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Transitioning from High School to College: Differences across Virginia

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In Virginia, there are substantial differences across school districts in college enrollment and, conditional on college enrollment, attendance at high-resource colleges and universities. School districts in low-income and relatively rural areas tend to demonstrate the weakest outcomes, but income and geography do not fully account for the observed differences. Whether limited enrollment at a broad range of colleges arises from gaps in academic preparation, difficulty in navigating the application process, or individual preference matters greatly for public policy.

Nationally, Virginia appears to be a leader in college education, ranking seventh in the country in bachelor's degree attainment among residents.[1] Within Virginia, however, college-going varies widely by school district. In the fall of 2014, attendance at any two- or four-year college among high school graduates ranged from less than 50 percent in several low-income, predominantly rural districts to more than 80 percent in several high-income, suburban localities. Students also differ systematically across districts in where they choose to apply to college and eventually enroll. These differences are particularly significant at the state's most resource-intensive public colleges and universities, such as the University of Virginia (UVa), the College of William & Mary (W&M), and Virginia Tech (Tech).[2]

Given the clear evidence of employment and earnings rewards for college completion, and the potential impact of college completion on intergenerational mobility and economic growth, the pattern is both striking and concerning.[3] Students from low-income, predominantly rural districts in the state are both less likely to attend college and, conditional on college attendance, less likely to attend a high-resource institution than their counterparts from more affluent districts, mostly in urban or suburban areas. The observation of large differences in college choice by place of residence raises questions about whether policies in different school districts and the recruiting strategies employed by colleges and universities are successful in providing a full range of college choices to all Virginians. In 2015, fifty-two of the state's 132 school districts sent no students to W&M, twenty districts sent no students to UVa (which is appreciably larger and more centrally located than W&M), and seven sent no students to Tech.

Whether inequalities in college attendance and college choice derive from differences in academic preparation, navigation of the application process, or individual preference matters greatly for public policy. Gaps in academic preparation that

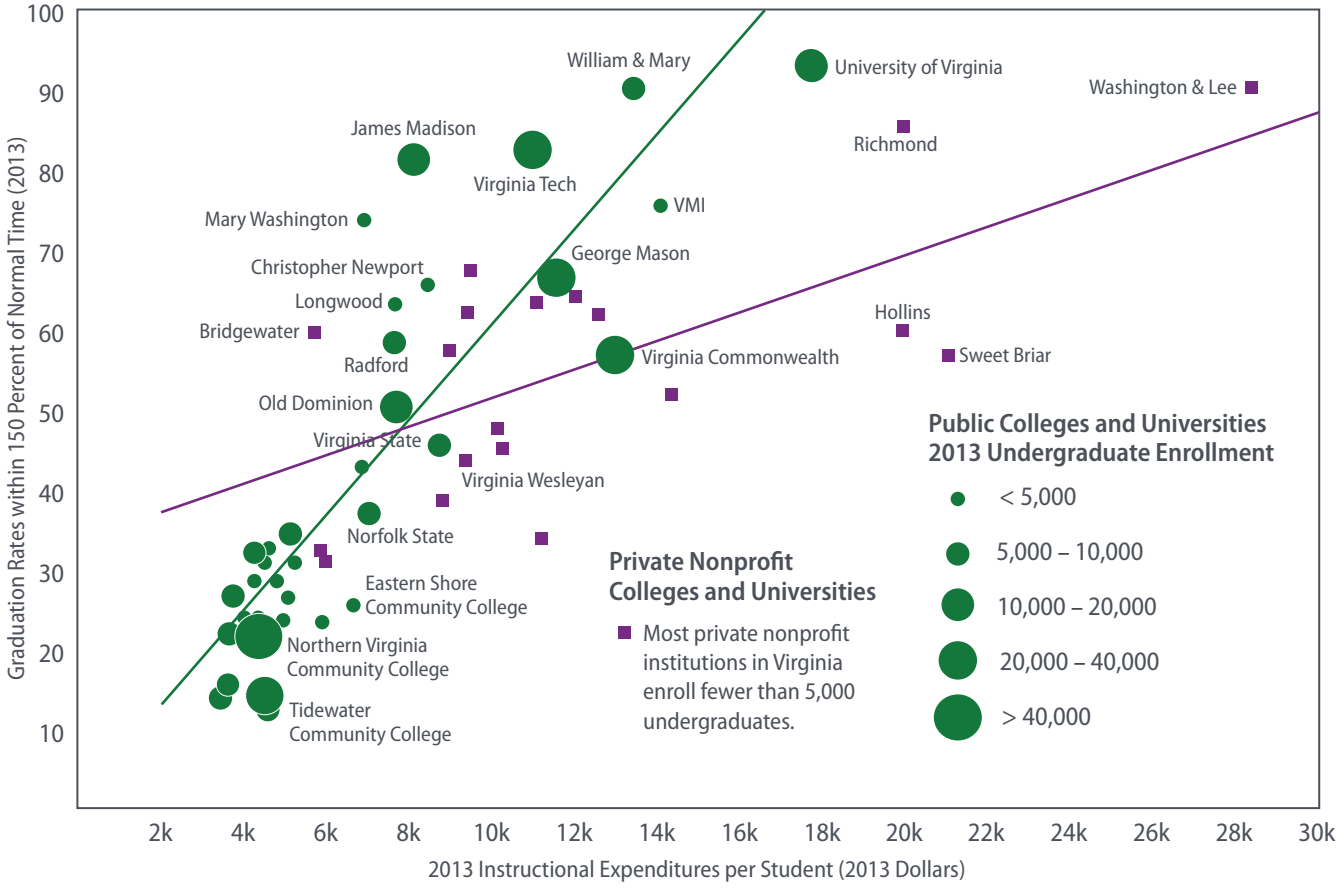
generate differences in college choice should prompt scrutiny of achievement gaps at the district level. Additionally, student "selection" into different college types may arise from information barriers or from differences in guidance from counselors, teachers, and parents in the application process. Finally, preferences that may vary by community, such as a desire to be close to home or to attend institutions with familiar cultural dimensions, should not be discounted.

This *Economic Brief* sets forth some facts about the matching of students to colleges and universities with the aim of understanding the primary explanations for wide differences in college choice by community. A starting point for this analysis is a survey of the supply of higher education in the state, including evidence on the variation in outcomes and resources at Virginia higher education institutions. The brief then presents evidence on the college choices made by students at the district level. Salient questions concern whether there are barriers to college choice that could be addressed by public policy, collective university action, or further research. While there are a number of opportunities for policy innovation, the challenges in helping students and their families navigate college choice are substantial and defy quick fixes.

The Supply Side of Virginia Higher Education

Like many states, Virginia boasts a wealth of postsecondary options, including world-class research institutions, high-quality public and private liberal arts institutions, and other schools of varying admissions difficulty and quality.[4] This "thick" market for colleges

Figure 1: Graduation Rates and Instructional Expenditures per Student



Notes: The figure shows the relationship between graduation rates (within 150 percent of normal time to graduation) and instructional expenditures at two-year and four-year colleges and universities in Virginia. Both metrics are derived from the National Center for Education Statistics Integrated Postsecondary Education Data System. Instructional expenditures include expenses associated with large medical schools at UVa and Virginia Commonwealth. Due to space constraints, not all institutions are labeled.

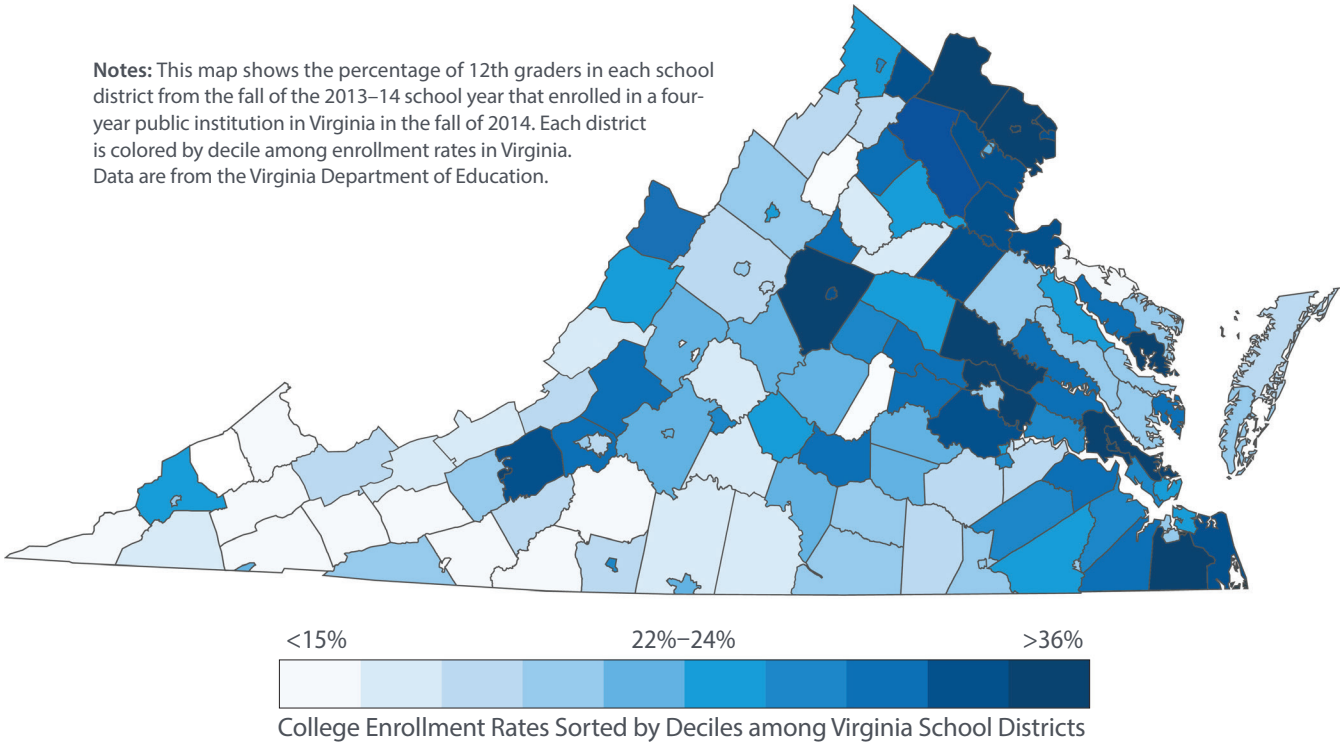
and universities yields two main benefits. First, students have a great deal of choice and thus have the opportunity to match their individual preferences with colleges' offerings. Second, competition among institutions for students should enhance the quality of collegiate offerings.[5]

As seen in Figure 1, there is a strong relationship between an institution's resources, as measured by instructional expenditures, and graduation rates, both at public and private colleges. The relationship is strongest within public institutions. There is also substantial variation in resources and graduation rates. Instructional expenditures range from less than $4,000 per student at some community colleges to $28,500 per student at Washington & Lee University, while graduation rates range from less than 15 percent at some community colleges to 93 percent at UVa. The correlation between institutional resources and graduation outcomes reflects both the benefits of greater resources and the observation that well-prepared students are more likely to attend colleges with high resources per student.[6] To the extent that the differences in outcomes are generated by institutional characteristics or institutional resources, the choice of which college to attend is consequential.

In recent decades, Virginia's top institutions have become more selective, more academically competitive, and more willing to increase their expenditures per student. According to the College Board's Annual Survey of Colleges, from 1996 through 2012, admission rates at Virginia's four-year, public institutions decreased from a median of 78 percent to a median of 67 percent; their student bodies' average SAT (math and verbal) scores increased from a median of 1070 in 1996 to a median of 1140 in 2012; and instructional expenditures per student grew from a median of $6,900 in 1996 to a median of $7,900 in 2012 in constant 2015 dollars. (See Figure S1 in the supplementary slides.)

In addition to these general increases at Virginia's four-year, public institutions, the differences across universities have widened. For example, the difference between the minimum and maximum instructional expenditures per student was approximately $8,500 in 1996 but was $10,000 in 2012. This widening distribution, particularly among public colleges

Figure 2: Enrollment Rates in Four-Year Public Colleges and Universities by School Districts in Virginia



and universities, underscores the need to understand how students choose colleges.

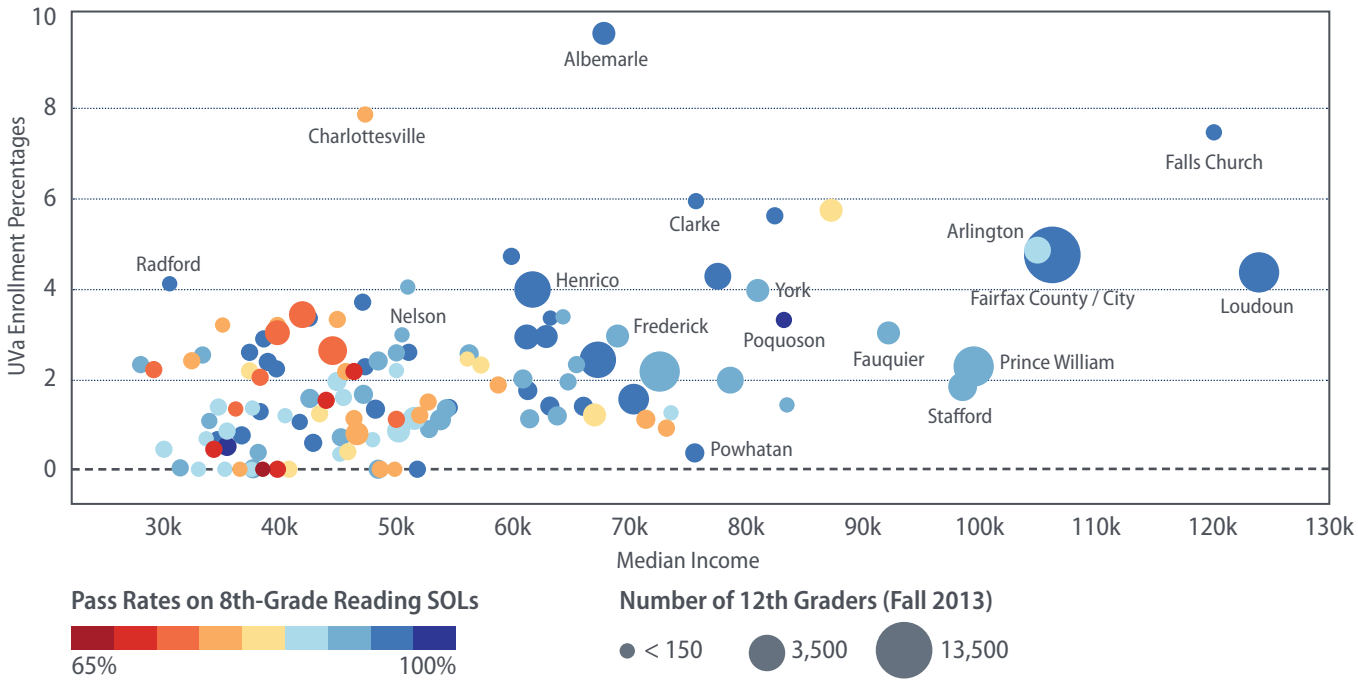
College Going and College Choice in Virginia

Where students grow up in Virginia predicts both whether they will attend college and where they will enroll. As noted, district enrollment rates in any two- or four-year college range from less than 50 percent to more than 80 percent of high school seniors, while enrollment in four-year, public institutions varies from 5 percent to 55 percent. Geography and proximity to a four-year college or university help explain the variation; to the extent students are reluctant to move away from home to attend residential colleges and universities, students in more densely populated markets often have more college options.[7] As Figure 2 shows, the districts with the highest enrollments in four-year public institutions include those in northern Virginia and several in southeastern Virginia. The districts with the lowest enrollments are concentrated in the western and southwestern regions of the state.

Community college enrollment rates are relatively high in the southern part of the state, where the four-year residential options are limited. Beyond the structural reasons for low application rates in small districts, it is important to note that the year-to-year variation of enrollment rates will be greater for small districts than large districts, so one might expect to see somewhat greater representation of small districts among those with the lowest (and highest) enrollment rates.

Postsecondary institutions differ in the extent to which they serve local, regional, or statewide markets. And several Virginia institutions draw undergraduate and graduate students from across the nation as well as from abroad. The "charter" institutions in the public sector — UVa, W&M, and Tech — might be expected to draw students from across the state. Yet, evidence shows that the percentage of high school graduates enrolling in these institutions is not equally distributed, with higher concentrations in high-income and relatively urban districts.

Figure 3: University of Virginia Enrollment Percentages by School District and Median Income



Sources: Virginia Department of Education, the State Council of Higher Education for Virginia, and the U.S. Census Bureau's American Community Survey

Notes: The figure shows the relationship between median income and the percentage of 12th graders who enrolled at the University of Virginia from each school district. All but two districts that had zero enrollment at UVa did have students who applied. Due to space constraints, not all districts are labeled.

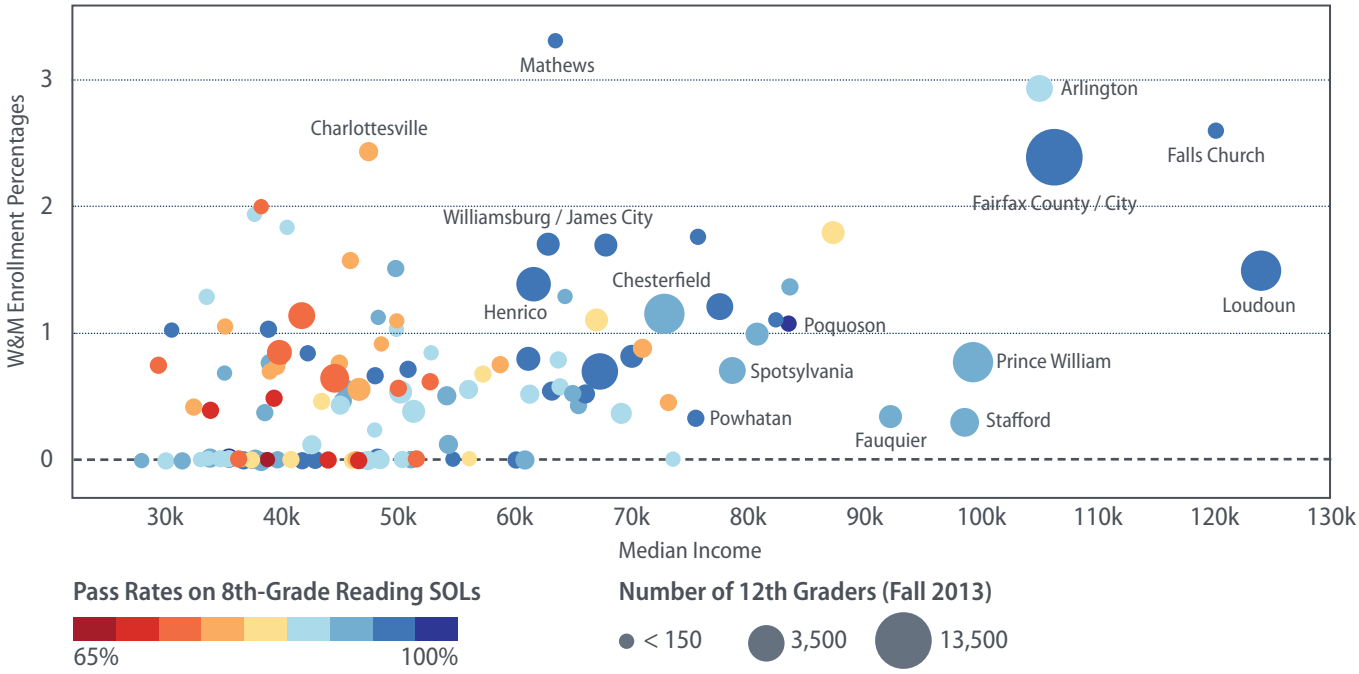
Looking at applications and enrollment by individual institution provides a more detailed look at the variation in college choice. Figure 3, for example, highlights the strong relationship between median income and enrollment at UVa for the 2014–15 academic year. Among students from the relatively wealthy northern Virginia districts of Fairfax County (including the city of Fairfax), Loudoun County, Arlington County, and Falls Church, between 4 percent and 7 percent of high school seniors enrolled at UVa, while students in most other districts enrolled at rates around 2 percent. The same northern Virginia districts also had relatively high application rates. (See Figure S2 in the supplementary slides for application data.)

Yet, in two districts, Surry County in the southeast and Scott County in the southwest, no student applied to UVa. These districts, along with others in the bottom left corner of Figure 3, have low application and admission rates, along with relatively low income levels. Measured academic performance captured by pass rates on the standards of learning (SOL) reading tests given to all eighth graders does explain some of the differences among districts in applications and enrollment. Nevertheless, there is substantial variation in performance among districts that send few students to UVa.

The strong positive relationship between income and applications and enrollment holds for other selective institutions in Virginia. Figure 4 shows enrollment data for W&M; the story is substantively the same as with the UVa figure. For Tech, we again see positive correlations between applications and income and enrollment and income. (See Figure S4 in the supplementary slides for Tech data.)

The correlation between applications or enrollment and income is not a result of admissions policies that discriminate by income (after accounting for the correlation between income and academic preparation) but is instead a result of application and enrollment decisions by students. In fact, for UVa in 2014, there

Figure 4: College of William & Mary Enrollment Percentages by School District and Median Income



Sources: Virginia Department of Education, the State Council of Higher Education for Virginia, and the U.S. Census Bureau's American Community Survey

Notes: The figure shows the relationship between median income and the percentage of 12th graders who enrolled at the College of William & Mary from each school district. Most of the districts that had zero enrollment at W&M did not have students who applied. Due to space constraints, not all districts are labeled.

is a weak *negative* association between income at the district level and acceptance rates, after controlling for district-level SOL performance. In other words, students from low-income districts who do submit applications are more likely to be accepted to UVa, although this may be because only the highest-achieving students from low- and moderate-income districts submit applications. For W&M, the correlation between income and the acceptance rate is statistically indistinguishable from zero. This evidence is consistent with national studies of high-achieving students, which have found that differences in application behavior drive the observed differences between low-income and high-income students in college choice.[8]

Explanations for Variation in College Choice

Why are students from some school districts, particularly those with relatively low incomes and in rural locations, less likely to apply to selective universities in the same proportions as their peers from high-income districts?

Academic Preparation

Evidence suggests that academic preparation in K-12 plays a role in college choice. Looking back to Figure 2, each dot (representing a district) is colored by the cohort's eighth-grade SOL reading test pass rate. Eighth-grade SOL scores are, on average, lower in low-income districts and correlate negatively with application and enrollment at high-resource institutions. But this explanation is insufficient to account for the magnitude of the observed differences. Not only are there districts with mid-to-high performance on the SOL for which applications to high-resource institutions are quite low, but it also is highly likely that there are a small number of very high-achieving students in the districts with low average achievement who may be well-qualified to succeed at the resource-intensive institutions.[9]

College Application Preparation and Navigation

Adequate preparation for submitting a college application consists of more than good grades and challenging high school coursework. Choosing a college can be a process that starts years before enrollment and requires purposeful actions over many months, including taking college achievement tests, such as the SAT or ACT, and submitting financial information via the FAFSA form or the College Board's College Scholarship Service Profile. Some groups of students — for example, first-generation college students or students from low-income families — may find it particularly difficult to negotiate the matching process.

At the local level, school districts — along with community-based organizations — differ in the extent to which they provide students with guidance and assistance. One indicator is test-taking behavior, which is strongly correlated with application behavior.[10] In some districts, sitting for college entrance exams is near universal while in other districts test-takers are a clear minority. For example, districts such as Loudoun County and Greene County describe PSAT testing as free and mandatory, while other districts require students to pay the fee and make the exams optional. In these districts, test-taking requires an active effort on the part of students and their parents.

In the case of the PSAT, participation may be the most important outcome, as the PSAT provides useful practice and an important signal as students begin to seek good college matches. In districts at the 75th percentile of test-taking, 84 percent of students take the PSAT and 71 percent take the SAT, while at the 25th percentile, 35 percent take the PSAT and 44 percent take the SAT, according to the authors' calculations based on data from the Virginia Department of Education.

Evidence from other states shows that universal access to college entrance exams can have large effects on test-taking and enrollment among low-income students. Twenty-five states now require and pay for college entrance exams for all public school eleventh graders. In Michigan, the policy increased four-year college enrollment rates by about 2 percent overall with much larger effects for poor students and those attending schools with a high concentration of low-income students.[11]

Knowledge about College Choices and Costs

Students and their families need a great deal of information to make well-informed choices about where

to apply or where to attend, including the school's academic quality, the existence and strength of non-academic programs (such as athletics and performing arts), the community and social environment of the school, and the expected labor market returns of attendance. Students and families also need to know the net price (tuition, fees, room and board, transportation and personal expenses minus financial aid) and the likelihood of admission, because there is little point spending time and energy applying to a school that is unaffordable or unattainable. There is ample evidence, however, to suggest that some students may not have sufficient information to evaluate these factors. The data required to assess them, even if a student is only applying to a small number of colleges, are immense and not always readily available in the public domain.[12]

A particularly important data point is net cost because students from low- and moderate-income families may not apply if they believe that the most academically competitive colleges are unaffordable. Indeed, total costs of attendance at UVa ($26,865) and W&M ($28,570) are appreciably more than at other four-year public universities, such as George Mason University ($23,081) or Old Dominion University ($21,523). Private colleges and universities also have total costs of attendance that may seem unaffordable. But the availability of considerable need-based financial aid shifts the accounting considerably, producing realized net costs that often are the lowest at the most selective institutions for low- and moderate-income families. For an in-state student with family income of $30,000 to $39,999, the average net price is $10,896 at UVa and $6,011 at W&M but $18,056 at George Mason and $15,170 at Old Dominion.[13] While paying for any college may remain a burden for many families, students who forgo applying based on posted prices alone do not have full information.

"Knowledge about college" likely varies significantly among students and districts. For students from families in which no parent (or sibling) has completed college, it may be harder to recognize the differences among colleges and the necessary steps for applying.[14] In addition, in school districts in which a single counselor must provide guidance and support to students on very different trajectories, it may be difficult to convey the specialized knowledge needed to guide a small number of students considering selective colleges and universities.

The Expanding College Opportunities Project, an experimental program run by one of this brief's coauthors (Turner) and Caroline Hoxby of Stanford University, provided personalized information about application strategies and net prices to high-achieving students from low-income families. Turner and Hoxby found that after receiving this information, there was not only a significant increase in applications and enrollment at high-resources colleges and universities but students also considered a college's academic quality to be very important, while students in the control group did not use information about graduation rates, institutional resources, or peer ability in assessments of differences among colleges.[15]

Policy Opportunities

There are many reasons why policymakers may wish to address the wide variation across school districts in college choice and enrollment at Virginia's most resource-intensive universities. With increasing returns to collegiate attainment, failure to address observed differences in enrollment may exacerbate intergenerational inequality and limit economic growth. Within the state, large differences in enrollment at the most resource-intensive universities tied to where students grow up may raise questions about the extent to which publicly funded institutions benefit only those from the most affluent communities.

In addition, while it is common to read press reports extolling the virtues of collegiate attainment in terms of improved labor market outcomes, attending college is not without costs and risks. Poor college choices may leave students burdened with debt and few labor market benefits.[16] Indeed, because college success depends on individual engagement, skills, and interests, it is imperative for students to understand that they have a rich and multidimensional set of choices in Virginia, as well as across the nation. So what can be done? There is ample room for policy innovation to develop replicable and scalable ap-

proaches for improving college matching and accessibility. State government, colleges and universities, and school districts all can play key roles.

A first step is diagnosis: rich data that are increasingly collected at the state and district levels provide a way to identify where students, schools, and districts lag in college-preparation steps, including achievement test-taking, FAFSA filing, and college application behavior. For example, are college-ready students taking the appropriate steps to navigate the application process by taking tests like the PSAT and SAT? Do students who are likely eligible for financial aid complete the FAFSA early in the college choice process?

A second step is to employ and evaluate innovative strategies to assist students with the college choice process. As one example, the nonprofit College Advising Corps is serving twenty-eight high schools or nearly 6,000 seniors with near-peer advisers dedicated to college choice; this model provides direct assistance to students, along with an opportunity to learn about the barriers to college enrollment identified in Virginia schools.[17] Models from other states, such as the HAIL Scholars initiative in Michigan, provide clear demonstrations of how targeted outreach efforts can improve college choice and attainment.[18]

Finally, the responsibility for improving college choice cannot be placed solely on high schools. Colleges and universities in the state — particularly those with the greatest resources — need to invest in strategies to work effectively with high schools and to communicate with students and parents about college options, admission processes, and net-price expectations. Even as the need to address these challenges is imperative, it is important to recognize that the challenges are formidable and complex, requiring innovation and evaluation over a sustained horizon. But the payoff could be substantial: in addition to benefitting students, improving college choice would strengthen the role of colleges and universities as engines of opportunity, ultimately contributing to economic growth. ■

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Endnotes

[1] This paper is adapted from a presentation given at the Federal Reserve Bank of Richmond in September 2017.

[2] These three institutions received greater operational autonomy ("charter" status) in exchange for their commitments to meet statewide higher education policy goals as part of the 2005 Restructured Higher Education Financial and Administrative Operations Act.

[3] See David H. Autor, "Skills, Education, and the Rise of Earnings Inequality among the 'Other 99 Percent,'" *Science*, May 23, 2014, vol. 344, no. 6186, p. 843 (article available with subscription).

[4] Virginia is home to fifteen four-year, public universities, twenty-three community colleges, and forty-four nonprofit private colleges.

[5] Inequality in resources across higher education institutions is unambiguous and can be reconciled with an economic model that assumes complementarity between student ability and resources. See James M. Sallee, Alexandra M. Resch, and Paul N. Courant, "On the Optimal Allocation of Students and Resources in a System of Higher Education," *B.E. Journal of Economic Analysis and Policy*, June 2008, vol. 8, no. 1, pp. 1–26 (article available with subscription).

[6] A similar story links college attendee income to institutional resources. Figure S5 in the supplementary slides shows the 2014 median income of young alumni of these institutions plotted against 2013 instructional expenditures. There is a strong positive correlation between institutional resources and median income within both public and private university types, with the strongest correlation evidenced by public institutions. Again, the correlation between institutional resources and alumni incomes is affected both by institutional resources and by student characteristics that vary across institutions. Nonetheless, there is a broader literature that identifies causal estimates of the return to education.

[7] See Kristen Blagg and Matt Chingos, "Choice Deserts: How Geography Limits the Potential Impact of Earnings Data on Higher Education," Urban Institute Research Report, December 13, 2016. The authors discuss what they describe as "choice deserts" — geographic areas where students have few well-matched options. This evidence raises an important question about whether students who choose colleges based on proximity are limited by financial capacity to live away from home, preference for being near home, or by lack of information about options in a more broadly defined market.

[8] See Caroline Hoxby and Sarah Turner, "Expanding College Opportunities for High-Achieving, Low-Income Students," Stanford Institute for Economic Policy Research Working Paper No. 12-014, March 2013, and Caroline Hoxby and Christopher Avery, "The Missing 'One-Offs': The Hidden Supply of High-Achieving, Low-Income Students," *Brookings Papers on Economic Activity*, Spring 2013.

[9] Of course, the SOL tests are a relatively early (eighth grade) indicator of academic achievement, and the competencies assessed on this exam are not necessarily well-aligned with the skills measured by the PSAT, SAT, or ACT.

[10] A one percentage point increase in SAT-taking at the district level is associated with a 0.18 percentage point increase in applications to W&M and a 0.27 percentage point increase in applications to UVa.

[11] Joshua Hyman, "ACT for All: The Effect of Mandatory College Entrance Exams on Postsecondary Attainment and Choice," *Education Finance and Policy*, Summer 2017, vol. 12, no. 3, pp. 281–311 (article available with subscription).

[12] For each of these benefits and costs, what matters is the outcome for the applicant, or a person just like the applicant, not the outcome for someone much stronger (or weaker) in academic preparation or someone much richer (or poorer) in family circumstances. Such outcomes are extremely hard to assess when students are making application decisions.

[13] Data are from the State Council of Higher Education for Virginia, "Cost of Attendance and Income."

[14] Using data from the American Community Survey, two of the authors (Cook and Turner) ran a simple linear regression of the percentage of high school seniors who applied to or enrolled at UVa (by school district) on the percent of adults twenty-five and older with a bachelor's degree or higher. A one percentage point increase in bachelor's degree attainment is associated with a 0.34 percentage point increase in applications to UVa and a 0.09 percentage point increase in enrollment at UVa. Both results are statistically significant.

[15] Caroline M. Hoxby and Sarah Turner, "What High-Achieving Low-Income Students Know about College," *American Economic Review*, May 2015, vol. 105, no. 5, pp. 514–517 (article available with subscription).

[16] Christopher Avery and Sarah Turner, "Student Loans: Do College Students Borrow Too Much — Or Not Enough?" *Journal of Economic Perspectives*, Winter 2012, vol. 26, no. 1, pp. 165–192.

[17] For more information, visit https://advisingcorps.org.

[18] Susan Dynarski, "Increasing Economic Diversity at a Flagship University: Results from a Large-Scale, Randomized Trial," Manuscript, 2017.