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**Article**

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# Resource Barriers to Postsecondary Educational Attainment

Michael Lovenheim

U.S. economic growth in recent decades has favored high-skilled, service-based occupations and industries. As a result, the demand for skilled relative to unskilled labor has grown markedly, which has been the source of much attention and concern among policymakers and researchers. Increasingly, the labor market outcomes of working-age adults are linked to their educational attainment. Earnings gains have flowed disproportionately to those with four-year college degrees. One might expect that this growth in the demand for skilled labor would be met with a substantial increase in the production of such labor, but this has not been the case.

The anemic response of collegiate attainment to persistent increases in labor market returns has occurred alongside rising inequality in postsecondary outcomes.<sup>1</sup> Although education is often discussed as a means to reduce economic inequality and induce upward social mobility, large and growing attainment gaps among students from different socioeconomic backgrounds, coupled with high labor market returns to postsecondary education, have led to concerns that the higher education system is exacerbating inequality.

The fact that the supply of college-educated workers has not kept up with demand along with growing inequality in postsecondary outcomes suggests there are barriers precluding many students from obtaining a postsecondary degree. A particularly important class of barriers, especially for low-income students, centers around financial resources. Such barriers can occur on the demand (i.e., student) or supply (i.e., institutional) side of the higher education market. Demand-side resource constraints mostly consist of difficulties in paying the often high tuition price associated with college

enrollment. Supply-side resource barriers are driven by declining state subsidies for public higher education, as well as the higher propensity of lower-income students to attend universities with lower per-student resources.

In a series of research papers, my co-authors and I have examined how family financial resources and postsecondary institutional resources affect collegiate attainment. We estimate resource effects on both the demand and supply sides of the higher education market and provide insight into policies that could reduce barriers to college completion.

Policymakers and researchers have focused a significant amount of attention on college access, with the goal of increasing college enrollment either overall or for specific groups. Much of my research is motivated by the widening gap between enrollment and degree attainment: A large component of both the increased inequality in postsecondary attainment and the sluggish increase in postsecondary attainment overall is degree non-completion. Simply put, if most of the students who enroll in college were to successfully obtain a degree, postsecondary attainment would rise dramatically and inequality in attainment would decline. Increasing the supply and altering the composition of college-educated workers thus requires understanding barriers to completion among the students who enroll, as well as understanding barriers to enrollment.

My collaborators and I have examined how financial resource barriers can affect dimensions of postsecondary investment behavior beyond enrollment, such as what types of colleges students attend and whether students complete college conditional on attending. We look beyond access to the various dimensions along which financial resources can



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Lovenheim's research focuses on empirical, policy-relevant issues in the economics of education and public finance. In higher education, his research examines questions related to the effect of personal and institutional resources on student outcomes and institutional productivity. Lovenheim also has an active research agenda on teacher labor markets, focusing specifically on teachers unions, performance pay, and teacher pension policies. His research on public economics studies questions related to interstate cigarette and alcohol regulation as well as the nutritional effects of consumption taxes. In addition to his academic research, he recently co-authored, with Sarah Turner, a textbook on the economics of education.

influence higher education attainment. This summary describes our recent research findings and discusses their policy implications.

## Demand-Side Resource Effects

A popular view among parents, policymakers, and the media is that the cost of college presents a substantial impediment to postsecondary investment for many students. While college tuition and fees have indeed risen precipitously over time, so has financial aid. The United States has one of the most generous financial aid systems in the world, especially for very low-income students. The goal of this system is to decouple students' financial background from their ability to invest in a postsecondary degree. Finding that students' college choices are causally linked to their family's financial resources is evidence that the current financial aid system is not sufficient to achieve this goal.

Prior research has struggled to obtain credible estimates of the causal effect of family financial resource variation on postsecondary attainment. Estimating such an effect is challenging because income and wealth are not randomly assigned across students: Families with lower resources at the time of their children's college entry decision typically had fewer resources throughout the children's lives to invest in their education. The result is that students from lower-resource households tend to be, on average, less academically prepared for college than their counterparts from more affluent backgrounds.

What is needed is a source of family resource variation unrelated to the myriad attributes of students that are correlated with the costs and benefits of attending college, such as motivation and academic achievement. I have exploited differences in the tim-

ing and magnitude of the urban housing boom between the late 1990s and mid-2000s, across cities, to generate such variation.<sup>2</sup> This period saw an unprecedented growth in the value of housing as well as in the liquidity of housing wealth; it became much easier to extract equity from the home through home equity loans, lines of credit, and cash-out refinances. Home price increases varied considerably across cities, with some such as Las Vegas and Miami experiencing enormous increases over a short period of time, while others experienced relatively modest growth. The idea underlying my approach is to consider high school seniors in the same year whose parents own a home in cities that experienced different recent housing price growth. Families in high-increase cities received a financial windfall just before their children made college choices,

with incomes between \$70,000 and \$125,000, and families with incomes above \$125,000. I present the effect of enrollment from a \$10,000 home equity increase relative to the mean college enrollment rate for each group, as well as the effect of the mean home equity increase experienced by each group between 2001 and 2005, the heart of the housing boom. For all families, enrollment increases by a statistically significant 1.4 percent for each \$10,000 of additional home equity. During the housing boom of the early 2000s, the average homeowner experienced an almost \$58,000 increase in home equity, which my estimates indicate increased college enrollment by 7.9 percent relative to the baseline level.

Students in families with earnings under \$70,000 per year are particularly responsive to home equity changes: \$10,000 of additional home equity increases college enrollment by 13.7 percent relative to the mean level. When multiplied by the average home equity increase experienced by this group in the early 2000s, the effect is 21.4 percent. Among students from higher-income households, enrollment responds more modestly to housing wealth changes. For both higher income groups, the effect of housing wealth is much smaller and is not statistically significantly different from zero. However, the point estimates are positive and are sizable in magnitude

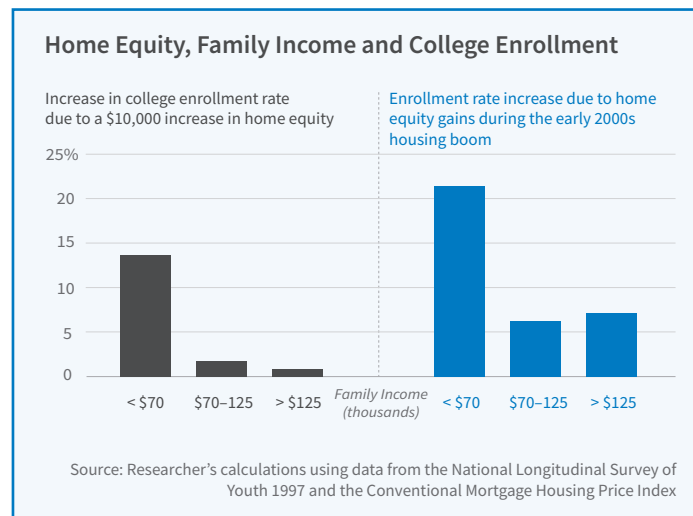


Figure 1

while families in lower-increase cities experienced a much more modest change in resources. I therefore leverage the timing, magnitude, and geographic dispersion of the housing boom to generate variation in household resources that are unrelated to the underlying characteristics of students.

I found college enrollment was responsive to housing wealth during the housing boom. Figure 1 shows the results graphically for families with incomes below \$70,000, families

when multiplied by the large increases in home equity experienced by these families during the housing boom. The fact that students from higher income households are less affected by housing wealth changes is likely because these students face fewer resource constraints in financing a college education than their less affluent counterparts. I also show that the housing wealth-enrollment relationship was not present prior to the housing boom, which suggests an important role for the increased liquid-

ity of home equity in the early 2000s.

In a follow-up paper, C. Lockwood Reynolds and I use the same source of variation to examine how housing wealth impacts the type of schools students choose, and college completion.<sup>3</sup> We find that when families experience more home price growth when their child is in high school, their child is more likely to attend a state flagship university and is less likely to attend a community college. Interestingly, the flagship effect is driven by increased applications, which suggests that changes in family resources impact the types of schools students consider attending. Low-income students whose families experienced home price increases during the housing boom were more likely to complete a four-year degree as well.

Another way to test for household resource effects is to study variation in the amount of financial aid available to students. This has proved difficult. Because most financial aid is federal, there is little variation in aid eligibility across students that is not directly tied to their family finances and background. Emily Owens and I studied an unusual policy change enacted by the federal government in 2001 that excluded anyone with a drug conviction from receiving federal financial aid.<sup>4</sup> While a small group, students with drug convictions tend to be from more disadvantaged backgrounds, and there may be particularly large social returns to increasing their educational attainment. We compare the change in college enrollment among those with a drug conviction when the rule was implemented to the change among those with no conviction. Our findings indicate that college enrollment within one year of high school graduation dropped by 22 percent among those with a drug conviction relative to those without, which suggests financial resources are a relevant barrier to postsecondary investment for many families. We also present evidence that the reduction in financial aid leads to a reduction in the comple-

tion rate of bachelor of arts degrees, a longer time required by college completers to complete a B.A., and an increased likelihood of a subsequent criminal conviction. Excluding these students from financial aid eligibility negatively affects their life outcomes and produces substantial social costs.

Sarah Cohodes, Daniel Grossman, Samuel Kleiner, and I examine another source of household resource variation: access to Medicaid. This occurs earlier in life than the resources I examined in my other research.<sup>5</sup> Medicaid is the primary means through which lower-income children receive health insurance, which can improve their health and their parents' financial standing. This resource variation is different from those previously discussed because it does not just impact the ability to pay for college. Instead, it can affect the level and productivity of early childhood investments in education. We examine the large Medicaid eligibility expansions experienced by those born from 1980 through 1990. Using the fact that children born in different states and years had very different eligibility for Medicaid over the course of their childhood due to state and federal Medicaid law changes, we estimate how Medicaid eligibility translates into educational attainment later in life. We find that a 10 percentage point increase in average Medicaid eligibility during childhood decreases the high school dropout rate by 4 percent and increases the likelihood of B.A. completion by 2.5 percent. These results suggest that policies targeting resources to low-income families with young children can have sizable effects on their ultimate collegiate attainment.

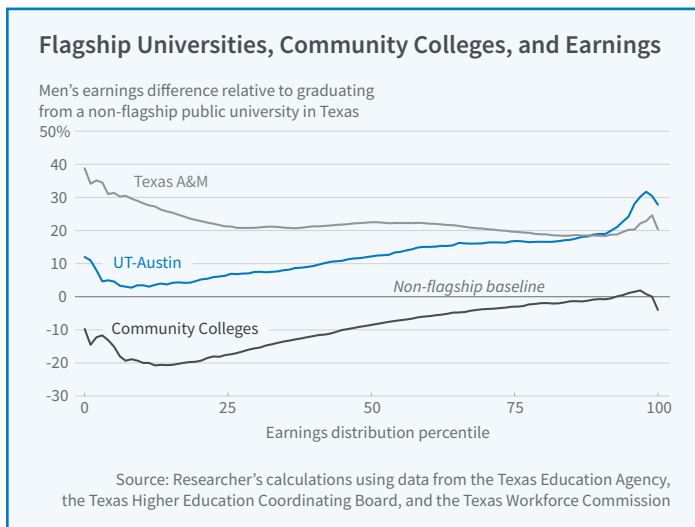
### Supply-Side Resource Effects

One reason studying postsecondary institutional resources is important is the high degree of resource stratification within the higher education sector. More selective institutions

have higher per-student expenditures, higher-achieving student bodies, and higher-paid and more research-productive faculties. The result is that resources are increasingly being concentrated in a small set of "elite" institutions that serve students with high precollegiate achievement levels. A growing body of research in economics seeks to estimate the labor market return to enrolling in one of these highly selective schools, which is difficult because students with higher earning potential select into these higher quality institutions.

Rodney Andrews, Jing Li, and I contribute to this literature using administrative data on all public school students in the state.<sup>6</sup> We link educational records for all public K-12 students in Texas to postsecondary records for all public higher education students in the state, and merge these data with quarterly earnings records. Linked administrative data are becoming more prevalent in education economics research; they provide both a wealth of information about students over time as well as large sample sizes. We use pre-collegiate demographic and academic achievement information to account for student selection. Our findings indicate that graduating from the University of Texas at Austin or Texas A&M University, the flagship universities in Texas, increases earnings by 12 and 21 percent, respectively, relative to graduating from a non-flagship public university. Graduating from a community college is associated with lower earnings by 11 percent relative to obtaining a degree from a non-flagship public university.

We also examine how college quality affects the distribution of earnings. Going beyond mean earnings effects is important, because the average may mask a large amount of variability in labor market returns across the earnings distribution. We estimate quantile treatment effects of college sector on earnings; the results are presented in Figure 2, on the following page. These curves show the differences in



**Figure 2**

earnings, adjusted for observed student characteristics, between graduates in the given sector and those in the non-flagship four-year sector at each percentile of the earnings distribution. For UT-Austin graduates, the mean effect of 12 percent does a poor job of characterizing the effect on the entire distribution. At the bottom of the distribution, earnings returns to UT-Austin are quite low, and then they grow to more than 30 percent at the top of the distribution. The effects are much more constant among Texas A&M graduates, however. We argue the differences across the two flagship universities are likely due to differences in field of study, as Texas A&M students are much more likely to major in high-earning, low-variance fields such as engineering. Finally, we examine community colleges and show that the earnings penalty to a community college relative to a non-flagship public university is driven by low earners. At the top of the earnings distribution, community college graduates earn the same as their non-flagship four-year counterparts. This is despite the fact that the community college degree requires two fewer years of study; for a portion of students, the payoff to community college enrollment is relatively high.

A second reason economists are interested in the effect of supply-side

resources on collegiate attainment is that a large amount of money is spent by federal and state governments to subsidize higher education. For public institutions, state appropriations are a particularly important part of the budget, and they have declined substantially over time. John Bound, Sarah Turner, and I examine whether changes in supply-side resources contribute to declining completion rates over time.<sup>7</sup> Between the mid-1970s and mid-1990s, college completion rates conditional on ever having attended college dropped from 52 to 43 percent. The largest declines were experienced by students attending non-top-50 ranked public four-year schools and community colleges.

Supply-side forces can play two roles in explaining this decline. First, as more students enter college over time, an increasing proportion sort into less selective and less resourced schools because these are the institutions that expand their enrollment due to higher student demand. Second, per-student resources at the less selective institutions have declined due to reductions in state appropriations, as these schools are particularly reliant on state funding. We conduct a decomposition analysis that shows how college completion rates would have changed had institutional resources (proxied by student-faculty ratios) and the distribution of students across postsecondary sectors not changed over time. We find that the increase in student-faculty ratios can explain about a quarter of the completion rate decline, while the rest can be explained by students increasingly attending lower-quality colleges and universities. Thus, we argue that supply-side resource changes can explain

all of the observed decline in college completion rates.

In a follow-up paper, we conduct a similar decomposition analysis with respect to lengthening time to degree among B.A. recipients over time.<sup>8</sup> While the supply-side effects are not as strong, we find reductions in per-student resources in the less selective public four-year sector to be a core contributor to the longer time it is taking students to complete B.A. degrees.

## Comprehensive Interventions

Students from low-income backgrounds face several barriers to post-secondary success, including difficulty in financing postsecondary enrollment, lack of information about the postsecondary system that leads to less enrollment and enrollment in lower-quality colleges, and lower pre-collegiate academic achievement. There has been a policy trend toward attempting to address these multiple dimensions of disadvantage that low-income students face using comprehensive interventions. Examples of such programs are the Longhorn Opportunity Scholarship (LOS) in Texas, the Susan Thompson Buffett Foundation (STBF) scholarship in Nebraska, and the ASAP program at the City University of New York.

Andrews, Scott Imberman, and I study the LOS program in Texas using the linked administrative data discussed previously.<sup>9</sup> The LOS program is run by the UT-Austin and consists of recruiting students at urban, low-income, and heavily minority high schools, offering grant aid if they enroll at UT-Austin, and providing a series of academic support services once they are enrolled. This program thus combines demand-side and supply-side resource supports. We find that among high-achieving students who were the targets of this program, the LOS intervention substantially increased the likelihood that students both enrolled at and graduated from UT-Austin. Among students from targeted high schools

who attended UT-Austin, earnings increased by 82 percent 12 or more years after high school relative to similar students who were not exposed to this program. These results show that combining supply-side and demand-side resource increases for disadvantaged students can be particularly effective in supporting their postsecondary attainment and future earnings.

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<sup>2</sup> M. F. Lovenheim, "The Effect of Liquid Housing Wealth on College Enrollment," *Journal of Labor Economics*, 29(4), 2011, pp. 741–71.

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<sup>3</sup> M. F. Lovenheim and C. L.

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<sup>4</sup> M. F. Lovenheim and E. G. Owens, "Does Federal Financial Aid Affect College Enrollment? Evidence from Drug Offenders and the Higher Education Act of 1998," NBER Working Paper No. 18749, February 2013, and *Journal of Urban Economics*, 81, 2014, pp. 1–13.

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<sup>5</sup> S. Cohodes, D. Grossman, S. Kleiner, and M. F. Lovenheim, "The Effect of Child Health Insurance Access on Schooling: Evidence from Public Insurance Expansions," NBER Working Paper No. 20178, May 2014, and *Journal of Human Resources*, 51(3), 2016, pp. 727–59.

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<sup>6</sup> R. J. Andrews, J. Li, and M. F. Lovenheim, "Quantile Treatment Effects of College Quality on Earnings: Evidence from Administrative Data in Texas," NBER Working Paper No.

18068, May 2012, and "Quantile Treatment Effects of College Quality on Earnings," *Journal of Human Resources*, 51(1), 2016, pp. 200–38.

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<sup>8</sup> J. Bound, M. F. Lovenheim, and S. Turner, "Increasing Time to Baccalaureate Degree in the United States," NBER Working Paper No. 15892, April 2010, and *Education Finance and Policy*, 7(4), 2012, pp. 375–424.

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<sup>9</sup> R. J. Andrews, S. A. Imberman, and M. F. Lovenheim, "Recruiting and Supporting Low-Income, High-Achieving Students at Flagship Universities," NBER Working Paper No. 22260, May 2016.

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