Should a High School Adopt Advanced Placement or a Concurrent Enrollment Program? An Expected Benefit Approach

By

Donald H. Dutkowsky*
Professor of Economics
Maxwell School of Citizenship and Public Affairs
Syracuse University
110 Eggers Hall
Syracuse, NY 13244
Phone Number: 315-443-1918
dondutk@maxwell.syr.edu

Jerry M. Evensky
Professor of Economics
Laura and Douglas Meredith Professor of Teaching Excellence
Maxwell School of Citizenship and Public Affairs
Syracuse University
110 Eggers Hall
Syracuse, NY 13244
Phone Number: 315-443-5863
jevensky@maxwell.syr.edu

Gerald S. Edmonds, Ph.D.
Director, Syracuse University Project Advance®
400 Ostrom Avenue
Syracuse, NY 13244
Phone Number: 315-443-2404
gedmonds@syr.edu

Running Head: College Courses in High School

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Abstract

This paper provides an explicit framework for evaluating the Expected Benefit to college-bound students of courses offered by Advanced Placement (AP) versus Concurrent Enrollment Programs (CEP). District personnel can use it to assess the relative merits of these programs, given the characteristics of their students, in deciding which model to implement or maintain. Simulation results reveal that CEP generally provides higher Expected Benefit for districts where students who take the course attend private colleges or universities (including public institutions out-of-state) and perform on the AP exam around national norms. AP favors high schools where students taking the course either face inexpensive costs for study at institutions of higher education, or perform exceptionally well on the AP exam. Information from individual colleges and universities reveals that few explicitly reject AP or CEP for credit if the student meets a minimum criterion, although more information is provided for AP.

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1. Introduction

Educators almost universally agree that offering academically challenging high school courses plays a significant role in the development and academic preparation of students (Adelman 1999). This point certainly pertains to college-bound students, the majority of the clientele in many high schools. Such courses keep these students challenged (National Commission on the High School Senior Year 2001) and help to diminish senioritis by keeping students motivated and engaged. The courses also give the high school student indications of the rigor expected from college work. In this regard, institutions of higher education place a non-trivial weight on these courses in admissions decisions. Given that the student performs well in such courses, they serve as a signal for student motivation as well as an indicator of college preparedness. High schools may also use such courses to increase their profile for admissions officers at institutes of higher education.

Several models are available as a way to implement challenging college or college-level courses in high school classrooms. Individual high schools are generally free to choose which model(s) to offer within their school for a given subject. In each model, the course is taught by a teacher at the high school who has been trained by the respective sponsoring program. These models also offer the potential for the student to acquire recognition for the course (credit, exemption, or placement) granted by whatever college or university that she attends after graduating high school.

The most popular model for college-level courses is Advanced Placement (AP). Nationally offered by the College Board, the student seeks recognition by taking the AP exam

offered in the subject and submitting their exam score to their college or university. Typically the high school offers a course to prepare the student for the test. The college or university determines recognition based upon the student's score on the AP exam. If the student achieves a sufficient score, she gains recognition; otherwise no. The popularity of AP as well as the ability to gather data from high schools on the number of students taking the AP exam has led to publications of "nationwide rankings of high schools" from non-educational outlets (e.g. Kantrowitz and Mathews 2007).

The Concurrent Enrollment Program (CEP) represents an alternative model. The CEP – also referred to as a dual enrollment program – consists of classes sponsored by colleges or universities, which are taken by high school students for college credit from the sponsoring institution. Upon completion students receive credit from the sponsoring institution and can apply to transfer these credits to whatever college or university they attend. In the CEP model, the institution of higher education where the student matriculates uses the course grade to decide whether the student receives recognition in the form of credit, exemption, or placement.

The research question we examine is as follows. Which model should an individual high school choose to offer its students? Certainly a number of factors enter into this decision. Educational philosophies, quality controls, and operational issues all come into play. In addition, each model requires upfront expenditures from the school district toward training sessions for the teachers.[1] But arguably the ultimate goal in making this choice is to provide the greatest net benefit to the students, given the financial cost they incur for taking such a course.

This paper provides an explicit framework for evaluating and comparing the Expected Benefit to students of AP versus CEP. It centers around the likelihood of receiving college credit for the course and the cost savings involved in obtaining college credit in this way.[2] Using

expected value analysis from statistics, we put forth a way to determine which model offers the larger expected benefit to students from a given high school. Administrators, teachers, and school boards can use this framework to assess the relative merits of these programs, given the characteristics of students within their district, in deciding which model to implement or maintain. We also provide data from random samples of individual Baccalaureate, Masters, and Doctoral level colleges and universities regarding their policies toward accepting or rejecting AP and CEP for college credit.

Our study applies the Expected Benefit framework with some realistic numerical assumptions to examine the relative merits of the AP versus the CEP model. The CEP is represented by Syracuse University Project Advance® (PA). Begun in 1972, Gehring (2001) reports that PA stands as one of the largest programs of its kind in the nation. In the 2006-07 school year, PA offered Syracuse University courses to approximately 10,900 students in 176 high schools in a five state area. In the same school year, the program in economics consisted of 32 high schools throughout New York, serving nearly 1,250 students.

Our simulation puts forth explicit breakeven points for the district in choosing CEP versus AP based upon the cost of tuition for taking the course on a college campus and the probability of a representative student obtaining a sufficient score on the AP exam. We find that the CEP provides the higher Expected Benefit for districts where the student clientele who take the course attend private colleges or universities (including public institutions out-of-state) and perform on the AP exam at or around national norms. AP provides a higher expected benefit for districts where students who take the course either face relatively inexpensive costs for full-time study at institutions of higher education, or perform exceptionally well on the AP exam.

2. Acceptance for College Credit: CEP and AP

Educational pluses aside, a key benefit that students receive from either of these models is to obtain college credit from the institution of higher education that they attend. To provide factual evidence in this regard for CEP and AP, we present results from data that summarizes the policies from a sizable number of individual colleges and universities. The Carnegie Classification, in their comprehensive list of higher education institutions, lists 282 Research/Doctoral Universities (Basic Classification Number = 15-17), 665 Masters Colleges and Universities (Basic Classification Number = 18-20), and 766 Baccalaureate Colleges (Basic Classification Number = 21-23). From these populations, we selected random samples of 60 Doctoral Universities, 80 Masters Colleges and Universities, and 100 Baccalaureate Colleges and examined their policies for granting credit for AP or CEP courses. The data we report come from the websites of the individual schools. With CEP, we also used records from PA. The latter information comes from upon surveys of students who sought college credit for the PA course from the school at which they matriculated. A complete list of the colleges and universities in our sample is available upon request.[3]

Table 1 reports information on whether or not colleges and universities accept CEP and AP for credit.[4] The findings reveal that few schools provide explicit statements that reject these courses. Only two institutions (UCLA and Swarthmore) state that they don't accept CEP courses for credit. Only one institution (California Institute of Technology) does so for AP.

Many more colleges and universities state explicit policies for granting college credit with AP than for CEP. Baccalaureate colleges feature the most instances of non-reporting for both models, Doctoral universities the least. We attribute the lack of reporting by individual colleges or universities regarding CEP credit to one of two possible reasons. First, for a few

highly selective schools, this may signal that they will not even consider these courses for college credit; possible examples in our sample include Harvard and California Institute of Technology. Second, most institutions of higher education consider CEP courses in the same way as those directly taken on a college campus other than theirs. Thus they would accept them in a standard fashion as part of transfer credit. This has been our experience from PA.

Where information can be found, the findings show that nearly all schools are open to granting college credit for both CEP and AP, based upon some explicit criterion. For CEP, the standard tends to be a minimum grade of C for the course. As is well-known, granting credit for AP generally hinges upon a minimum score in the AP exam; possible scores range from 1-5, with 5 being the best. Perhaps surprisingly, in some cases schools state that they grant credit for AP but do not provide the specific criteria for certain courses.

Table 2 reports the number of colleges and universities that state minimum acceptable scores at the 3, 4, or 5 level on the AP exam for awarding college credit (none that we found accept scores below 3). For this analysis, we choose three widely-taken AP exams – Calculus AB, Macroeconomics, and English Literature. There exists a great deal of variation in terms of granting AP credit, consistent with the discussion of Chute (2007) and others. Most schools require a minimum score of 3. Roughly 1/3 of cases, though, require a score of at least 4. In several cases, a score of 5 is required. Macroeconomics and English Literature tend to require a higher score on their AP exam than Calculus. On the average, Baccalaureate and Doctoral schools apply tougher criteria than Masters Colleges and Universities.

3. Comparing Expected Benefits: CEP Versus AP

Now we proceed to modeling the comparison based upon Expected Benefit. Both CEP and AP carry benefits and costs to students taking the course.[5] In monetary terms the benefit consists of cost savings, since the CEP course or AP exam is typically much cheaper than the tuition for taking the course on-campus. For AP the monetary cost consists of a fee to take the exam. In a CEP students have to pay tuition for the class to the college or university that sponsors the course. Tuition for the CEP course is generally more than the fee for the AP exam.

On the benefit side, the results in Tables 1 and 2 indicate that CEP carries a higher probability of students obtaining college credit than AP. This advantage stems from the criterion for granting credit. For AP, credit is based solely upon the performance on the standardized test. This risky "all-or-nothing" scenario implies that a "bad day" means no college credit despite whatever work the student has done. In Table 2 we see that only about 60% of students who take the exam achieve a 3 or above and many institutions of higher education have raised the bar to 4 or even 5. On the other hand, credit for the CEP course comes from the course grade, which reflects a continuous evaluation of a diverse set of performances throughout the semester or academic year.[6]

To further increase the probability of obtaining college credit for the CEP course due to the notable heterogeneity in the quality of these courses (e.g. Bailey, Hughes, and Karp 2003), a number of leading CEP institutions have formed the National Alliance of Concurrent Enrollment Partnerships (NACEP). As described in Dutkowsky, Evensky, and Edmonds (2003, 2006), NACEP (http://www.nacep.org) accredits institutions which offer CEP that meet explicit quality standards. These standards include requiring that courses offered at the high schools are being taught at the sponsoring institutions of higher education, that college and university faculty be

involved to ensure content coverage and teaching quality, that faculty make site visits to the high schools, and that continued professional development is provided for the teachers. NACEP accreditation is designed to serve as an easily recognizable signal of quality to institutions of higher education so that they can determine which CEP credits to accept in a routine and efficient manner.

We proceed to the quantitative analysis. Suppose that a representative college-bound high school senior in a given district is interested in taking such a class. Should the district fill this need by offering an AP or a CEP course?

To address this question, we define the following variables:

r = interest rate on a one-year financial instrument;

P_{AP} = probability of student receiving college credit for the AP course;

P_{CEP} = probability of student receiving college credit for the CEP course;

T_{AP} = cost of AP Exam;

T_{CEP} = cost of CEP course;

T = cost of corresponding course for full-time students at the college or university at which the student matriculates.

Our framework applies expected value analysis from statistics. For the student, the Expected Benefit of the AP course based upon receiving college credit is given by:

$$\textit{Expected Benefit}\ (\textit{AP Course}) = [T/(1 + r) - T_{AP}][P_{AP}] + [-T_{AP}][1 - P_{AP}]. \qquad (1)$$

The student encounters one of two possible scenarios. If her performance meets the criteria for credit, with probability P_{AP}, her benefit in current dollars equals the present value of the tuition

cost at the college (present value since it will be awarded next year upon entering college), minus the cost of the exam. If her performance does not meet the criteria for recognition, with probability $1 - P_{AP}$, she loses the cost of the AP exam. Using the same reasoning, the Expected Benefit of the CEP course is given by:

$$\textit{Expected Benefit}\ (\textit{CEP Course}) = [T/(1 + r) - T_{CEP}][P_{CEP}] + [-T_{CEP}][1 - P_{CEP}]. \qquad (2)$$

Before proceeding, an important point should be noted. The analysis specifies that the probabilities represent averages for students within a given school district that would be taking such a course, rather than student-specific numbers. Different individuals clearly have different probabilities of performance, given innate abilities and/or background. Further, for the individual student the probability of college credit depends upon the specific institution of higher education where she goes.

An individual student can employ this framework for her own personal decision; she decides to take the course if the Expected Benefit is greater than zero. Nonetheless, our study operates from the perspective of the high school in considering which model to implement or maintain. This is the level of analysis at which district leaders must make such decisions. Therefore, here the probabilities represent district-wide averages for the set of students who would consider these courses. These averages are based upon characteristics of the student population such as average aptitudes, demographics, and typical colleges and universities where they would attend.

With this qualifier, we return to the analysis. Having presented the Expected Benefits of the AP and CEP courses, the question is which one generates the greater Expected Benefit. In

formal terms, we derive the condition for when the *Expected Benefit* (*CEP Course*) ≥ *Expected Benefit* (*AP Course*).

Substituting the two Expected Benefits into the above inequality and rearranging yields the condition:

$$T \geq \frac{(1 + r)(T_{CEP} - T_{AP})}{(P_{CEP} - P_{AP})}. \quad (3)$$

This inequality shows that the comparison of Expected Benefits between the CEP and AP courses is non-trivial. The CEP course generally costs more ($T_{CEP} > T_{AP}$), but has a higher probability of credit ($P_{CEP} > P_{AP}$). The condition highlights the value of the tuition savings that the representative student in the district will receive (T). *Ceteris paribus*, a higher dollar value in college tuition favors the CEP. The bigger probability of obtaining credit more than compensates for the relatively higher cost. A small dollar value for college tuition favors AP. This instance emphasizes the relatively lower cost of AP.

4. Deciding on CEP versus AP: A Simulation

When equation (3) holds with equality, it can be interpreted as a breakeven condition for CEP versus AP, based upon Expected Benefit. We use this condition to simulate how such a decision could be made. In doing so we set the interest rate (r) and the costs for both CEP (T_{CEP}) and AP (T_{AP}) at constant values across school districts. In addition, we assume that the probability of obtaining credit from the CEP course (P_{CEP}) is constant across high schools. While the probability of obtaining college credit from the CEP model may differ across districts based upon student clientele, it arguably has much less variance than the probability of credit from AP. The former depends on course-long performance, whereas the latter depends upon a single standardized test.

We perform the simulations by providing benchmark values for the interest rate, cost of the two programs, and probability of obtaining credit from the CEP course. Our exercise is done both for three credit courses (e.g. Macroeconomics) and six credit hour courses (e.g. English Language and Composition). The values are as follows:

$r = 0.03$,

$P_{CEP} = 0.88$,

$T_{AP} = \$83$,

$T_{CEP} =$ \$330 for 3 credit hour course, \$660 for 6 credit hour course.

The value for r represents an interest rate on a one year bank certificate of deposit. The probability of obtaining credit from the CEP course (P_{CEP}) comes from records of PA. Algebraically, it equals the probability of the student obtaining the minimum criterion in the course multiplied by the probability that her matriculating college or university will accept the course for college credit. Since nearly all students who register for the course tend to achieve a C grade, the latter effect can be assumed to account for the probability being less than one.

The cost of the AP exam is taken from the website (http://apcentral.collegeboard.com); the exam carries the same cost for three or six credit hour courses. The tuition for the CEP course equals the \$110 per credit hour charged by PA for the 2007-08 academic year (http://supa.syr.edu).

Substituting these numbers into the breakeven condition results in a direct relationship between the amount of tuition charged by the college at which the representative student taking the course in the high school would matriculate (T) and the probability of this student obtaining credit based upon the AP exam (P_{AP}). Figure 1 displays a plot of the equation for a three credit hour course.

Figure 1 can be used to assess the decision to implement a CEP versus AP. Every point on the curve displays a case where CEP and AP generate identical Expected Benefit. So along the curve a district representative would be indifferent between these options. Points above the curve describe situations where the CEP course produces the higher Expected Benefit. Points below the curve present instances where AP generates the higher Expected Benefit.

5. Simulation Results: CEP versus AP

General Results

We can infer some general results regarding the Expected Benefit of CEP versus AP based upon the breakeven condition plotted in Figure 1, data on national performance on AP exams, and tuition for full-time students at representative institutions of higher education. Given that the percentage of students that obtain scores of 3 or above on the AP exams is approximately 0.60 (see e.g. Table 2), several results emerge.

The CEP model would be favored – points above the curve – for districts whose students taking the course perform below or around the national percentage on the AP exam and attend colleges or universities that charge relatively high tuition (net of financial aid, in the form of outright grants or tuition discount). In this case the benefit of saving tuition becomes the dominant effect. This benefit rewards the greater probability of obtaining credit from the CEP course, and downplays its relatively higher cost.

Inspection of Figure 1 reveals two characteristics that favor AP, described as points below the curve. AP would be preferred for districts whose student clientele either (1) perform exceptionally well on the AP exam, or (2) attend institutions of higher education with relatively low tuition costs.

The first case is reflected in the curve's sharp upward increase for AP success probabilities of 0.75 to 0.80. For districts with this characteristic, the probability of obtaining credit from the AP exam approaches that of the CEP, and therefore highlights the lower cost of the AP model. Here, though, a qualifier is important. A district might take this finding as a justification to limit such courses to the most elite students. This move would deprive the remaining academically strong, college-bound students of the opportunity to obtain college credit as well as the other beneficial experiences from taking such courses.[7] The finding does, though, suggest an alternative strategy for high schools, especially those with large enrollments. The district could offer both the AP and CEP courses in a given subject, with the former targeted toward the elite clientele.

In the second case, Figure 1 shows that AP would be preferred for districts where the college tuition that they would pay is less than $250, regardless of the probability of obtaining credit from the AP exam. Since the monetary benefit of taking such a course in the high school is small, the situation favors the lower cost of AP. Given actual current tuition costs based upon full-time study, this scenario could reflect two characteristics. One would be districts where students taking the course predominantly matriculate at community colleges within the same state. A second are districts with students that receive significant financial aid from institutions of higher education, such as those with a substantial percentage of low-income families. Given our benchmark values, this finding indicates that AP would be favored for city high schools with a large percentage of low-income populations.

How Can the Individual High School Decide?

To provide a framework for an individual high school's decision, we pursue the comparison of CEP versus AP with some specific examples. Table 3 reports breakeven points for

three and six credit hour courses. These examples use a range of probabilities of obtaining college credit based upon performance on the AP exam, which are then substituted into the breakeven condition for the three credit hour or six credit hour course.

From Table 3, the nationwide probability of scoring at least 3 on the AP exam of approximately 0.60 corresponds to a breakeven point of $909 for a three credit course and $2123 for a six credit hour course. Typically, though, for a given district the probability that the student who takes the AP course will obtain college credit will be lower. Two reasons account for this occurrence. First, as described in Table 2, a non-trivial number of colleges and universities have raised their standard to a minimum of 4 or 5 on the AP exam. Second, many students taking AP courses choose not to take the exam at all, in which case they cannot achieve the required score.

Table 4 reports data on tuition costs for a set of colleges and universities within New York. The institutions are Onondaga Community College; SUNY Binghamton, a state university with different tuition for in-state versus out-of-state residents; Le Moyne College, a private college; and Syracuse University, a private university.

For an individual school district, Tables 3 and 4 can be utilized in the same way as Figure 1. To determine whether CEP or AP generates the higher Expected Benefit, first assign a probability that the typical student who takes the course obtains college credit based upon her AP exam score (P_{AP}). Given that value, determine the breakeven point either from Figure 1, Table 1, or the equation itself. Then compare the computed breakeven point to the actual tuition of the institution of higher education that this student would attend. If the actual college or university tuition is greater than the breakeven point, the CEP model is preferred. Actual tuitions below the breakeven point favor AP.

We illustrate this procedure with the colleges and universities in Table 4. If the typical student taking the high school course attends Onondaga Community College, AP is preferred for all probabilities of obtaining credit from the AP exam which are reported in Table 3. For in-state residents attending SUNY colleges and universities, AP wins for values of P_{AP} of 0.30 and above for the three credit hour course and the entire range of probabilities for the six credit hour course.

For students attending SUNY from out-of-state, though, the CEP model becomes preferred for probabilities at or below approximately 0.60 for the three credit course and the six credit hour course. For Le Moyne College, the CEP wins for values of P_{AP} at or below 0.75 for the three credit hour course and 0.70 for the six credit hour course. And for Syracuse University, the CEP is preferred for all probabilities of obtaining credit from the AP course below 0.80.

Several qualifiers apply here. First, direct financial aid will decrease the amounts in Table 4 for the two private institutions. But even with 1/3 taken off tuition at Syracuse University and Le Moyne College, approximately the average discount for the former institution, the CEP model remains predominant except in cases of relatively high probabilities of success on the AP exam. Second, regardless of the tuition costs, AP would tend to be favored for districts in which a significant portion of the students attend Ivy League schools, since Ivies generally don't grant credit for CEP courses. Correspondingly, this group of students would generally perform exceptionally well on AP exams. For districts with large numbers of college-bound students with a core that matriculate at Ivy League schools, offering both AP and CEP courses in the same subject could be the most favorable option.[8]

6. Conclusion

This study proposes a framework for comparing the Expected Benefit to students, in terms of gaining college credit, of a course from a Concurrent Enrollment Program versus Advanced Placement within a given high school. It provides an explicit means of weighing the different probabilities of obtaining college credit from the two models against their respective costs to the students who take such courses.

Clearly, other factors come into play for the high school in making this important decision. One centers on the fundamental educational benefits of the CEP versus AP for the students and their teachers (see Dutkowsky, Evensky and Edmonds 2003, 2006 for further discussion).[9] A second issue pertains to the ability of these courses to increase the probability of the student being accepted into institutions of higher education. Deans of admission that we interviewed indicate that they place the AP, CEP, and IB models as roughly in the same category, as a signal that the student has taken challenging college-level courses. A third factor is the quality of the courses themselves. In this regard, Dutkowsky, Evensky, and Edmonds (2006) find that students from the CEP Economics course outperform the AP/Honors Economics group on the nationally normed Test of Economic Literacy (Walstad and Rebeck 2001a, 2001b).

A fourth factor involves the role these models play in college success. How effective are they in affecting student GPA, retention, performance in higher level courses in the subject, or related results? Advanced Placement (2008) cites several recent studies which it funded that support the effectiveness of AP in this regard, although Geiser and Santelices (2004) and Klopfenstein (2006) provide evidence to the contrary. As discussed in Bailey and Karp (2003), the effectiveness of CEP as well as a direct comparison of all the leading models in this category represents an important area of continuing research.

ENDNOTES

1. The International Baccalaureate (IB) program (http://www.ibo.org) is another model. But beyond the upfront training costs, IB requires an annual expenditure ($8850 in the 2007-08 academic year) for the high school in order to offer their courses. Still another is the "Early College" model. Described in Brewer, Stern, and Ahn (2007), Early College is a more extensive version of the CEP with a set of college-level courses for grades 9-14.
2. In this study we focus on colleges and universities granting credit for the course taken in the high school, since it is the easiest to quantify. One can adapt our analysis using the broader concept of recognition, based upon more implicit measures of benefit.
3. We are grateful to Bethany Heaton-Crawford for collecting this information.
4. The information on the websites focused exclusively on college credit. We did not find statements regarding offering other forms of recognition (advanced standing or exemption). Some colleges and universities place an upper bound on the number of CEP and AP credits they grant toward graduation; for example Syracuse University places a restriction of a maximum of 30 credit hours. Since few students generally approach this ceiling, we do not consider this behavior in our analysis.
5. Our analysis here focuses exclusively on the benefits to students. The costs to high schools for offering both the CEP and AP models are roughly equivalent. Both require that teachers complete a 3-5 day workshop that they sponsor prior to teaching the course, but neither places an annual cost to the high schools for offering the course. Dutkowsky, Evensky, and Edmonds (2003) discuss ways that the CEP model provides greater educational benefits than AP for teachers who teach the course.

6. The quantitative framework that follows assumes that students are risk-neutral. The single exam criterion of AP relative to the course evaluation criterion of CEP implies that the former carries greater risk for the individual student. Sickness, adverse life events, or a packed schedule of AP exams may lead to exam performance below the student's normal capability. This characteristic implies that AP would be less favored within an expanded model framework that allows for risk-aversion.

7. For example in Syracuse University Economics through PA, some teachers use as a prerequisite minimum grades of 85 in the American History course and on the American History Regents exam.

8. Still another qualifier stems from the fact that many colleges and universities charge a flat-rate tuition each semester based upon a minimum number of credit hours. Hence, the CEP and AP courses may not provide monetary savings to the college student unless she has enough credits from the high school courses to eliminate a full semester of study. We assume away this behavior, working more within a continuum based upon the price of an individual course. Even under the flat-rate tuition policy, both the CEP and AP models enable students to take more courses overall.

9. Unfortunately, another criterion that some high schools use is to improve their standing in the *Newsweek* ratings of, "America's Best High Schools" (e.g. Kantrowitz and Mathews 2007). This ranking uses the ratio of the number of students who took AP, IB, or Cambridge exams to the size of the graduating class. Among its inherent flaws in seeking to measure educational quality, this system is based upon tests taken as opposed to success and CEP successes are not included. We have had several conversations with disappointed teachers and principals whose districts chose AP or IB for this reason alone.

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Table 1

Number of Colleges and Universities Accepting or Rejecting CEP and AP for College Credit

	CEP Courses			AP Exam		
Classification	Accept	Reject	No Information	Accept	Reject	No Information
Doctoral	37	1	22	52	1	7
Masters	31	0	49	75	0	5
Baccalaureate	30	1	69	81	0	19
Overall	98	2	140	208	1	31

Notes. The data are compiled from information provided by the individual websites of the colleges and universities in the sample. For CEP we also use records of Project Advance, based upon student surveys regarding acceptance or rejection of their course for college credit.

Table 2

Number of Colleges and Universities Granting College Credit for AP Exam Performance

(Minimum Acceptable Scores of 3, 4, and 5)

Classification/Course	Calculus AB	Macroeconomics	English Literature
Doctoral	(37, 15, 1)	(28, 19, 2)	(26, 24, 2)
Masters	(55, 7, 0)	(49, 10, 0)	(51, 11, 0)
Baccalaureate	(51, 22, 1)	(42, 26, 1)	(44, 25, 3)
Overall	(143, 44, 2)	(119, 55, 3)	(121, 60, 5)
National Percentage of Students Receiving Minimum Score, 2007	(58%, 39%, 20%)	(54%, 37%, 13%)	(61%, 28%, 7%)

Notes. Data on the colleges and universities policies toward granting credit based upon the AP exam score come from their individual websites. Percentages in the last row are computed from data on national distributions of AP scores provided in the website http://www.collegeboard.com/student/testing/ap/exgrd_sum/2007.html.

Table 3

Simulated Breakeven Points for CEP versus AP,

Based Upon Probability of Student Obtaining Credit Based Upon AP Exam Score

	Breakeven Points ($)	
P_{AP}	3 Credit Course	6 Credit Course
0.20	$374	$874
0.25	$404	$943
0.30	$439	$1025
0.35	$480	$1121
0.40	$530	$1238
0.45	$592	$1382
0.50	$670	$1564
0.55	$771	$1801
0.60	$909	$2123
0.65	$1106	$2584
0.70	$1414	$3302
0.75	$1957	$4572
0.80	$3180	$7428

Notes. Breakeven points come from the equation comparing Expected Benefits of CEP and AP. Actual college tuitions for full-time students which are above the breakeven point favor the CEP. College tuitions below the breakeven point favor AP.

Table 4

Tuition Costs for Academic Year 2007-08

College or University	3 Credit Course	6 Credit Course
Onondaga Community College	$328	$656
SUNY Binghamton: In-State Residents	$435	$870
SUNY Binghamton: Out-of-State Residents	$1061	$2122
Le Moyne College	$2428	$4896
Syracuse University	$3047	$6094

Notes. Tuition costs come from the schools' websites. Data in the Table are computed based upon annual tuition and a class schedule of 30 credit hours for the academic year. Tuition costs for Le Moyne College pertain to the 2008-09 academic year.

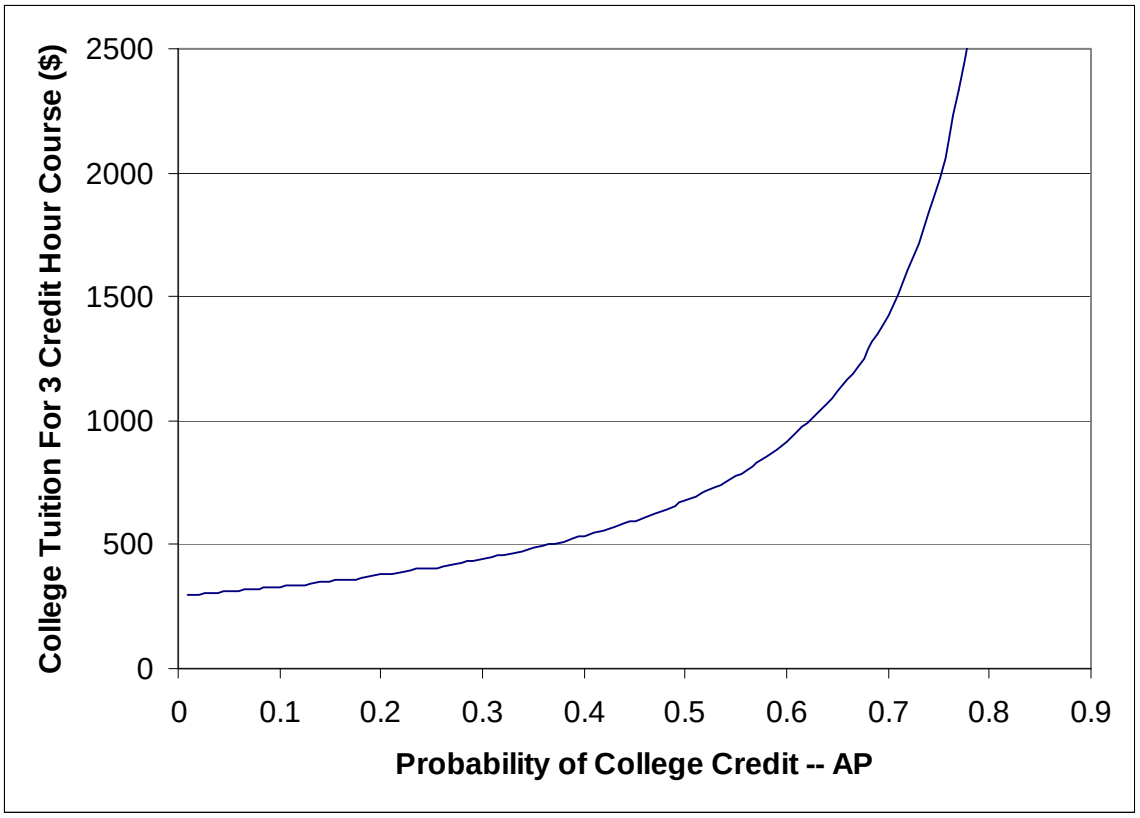

Figure 1. Breakeven curve for Concurrent Enrollment Programs (CEP) versus Advanced Placement (AP), based upon Expected Benefits for a three credit hour course. Points above the curve signify that CEP generates a higher Expected Benefit. Points below the curve signify that AP generates a higher Expected Benefit.