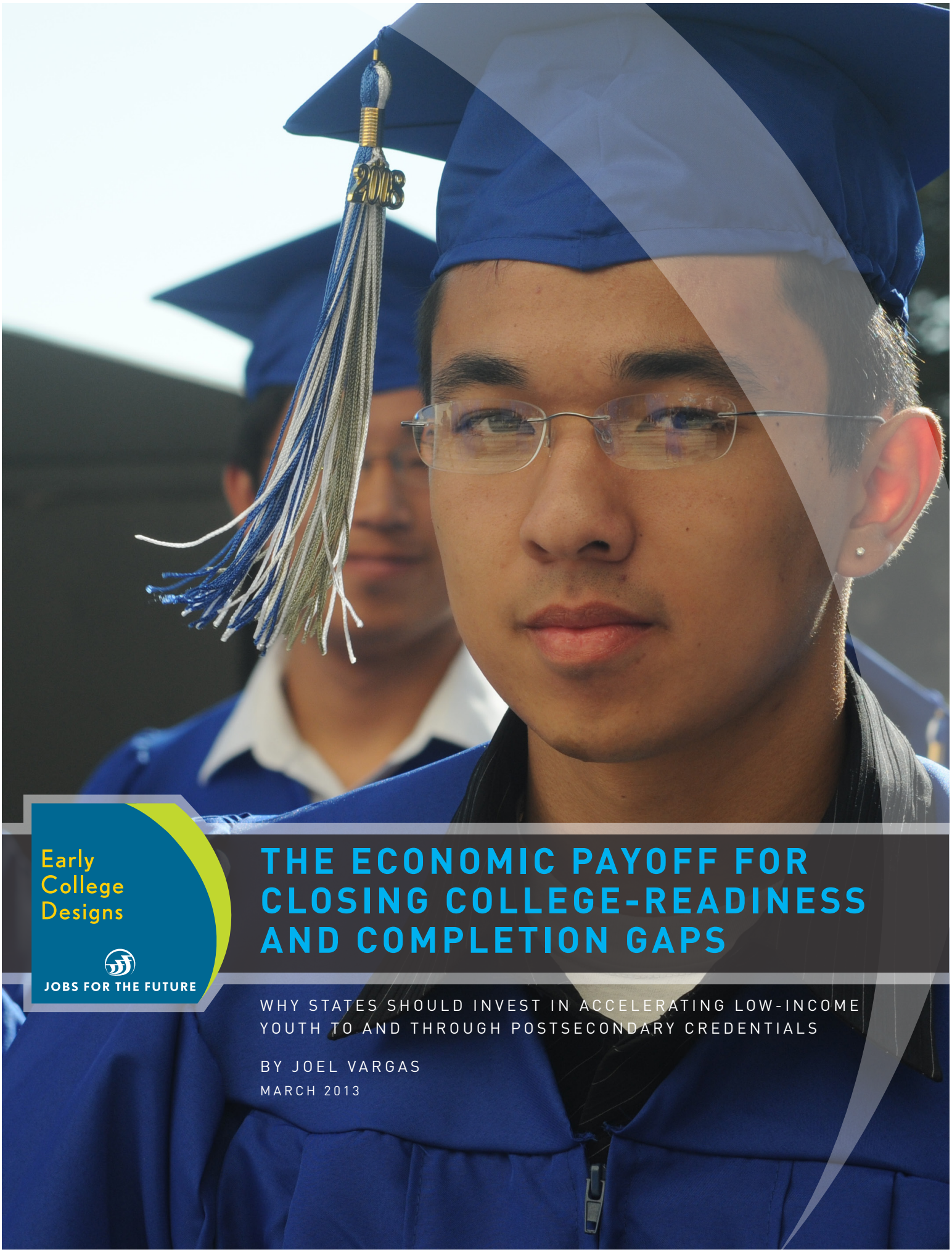

Early College Designs

JOBS FOR THE FUTURE

THE ECONOMIC PAYOFF FOR CLOSING COLLEGE-READINESS AND COMPLETION GAPS

WHY STATES SHOULD INVEST IN ACCELERATING LOW-INCOME YOUTH TO AND THROUGH POSTSECONDARY CREDENTIALS

BY JOEL VARGAS

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ABOUT THE AUTHOR

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INTRODUCTION

The low rates at which U.S. college students complete a degree and the amount time they spend in remedial coursework are national problems. The situation is particularly acute for low-income and other underserved youth, including populations such as Hispanic students that are growing the fastest in the country and that have some of the lowest success rates in our K-12 and postsecondary education systems.[1] It is a problem not only for the students, and not only because our economy and democracy depend on well-educated citizens, but also because it represents an inefficient use of personal and public investments in education. Every student who falls short of the goal of earning a high school diploma and a college degree represents a financial investment that did not pay off in a credential of value in the labor market.

In response, state policymakers and major foundations have invested in a variety of strategies to improve the college readiness of high school graduates, reduce the need for remedial courses in college, improve college completion rates, and reduce the "time to completion" of a degree. This brief supports the economic logic of such investments, in particular those that result in more low-income youth attaining the postsecondary credentials that can yield enormous benefits to students, families, and taxpayers.

Often, those benefits are described as long-term returns on investments: If more young people graduate from high school and college and earn the higher incomes associated with greater educational attainment, their increased contributions to local and state economies as working adults can be modeled and estimated.[2] Indeed, those benefits are significant, but this brief takes a different perspective. Jobs for the Future considers a shorter timeframe tied to a well-defined goal. Using a new, analytical, cost-benefit calculator, we estimate the savings specifically to state taxpayers of reducing the cost of a student's successful completion of high school and college.

By cost to completion, we mean the amount of the public investment in K-12 and postsecondary education per high school student who completes high school and an Associate's or Bachelor's degree. This amount is a direct measure of the *productivity* of our education systems: the less spent for each successful outcome, the more productive the investment. Put another way, the more efficiently the education pipeline moves students through high school and to postsecondary degrees, the lower the cost to completion and the higher the return on the public's investment in education.

JFF's cost-to-completion model provides a tool for quantifying the benefits of making the progress of students more efficient through high school and into and through college. Moreover, it can show the impact of improving progress for populations by income status. When we make that type of calculation, it turns out that the benefits relative to the costs are particularly great for strategies that target low-income students and raise their rates of degree completion.

This methodology also can be applied to specific strategies. For example, over the past decade, JFF has developed and put into operation early college high schools, an educational strategy that exemplifies the potential for greatly reducing cost to completion. Early colleges are designed so that low-income students, as well as others less likely to go to or complete college, graduate from high school while simultaneously earning one to two years of college credit or an Associate's degree. They become better prepared for college in the process, experiencing college success even before completing high school.

Today, upwards of 300 early college schools serve roughly 90,000 students each year. The data show that early college students are completing high school at higher rates than their peers, graduating from high school better prepared for college, and entering and persisting in college at higher rates. They are also accelerating their progress toward college degrees: 56 percent earn an Associate's degree or two years of college credit by the time they graduate from early college.[3]

Because of the potential benefits associated with shortening the time to completion through early college and other *acceleration strategies*, especially for low-income students, this brief also examines the effect on cost to completion of raising educational outcomes in general to levels comparable to those of early college students.

This brief comes to three major conclusions, based on the cost-to-completion model:

1. **Improving outcomes for low-income students will greatly improve the productivity of taxpayer investments in education.**

A high return on investment can be achieved by closing gaps in high school graduation rates and college completion between low-income students and their higher-income peers (*see section, "About the Model and Data," for how this paper defines low income and higher income on page 3*). Given current median levels for state spending on K-12 and higher education, closing these gaps would reduce the cost of high school and college completion for low-income students by as much as $1,371 per high school diploma, $1,493 per Associate's degree, and $3,212 per Bachelor's degree.

The savings add up quickly. For every 1,000 low-income high school graduates, the cost to completion would be lowered by $1,371,000 ($1,371 x 1,000); $1,493,000 for every 1,000 low-income Associate's degree earners; and $3,212,000 for every 1,000 low-income Bachelor's degree earners.

2. **Strategies that raise college and career readiness will pay off.**

State and local investments that increase college-readiness rates are likely to yield high returns because they will lead to increased college completion rates (*see section, "About the Model and Data," for how this paper defines college readiness on page 3*). This will reduce the cost to college completion for each graduate, especially those from low-income backgrounds.

Increasing college-readiness rates for low-income students by 20 percent could lower the cost per Associate's degree earned by as much as $1,148 in higher spending states—or $1,148,000 per 1,000 Associate's degrees earned by low-income students.

3. **Increasing college readiness and success through early college schools and other acceleration strategies can enhance productivity and offset additional investments—especially if they accelerate low-income students.**

Improving the college readiness and success of students through acceleration increases the productivity of an education system substantially. That is, through dual enrollment, advanced placement, and other ways to earn college credit in high school, students gain momentum toward college completion.

The combination of improving college readiness and supporting low-income students to earn college credit toward degrees lowers cost to completion so much that additional investments in such strategies should more than pay for themselves. A state that spends on education at the level of Texas can lower the cost to completion by as much as $4,711 per Associate's degree and $4,194 per Bachelor's degree—or $4,711,000 per 1,000 Associate's degrees and $4,194,000 per 1,000 Bachelor's degrees.[4]

As state policymakers face tough choices in determining funding levels for educational programs, a cost-benefit analysis can help them weigh which investments are likely to get more bang per taxpayer buck. Such decisions are being played out now—for example, in the increasing prevalence of performance-based funding for colleges.

Whatever the funding vehicle, our analysis suggests that states should give greater weight in investments and incentives to strategies with strong evidence of raising college-ready graduation rates and successful college course-taking by low-income high school students.

ABOUT THE MODEL AND DATA

The basic premise of "cost to completion" is that it is a measure of the level of investment made for each student who reaches a specified educational outcome. To illustrate with hypothetical figures, assume a state spends $10,000 annually per K-12 student (which happens to be close to the national average). Thus, for every 100 students, the state spends about $1 million annually regardless of outcome. Over the course of four years—the expected time to graduation for an entering ninth grader—state spending per 100 students would be $4 million. A state with a 100 percent graduation rate would have a cost to completion of a high school diploma of $40,000 per graduate. However, if only half of the students graduate from high school, the cost to high school completion would double, to $80,000 per graduate. Same cost, but for half the number of graduates.

Of course, states vary in their level of support for K-12 and higher education. Moreover, additional variables other than completion of a credential, such as the *time* to completion, affect the cost to completion.

To develop a standardized method for calculating the cost to completion for high schools and colleges in any state, JFF worked with Augenblick, Palaich, and Associates, who are experts in education finance. We created a dynamic tool that any state can use to calculate the costs and benefits of education improvement strategies, based on a variety of user assumptions about outcomes and costs. APA constructed the algorithms underlying the model, based on an analysis of longitudinal data by Optimal Solutions, Inc.

The model uses the following data about costs and student outcomes:

- To calculate state costs for K-12 education, the model uses 2009 per-pupil spending data from the National Center for Education Statistics for each state. These data are based on an average of total state, local, and federal expenditures on education across all school districts in a state. To facilitate analysis and comparison, given the complexity of education funding, the model assumes that those expenditures are, in effect, a state's costs for K-12 education.
- For state costs for higher education, the model uses each state's 2008 per-student cost data for two-year and four-year public colleges, obtained from the Delta Cost Project at the American Institutes of Research (Desrochers, Lenihan, & Wellman 2010). The data used are the state share of college costs for community colleges (for Associate's degree costs) and the public research sector (Bachelor's degree costs). The state share is what the Delta Project calls the "average subsidy portion" of education and related costs, which does not include student tuition.

- To model students' education paths and outcomes, the model uses the National Educational Longitudinal Survey for students who started high school in 1988.[5]

The model calculates cost to completion by applying costs to students' educational paths taken over 12 years from the time they start high school. The default calculations are based on the actual outcomes from students in the NELS. However, users of the tool can change the calculations of cost to completion based on three NELS variables.

- **High school graduation rate:** This rate enables users to understand the cost to reach high school graduation, which is the primary pathway to college entry.
- **College-readiness rate:** Academic preparation in high school correlates closely with college success. For the purposes of analysis, Optimal and APA categorized students as college ready who scored "highly qualified," "very qualified," and "somewhat qualified" for college based on a NELS composite variable comprising student performance on college admissions and other exams, GPA in high school academic courses, and class rank.
- **Family income:** Educational attainment correlates closely with socioeconomic status. This is evident in NELS and documented in research. We classified students as low income whose reported family income, given the number of family members, was calculated to be at a level below 185 percent of the federal poverty rate. We classified all other students as higher income.

Manipulating these variables changes cost-to-completion estimates. For example, because college readiness is positively correlated with college completion in NELS, raising the college-readiness rate in the model correspondingly raises the college completion rate and lowers the cost to completion.

IMPROVING OUTCOMES FOR LOW-INCOME STUDENTS WILL GREATLY IMPROVE PRODUCTIVITY

Family income is strongly associated with a student's educational attainment. Low-income students have significantly lower rates of completing high school and college than their higher-income peers. A cost-to-completion analysis illustrates this gap in stark economic terms. Inadequate support for low-income students not only hurts individual students, but it also results in great inefficiencies in state education investments. As illustrated below, states can realize significant gains in efficiency by closing gaps between low-income and higher-income students in terms of high school graduation and college completion rates.

COST OF HIGH SCHOOL COMPLETION GAPS

The NELS data show large gaps in high school and college attainment between low-income and higher-income students. Nationally, only 65 percent of low-income students who start eighth grade complete high school, compared with 87 percent of their higher-income peers. Using this graduation rate differential to calculate the cost of high school completion in a state with average spending on K-12 education, the cost to completion would be $43,214 for each low-income student compared with $41,843 for higher-income students.[6] If the state could raise the high school graduation rate for low-income students to the level for their higher-income peers, it would increase the productivity of education investments by lowering the cost of high school completion by $1,371 per graduate, or $1,371,000 for every 1,000 graduates.

POTENTIAL FOR HIGHER PRODUCTIVITY BY FOCUSING ON LOW-INCOME YOUTH

Raising the college readiness of low-income students as a group produces particularly high returns on productivity. The current productivity of high schools and colleges is so low for these populations that even modest increases in completion result in large gains in efficiency.

To illustrate, for every $100 of state spending, increasing the completion rate at lower ranges of productivity—for example from 1 percent to 2 percent—would decrease the cost to completion by $50 per student ($100 divided by 1 minus $100 divided by 2). In contrast, increasing the completion rate at higher ranges of productivity, say from 99 percent to 100 percent, would only decrease cost to completion by one cent ($100 divided by 99 minus 100 divided by 100).

COST OF COLLEGE COMPLETION GAPS

The gaps are even larger when it comes to college completion. Nationally, only 17 percent of low-income students who start high school ever complete an Associate's or Bachelor's degree at a public institution of higher education. This compares with 57 percent of their higher-income peers. In a state with average spending on K-12 and higher education, the cost to completion for each low-income student is $60,924 for an Associate's degree and $80,717 for a Bachelor's degree (*see the second hypothetical example in Table 1*). This compares to $59,472 for each Associate's degree and $77,110 for each Bachelor's degree earned by higher-income students.

Closing the income-related gap in college completion would increase the productivity of public education investments by $1,452 per Associate's degree earned and by $3,607 per Bachelor's degree earned.

Cost to completion is a function of spending as well as of outcomes. Thus, it is illustrative to see how improvements in efficiency play out in lower- and higher-spending states. Table 1 models the higher productivity that would result from closing cost-to-completion gaps between low-income and higher-income peers across a range of state per-pupil expenditure levels for K-12 and public higher education. For the purposes of illustration, we use national completion rates based on NELS, rather than a state's actual completion rates.[7] The only actual state data used are the costs.

For example, to demonstrate the effect of closing the college completion gaps in a high-spending state, we use cost data for a state such as Connecticut that is part of the top quartile of spending on K-12 and for two-year and four-year colleges. Applying national rates of college completion, the cost to Bachelor's degree completion in such a state is as much as $154,000 for every low-income student versus $146,672 for higher-income students, a $7,328 difference in efficiency.

TABLE 1.
THE VALUE OF CLOSING THE GAP IN COLLEGE DEGREE COMPLETION

Closing the gap in college degree completion between lower- and higher-income students substantially decreases the cost to completion and increases productivity across a range of levels of state spending on education.

RELATIVE LEVEL OF K-12 PER-PUPIL SPENDING	RELATIVE LEVEL OF TWO-YEAR PUBLIC COLLEGE SPENDING	RELATIVE LEVEL OF FOUR-YEAR PUBLIC COLLEGE SPENDING	COST TO DEGREE COMPLETION FOR LOW-INCOME STUDENTS	COST TO DEGREE COMPLETION FOR HIGHER-INCOME STUDENTS	VALUE OF CLOSING THE PRODUCTIVITY GAP PER LOW-INCOME STUDENT	VALUE PER 1,000 LOW-INCOME STUDENTS
1st (Lowest) Quartile of Spending	1st Quartile	2nd Quartile	$50,902 Associate's	$49,673	$1,229	$1,229,000
			$66,875 Bachelor's	$63,912	$2,963	$2,963,000
2nd Quartile of Spending	2nd Quartile	3rd Quartile	$60,924 Associate's	$59,472	$1,452	$1,452,000
			$80,717 Bachelor's	$77,110	$3,607	$3,607,000
4th (Highest) Quartile of Spending	4th Quartile	4th Quartile	$91,614 Associate's	$89,406	$2,208	$2,208,000
			$154,000 Bachelor's	$146,672	$7,328	$7,328,000

STRATEGIES THAT RAISE COLLEGE AND CAREER READINESS WILL PAY OFF

States are undertaking multiple efforts to increase the college and career readiness of students in elementary and secondary schools, such as adopting tougher K-12 standards and assessment systems. The Common Core State Standards (and other comparable standards) are designed to align the learning goals of secondary schools to the knowledge and skills demanded by colleges and well-paying jobs. State and federal funding for school improvement, school turnaround, and scaling up proven educational innovations are part of this effort to ensure that students get the support they need to graduate from high school prepared for college and careers.

Our cost-to-completion analysis shows that well-executed investments like these make economic sense. College readiness clearly correlates with college completion. Students who start college better prepared are more likely to earn credentials, and they do so more efficiently, avoiding remedial courses and taking less time to complete degrees. Strategies that raise the college readiness of low-income youth have the greatest potential efficiencies in cost to completion because these students' levels of college readiness are so low.

NELS data capture the relationship between college readiness and college completion. While 78 percent of high school graduates who had the highest levels of college readiness and who enrolled in college went on to earn a degree, only 31 percent of college entrants with the lowest level of college readiness did so.

Income clearly relates to college readiness and by extension to college completion and cost to completion. Only 23 percent of low-income students starting high school had prepared adequately for college by graduation. Moreover, as noted, only 17 percent who started high school eventually earned an Associate's or Bachelor's degree. In contrast, 46 percent of higher-income students entering high school had prepared for college by graduation, and 57 percent who started high school ultimately earned a degree.

Using the statistical relationship between college readiness and college completion, our cost-to-completion model enables us to extrapolate how increasing college-readiness rates also increases college-completion rates. For example, raising the college readiness of low-income students by 30 percent corresponds to an increase of 11 percentage points in college completion for low-income students and 15 percentage points for higher-income students.[8] Because more students attain the goal of completing college, the cost per successful student is lower. To use median state K-12 spending levels again, at these rates, the reduction in cost per Associate's degree would be $1,063 for low-income

students and $522 for higher-income students, and the reduction in cost per Bachelor's degree would be $961 for low-income students and $619 for higher-income students.

The model suggests how additional investments might pay for themselves through increased efficiency. For example, keeping spending at these median levels, a state could invest up to an additional $230 per pupil on strategies that achieve these rates of improvement in college readiness and yield cost-to-degree completion levels for low-income students that are still lower than at present.

Table 2 illustrates the gains in college completion and increased efficiencies in cost to completion that would be associated with closing the college-readiness gap between low-income and higher-income students for a range of state spending levels for K-12 and higher education. *(Note, we use NELS data to indicate college-readiness rates, rather than actual, state-specific readiness data.)*

In the last example in Table 2, we model cost-to-completion in a state such as Rhode Island that spends in the highest quartile for K-12 and the lowest quartiles on two-year and four-year colleges. Raising the national college-readiness rate of low-income students from 23 percent to the 46 percent rate of their higher-income peers raises college completion by 7 percentage points. This translates to a reduction in the cost of each Associate's degree they earn by $1,027, from $76,091 to $75,064.

TABLE 2.
THE VALUE OF RAISING COLLEGE-READINESS RATES FOR LOW-INCOME STUDENTS

Raising college-readiness rates for low-income students would substantially lower the cost to completion and raise the productivity of educational investments in a range of states.

RELATIVE LEVEL OF K-12 PER-PUPIL SPENDING	RELATIVE LEVEL OF TWO-YEAR PUBLIC COLLEGE SPENDING	RELATIVE LEVEL OF FOUR-YEAR PUBLIC COLLEGE SPENDING	COST TO DEGREE COMPLETION FOR LOW-INCOME STUDENTS	COST TO DEGREE COMPLETION FOR LOW-INCOME STUDENTS WHEN CLOSING COLLEGE-READY GAP	VALUE OF CLOSING THE PRODUCTIVITY GAP PER LOW-INCOME STUDENT	VALUE PER 1,000 LOW-INCOME STUDENTS
1st (Lowest) Quartile of Spending	3rd Quartile	3rd Quartile	$57,337 Associate's	$56,650	$687	$687,000
			$73,205 Bachelor's	$72,509	$696	$696,000
3rd Quartile of Spending	2nd Quartile	4th Quartile	$64,685 Associate's	$63,848	$837	$837,000
			$94,427 Bachelor's	$93,521	$906	$906,000
4th (Highest) Quartile of Spending	1st Quartile	1st Quartile	$76,091 Associate's	$75,064	$1,027	$1,027,000
			$71,487 Bachelor's	$70,509	$978	$978,000

INCREASING COLLEGE READINESS THROUGH ACCELERATION CAN BOOST PRODUCTIVITY SUBSTANTIALLY

A promising strategy for increasing college readiness, and one pursued by a number of school districts, colleges, and states, is to promote accelerated pathways from high school into and through college. For example, many states encourage students to take Advanced Placement courses and participate in dual credit/enrollment options. Others support early college high schools that target low-income and other underrepresented students.

These acceleration strategies enable high school students to take college-level courses before graduation as a way to become familiar with college expectations. Successful students also earn college credit that they can apply to college and potentially reduce their time and cost to completion.

Research suggests that these strategies improve high school and college persistence and completion. For example, participation in dual enrollment consistently shows a positive relationship to enrollment in college as well as persistence and completion.[9] For low-income and other underserved students, early college schools nationally have supported higher rates of college readiness, high school completion, college persistence, and the attainment of postsecondary degrees. Among early college students, 56 percent graduate with two years of transferable college credit or an Associate's degree.[10]

Our cost-to-completion modeling illustrates that effective acceleration strategies can have a substantial impact on increasing the productivity of K-12 and higher education spending. This impact is a function of three factors:

- States spend less per student because the strategies increase college readiness and completion.
- States spend less per student when students spend less time in college because they apply transferable credits toward a degree program.[11]
- The strategies realize the largest potential efficiency gains when they target and accelerate the education of low-income and other underrepresented students.

The example of public expenditure levels for K-12 and higher education in Texas is illustrative. Spurred by increased state support over the past decade, student participation in Texas's dual enrollment program has grown significantly, and 14 percent of all high school juniors and seniors now participate. Recent longitudinal research by JFF on Texas high school graduates from 2004 found that those who had completed a college course for dual credit were 1.65 times more likely to complete an Associate's degree or higher within six years of graduation, by 2010. The state has also supported the creation of 44 early college schools that are serving a low-income student population and achieving strong results consistent with national results for early college schools.

Our cost-to-completion modeling suggests that great reductions in cost to completion would be made for low-income students if Texas were to raise high school and college completion at rates consistent with those from research on early college schools and dual enrollment. Table 3 includes the research rationale for each change modeled. (Again, while we use the state's actual education spending rates, we use national college-ready rates, not the state's, to illustrate the potential magnitude of efficiencies.)

TABLE 3.
THE VALUE OF COMBINED STRATEGIES

Accelerating low-income students through some college during high school, in tandem with raising college-readiness rates, substantially lowers the cost to completion of a college degree.

SCENARIO	RATIONALE	REDUCTION IN COST TO COMPLETION FOR LOW-INCOME STUDENTS	VALUE PER 1,000 LOW-INCOME STUDENTS
Scenario 1: For low-income students, raise high school graduation rates by 17 percent and raise college-readiness rates by 15 percentage points.	The national rate for early college schools is 93 percent. The median rate of their home districts is 76 percent, a difference of 17 percentage points. Research shows that high school students who complete college courses for dual credit are 1.65 times more likely to earn a college degree. (1.65 x current low-income college-ready rate of 23 percent = 38 percent.)	$442 Associate's	$442,000
		$437 Bachelor's	$437,000
Scenario 2: In addition to Scenario 1, support students to earn 12 college credits by high school graduation.	In 2006, the Texas legislature required districts to offer students the opportunity to earn 12 college credits by graduation.	$3,003 Associate's	$3,003,000
		$2,691 Bachelor's	$2,691,000
Scenario 3: Same as Scenario 2, except support students to earn 20 college credits by high school graduation.	Graduates of early college schools nationally earn 23 credits on average by graduation.	$4,711 Associate's	$4,711,000
		$4,194 Bachelor's	$4,194,000

The increases in efficiency for low-income students are especially high when they earn substantial college credit in high school, as in early college schools. In fact, the model suggests that increases in degree productivity would more than offset investments that achieve these results. Thus, Texas could increase per-pupil expenditures by as much as 11 percent and still reduce cost to completion for low-income students if students earned 20 college credits by graduation and completed a college credential. If students earned 40 credits by graduation, investments per pupil could increase by as much as 21 percent.[12]

CONCLUSION

As policymakers make tough choices on how to invest public revenue, they should assess where they are likely to achieve the most value for taxpayers. Improving low college success rates by addressing their causes—lack of preparation for college and the need for remediation by students entering college—would create large public benefits.

Currently, states are wasting resources in their secondary and postsecondary education systems, particularly where programs and policies do not increase the numbers of low-income students who complete high school and college. States should invest in strategies that demonstrate the ability to increase educational success for these students. Such investments are an economic imperative for at least two reasons:

- These students include demographic groups that represent the fastest-growing segments of the nation's future workforce.
- The potential for increasing the productivity of educational investments is great.

These strategies must target college readiness, and they will get better results by supporting evidence-based acceleration strategies that can strengthen and hasten students' preparation for and completion of postsecondary credentials—especially by low-income students.

While we focus here on costs and benefits from the state perspective, strategies that raise college completion rates and reduce the cost to completion produce benefits at multiple levels. Students and families benefit from spending tuition dollars more efficiently and saving on tuition costs if they earn college credit in high school. Public colleges, which increasingly receive funding in part on the basis of performance, would be rewarded for working with high schools to improve students' college preparation and acceleration toward degrees. And school districts that produce higher college-readiness rates and opportunities for students to get a head start on college make their communities more attractive for potential residents and employers.

ENDNOTES

[1] Complete College America reports that over "50 percent of students entering two-year colleges and nearly 20 percent of those entering four-year universities are placed in remedial classes." About 65 percent of low-income students in two-year colleges take at least one remedial course. About 32 percent do so in four-year colleges (Complete College America 2012).

[2] Two examples of this are Augenblick, Palaich, and Associates' 2005 analysis of the return on investment for early college high schools and analyses done by the Alliance for Excellent Education (2011) on the return on investment that would result from raising high school graduation rates.

[3] Rigorous studies have shown that early college high school students in Texas are two times more likely to pass state exams in all four core subject areas than peers in comparison schools and more than two times more likely to pass the next math courses in the college prep sequence (SRI 2011). A study of North Carolina early college students found similar results (Edmunds 2010). Data from the Early College High School Student Information System, containing data provided by districts, schools, states, and the National Student Clearinghouse, show that 93 percent of early college students graduate from high school compared with 76 percent of students in their respective districts. At least 72 percent of early college high school students enroll in postsecondary education upon graduation compared with 55 percent of graduates nationally from schools where a majority of students, like early college schools, receive free or reduced-price lunch. Upon enrollment in college, at least 82 percent of early college high school graduates persist to their second year, compared with 69 percent of low-income students or first-generation college goers nationally.

[4] We use Texas, which is a relatively low-spending state, as an example. Its spending on K-12 education is the first (lowest) quartile nationally. For higher education, it is in the second quartile for two-year colleges and the first quartile for four-year colleges.

[5] While these data are old, they are still valued and used by education researchers because they follow students for 12 years—long enough to understand postsecondary education outcomes—and because the comprehensiveness of the survey allows for the examination of a multitude of factors associated with education attainment for a large sample of students over time.

[6] For purposes of illustration, we used Montana; it is at the median per-pupil level of spending nationally at $10,189.

[7] It is possible for the cost-to-completion calculator to create estimates based on a state's actual data if disaggregated data are made available.

[8] Raising the college readiness for higher-income students actually corresponds to an even greater increase in college completion—15 percentage points—mainly because low-income students face other barriers to completing college beyond academic preparation.

[9] For examples of these outcomes, see Struhl & Vargas (2012), Karp et al. (2007), Hughes et al. (2012), Klopfenstein (2010), Michalowski (2007), Speroni (2011a & b), Western Interstate Commission for Higher Education (2006), and Swanson (2008).

[10] These data come from the ECHS Annual National Survey 2010-2011 administered by JFF. For other research about early college schools, see also Edmunds et al. (2010) and SRI (2011).

[11] This assumes that the college credits earned by high school students are transfered to the colleges they attend. This is an important consideration for state policymakers. See Ward & Vargas (2012).

[12] JFF's research about the college credit-earning outcomes for some of the state's first early college schools showed that at least one school was graduating students with an average of 40 credits, amounting to an even lower cost to completion.

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