The Advanced Placement Program

How have AP classes changed secondary and higher education in America?

Economics of Education (ECON 4250H)
I. Abstract

Over the past 20 years, colleges, universities, parents and secondary schools have placed increasing value on AP coursework. The effect has been a significant increase in the number of people taking AP courses (an increase of almost 25% in the last four years), accompanied by a simultaneous decrease in average AP exam score. This paper attempts to address whether or not the increasing value placed on AP coursework by college admission boards and society as a whole is justified by research in the field. We ask two questions: 1. Is the AP course curriculum an adequate substitute for the curriculum of a college level principles course? 2. Is there an inherent benefit to students taking an AP course regardless of their performance on the AP exam? Our research indicates that the AP course curriculum is a good substitute for college courses for students who pass (3 or better) the AP exam. Furthermore, there are benefits to be accrued to the educational structure of an AP program. However, our research also indicates that the benefit (increased student performance and college graduation) that a student receives from enrollment in AP programs is almost entirely tied to performance on the AP exam. Thus we recommend future policy focus on increasing performance on the AP exam for those students qualified to take the exam instead of simply increasing the number of students taking AP courses.

II. Introduction

The Advanced Placement (AP) program allows participating students the opportunity to obtain college credit for tested subjects dependent on a score they receive on an exam administered each May by the College Board. Proponents of the program believe AP courses help prepare students for college success by providing a rigorous, college-level curriculum in a high school environment. Such courses may help smooth the transition between secondary and higher education and effectively raise the quality of students entering college. Opponents of the program suggest that these high stakes tests create an incentive to teach toward the specific material on the exam at the expense of engendering a deeper understanding and appreciation of course material (Lewin 2006).

If this latter hypothesis is correct, we would expect students exempting out of college classes with AP credit to do poorer in higher level courses, as their shallow understanding of the subject becomes insufficient to cope with more difficult concepts. On the other hand if the AP
program selects students with minimal noise, we would expect those who obtain credit via an AP exam to be comparable to their counterparts taking the introductory course in college. Over the past thirty years, much research has attempted to discern which of these two theories the data supports. Our review focuses on evaluations of the Advanced Placement economics program. The evidence we found suggests that students who score a four or five on AP exams are as, if not more, qualified for advanced coursework as college undergraduates who pass introductory courses.

Recently, colleges and universities have become aware of this evidence and consequently have been placing increasing weight on AP coursework for admission decisions (Breland et. al 2002). Concerned parents desiring to keep their children competitive in the college application process have responded by demanding more access to AP classes in schools nationwide. The effect has been a significant increase in the number of people taking AP courses (an increase of almost 25% in the last four years) and the number of AP courses administered every year, accompanied by a simultaneous decrease in average AP exam score (Cech 2008). The AP movement has become popular enough to generate broad political action; President Bush, in his broader effort to make America more competitive in math and science, launched a nationwide $90 million AP Incentives Program (APIP) aimed at raising the number of students taking math and science AP exams from 380,000 in 2002 to 1.5 million in 2012 (Feldmann 2006). In general, the public seems to be placing an increasing value on the AP course experience, independent of the score a student achieves on the exam itself. The principle evaluative question has shifted from whether or not good AP scores ought to be considered equivalent to college courses to discerning whether or not something inherent within the AP course curriculum itself benefits students, regardless of how well they do on the exam in May.
An emerging hypothesis addressing this concern contends that students take AP classes in order to signal to college admission boards certain unseen, hard-to-measure characteristics such as motivation and ability (Geiser and Santelices 2004, Klopfenstein 2006). Signaling is a well-studied phenomenon within the context of the education system (Weiss 1995), which sometimes contradicts economists and policymakers who would put a substantial premium on the human capital and societal productivity that education theoretically provides. The competing theories of human capital and signaling are pertinent in the AP discussion as well. On the one hand, AP classes might increase human capital by challenging students with college-level coursework. Such courses should give them the practice, study habits and knowledge that contribute to success in higher education, regardless of their score on the exam. On the other hand, AP classes could be a signal to college admission boards about the motivation of a student, a proxy for the willingness of a pupil to take a challenging curriculum in high school. An accumulating amount of evidence indicates that for a growing population of AP course participants, it is this latter hypothesis that is correct. Such evidence has substantial implications for how AP program education policy ought to be evaluated in the future.

Our review of the AP program concentrates on the AP Economics (micro and macro) exams and their effect on economic education in American high schools. While much of the empirical data we use is specific to AP Economics, many of the theoretical arguments are general in nature; we believe many of the observations we noted for the AP Economics program could apply to a variety of other AP subjects. We wish to use the AP Economics exam as a case study to examine possible costs and benefits to the AP program as a whole. We believe that by widening choices available to students, the AP program on the whole increases the level of economic awareness at the secondary level nationwide. It allows excelling students the freedom
to take a course for which they are readily prepared in high school—in effect the program tears down an artificial ceiling the traditional educational system had placed upon the achievement of exceptional students before entering higher education.

However, it is dangerous to take our conclusion as a general call to expand the AP Economics program or the AP program as a whole. In an ideal world, every highly motivated, exceptional student would have the opportunity to take the all the AP coursework he or she desired—however, highly motivated, exceptional students are likely to find success even without such opportunities. The school system’s principle goal has traditionally been raising the achievement of the average, rather than the exceptional, student; we question the notion that putting an average student into an AP classroom somehow improves that student’s future achievement ceteris paribus. The AP program was established to meet a demand by high aptitude students to get ahead; it is unlikely that the program in and of itself somehow creates such high aptitude students. As such, we are skeptical of AP proponents that hail the program as an avenue for improving America’s education system for the typical student, much less for the disadvantaged or below average pupil.

III. Main Analysis

Effects of AP Exam on Educational System

Before 1960, the teaching of economics occurred mostly on college and university campuses. Academics interested in economics believed if the subject were taught at the high school level, it would be of an inferior quality; students in college would find themselves only having to repeat the course in order to capture fundamental economic principles (Buckles 1988). The year 1960 marked a decisive change in this prevailing attitude, as those concerned with economic education in the general public realized that many high school graduates never
attended college and those that did often did not take a course in economics throughout their higher education career. As such, high school economics courses often were the only contact many pupils had with the subject in the entirety of their academic careers (Walstad 2001). This situation prompted the American Economic Association (AEA) to commission a National Task Force on Economic Education aimed at providing recommendations for the improvement of primary and secondary economic instruction.

The increased interest in promoting economic education at the secondary level culminated with the implementation of the AP Economics program in the early 1990s. Proponents of the program cited a number of potential benefits it could bring to the field, including standardizing high school economics curriculum nationwide, encouraging high level students to take classes in the subject, improving the average quality of economics teachers for AP and non-AP students alike, and raising the “prestige” of economics among other the social sciences (Buckles 1988). Furthermore, exceptional students exposed to higher quality economic curriculum at the secondary level may choose to pursue the subject further in college; Willingham and Morris (1986) demonstrate that students are two to five times more likely to major in a field after having taken an AP course in the subject during high school.

However, the implementation of the program could also impose unintended costs on the higher education system. At AP accepting institutions, better economics students may not take the introductory level economics courses because they will have exempted out with AP credit (Buckles and Morton 1988). The “cream skimming” of better economics students may lead to a decrease in the student quality of college principles courses. This decreased student quality in turn may force professors to reduce either the breadth or depth of economic principles taught in the introductory course. At non-AP accepting institutions, students who have already taken the
AP course may not want to repeat the principles course at the college level, deterring students from choosing economics as a major. The existence or magnitude of these theoretical costs or benefits has of yet not been well-studied.

We now evaluate how the AP economics exam places students relative to their college counterparts, as this question is fundamental to determining whether the program accomplished its basic goal of permitting high school students to perform college level work.

*Is the AP exam equivalent to an introductory class in college?*

*Comparing AP takers to their counterparts in college*

One of the main concerns to the implementation of an AP economics exam is discerning whether AP classes taught in high schools are equivalent to college-level courses. Since a passing score on the exam grants students credit for introductory economics at AP accepting universities, we would expect students passing the test to have a comparable amount of knowledge concerning the subject as students who took the class in college. Melican, Debebe, and Morgan (1994) attempt to validate this claim by comparing scores between high school AP Economics candidates and university students who took the introductory level economics course in college.

In 1993, the researchers contacted 200 department heads of the colleges that received the most AP Economics exam grades the previous year. Professors were asked to administer the 1994 AP Microeconomics or Macroeconomics exam to their students as a substitute for a final exam. The professors evaluated the exam and provided the researchers with a letter grade based on student performance on both the multiple choice and free response sections. Participating professors were also asked to provide a final letter grade for each student including the performance on the exam as well as an estimated letter grade excluding exam score (performance
in the course up to the exam). Each student’s free response was then given a cover identical to that of a high school AP Economics exam, and AP graders graded the exam without the knowledge of whether it was a high school or college student. The multiple choice section was graded by a computer. A standardized AP score (1-5) was assigned to both the college and high school students’ exams. In total, eleven schools participated in the AP Microeconomics study while seven schools participated in the AP Macroeconomics study.

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td>Average Scores on Each Section of AP Exam</td>
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<tr>
<td>Microeconomics</td>
</tr>
<tr>
<td>AP</td>
</tr>
<tr>
<td><strong>Multiple Choice</strong></td>
</tr>
<tr>
<td><strong>Free Response</strong></td>
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<tr>
<td><strong>Cumulative</strong></td>
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As can be seen from Table 1, AP candidates obtained a higher standardized score on the multiple choice, free response, and cumulative sections than the college students they were compared against. On the microeconomics exam, the average for AP students was higher at nine out of the eleven colleges; for macroeconomics, the average for AP students was higher at four out of the seven colleges. For both of the exams, AP candidates who scored a five outperformed college students who received an A in the college class; AP students who scored a four outperformed college students receiving a B and had a similar score to college students receiving an A; AP students who scored a three outperformed the college students receiving a B in the college class.

Similarly, for both exams the AP students who received a five on the exam outperformed the college students who received an A on the exam from their college professor. In the microeconomics exam, the AP students receiving a four performed slightly better than the
college students receiving an A, while in macroeconomics they performed slightly worse. AP students who received a three on the exam performed in the range between the college student’s B or C on the exam.

Based on the grades given to students without the AP exam included, there appears to be strong evidence that college grading and AP scoring are congruent (Melican et al. 1994). Of the 401 macro students who received a three or better, only four percent merited a D or F in the class and 68 percent were doing at least B level work in the class. Of the 616 students in microeconomics who received a three or better, only five percent merited a D or F and 71 percent were doing at least B level work in the class. However, 40 percent of the students in microeconomics and 19 percent in macroeconomics who were performing at a B or higher level received less than a three on the exam. To summarize, students who did poorly in the class performed poorly on the exam, and those who did well in the class performed well on the exam. This evidence provides some justification for using the AP exam as a proxy for introductory economics knowledge. In general, a college professor’s evaluation of a student’s performance is in line with the AP Economics’ assessment of knowledge.

Given these results, it appears that students who score well on the AP Economics exam have a level of economic knowledge comparable to (if not more than) that of their college counterparts. However, there are a few caveats that need to be mentioned before drawing our final conclusions of this study. First, AP students are more motivated to do well on the exam because the score they receive on this single test determines the credit they receive upon entering higher education. College students, however, have other factors determining their grade and most do not need to do exceptionally well on the final to pass the course and earn credit for the class.
AP economics students may therefore represent a more motivated sample than the college comparison group.

The second caveat is the appropriateness of comparing scores on the exam between the two groups. For all of the high school AP economics classes, there is a similar curriculum outlined by the AP course description. In a college classroom, the professor has much more freedom to influence what subjects are addressed or emphasized throughout the course. Furthermore, AP students take practice AP economics exams and study AP test taking strategies. The AP may then be less a measure of a college student’s knowledge of economics and more an indicator of how much an AP student has practiced taking the exam. However since college professors voluntarily participated in the study, and since the grades college students received on the AP impacted how well they did in the course, we would expect professors whose curriculum deviated substantially from that of the AP course to decline to participate.

The final potential problem with this study is a selection bias caused by the small sample size taken. Fewer than 20 professors at 14 schools participated and the colleges in the study do not represent a random sample of the colleges AP students attend. Furthermore, the schools in the study tended to be of average to lower academic reputation. Thus the small and non-representative sample size may not provide a fair representation of college student performance in general. Once again this factor could skew the results in favor of AP candidates. Finally, the selection of the schools in the study was not completely random as only the schools that voluntarily chose to participate were included. This leaves the data susceptible to sampling and selection biases.

These caveats aside, the research above suggests that AP Economics students scoring passing grades on their exams are indeed comparable to counterparts taking the introductory
economics courses in college, validating the claim that AP courses in some way improve the human capital of students excelling in them. However the story is not as clear for students not obtaining at least a three on the AP exam, a group that appears to be growing with the large increases in AP exam takers seen over the past decade (Breland et al. 2002). In addition, it remains unclear how average and lower aptitude students (those unlikely to be AP candidates) fare when schools devote substantial resources toward Advanced Placement programs.

The Effect of Advanced Placement on those Left Behind

When considering the implications of the AP program, it is important to evaluate how the program might affect those who are “left behind,” students in high schools with extensive AP programs that are not enrolled in AP classes. A study by Willingham and Morris (1986) first attempted to examine the effect of an AP program on both AP and non-AP students. They performed a longitudinal study in which they matched AP to non-AP students from nine colleges over the course of the higher education career, controlling for demographic characteristics as well as secondary school performance. Their research included 4,814 students from 717 different secondary schools, 1,115 of which were AP students and 3,699 were non-AP students. Their research found that students from high schools with extensive AP programs, who did not take AP exams, did better in college than their high school grades or test scores would have otherwise predicted. It is important to note that this study was written for a report issued by the College Board, the company that administers the AP exams. While numerous authors cite this study as a seminal piece of AP program review, the inherent bias of this report due to its purpose and association with the College Board brings into question its underlying legitimacy.

In contrast, studies by Cocking (1990) and Gamoran (1992) argue that the effect of grouping students based on previous educational achievement, as occurs with the AP program, is
not beneficial for the school as a whole because the general and lower ability groups often are adversely affected. One possible explanation is the shift of resources to the higher level groupings at the expense of lower level groupings. Gamoran finds that after 10th grade, the academic track that a student is on (i.e. the group in which he/she has been placed) is more important to his/her achievement than attendance in school. While these authors do not focus specifically on the AP exam, their results are nonetheless applicable to the AP program. It is difficult to make a definitive conclusion regarding the effect of Advanced Placement on those “left behind,” as currently the amount of research is lacking and different authors have reached opposing conclusions.

**Is there inherent value in taking an AP course independent of performance on the exam?**

*Effect of the AP class experience on future student performance*

Until this point, we have focused on students who *pass* the AP exam (score 3 or higher). We now turn to students who fail to pass after taking the class in high school in order to discern whether or not there is any inherent value to taking an AP course independent of performance on the test. When these students enroll in the college introductory course, are they better off than their peers who took the standard non-AP course curriculum? Recent research into this subject suggests the answer is no. Rather, it seems AP exams signal motivation and ability to colleges, as students having a strong desire to go on to higher education select into AP programs at a much higher rate than those planning to enter the work force straight out of high school. In addition, schools often weight AP classes higher when calculating grade point averages. Thus, when deciding which courses to take, students wishing to remain competitive in class rank (and the college admission process as a whole) face the double incentive of raising their GPA and positively signaling their motivation to colleges.
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Originally developed as a college placement tool, the presence of AP exams on a college resume has now become a growing part of admission criterion for selective schools (Dougherty et al. 2006). This trend has greatly contributed to the substantial increase in the number of AP exams taken as well as the number of students taking AP exams each year. As college admission boards place increasing importance on AP course load, the question of whether or not the presence or number of AP exams taken at the high school level is a good indicator of college performance has become a key issue for evaluation.

Saul Geiser and Veronica Santelices, both education professors from the University of California at Berkeley, used data from 81,445 incoming freshmen at the eight UC undergraduate campuses between Fall 1998 and Fall 2001 to examine the relationship between the number of AP/honors classes taken at the high school level and college performance. They used two data sets for this sample. The first was the UC Corporate Student System (CSS) data which included admission information (high school GPA, SAT scores, number of AP/honors classes taken, demographic factors, etc.) and corresponding student performance and persistence throughout higher education. The second data set was statewide information on California AP test takers collected by the College Board. These two resources allowed the researchers to match AP scores with CSS data. The researchers used GPA in the college student’s first and second year in college as an indicator for student performance. In order to study the relationship between predictor variables (e.g. HS GPA, number of AP/honors classes taken, SAT scores) and GPA, the researchers used an ordinary linear regression with the following regression equation:

\[ \text{UCGPA} = \alpha \text{HSGPA} + \beta \text{School API} + \phi \text{Parents' Ed} + \theta \text{SAT I} + \mu \text{SAT II} + \psi \text{AP/Honors} + \omega \text{AP Scores}. \]
For the relationship between predictor variables and college persistence, they used logistic regression. They attempted to control for confounding demographic effects, including age, race, and income.

One particular characteristic of the UC admission process that proved significant to the Geiser and Santelices analysis was the “bonus point” rule, where students in AP or honors classes receive an added point to their HS GPA (e.g. an A earned in an honors/AP class would count as a 5.0 instead of a 4.0). The researchers found that the best estimator of college performance was HS GPA without the bonus point and that the bonus point was an “unnecessary addition.” In fact, the greater the weight given to the AP or honors classes, the weaker the prediction HS GPA had on college performance. Furthermore, after controlling for demographic factors, HS GPA (no bonus), SAT I and II scores, parent’s education and API quintile, the number of AP/honors courses had “no statistically significant predictive weight” (Geiser et al. 2004).

Prior research before Geiser and Santelices focused on an aggregate of both AP and other honors (honors, IB, joint enrollment) classes, but it is important to disaggregate the AP data to confirm that each class follows the trend of the entire group. When disaggregated, none of the honors classes added any substantial impact to the prediction of college performance. However, for the AP exam, the performance on the exam proved to be a remarkably strong predictor of college performance, with a regression coefficient of 0.15 (statistically significant at the 0.01 level) and second in predictor variables only behind HS GPA. In contrast, the number of AP classes taken proves to be an extremely weak predictor, with a regression coefficient of 0.02 (not statistically significant at the .01 level). Ultimately their findings were consistent with Morgan
and Ramist (1998) and Morand and Maneckshama (2000), in that while the performance on AP exams is a strong predictor of college performance, the number of AP classes taken is not.

Klopfenstein and Thomas (2006) also demonstrate that AP course load is a poor predictor of college success after controlling for other factors, most importantly that of a student’s non-AP curriculum. Using regression analysis, Klopfenstein controls for a host of variables (sex, race, SAT score, GPA, family characteristics, etc.) to isolate the effect that the number of AP courses taken in high school has on college success as measured by freshman GPA and second year retention rate. The researchers find that the most popular AP courses (calculus, English, and history) have virtually no detectable effect on student performance across any group. In an interesting side note, they find AP Economics to be weakly correlated to higher achievement, but attribute such findings to small sample size and unobserved characteristics of the schools offering such programs.

In a related study, Chrys Dougherty, Lynn Mellor, and Shuling Jian of the National Center of Educational Accountability used data from 67,412 Texas 8th graders who graduated from high school in 1998 and enrolled in a Texas public college or university within 12 months of high school graduation to examine the relationship between AP classes and college graduation. They sought to discern whether schools and districts that increased student participation in AP courses significantly improved their students’ graduation rates from college. The researchers made three key comparisons: 1. Comparison of college graduation rates between AP and non-AP students, 2. Comparison of college graduation rates between AP and non-AP students controlling for student characteristics 3. Relationship between the percentage of a high school’s students graduating college and the percentage of students taking AP courses.
Before examining their results, it is important to note potential biases that could have influenced their findings. The first is a self-selection bias within schools. Students who are better prepared and highly motivated are more likely to take an AP class than other students within the school. Thus an increased rate of college graduation may be due to other personal characteristics (e.g. intelligence or work ethic) that led them to take the test in the first place (Dougherty et al. 2006). The second is self-selection between schools. The schools with the largest AP programs are usually the schools that have the most academically focused and motivated student body (i.e. students most likely to take the exam). Thus students from these schools are more likely to have higher college graduation rates than students from other schools, even if the AP programs did not exist. Finally, differences in the organization or the school’s curriculum independent of AP programs between schools could have lead to increased graduation rates. Keeping these caveats in mind, the results of first comparison group (which controls for none of these biases), should be strictly interpreted as the size of the AP and non-AP college graduation gap, explainable by a number of possible variables. The second comparison controls for some but not all non-AP related characteristics and thus could provide greater insight into the benefit of AP classes. The third comparison should not be affected by the selection effects and thus the differences are due to AP effects or other hard-to-measure variables, such as organization and curriculum.

To effectively examine the AP effects within these comparison groups, the researchers divided all high school students into four groups. The first group included all students who took and passed (3 or better) at least one AP exam. The second group took at least one AP exam but did not pass any. The third group took an AP course but did not take any AP exams, and the final group did not take an AP exam or an AP class. All comparisons are then made between the first three groups and the fourth group.
Comparison Group 1

As can be seen from Table 2, across all of the student demographic groups, the differences in the college graduation rates between those who participated in the AP program (whether through an exam or a course) is positive and statistically significant, when no control groups are used. Thus, a positive AP/non-AP college graduation gap does exist. It should be noted that all differences are stronger for those that passed AP exams than those that did not.

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Passed AP Exam</th>
<th>Took, Did not Pass AP Exam</th>
<th>Took AP Course, No AP Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>African-American</td>
<td>43%</td>
<td>26%</td>
<td>20%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>45%</td>
<td>21%</td>
<td>15%</td>
</tr>
<tr>
<td>White</td>
<td>43%</td>
<td>26%</td>
<td>20%</td>
</tr>
<tr>
<td>Low-Income</td>
<td>39%</td>
<td>20%</td>
<td>14%</td>
</tr>
<tr>
<td>Non-Low-Income</td>
<td>45%</td>
<td>26%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Comparison Group 2

Using a hierarchical linear modeling (HLM) regression, the researchers were able to examine the differences between group four and the other three groups, controlling for many student and school characteristics (both demographic and academic). As seen in Table 3, for all student demographic groups results are still positive and statistically significant, albeit at a lower level. The stronger difference for those that passed the AP exam still holds.

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Passed AP Exam</th>
<th>Took, Did not Pass AP Exam</th>
<th>Took AP Course, No AP Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>African-American</td>
<td>28%</td>
<td>22%</td>
<td>16%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>28%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>White</td>
<td>33%</td>
<td>22%</td>
<td>20%</td>
</tr>
</tbody>
</table>
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Control variables in the model include the student’s 8th grade mathematics test score and economically disadvantaged (free and reduced price lunch) status, and the average test scores and percent economically disadvantaged students in the student’s school. College graduation probabilities were calculated at the average of each variable for the student group in question, e.g., African-American students.

<table>
<thead>
<tr>
<th></th>
<th>Passed AP Exam</th>
<th>Took, Did not Pass AP Exam</th>
<th>Took AP Course, No AP Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Income</td>
<td>26%</td>
<td>17%</td>
<td>12%</td>
</tr>
<tr>
<td>Non-Low-Income</td>
<td>34%</td>
<td>23%</td>
<td>19%</td>
</tr>
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</table>

Comparison Group 3

Using an ordinary least squares regression, Dougherty et al. found a statistically significant relationship between passing the AP exam and college graduation rates for all groups except African Americans (may be due to small sample size). However, as can be seen from Table 4 simply enrolling more students who do not take or pass the AP exam in AP courses provides a weaker and often not statistically significant relationship on college graduation rates, especially when controlling for student characteristics.

Table 4
Differences in College Graduation Rates Associated with Differences in AP Participation and Exam Success

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Passed AP Exam</th>
<th>Took, Did not Pass AP Exam</th>
<th>Took AP Course, No AP Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>African-American</td>
<td>21%</td>
<td>18%</td>
<td>10%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>27%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>White</td>
<td>19%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Low-Income</td>
<td>32%</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Non-Low-Income</td>
<td>23%</td>
<td>0%</td>
<td>5%</td>
</tr>
</tbody>
</table>

This table should be interpreted as follows: A school where 10 percent more of its population of low-income students take and pass AP exams (vs. not participating in AP at all) should expect a college graduation rate 3.2 percentage points higher (32% of 10 percent) for that same population. The low-income population in question is the cohort of low-income students who enrolled in a Texas public college or university within twelve months of high school graduation.

The main conclusion to be drawn from the afore mentioned research is that performance on AP exams is a much stronger predictor of college performance and graduation than the
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completion of an AP course. Simply putting more students through AP courses does not seem to improve their chance of success, as measured by college GPA or graduation rate. We conclude our review by summarizing a recent evaluation of the Advanced Placement Incentives Program, an initiative that attempts to capitalize on the research mentioned in this paper by rewarding students and teachers for performance on AP exams rather than participation in AP courses.

The Advanced Placement Incentives Program (APIP)

In his budget proposal for the fiscal year of 2006, President Bush called for a large expansion of the Advanced Placement Incentive Program (APIP) as the flagship of his “competitiveness initiative” aimed at improving America’s international standing in mathematics and the sciences (Cech 2008). The program, which targets low income and minority school districts, pays cash rewards to teachers and their students if the pupils score passing grades (three or higher) on their AP exams. Research on high stakes testing suggests that when the consequences of a particular test increase, students and teachers respond by scoring higher (Jacob 2001). This result appears to be desirable and indeed is often used to justify the implementation of high stakes testing to boost school accountability and ultimately student performance. However, the desirability of these score increases is in actuality uncertain, as the mechanism by which scores improve remains hidden. In an ideal situation, better scores would reflect a rise in student ability; however they might instead reflect a shift in resources away from non-tested subjects by students, teachers, and schools. In the context of the APIP initiative, these unintended consequences might mean taking resources away from low ability students and instead focusing on students who could potentially pass an AP exam. On the student side, the program might encourage pupils to opt out of non-AP coursework or substitute efforts away from non-AP classes.
Recent research by Jackson (2007) has attempted to discern if these are valid criticisms of the APIP. Using data from Texas schools, Jackson uses a differences-in-differences analysis to study the impact of APIP on two educational outcomes, SAT (ACT) scores and college matriculation. The power of Jackson’s analysis comes from its establishment of causality. He compares the difference in a school’s performance before and after it participates in APIP with the difference in a school interested in opting into the program but unable to due so because of a lack of program funding. The distribution of APIP funding among schools that apply is essentially random. This approach isolates the effect of APIP from possible omitted or endogenous variables, since the control and the tested groups are similar across many characteristics (both qualify for APIP, both apply for funding, the decision to fund or not to fund is essentially exogenous).

When compared against schools without APIP support, Jackson finds that schools enacting APIP increased the number of students scoring higher than 1100 on the SAT (or 24 on the ACT) by 30 percent and increased the number of graduating seniors entering college by 8 percent. This result is significant because it does not measure improvement on the rewarded behavior—schools that enroll in APIP improve student achievement on non-rewarded standardized tests, suggesting that APIP does not cause students or schools to concentrate efforts on AP exams at the expense of achievement in other areas. Furthermore, Jackson suggests that insofar as SAT and college matriculation rates are indicators of future earnings, the cost of the APIP is insignificant when compared to the predicted income gains made possible by schools that enacted the program.

Jackson also found students at APIP schools are not more likely to substitute away from other difficult classes, the effects of APIP are relatively consistent regardless of how much cash
is rewarded, and AP course enrollment rose in AP courses not rewarded by the program. He argued that this evidence suggests students and schools are not revenue maximizers attempting to game the APIP system. Rather, the substantial effects of APIP might instead be attributed to changing student information, teacher effort, and peer norms. APIP could provide the impetus schools need to jump start their AP programs by promoting AP courses to students otherwise unaware of such opportunities and by encouraging teachers to participate in AP teacher training and mentoring programs. The mechanism by which APIP achieved these results does not suggest that any and all students take AP classes. Rather, the program helped disseminate information and encouraged high aptitude students who might otherwise not desire to go to college achieve in difficult classes and excel in high school.

### III. Conclusion

Based on the results of the research addressed in this paper, we have drawn two important conclusions. The first is that the standardized curriculum used in an AP course is an adequate replacement for a college level introductory course insofar as AP Economics is comparable to other AP exams. In other words, AP students who score well on the test are comparable to college students who pass an introductory level course. As such, the AP program helps exceptional and motivated students get ahead in their college careers, expanding their horizons in higher education and making the education system on the whole more efficient.

The second conclusion is that the number of AP classes taken is a poor indicator of college success and that simply increasing the number of students taking an AP class will not guarantee increases in the number of students graduating from college. Performance on AP exams is a much stronger indicator of college success and improved performance on AP exams has the greatest potential to help students and schools reap the benefits the AP program could
offer. Future education policy ought to encourage students and schools to emphasize exceptional performance on AP exams rather than blindly attempt to increase enrollment in AP courses. At its core, the Advanced Placement Incentives Program is inline with our recommendations and as such we believe this initiative could substantially improve American education.
References


