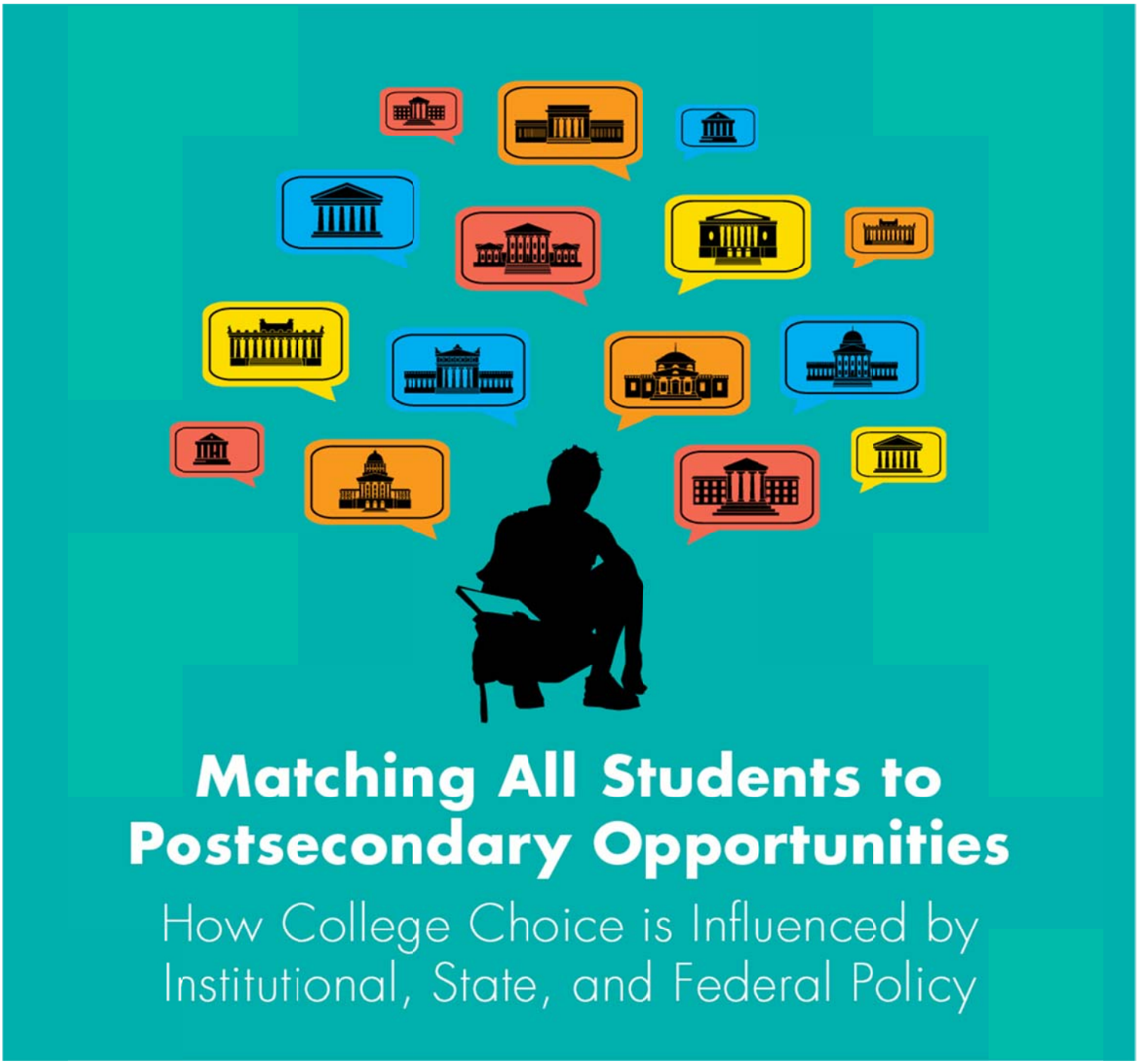

The Effect of State Policy on College Choice and Match

By Joshua Goodman, Michael Hurwitz and Jonathan Smith
Harvard University | The College Board

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States play a critical role in the U.S. higher education system, both by funding colleges and students and by regulating various aspects of the college admissions process.[1] This paper summarizes existing research on a variety of state higher education policies, with a focus on the effect of such policies on students' college enrollment choices, the quality of the colleges they attend, and their degree completion rates. We pay particular attention to the match between a student's academic skills and chosen college, in part because state policies most affect disadvantaged students who undermatch more frequently than do their more advantaged peers. We emphasize the importance of evaluating such policies not only on the basis of how they affect enrollment rates but also by the extent to which they connect students to colleges that give them the greatest chance completing their degrees.

This paper addresses four broad types of state policies that influence students' college enrollment and academic match. First, we examine in-kind spending, the subsidies that states provide to their public colleges. Second, we consider financial aid, both need- and merit-based, that states provide to their students. Third, we explore state policies that mandate public high school students take college entrance exams, such as the ACT or SAT. Fourth, we discuss admission criteria imposed by states, including affirmative action regulations, plans such as the Texas Top 10 Percent Rule, and minimum test score thresholds needed for admissibility.

In each of these areas, we provide an overview of the topic, discuss evidence provided by the existing research, and conclude with lessons learned and questions that still remain. Each section clearly demonstrates that state policies, intentionally and unintentionally, can have large impacts on college enrollment, college quality and college

match. We see consistent evidence that improving the quality of college attended improves students' longer-run outcomes such as degree completion. Students appear to benefit, or are at least not harmed, even in instances where attending a higher quality college results in a poorer academic match, suggesting that match may be less important as a concept than absolute quality.

After discussing many examples of these effects, we conclude with a broader discussion of the role of state policy in higher education and how states should consider evaluating such policies that are often geared at enrollment and affordability, not choice and match. The central lesson here is that policymakers should pay more attention to the margins on which students will alter their college choices as a result of the policy being designed. The ultimate impact of any higher education policy depends heavily on the alternative college choices students are forgoing as a result of the policy.

IN-KIND SPENDING

The primary way that states financially support students' pursuit of postsecondary education is through direct subsidies of public colleges themselves. In 2013, states spent a total of $72 billion on higher education, with local tax appropriations providing an additional $9 billion in support.[2] Of that total of $81.6 billion in state and local support, more than three-fourths (or $62.5 billion) funded "general public operations," meaning direct subsidies to the budgets of public colleges.[3]

There has been great variation over time in the extent to which these public in-kind subsidies have paid for college. In 1988, public subsidies amounted to $8,100 per

student, or 76 percent of the total cost of higher education. In other words, 25 years ago, student tuition accounted for only 24 percent of the cost of a college education. In 2013, public subsidies came to $6,100 per student, or 53 percent of the cost of a college education, with student tuition covering the remaining 47 percent. States' per-pupil subsidies for higher education have thus declined substantially in real terms, a trend particularly noticeable in the last 15 years or so.

There is also tremendous variation across states in the extent of in-kind subsidies. In 2013, Wyoming and Alaska's per student spending on higher education were $12,900 and $16,500, respectively. Nine other states spent between $7,000 and $10,000 per student. Conversely, New Hampshire and Vermont respectively spent $1,700 and $2,700 per student. Sixteen other states spent less than $5,000 per student. As a result, states vary quite widely in the extent to which students are subsidized to attend public colleges. We turn now to evidence on the effect of such subsidies.

Evidence on the Effects of State In-Kind Spending

The seminal paper on in-kind spending on higher education is by Sam Peltzman, which carefully distinguishes the theoretical effects of in-kind spending from those of an equivalent money subsidy such as a scholarship. Peltzman notes that while direct financial aid unambiguously increases the amount of higher education a student will pursue by lowering its price, an in-kind subsidy's effect is actually ambiguous. In particular, the large amount by which public college tuitions are subsidized can induce some students to enroll in the public sector, where less money in total will be invested in their higher education than if they had enrolled in the private sector. This phenomenon is

due in part to the indivisible nature of higher education (such as the inability to take individual classes at multiple campuses).[4]

Peltzman himself estimates that about three-fourths of public spending on higher education simply substitutes for private spending and that at times public spending actually displaces more than its value in private spending. In another study, Philip Ganderton uses student- and college-level data to estimate the impacts of public subsidies on college enrollment choices. He argues that such subsidies induce students to choose public colleges of much lower quality than the private colleges they would otherwise have picked.[5] Bridget Terry Long extends this work, arguing empirically that if state appropriations to public colleges could be used at any in-state college, then roughly one-fourth of students would prefer to attend private four-year colleges instead.[6]

The estimates provided by these papers are generated by regression analyses that include controls for potentially confounding factors. More recent papers have exploited natural experiments to try to identify the impact of changes in in-kind spending on student outcomes. Stephanie Cellini uses a regression discontinuity design to compare two-year college enrollment in communities where college funding bond referenda barely passed to those where it barely failed. She finds that bond passage, which increases funding for public two-year colleges, diverts students from enrolling in private colleges and, by shrinking that sector, leads to closure of some of those private colleges. This is direct, quasi-experimental evidence that in-kind spending can shift enrollment into the public sector. In this case, it appears such spending did not impact overall enrollment rates and too little time had passed at the study's publication to estimate impacts on degree completion rates.[7]

In addition, John Bound and Sarah Turner exploit the fact that the overall level of state subsidies changes slowly over time, too slowly to react to short run fluctuations in the size of the cohorts potentially attending public colleges.[8] This means that students born in an unusually large cohort have access to public colleges where the resources per student are lower than they are for students born in a smaller cohort. The authors find that students in such large cohorts are substantially less likely to have earned a college degree than students in small cohorts. They argue that the most likely explanation for this finding is that such students are less subsidized and thus have fewer resources available to them while on campus. This might include fewer faculty members per student, fewer courses open to enrollment, less academic support outside of the classroom, and perhaps less subsidized housing. This is quasi-experimental evidence that in-kind spending per pupil affects not only enrollment, as prior papers showed, but also degree completion.

Furthermore, states' goals of improving their local economies by financing higher education would be undermined substantially if the additional college graduates produced by such subsidies migrated out of state. John Kennan explores the question of whether in-kind spending ultimately results in a more educated in-state labor force, estimating a dynamic programming model of expected income maximization with data from the *National Longitudinal Survey of Youth*. Consistent with the literature discussed here, he finds that in-kind subsidies do increase college enrollment.[9] More importantly, he argues that improvements to the educational attainment of in-state labor forces are long-lasting because such improvements do not dissipate due to migration. In other words, a substantial fraction of students whom in-kind subsidies induce to earn degrees in-state remain in-state upon entering the labor market.

Lessons and Remaining Questions

The literature on states' in-kind spending shows that a large fraction of such spending displaces what would otherwise be private expenditures on higher education. By constraining that subsidy to students who choose public colleges, in-kind spending diverts some students from private colleges, so that college quality and match are likely affected for students on the margin of choosing between the public and private sectors. Whether such students benefit from the in-kind spending depends on both the relative tuitions in the public and private sectors and the relative qualities of colleges in those sectors. Both of these dimensions vary by state, making it difficult to generalize about the effects of in-kind spending on college match and quality.

The key remaining questions about in-kind spending concern which policy option is the appropriate comparison. Much of the existing literature compares levels of in-kind spending and implies that increasing in-kind spending per pupil improves college outcomes relative to lower levels of in-kind spending. We know much less about how changing policy design—such as a shift from in-kind support to a portable voucher that students could use anywhere—might affect student choices.

FINANCIAL AID

In addition to the in-kind subsidies that states provide through financial support of public colleges, states also provide subsidies directly to individual students through various forms of financial aid. In the 2012-13 academic year, states awarded $11.2 billion in financial aid, about 85 percent of which consisted of grants. Of that grant aid, $7.1 billion

funded need-based grants and $2.4 billion funded non-need-based grants, usually in the form of merit aid. States spent the remaining $1.7 billion of non-grant aid largely in the form of tuition waivers ($900 million) or loans ($400 million). The remaining aid dollars were spent on loan forgiveness, conditional grants, work-study, and other miscellaneous forms of support.[10]

There is wide variation across states in the amount of financial aid being provided to undergraduates and in the form of that financial aid.[11] South Carolina, for example, spends the most of any state on all grant aid, roughly $1,900 annually per undergraduate student. The equivalent figure is less than $200 in 14 states, including New Hampshire and Wyoming, which provide no grant aid. In terms of need-based aid, South Carolina ranks 22nd among the states with only $300 in aid per student, as over 80 percent of the grants it provides comes in the form of merit-based scholarships. The state of Washington, in contrast, ranks first in the nation in terms of need-based grants, providing $1,300 per undergraduate. This amount represents over 99 percent of the grant aid that the state distributes.

Evidence on the Effects of State-Provided Financial Aid

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Some of the earliest rigorous research on these questions explored only the impact of state financial aid programs on college enrollment, in part because the programs or data were too recent to observe students' degree completion results. Susan Dynarski examined the enrollment impacts of Georgia's HOPE Scholarship, a merit aid program that allowed free attendance at in-state public colleges for graduating Georgia seniors

whose high school GPA was at least a B. To identify the impact of the new program, Dynarski uses a difference-in-difference strategy that estimates the change over time in Georgia's enrollment rates relative to those in nearby states that did not implement such a program. She finds that this fairly generous aid program, for which over half of Georgia students were eligible, increased college enrollment rates among 18- to 19-year-olds by a substantial 7 percentage points, or about 4 percentage points for every $1,000 in aid.[12]

Similar impacts on college enrollment are seen in other early papers on state aid programs. Thomas Kane studies the California's CalGrant program, which had both minimum GPA and financial need requirements. The aid would cover tuition and fees at in-state public colleges, worth less than $4,000, or would cover up to $9,400 in tuition at in-state private colleges, in part because the state found it cheaper in the short run to subsidize private enrollment than to expand overcrowded public campuses.[13] Kane uses a regression discontinuity approach that compares students just above and below the GPA threshold that determined eligibility, students who are otherwise similar but for aid eligibility. He finds that students eligible for CalGrant are 3 to 4 percentage points more likely to enroll in college at all, and an even larger proportion are induced to switch from public to private colleges.

Additionally, in another study, Kane studies a rare example of federal aid that changes the relative price of colleges across states. In 2000, Congress created the D.C. Tuition Assistance Grant, which allowed D.C. residents to pay in-state tuition rates at public colleges in Maryland and Virginia. The program was designed to expand the options available to D.C. residents, for whom the only in-district four-year public college, the University of the District of Columbia, was an open admissions campus that

functioned much like a community college. Kane finds that this dramatic drop in tuition more than doubled the number of D.C. residents attending public colleges in those two states. Some of this effect appears to be due to the shifting of students among four-year colleges but some also appears to stem from low income students who would not otherwise have enrolled in the absence of this tuition drop.[14]

With consistent evidence that financial aid generally, and state aid in particular, has relatively strong impacts on college choices and overall enrollment rates, subsequent research has turned toward the question of whether such aid translates into increased degree completion rates. Enrollment and completion effects might be quite different if, for example, the marginal student induced to enroll due to increased financial aid faces further constraints (financial, academic, or other) that prevent graduation. With this in mind, Susan Dynarski provides a follow-up study of the Georgia HOPE program, as well as of a similarly generous scholarship program run by Arkansas. Again employing a difference-in-difference strategy using nearby states as controls, Dynarski finds that exposure to these programs increases the fraction of young people enrolling in college by 1.6 percentage points and the fraction completing a college degree by 3 percentage points. This means that at least half of the increased degree completion came from inframarginal students, those who would have enrolled even in the absence of the program but due to the aid faced lower costs than they otherwise would have.[15]

Recent work by Ben Castleman and Bridget Terry Long explores the impact of Florida's Student Access Grant, a need-based grant that gave students from low income families an additional $1,300 annually in addition to any Pell Grant funding. This amount was sufficient to cover over half the average cost of tuition and fees at in-state four-year

public institutions. The authors identify the impact of the grant through a regression discontinuity design that compares students whose estimated family contributions placed them just above or just below the threshold for grant eligibility. They find that eligibility for this aid increased both enrollment in four-year public colleges (by 3.2 percentage points) and also the probability of earning a bachelor's degree within six years (by 4.6 percentage points). The estimated impacts are largest for the academically strongest students, those with relatively high GPAs in high school.[16]

Evidence from Georgia, Arkansas, and Florida thus suggests that state aid can increase not only enrollment in college but also degree completion. Recent evidence from Texas and Massachusetts suggests, however, that not all aid programs improve degree completion rates. Jeffrey Denning studies students in Texas whose school districts were annexed into a local community college's taxing district and thus became eligible for a substantial tuition discount at that community college. Using a difference-in-difference strategy that exploits the staggered timing of these annexations, Denning finds that a $1,000 drop in the sticker price of community college increases community college enrollment rates by about 3 percentage points. Most of the marginal students would not have attended any college otherwise and very few if any gave up four-year college options due to this price change, suggesting small effects on match. Importantly, he finds little clear evidence of any increase in degree completion rates, perhaps because the community college students affected by this aid have very low completion rates to begin with.[17]

In Massachusetts, Sarah Cohodes and Joshua Goodman study the Adams Scholarship merit aid program that subsidizes tuition at in-state public colleges for

students in the top quartile of each graduating high school class. Using a regression discontinuity design that compares students just above and below the test score-based eligibility threshold, the authors find little evidence of increased enrollment rates, largely because the marginal student is already very likely to enroll in a four-year college. They do, however, find that the scholarship induces a substantial number of students to switch from private four-year to public four-year colleges and, more importantly, that receipt of the scholarship actually reduces degree completion rates. Cohodes and Goodman argue that this negative impact of aid on completion can be explained by the fact that recipients forgo private colleges that are academic matches with relatively high graduation rates in order to enroll in public college with relatively low graduation rates, and that this institutional quality affects the individual students.[18]

Interestingly, this evidence on the relationship between financial aid, college quality, and degree completion is also consistent with evidence from the Georgia HOPE Scholarship. Rajashri Chakrabarti and Joydeep Roy document that Georgia's aid program caused students to enroll in more selective colleges because the state's public four-year colleges were more selective than the private and out-of-state colleges that students would have attended in the absence of the scholarship.[19] Coupled with Dynarksi's evidence that the HOPE Scholarship increased graduation rates and contrasted with Cohodes and Goodman's evidence from Massachusetts, this study suggests that financial aid may improve degree completion rates as long as the given program is not designed in such a way as to induce students to sacrifice college quality.

Lessons and Remaining Questions

Research on state-provided financial aid thus provides a few clear lessons. First, such aid can have substantial effects on the probability that a given student enrolls in college at all. Second, it can also have a substantial effect on the type of college students choose, whether public or private or in-state or out-of-state. Much of the research demonstrates a jump in four-year college enrollment, instead of two-year enrollment, which is one of the largest undermatch margins.[20] Third, aid can improve completion rates, particularly if the aid program's design raises or at least does not lower the average quality of the college students choose to attend.

These lessons suggest some critical questions that those designing or evaluating state-provided financial aid programs should consider. First, how does the program's design determine the marginal student whose college enrollment decision is changed by the aid? The marginal student's income and academic skill will relate strongly to the set of college options among which he or she is choosing, whether four-year, two-year, or none; public or private; in-state or out-of-state; high quality or low quality.

Second, how does the program's design determine what fraction of aid recipients would have enrolled in college absent such aid and how many aid recipients choose to enroll because of the aid? Third and related, does the program's design create price wedges between different colleges that may distort college choices in potentially perverse ways? All state aid programs lower the relative price of in-state colleges but only some alter the relative price of the private and public sectors. In different state contexts, these changes in relative prices can differ dramatically in their effect on the quality of college students choose, which in turn affects the long-run impact of these programs on degree

completion, among other outcomes. To what extent do these price distortions help or harm students?

EXAM-TAKING POLICIES

In 2001, No Child Left Behind required states' publicly funded K-12 school systems to administer standardized tests for accountability purposes. Since then, at varying times, a handful of states have chosen to use a college entrance exam such as the ACT or SAT to satisfy that requirement for high school testing. These include Colorado (2002, ACT); Illinois (2002, ACT); Maine (2006, SAT); Michigan (2008, ACT); Kentucky (2009, ACT); Delaware (2010, SAT); Idaho (2010, SAT); and Tennessee (2010, ACT).[21] In such states, nearly all public school students have to take a nationally recognized college entrance exam, typically as juniors. Many of these students would not have taken the exam in the absence of the state policy. In Maine, for example, the number of SAT takers increased by 43 percent in the year the SAT was mandated.[22] In Colorado and Illinois, between one-third and one-half of high school students are induced to take the ACT as a result of the state requirement.[23]

Policymakers in those states may have been motivated in part by the belief that mandating the taking of college entrance exams might improve college enrollment rates. Do such mandated exam-taking policies affect college enrollment? There are three reasons why exam-taking requirements might affect college enrollment decisions. First, such entrance exams are required by many colleges' admissions processes, so that failure to take such an exam is automatically disqualifying. George Bulman, for example, shows

that the opportunity to take the SAT at a student's own high school, rather than traveling to a different testing center, results in an 8 percentage point increase in test-taking rates and that nearly half of those new test-takers ultimately enroll in four-year colleges.[24] State policies requiring college entrance exam-taking may counteract some students' tendencies to let small short-run costs affect decisions with large long-run implications.

The second reason such policies may affect college enrollment is that taking such exams may improve students' information about the college application process, about specific potential colleges, and about their own academic skills. Exam takers have the option to receive information from specific colleges. Obtaining additional information in the college application and enrollment process is important because ample research suggests that some students, particularly low-income students, lack valuable information when choosing colleges. For example, Christopher Avery and Thomas Kane show that students from low-income households have similar college aspirations to neighboring high-income students, but their unfamiliarity with the college application process prevents similar college-going patterns.[25] The lack of information and support among poor and rural students, often leading to undesirable college application and enrollment decisions, is well documented.[26] Caroline Hoxby and Sarah Turner show that providing information about colleges can induce low-income, high-achieving students to enroll in a relatively selective college over a less-selective one and thus improve their academic match.[27] Students may also learn from exam-taking that they had previously underestimated their own academic skills, so that exam-taking induces them to choose higher quality college options than they would otherwise have chosen. Conversely, some students may have previously overestimated their skills, in which case mandatory exam-

taking may cause them to shift down the college quality distribution. The net effect of this last point depends on whether the lower quality or improved match has a dominant effect.

A third reason such policies may affect enrollment is that school-wide college entrance exam administration may create a college-going culture in high schools. Studies by both Michael Hurwitz and others and the Strategic Data Project show that observably similar high schools can have vastly different college-going and undermatch rates.[28] If students learn from one another, perhaps about new colleges or about the benefits and costs of selective colleges, then there may be positive spillovers from students to each other. These externalities may mean that school-wide administrations of college entrance exams have larger college enrollment impacts than would interventions to induce individual students to take such exams.

Evidence on the Effects of State Exam-Taking Policies

Recent research has estimated the impact of states' mandatory college entrance exam-taking policies on students' college choices. The three main questions addressed by this literature include whether such policies increase enrollment rates in four-year colleges, whether they change the type and quality of the colleges students choose, and which kind of students are most affected by such policies.

Four-year college enrollment rates clearly respond to mandatory exam-taking policies. Michael Hurwitz, Jonathan Smith, Sunny Niu and Jessica Howell find that Maine students induced to take the SAT are 10 percentage points more likely to enroll in a four-year institution, which translates into a roughly 5 percent increase in Maine's

overall four-year enrollment rates.[29] Daniel Klasik finds that Illinois's four-year colleges saw enrollment increases of 12 percent and that Colorado's private four-year colleges saw a 10 percent increase in enrollment.[30] Sarena Goodman estimates that four-year enrollment in Colorado and Illinois actually increased by about 14 percent.[31] Joshua Hyman finds that enrollment at Michigan's four-year colleges increased by 0.6 percentage points, or 2 percent.[32] All of these studies suggest that, for some subset of students, the state's requirement that they take a college entrance exam does induce them to enroll in four-year colleges.

Do such policies affect the type and quality of college that students choose? It appears that some of the marginal students induced to enroll in a four-year college would otherwise have attended a two-year college. Klasik finds, for example, a sharp decrease in two-year public college enrollment in Illinois and Maine following the new exam-taking policy, implying that more students were induced to forgo two-year colleges in favor of four-year colleges than were induced to choose two-year colleges instead of no college.[33] This is not true in all states, as Klasik finds a marginal increase in two-year public college enrollment in Colorado, and Hyman finds no significant change in two-year enrollment in Michigan, though his point estimate is negative.[34] Mandatory exam-taking also appears in some contexts to increase the selectivity of colleges students choose. Goodman estimates that the new policy made students 20 percent more likely to enroll in selective colleges as opposed to less selective four-year and two-year colleges.[35] Klasik finds a similar result in Colorado, though not in Maine or Illinois.[36] These mixed findings suggest some evidence of increases in college quality, though that result is not consistent across all contexts.

Finally, the type of student most affected by mandatory exam-taking policies appears to be consistent with prior research that suggests isolated and low income students have a difficult time attaining information on colleges.[37] Hurwitz et al. find that their results, for example, are driven by students from Maine's rural high schools.[38] Similarly, Hyman finds that the modest improvements in four-year enrollment are driven by sizeable improvements among low-income students and students in high poverty high schools.[39] He also shows that these effects are driven more strongly by high scoring low income students, a result consistent with the finding in Goodman that there are many high scorers who would not have taken the exam in the absence of the mandate and therefore would have undermatched.[40] These two papers show that it is not simply students who are on the margin of college readiness who may benefit from such a mandate.

Lessons and Remaining Questions

Research on states' mandatory college entrance exam-taking policies thus provides a few clear lessons. First, such policies have the potential to change four-year college enrollment rates. Second, they can also improve the quality of the college that students attend and thus affects match. Third, the marginal student whose college choice is most affected by such policies tends to be geographically isolated or from a low income family or school. Fourth, not all such marginal students have low academic skills. Some are highly skilled students for whom attending a matched selective four-year college may have long run benefits.

Three major unanswered questions remain. First, which of the underlying mechanisms discussed earlier is responsible for the observed enrollment effects?

Second, what fraction of the marginal students whose college choice is altered by these policies successfully complete their college degrees? These policies are too recent to estimate six-year graduation rates, but Hyman finds relatively high persistence among Michigan students, suggesting future studies may find positive graduation impacts.[41] Third, and most broadly, how do these mandates compare in terms of cost effectiveness to other state policy options for improving enrollment and completion?

PUBLIC COLLEGES' ADMISSIONS CRITERIA POLICIES

Affirmative Action

While much college match research focuses on undermatch, overmatch also attracts attention, particularly as it relates to affirmative action. Some critics of race-based affirmative action argue that it does a disservice to those students who would not have been admitted otherwise on the basis of their academic record. Such students, those critics argue, find themselves among the least academically prepared students on their college campus and may suffer as a result. The skill gaps between racial groups on a given campus have been documented by William Bowen and Derek Bok, who find black students entering their sampled colleges between 1976 and 1989 have SAT scores between 150 and 200 points lower than white students on a 1600 point scale.[42] At Duke, Arcidiacono et al. document a recent black-white SAT gap of about 140 SAT points. These SAT point gaps point to academic overmatch.[43]

Several recent studies attempt to estimate whether affirmative action may actually harm the students that it is intended to help. Richard Sander argues that overmatched

African-American law students fail the law bar at a higher rate as a result of an admissions process that inappropriately matched those students to overly selective law schools.[44] In response, Daniel Ho notes a number of flaws in that analysis, including the use of correlational analyses to make causal claims.[45] Jesse Rothstein and Albert Yoon make different statistical choices and conclude that, except for the weakest law school students, academic "mismatch" does not disadvantage black students' law school graduation rates, bar passage rates or employment prospects.[46] Arcidiacono and Lovenheim, in an extensive review of this literature, conclude the question of mismatch "merits further attention, where more definitive answers could be answered with better data."[47]

One reason that research has not clearly answered the question of the long-run impacts of affirmative action on underrepresented students is that the counterfactual is hard to identify. Recent state-level policy changes have, however, generated clearer evidence about the short run college enrollment effects of affirmative action. California, Texas, Florida, Michigan and Washington now forbid race from factoring into the admissions processes at public colleges.[48] Several researchers have documented how such affirmative action bans have impacted the college match process for underrepresented students.

Marta Tienda et al., for example, show that both of Texas's most selective public postsecondary institutions (UT-Austin and Texas A&M) experienced declines in the fraction of enrollees identifying as African-American or Hispanic/Latino after the ban on affirmative action imposed by *Hopwood v. University of Texas*.[49] Subsequent studies have echoed this findings that underrepresented minorities are shut out of some,

particularly very selective, postsecondary institutions as a result of affirmative action bans. Peter Hinrichs, for example, shows that California's 1998 ban generated a cascading effect in which underrepresented minorities shifted from the more selective University of California institutions (UC Berkeley, UCLA, UCSD, and UC Davis) toward the least selective institutions (UC Irvine, UC Riverside, UCSB, and UCSC). Underrepresented minority students' enrollment at the more selective institutions dropped by 4 percentage points, a decline partially offset by a 2 percentage point increase in enrollment at the less selective institutions.[50] This is some of the clearest evidence that affirmative action does substantially improve the average quality of college attended by underrepresented minority students.

The Texas Top 10 Percent Rule

Just one year after affirmative action was banned by the *Hopwood* decision in Texas, the state legislature passed a bill now known as the "Top 10 Percent Rule." Anticipating that the affirmative action ban would reduce the number of underrepresented minorities at Texas's most selective colleges, the Top 10 Percent Rule mandated that any Texas high school senior in the top 10 percent of her class would be admitted automatically to the Texas public college of her choice.[51] Given the extent of racial segregation among Texas's public high schools, the Top 10 Percent Rule allowed for the admission of underrepresented students who might have been shut out of the most selective institutions like UT-Austin and Texas A&M were they compared to the statewide distribution of applicants. The new rule essentially allowed for the continuation of academic overmatch for some students without explicitly using race to justify this overmatch.

How much did the Texas Top 10 Percent Rule allow for the preservation of diversity in a legal environment where the consideration of race in the admissions process was forbidden? Mark Long and Marta Tienda examine data from the three most selective Texas universities (UT-Austin, Texas A&M, and Texas Tech) for the entering classes of 1990 through 2003, a period that encompasses three distinct admissions policy regimes. The authors find that at UT-Austin, the most selective of the three institutions, black and Hispanic applicants enjoyed a 13 percentage point admissions advantage relative to academically similar white applicants between 1990 and 1996, when race could be considered in admissions. In 1997, when consideration of race was banned, that admissions advantage disappeared. Upon implementation of the Top 10 Percent Rule in 1998, black and Hispanic applicants regained some, but not all, of that pre-*Hopwood* admissions rate. At the somewhat less selective Texas A&M, the admissions advantage did not return with the Top 10 Percent Rule. At the least selective of the three colleges, Texas Tech, there was little evidence in the earliest period of an advantage for black and Hispanic students, and after implementation of the Top 10 Percent Rule, such applicants actually had lower probabilities of admission than academically similar white students.[52]

Long and Tienda's analyses, while descriptive in nature, strongly suggest that the affirmative action bans and subsequent Top 10 Percent Rule markedly reshaped admissions policies, at least at Texas's two flagship institutions. In a subsequent paper, Niu and Tienda use a regression discontinuity comparing students on either side of the GPA threshold defining the top 10 percent to identify the impact of automatic admission on college enrollment decisions. They find large but noisy differences in the probability of enrollment at a flagship institution as a result of automatic admission, with Hispanic

students showing a particularly large and statistically significant difference.[53] Eric Furstenberg also finds a substantial increase in the quality of college attended as a result of eligibility for automatic admission, further arguing that the data show a decrease in graduation probability.[54] This last finding, however, should be treated with caution as he is not able to observe college enrollment and graduation outside of the Texas public sector, thus missing students who attend private or out-of-state colleges.

Daugherty et al. can observe students regardless of where they enroll in college and apply a similar regression discontinuity approach to data from a single, large school district. They find clear evidence that eligibility for automatic admission substantially increases enrollment at the flagship universities.[55] This enrollment entirely displaces enrollment in private universities of similar quality, so that overall enrollment and average college quality are unchanged. Such enrollment changes are driven by students at schools with relatively high college enrollment rates, so that students from the most disadvantaged schools appear not to benefit from the policy. Taken as a whole, this evidence suggests that the Top 10 Percent Rule does increase access to Texas' flagship public colleges for minority students, though the longer-run effects on degree completion and labor market outcomes are still unclear.

Minimum Admissions Criteria

A recent survey by the National Association for College Admissions Counseling finds that one in five colleges reports using specific test scores as minimum thresholds for admission, often in combination with minimum GPAs. These statewide minimum threshold policies help public colleges process large applicant pools with limited

resources and serve to screen out applicants who may be academically unsuitable for those institutions. States that use such criteria across their entire public higher education systems include California, Texas, Florida, and Georgia. For example, in the state of Georgia, the Board of Regents requirement that students score at least a 430 on the critical reading section and a 400 on the math section of the SAT in order to gain entry into one of the state's four-year public colleges.[56] This creates a dichotomy: students who just meet the criteria have access to public four-year colleges and are more likely to attend and, consequently, overmatch. Students who just miss the criteria are more likely to attend two-year public colleges and, consequently, undermatch.[57]

Goodman et al. exploit the aforementioned Georgia SAT minimum thresholds. The authors use a regression discontinuity design to compare the college enrollment choices of students just above and below those thresholds, students who are otherwise identical except for differences in eligibility for admission. They find that access to four-year public sector institutions increases the probability of enrollment in that sector by as much as 10 percentage points. If not for access to the four-year public sector, as much as three-quarters of such marginal students would have instead attended two-year community colleges. The remaining students would largely have attended other four-year institutions.[58]

Seth Zimmerman performs a similar empirical exercise in Florida, exploiting the fact that Florida International University (FIU), the state's least selective public four-year college, has minimum GPA requirements for admission. He shows that GPA-based eligibility increases by about 10 percentage points the likelihood of enrolling at FIU and,

as in Georgia, that many of the marginal students would have attended community colleges if not for admission to this four-year college.[59]

Both papers thus indicate that strict minimum admissions criteria in public college systems can substantially change the type and quality of college that a student attends. This implies that the set of choices students face is not a continuum. In part because of the in-kind subsidies states provide by funding public colleges directly, it is hard to find colleges of similar price and quality to the four-year public colleges to which some students want access. Private colleges of similar quality are often substantially more expensive.

Given the clear enrollment and match effects, it is unclear whether states consider the effects of the policies on marginal students' longer term outcomes. Interestingly, both papers clearly show that the benefits of being at a higher quality college (or a four-year college instead of a two-year college) far outweigh any disadvantages over such overmatch. In Georgia, the marginal student who enrolls in the four-year public sector roughly doubles his chances of earning a college degree. In Florida, enrollment at FIU yields substantial gains in labor market earnings about a decade later. Both studies find that the degree completion gains and earnings gains are concentrated among students from low income backgrounds.[60]

Lessons and Remaining Questions

The literature on affirmative action bans makes clear that affirmative action has a substantial impact on the quality of colleges that underrepresented minority students attend, often resulting in overmatch. The Top 10 Percent Rule does appear to mitigate

some of the effects of affirmative action bans, though perhaps not for students from the most disadvantaged schools. Much less clear is whether access to more selective colleges as a result of affirmative action or automatic admission has a positive impact on students' longer-run outcomes. Also unmeasured in this research is the impact on those applicants displaced to other colleges by students admitted because of affirmative action.

Research on minimum admissions criteria at public colleges makes clear such criteria can substantially change the type and quality of college students choose. The two papers reviewed suggest, however, that attending a higher quality college is beneficial to disadvantaged students even if such students are academically overmatched. In other words, absolute measures of college quality appear to matter more than the match between a student's skills and the college he attends. That the relatively low-skilled students in these studies benefitted from attending a public four-year college suggests that such admissions criteria may be screening out some potentially successful students. No research yet has explored the effect of relaxing such criteria on either students at the margin or public higher education systems as a whole. Doing so might increase access for some potentially successful students but might also involve admitting a higher number of incorrectly matched students as well, while increasing the costs of the admissions process itself. The net result of such a change is ex ante unclear.

CONCLUSION

The evidence reviewed here shows that state higher education policy clearly impacts students' college choices. In-kind subsidies, financial aid, mandatory college entrance exams and admissions regulations all affect college enrollment rates, college quality and

academic match. Policymakers often mistakenly focus on increasing overall enrollment rates while neglecting the potential for policies to shift students between different types of colleges. The evidence suggests that match quality itself matters relatively little for longer-run outcomes but that absolute college quality does matter. To the extent that students have viable choices between colleges, choosing the highest quality college appears to improve degree completion rates more than choosing the closest academic match.

As a result, to increase degree completion rates requires designing policies that on balance shift students to higher quality college options than they otherwise would have selected, where quality is measured by an institution's track record of graduating students. This can mean shifting students from no college to the community college sector or from the community college sector to the four-year sector. It can also mean shifting students within the four-year sector to colleges with higher institutional graduation rates. Policies that, often unintentionally, distort student decisions toward lower quality colleges are almost certainly poor uses of public funds. One plausible hypothesis is that the best use of a public dollar in this context is the policy most improves the graduation rate of the institution that a student chooses to attend.

At least two fundamental questions remain largely unanswered by the existing research. First, nearly all of these analyses abstract from general equilibrium effects. Do students displace one another or are there a flexible number of seats at colleges? Michael Bastedo discusses this potential issue at length.[61] Second, what are the effects of these policies away from the margins, if any? Are students whose colleges choices remain

unchanged nonetheless indirectly affected by the changing composition of their peer groups? We hope future work will address these bigger picture questions.

Finally, though states can affect students' college choices in meaningful, such policies are not the only options available for improving longer-run outcomes. In addition to encouraging students to choose institutions with better historical completion rates, states could, for example, focus on improving colleges' degree completion rates. The best state policies could both improve the college choices students make and the quality of the choices students have.

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[1] This research reflects the views of the authors and not their corresponding institutions.
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