between CEP and AP/Honors Economics widens as the questions become easier. This property appears in the data as well, as the CEP group has six observations which exceed the maximum percentage correct for AP/Honors Economics. Five of the six fall within the fundamentals category.

On the other hand, inspection of (4) reveals notable differences in the performance of the CEP versus AP/Honors Social Studies. The estimation generates an intercept which is positive and significantly different from zero at the 5% level. The estimated slope parameter is also significantly different from zero, and significantly less from one as well. The latter result indicates that the spread between these two groups grows as the questions become more difficult. A regression of AP/Honors Economics on AP/Honors Social Studies produces very similar results, with an estimated intercept of 45.457 and slope of 0.507.

Further empirical investigation reinforces the virtually identical performance of CEP versus AP/Honors Economics. Estimates of (1) for the CEP and AP/Honors Economics with the sample split by either field or cognitive level produce the same qualitative results. We also estimated an equation regressing CEP on both AP/Honors Economics and AP/Honors Social Studies. The estimation generates a coefficient and

standard error for AP/Honors Economics nearly the same as in (3), and an estimate for AP/Honors Social Studies insignificantly different from zero.

That said, the regression approach in this context has limitations in attempting to draw sharp distinctions between CEPs and AP/Honors Economics. An important limitation stems from not using all the available information. Each observation point for the CEP or AP/Honors Economics in itself summarizes the performance of over 100 students who took the test from the CEP or the norming group. We now turn to a method of analysis that more directly takes this sampling into account.

This method consists of testing for significant differences between the CEP group and the AP/Honors groups on a question-by-question basis. Investigation along these lines can sharpen the analysis, relative to comparing means or estimating regression equations. Besides taking into account sample sizes, examining by individual question reduces the effect of outliers within the statistics that result from comparing across questions.

To test for a significant difference within a given question, let $p_{CEP,i}$ and $p_{APH,i}$ be the true percentages of students from CEP and AP/Honors (Economics or Social Studies) with the correct answer for question *i*, for *i* = 1, 2, 3, … 68; $\hat{p}_{CEP,i}$ and $\hat{p}_{APH,i}$ be the estimated percentages as defined previously; and $n_{CEP,i}$ and $n_{APH,i}$ be the respective sample sizes. We test the null hypothesis H_0: $p_{CEP,i} = p_{APH,i} = p_i$, where p_i denotes the population percentage, versus the alternative that the two percentages are not equal. Since either CEP or AP/Honors can score higher, we conduct two-tailed tests.

The test statistic is as follows. Under H_0, $\hat{p}_{CEP,i}$ and $\hat{p}_{APH,i}$ each follow a normal distribution, with mean p_i and variance respectively equal to $p_i(1-p_i)/n_{CEP,i}$ and $p_i(1-p_i)/n_{APH,i}$. Given independence of the CEP and AP/Honors populations within the sampling, the test statistic for the difference is given by

$$difstat = \frac{\hat{p}_{CEP,i} - \hat{p}_{APH,i}}{\sqrt{\hat{p}_i(1-\hat{p}_i)[(1/n_{CEP,i}) + (1/n_{APH,i})]}}, \qquad (5)$$

where $\hat{p}_i$ equals the weighted average of $\hat{p}_{CEP,i}$ and $\hat{p}_{APH,i}$. The test calls for rejecting H_0 if |*difstat*| exceeds the critical value from the *t* distribution with $n_{CEP,i} + n_{APH,i} - 2$ degrees of freedom, at the $\alpha/2$ level of significance.

Table 3 reports the number of questions where the difference between the CEP and AP/Honors groups turned up significant, based upon $\alpha = 0.05$. For TEL questions that appear on both Form A and B, the sample size equals the total number of students in the group (CEP or AP/Honors). For items appearing on either Form A or B, the sample size is the number of students in the group who took that particular exam.

The findings from Table 3 reinforce those in Table 1, but also draw broader distinctions between the CEP and AP/Honors Economics groups. CEP students score a significantly higher percentage on 15 of the 68 questions, and significantly lower on 7 questions. The results by subject area indicate little difference between the two groups within microeconomics and macroeconomics. The CEP group, though, produces three questions in international economics with significantly higher percentages, to one question with the percentage significantly lower. In the fundamentals area, the distinction is even greater – eight questions with significantly higher performance for the CEP versus two questions with significantly lower performance.

Breaking down the questions by cognitive level, the CEP group outperforms AP/Honors Economics on knowledge questions with four significantly higher percentages to none significantly lower. This result reinforces the four percentage point difference between the means of the two groups reported in Table 1. The findings also show a difference in performance on the application questions. The CEP group generates a significantly higher percentage correct on nine questions, with five questions significantly lower.

The findings reveal a sizable discrepancy in economic literacy between the CEP and AP/Honors Social Studies groups. For 52 out of the 68 questions, the CEP generates a significantly higher percentage of correct responses, with none being significantly lower. The distinction is fairly uniform throughout the subject areas. By cognitive level, the CEP group scores significantly higher percentages for ten out of the eleven questions testing knowledge of economics.

The question-by-question analysis also enables closer assessment of the relative strengths and deficiencies in coverage of particular material for both the CEP and the AP/Honors Economics groups. The three questions with the largest negative difference between the CEP and AP/Honors Economics (all significant) are questions #8 (difference = –0.173), #21 (-0.172), and #32 (-0.147), all on Form B. Question #8 deals with people in all economic systems needing to decide what goods and services should be produced. Question #21 tests for knowledge that wages and salaries are the largest component of business cost. Question #32 applies open market operations. The CEP's deficiency in this central concept in monetary policy is disconcerting. But with the faculty's attention alerted in this way, such weaknesses can be addressed within future high school courses.

The three questions with the largest positive differences between CEP and AP/Honors Economics (all significant) are question #38 on Form A (0.113), and questions #27 (0.132) and #4 (0.136) on Form B. Question #38 tests the definition of the Balance of Trade. Question #27 examines changes that increase aggregate demand. Question #4 applies the concept of opportunity cost.

4. Conclusion

Taken as a whole, the results indicate that a well-designed and well-maintained CEP in Economics can help to advance economic literacy. By placing college Economics within the high school setting, it can utilize key advantages of high school instruction. A quality CEP course can expose more students to college Economics earlier, and possibly increase interest in the subject matter. It can also attract more college-bound students than AP or IB, due to granting college credit based upon overall course performance rather than a standardized test. This advantage will be further enhanced as NACEP standards enjoy increasing national recognition. Finally, CEPs may contribute to economic literacy by providing positive spillover effects in the basic high school Economics courses.

Results from the nationally normed TEL reveal that CEP students in SU Economics courses offered through PA perform equal to if not better than those with an AP or Honors course in Economics. The findings draw particularly favorable attention to the coverage of economic fundamentals and international economics within the CEP

course. They also corroborate Walstad and Rebek (2001a) regarding the importance of students receiving Economics from a stand-alone course, and the notable differences in economic literacy between those taking high school and college-level Economics.

Our study encourages colleges or universities to consider forming CEPs in Economics, or to expand existing operations. Still, a high quality CEP in Economics needs active faculty involvement. Such participation mitigates potential problems in high school instruction of college Economics, such as lack of sufficient rigor.

But it creates opportunities as well. Involvement through CEPs places faculty in a more influential position within the general teaching of Economics. Since Economics faculty are commonly regarded as the most important, reliable, and visible sources of economic knowledge, such participation serves to increase the rigor and quality of Economics training well-beyond the campuses.

In all, CEPs provide for much greater interaction between high school teachers and college/university faculty, significantly benefiting both groups as a result. Project Advance began at SU in 1973 as a pilot program to foster a partnership between these two disparate groups of educators – in 2003 the program celebrated its thirtieth anniversary of service. By engendering ongoing dialogue and cooperation, CEPs can be a powerful vehicle for addressing the critical problem of economic literacy, and enhance both high school teachers and college faculty in the process. We continue to be greatly enriched and learn from our excellent teachers, as they continue to learn from us.

Appendix

List of Participating High Schools in SU Economics, 2003-04 Academic Year

Auburn High School
Canandaigua Academy
Clarkstown North High School
Clarkstown South High School
Corning-Painted Post East High School
Corning-Painted Post West High School
Deer Park High School
East Syracuse-Minoa High School
Fairport High School
Fayetteville-Manlius High School
Glens Falls High School
Gloversville High School
Guilderland High School
Indian River High School
James I. O'Neill High School
Jericho High School
North Rockland High School
Oswego High School
Putnam Valley High School
Ramapo High School
Riverhead High School
Schalmont High School
Seaford High School
Skaneateles High School
Spring Valley High School
Suffern High School
Wantagh High School
West Genesee High School
West Islip High School

Table 1 – Percentage Correct on the TEL For US High School Students

Course/Item	CEP	AP/Honors Economics	AP/Honors Social Studies
All Items (68)	75.6	74.9	57.9
By Subject Area			
Fundamentals (25)	80.4	78.9	59.0
Microeconomics (15)	74.0	74.6	60.9
Macroeconomics (17)	73.1	72.9	55.3
International (11)	70.7	69.0	55.3
By Cognitive Level			
Knowledge (11)	81.4	77.0	64.5
Comprehension (21)	77.1	77.4	57.9
Application (36)	73.0	72.7	55.9

Notes: The number of questions appears in parentheses. Percentages for AP/Honors Economics and AP/Honors Social Studies are calculated from Walstad and Rebeck (2001b), Tables 12 and 13.

Table 2 – Percentage Correct on the TEL For US High School Students:
Disaggregated by Subject Area

Subject Area	CEP	AP/Honors Economics	AP/Honors Social Studies
Fundamentals			
Scarcity (6)	83.8	83.5	56.2
Opportunity Costs/Tradeoffs (4)	76.3	74.6	44.9
Productivity (3)	82.3	78.7	64.0
Economic Systems (4)	78.3	80.5	62.5
Economic Institutions and Incentives (5)	83.1	78.1	65.7
Exchange, Money, and Interdependence (3)	75.7	74.6	63.5
Microeconomics			
Markets and Prices (1)	75.6	76.0	46.4
Supply and Demand (6)	79.7	79.1	68.6
Competition and Market Structure (2)	84.9	78.3	73.4
Income Distribution (2)	63.9	69.7	53.6
Market Failures (3)	66.4	67.7	50.4
Role of Government (1)	59.4	70.4	50.6
Macroeconomics			
Gross Domestic Product (1)	72.1	70.4	57.4
Aggregate Supply And Demand (4)	79.7	74.5	54.3
Unemployment (2)	79.9	81.1	68.9
Inflation and Deflation (4)	73.9	75.2	59.7
Monetary Policy (3)	49.0	56.5	29.9
Fiscal Policy (3)	83.0	79.5	66.3
International			
Comparative Advantage/ Barriers to Trade (5)	73.5	74.7	56.4
Balance of Payments and Exchange Rates (4)	66.6	60.7	50.4
International Growth And Stability (2)	72.0	71.3	62.2

See Notes to Table 1.

Table 3 – Number of Questions With Significantly Different Average Performance: CEP Versus AP/Honors

Item	AP/Honors Economics		AP/Honors Social Studies	
	CEP Better	CEP Worse	CEP Better	CEP Worse
All Items (68)	15	7	52	0
By Subject Area				
Fundamentals (25)	8	2	18	0
Microeconomics (15)	2	2	12	0
Macroeconomics (17)	2	2	15	0
International (11)	3	1	7	0
By Cognitive Level				
Knowledge (11)	4	0	10	0
Comprehension (21)	2	2	17	0
Application (36)	9	5	25	0

Note: The number of questions appears in parentheses. Significance is determined at the 5% level.

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